CONSTRUCTION

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CONTENTS

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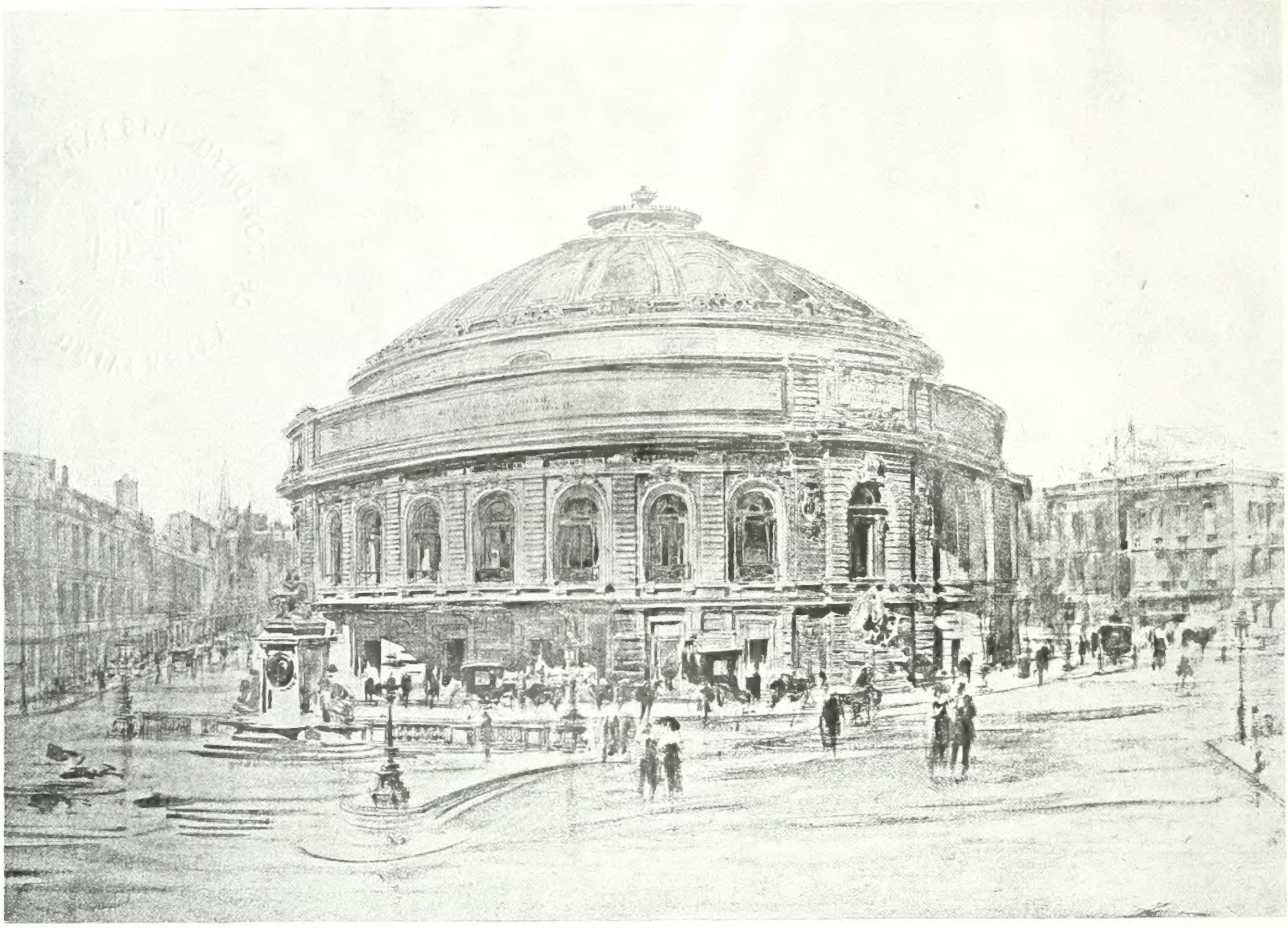
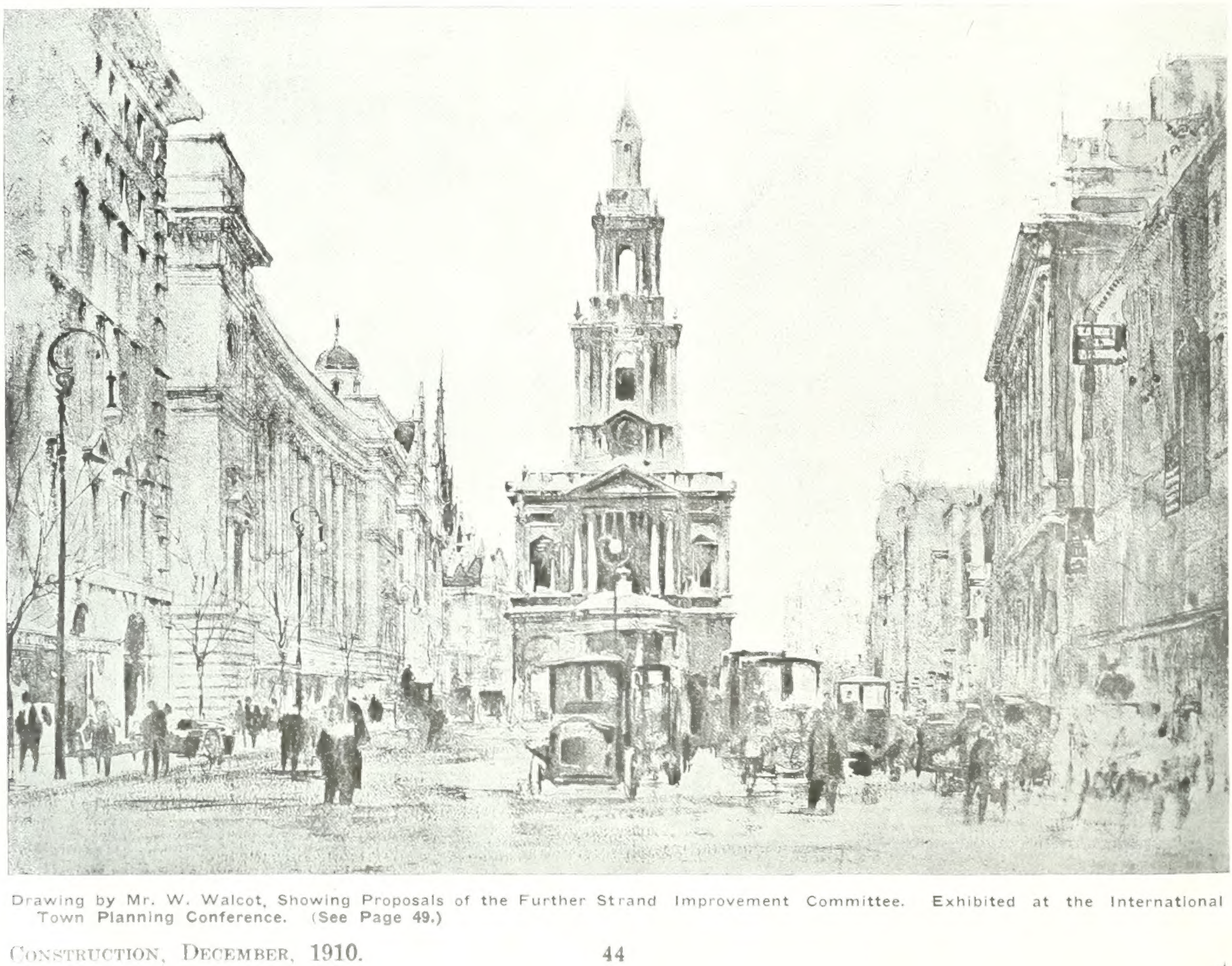
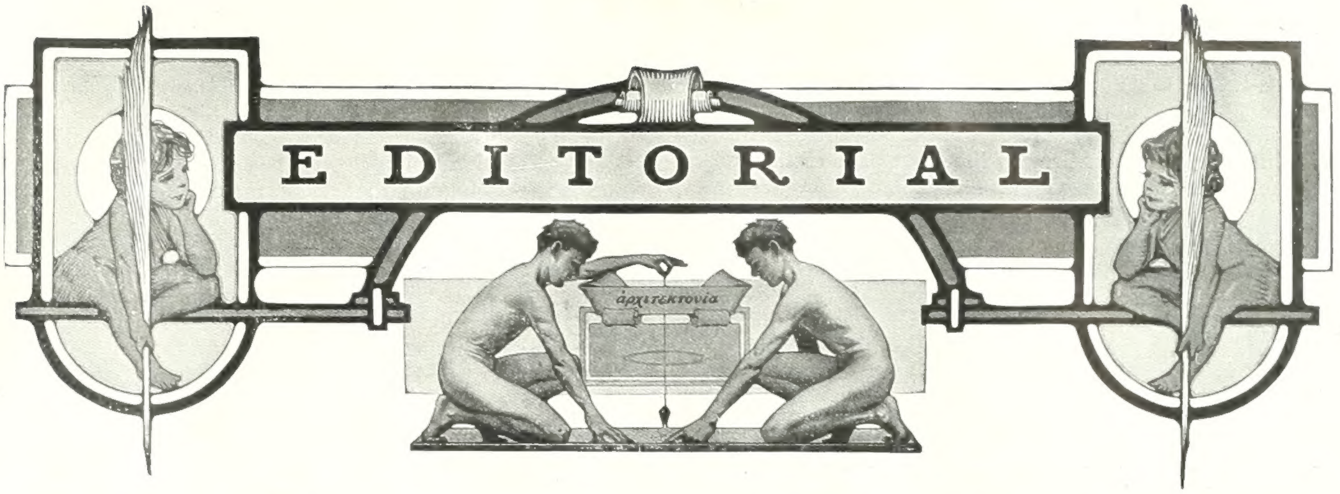


Design of Messrs. Lancaster and Rickards, for a Public Hall and Monument Terminating an Important Avenue. Exhibited at the International Town Planning Conference Recently Held at London, England.



Drawing by Mr. W. Walcot, Showing Proposals of the Further Strand Improvement Committee. Exhibited at the International Town Planning Conference. (See Page 49.)



¶ Building Returns for October—Volume of Work in Eighteen Important Centres 89 Per Cent. Greater Than That Undertaken in Same Month Last Year.

IT IS QUITE EVIDENT from the extent of operations that are now being carried on that the lateness of the season has had but little effect on building activities as far as Canada is concerned. While the total investment possibly does not equal that attained in certain of the spring and summer months, no similar period in the past has witnessed in general a more marked and consistent development.

In the eighteen cities reporting to CONSTRUCTION for October, the total aggregate for permits issued amounted to $8,638,269, as compared with $4,570,506 in the same month of last year. But three decreases in all are noted, and in two of these cases the loss (less than one per cent.) is so infinitely small as to be hardly worth while taking into consideration. On the whole, the country marched forward at a most substantial clip. Toronto's total in itself, which approximates the three million mark, and is the grand individual monthly total for the year, reflects an expansion that is little short of marvellous; but at that, considering the size of the two cities, it is hardly more remarkable than the showing made at Vancouver, where work amounting to $1,286.955 was undertaken as against $507,615 in the month of October, 1909.

Aside from Peterboro's loss of 11 per cent., the greatest decrease noted, and which in itself, considering the comparative amounts, is not of very serious proportions, all points in Ontario progressed in the most gratifying manner. Ottawa reversed the less favorable condition existing in the two previous months by recording an investment of $438,925, equivalent to a gain of 28 per cent.; while Hamilton, with a like increase, issued permits aggregating in value to $318,330. Fort William also topped its corresponding figures by an advancement of 8 per cent., and Kingston, which does not submit comparative figures, reports activities to the extent of $23,317. Port Arthur, which was practically dormant during this month last year, registers an increase of 73i per cent., the largest proportionate gain in the list. Other gains noted are: Windsor, 82 per cent.; Berlin, 43 per cent.; and London, 2 per cent.

In the western section of the Dominion, the strides made exceeded all expectations. Although Winnipeg failed by a fraction of equalling her previous figures for the month, permits were issued to the extent of $530,150, which is an excellent showing in view of the heavy months immediately preceding. Calgary experienced a marked state of activity as is evidenced by her total of $568,290, which represents a gain of 40 per cent., while Victoria and Regina are ahead by 18 and 376 per cent. respectively, the figures in the latter cases amounting to $247,975, as against $52,080 last year.

Montreal's great total of $1,907,440 is the second largest amount noted, and represents an investment of $1,278,795 more than was made on the same month last year. These figures reflect a tremendous growth, and especially so when one takes into account that at this season of the year considerable work is abandoned owing to uncertain weather conditions. St. John also records an advance, a gain of 149 per cent; although Sydney, in the same section, is a trifle behind her corresponding amount.

Reports from various other points throughout the country indicate an activity equally as pronounced as that shown by the cities included in the list, but in the other cases the respective totals for the month are not available. The prospects in every respect are anything but discouraging, and it looks very much as though the building fraternity in general will find much to do during the winter season.

	Permits for October, 1910.	Permits for October, 1909.	Increase, per cent.	Decrease, per cent.
Berlin, Ont.	$14,300	$10,000	43.00	......
Calgary, Alta.	568,290	403,050	40.99	......
Fort William, Ont.	95,155	88,050	8.07	......
Hamilton, Ont. ...	318,330	247,350	28.69	......
Kingston, Ont.	23,317	....	......	......
London Ont.	30,493	29,880	2.05	......
Montreal	1,907,440	628,645	203.42	......
Ottawa, Ont.	438,925	341,150	28.66	......
Peterborough, Ont.	14,700	16,691	......	11.93
Port Arthur, Ont...	29,090	3,500	731.14	......
Regina, Sask.	247,975	52,080	376.14	......
St. John, N.B.	59,600	23,900	149.37	......
Sydney, N.S.	21,836	22,050	......	.97
Toronto, Ont.	2,914,980	1,540,355	89.24	......
Vancouver, B.C. ..	1,286,995	507,615	153.53	......
Victoria, B.C.	124,375	104,840	18.63	......
Windsor, Ont.	35,635	19,500	82.74	......
Winnipeg, Man. ...	530,150	531,850	......	.32
	$8,636,269	$4,570,506	88.89	

¶ Dangerous Juggling of Facts—Toronto "Daily" gives Undue Prominence to a Ridiculous News Item Under Caption of "Building Materials Scarce."

THE CUB REPORTER on the daily newspaper every once in a while runs "amuck," but usually the news editor screws down the safety valve when it comes to reporting an important news item that is given prominent space on the front page.

In a recent issue of the *Toronto Star*, an article, under a double column caption, "Building Material Scarce," was published on its front page, and for a misstatement of facts and pure nonsensical inaccuracies (if it were not that its publication might have a tendency to affect one of our most important industries, "building construction") it would appear almost humorous. It occurs to us that a large daily paper, before giving space to a news item concerning so important an industry, would delegate the reporting of it to some man who knew something about that which he was writing, unless the article was submitted by an exceedingly shrewd publicity man for the firm erecting the building specifically discussed, who was bright enough to work up what apparently looked like a good news item for the purpose of securing a reading notice for his firm on the front page of the paper in question.

The article says in part:

"The building contractor is one of the most worried men in the city of Toronto to-day. From every point of view he is up against it. Supplies are hard to obtain. . . . Those who are under contract to have their work finished in a certain time limit are finding themselves compelled to pay bonuses in order to secure delivery of their supplies. In other cases even bonuses cannot hurry things up. . . .

"The shortage exists in cement, crushed stone, lumber, bricks, plumbers' supplies, and other minor items. The crushed stone, great quantities of which are now used in the reinforced concrete structures, comes from all parts of the country. . . .

"Canadian manufacturers have been unable to supply the demand for cement, and some has had to be imported. In view of the great demand the manufacturers or the agents are sending along any old thing that comes to hand, and the result is that the architect or conscientious contractor has to watch particularly every bag put into the building.

"One of those who has been held up in this way is Contractor McLeod, who is in charge of the Hobberlin building at the corner of Yonge and Richmond streets. He is one of those unfortunates having to pay bonuses in order to secure delivery of supplies and having great difficulty in securing the proper qualities of cement.

"Just what qualities of cement and crushed stone are needed in a modern building can be indicated by this building. It is to be a steel structure on cement foundations. The basement will be twelve feet below the sidewalk, but below this again there are thirty-seven pier holes, each 34 feet deep and four feet square. These holes will be filled with concrete, which will support the foundations. About 10,000 barrels of cement will be required and several carloads of crushed stone. . . ."

With regard to the shortage that it is stated exists in cement, crushed stone, lumber, brick, plumbers' supplies and other minor articles, we would say that we do not know of the existence of such a shortage. Every large building contract that has been executed in the city of Toronto during the past year has been carried out on schedule time, and if a man really wants a quantity of any one of the materials mentioned above, there should be absolutely no difficulty in obtaining it, providing he can meet the terms of the supply dealer.

With regard to cement, Mr. F. P. Jones, general manager of the Canada Cement Co., says as follows:

"I wish to advise that as far as cement is concerned the article that appeared in The Toronto Star is entirely wrong. At no time this year have we had less han 325,000 barrels of cement in stock, and the only delay that any of our customers have been subject to has been caused by the shortage of cars. I might further add that at the present time we have over 400,000 barrels of cement in stock, and are producing more than we can get orders for, and will be forced to carry more than this quantity over from this year into next year.

"In addition to this I wish to state that the production has been so much in excess of demand that during the last year we have not been able to operate two of our mills, one situated at Belleville, Ont., and the other situated at Lakefield, Ont., and the mills we did operate were not operated to their full capacity owing to the insufficient demand.

"As to the quality, if you will refer to any of the large users who have used 'Canada' cement, I think you will find that the quality this year has been better than it ever was before, and is certainly equal to the quality of any cement purchased in Canada or elsewhere at any time."

With reference to crushed stone, we would say that a large number of concrete jobs have been carried out in Toronto during the past season, and we have not as yet heard of any extraordinary difficulty in obtaining quantities of this material.

We have not as yet heard of a scarcity in lumber. We are free to admit that stock brick has been rather scarce, but this has not had a tendency to affect large jobs. Manufacturers have been quite equal to the demand for brick on their larger contracts.

With regard to plumbers' supplies, we know that this has been truly a busy season, and the plumbing in some of the buildings might have been delayed to some extent, but this is not on account of the shortage of supplies. It is due merely to the fact that contractors have been unable to get all the journeymen they required to carry out their contracts.

We don't know why the contractor on this particular job had to pay bonuses, and may say that this is an unusual procedure with contractors on large buildings.

In the last two paragraphs, however, in which a very elaborate description of this large prepossessing building is given, the object of the whole item seems to be apparent. In other words, in order to get the description of this great building on the front page of a daily paper, it seems it was found either necessary or expedient to work up a sensational news item around it. As a sample of the inaccuracies of the statements in this article we would point out, that it is stated that about 10,000 barrels of cement will be required on this job, while we are informed that the job will not require more than 600 barrels.

Before a daily paper enters into a discussion of matters of vital importance in an industry that is so important in every large growing centre in the Dominion, it would seem reasonable that they would secure their information from some authentic source. Nothing can militate against the continued activity in building operations more than the creation of the erroneous impression that materials are unduly high in price, hard to secure, of an inferior quality, and above all, that to finish his building in reasonable time an owner or contractor is obliged to bonus the supply dealer.

Reduction in Price of Cement—Both Cement Merger and Independent Companies Announce an Average Reduction of 10 Cents a Barrel all over Canada.

THAT THE MERGING of the cement interests in Canada has operated for the benefit of the consumer and contractor rather than to their disadvantage is shown by the fact that an announcement has been made by both the Merger and the Independent Companies of a reduction in the price of cement of from five to fifteen cents per barrel, making an average reduction of ten cents a barrel all over Canada.

As was pointed out in these columns some months ago, the present conduct of the Cement Merger in Canada has served to work great economies in sales, operation and freights. The Independent Companies, through having arranged for a central sales office, have also worked big economies. As to whom the credit should be given for the reduction of prices is of little interest to the consumer; the fact is that he buys his cement to-day at from five to fifteen cents per barrel cheaper than he did last year. The cement interests are evidently working upon the broad principle that it is better to increase the consumption of cement, through selling it at a reasonably fair price, than to curtail its consumption by attempting to unduly raise prices, thereby giving the public the impression that a cement monopoly exists in Canada. Both the Independent and the Merged interests are capable of producing at least 25 per cent. more cement than is now consumed in Canada, and it is this increased consumption of 25 per cent. that it is evidently their desire to create.

Some Interesting Correspondence Betweeen the R.A.I.C. and the Minister of Public Works, Relative to the Ontario Government House Competition.

UNDER THE HEADING "Extraordinary Conditions of Ontario Government House Competition," an editorial appeared in the November issue of CONSTRUCTION in which the inconsistencies in the Government's programme, together with their unfair treatment of the architectural profession generally, especially those who consented to strain a point and enter the competition, were commented upon. In the course of the article we stated: "This unfortunate condition exists only because Canadian architects are not sufficiently positive in asserting their rights as professional men." We are in receipt of a letter from Mr. F. S. Baker, President of the Royal Architectural Institute of Canada, in which he disagrees with us on this point, declaring that "architects invariably go to the limit of good taste in contending for their rights," and to strengthen his contention in this connection, Mr. Baker has handed us the correspondence that passed between the Royal Architectural Institute of Canada and the Government, relative to this competition. A perusal of these letters shows conclusively that the R.A.I.C., on behalf of the architectural profession of Canada, certainly did take a very strong, though justified stand in this matter. However, we are under the impression that Mr. Baker misunderstood the exact meaning of our statement, or at least, the meaning that it was intended to convey, for as stated in the above mentioned editorial, "conditions of this kind will reoccur just so long as architects see fit to enter into competitions, the conditions of which are unfair to themselves, the profession and the community generally," our contention is that individual architects, who enter such competitions and submit to unfavorable conditions as embodied in a programme, fail to assert their rights as professional men. We know that the Royal Architectural Institute of Canada, the Ontario Association of Architects, the Province of Quebec Association of Architects, and the Manitoba Association of Architects, have all, on several occasions as bodies, made strenuous fights for the rights of the profession, but it is the individual architect who, though he realizes that the conditions of a certain programme are unfair to him, consents to enter such a competition, and there failing to assert his professional rights.

Mr. Baker's letter to CONSTRUCTION, which we publish below, is most interesting, and the correspondence that passed between him as president of the R.A.I.C. and the Hon. Dr. Reaume, Minister of Public Works, is further interesting, in that it shows the feeble conception of the rights and duties of the architectural profession by the average Government official.

Toronto, June 1st, 1910.

Dear Sir:

In reading your editorial regarding Ontario Government House Competition, one or two points occurred to me as requiring explanation.

It is a common thing for the public outside of the profession of architecture, to feel that architects individually and collectively, are not as you say, "sufficiently positive in asserting their rights as professional men," but I think you are quite wrong, because architects invariably go to the limit of good taste in contending for their rights; you see it generally is, as in this case, the public who suffer and not the architects, because one does not lose or miss anything one never had, consequently the architects are not losers through the policy which the Government has chosen to adopt. The public is the real loser as they undoubtedly miss the opportunity of being able to select an architect who would produce a satisfactory solution of the problem from every point of view.

Neither can architects be expected to educate Governments or the public as to the proper procedure in selecting an architect for an important structure; certain courses of study and practice have defined very clearly the architect of culture as compared with the uneducated man who hangs out his shingle and as far as the public can see, is as good as any other, though he may be an architect in name only. You will never find the true architect objecting in a case like this, but you may find him laughing up his sleeve. He finds plenty to do in this country without wasting time in entering competitions, the conditions of which are as ridiculous as those you publish.

If the Government chooses to employ an architect who works for about one sixth of the earnings of a properly trained architect, to design a residence for the first gentleman of the Province, a residence which should surely show the taste and culture of the people of the Province, they will simply have to sleep in the bed which they have prepared for themselves. But I consider it is the duty of architects who *know*, to draw the attention of the authorities, in a case like this, to what should be done, and that your subscribers may know that a reasonable effort was made in this case to induce the Government to steer a straight course, I have the pleasure to enclose the correspondence which passed between the Department of Public Works and the Royal Architectural Institute of Canada. I am.

Yours very truly,
F. S. BAKER,
President R.A.I.C.

To Editor, CONSTRUCTION,
Saturday Night Bldg., Toronto.

In Mr. Baker's letter dated June 1 he goes into detail with Hon. Dr. Reaume, and explains quite clearly the position of the architectural profession as regards competitions.

June 1st, 1910.

Dear Sir:

In my capacity as President of the Royal Architectural Institute of Canada, my attention has been drawn to the "General Conditions for the Guidance of Architects in Preparing Competitive Designs for a New Residence for the Lieutenant-Governor of the Province of Ontario," as recently issued by your department.

As printed the conditions are, of course, such that no self-respecting architect could conform to, inasmuch as they do not provide that a board of professional assessors will be appointed to select the designs, and further that the conditions do not guarantee to the author of the winning design the commission of carrying out the work at the regular commission.

In the face of the printed conditions, it is difficult to understand the object of your department in advertising for competitive plans in such a case. If the Government were to ask an individual architect to prepare preliminary plans for a mansion to cost $225,000, the minimum commission for such preliminary drawings, without any further work, would be $2,700,000, and if I understand the conditions correctly, the Government is asking for this information for $1,000.00. Surely the Department does not suppose that any educated architect capable of building a gentleman's mansion would enter a competition under those conditions, or under a condition where his preliminary studies, which would naturally express his best effort and only require mechanical development, might be carried out by some one else, for instance, the architectural staff of the Department.

At this moment, as you are no doubt aware, the architects of Canada, from Halifax to Vancouver, are protesting to the Federal Government the unfairness of applying this principle to the erection of Departmental buildings at Ottawa, for which a competition was recently held and under which the architects who competed naturally supposed that the winning author would be commissioned to carry out the work.

If the profession of architecture in Canada is not to look for support to the Government, Provincial and Federal, where is it to be found? And if proper attention is not paid to the development of architecture in this country, what will the future appearance of the country be?

With this I send you a copy of the Year Book of the Royal Architectural Institute, which contains on pages 22 to 24 the regulations for the conducting of architectural competitions approved by the Institute, and I trust that your Department will find it possible to amend the printed conditions in accordance with these.

This letter is not written in a critical sense at all, our effort is to improve the architecture of Canada. Government support is essential to our success in this direction. All advanced countries have abandoned the idea of having important buildings designed and carried out by departments. Architects in private practice are employed and are always ready to collaborate with the chief architect of the Department in the matter of supervision of the construction. A Government house above all buildings demands a design and plan indicating good taste and culture, and I feel sure that on further consideration you will decide to supplement the printed conditions by adding the matter contained in the second paragraph of this letter, which on behalf of the Institute, I assure you is essential to the success of your otherwise most interesting competition.

Yours truly,
F. S. Baker,
President.

Hon. J. O. Reaume,
Minister of Public Works,
Parliament Buildings,
Toronto.

The following is the reply to Mr. Baker's communication by the Hon. Dr. Reaume, in which the Minister of Public Works shows very plainly that his conception of the proper conduct of architectural competitions is sadly in error.

He states that it is for the Government to decide the conditions of a competition, and that the architects may compete or not compete just as they choose. He further intimates that the plans are not to be judged upon their architectural merits alone, but that "the prize will be given to the one that is most satisfactory to the Department." He does not state whether he means to the architect most satisfactory to the Department, or the plan most satisfactory to the Department. Again, it will be noted that he does not give any assurance that competent advice, as the profession would view it, would be obtained to aid the Government in the selection of the designs to be awarded the prizes. However, the last paragraph of Dr. Reaume's letter appears to be designed to give a half-hearted assurance, that the author of the winning design would be given the commission to carry out the work.

Department of Public Works,
Minister's Office,
Toronto, June 3rd, 1910.

Dear Sir:

I have received your letter of the 1st instant.

I regret to observe the language used by you to the effect that "the conditions are, of course, such that no self-respecting architect could conform to," etc., etc.

The conditions are for the Government to formulate, and, of course, architects and other persons interested in them can govern themselves according to their best judgment.

You are evidently under a misapprehension as to what the prize of one thousand dollars means. It is not necessarily a prize for the best plan, architecturally speaking. At least, if I make myself clear, something more than abstract architectural merit will be required. Having regard to the structure we desire to erect, etc., etc., the prize will be given to the one most satisfactory to the Department, and in coming to a conclusion the Department will take care to procure and receive information from thoroughly competent sources.

I may also say that, as will appear from what I have already stated, the author of the winning design will in all probability receive the commission of carrying out the work.

Yours very truly,
J. O. Reaume.

Mr. F. S. Baker,
Royal Architectural Institute,
Toronto, Ont.

The following is a communication addressed to Sir James Whitney, relative to the matter, by Mr. F. S. Baker, to which, it may be said, no reply was made:

June 1st, 1910.

Dear Sir James:

I have the pleasure to forward to you a copy of an official letter which the Royal Architectural Institute has asked me to write to the Honorable Mr. Reaume, in connection with the proposed competition for the new Government house.

I should be very glad indeed to have an opportunity to discuss this with you and the Honorable Minister, if your time will permit.

Yours truly,
F. S. Baker,
President.

Sir James Whitney,
Parliament Buildings,
Toronto.

On June 10 Mr. Baker wrote to the Hon. Dr. Reaume, after a deputation from the R.A.I.C. and the O.A.A. had waited upon the Department, outlining the four objectional conditions of the competition.

June 10th, 1910.

Dear Sir:

Referring to the interview which you were good enough to arrange this morning with the representatives of the Royal Architectural Institute of Canada and the Ontario Association of Architects, in connection with the conditions of competition recently issued by the Government for a proposed residence for the Lieutenant-Governor, in Toronto, this joint deputation begs to submit, on behalf of Canadian architects, that it is desirable to supplement the conditions issued:

1st. By extending the time for receiving the designs to the 1st of September, 1910.

2nd. By naming now a competent professional assessor, or assessors, to advise the Government in the selection of the designs.

3rd. By making the first prize the commission of carrying out the building, and dividing the $1,500.00 already offered equally between the three designs judged next in merit.

It will be apparent to you that for a large building of this nature intelligent designs could not be got ready by the 15th of July.

The appointment of professional assessors in competitions for all important buildings is a usual and necessary condition.

That the winning author, provided he is a competent man in every way, should be given the carrying out of the work is also considered essential.

If you wish to consult us regarding the naming of a professional assessor, or assessors, to act with Mr. Heakes in advising the Government, or upon any other point, we will be happy to place our services at your disposal at any time convenient to you.

Yours truly,
F. S. Baker,
President.

Hon. J. O. Reaume,
Minister of Public Works,
Parliament Buildings,
Toronto.

The following is Dr. Reaume's communication on June 10, which, we understand, closed the controversy so far as the R.A.I.C. and the Department of Public Works were concerned:

Department of Public Works,
Minister's Office,
Toronto, June 10th, 1910.

Dear Mr. Baker:

I am in receipt of your communication of even date in which you set out the views of the committee of architects who waited upon me this morning with reference to the Lieutenant-Governor's residence. I note what you state and can only state that this matter will be brought up in council early next week. I will then immediately notify if any changes from the present arrangements are permitted.

Sincerely yours,
J. O. Reaume.

Mr. F. S. Baker,
Architect,
Toronto, Ont.

It is high time that Government officials, who are authorized to expend large sums of money in the erection of public buildings, should commence to realize the importance of having these structures designed by the best architectural brains in the country, to secure which, they must surely understand that their method of procedure must be compatible with the ethics of the architectural profession.

The recent Knox College competition, which was closed a few days ago, was a really good one. The program was ideal, and the designs submitted were, generally speaking, of a very high standard. Some of the best designers in Toronto entered the competition, and the assessors in the competition were all competent men, thoroughly qualified to act in such a capacity. In such competitions the owner, whether a private individual, a corporation or a government, invariably secures the best services of the best designers, because the competing architect is given some assurance that he will be dealt fairly with, and that his designs will be judged on their merits by competent men.

¶ Announcement in Letter by Frank Miles Day of Position Assumed by American Institute of Architects on the Question of Competition Programs.

WHILE WE HAVE THE MATTER of competitions under discussion, it is well to note the position taken by the American Institute of Architects on this very same subject, and from a letter written by Mr. Frank Miles Day to the *Architectural Record*, it appears that they have encountered in the United States, difficulties very similar to the one outlined in Mr. Baker's letter. It will be noted that the conditions insisted upon by the American Institute of Architects in competition programmes are very similar to, though a slight more exacting than those of our several Canadian architectural organizations. It appears, however, that the American Institute of Architects has adopted a very practical and effective method of enforcing these rules and regulations which follows:

Recent editorials in architectural journals strongly support the present effort of the American Institute of Architects to improve competitions, yet communications and minor notes show, in some cases, such a lack of information that it seems well that some statements on the subject should be made.

It is obvious that any improvement in the conduct of competitions can take place only as a result of the general enlightenment of the profession and through it of the public. After many years of discussion, the profession appears to have reached substantial agreement as to what are the essentials of a well conducted competition. Without such agreement, the present advanced position of the Institute would be out of the question.

The Institute has made many attempts to inform the public as to the proper conduct of competitions and to dissuade architects from taking part in them except under proper conditions. Its carefully prepared statements, though they had an excellent educational effect, were without other result since they were merely advisory.

The Institute never has presumed, nor does it now presume, to dictate the owner's course in conducting a competition, but it aims to assist him by advising the adoption of such methods as experience has proved just and wise. But the Institute has

(*Concluded on page 89.*)

[illegible] Garden Suburbs

THE TOWN PLANNING CONFERENCE AND EXHIBIT

Summary of important event recently held at London, England, under the auspices of the R.I.B.A. Some of the more important papers presented before the Conference.

T[illegible] these municipalities of widening streets, creating new avenues and cleaning out old tenement districts, is a most [illegible] and gigantic problems.

But, in Canada, we are creating new towns. Our cities that have already been established are only in their in[illegible] that not only architects, engineers and municipal officers, but the lay public should profit by the mistakes of these older countries and watch closely the methods now being employed by those that have given this subject much study [illegible] Our towns and cities should be laid out according to a carefully conceived plan. Our larger cities should at the earliest possible moment undertake to rectify the mistakes that have already been made, and to arrange, so that their future growth would be properly provided for by carefully laid out scientific plans. The evils of the suburban real estate speculator operations are very evident on every [illegible] that the growth of their cities in suburban districts is along lines compatible with good town planning.

The Guild of Civic Art in the city of Toronto has done much in this direction. They have been successful in having an Art Commission appointed, and it is to be hoped that in their endeavors to provide plans for a beautiful city in the Toronto of the future, that they will receive the unqualified co operation of every citizen.

One of the greatest events that has yet taken place toward the promotion of the town planning movement was the International Town Planning Conference recently held [illegible] British Architects at London, England. The delegates to this conference came from almost every country in the world, and the papers read, as well as the discussions, proved that there are a large number of brilliant, earnest men giving this great social and economic problem serious thought. Mr. F. S. Baker, president of the Royal Architectural Institute of Canada, was a delegate of this organization to the conference. The following brief account of the conference in general by Mr. Baker, will be of interest to our readers:

Opening with a meeting in the Guild Hall and an inaugural address by the Hon. John Burns, the Town Planning Conference held at London from October 10th to the 15th inclusive, and at which nearly 1,500 members registered, gave expression to the broad steps that are now being taken towards the sociological, hygenic and economic betterment of towns and cities in the more enlightened countries of the world.

Unfortunately the weather, which for the preceding fortnight had been exceedingly fine, broke on the second day of the conference, and interfered with the comfort of those visiting the districts which had been selected as models of their different kinds. Aside from this, how ever, the event was held under the most auspicious circumstances.

The great success of the conference was due to the enthusiasm of the delegates from nearly all parts of the world. At nearly every meeting the hall was filled and overflow meetings were necessary. The splendid arrangements which had been made by the committee of the Royal Institute of British Architects made it possible to carry out the programme exactly as prearranged. It was notable at this conference that everything came out exactly as was expected.

The exhibition at Burlington House was remarkable because of the very large number of drawings and models exhibited, and was very much appreciated by the large number of visitors, the majority of whom were not members of the conference. There was also a very comprehensive exhibit of maps and plans of London at Guild Hall.

A vast number of interesting and carefully prepared papers were read on various subjects, and as indicated in the programme these have all been recorded, and when

Design by Mr. T. H. Mawson for Dunfermline. From a Drawing by Robert Atkinson.

the volume containing all of the proceedings of the conference is published, it will make a notable addition to the [illegible] I predict for this volume, that the first edition will be out of print in a very short time.

The social side of the conference was extremely interesting and consisted of a conversazione given by the Royal Institute of British Architects in their rooms on the evening of the first day; a smoker, also held by the Institute from nine to ten p.m. on Tuesday and Friday evening, both of which were very largely attended and most enjoyable; the conference banquet, which was held on Wednesday evening at the Hotel Cecil, and at which dinner more than 500 ladies and gentlemen were seated, the magnificent banqueting hall being well filled, and with the beautiful floral decorations and splendid speeches this banquet was one which will long be remembered.

The Hon. Whitelaw Reid, Ambassador from the United States, threw open that most interesting and palatial residence, Dorchester House, to a limited number of the members of the conference, who were invited to an At Home given by the Minister on Thursday afternoon.

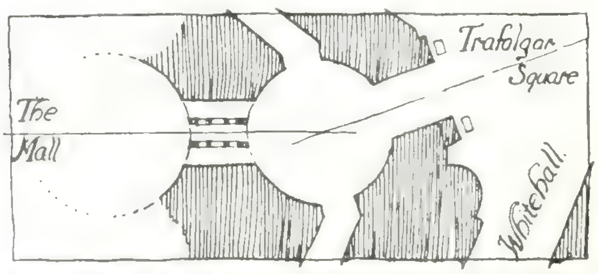
On Thursday evening the Lord Mayor and Lady Knill gave a reception to the members of the conference at the Mansion House, which was largely attended. In

Design by Messrs. C. E. Mallows and T. H. Mawson for Dunfermline. From a Drawing by Robert Atkinson.

teresting in itself, this historial old building was made exceedingly attractive by the throngs of gaily dressed people, the beautiful decorations and illuminations, and the charming music.

The art of town planning was undoubtedly advanced a long distance by this conference, and similar meetings held in the future will do much to improve the conditions under which those who have to live in towns exist. The making of beautiful streets, squares, parks and pleasure grounds, the forming of streets, etc., in a way which will give convenience and practicability, and the housing of the artisan in a manner from which he and his family can derive health and strength, rather than the opposite, is now being given close attention throughout the world.

In this new country, where there are at present some two hundred cities in an embryonic state west of Winnipeg, it is for us to benefit by what has taken place at this recent conference, and to bring the standard of our towns and cities up to a point which will not be surpassed by any country in the world. Every town should have its Guild of Art, and every town council should lend its ear to their advice, for town planning is undoubtedly an art, and art is something which only a few people absorb to an extent which permits them to impart it to others, therefore when the man who is a known artist speaks, the layman should listen.

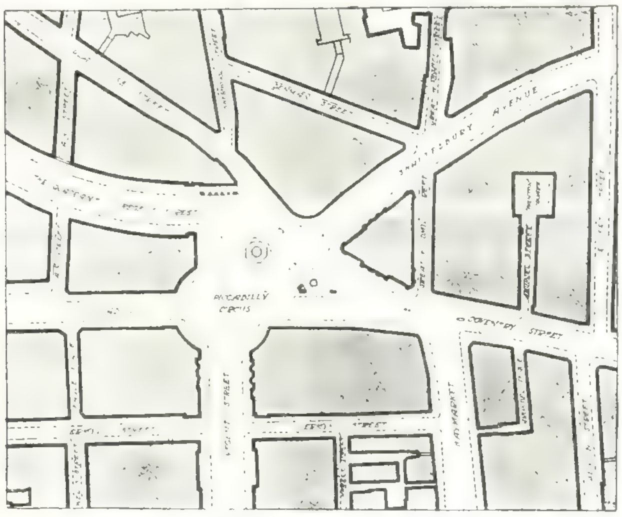


Sketch Plan of Mr. Leonard Stokes' Scheme for Approach to Sir Aston Webb's Plan for the Mall.

In connection herewith we publish, either in whole or in part, a number of papers read at the conference, together with several illustrations of schemes that are being worked out, or proposed, in England, Germany, and the United States, believing that those selected will prove of special interest to Canadian architects and those concerned with the "City Beautiful" movement in Canada.

Town Planning Bill.

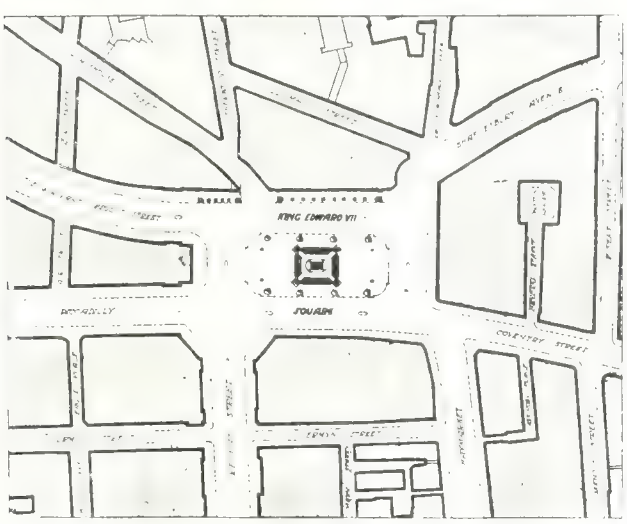
A sociological reason for carefully planned schemes in connection with the upholding of new centres, and the reconstruction of many of the older districts, was outlined by the Right Hon. John Burns, author of the Town Planning Act in England, who in following the opening



Piccadilly Circus, London: Plan as Existing.

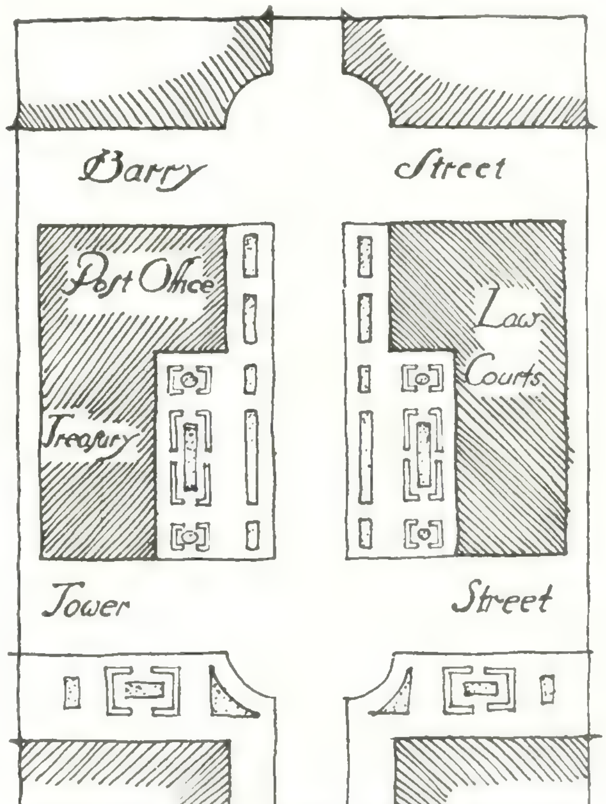
remarks of President Stokes, of the R.I.B.A., delivered the inaugural address at the conference.

People of the poor towns suffered, as a rule, from poverty of spirit as well as lack of means. These dismal spirits were often caused by their squalid surrounding. It was a daily occurrence to see children's character spoiled and their natures stunted by the depressing circumstances under which they lived. The spoiled life and the soiled home in the slatternly street were too often the causes of drink, degradation, loafing, and dependence in many of our large cities. The towns and districts where the money was made ought to be as cheerful as the districts where the money was too often foolishly spent. When a slum vanished a brewery fell and public houses disappeared, and there was a greater reason than architectural symmetry and artistic appearance in a town planning scheme. Fifty per cent. of our total pauperism, and more than 60 per cent. of its total cost, much of our lunacy and debility, and a great deal of our crime were due to sickness. Disease could not be fought and exter



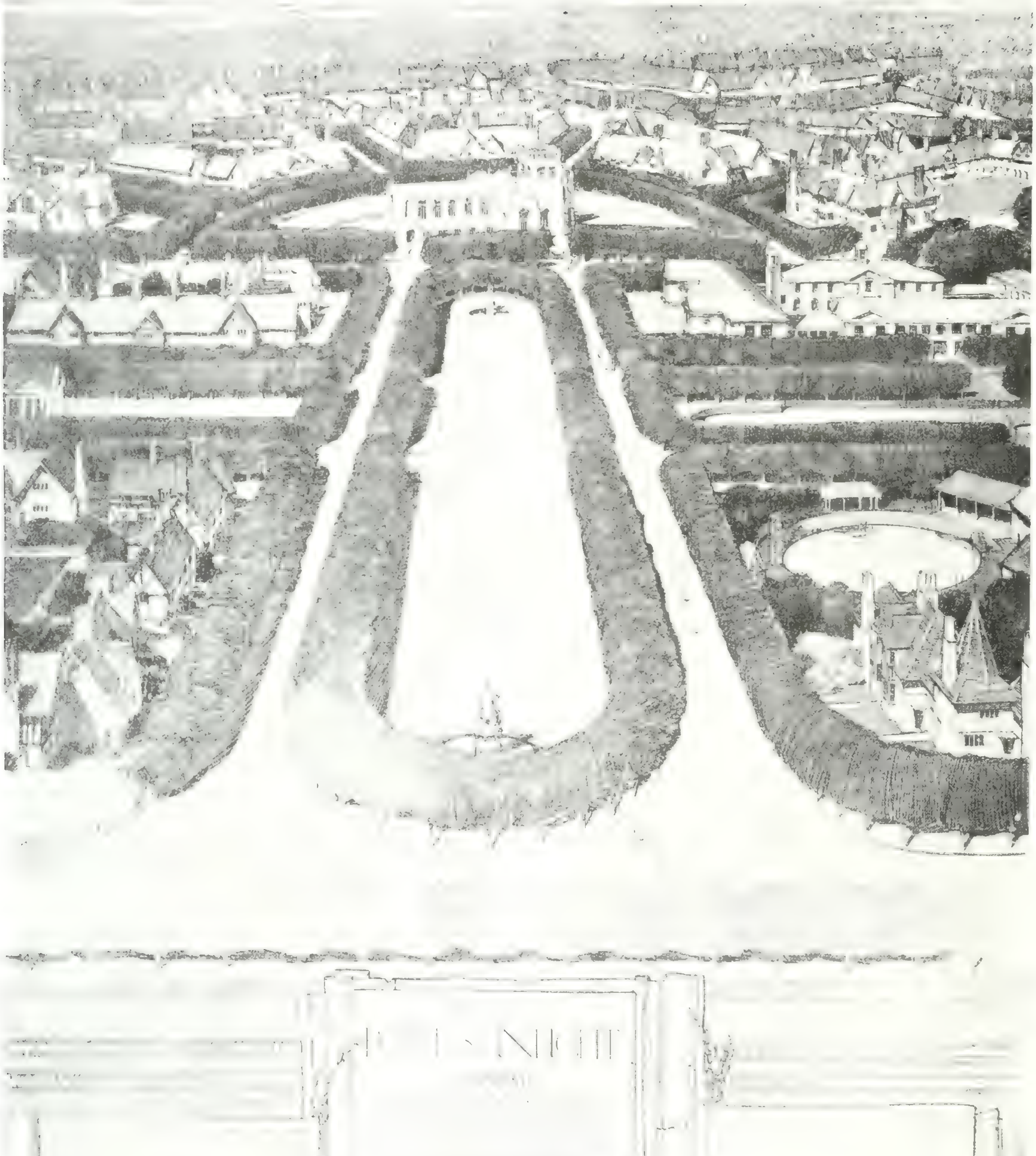
Piccadilly Circus, London: Plan as Proposed.

minated unless we let in sun and air into our houses and streets. So long as casual labor lived in squalid courts, ugly dwellings, and rotten tenements the country would continue to turn out nerveless mannikins instead of enduring men, and motherhood, childhood, the race, and society demanded the demolition of the festering slum and the erection of pleasant towns and dignified and comfortable cities. Was it possible to get what was wanted? A review of what has already been accomplished would seemingly indicate that it was. In England great strides had been made in connection with the town-planning movement—greater strides, considering their ancient difficulties, than any other country in the world. At Bournville, Port Sunlight, Hampstead, and other places could be seen some of the most beautiful domestic architecture that could be found in any part of the world. The upper and middle classes generally were being fairly well provided for by architects, and now the artisan was clamoring for something better than a hovel. He was securing a home at Bourneville, Port Sunlight, Tooting, Ealing and many other places at a rent and of a character and a beauty which were not within the reach of the average artisan twenty five or thirty years ago. The artisan had come forward and said: I want something better than a hovel; I want a home for my children at a modest rent, and of a character and beauty which were not within the reach of the average artisan twenty-five or thirty years



Sketch Plan for Government Buildings, Jamaica.

ago. It was necessary to consider the great mass of mankind, the hewers of wood and drawers of water, those who are lower even than the artisan, the unskilled and casual laborer; and the responsibility rests upon us to see that the laborer was provided with infinitely better housing and street accommodation than he now secured. The great town planning movement must not end in a few cities getting all the talent, most of the money, and the best of the improvements. The East-end wanted "West ending" in its reconstruction. Wigan had got to be taken in hand as well as Westminster. The Potteries as well as London and Bermondsey needed, [illegible] more than Belgravia. For reasons industrial, social, commercial, and Imperial, town planning must go hand in hand with better housing, wider roads, higher wages, and increasing sobriety. Town planning was very belated, but it was not too late. The gradual reconstruction of a city was a very serious matter for all. If planning was neglected at the beginning or badly done through timidity or lack of imagination, it placed a burden for 50 or 100 years upon progress, and paid seven or eight times over for their



Designed for Central Boulevard. Public Library and Museum, Port Sunlight. From a Drawing by Robert Atkinson.

[illegible]ck of prescience and daring. It was no good pitching into Mr. Jerrybuilder too much. Mr. Jerrybuilder was [illegible]. For proof of it they had only to look at the surroundings of a garden city, where builders tried to live up to the example [illegible] in those [illegible]. Mr. Property Owner, who often unloaded on the jerrybuilder and architect much of the responsibility he should take upon himself, had littered the earth with his squalid tenements and his ignoble streets. The speaker believed that the landlords as well as the ratepayers would benefit if they did what the best architects were advising them to do. Garden cities were magnificent in themselves, but they were a hundred times more useful in the inspiration they supplied to others. In the past property owners seemed to have thought that parsimony meant economy. Therefore, they narrowed streets, contracted rooms, and looked upon a beautiful vista as the eighth deadly sin. The Philistine was being taught that houses, roads, and bridges might be made without loss of money to harmonize with beauty. It was with such objects that the Housing and Town Planning Bill had been framed and passed. The reception it received was an agreeable surprise. It should be given an indulgent trial, and if it could be, it would be amended and improved so that their object should be secured. Its modest object was comfort in the house, health in the home, dignity in their streets, spaces in their roads, and a lessening of noises, smoke, smells, advertisements—all the nuisances that accompanied a city without a plan, because the rulers were governors without ideas, and the citizens without hopeful outlook and imagination.

Modern Difficulties

In tackling this great job modern communities had little to learn which ancient ones did not teach them. Where in other times, for military or other reasons, the streets were narrow and the citizens crowded, compensation was given in large spaces, fine squares, and picturesque buildings. It was true that there were modern disabilities from which communities formerly escaped. But the ancients were better off in one respect than the mechanical modern. Rome, Florence, Salamis, and Athens did not have imposed upon them the vandal disabilities that the modern town now had as a burden. Athens did not have 600 miles of railway as London had, or ugly viaducts, creating *culs de sac* of mean and poor streets, with 500 ugly railway stations spoiled by vulgar advertisements; it had no gas works, and was without the 7,000 public-houses London possessed—nearly all of them at street corners, in positions which ought only to be occupied by banks, libraries, post offices, and police stations. London labored under the disadvantage of having all the burdens of light, heat, smoke, traction, and rapid communication which the ancients did not have. When it got rid of the 7,000 public-houses it would not need the police stations, but the measure of its difficulty ought to be the extent of its determination to grapple with these abominations. Let them go up the Monument, look westward and see what Cannon Street Railway Station hid of the river and the city. It would be a blessing if it would fall, as Charing Cross fell, only without hurting anybody.

As regarded the planning of towns, it was necessary to remember that cities should be as varied as the peoples who lived in them, and that they ought not to too slavishly copy after other municipalities. Wide roads were good, but they did not want too wide roads, if it was at the cost of the tenement behind. Then, in their wide roads, care must be exercised not to litter them with endless kiosks, posts, refuges, and other things. There was often a danger in space. Trafalgar Square, in his opinion, was too small, and the Place de la Concord too large, beautiful although it was. He thought there were too many trees in Toronto, and not enough in Berlin.

Town planning, in the speaker's opinion, should be applied rigorously and at once, but there was one person who stood between the authorities, the architect, the engineer, the surveyor, and the medical officer, and that was the layman who paid the rates and the taxes. The layman, the Philistine, and the economist, however, could be converted if the trouble was taken to teach them.

Planning of Hellenistic Cities

Professor Percy Gardner read a paper on "The Planning of Hellenistic Cities." In the course of his remarks he said:

It is certain that recent archæological discovery has proved to us that the Greeks were more modern than we supposed.

If Euclid and Archimides, Zeno and Epicurus, Theocritus and Menander, Deinocrates and Pythius came to life, they would fit into the modern world far more easily than would our own heroes of the Middle Ages.

Architecture and the planning of cities went through, in the ancient world, the same two phases through which they have gone in the modern world. The old cities of Greece, in the age before Alexander the Great, consisted of narrow, winding streets bordered by poor houses. The central and important sites were occupied by the temples of the gods, the senate house, and the town hall, the market place, and the gymnasium. The public buildings were large and splendid, the private houses were shelters for the night.

On the Ionian coast of Asia Minor cities were more orderly and stately. Heredotus tells us that the very ancient city of Babylon was four square, the River Euphrates running through the midst, and the streets all running straight parallel or at right angles to one another. Something of this order and symmetry characterized the Greek towns of the coast. While the agora or market place in the old cities of Hellas was merely an irregular open space where streets met, an Ionian agora was square, with porticoes round it, and lying in the heart of the city.

A Greek city, even in the Hellenistic age, consists of four parts. First, the arrangements for defence. It was necessary to surround it with a wall and towers. Even when, in the age of the Roman peace, it became a custom to build outside the barrier of the walls, these were still maintained—as in the case of modern ironclads—to protect the most vulnerable parts. And above the city rose almost always an Acropolis, at once the dwelling place of king or tyrant, an arsenal and place of arms, and the oldest seat of the city deities. Second, we must place the abodes of the gods in the Acropolis, or the lower city, with the sacred precincts which surrounded them. Third, there is the market place, with the porticoes or public buildings which surrounded it. Fourth, we have the houses of the inhabitants. Naturally we place this last feature at the end, in Greek fashion; a modern mind would probably place it first.

"As in old Italian cities we find a street traversing the site from north to south, with another passing from east to west, and crossing it at right angles. The centre was the altar in the midst of the agora."

Ancient authorities discussed the advantages of the regular arrangements of streets in a town from the hygienic point of view. The physician Oribasius maintained that when roads were straight air flowed faster through a city, and most freely of all when the roads were set to the four points of the compass. The great architect Vitruvius, on the other hand, though the free entrance of winds into a town a thing which it was desirable to check. Our own ancestors built rather on the principles of Vitruvius, we, on those of Oribasius.

The Greeks, both in early and later times, were careful to obtain for their cities a good supply of water. On all early sites we find extensive cisterns for rain water; but these were only for a supplement to spring water, or for use as a last resource in case of siege. In supplying water the Greek usage differs notably from the Roman, and the difference is very characteristic and suggestive. The Roman brought water by great aqueducts, striding across valleys and ravines; he made his way straight to his end, without troubling himself about natural impediments. The Greek, more subtle and less determined, [illegible] known of the wondrous underground conduit of Eupalinus, whereby in the time of Polycrates the Tyrant, water was brought from the hills to the city of Samos. At Pergamon there was a water conduit even more remarkable. From the heights of the Madaras Dagh, 1,700 ft. above the sea, the water of springs was conveyed by leaden pipes a foot in diameter.

The most striking feature of a well-planned modern town—the open spaces with lawns and trees and flowers, and the private gardens—were almost unknown in Greece, and, indeed, they are still comparatively rare in the cities of the continent, the limited space within the fortifications leaving little room for such luxuries. We try to mix town and country; the Greek idea was to produce a well-planned and self-complete township, enclosed by a wall and set in the midst of fields and woods.

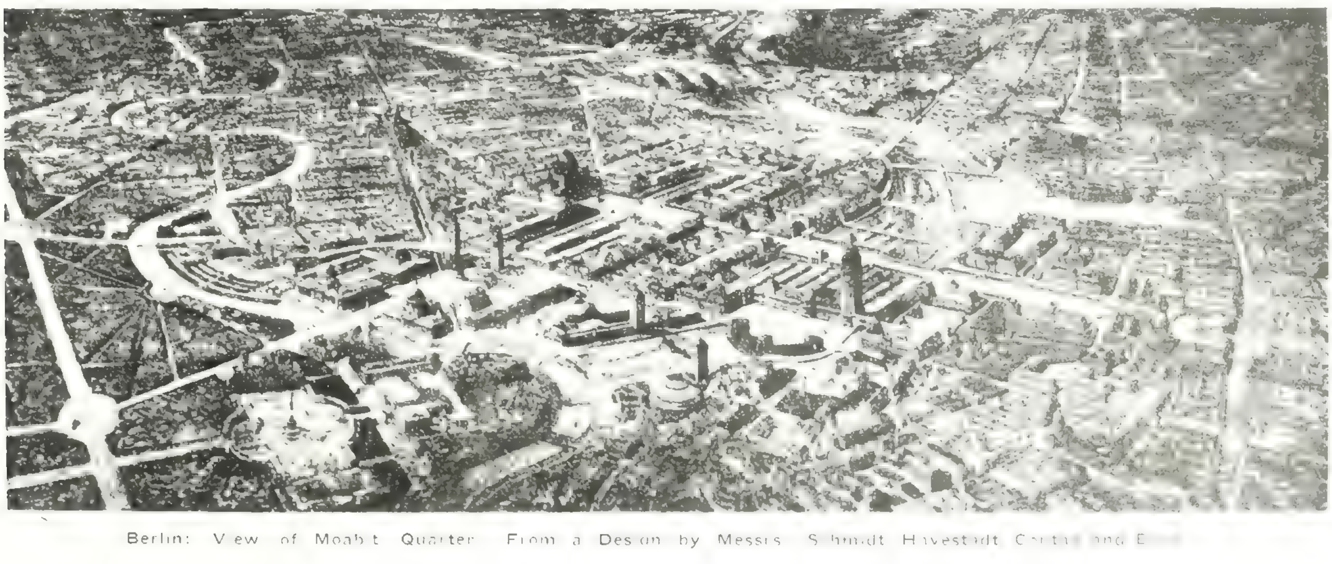
Town Planning in the Roman World

An address on the above subject was delivered before the conference by Professor F. J. Haverfield, LL.D., F.S.A., who said that town planning might be regarded as one of the intermittent sciences which came to its activity only at special periods and under special circumstances. There were, of course, towns being planned for good or for evil at all times, and there were cases such as Edinburgh, Newcastle, or Bath of isolated pieces of town planning in the eighth and seventh centuries. But in such cases the town planning was not systematic, for systematic attention to town planning occurred only at special periods, such as at periods of great expansion when large urban areas were being developed and towns were being created all at one moment. Professor Gardner had just described one such period, and another might be found in the early history of the Chinese towns in Central [illegible] streets such as was characteristic of the Greeks and Romans. It was the custom of the Romans and of the Greeks before them to send out emigrants to establish towns such as towns were then, viz., fortified groups of houses possessing a municipal charter, but covering a small space of perhaps thirty or forty acres, and whenever such a body of colonists went out the result generally was the birth, fully grown, of a new town. During a period of the Republic this practice was followed with varying energy, and according to ancient authorities about eighty such towns were founded, or some were refoundations of old and decayed towns. Under the Empire the creation of new towns went on apace. It would be a big task to enter into the process or causes which brought these towns into existence, for they varied in every case, but the central fact was plain that the towns assumed a definite form. Ancient life differed from modern life in nothing so much as in its preference for set and crystallized forms of life, and this was especially seen in the form given to the town. It was the old form which resembled very closely that which Professor Gardner had illustrated in his plans of Priene and other short-lived towns of the Hellenistic period. It was the rectangular form which in all ages until twenty or thirty years ago was the form for all systematic town planning. They met it in the Chinese towns of Central Asia, and where the Chinese got it from he did not know, although they probably invented it for themselves. They met it in Greece from the fourth century, and occasionally they met it in mediæval England; and in many modern towns of the most recent times the square and the straight line were the simplest marks which divided civilized man from the barbarian. Not all the Roman towns showed this chess board, for Pompeii was somewhat irregular, but that city had a somewhat irregular history, and perhaps when the excavation was complete they might be able to figure out the planning and see what part belonged to Colonia and which belonged to the older town. Many towns which were one Colonia kept the old street lines to this day, and Turin and Florence were examples. They knew from ancient history that Florence took its origin as a Roman Colonia, and they

Berlin: Proposed Opera Place. From a Design by Messrs. Mohring, Eberstadt and Peterson.

Berlin: A Place. From a Design by Messrs. Schmidt, Havestadt, Contaq and Blum.

would see from a plan of the city dated 1427 that the streets divided themselves up into regular chess-board fashion, and it was quite obvious that the origin of Florence was the chess board plan which was proper to the Roman Colonia. The history of the city showed that the first stage was the plain Roman chess board; the second stage preserved vestiges of this plan; and the third stage, which was that of to day, showed the Italian architects going back probably quite unconsciously to the chess-board plan, which was that of their Roman ancestors nearly eighteen centuries before. Professor Haverfield proceeded to show a plan of Timgad in Roman Africa, which occupied an area of forty acres, and was founded in the commencement of the second century, and said it showed what Florence must have been like at its beginning, and what a large number of Roman towns must have been like. In the centre was the Forum, and there was also a theatre and market and baths. Presently the city grew outwards, and regular straight lines were no longer preserved. Ancient law told them very little about any control of this rigid system of town planning. There was the normal administrative control of water and sewage, and lighting where it existed as it did in one or two ancient towns, but one clause appeared repeatedly in town charters and enactments, *i.e.*, "that without the consent of the town council no house owner may pull down a house unless he is going to build it up in at least as good a fashion as before." There was one Imperial edict which ordered that if a site owner in a town did not build on his site, anyone else might peg out a claim there. That, no doubt, was an excellent precedent for a good many modern architects, but he hastened to add that it was an edict issued in connection with Rome after one of the largest fires, and was therefore an exceptional matter. Roman planning had influenced modern town life in various ways. In Belgrade the old market place outlived the ancient Roman town, and another example could be taken from Trier, on the Moselle, in Germany. The old rectangular plan of this town was recovered entirely in the course of sewage operations, for the contractors agreed with the architects and archæologists to take notice of all the Roman streets and joinings they came across, and in this way a complete plan of the ancient town was arrived at. Cologne at the present day had no resemblance to a Roman town, but nevertheless when they planned the thing out one could see that some of the streets did preserve vestiges of the ancient fashion. In the case of Silchester, in Hampshire, they had what might be called town planning put upon a wilderness, for the development was not strictly on town planning lines. Regarding a Roman house in Oxfordshire, which he had been digging out, and one at Cromhall, Gloucestershire, it was evident that these were not town houses like those of Pompeii and Silchester, but a conglomeration of such country houses. In England at the present time the inverse process was going on, and people were found building cottages in the country which were really town houses taken out of a row. All Roman planning was based on the supposition that they started *de novo* and had not to clear away or adapt, and there was no question of rights and property. Again, in all ancient towns the area dealt with was very small, and the problems which arose were entirely unlike those which existed in Chicago or Buenos Ayres. Modern town planning seemed sometimes to be a matter entirely of gardens, but in the Roman town there was no need for any real open spaces, because the place was too small. The Forum was an open square, but it was not an open space in the sense of the modern square or circus. Lastly, there were no [illegible]



Berlin: View of Moabit Quarter. From a Design by Messrs. Schmidt, Havestadt, Contag and Blum.

[illegible]

The Evolution of the Town Planning Ideal Since the Renaissance

Dr. A. E. Brinckmann, of Aix la Chapelle, presented a paper on the above subject [illegible] is reproduced:

[illegible] ally a necessity of the urban population, but it had not yet come to be considered in the light of an architectural creation to be treated as a whole. The attention is centred upon the buildings, considered singly, round the square—*i.e.*, the cathedral, the public hall, and the castles of the nobility, but not at all upon the idea of unity. Hence the town as a whole appears merely as an agglomeration of separate buildings and separate small castles. The streets and the squares are merely areas left unbuilt.

It is but gradually that the streets and square acquired a life of their own and that the ground plan became definite. It was little by little that the Piazza della Signoria in Florence, owing to the demolition of houses by the nobility, was extended and assumed greater regularity, after, about 1300, the Town Hall had been built. The Renaissance demanded a single external calmness in the form as against the restless aspect and anarchy of the mediaeval towns. To develop town planning as an artistic unity, as had been the case before in the Perikles style of town construction, was the object of the Renaissance. We find an example of a town built with regular lines of street intercepting, one another at right angles in Leghorn, which dates from the sixteenth century and represents the masterpiece of De Medici Dynasty.

The influence of Rome was immense. Without the influence of that city modern town planning would be inconceivable. Such perspectives as found in Rome have been models, more or less powerful, for other cities.

The development of the conceptions of town planning, whose native place was Rome, was taken up by France, and first of all by Paris, under a monarchy which looked upon town architecture as the highest expression of its power. If the architectural efforts of Rome were like a violent explosion of energy, France, on the other hand, [illegible] harmony. The idea of considering a city as a unified work of art had already bpeen conceived in France, and if at Vitrey le-Francois (1545) we find a plan exactly in accordance with the principle of the Italian Renaissance, the French architects also designed new forms.

The typical town square originated about 1700 in the Place des Victoires and in the Place Vendome (formerly Place Louis le Grande) in Paris. The facades in the square are uniform, and not high relatively to the area of the space. We find a splendid example of proportions in the sizes of the buildings and in the conception of French architects of rhythm in matters of space in the Place Royale at Nancy, which of all the French "places" or squares is the one best example preserved. The movement in favor of rectangular spaces is indicated by the prominence of the contours of the buildings round the square from the triumphal arch towards the Town Hall, which becomes the predominant edifice, whilst it rises at the same time towards the Carriere, and the way leading to it becomes more monumental. The view through this gate towards the square lacks the powerful movement of Rome, and the square itself is not only an imposing frontal square for the Hotel de Ville, but also a space for festive gatherings. The central closed square of the Renaissance is now becoming more animated after having passed through those periods.

A star shaped square, even, is formed architecturally in this manner. When Roussel, in his scheme for the construction of a Place Louis XV. in 1748 designed six of the ten streets converging upon the square with portals, he arranged for strong supports on two sides of the square, without depriving it of the character of a proper town square. The erection of fountains facing streets started this movement. The slender monument in the centre appeared as the *point de vue* of all the four streets.

The position of the streets round the Odeon in Paris show a monument which has been taken advantage of in this way, and where the front space and the streets stand in the most beautiful proportions to one another. Equally fine also is the Rue de Turenne, rising and widening towards the high gate of the Luxembourg.

In Germany we can observe in Freudenstadt, in the Black Forest, which was built in 1599 by a German architect with an Italian training, a structure which is exactly the same as the Italian Renaissance constructions. The rectangular central square is surrounded by arcades; in one corner stands the Town Hall, with two wings at right angles to each other, and at the other the church, similarly designed. Four main streets extend perpendicularly from the lateral centres of the market, and other streets run parallel with the sides of the market place. The early productions of this period, like Mannheim, Hanan, which were mainly built for the French refugees, follow the regular plan only, without bearing the impress of the lofty conception of the French architects. Nevertheless, sometimes we find artistic productions of this type when they received the patronage of the ruling princes. In this respect we must mention Erlangen. Here we find great beauty obtained by the simplest means.

Next to the more common rectangular plans we find also instances of whole towns centrally agglomerated, as, for example, Neustrelitz, in Mecklenburg, which is built round a market place, and Karlsruhe, which takes for its central point the castle, from which streets run radially through the town and the park.

The great designs were frequently originated by Frenchmen, or at any rate architects with a French training, as in the case of the scheme for building the Berlin Gendarmenmarkt by Bourdet in 1774.

Modern German town planning might well, after the depression of the nineteenth century, seek some instruction in the past. A certain romantic temperament, however, peculiar to us Germans, led us to overlook the lofty architecture of the eighteenth century, and we turned round towards old little towns, like Nuremberg and Rothenburg. I believe that the study of town planning in the eighteenth century would be good practice for everyone, although it cannot—and, in fact, must not—be used as a standard. We find the town planning of that century continued in America, and embodied in the scheme for a general plan of construction of Chicago under Daniel H. Burnham. Whatever doubt the reader may entertain as to the details, what surprises him most is what might be termed the "will of a town." There is no longer now any question of a town being founded by the fiat of a sovereign; it is now a purely democratic creation. It is the community which nowadays has to take over the role of the princes of the eighteenth century in the foundation of cities, so that we may well sa · *"Usui civium, decori urbium."*

Growth of Legal Control Over Town Development in England

Mr. H. Chaloner Dowdall, M.A., of the Northern Circuit, barrister-at law, presented a paper on "The Growth of Legal Control over Town Development in England, Together with Observations on the Expense Incurred by Local Authorities in Carrying Out a Scheme Under the Town Planning Act." He said in the course of his remarks:

There are three ways in which the State may control action within its territory:

First, the State may establish conditions of general application and rely on the action of individuals acting with

Restoration of Selinonte. Elevational View. From a Drawing by M. Jean Hulot.

[illegible] these conditions to produce results [illegible] to the [illegible]. This may be called the common law method.

Secondly, the State may [illegible] or power to acquire and control property within their locality. This may be called the local government method.

Thirdly, the State may itself lay down conditions of local application, or may itself acquire and control property. This may be called the method of direct State control.

Each of these methods, either singly or in combination, operates in the sphere of land development in which town planning occupies an increasingly important position.

The earliest system of land development with which we are concerned is that which was introduced and matured by feudalism, namely, the common law system, which governed all land development in England until the middle of the eighteenth century, and which still remains in force, subject only to those statutory limitations which have been introduced since that time. It is impossible to deny that much of the land, both urban and rural, has been and is being admirably developed under this system. A country gentleman of the eighteenth century often bestowed as much interest and intelligence in the development of his estate as a great manufacturer does on his factory to-day; and the squares, terraces, and semi public parks of London and the provincial towns are in many cases achievements which command admiration. More recent developments of unfettered enterprise are of even greater interest—model factories, model villages, garden cities, and the like are rising up in every part of the country.

In the eighteenth century, under the stress of growing manufacturing industry, the common law system was felt to be inadequate. Villages grew into towns, traffic increased, and accommodation had to be found for a fast-multiplying population; landlords in urban districts, desiring the fullest return from their land, often built houses closely packed together, without proper ventilation, accommodation or access; the roads in bad weather became almost impassable.

The eighteenth century, even in England was not great at representative institutions, but the Parliament of that time thoroughly understood trusts and private bills, and the remedy was sought through other means. A vast number of Improvement Acts and Turnpike Acts and Canal Acts were passed whereby a corresponding number of bodies of commissioners or trustees were authorized in [illegible] proposed [illegible].

Public improvements are still often effected under powers conferred by the local Acts which every year pass through Parliament, but by the time that the Towns Improvement Clauses Act was passed in 1847 one may say that the great period of special Improvement Acts promoted for each particular locality was drawing to a close; for the Reform Act of 1832 had been followed by the Poor Law Act of 1834 and the Municipal Corporations Act of 1835, and the principle of carrying on local government by some uniform scheme of popularly elected representative bodies was now admitted.

[illegible] Public Health Act [illegible] by that of 1872 every municipal borough local board district, and Improvement Act area was constituted an Urban Sanitary District, and similar powers were conferred on town councils, local boards, and improvement commissioners. These powers were more clearly defined and consolidated by the Public Health Act of 1875, and extended in regard to matters with which we are here concerned by Acts of 1888 and 1907. By the Local Government Act of 1894 a uniform type of more popularly elected urban district council was substituted for the local boards of health and improvement commissioners.

And now, having very briefly sketched the growth of local governing bodies previous to 1909, a word must be said in conclusion as to the nature of the Town Planning Act of the year.

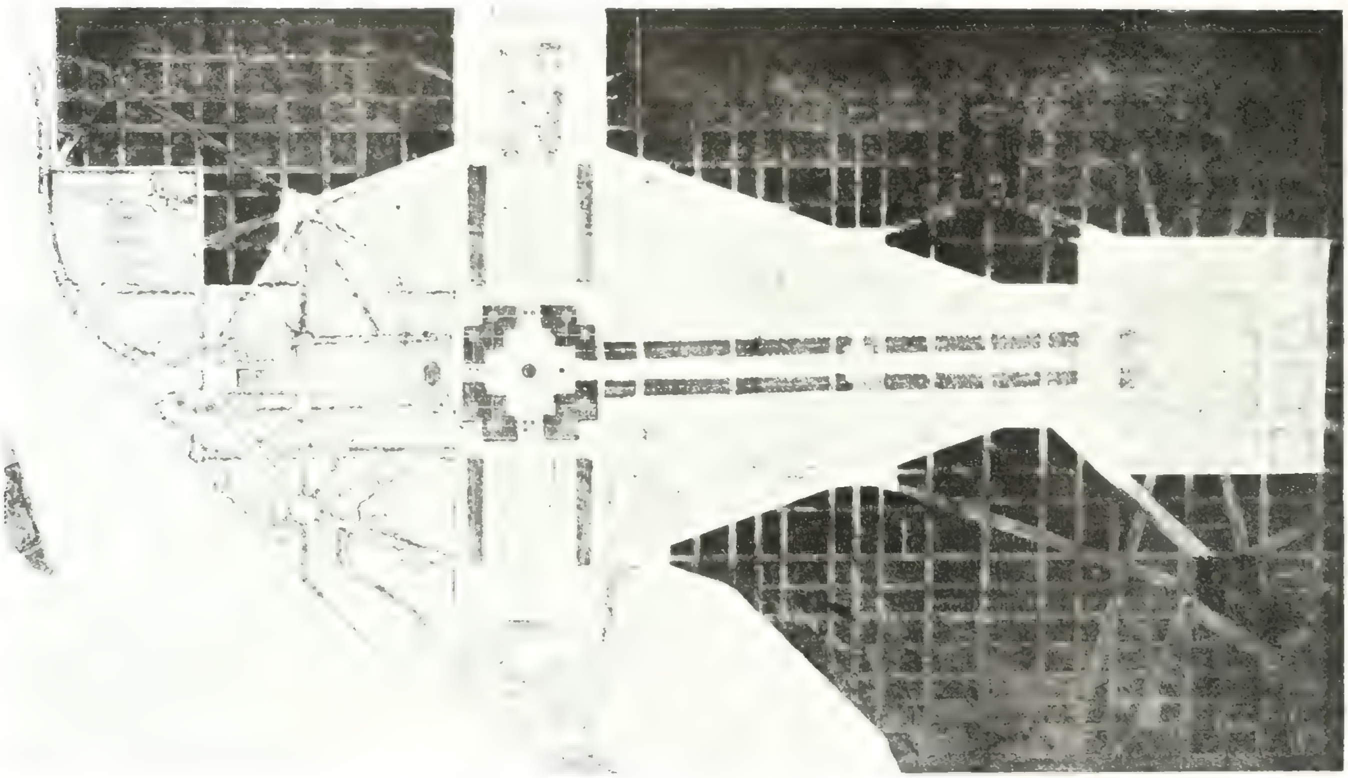
The Town Planning Act relates to land in course of development or likely to be used for building, and in certain cases to land adjacent thereto, whether already built upon or vacant, and it introduces a new and ingenious method of procedure; the effect of a "scheme" approved under the Act is that of a Private Act of Parliament, but the "procedure regulations," which take the place of standing orders in Private Bill or Provisional Order procedure, are specially adapted to the requirements of the case; the central criticism and control, instead of being exercised by a committee of either House or by Parliament itself, will be exercised by an expert department of the Local Government Board, Parliament only reserving to itself a right of veto in certain circumstances. The local authority also, which for this purpose may be either a Rural or Urban or Borough Council, or a combination of them, appears, either spontaneously or possibly under compulsion, as promoter of the scheme and as responsible for its execution. The Act, in short, gives to the Local

Restoration of Selinonte. Elevational View. From a Drawing by M. Jean Hulot.

Government Board a perfectly general power to make local Acts of Parliament, called "schemes," with reference to streets, roads, and other ways, including stopping-up or diversion of highways; buildings, structures, and erections; sewerage, lighting, water supply, ancillary works, extinction and variation of private easements, and all incidental powers. The only limitations on this legislative power vested in the Local Government Board are, first, that if anyone interested gives notice of objection to any scheme, or if the scheme suspends any enactment of a public general statute, then either House of Parliament may within a limited time exercise a veto; and, secondly, any person injuriously affected must be compensated.

This short account of the nature of the Town Planning Act would be incomplete without some reference to the Development Act of the same year, the road-improvement clauses in which establish under the Treasury a Road Board, with power to construct and maintain new roads or to subsidize the construction or improvement of roads, principally in rural districts, to which the powers of Urban District and Borough Councils do not apply.

The Development Act gives the Road Board power to compulsorily acquire land for the construction of new



General Scheme of Mall System, Washington.

roads, and also to acquire land some 220 yards on either side of the new roads, the arbitrator for compensation in such cases being appointed by the Lord Chief Justice and the general control kept in the hands of the Treasury.

Town Planning and the Preservation of Ancient Features

Professor G. Baldwin Brown, M.A., Hon. A.R.I.B.A., in a paper on this subject, said the aim he had in view was the reinforcement, by arguments suited to the occasion, of the old principle that in the laying out and alteration of our towns utilitarian considerations should not override the claims of beauty and of historic association; that zeal for city improvement and extension should be tempered with a conservative care for older monuments, and for those natural features which give individuality and charm to civic and suburban sites. The phrase in the title, "The Preservation of Ancient Features," is intended to include the natural beauties of the situation or surroundings of an inhabited place, as well as its older buildings [illegible]

speculative builder we need hardly concern ourselves here, for this conference should certainly result in limiting to a great extent his powers for evil.

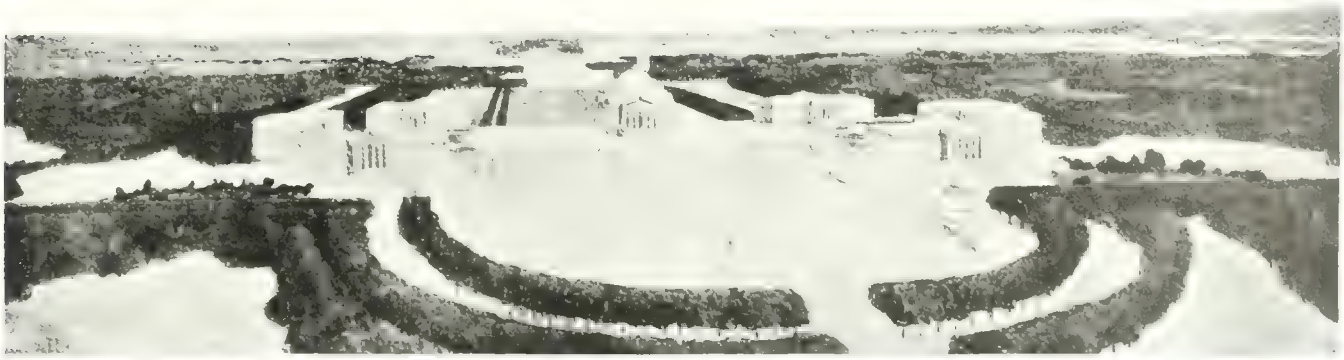
More attention must be directed to that prominent figure in our time, the progressive municipal administrator, who discards antiquated methods and appeals for the votes of the urban elector from his platform of "efficiency."

It was hinted above that even the enlightened town planning enthusiast needs some watching. The "clean slate" has a fascination for many people, especially for the capable administrator dominated by a theory. The civic reformer in every age has been disposed to sigh for the "clean slate"; but these reformers must not be impatient, and must remind themselves that the tablets on which they draw out their scientific schemes are not foursquare, but of infinite variety in contour, and that the surface of them is already deeply bitten with lines ploughed out by the comings and goings of many generations. For cities are not only made, but grow. Furthermore, the growth is conditioned not only by physical but by human environment, and is closely dependent on history.

If we ask, Are these things to count for nothing? there can be but one answer. Every responsible person who is concerned with "town planning" will acknowledge that the historic past has the very strongest claims on the reverent attention of the present; but here again the danger is that considerations recognized in principle may in practice be crowded out through the clamorous insistence of hygienic, artistic, and economic claims.

The increasing evidence of the solicitude of the British Government for the safeguarding of this portion of the national assets is an encouraging feature of our time. The policy that established the recent Royal Commissions in the three parts of Great Britain for the survey of these ancient monuments with a view to their preservation, is of the happiest omen for the future. It is novel for a general Act of the British Legislature to throw the ægis of the law round the beautiful objects of Nature as well as those of Art. It should be pointed out that the Government is in this, following the example of some of the more enlightened administrations of the continent, notably those of France and Prussia.

The recognition by the Government in the recent



View of Proposed Scheme for the Washington Common.

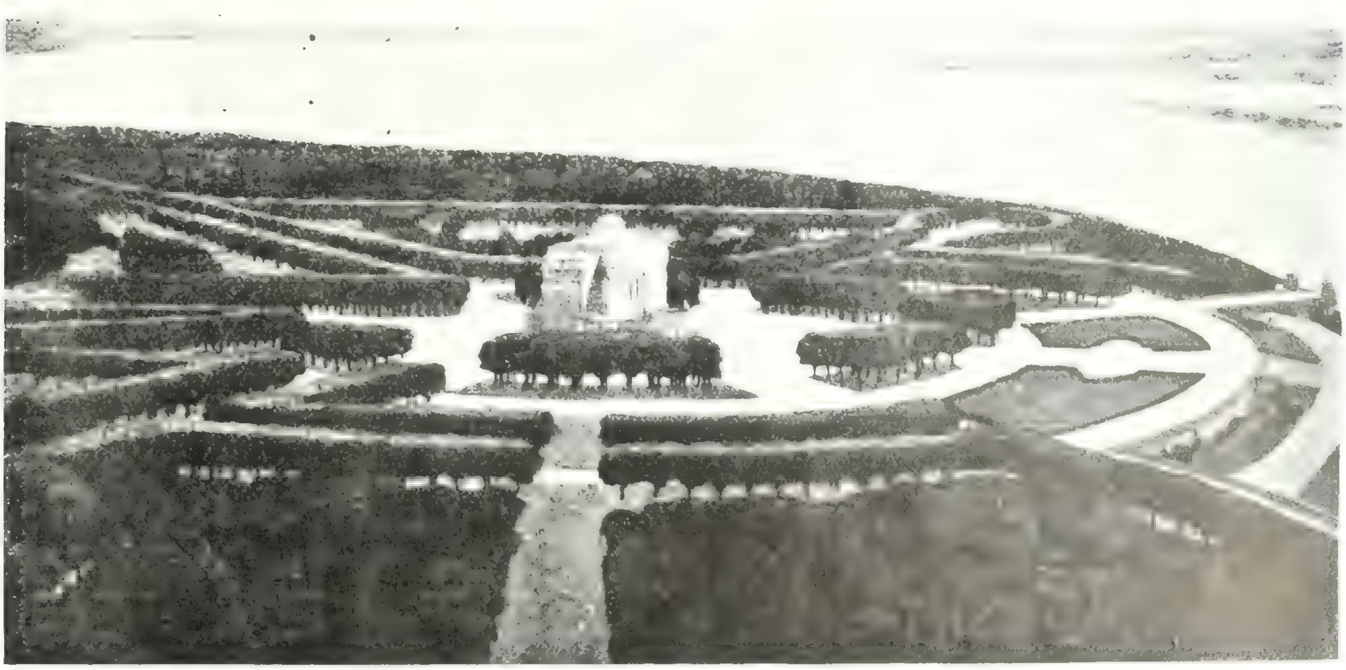
Town Planning Act of the national importance of the preservation of ancient features carries with it a logical consequence. It is obvious that there will now rest upon all the various departments of the British public service concerned in building or pulling down, the obligation to assist in a loyal spirit in carrying out in matters of detail the expressed policy of the administration.

One practical object which is here in view is the devising of means by which alterations and improvements in our towns may be carried out without the disastrous demolitions of fine old buildings or the obliteration of the characteristic natural features of a site.

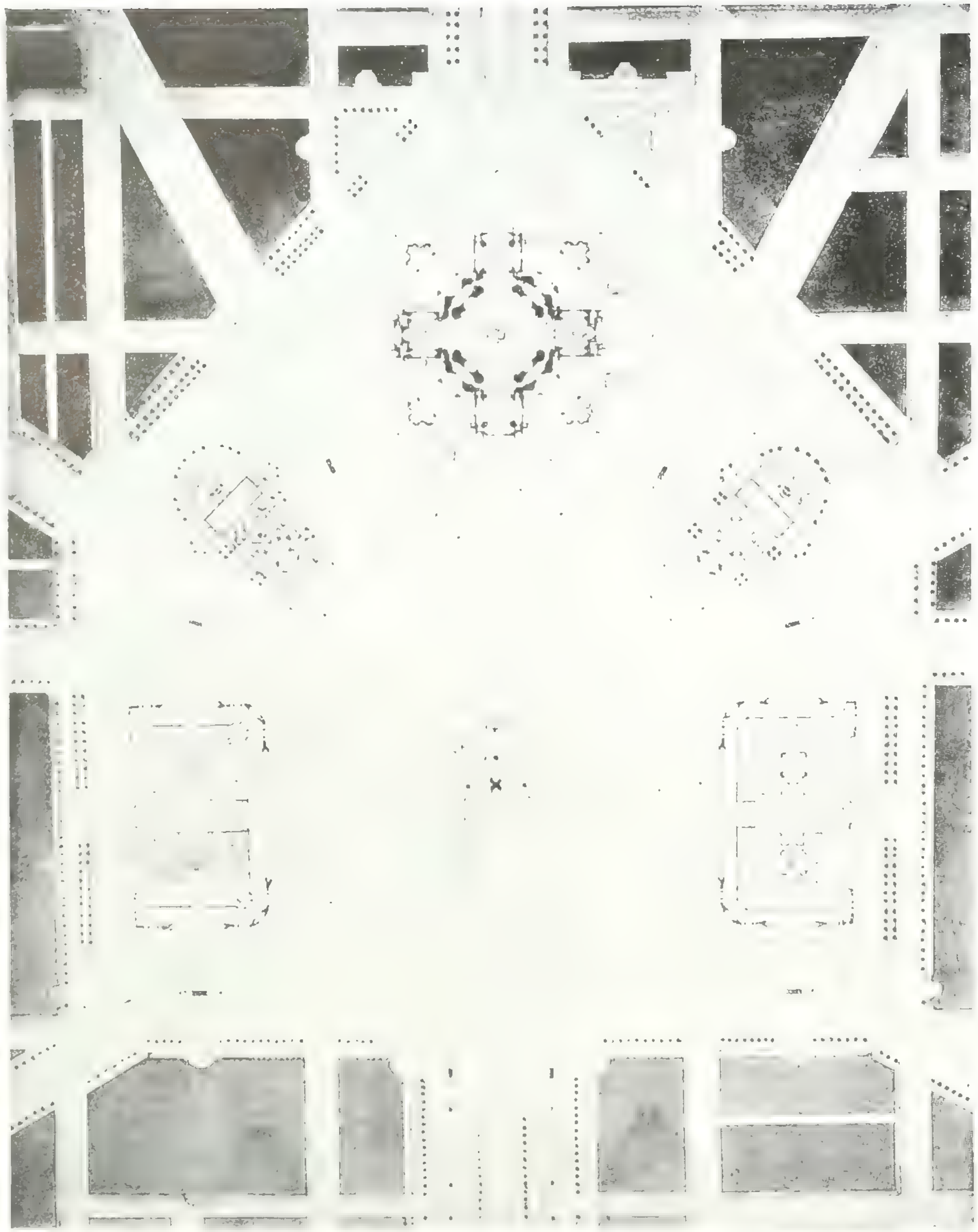
The arrangement of new streets and spaces in accordance with the configuration of a site, so that natural indications are followed out in Art, is so obviously right that one would apologize for mentioning it were it not for the glaring contraventions of the principle in certain modern towns. This does not mean that artificial lines of communication are never to be allowed. It is, on the other hand, a most grievous mistake, always as regards Art and often as regards economics and hygiene, when the configuration of a site is completely altered for large structures of utility or of display. In Edinburgh the running of solid causeways rather than light bridges across the low lying valleys has had the effect of cutting off communication between the upper and lower levels and of thrusting the latter down into squalor. The cities of the well to do and of the poor are in this way sharply sundered, with the worst possible social and economic effects.

The demolition of ancient monuments in the interests of urban extension and improvement is the last, but the most important, point with which this paper is concerned. Its importance resides specially in the fact that in this department whatever is done is irrevocable. If in planning out a new quarter of a city a mistake be made, it is generally possible later on in some measure to correct it; but when a fine architectural monument of the past is destroyed or mutilated it is gone for ever.

It is possible that [illegible] result of the Congress may be the establishment of standing committees to carry out its objects, and if this prove to be the case it might be found desirable for some of these committees to undertake the very useful post of advisers to those in trouble about their ancient monuments, giving them information as to



View of Proposed Lincoln Memorial, Washington



Chicago: Proposed Civic Centre. Design by Messrs. D. H. Burnham and E. H. Bennett.

Chicago: Proposed Boulevard Continuing Michigan Avenue Northward. From a Drawing by Jules Guerin.

where they could best obtain the sort of professional assistance they require.

Cities of the Present

Mr. Chas. Mulford Robinson, Rochester, N.Y., U.S.A., read a paper on "Cities of the Present as Representative of a Transition Period in Urban Development.—The Evidence of Standardizing Streets." In the course of his remarks he said:

The city of the present is the town of the past at, generally speaking, an ungainly age. In the olden days, when, as we look back, we see shining upon it "the light of early morning and the *naivete* of childhood," it was pre-eminently picturesque. The picture still delights the artist spirit in us.

But we know now that in those days the town was [illegible] productive. To be sure, it was a sturdy young fighter, against foes of its kind; often it mischievously made a noise in the world; generally, too, it was light hearted. It was, in truth, a real child city, playing well, fighting well, and, when tired, sleeping well. Indeed, like a child, it was prettiest and most picturesque when it lay asleep. Here and there we discover yet one of the number that has not wakened, and we steal up to it on tiptoe to gaze at the little sleeper and sigh for civilization's childhood—for the care-free days of urban short frocks and tousled curls. Playing and sleeping were the occupations of the community. Now few can work for themselves. Labor is become the community interest, and the fighting, playing and sleeping are only individual or neighborhood concerns.

So the towns of to-day may be fancied as of long legs and arms, with hair slicked down and faces grown sad and serious. They have become poor fighters but great workers; their sleep is fitful and restless. They are the embodiment of a wealth-producing energy, and they have lost the joy of life. Their frames are not fully developed for the work they try to do.

The city of the present is the town of the past, sometimes grown in size, but not adjusted to new conditions. Let us take as illustration one very simple, though very important, matter that is within the memory of us all. Not in the picturesque mediæval city only, but in the city of our own remembrance, it was necessary that the workman live near his work. That necessity is passing.

Nowadays architects and lawyers may have their office in the city and their home in the outskirts; merchant and banker and broker may sleep in the country though their labor is in town; in multitudes the more progressive clerks and salesmen and their families occupy the long rows of detached and semi detached dwellings that make up the outer residence zones of cities. Thousands of men, to be sure, still go to bed over their shops, still sleep within call of the factory whistle; but other thousands, in a throng that grows with astonishing rapidity, considering how radical the domestic upheaval involved, now have daily change of scene and air, entering at nightfall into a peace which industry and commerce may not molest.

Obviously this is a social readjustment of incalculable value. But it has expressed itself very inadequately on the city plan. Though business sections and home sections have become divorced, and consequently have developed entirely different traffic requirements, yet, generally speaking, the street plan has remained unchanged.

Adequate recognition would involve two groups of changes, and these, when made, or if made, must definitely differentiate the city of the present from the mediæval town, and even from the city of the last century. These changes would be, first, the provision of long, straight, broad radial highways of easy gradient. Such thoroughfares, shortening time and distance to the outer zones, would facilitate the daily ebb and flow of travel, and would increase the area available for home-building. Second, the changes would involve a re-arrangement of minor streets, adjusting them to the needs of the sections which they serve, largely new needs in home sections.

How unlike are the needs of various sections must be obvious at a glance. Contrast the traffic requirement of a street in the business district, a street in a laborers' residence district, and one in a region wholly given up to villas in spacious grounds.

To illustrate concretely, let us take the Borough of the Bronx, New York—a region [illegible] topography, and illustrating within its considerable area almost every kind of suburban development. Yet here a general ordinance dealing with the arrangement of streets requires that all streets 60 ft. wide shall have a 30 ft. roadway, all streets 80 ft. wide a 42 ft. roadway, any street 100 ft. wide a 60 ft. roadway, etc. For example, as to the other aspect of the matter one may turn to the city of Washington, which we like to think of as so admirably planned. There a law requires that all new streets shall be not less than 90 ft. in width.

Consider the economic loss involved in such "mechanical standardizing"—an evil of which the United States has no monopoly. In fact, Mr. Olmsted, summarizing his observations on a city planning trip in Europe some months ago, remarked that such standardizing was to be found "in not a few quarters of European towns, perhaps most noticeably in England."

The economic loss that results is of two kinds, and it is all reflected in the rent. In part this loss is represented by the actual municipal outlay for the paving and maintenance of the unnecessary street space, and in part it is represented by the increase in rent traceable to the amount of building land taken out of the market in order to supply the needless street space.

Æsthetically, streets gain nothing by excessive width. The grass and flowers, and air and light, can still be had. Assuming that it is our right to force them on the community, we still could narrow any distinctively secondary street to such proportions only as the traffic really, all things considered, needs. For this would lengthen the abutting lots, and we might then establish a building line in front of which no structure on a given street, or portion of street, should project. If the community still felt the need of forehandedness, it could secure an easement over those restricted spaces; the desired amenities would become attributes of the home rather than of the street, and better so.

Childhood is very dear and picturesque; but it passes at last in all our human institutions. Of these none is so complex as a city, and for none is absolute efficiency and adaptation to function so important. To plan streets on a system devised to meet the needs of an outgrown age is to impair their efficiency and to cause an economic waste which bears heavily indeed upon us all, and cruelly upon the poor.

In the ideal city of the future the system surely will not persist. Already there are numberlesss instances of its breaking down, and so fundamental is the planning of the streets that no other merits of the modern city can atone for shortcomings there. To our lost urban childhood, the streets of the little city of long ago were better adapted than are most streets now to our lately-attained and strenuous urban manhood. We need to recognize the modernness of the problem, and to approach it with unprejudiced freedom and common sense.

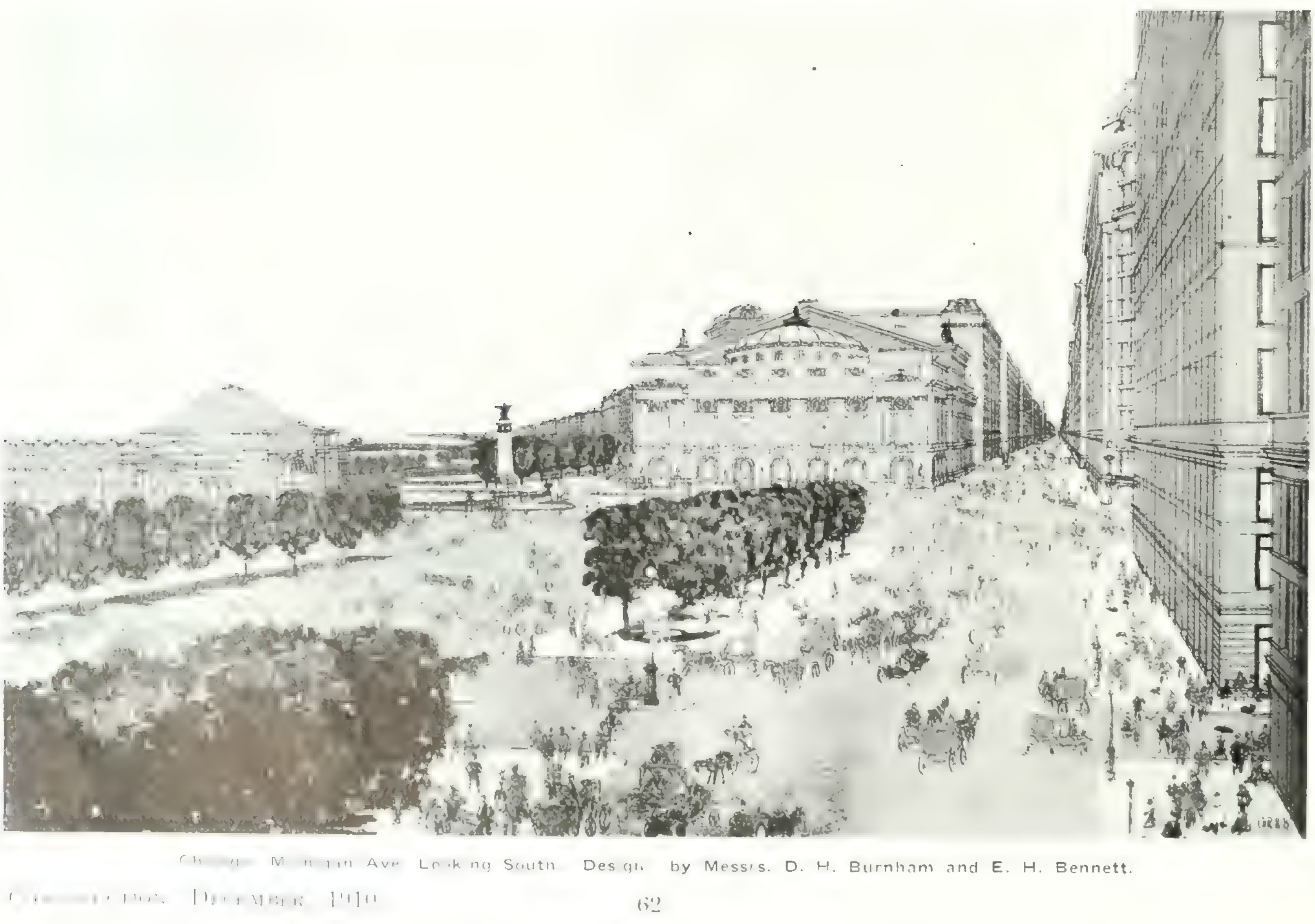
Cause and Effect in the Modern City

This paper was read by Mr. H. V. Lanchester, F.R.I.B.A., and is reproduced herewith in part.

The causes influencing the outward aspect of the city are of the widest imaginable range, embracing the whole life of man, and is it is hardly possible to conceive any factors, whether physical, psychological, racial, or social, that do not act and are not themselves reacted on by the structural environment of the community.

To state the matter more fully, we have the large factories and warehouses grouping themselves along first the river, for the sake of water power and transport, and subsequently the canals and railways when water power became unimportant and transport the main requirement.

The Chicago Exhibition, 1893: Court of Honor. From a Drawing by Mente.



Chicago: Michigan Ave. Looking South. Design by Messrs. D. H. Burnham and E. H. Bennett.

We have the original city gradually taken up by commerce and exchange, the residential districts filling up by degrees the spaces between the star points composed of mills or factories, and the retail traders following along the main radial arteries. The most attractive district will naturally be selected by the wealthy, and the others will secure occupants on a basis of necessity or convenience.

The governing or official centre will, unless firmly fixed by tradition, slip into a position between the commercial centre and the wealthy quarters, while the leading places of entertainment will gravitate in the same direction.

There is, by the way, one factor that, dating from the remote past, still operates at the present time, to which we may devote just a moment's attention. Explanations of the tendency towards the formation of a "West end," so clearly marked in almost every city (where the natural formation of the cite does not forbid it), have been frequently attempted; the most usual is to regard it as a question of the prevailing wind, a solution which I have always felt to be doubtful. My own conclusion is that, the time of leisure and recreation coming towards the latter end of the day, man naturally turns his steps towards the brightness of the evening sky. Try the experiment; place yourself at four or five o'clock where the conditions in all directions are fairly similar without any preconceived intention, and see which way you feel naturally inclined to move. Will it not be westward?

To resume our inquiry into the causes influencing cities as they are. Having maintained that these are not mainly economic, it may appear inconsistent to admit that the general distribution of the city is chiefly determined on economic grounds. But one may admit it and yet deny that this general distribution bears the more important part in the impression received. For it needs investigation to grasp it, while the character of the buildings, their local massing, and arrangements are obvious to the casual observer. It is in these cases that the ideals come into play.

Thus the British convention for a church or a house differs far more from the French or the Italian than the merely material requirements demand, these differences being symbols of similar ones in the conventions of life. National character and national ideals are the paramount influences, arising out of climatic demands and historic traditions.

Thus we find the English house designed to stand a more boisterous climate than the French; but the English house in a sheltered position remains English, and the French, however exposed, will be French.

More important is it to take the broad differences in the manner in which two nations would approach the problem of erecting an important public building—say, a Law Courts, a case in which the very name starts us on our way, when we compare it with the title Palais de Justice; ours, short and businesslike, suggests the aim of fulfilling the practical requirements in a convenient and economical fashion, while the other hints at the first necessity of creating a mental impression of the dignity and paramount force of the law. The building abroad would not be wedged in between a congeries of narrow streets that it might be conveniently near the established quarters of the lawyers, nor would the designer be at pains to make the traffic lines in the building as short and direct as possible; indeed, we find a spacious carelessness as to the number of steps to be taken between the various rooms, suggesting the intention that time is well spent in passing from ahll to hall and through vestibule, corridor, and staircase, if by this means the majestic dignity of the building may penetrate and impress itself on the mind. The varying importance attached to emotional influences of one kind or another must be regarded as one of the causes making for difference in the character of the city among the nation and even in different districts.

Is it not an almost invariable rule that the Anglican church shall build in some form of Gothic? Again, how would it appeal to the householder if his garden were left unfenced, as in the United States? Even the garden city community compromises with posts and chains; while half our building by-laws are based on no real necessity, but on traditional ideals.

As to the house itself, probably nothing determines the general character of the city so much as the dwelling unit.

The Englishman's notion for a house "all his own" does more to fix on us the type of our city than any other consideration. This is obviously not a matter of eco-
does more to fix on us the type of our city than any other consideration. This is obviously not a matter of eco-
nomics, but one of ideals; the feeling of privacy and of a certain dignity as householder, mixed perhaps with other less admirable motives, turns the scale in favor of methods that may not be more convenient and economical.

There are other qualities in our countrymen that cannot be regarded with so much equanimity, and which we can only stigmatize as inimical to the best developments of civic design.

In the main they arise from an unfortunate tendency to specialize in interests rather than to take a broad view of life as a whole. One thinks of nothing but commerce; another devotes himself to sport; while a third regards the acts as only to be taken note of at recognized times and seasons, if at all. The latter will perhaps fill the house with interesting pictures, his gardens with carefully selected flowers, or maybe he will go, with mind attuned to appreciation and criticism, to a pageant or play; but he will pay no more attention than the trader or the sportsman to the aspect of the streets through which he passes. Until national feeling is awakened in these respects, and we realize that our art is not a thing to be taken in specified doses at specified times, the ideal of the city as a thing of beauty in all the aspects of street, square, and park will receive but poor support support from the general public.

Town Planning in Sweden

The progress of Sweden in town planning is recounted in part in the following paper, which was presented by Dr. Ing. Lilienberg, of Goteberg:

Sweden in the seventeenth century was strong, while the organization of Russia and Germany was unsettled. When Sweden had lost its greater political power its Government always kept up the influence over the interior conditions and regulated the forming of the towns as well as the construction of the buildings.

And so we see that since the beginning of the seventeenth century towns in Sweden have been built according to fixed plans. A great number of towns were then laid out by the orders of the kings, and the royal charters were usually accompanied not only by drawings of plans that were to be followed, but also by regulations as to how these towns, generally speaking, were to be built. In the case of newly-laid out towns as well as those already existing, a grant was made of the ground required by the inhabitants for their future main means of sustenance; and in this we see the beginning of the great landed properties usually owned by Swedish towns.

As a consequence, the governing powers had a very direct and powerful influence on the life and future of the towns; but this patriarchal time is over. There was a long period of transition in Sweden, which may be said to have had its actual beginning in the public law of 1734, in which was anticipated a special law touching the building of towns, and which lasted until such a one was forthcoming, viz., 1874. But during these 140 years of waiting building operations were fortunately of such a comparatively insignificant nature that one did tolerably well with royal circulars and building by-laws for the various towns and, as a rule, by working out the plan for the development of a town and submitting it to the king for confirmation.

However, in the fifties the towns begans to develop more rapidly than before, and in 1866 large extension plans were approved for Stockholm and Gothenberg, as well as other places, which plans were expected to be followd by a large number of plans for smaller towns. The [illegible] 1874.

[illegible] planning and building of towns in conformity with the requirements of hygiene, comfort, communication, and [illegible] different economic interests that were of a conflicting nature in the execution of the town plan was not forthcoming until the year 1907.

So far as I know, the law of 1874 is the first building [illegible] drawn up, which included all the various subdivisions I have just enumerated. It is true that at the moment it is [illegible] with the times, but in very many respects it is still a pattern for a law of this description, since it is dictated by a broad regard for the requirements of the citizens for easy communications, comfort, air, and light.

All town plans are carefully drawn on the scale of one two thousandth part of the actual dimensions. On the plan, or on a supplementary plan, particulars of the height and slope of all parts of the ground are indicated by the use of appropriate means, and the plan is accompanied by the necessary explanations.

The town plan must be so prepared as to ensure:

That streets shall be wide and shall run in the directions most suitable for traffic;

That large and suitable sites shall be provided for markets, harbors, and other places where there will be much traffic;

That wide promenades (or boulevards), with shrubberies in the middle and roadways on each side, shall traverse the town;

That as many as possible other public planted open spaces shall be provided in the town.

When a new plan is prepared, or an existing plan is altered, for the regulation of one or more districts of a town, regard must at the same time be had to the future regulation of other town districts which may possibly come into existence, so that an harmonious arrangement of the whole town may be obtained.

In Swedish towns a private landowner may not send a plan for his property to the Government for approval. He has to apply to the surveying department of the town, and the scheme will not be sent to the Government unless it has been adopted by the town council. On the other side, the town council has the right to make a scheme for a part of a town without any demand of the owner. The law of 1907 has, to a great extent, influenced the English [illegible].

In order to facilitate the working out of a scheme and to stop speculation the community may claim a prohibition of erecting of buildings on a certain area that is to be planned.

In Sweden such restraint cannot be imposed for a longer time than six months, while, for instance, in the law of Saxony, it may last for two years.

When the law proceeds to divide the costs of the carrying out of the plans between the owners and the community, and, besides, to settle all disputes between these two parties, it presumes it to be indubitable that not only the town but also the private owners will derive benefit from the scheme being carried out. The burdens have, therefore, been divided between the landowners or those who are building and the community in this way: that the former have to bear the costs of the street ground up to the normal width, fifty nine English feet, whereas the town has to pay for all the ground over this normal width.

In carrying out a scheme Swedish towns have a good help in being allowed to acquire right of expropriation, not only for the carrying out of a complete plan, but also of the whole town districts, provided these are insanitary or overcrowded, [illegible] town in order to secure main roads for traffic over certain districts not included in the town plan. With regard to such districts the town has right to get general rules laid down relating to the building thereon without the necessity of making out a scheme for the streets. Our Swedish law enacts that the expropriation commissions must not take into consideration the increase in value which has resulted from the carrying out of a town planning scheme."

Civic Improvement

[illegible] R.I.B.A., [illegible] Department of Civic Art, School of Architecture, University of Liverpool, in the course of a paper on "City Improvement" said:

It is not often that an occasion arises for the planning of an entirely new town, but opportunities for making improvements are constantly happening. This is a congress of architects, and our interest is in the first place an architectural one; therefore, important as are those [illegible] are always involved where an alteration in a city is projected, I propose to deal only with the architectural is[illegible] with English towns.

In an age of constant international communication, the barriers which separate nations in the direction of their arts are the first to be broken down. At a time when England and Germany exchange ideas by the frequent visits of their societies and deputations, by international congresses and exhibitions, with cities like New York built up in a decade entirely from "motifs" borrowed from European models of the past—at such times it is imperative that we look far afield.

Lack of cohesion in style is, of course, more noticeable to us than to a foreigner. True we have had the influ[illegible] mestic work, but it is to our monumental work that I particularly refer. In America they have had the strong personal influence of pioneers like the late Charles Follie [illegible] the traditions of the Ecole des Beaux Arts. The lack of cohesion in style which I see in England may be largely due to the Gothic revival of 1870 and thereabouts, certainly its destructive influence was never quite felt in other countries as it has been here.

The expression of endurance, solidity, playfulness, elegance, etc., are wrapped up in questions of style and character. It is the correct expression of these things which is, after all, the important thing, and this can only be done by a sympathetic use of traditional forms and a recognition of style.

Many of the worst features of modern architecture arise out of an exaggerated regard for the trivialities of modern life, or owing to a too evident desire to explain some details of construction which it is felt must appear on the face of the work.

But apart from this question of style, yet very closely allied to it, comes the question of scale. A comparison of London with Paris or with New York, or a comparison of provincial towns, Liverpool, Birmingham, or Glasgow, with London, shows us that, after all, the æsthetic value of a town approximates very nearly to its appreciation of scale. More than half the mistakes that are made in connection with city improvements in England arise out of a lack of appreciation of scale. By scale I mean not only comparative size, but also comparative appropriateness and fitness. I mean that to make a town look big it must be framed up in huge but simple lines, be filled in and interpenetrated by interests analytically separable and subordinate to one another.

A great city must be built on a great scale; it must have wide streets, wide sidewalks, and big buildings simply composed; it must concentrate its interests at points, and must not spread it about with reckless waste. I do not look disparagingly ahead; on every side I see evidence of the need for a bigger scale, and the advent of the Ritz Hotel and Selfridge's Store mark a change. Still, It is heartrending to think of the number of costly buildings that have been erected in London and our provincial towns during quite recent years which, though big in scale and measurement, in some exhibit a miserably poor appreciation of the importance of their place. It is only by a bigger comprehension and a better appreciation of the [illegible] of design that we can hope to get better sense in the architecture and composition of our towns.

In regard to sculpture, our system in this country seems to be to erect wherever possible portrait statues of great men. So far as I know this is quite a modern idea. I stand to be corrected, but I feel very strongly that the [illegible] value of a piece of sculpture is the only value it possesses which is of any worth. Its aesthetic value is proportionate to the power it can exert in arousing abstract feeling and not concrete ideas in the crowd. I feel that the portrait statue as such is best consigned to the gallery, to be regarded as a gallery piece, or should be treated as a bust or medallion surmounting a pedestal or supporting a sculptured group of symbolic worth; the right sort of sculpture to be placed in the city and amidst the crowd is such as tells an abstract tale—a figure of Liberty, Maternity, Justice, Peace, War, or some such symbolic subject inspiring to civic and national pride.

The finest type of sculpture is that which is purely allegorical, which stands simply for the poetry of nature and of human life. This is misplaced midst the busy throng. It should be reserved for the quiet corner and for the park; not the entrance gateway or the centre of the main boulevard, but in the recesses of the green arbours around the fountains, midst the flowers, where its intimacy with nature and its retirement from the throb of the city enables it to exercise a mystic charm.

Then we have the fountains, lamp-standards, and other incidents of a utilitarian kind. Fountains, like allegorical statues, are seen at their best midst green trees and in quiet and secluded spots. We need more [illegible] places in our cities; such places need not all be in the parks. Here, in replanning our cities, great improvements could be made. The quietness of our railed-in squares corresponds in some measure to what I have in my mind.

In conclusion, I may say we hear a great deal about English architecture preserving English character. I am one of those who look upon the expression of character as being an affectation when not a subconscious sort of thing. It is significant that at this congress are representatives from many nations. Facilities for travel have made it inevitable that we be dependent upon one another. We would be foolish to close our eyes to the successes of our neighbors; we would be as foolish to shut our doors upon the things of which we ourselves are proud. Year by year the architecture of the civilized world will become more cosmopolitan and international. We should not resist, but should welcome such a result.

The City Development Plan

Mr. Raymond Unwin read a paper on this subject, from which we take the following:

Mr. John Burns's Town Planning Act has wisely concentrated the attention of town planners in England mainly on the development of the still unbuilt on areas round existing towns where the greatest damage is now taking place. We must, however, not suppose that we can con[illegible] the suburban areas by themselves. City planning really involves the whole problem of the proper organization of city life. The high degree of specialization upon which modern industry and life depend points to the probability that a very large proportion of the population of civilized countries will continue to live in, or immediately about, great city centres. The growth of our industrial towns during the last century found us unprepared. We need to bring into our city life that guiding oversight and direction in making the best of the facilities which its position affords, and that proper correlation of all the different parts which are found so essential in a great modern industrial concern.

The first thing to be done in relation to the extension plan is to determine the general lines on which the city should be encouraged to develop; determine which areas it is important to reserve for industrial purposes, for providing new railway accommodation, docks, harbors, warehouses, etc., and which should be devoted to residences of various classes.

In considering the general [illegible] that town development should take two extremes may be mentioned. Either the town may extend in solid continuous rings [illegible], or it may increase by the growth of numerous detached townlets spreading from some centre, such as an existing village or a railway station on the outskirts of the town.

The essential idea that after a certain size the development of a city should be by the formation of supplementary centres on the outskirts, and the recognition of the importance of securing that the indefinite expansion of these and the central town into closely built up areas should be checked, and that defining belts of park, woodland, or open country should be reserved, seems to me of the utmost importance.

If towns of great size are to be wholesome dwelling places, it seems necessary to adopt one of two courses. Either we must give to every house a considerable extent of ground, which means spreading the town over an excessively large area, increasing unduly the distances which have to be travelled and creating the maximum difficulty in supplying and maintaining all the various services and conveniences of communal life, either material or social; or we must develop on the principle of grouping our buildings together in certain parts and leaving adequate open spaces around each group. This seems to me both the right and natural course. It is rendered easy by modern means of transit, particularly by street tramways, which have been found hitherto, perhaps, the most efficient means of conveying large numbers of people about urban areas. It renders easier and less costly the distribution of water, light, heat, telephone, and all other such conveniences, and at the same time fosters a much more interesting and varied character of development. City life is essentially co-operative in character, and I do not think that the ideal city life will be the setting of every individual house within its own quarter-acre plot of garden, but rather the placing of groups of houses within their own hundred acres of park. This is the method of development that has in past times been adopted when sufficiently highly organized groups have made settlements for themselves. In the great ecclesiastical establishments of the Middle Ages, for example, we find this method adopted, and, to take a most extreme example, it is said that in the days of its glory the Palace of Versailles has housed as many as ten thousand people—the population of a small town [illegible] parks and gardens which surrounded the palace. Contrast the possibilities for social life and organization of this palace with what there would have been if those thousand people had been scattered over the park, each in his own cottage. A great many considerations must influence the widths of highways and minor roads.

Having settled the purpose of different areas, determined the general character of growth and the approximate directions desirable for main and subsidiary highways, the town planner finds himself with the following [illegible] the main centre point or climax dominating the whole, the secondary centres in definite proportion and relation to it, [illegible] difficulties which have been found to exist in American cities seem to me to arise from neglect of the proportion[illegible] the town being planned in relation to the smallest unit the building block—it consists primarily of a mass of detail framework having no relation to anything but itself. The excessive inconvenience of the indefinite multiplication of small units of the building block is forcing the American cities to attempt the very difficult task of super

Chicago: Proposed Plaza on Michigan Ave., West of the Field Mus eum. From a Drawing by Jules Guerin.

Elevation of the Field Museum of Natural History.

imposing a framework upon this rigid mass of detail, a task not only enormously expensive, but, from the point of view of producing a successful artistic result, well nigh hopeless; and looking at some, at any rate, of the plans which have been prepared for the further development of American cities one is led to think that the fundamental wrongness of this type of plan has not yet been recognized, as apparently they are but reversing the order that has to be adopted in the town improvement scheme, and are trying to superimpose on a framework of main highways another rigid framework of minor roads, which, though it may have some distant relation to the whole, bears no proper relation or proportion to the spaces resulting from the character of the main framework. That the minor roads in the northwest corner of a town should be parallel with the minor roads in the southeast corner, though it may look pretty on the plan, is a matter having in reality no value whatever; but that the minor roads should have a definite relationship to the secondary or main roads of the framework to which they are adjacent is essential as much for convenience and economy as for securing a satisfactory artistic treatment of the street. No system cuts up the land into more awkward corners, or more thoroughly destroys the street facades, than that which consists of a framework of diagonal highways laid upon a rigid gridiron system of minor roads, and from no system do such satisfactory road junctions result. In town planning it is essential to avoid being carried away by the mere pattern of lines on paper.

Rome

Dr. Thomas Ashby, Director of the British School at Rome, read a paper on "Rome," from which the following is taken:

The natural topography of the site of Rome and the circumstances of the growth of the city alike render any systematic scheme of planning a very difficult one to adopt. The main lines of the streets were fixed from very early days by considerations of an entirely different nature. The Palatine hill, the nucleus of the city, was no doubt occupied by the original settlers, owing to the natural advantages of its position. It was almost entirely surrounded by abrupt cliffs rising from deep valleys, swampy at the bottom, and frequently flooded by the Tiber, and was only connected at a single point with the tableland on the north by the ridge of the Velia, on which the Arch of Titus now stands at its north-east corner.

The first extension of this settlement, towards the east and south, formed the Septimontium, including the two summits of the Palatine, the Velia, the Fagutal, Oppius and Cispius (these three all parts of the Esquiline), and (perhaps) the Caelius.

It is to the middle of the sixth century, B.C., that tradition assigns the construction of the Cloaca Maxima by the Tarquins, before which it is impossible that the Forum could have been used as a market place. Professor Lanciani has well pointed out that the three main cloacæ of ancient Rome—the Cloaca Maxima, that of the Campus Martius, and that of the valley of the Circus Maximus—are simply in origin streams, which have been first regulated and then roofed over. The irregular course of the first of these indicates this fact clearly. The inclusion of the temple of Janus within the city boundary must have been a consequence of the fusion of a Sabine settlement on the Quirinal with the original community, and the selection by the united body of the Capitol as their citadel (*arx*) and the seat of the *templum Iovis Optimi Maximi*.

The Viminal (between the Quirinal and the Esquiline) and the Caelian (or the remaining portion of it) no doubt became parts of the city, either simultaneously with, or not long after the changes just dealt with, and the result was the city of the four regions Suburana, Esquilina, Collina, and Palatina.

The next stage in the development of the city is marked by the "Servian" wall, which, on the west and east, coincided with the pomerium, while on the north and north-east it included a great portion of the tableland from which the Quirinal, Viminal, and Esquiline originate, and on the south it took in the Aventine, which remained outside the pomerium until the time of Claudius. It thus enclosed what came to be known, at any rate in the time of Cicero, as the seven hills of Rome—the Palatine, Capitoline, Aventine, Caelian, Esquiline, Viminal, and Quirinal.

The "Servian" line of fortifications was laid out with considerable skill, following, where possible, the edge of the cliffs of the various hills, the wall being there constructed on the same system as that of the Palatine, with blocks of similar size. Where it had to cross the tableland, from which the Quirinal, Viminal, and Esquiline originate, it was necessary (for a length of nearly a mile) to adopt a more complicated system of defence. A ditch, 30 Roman feet deep and 100 wide, was dug, and the earth thrown up on the city side; this was supported by a massive wall on the top of the ditch, and sometimes at the back by a smaller wall.

The lines of the streets were, in the main, dictated (1) by the natural features of the site, with its seven hills and their intermediate valleys, and (2) by the position of the gates in the Servian wall, from which issued the roads upon which the supremacy of Rome depended. When the city later on outgrew its boundaries and issued beyond the Servian walls, the main lines of streets were already down by these military roads. The city as a whole, however, seems to have grown up quite unsystematically; it had narrow and ill built streets, and the central portion, between the hills and the river, was cramped and overcrowed, though it had already overflowed into the Campus Martius. This area, however, which had originally served for military purposes and for recreation, was mainly occupied by public buildings.

Julius Cæsar was the first to grapple with the problem. He realized the necessity of improving the communications between the Forum Romanum and the northern portion of the city, and the changes which he made in the Forum and the building of the new Forum Julium were directed to this end. These changes were difficult and costly. In a letter written in the summer of 54, B.C., Cicero says: "Cæsar's friends (I refer to myself and Oppius) have felt no hesitation in spending 600,000*l*. in extending the Forum. The owners of the property would not consider any smaller proposition.

Augustus continued on the same lines, completing the plans which Cæsar had begun, erecting a temple in his honor at the south-east end of the forum, and himself adding another Forum on the north-east of that of Cæsar. He also carried out a second delimitation of the rival banks. Whether it is from his reign that the actual embankment of the Tiber dates, we have no means of knowing. Certainly the ancient system, as seen at the Pons Aelius (Ponte S. Angelo), has some advantages over the modern; the walls were arranged in steps, which gave three different widths to the river at different periods of the year, the flood arches coming into use as required. This secured a faster flow in dry weather, and prevented the silting up which now so often occurs, and considerably increased the water supply of Rome. The first public baths the thermae of Agrippa, were constructed in his time.

The next great epoch of change in Rome is the latter part of the reign of Nero. This Emperor compelled private proprietors to reconstruct their houses in a more substantial way, and to allow greater width for the streets He himself constructed public thermæ in the Campus Martius.

Vespasian, the founder of the new Dynasty, rebuilt much of what had suffered destruction during the tumults which preceded his accession, and, above all, the Capitol; he also added a new Forum, with a temple of Peace in the centre; he erected the Colosseum on the site of a great lake in the gardens of the Golden House; and, as censor, carried out a new survey of the city. The results of this were probably recorded in an earlier form of the

[illegible]

Trajan's most important achievement in Rome was the [illegible] the problem of easy communication between the centre of Rome and the Campus Martius. It is not easy to see why this solution had not been adopted by any of his predecessors. The discoveries of 1812-14 and those of 1906 have shown that where the column of Trajan stands, and also on the site of the north eastern hemicycle of his [illegible] levels and a different orientation; and the reference of the inscription on the column must be, not to the original height of the hill at the point where it stands (for we can no longer believe in the existence of a ridge connecting the Capitol and the Quirinal), but to the greatest height to which the hillside was cut back.

The troublous times between 235 and 284 allowed of little building activity, except for the hasty construction of the *enceinte* of Aurelian and Probus (270-282). These walls seem in the main to have followed the boundary of the regions (and the *octroi* line), though they took great advantage of existing buildings, which were indeed made use of to about one third of the total length of the *enceinte*. The walls are of brickwork, with an internal gallery and towers at frequent intervals. They have, of course, dictated in large measure the subsequent topography of the city.

The upper portions of the city of Rome were deserted after the Barbarian invasions, and the destruction of the aqueducts on which they depended for their water supply, and mediæval Rome occupied only the lower portions of the ancient city, the hills being dotted with isolated churches and convents, but otherwise given up to cultivation.

The hills were free of buildings for the most part, and largely occupied by villas and gardens until after 1870. It was only then that the upper parts of the city began to be once more inhabited, and even at the present day the south-west portion of the area within the Aurelian walls still gives an excellent idea of the quiet and peaceful beauty, the disappearance of which those who have known Rome for forty or fifty years cannot help viewing with some measure of regret.

THE TOWN PLANNING EXHIBITION

The exhibit held in connection with the conference gave the members and visitors an excellent opportunity to familiarize themselves with the various schemes that are either being worked out or projected with "town planning" work. In commenting on this feature, the *Builder*, London, says:

"It is no exaggeration to say that the exhibition marked an epoch in the history of architectural progress, for, [illegible] that the town planning movement will go down to pos[illegible] Burlington House [illegible] hitherto held. Though it may be admitted that England cannot take first place in the world of art, it can, however, fairly claim to have been early in the field in organizing an international exhibition of town planning. That the intention was absolutely realized cannot be contended, but that the attempt comes as near as it did is something to [illegible] hibits were not quite proportionate, the relative represent[illegible] in the exhibition held in the summer at Berlin.

"The Royal Academy is to be congratulated on its prescience in making this the first occasion on which it has granted the use of its galleries to another body, and its liberality in so doing deserves the warmest recognition.

"As might be expected, Germany and Austria were well represented, while the United States took a leading position. England's exhibit was as much as one would expect, but France and Italy were disappointing, the former showing little beyond a fine series of plans of Paris and Mr. Herrard's studies of civic improvements, while the latter's exhibit was limited to a series of plans of Rome."

Of the illustration shown throughout these pages, there are several schemes pertaining to improvements in England with which a large number of Canadians are already acquainted. One of these is a model of a portion of Hampstead Garden suburbs, a project which reflects great credit on its authors, and which has beyond doubt the æsthetic and practical advantages of building up a district according to a preconceived plan. Equal in importance is the drawing, by Mr. Robert Atkinson, of Mr. F. Prestwick's winning design for improvement at Port Sunlight, which shows the proposed scheme for a central boulevard, public library and museum. Other views show a design for a superarched bridge crossing the glen from Comely Bank at Dunfermline, and suggested public buildings in a park at the same place, from a design by the same author and Mr. C. E. Mallows; also the existing and proposed plan for Piccadilly Circus as worked out by Mr. John Murray; a sketch of the Leonard Stokes' scheme for the approach to Sir Aston Webb's plan for rearranging the Mall as a national memorial to Queen Victoria. Sir Aston Webb's plan, unfortunately, is not available for illustration.

The proposed Opera Place at Berlin, from a design by Messrs. Mohring, Eberstadt and Peterson, shows a most comprehensive and splendidly conceived scheme, as does also the suggested "place" with its monumental buildings and lofty towers, and the view of Moobit Quarter, Berlin, both from designs by Messrs. Schmitz, Havestadt, Contag, and Blum. All of these designs give an excellent idea of how thoroughly Germany has taken up the task of beautifying her towns and cities. Also noteworthy is the drawing by M. Jean Hulot of the restoration of Selinonte, and Messrs. Nicolson and Corlette's plan showing the ground scheme and arrangement of the new Government buildings at Kingstown, Jamaica.

Owing to the proximity, and also to the analogy existing in many respects, between the two countries, the several designs suggesting improvements for Washington and Chicago, illustrated herewith, and which constituted the major portion of the American contribution to the exhibit, will undoubtedly be of interest to Canadians in general. These are reproduced from the same contemporary, which comments as follows: The designs for Washington are based on the original plans of L'Enfant, plans that had been to a large extent obscured and degraded during years of neglect in the last century. Railways had been allowed to take positions destructive of the lines of L'Enfant's scheme, and the principal station actually encroached on the fine open space known as The Mall, which runs from the Capitol westward towards the river. One of the first objects of the plan prepared under the auspices of Messrs. Burnham, McKim, St. Gaudens, and Olmstead was to rearrange the railway routes so that they should no longer interfere with the fine surroundings of the Capitol, and this has been done by bringing them together at a point about half a mile to the north-east of the Capitol, where one of the avenues radiating from this centre terminates in a magnificent semicircular place, the forecourt of the great joint station, which is mainly a terminus, though the lines running south are continued through, and pass under the Capitol square towards the Potomac river by means of a tunnel. Thus all the railways have been cleared out of the central area of the city, and one of the most detrimental features removed.

The Mall itself and the fine park crossing it at right angles, about the centre of its course, had never been laid out and planted in a suitable fashion, while the buildings fronting it are out of alignment and architecturally unworthy. These areas demanded a complete remodelling, and the manner in which this is now being carried out will be seen from the accompanying drawings. Many other problems are linked up with this great central improvement, and some of the other drawings show how it

(*Concluded on page 76.*)

CONSTRUCTION

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

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CURRENT TOPICS

CANADIAN ELECTRICAL FIRMS who are desirous of extending their trade to foreign markets, might well consider the field offered by British South Africa where the importation of electrical fittings for the first seven months of 1910 amounted to $1,110,000, as against $586,000 for similiar supplies in the same period of last year.

* *

THE ROCKY RIVER BRIDGE previously referred to in these columns has been formally opened at Cleveland, Ohio. It is built entirely of concrete and its great central span of 208 feet is said to form the largest arch ever carried out in this material. The bridge in all is 708 feet in length, and over 50,000 tons of concrete were required in its construction.

* * *

THE LAUNCHING OF THE "PIONEER" the new Government scow at Port Dalhousie marks Canada's first experiment in reinforced boat construction. The scow, which was built under the direction of Superintendent Weller of the Welland Canal, is eighty by twenty-four feet in dimensions, seven feet deep and draws three feet of water. It has three bulkheads and the deck sides, and bottom are two and one-half inches thick.

* * *

STEPS ARE TO BE TAKEN at North Vancouver to regulate the planning and erection of buildings. A by-law now in course of preparation is to be introduced in the Council at a very early date. The proposed measure is being carefully drafted so as to incorporate such regulations as have proved to be the most effective and beneficial in the more important cities throughout the Dominion. At the present time such restrictions as apply, are at the best of a very vague character, and the need of a by-law and its proper enforcement by a competent Building Inspector, has been felt for some time past.

A FIND OF RICH, RED MARBLE is reported from the Province of Quebec. The discovery was made on the property of Thomas Armstrong at Trenholmville, and experts who have examined the vein pronounced it as being of a particularly high grade and eminently suitable for architectural and commercial purposes. A Montreal party, it is said, has in contemplation the purchase of the property with a view to developing same and placing the marble on the market.

* * *

DOUBLE TRACK IMPROVEMENTS along the line of the Canadian Pacific Railway, are now being rapidly pushed forward. An official announcement states that within a year's time, the entire system between Montreal, Toronto and Victoria Harbor will be provided with advantages in this respect. While the double-tracking is going on, all the wooden bridges will be replaced by steel and concrete structures. It is also the intention of the company to increase the accommodation in every yard from one end of the system to the other.

"PITT HOUSE," or "WILDWOODS" as it was originally known, is one of two historic mansions in the outskirts of London (Eng.), which are about to be brought under the auctioneer's hammer. It was to this place on Hampstead Heath, then the property of Lord North, that William Pitt, the "great commoner" retired in 1766 within a few days of his double elevation to the premiership and the Earldom of Chatham. The other house is "Moray Lodge" one of the few remaining "country houses" of London. It is a very old house, once surrounded by fields, but now within five minutes walk of the High street underground station at Kensington. It still has beautiful gardens and lawns, shrubberies and rosary. Lately it has been in possession of David Pullinger, a South African magnate, who now wants to sell it.

REBUILDING THE HIGHEST BRIDGE in America, say the *Building and Industrial News*, without disturbing traffic is the unique undertaking which the Galveston, Harrisburg and San Antonio railroad, a branch of the Southern Pacific, between San Antonio and El Paso, has begun. This great bridge is 328 feet above water and 2,080 feet in length. At present the trains are supported by a temporary bridge of wood. This was built before a support of the old bridge was torn away. The new bridge will be a great viaduct resting on concrete piers built in the bottom of the canyon. The necessity of rebuilding the bridge arose from the purchase of big Mallet locomotives and the handling of heavier trains in the through traffic to the Pacific Coast. This Pecos bridge is higher than any other of the North American bridges and is surpassed in other countries by only two others, one in France, and one in Peru.

AN ANGLICAN CATHEDRAL of considerable magnitude and architectural merit is among the contemplated improvements at Colombo, Ceylon. At a public meeting recently held at that place, a request was drafted and forwarded to the President of the Royal Institute of British Architects asking him to suggest the names of two or three distinguished architects who will submit to the design committee, and subsequently to the general committee, specimens of the ecclesiastical works of the realm. While the request was made directly of the R.I.B.A., other architects, whether in Ceylon or elsewhere, who are desirous of submitting specimens of their work or designs for a cathedral may do so and their work will be duly considered by the design committee. When the final selection of an architect is made he will be asked to make a study of the subject on the spot to acquaint himself with local conditions before the work is commenced.

BUT LITTLE IS KNOWN on the Continent, and even in most European countries, regarding moler bricks, a Danish product which was first exhibited at Aarhus in the summer of 1909. The salient feature of the brick is its unusual lightness, combined with great strength. The clay from which it is manufactured is found in certain localities in Denmark, especially in Jutland, on the shores of the Limfjord. In a dry condition the moler clay is white or of a lightish grey color and is largely composed of shells (*Silex algoe*). It is claimed for these bricks that, apart from their lightness, they are not liable to crack even when a nail is driven into them and that they possess insulating qualities and can be used in the construction of stoves when in close proximity to wooden partitions or for the brickwork of steam boilers.

* * *

THE MEDICAL HEALTH OFFICER of Hamilton has started a crusade to close all houses, which, in his opinion, are not fit for habitation. A similar effort, which was made a year ago, resulted in one or two structures being permanently vacated, but as there are still quite a number of dilapidated and unsanitary frame dwellings, it is the intention of Dr. Roberts, the official in question, to conduct the present campaign along more comprehensive and vigorous lines in order to relieve the city of a grave and dangerous condition. Practically every city has its quota of tumble-down, antiquated, disease-breeding shacks, and while their removal or enforced vacancy might, in one or two cases, work a possible hardship, yet the physical and moral welfare of the community demands that such steps should be taken. Although the Hamilton Board of Health has no power to order the razing of such structures, it is invested with authority to at least close them up and see that they are not a menace to the public's health. Under these circumstances, the object aimed at is eventually attained, as with the purpose and earning power of these houses thus destroyed, together with the accumulation of the yearly taxes, the owner is forced to either get rid of his holding or else replace it with a better and more improved structure. The "Ambitious City's" policy in this respect can be adopted by other municipalties to advantage.

* * *

A SOMEWHAT NOVEL PLAN for constructing concrete walls without the employment of forms, either wood or metal, was adopted in extending the exercise grounds of the Allegheny County Work House, at Claremont, Pennsylvania, where concrete slabs, molded in a simple way, were employed as forms and used in such a way as to become an integral part of the permanent wall construction. In all, 710 ft. of walls, twenty-three feet high, were constructed at an expense to the county of between $1.90 and $2.00 per cubic yard, exclusive of the cost of tools, labor and superintendence. The slabs used are reinforced with a triangular mesh, and are uniform in size, being two feet wide, four feet long and three inches thick. They were cast in open forms laid on the ground, and in making them a small wire loop was placed in the forms, six inches from each corner, the ends projecting up into the concrete when applied. The upper layer of the concrete which forms the exterior of the wall is made of sand and fine gravel, and has been given a fairly smooth surface. When properly hardened the slabs were set on end in mortar, the distance between them being thirty inches, thus making the completed wall three feet thick. The slabs are fastened in position by a wire which passes through the loops inserted in the moulds and which project on the backs of the slabs. They were placed at exactly the proper distance by inserting wooden spacers, which were removed after the concrete was poured and spread. The wall was designed by Arch. F. C. Sauer, of Pittsburg, and constructed under the direction of the superintendent of the Work House, A. H. Leslie.

BUILDING SUPERSTITIONS in remote times, says an exchange, found expression in sacrificial offerings during the erection of a building, either public or private. Sacrifices were not only made at the completion of structures of all kinds, but also during the time the work was in progress. The foundation themselves were usually laid in blood, whether the structure was a castle, bridge, cottage or temple. Originally—tracing the subject back to heathenish times—the sacrifice was offered to the god under whose protection the building was placed. In early Christian times the bloody rite was retained, but was given another significance. In those days it was generally believed that no edifice would stand unless the cornerstone was laid in mortar mixed with blood. Usually the blood was obtained by sacrificing a dog, a pig, a wolf, a black cock or a goat, and not infrequently some malefactor's blood was poured out to make the ceremony more impressive.

* * *

REMOTE IN SITUATION as it is, and only brought to the attention of many by such occasional and fascinating tales as the "Foot Prints," Lower California nevertheless, is not without its town-planning schemes, such as is now evident in all progressive countries throughout the world. An announcement has just been made by U.S. Consul George B. Schmucker, Ensenada, Mexico, of the completion of plans for founding an entirely new city on the line of the new San Diego and Arizona Railway, near the old towns of Tia Juana, and the international boundary. The plans for the New Tia Juana, as the place will be known, call for well-constructed streets, a modern hotel, a casino, a sunken garden, a theatre, a Spanish bull ring, pavillions, and other places of amusement, including a lecture hall, plunge baths and library. The scheme in general has been worked out on quite an elaborate scale, and while the primary object of the enterprise is to found an amusement resort, a town of considerable industrial importance is also anticipated.

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ACCORDING TO A LATE ISSUE of the London *Daily News*, the village of Brightling, about 9 miles inland from Hastings, possesses probably the most novel collection of strange buildings to be found among the British Isles. About half a century ago a certain Squire Fuller, the chief resident, who was possessed of great riches, spent money lavishly in the erection of numerous quaint buildings, with the idea of rendering his memory imperishable in the little village. Squire Fuller's eccentricity earned him the sobriquet of "Mad Jack." Perhaps the most remarkable of the buildings is the Sugar Loaf House, in which the "Mad Squire" was anxious to immune a man for seven years, during which time the victim was neither to shave, wash nor hold any communication with the outside world. His food was to be passed in through a window. There were several candidates for the experiment, but the authorities intervened and forbade the execution of the wild scheme. The observatory contains in the dome a camera obscura, which the Squire placed there so that his tenants could keep observation on the cattle without going into the fields. Cleopatra's Needle, built of local sand stone, stands at an altitude of 600 feet above the sea, and its base is covered with innumerable visitors' names. "Solomon's Temple," built in the style of an Eastern mosque, with massive marble pillars, was used by "Mad Jack" as a card room. The Squire's tomb, built to resemble the Pyramids, has a beautifully decorated interior and bears carved quotations from the Squire's favorite authors. The Squire's coffin was placed on a stone trestle above the ground and the door of the tomb locked with a key which was afterward destroyed. Beacon Tower was originally intended to guide ships into Pevensey Bay, but the Squire planted trees all round and thus rendered it useless to mariners.

AN ATTRACTIVE TORONTO BUNGALOW OF SPANISH TYPE

Residence of Frederick Paul, Castle Frank Road, Toronto—an essentially domestic dwelling structure, built on a site abounding in natural advantages, and thoughtfully considered in every particular.

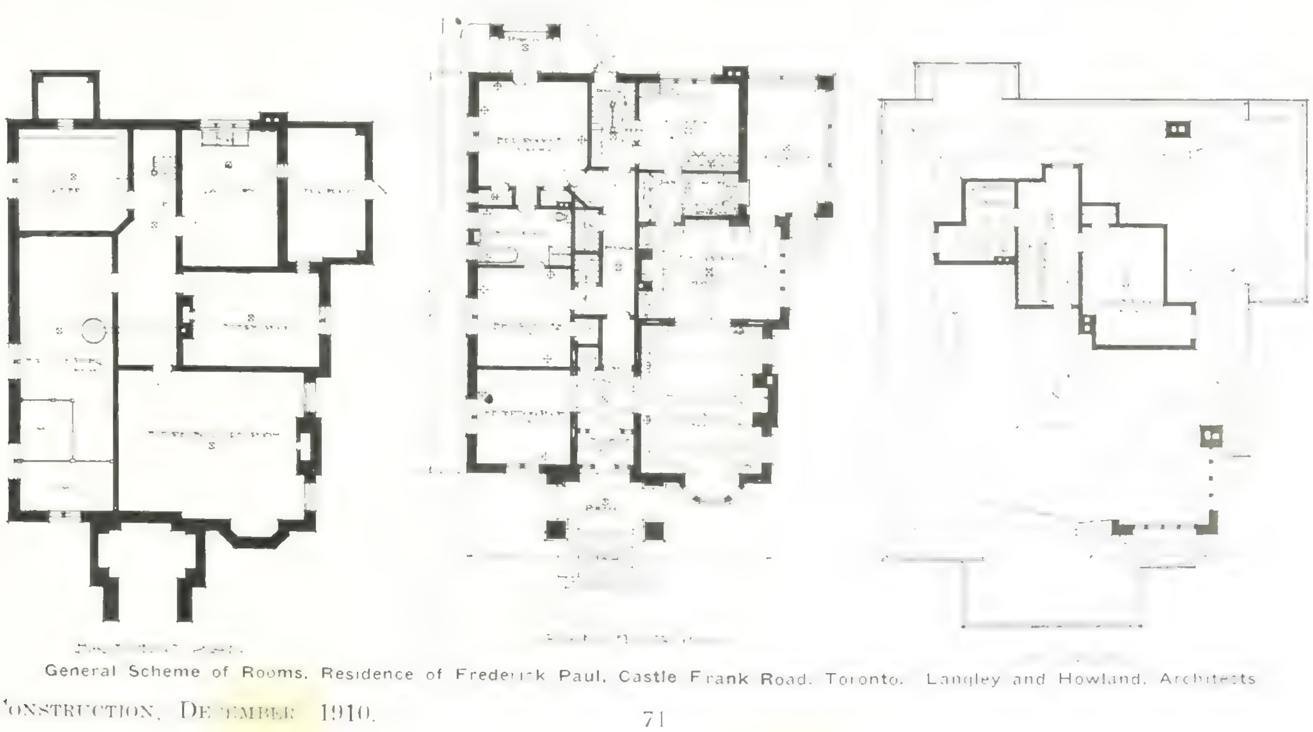
WHILE MANY MODIFICATIONS have come to make the bungalow the essentially domestic structure that it is, little has been done to vary its height from that of its early prototype. It still remains characteristically a one, or one and a half story structure, and any residence in excess of this height can hardly be regarded as coming well within the meaning of the term.

Situated back about seventy feet from Castle Frank road, on grounds, some three quarters of an acre in extent, is one of Toronto's few represented homes in this respect. It is the residence of Frederick Paul, and an excellent example of the Spanish bungalow type. The location itself could hardly be improved upon. The site is resplendent with oaks, pines, spruce and maples, which, together with the wide expanse of the Rosedale Ravine to the east, south and west, affords the occupants every advantage of a beautifully wooded outlook. In construction, the walls of the house are of hard brick finished on the exterior with a roughcast cement plaster, and roofed in with unglazed Spanish tiles; the windows throughout being of polished plate divided into small diamond panes in the upper sash. The design, in keeping with dwellings of this type, is devoid of any architectural elaboration; the general color scheme of gray walls, red tile and brown painted woodwork, together with wide corbelled eaves and effectively grouped windows, being mainly relied upon to produce a simple, homelike and unpretentious effect.

Although low in outline, the fact that the house is approximately fifty feet wide by seventy feet long allows for an exceptionally well arranged plan with practically the entire scheme of rooms on the ground floor.

Entrance to the vestibule is through a heavy oak door having an old fashioned thumb latch and hung on heavy wrought iron hinges. This leads in from a deep, broad porch paved with red Welch quarries. The vestibule, which is similarly paved, and the reception hall are both wainscotted in ash to a height of seven feet with a grey plaster frieze above, decorated with an arrangement of antique arms of various periods. To the right of the hall is the living room, a particularly homelike and roomy interior, with a heavy beamed ceiling and a large inviting fireplace directly opposite the door opening in from the hall. There is a certain sturdiness and a sincere simplicity in the general architectural scheme and the substantial character of comfortable leather covered chairs and couches, such as one would expect to find in residences built two centuries or more ago. The ceiling, which is twelve feet and six inches in height, is arranged with sloping sides, with the beams having the effect of being immediately under the roof; while adding materially to the general domestic character of the room, are the built-in bookcases which occupy all available wall space, other than that utilized by the fireplace, the sliding doors and the octagonal bay window. The fireplace is faced with tapestry brick, ranging in colors from brown to red, and set in with Moravian tiles, reproduced from some of the famous tiles of the old world. The hearth is paved with quarries similar to those used in the vestibule; and the fire box proper, which is equipped with a crane and heavy hammered dogs, has an opening four feet wide, thus enabling the owner to burn large logs of wood. Above the mantel shelf the chimney is divided off by wood straps and finished with panels of stucco of a yellowish tone in oils, in keeping with the treatment of the walls below the heavy wood moulding. The frieze and ceiling are in grey plaster. Upon the walls are many oils and water-colors, chiefly the work of Canadian artists.

Adjoining the living room is the dining room which



General Scheme of Rooms, Residence of Frederick Paul, Castle Frank Road, Toronto. Langley and Howland, Architects

Residence of Frederick Paul, Castle Frank Road, Toronto. One of Canada's few Representative Homes of the Spanish Bungalow Type. The House is Situated on a Site Approximately Three-Quarters of an Acre in Extent, and Overlooks the Rosedale Ravine on the East, South and West Sides. This View Shows the Structure in Perspective from a North-west Point. Langley and Howland, Architects.

This View Shows the Main Approach and the Heavy Oak Entrance Door, Hung on Wrought Iron Strap Hinges. The Walls are of Hard Brick, Plastered on the Exterior With a Roughcast Cement; the Roof is of Red Unglazed Spanish Tile, and the Windows Throughout are of Polished Plate Glass with Small Diamond Panes in the Upper Sash. Langley and Howland, Architects.

Living Room, Residence of Frederick Paul, Castle Frank Road, Toronto. A Particularly Homelike Interior With Unusual Ceiling Beams, and a Large Fireplace Built of Tapestry Brick and Set in With Moravian Tiles. Note the Substantial Character of the Furniture, and the Bookcases Which Form an Integral Part of the Entire Wall Scheme. Langley and Howland, Architects.

View of Living Room, Looking Toward the Dining Room and the Sun Room Beyond. The Arrangement in General Brings the Scheme of Rooms Well Together, and Permits of the Living Room and Dining Rooms Being Thrown into One Large Apartment if so Desired. Langley and Howland, Architects.

Dining Room, Residence of Frederick Paul, Castle Frank Road, Toronto. Panelled in Ash to a Height of Seven Feet, and Finished Above Plate Rail With a Stencilled Frieze in Oils on Rough Plaster. The Buffet in the Alcove at Right, and the China Closet on Either Side of the Fireplace Are Built-in. Langley and Howland, Architects.

Sun Room, Residence of Frederick Paul, Castle Frank Road, Toronto, Which Opens from the Dining Room by a Plate Glass Door, and Overlooks the Ravine at the South and West. Langley and Howland, Architects.

also has a beamed ceiling. These two rooms open one into the other, so if desired, they can virtually be thrown into one large apartment. The dining room is lighted by large windows facing the west, as well as from the sun room which is placed immediately beyond. The walls are panelled in ash to a height of seven feet and finished with a

Reception Hall, Residence of Frederick Paul, Castle Frank Road, Toronto. Langley and Howland, Architects.

hand painted frieze on rough plaster. In the east wall, set on either side of a large fireplace, of the same general character of the one previously described, are built-in china closets with doors of plate glass with small irregular panes. At the rear of the room is an alcove with a fixed dresser and to the left of this, the door of the butler's pantry which connects the dining room with the kitchen.

In connection with the fireplace it might be well to mention that both have gas connections, with no idea, however, of burning gas as a fuel, but for the purpose of readily lighting the wood, thus saving considerable trouble when kindling a fire.

On the east side of the house on a line with the reception room, which is directly to the left of entrance, are two bedrooms with a bath-room between. The bathroom has tiled floor and walls, and besides the usual appliances, is fitted with a shower bath of marble. From the owner's bedroom, which is situated in a south-east position to the rear of the house, is a private verandah opening from the room by means of a pair of French doors, and overlooking the ravine. The main hall is cut off by doorways so as to give entire privacy to the bedroom suite, thus doing away entirely with an objection so common in houses of the bungalow type.

One of the features of the house is that stucco plaster has been utilized throughout, there being no wall paper in any of the rooms; the necessary decorations being accomplished by painting and stencilling. All the woodwork is in ash finished in dark brown, and the floors throughout are oak, no paint having been used at all in the interior of the entire structure.

The sun room, which is heated with hot water, as is also the rest of the house, is primarily used for flowers and plants. The walls are of grey plaster and a water tap is provided for the special purpose of taking care of the flowers with the least possible inconvenience. This room overlooks the ravine, as does also the kitchen, which is large and airy and provided with a modern refrigerator, which is supplied with ice from the outside. The butler's pantry, previously mentioned, is fitted with cupboards and running water, and the features of the service department generally are modern and complete in every respect.

The back hall, leading from the front hall, is utilized as a picture gallery as is also the stairway to the upper story. On the upper floor is a bathroom of considerable size and a bedroom of unusual proportion. This floor is planned so that additional space can be added if so desired; in other words, there is a good deal of space which is now unoccupied.

All hardwarre throughout the entire structure is of simple fashioned black iron, a style which is admirably adapted to the general architectural scheme, and particularly suited to a house of the bungalow type. Another feature is the lighting fixtures, which are of heavy Pompeian brass in rather severe design. These fixtures are in evidence in several of the views shown herewith.

The basement of the house has a ceiling of six feet

Fireplace in Living Room, Residence of Frederick Paul, Castle Frank Road, Toronto. The Bricks Vary from Brown to Red, and the Hearth is Laid with Red Welch Pavers. Note the Crane and Sturdy Character of the Heavy Wrought Iron Fire-Dogs. Langley and Howland, Architects.

eight inches in the clear. This part of the house is exceptionally well lighted in every way, and the plans provide for a handsome billiard room if so desired; the fireplace in this interior being already provided. The space occupied as a tool room, under the sun room, is of sufficient size so that it can be easily utilized as a garage if so desired.

The house was designed and erected under the supervision of Architects Langley & Howland, Toronto.

THE TOWN PLANNING EXHIBIT—Cont'd from Page 68.

is prepared to deal with these, while it is interesting to note that though in this portion [illegible] ment is adopted, in the little valleys in the outskirts, such as Rock Creek and Piney Branch, an avowedly naturalistic effect is preferred.

The city of Washington has made more [illegible] progress in the materialization of its civic scheme than any other in the United States. Chicago, by comparison, has hardly begun, and offers, moreover, a much less inspiring problem to the designer, the site being level and the existing town most monotonous in its lay out, besides being cut up in all directions by the multitude of railway tracks necessary to the conduct of its large business as a manufacturing and commercial centre. All the more credit, therefore, to those citizens who have had the courage to initiate and prepare the comprehensive scheme shown herewith. . . . Where sections of the plan have been worked out in detail a marked degree of skill is displayed in treating awkward problems. In considering the proposals as a whole, however, we cannot help feeling a doubt as to whether the effects indicated in the drawings are ever likely to be attained in actuality. It appears to be essential to the dignity these designs suggest, that a certain uniformity of height should be adopted in the buildings. The height shown is based on the present limit for buildings in Chicago, but is it likely that the central area of several square miles can be entirely filled by buildings of this height, and, if it were, what satisfactory provision can be made to overcome the awkward transition from these to the two or three story dwellings that stretch for miles around them? Would it be practicable, in the U.S.A., to introduce any ordinance ensuring uniformity of height in any given street or area, and without this how can even the most monumental plan secure that ordered dignity of effect essential to the great city?

In Boston a system of zones obtains, with stipulated heights for buildings in each zone, but these heights are permissive, and in no way compulsory. While it would not be advisable to make hard and fast rules, at the same time no civic scheme is complete that omits to provide for control over the height to be adopted for buildings in the various sections of the city, determining not only the height to which structures *may* be carried, but also that to which they *must* be carried. The English Town Planning Bill, as its name implies, does not extend its operations to this, but no city can be assured of achieving the ultimate power of monumental expression without regulations of this character.

Up to the present these have only been imposed in special cases and to a very limited extent. Even in Paris there are numerous instances where municipal control in this matter could have been put in operation with advantage. Of what avail is it to attempt to achieve a fine and impressive city by the study of its horizontal components only, while the vertical ones are left to chance and to the accidents of commercial necessity. Such control need not insist on a montonous uniformity, but control of some sort there ought to be, preferably exercised by a body of broad-minded men, possessing a sound knowledge of the principles of architecture as applicable to the city as a whole.

FIRE PREVENTION.*—By Frank B. Gilbreth

[illegible] destruction by fire, and to apply the lessons which are taught by every great fire. All great fires are alike; building material behaves the same in the case of a fire, whatever the location.

[illegible] at San Francisco was a steel-frame structure, eight storeys high, of the best construction in 1892, when it was erected. The laying up and the filling of the joints in the [illegible] possible. The exterior wall completely enclosed the steel frame, which was put together with bolted connections. Th floors were of hollow terra cotta flat arches, and the partitions were hollow terra-cotta blocks The damage to the building which necessitated the removal of the upper six storeys was practically all done by fire. This building is excellent for an illustration because it shows the good and bad points of many different kinds of incombustible materials which were used in its construction.

The lessons from this and from all fires point to the conclusion that no structure of the future should either be built of wood or should contain any wood. A very small quantity of wood in a so-called "fire-proof" building almost entirely of non-combustible materials will furnish sufficient heat to destroy it. Concrete construction is the best form for the elimination of fires, because the amount of damage done by a fire in a concrete building depends upon circumstances which are within control and predeterminable. With concrete made of properly selected fire-resisting materials practically no damage is done, except by prolonged high temperature.

The results of recent tests by Professor Ira H. Woolson and his assistants, Mr. J. S. Macgregor, prove conclusively that a properly designed concrete building, with as few projecting corners as possible, will withstand long periods of the hottest hard-wood fires, with no resulting damage that cannot be repaired with mortar. These tests were carried out on full-sized rooms with walls of concrete made of different kinds of material.

Concrete for walls can be poured in moulds with sufficient accuracy to permit of painting or wall-papering without further plastering or smoothing, which means that the best of this fire-resisting material is brought to the surface of the wall where the flames would strike. If a fire does occur in a building made with concrete cast in smooth forms, the damage is less than in any other type of building, and the danger of spreading is less. Water does not injure concrete; in fact, it improves its quality. There is no wood to swell and afterwards to shrink and crack the plastering, and no hollow spaces that the water can flow through, damaging the contents below. A concrete building is water-tight from floor to ceiling, and small quantities of water can be easily handled through small scuppers, either into the air space of the vaulted wall or through the wall to the outside. The fire is never hidden by the construction; consequently no unnecessary streams of water are flooded into the building.

In a concrete residence there are few parts that cannot be made better and cheaper of Portland cement than of wood. Chair rails and picture moulding could be made of concrete, and the ornamentation around the windows and doors could be moulded in metal moulds as cheaply as straight members. Windows might have cement sashes, with wired glass, and self-closing shutters or self-dropping shutters of rolled-up metal or asbestos. The flooring need not be of wood. There are many first-class non-combustible materials besides Portland cement that would fill every good requirement of wood and still be fire-proof.

Government could aid fireproof construction by passing laws restricting the use of wood in buildings; by levying taxes, discriminating in favor of fireproof houses and against wood in construction; by teaching the people how to build fireproof houses, by establishing a Government bureau for disseminating information regarding honest and unbiased fire tests on material, together with Government experiments on different full-sized buildings—kinds, types and materials—with bulletins of the progress; by building fireproof houses for the use of the Government Departments, and disseminating information concerning them by means of bulletins. It is not argued that concrete should be used exclusively; there are many cases where other non-combustible materials have special merits but now that a cheaper and incombustible substitute for wood is available, wood construction, wood trim, and wood finish should be legislated and taxed until wood is eliminated from all building construction.

[illegible]

THE USE AND VALUE OF COLOR IN ARCHITECTURE*

By FRED SCATCHARD

"Color is used to assist in the development of form, and to distinguish objects or parts of objects one from another,.....it is the only visual means by which things can be known."

"THE USE AND VALUE OF COLOR [illegible] progress of art.

[illegible] another, and is also used to assist light and shade, helping the undulations of form by the proper distribution of the several colors.

In certain cases I shall merely point to instances which the study of ancient art shows of the use of color, and indicate what seems its value in works of architecture.

[illegible] colors all her works, it can hardly be inappropriate for [illegible] it, whether it be exhibited in Nature's works or in works of art; it is the only visual means by which things can be known.

The Egyptians, Greeks, Persians, Assyrians, and other [illegible] or, and the mediæval nations used it in their buildings.

Color applied to buildings is not a new art, not a discovery of modern times, for we have instances of past masters who excelled in this class of work. Ruskin says: "The noblest thing is a building, and its highest virtue, is that it be nobly sculptured or painted." (By the term [illegible])

In our early modern buildings color seems to have disappeared from the outside. Viollet-le-Duc says in his article on painting: "The Romans during the Empire seem to have been the first people who erected monu[illegible] stucco work this was always colored, whether inside or out." Decorative painting once played a most important part on the outside of buildings. The Notre-Dame at Paris shows the mouldings, columns, and figures decorat[illegible] but it can be regarded as an educative power, and a necessity of cultured life, and when applied with due regard to its relative importance it gives a sense of pleasure, interest, and added value to a building which might otherwise be commonplace.

[illegible] should look to examples of the past as instances of experience for the schooling of the present. The seed is sown, mature it, and study it in its gradual growth until [illegible]

The two principles, then, on which this subject can be based are: first, Structural Decoration; and second, Decorated Construction. Structural Decoration may be defined as that color introduced in buildings by using such materials for the structure as have in themselves the color required for decorating these as works of architecture. Decorated Construction may be defined as, whether buildings have, or have not, been decorated by colored materials used constructively, the application of colored or other decoration.

Construction suggests design, and decoration cannot be without design. Flowers are constructed, and, however small or however large a thing may be, the very color of each thing has structure and design. Ruskin said, "that he would not consider architecture in any wise perfect without color, and further thought the colors of architecture should be those of natural stones, partly be[illegible], and also more perfect and graceful."

In foreign countries proof of the work and use of color in architecture can be seen in the monuments that remain to-day. They are in ruins, but true principles on which evidence can be based are still visible. Religion played a great part, and must have influenced the coloring and treatment of buildings. The Egyptians were great believers, and they based their buildings on religious principles. They believed that without religion no state could stand. Hence the reason we find the Egyptian buildings adorned with figures and sculpture, and most profusely painted. The principles of the Egyptians were based on application, and they possessed great power of conventionalizing natural objects.

In Egypt the most important buildings were covered with applied color, and the use and value of the color in architecture is apparent in all directions. Even their builders were careful designers, and the decorations they used were always carefully designed and treated with [illegible]

The treatment of ceilings was a common subject in Egyptian architecture, and they made great scope in this direction. The colors used by the Egyptians were principally red, blue and yellow, with black and white to define and give distinctiveness to the various colors. Green was used generally, though not universally as a local color.

Structural decoration in color was not often practised by the Egyptians. They used colored, glazed and decorated brickwork, but not to a very large extent. They, however, derived much matter for application in decoration from the suggestions conveyed to them by the structural forms; both in nature and the primitive methods of building in wood and stone.

The Notre-Dame of Paris is a notable example of decoration. The ornaments placed in 1257 on the top of the transept gables were gilt, with grounds of dull red and black. The outside colors were much more vivid than those inside, viz.: bright red tones such as vermilion (glazed with brilliant red,) crude green, orange, black and pure white, etc.

St. Mark's at Venice is another example, as the interior is richly veneered with colored marbles, casing the lower part of the walls; above, and extending in one great surface over vault and dome, is a lining of richly colored glass mosaic, in which are worked figures of saints, mingled with scenes from their lives, set off by a broad background of gold. Mosaic is the real and essen-

* [illegible]

tial decoration of the church, to which all architectural detail is subordinated.

Ruskin says of St. Mark's: "that the effects depend not only upon the most delicate sculpture in every part, but also on the most subtle, variable, inexpressible color produced by transparent alabaster, polished marble, and lustrous gold."

St. Mark's is wholly covered with slabs of Greek, Africano, verde antico, and other beautiful marbles.

Many countries show the use of color in architecture, viz.: Babylonia, Assyria, Persia, Greece, etc. The Babylonians, Assyrians and the Persians are three important Asiatic schools. Babylon was situated upon the Euphrates, and developed the brickmaking industry, and cultivated the use of glazed and colored brickwork. Not many of their examples remain, if any, but many beautiful and interesting specimens of decorative skill have been unearthed from the ruins of monuments, etc. The style of the Assyrians seems to have been borrowed from the Egyptians, and modified by the difference of the religion and habits of the Assyrian people. All things architectural were carefully and delicately decorated with colors, especially in the interiors of the buildings. In Persia and India is to be found the most magnificent exposition of extreme color applied externally, and executed too in that splendid material, enamelled earthenware, which is imperishable in a dry climate.

Greek architects used the color with which their works were decorated to emphasize leading features, and to give a fuller expression to such details as they wished to display. Some of the best products of Greek art are to be found at Athens, and these were built chiefly with ivory white marble from Attica. The temple of Theseus, Athens, and the Parthenon are notable Greek examples, which later shows the use of color applied to marble externally.

Color, to be perfect, must have a soft outline or a simple one, and the best examples of the use of same in architecture are to be found in the East.

The Romans were a race of builders who profited by the experience of the past, and wasted little time over failures which would have been certain to overtake them had they neglected what they had the wisdom and modesty to admire. The Romans were aided by the skill of the Greeks, and attempted to make architecture of building without spending the necessary thought, in order to develop from the essentials of their own buildings, that which was required to complete them as works of artistic design. Discoveries of mosaic, enamel, colored materials in structure, metal work, etc., are proofs of what had been done in the Roman cities.

A few words may be said about marble and its uses. It is the most delicate stone, but has been abundantly used in many countries; and in almost every part of a building. In this climate it is only suitable for interior work. Marble is the most beautiful stone that the architect has at his command. The materials which are used for permanent color decoration are marble and mosaic, and these materials hold a foremost position. How many churches are there erected without the use of marble and mosaic

The Westminster Cathedral, by the late Mr. Bentley, is a splendid example of modern work. The interior of this building shows the walls and vaults, etc., lined with these materials, and it is, perhaps, the most striking example of late years, showing the use and value of color in architecture. The Catholics are great believers in color, as used in decorating their churches, especially on the interiors.

The Byzantine decorators in color adopted the glass mosaic method as the chief vehicle by which to express their ideas. This, as well as marble mosaic, had been much favored by the Romans for introducing color in conventional decorative design at an early period. The Byzantine decorators used the Roman method of adopting the practice of covering their structure internally—if not so much externally—with slabs of colored marbles.

The Church of the "Sancta Sophia," Constantinople, has its walls and piers lined with beautifully colored marbles, and the floors are laid with colored mosaics of various patterns. The vaults and domes are enriched with glass mosaics of the apostles, angels, and saints on a glittering golden ground. Sancta Sophia and St. Mark's, Venice, as mentioned before, are volumes in themselves, showing the use and value of color in architecture. The interior of the church of S. Miniato, near Florence, is an example of the mediæval Italian use of colored materials, and both inside and outside it is structurally decorated in color. This small church was erected during the 12th century, and is an example of its kind showing the use and value of color in architecture.

In our cities and manufacturing towns the architect, in attempting to add the charm of color to his building, has to encountere the smoke demon. Many efforts have been made with various materials, such as glazed earthenware, etc., but such material gives a restless appearance, and is fatal to that repose which color demands when applied to a building. Terra-cotta is much used at the present time. These materials can be washed from time to time, and by this means would be a relief from the ordinary type of brick building; which when continuous have a monotonous effect.

A modern structure in glazed materials is a house in Addison Road, Kensington, designed by Mr. Halsey Ricardo, whose abilities in structural decoration are well known. In this example of domestic work there are intentions which stand for a new development in English architecture. The effects of the city atmosphere have, no doubt, determined the uses of glazed bricks, which are varied in color. The basement story is faced with blue-grey semivitrified Staffordshire bricks; the upper part or framework, as it were, is carried out in Carrara ware of a pinky cream color, relieved in the upper stages by darker bands of the same material. Glazed brickwork is introduced in the panels formed by this Carrara ware, the lower panels being of a soft deep green, and the upper of a bright blue. The roofs are covered with green Spanish tiles. Mr. Ricardo says "that to build with imperishable materials in London, or, indeed, in any manufacturing city, has become now a reasonable aim, and several examples have arisen in response to this desire."

"The erections of to-day have not a fair chance of acquiring the results that a building acquires in a cleaner atmosphere. Time and habitation pull a building together, give it the human look that a new building so sadly lacks. Another course then is open to us, and to attempt this course one must see what can be done with materials able to withstand the corrosion of the atmosphere, and avoid the permanent disfiguration of its impurities." Such materials, to meet these requirements, must be glazed materials, and the whole building must be built of such. The use of glazed materials causes the question of color to crop up. Glazed material is substantially impervious both to rain and wind, and it is a clean material. The use of this material is increasing year by year, and if carefully considered it can produce satisfactory results; proof of which is in the house already described, situate in Addison Road, Kensington.

Before concluding this essay, I will mention some examples in stained glass. If we wish to see some of the finest in the world we have not very far to go. There are examples in Oxford and Cambridge, one being the 14th century stained glass window in the ante-chapel, New College, Oxford. In stained glass the primary colors were chiefly used. The five sisters' window in north transept gable of York Minster is an excellent example.

The same general principles which govern other methods by which decorative art in color and line are practised are also applicable to stained glass. During the period between the 11th and 15th century the use of glass as a means of introducing color into architectural compositions had been largely developed, if not originally discovered.

In the course of this article I have attempted to describe the use and value of color in architecture by giving a brief outline of the methods adopted by the ancients. It has been found in examining the works of the past that color had always a necessary function to perform in the typical periods during which architecture flourished as a real living exponent of thought. The past instances give evidence showing how closely the chief interests of individuals and communities were linked together by the services of art. The examples that have been quoted help to show the truth of these statements concerning the various purposes served by decoration; and the manner both by structural and applied means in which color was introduced.

It is color which gives a town its look of home, and which unites all its buildings of various styles into unity of character. It is color which can bring us and our architecture into the stream of local tradition, and also into touch with a past which must not be allowed to die.

Had nature applied but one color to all objects they would have been indistinct in form as well as monotonous in aspect.

We must appeal to experience and be indebted to the past for its wondrous works, if we expect to realize our ideals for the future; for color is essential to the completeness of any work of architecture, as distinguished from simple buildings, even if only its aim is to please.

SAND AND GRAVEL FOR CEMENT AND MORTAR.

CONSIDERABLE INFORMATION that may be of value to Canadian architects and builders who are interested in concrete work is published in a bulletin issued by the U.S. Geological Survey, concerning field and laboratory studies made during 1909 of a large number of sands and gravel found in various localities where the erection of federal building had been authorized. One striking feature, says the report, brought out by these investigations, is the great variation in the quality of materials used for concrete aggregates in different places throughout the country. Broadly, the sand and gravels in common use may be grouped into three classes on the basis of origin—(1) glacial deposits; (2) coastal plain deposits; (3) stream deposits. The deposits of the first and second classes have, in many instances, been modified by water action, and the third class may be considered as composed partly of materials derived from deposits of the first two classes and partly of materials derived directly from the breaking down of the country rock. All three classes of deposits contain more or less silt, clay, loam, or other very finely divided impurities.

In many communities the run of bank sand and gravel is used directly in concrete work without any attempt being made to clean it, except, perhaps in rare instances, by dry screening or rough sizing. In some cases it has been stated by local contractors that the run of bank sand made naturally just the correct theoretical mixture of sand and gravel to produce the least voids in concrete. In practically all cases it has been found by experiment that these suppositions were erroneous, and that to use run-of-bank material for structural concrete work is a haphazard and careless method. It is certain that under such conditions not only is the proportioning and the sizing of the mixture indefinite and variable, but that the large quantities of impurities which are unavoidably included tend to weaken the strength of the concrete. Where gravel is coated with dust or dirt of any kind, the cement is compelled to set against this film of foreign matter rather than against the gravel itself, and is consequently easily broken away from the stone. Where such impurities are mixed with the sand and gravel, the cement can not set perfectly and form a firm bond between the sand and gravel. In recent years, particularly in the large building centres, there has developed a greater appreciation of the importance of clean sand and gravel for use in concrete and mortar. Leading architects, engineers, and contractors are now demanding in their specifications sound, clean, washed materials, free from dust, loam, clay or any kind of dirt. The soundness of the sand is an important consideration, since not all sands that look good and feel sharp prove to be satisfactory. Some sands are largely composed of grains of limestone and dolomite, and are softer than silica sand, and other sands may contain many grains of feldspar, which easily decays and crumbles. The presence of much mica in small flakes is also deleterious, as well as the presence of grains of pyrite and limonite. It is, of course, impossible to find deposits of sand and gravel that will yield 100 per cent. of desirable material, but it is gratifying to note the improvement that may be effected in a sand or gravel by a suitable process of washing. Where sand or gravel is taken from below water in streams and lakes, a certain amount of washing is accomplished, whatever the process of excavating may be, but where the material is pumped up from a deep stream, agitated in clean water, screened and drained, a very thorough cleaning is generally accomplished. In the case of bank deposits of sand and gravel, the material should be rolled and tumbled about in a rapid jet or stream of water, particularly streams that will size the material and deliver the oversize to a crusher. The crushed material is then returned to the washers and screens in the form of angular fragments, which are a very desirable addition to the aggregate.

EXPERIMENTS MADE to determine the effects of frost, if any, on the subsequent hardening properties of cement, mortar and concrete, that have been previously mixed ready for use, are recounted in a paper by H. Burchartz, in the Journal of the Society of Chemical Industry, an abstract from which is published herewith. "Tests were made on two samples of cement, which had been prepared in the dry and wet ways respectively. The cements were mixed with water to a stiff paste, and the times taken for hardening to begin, and for complete setting, under the conditions given below. The temperatures and humidity of the air were noted. (1) The cements were allowed to set under normal conditions. (2) They were kept as nearly as possible at a temperature of 0 deg. C. (3) They were subjected to a temperature of —10 deg. C, for (a) 3 hours, (b) 24 hours, and (c) 3 days. These frozen samples, at the expiration of the time stated, were broken up with the hammer, and after being allowed to thaw, were stirred for 3 minutes. The times for hardening and setting were measured from this point. It was found that preliminary freezing did not affect the times of heardening and setting. The samples kept at 0 deg. C., however, were about four times as long as the other in reaching each stage. The same cements were used to make mortar and concrete. The mortar consisted of 1 part by weight of cement to 3 parts by weight of standard sand. The concrete was made up of 1 part of cement to 5 parts of gravel. Two classes of each were prepared, sufficient water being added to make the mixture (1) 'earth-damp,' and (2) wet. Test pieces were made (1) immediately after mixing, (2) after subjecting to a temperature of about —14 deg. C. for (a) 3 hours, (b) 24 hours, (c) 3 days, and subsequently thawing. The test pieces were allowed to set under damp sand, some for 7 days, and the remainder for 28 days. Tensile and crushing tests were then made. The results showed that cooling for a few hours only had a negligible effect on the hardening of mortar and concete, but that the rate of hardening was much lower after a prolonged freezing. They also showed in a striking manner that the falling-off of the rate of hardening due to the preliminary freezing was relatively much greater for the "earth-damp" than for the wet mixings.

Residence of Mrs. C. C. Cummings, Corner of Hawthorne and Dale Avenues. A Modern House in Character of the Old English Type, Set on a Spacious Site and Built of Credit Valley Random Rubble. J. A. McKenzie, Architect.

[illegible] of Mrs. C. C. Cummings, Toronto, Showing the Wall Panelling and Built-in Shelf and Seats. [illegible] McKenzie, Architect.

AN ALL-STONE HOUSE OF OLD ENGLISH DESIGN

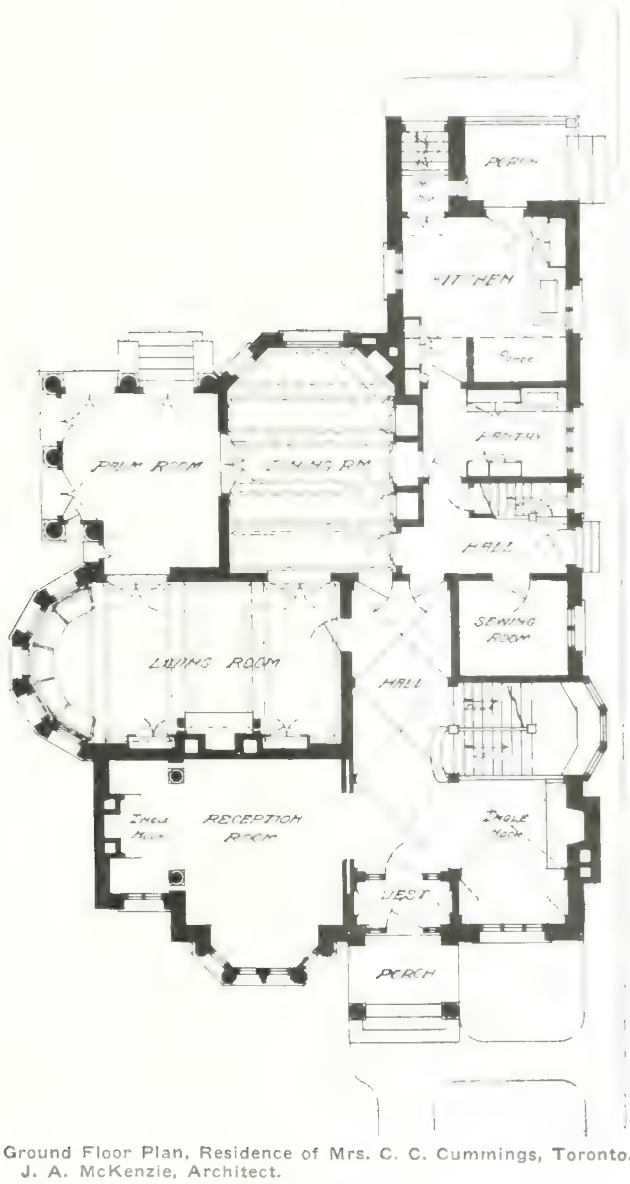
Residence of Mrs. C. C. Cummings, Toronto,—an unusually interesting house which incorporates a number of noteworthy features both in design and plan.

IN VIEW of the architectural possibilities of stone as a material for residential work, it is difficult to account for the scarcity of houses of this character in many sections of the country. Especially so, can this be said, when one considers the abundance of good material that is found in many localities. To day, outside the eastern portion of the Dominion, the all stone house is more the exception than the rule, and while in Toronto and in several parts of Ontario, there are a number of excellently constructed homes of this type, yet compartively speaking, such structures are vastly outnumbered by houses that are otherwise considered.

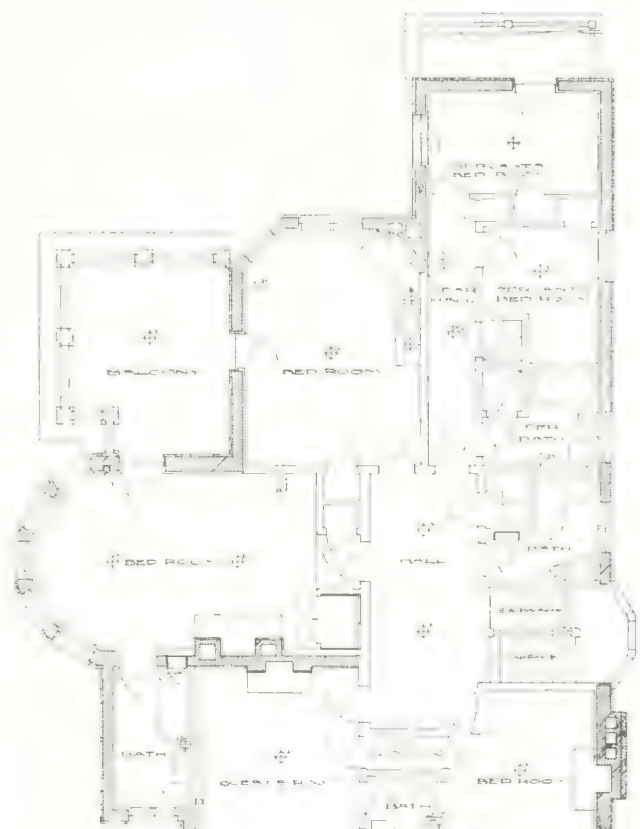
A recently erected Toronto home of stone construction is the residence of Mrs. C. C. Cummings, Hawthorne and Dale avenues, which is designed in character of the old English type of house, with casement windows, numerous fireplaces and beamed ceilings. The walls are built of Credit Valley random rubble with long thin stones, and the exterior is rather striking on account of its large cornice and English half-timber work in all the gables. The stone work has been very carefully executed, and might easily be taken for an ashlar job, the beds being so nearly paralelled, and the rock face being allowed to project as little as possible. The openings are trimmed with Indiana lime stone, and the deep reveals add very materially to the substantial nature of the whole structure. This effect is further augmented by a slight drawing of the bay window between the grade and ground floor; while an interesting feature are the columns of the palm room at the rear, which taper gradually into the columns of the balcony above.

Entrance to the vestibule is by a hooded porch with turned columns and paved marble floor, which readily indicates the character of the interior.

The vestibule and hall, which connects directly with all main living rooms, and also the back or servants' hall, is panelled throughout in select quarter cut oak, finished in dark Early English. The ceiling is arched with a series of cross groins, executed in stucco and tinted in a harmonizing tone. A large ingle nook with a broad fire



Ground Floor Plan, Residence of Mrs. C. C. Cummings, Toronto. J. A. McKenzie, Architect.



Second Floor Plan, Residence of Mrs. C. C. Cummings, Toronto. J. A. McKenzie, Architect.

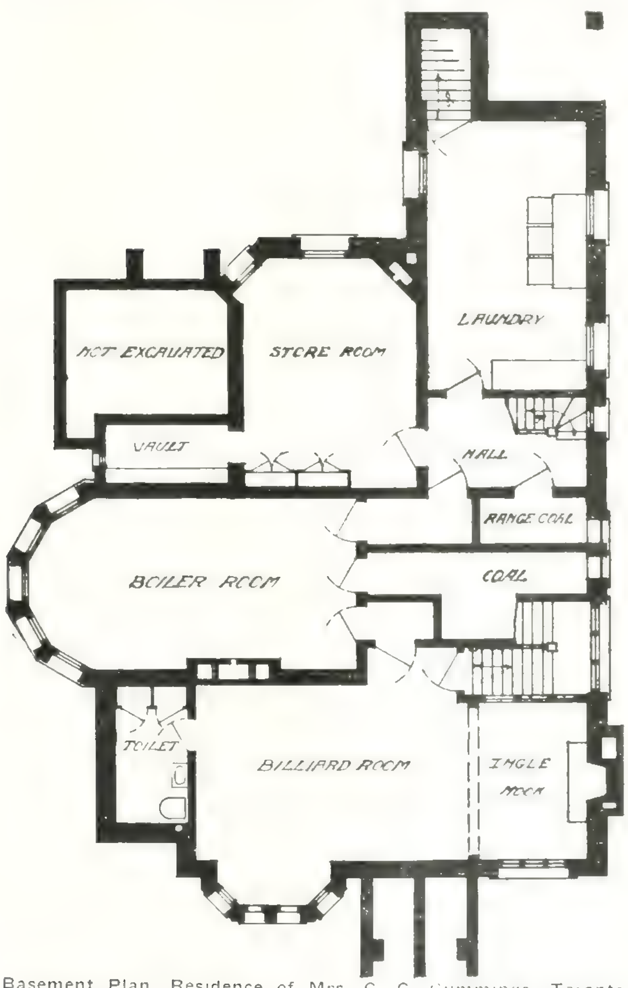
Reception Room, Residence of Mr. C. C. Cummings, Toronto. Decorated in Louis XVI. Style with Silk Wall Panels and White Enamelled Woodwork. J. A. McKenzie, Architect.

Corner in Living Room, Residence of Mrs. C. C. Cummings, Toronto, Showing the Tiled Fireplace and Built-in Bookcases. The Walls are Strapped with Moulded Oak and filled in with Leather Panels with a Heavy Plate Rail Above. J. A. McKenzie, Architect.

place, made of Roman brick, is immediately to the right, the shelves above supported on brackets, and the seats being built in. Beyond this, heavy oak stairs with carved newels rise to an oriel landing, provided with a fixed seat and having leaded glass windows of special design. These stairs continue up at the point to the third or attic story, and also give access to the billiard room in basement.

To the left on entering is the reception room, finished in white enamel, and decorated in Louis XVI. style with coved ceiling and cast ornament, all of which was carefully modelled according to the architect's design. The walls are panelled with silk with cast ornament at the corners of each panel. Directly opposite the doorway, is an ingle nook with a mantle faced in onyx, and a large mirror above shelf. The floor is of light oak, and the furniture in keeping with the scheme of the room is in Louis XVI. style.

The living room, which adjoins, is twenty-four feet long, including bay, by thirteen feet wide. A feature of this interior is the large mantle and the built in bookcases and window seats. The mantle has 6 in. by 6 in. reddish green



Basement Plan, Residence of Mrs. C. C. Cummings, Toronto. J. A. McKenzie, Architect.

tiles, with a hammered brass hood and turned oak columns. The window seats, which fit into the large bay, are made of oak with plenty of slope to back and bottoms to make them luxurious and comfortable. These entirely conceal from view the radiators which run under the five windows, the hot air passing up through the oak slats between the seat backs and the stool of the window. The wall scheme is carried out in leather, strapped with moulded oak, and has a heavy bracketed plate rail running round the room over doors, while the ceiling has heavy oak beams with stucco between.

Double French doors, broken into small lights, connect the living room, dining room, and palm room, one with the other. In the dining room, the walls are panelled to the top of door with large veneer circassian walnut panels, and finished above the plate rail with an ornamental frieze; the ceiling being broken into fine panels by heavy circassian walnut beams. A fireplace of small narrow brick with a hammered brass hood is at the end of the room near the window, and a dinner wagon or servery with two china closets, are built-in on the side next to the pantry.

The palm room is enclosed with French doors, between the columns, and is heated by indirect radiation through large registers in the middle of the room, the cold air being drawn down at the base of each column.

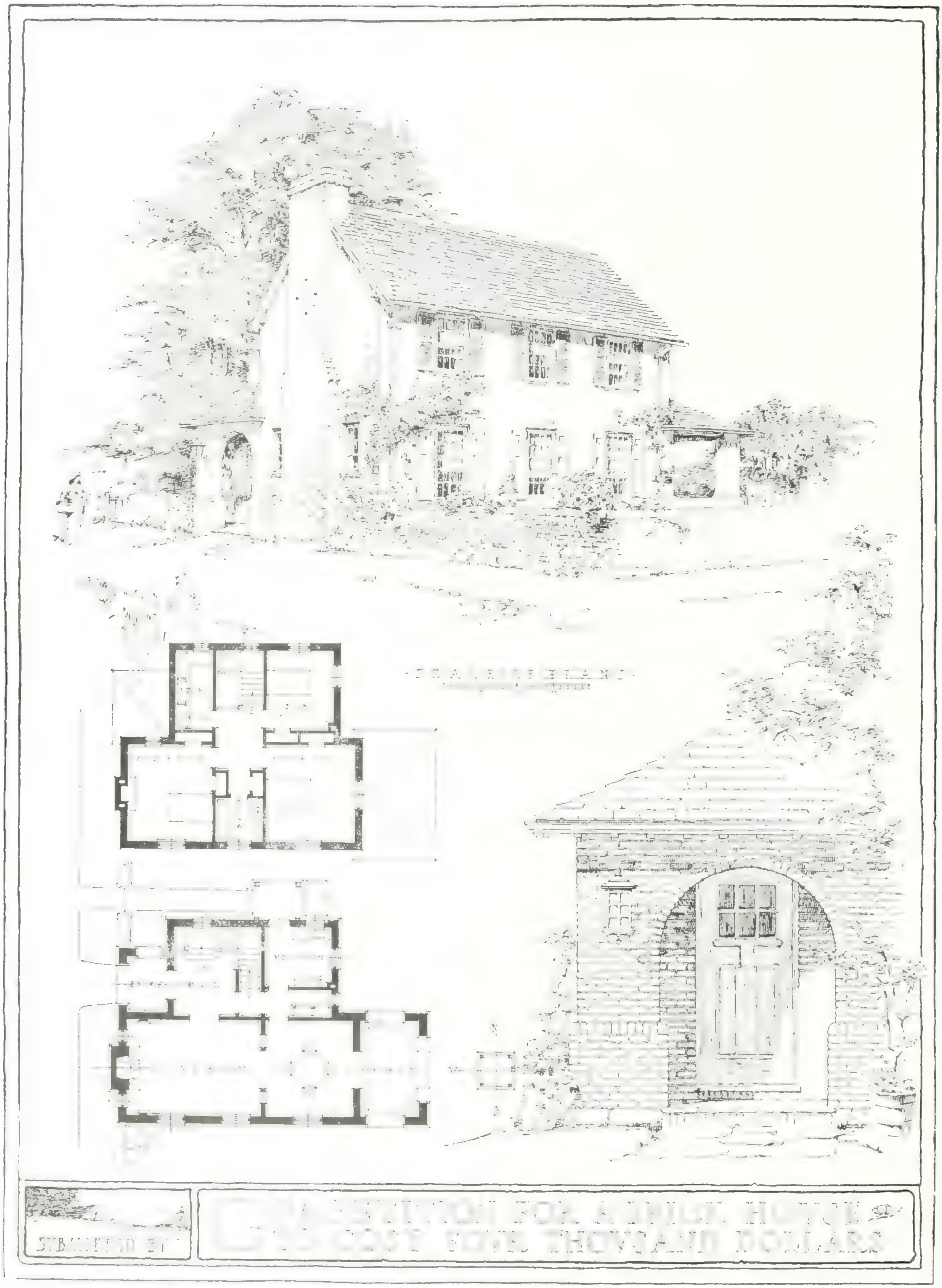
Off the rear hall is a servants' sitting room or sewing, a spacious pantry and a large modern kitchen; the latter room being tiled in glass to the top of doors, and provided with a large combination porcelain zinc and drip board, with cupboards built in. On the main shelf of the cupboard is a small opening leading to the rear porch with doors flushed on the exterior and interior of wall for milkman to leave his bottles. Connecting into the kitchen is a large built in ice box having separate compartments lined with opaque tile. The ice is put into this box from the rear porch. The range sets in an alcove and is practically screened from view with a hooded conical top from which a large vent pipe carries the steam and smell of all cooking into a heated flue. In one corner of the kitchen is a cupboard for brooms, etc., and a clothes shute leading to the laundry. The pantry has a counter extending round three sides and is provided with tilting flour bins and numerous small shelves for cutlery, also a copper zinc for diswashing. There is a slide and counter with a revolving barrel underneath connecting pantry to dining room. The house has a very complete set of 'phones, electric bells and indicators throughout.

On the second floor all the principal rooms are finished in pine, with built-in seats in windows and especially designed pine mantles. The seats have panelled sloping backs, with the bottoms as lids over boxes for storage purposes. There are five bedrooms in all, with one used as a sitting room, together with three modern bathrooms, and a large balcony which is closed in during the winter months with a temporary sash. In the servants' quarters, which are placed at the rear of this floor, there are two bedrooms, a bathroom, necessary closet space and a rear balcony. This portion can be shut off from the balance of the house by means of one door.

The attic has three large bedrooms, a large linen closet and a large fur closet lined with Spanish cedar. Over the bay of the living room in the attic is a unique girls' playroom, with seats, bookcases and radiators, all fitted up like a room in miniature. The ceiling is five feet and the door is four feet six inches. This room is octagonal in shape, with small windows in several sizes, and is plastered and decorated. This floor also has a bathroom. The bathrooms are all tiled to the top of doors, and all closets are supplied and furnished by tanks in the attic. The bath tubs in the two principal bedrooms are porcelain recess tubs built-in and tiled close up to the top.

The basement contains a large laundry with three porcelain tubs, a work-table, drying attachment and clothes shute. There is also a large store room with a fireproof vault and fireproof door. The boiler room is equipped with a pair of twin Daisy boilers connected up to be used in tandem or separately. There are separate hot water risers and returns to every part of the house with neatly stamped tags on valves controlling same, so that any part [illegible] fering with the balance. The equipment also includes a large sized independent heater and a large sized domestic hot water tank, which assures hot water whether the other heaters are working or not. The billiard room, which is located in the front part of the basement, is finished in ash, and has a large brick mantle and stucco ceiling, the walls being burlapped and strapped in ash with a moulded dado cap.

The house itself faces the east, and the plan was carefully laid out so that each room will, during some portion of the day, receive its quota of sunshine. It was also placed on the lot in deference to the beautiful old oaks and elms that make it so attractive. The designing and supervising architect was J. A. McKenzie, Toronto.



First Prize Design, Competition for a Small Brick House, Submitted by William Boyd, Jr., Pittsburg, Pa.

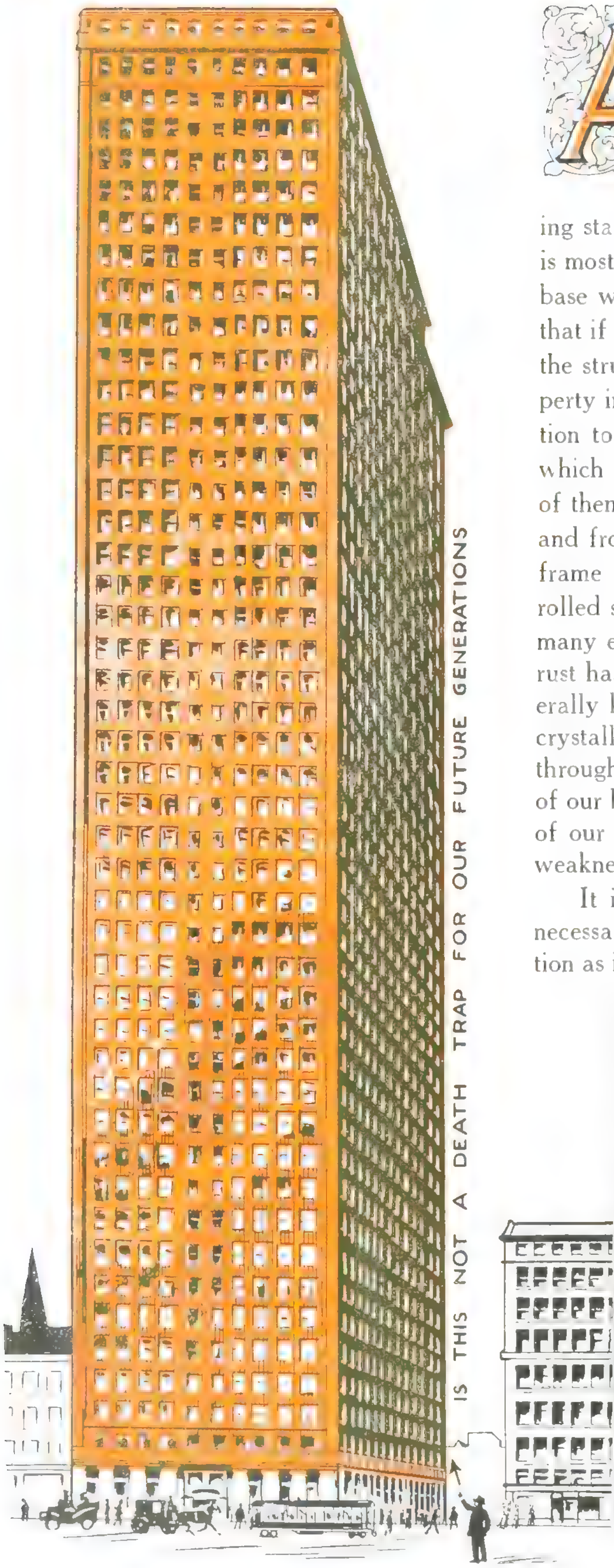
BRICKS

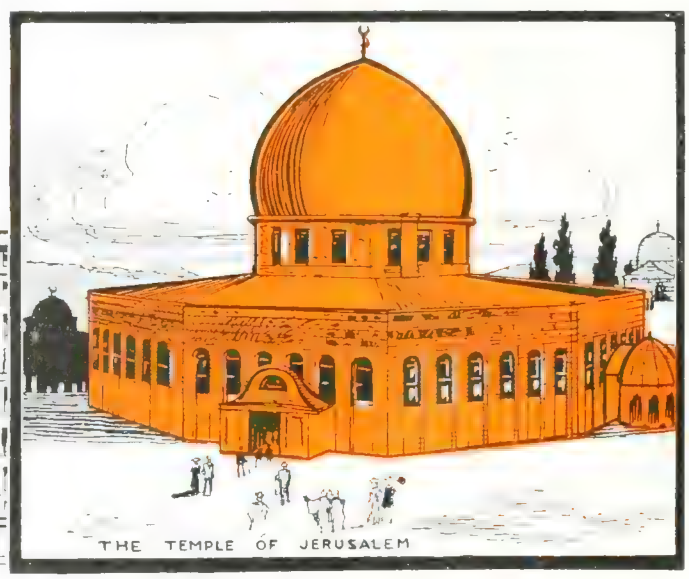
A·DEPARTMENT·DEALING WITH·THE·ARCHITECTURAL AND·CONSTRUCTIVE POSSIBILITIES·OF·BRICK

BRICK HINTS FOR THE ARCHITECT-BRICK POINTERS FOR THE CONTRACTOR-BRICK SUGGESTIONS FOR THE MANUFACTURER

ANNOUNCEMENT has been made that a forty-five story office building is to be erected in New York City, which will be 625 feet from the basement to the top of the tower, 13 feet higher than the Singer Building. In this connection, the following statement by Mr. Berg, in his article on the opposite page, is most significant: "Every structure should be built so that the base would be in proportion to the height, and so constructed that if certain materials should fail through rust or deterioration the structure itself would not fall down and destroy other property in its collapse. In this connection I mean to draw attention to certain structures in many places in the United States which have been built up in a disproportionate manner; some of them possibly 100 feet wide and 300 or 400 feet in length, and from 40 to 50 stories high. These invariably are of steel frame construction, and in many cases a very low grade of rolled steel or iron is employed. Investigation has shown that many elements are acting on such steel and that in some cases rust has greatly weakened the structural members. As is generally known, steel contracts and expands with heat and cold; crystallizes with electrolysis, and rusts, deteriorates and scales through atmospheric changes. Consequently, in the erection of our buildings, we should take that precaution in the selection of our materials that will assure our structure standing where weaknesses of this kind develop."

It is to be hoped that we, in Canada, will never find it necessary to go to such an extreme in office building construction as is illustrated in the accompanying comparative diagrams.





Comparative Diagrams Showing the Extremes to which Modern Builders Have Gone in the Erection of High Buildings. Mr. Berg in his Article on the Opposite Page Maintains that these Lofty Structures are a Menace to the Life and Property of Future Generations.

THE BRICK INDUSTRY IN CANADA

By A. BERG

The Dominion's resources in raw materials, and the importance of properly equipped plants. Character of bricks produced and methods of manufacture employed.

IT IS POSSIBLE to make bricks in many different ways, and to produce bricks of many qualities. The purpose of this article, however, is to deal briefly with the methods of manufacture and the character of bricks commonly employed in this country. When we speak of brick making, we must not only consider the industry from the standpoint of manufacture alone, but also from what is equally important, the standpoint of profit. It is, therefore, advisable to take certain conditions into consideration [illegible] ready market, but also brings the manufacturer a substantial return on his investment. While it is highly important to have proper materials, it is equally as essential to have proper machinery, capable management, and a plant so organized that it can be run the year round regardless of weather conditions. All of this, of course, means that the equipment installed must be the best adapted for the purpose required, and also that the plant must have the right kind of a drying system, and proper kilns. It is of little avail to discuss the individual choice of brick, as each and every person may have his set ideas or prejudices in this respect. For factories or ordinary buildings, say up to four stories in height, the selection of brick is not in itself a criterion [illegible] that requires any great restriction as to quality. What is known as stock brick or common mud brick, which, in most cases, is made from top soil, is quite generally employed in such structures. When properly manufactured this product turns a dark flat color, and it is adopted by many for residential work of the less expensive type. Although such bricks vary considerable in quality, it must be said that in Toronto bricks of high grade, capable of standing a fair crushing test, are made by this process.

Paving brick, or vitrified brick, and in this connection might be mentioned hollow tile and terra cotta, are manufactured by what is termed the "stiff mud process." These bricks are frequently turned out in large quantities, and if the material is of a suitable character, a very strong brick, as a rule, is produced. Of course, much depends on the machinery equipment, proper driers, and well constructed kilns, but where a plant is thoroughly considered in this respect, it can be operated at a big profit, especially so, if it is provided with down draft or continuous kilns and waste heat drying system. Recent improvements have done much for this branch of the industry, and machines are now made with an individual capacity of from 50,000 to 200,000 first-class bricks per day. These bricks are principally used for paving, and in some few instances for the exterior of buildings, but rarely on the interior. A very high grade of material burned to vitrification, will stand a very high crushing test, varying possibly from 4,000 to 9,000 pounds per square inch. The body of such brick will not deteriorate and go back to dust, but is, practically speaking, a piece of metal that is not susceptible to disintegration.

Bricks manufactured according to the so called "dry press process" are made from either clay or shale, the so called shale or shale-clay being preferred. This method of manufacture is greatly growing in favor, and is gradually coming to be recognized as the best and easiest way of producing a high grade brick [illegible] especially with shale, the most important thing is to have strongly constructed and accurately adjusted machinery so that a heavy, even pressure can be applied at the right time, thus making a dense and solid brick throughout the whole body, which will properly vitrify in the burning. It is imperative that the shale material should be uniformly and hard pressed before an attempt is made to burn it; as where the proper pressure is not exerted throughout the body of the brick, it cannot be burned to solidity, but on the contrary becomes very spongy, and almost useless as a building material. In many cases in the past, mechanical inefficiency and carelessness in this respect, has been a curse to the pressed brick industry, and has incidentally incurred many big failures. A well built and well equipped plant will turn out at least 95 per cent. of high grade bricks from every kiln, while the remaining 5 per cent. taken from the bag wall, or where the hardest fire [illegible] of clinkers. Some four years ago it was publicly stated that pressed brick could not be successfully made in Canada, outside of one or two places in Ontario. This, however, has since been disproven by facts, as we find there is an abundance of material in various parts of the country that will not only make a high grade product [illegible] quick burning and quick drying. In several parts in and about [illegible] equipment and capable management, a first-class article can easily be manufactured at $4 a thousand and less, and of a quality which at the present time should not for any reason be marketed for less than from $15 to $25 per thousand. [illegible] character, and like paving brick, stands from 4,000 to 9,000 pounds per square inch, besides being practically immune from deterioration. In appearance, it is very smooth and handsome, being produced in different colors, ranging from buff to dark red, according to the material employed, and it is the choice of many individuals for residences of the better class. We [illegible] this kind of brick for facing business buildings on the street side, but the interior and side and rear walls are invariably laid up with a lower grade material. While appearance is essential, structural efficiency is uppermost, and it is difficult to understand in this latter respect, how one part of a building is not considered just as important as the other, especially so, in warehouses or office buildings where heavy loads are carried on the walls. If the so called "stiff mud bricks" which are equally as high in crushing strength as the facing brick, were used for the interior and rear wall construction, a building of this class would practically endure for all time to come. Inferior brick made out of low grade materials, and low in crushing strength, should not be recognized as suitable for this class of work in buildings ranging from six stories upwards, and according to the writer's opinion, it would be advisable for the building authorities to carefully give this matter their respectful consideration.

In many parts of the country where a good quality shale or clay is not available, a product known as sand-lime or silicate brick is being successfully manufactured and extensively used in many important buildings. We [illegible] and high grade sand, and that it has been used these many years in the production [illegible] show that these bricks have a crushing strength from 2,000 to 6,000 pounds per square inch, and that they improve with age, in that the brick when subject to atmospheric changes becomes practically a hard impervious sandstone that will neither crumble, flake, nor deteriorate. With a high grade silica or a silica sand, and a modernly built and well equipped plant, the production of this character of brick is easily accomplished. Care, however, should at all times be exerted in the method of manufacture, and the raw materials should be put through a cleaning and drying system before being transferred to the storage bin. The lime should be treated by steam until thoroughly slacked, and then placed, in a pulverized state, in a separate bin. Proper mixing and measuring are very essential, and especially designed machinery has been invented for this particular purpose. The proper proportions are from 5 to 6 per cent. of high carbon lime to 94 per cent. of good sand. After passing through the measuring and drying machines, the mixture is transferred to another mixer, and a small quantity of water is added. The material is then moulded by a powerful machine, which is capable of exerting a 1,700 ton pressure, and which makes the brick sufficiently strong so that it can be easily handled to cars, having a capacity of 1,000 bricks each, and conveyed to the hardening cylinders, which holds in one unit 22,000 bricks. While in the hardening cylinder, the brick is subjected to a high steam pressure, which is taken away from the engines after the day's pressing is over. This process thoroughly penetrates them, and forms a chemical action through the carbonate of lime and fine silica, which perfectly cures the brick, and makes the product ready for the market in twelve hours' time. This branch of the industry is a very profitable one, and a thoroughly considered plant can be operated either in dry or wet weather the year round.

In this connection a word might be said about building construction in general. They who have the power to recommend, should exercise the greatest discretion as to the material to be used. We must not only consider our own immediate needs, but the future as well, and should therefore build our structures so that they will not endanger life and property, either during the present time or in years to come. Personally, I should dislike to have the responsibility laid at my door for recommending the construction of buildings that will deteriorate and collapse, and my hope is that we shall be sincere in our efforts in this respect, and do our duty to our fellow men in a manner that will redound to our credit many years hence. No material stands higher in structural efficiency than well made brick. Canada, which has a most brilliant future before her, and prodigious resources for growing grain, is also blessed with an abundance of suitable materials for making all kinds of bricks; and what is more, facilities for manufacturing high-grade machinery for such purposes, and practical men with engineering skill to design and construct a thoroughly modern plant in every detail. We have, in short, if we have the ability to recognize them, advantages in this respect that enable us to co-operate within ourselves, and to build up a home industry that would substantially add to our industrial strength and prestige.

Previous in this article, I have referred to brick as a piece of metal that will not either rust nor deteriorate. This in itself simply implies that well made brick has the stability of character of good steel, but unlike metal is not susceptible to disintegration. That is where the advantage of brick lies. All materials should be carefully examined so that in their use, their life for safety could be determined and a limit placed thereon, and the possibility of a collapse avoided. Life and property are [illegible] if we are careful in the selection of materials for our buildings, and in encouraging others to be so, we render a [illegible] and sincere. Every structure should be built so that the base would be in proportion to the height, and so constructed that if certain materials should fail through rust or deterioration, the structure itself would not fall down and destroy other property in its collapse. In this connection, I mean to draw attention to certain structures in many places in the United States which have been built up in a disproportionate manner; some of them possibly 100 feet wide and 300 or 400 feet in length, and from 40 to 50 stories high. These invariably are of steel frame construction, and in many cases a very low grade of rolled steel or iron is employed. Investigation has shown that many elements are acting on such steel, and that in some cases, rust has greatly weakened the structural members. As is generally known, steel contracts and expands with heat and cold; crystallizes with electrolysis, and rusts, deteriorates and scales through atmospheric changes. Consequently, in the erection of our buildings, we should take that precaution in the selection of our materials that will assure our structure standing where weaknesses of this kind develop. As bearing out my statement in this respect, I append herewith an article entitled, "Rust as Shown in the Removing of a Seventeen Story Building," by T. Kennard Thomson, M. Am., S.O.C.E., which says:

The Gillender Building, a seventeen-story structure, at the north-west corner of Wall and Nassau Streets, New York City, was built in 1896, and removed in 1910.

When built, all the columns were encased in solid brickwork. The steelwork received one coat of paint in the shop and two after erection, but on removal showed little evidence of having been painted at all.

From the top to the bottom, wherever the spaces between the brick and steel were filled with Portland cement mortar, there was no rusting, but, wherever the mortar did not fill such space completely, rusting had begun. Generally the undersides of the top and bottom flanges of the floor beams had begun to show rust while the web and upper surfaces, having been in contact with mortar, were in good condition.

The worst rusting of all was from the sixth floor down, on the north-east corner, where the columns had been against the adjoining building on the north side. The cover plates of these columns looked as if they had never been painted, but had stood in the open, exposed to all weather, for 6 or 7 years. On these columns one-half, in volume, of many rivet heads could easily be removed.

This building had been erected by first-class contractors and with first-class materials, although the rusting had not yet made the building unsafe, there is no telling how soon it would have become so.

It would seem that if the columns had been encased and filled with wet concrete there would have been little danger of rust, and they could thus easily have been protected from electrolysis. Oil or oil paints should not be placed on steel to be thus encased.

Messrs. Trowbridge and Livingston are the architects for the thirty-nine story Bankers' Trust Building which will take the place of the Gillender Building, and Messrs. Marc Eidlitz and Son are the contractors, to whom the writer gives his thanks.

IN ORDER to be more conveniently in touch with architects and contractors, the Roman Stone Company, Toronto, has moved its head office from the factory at 99-100 Marlborough avenue to Suite 504-505 Temple Building. Owing to its many excellent qualities, "Roman Stone" is rapidly growing in favor, and is being broadly specified throughout the country. The company has enjoyed a very successful season, and reports a number of important contracts on hand at the present time.

POSITION OF A.I.A. ON COMPETITION PROGRAMMES.—Cont'd from Page 48.

[illegible] structs its members as to what is good competition practice and requires them to conform to it, just as when it instructs them [illegible]

[illegible] adopted certain principles as in its opinion fundamental to the proper conduct of competitions, while that of 1908 decided that any competition not conducted in accordance with them should [illegible]

In practice it was found that it was impossible to gain a knowledge of all or even of any large proportion of the competitions throughout the country so as to disapprove those not in harmony with the Institute's principles. It was also difficult [illegible] tion was disapproved. Thus many badly conducted competitions [illegible]

[illegible] a more practicable course. The convention of 1909, therefore, adopted the principle that participation in any competition the program of which has not been approved by the Institute is unprofessional conduct.

[illegible] able programs and power to delegate that authority. Thus it became necessary for the board to establish a standard by which to test programs submitted for approval. Fortunately, the opinion of the profession as to the essentials of a good program being well crystallized, the board found its task easier than it had anticipated.

[illegible] which serves the purpose of informing the public on the whole subject; of instructing architects as to what the Institute regards as good practice; of strengthening the position of advisers chosen to conduct competitions as well as of setting up a standard to which programs must conform if they are to receive the approval of the Institute.

The board delegated its power of approval to the Standing [illegible] ritory of each Chapter. Each of these sub-committees deals only with competitions for work to be executed within its own terri- [illegible] are passed upon by the Standing Committee.

The Circular of Advice is, in general, an essay on competi- [illegible] visory document. The board found comparatively few things so [illegible] mandatory. Its instructions to the committees charged with giving the Institute's approval are that the program should conform to the spirit of the Circular of Advice, but as this statement might be interpreted in various ways, more specific directions are given:

1. [illegible]

2. [illegible]

[illegible]

3. [illegible]

[illegible] lacking any of the above requirements, the programme fails to reach such a standard as the Institute should set for its members.

[illegible]

1. [illegible] *basis of his fitness for the work and that if a competition must be held,* [illegible]

2. [illegible] *urged.*

3. [illegible]

4. [illegible]

5. [illegible]

6. [illegible]

7. [illegible]

8. [illegible]

9. [illegible] *made as to its essential contents.*

10. [illegible]

11. [illegible]

[illegible] widely circulated among members of the profession and the public generally through owners, editors, educators, etc. Copies of it may be obtained from Mr. Glenn Brown, secretary of the American Institute of Architects, the Octagon, Washington, D.C. Its reception was marked by general approval and it has since then been in successful operation. Many programs have been brought into harmony with its requirements and have received the approval of the Institute. In some instances, the owner on receiving the circular has decided to abandon the idea of a competition, and has chosen his architect directly, a much to be desired result. In the instances in which the program was not brought into harmony with the principles approved by the Institute, the results have justified members in not taking part in the competition, since the outcome in most cases shows either failure to appoint any competitor as architect or failure to proceed with the work for which the competition was held.

Very truly yours,

Fr[illegible] M[illegible] D[illegible],
Chairman.

PRIZE DESIGNS FOR A SMALL BRICK HOUSE

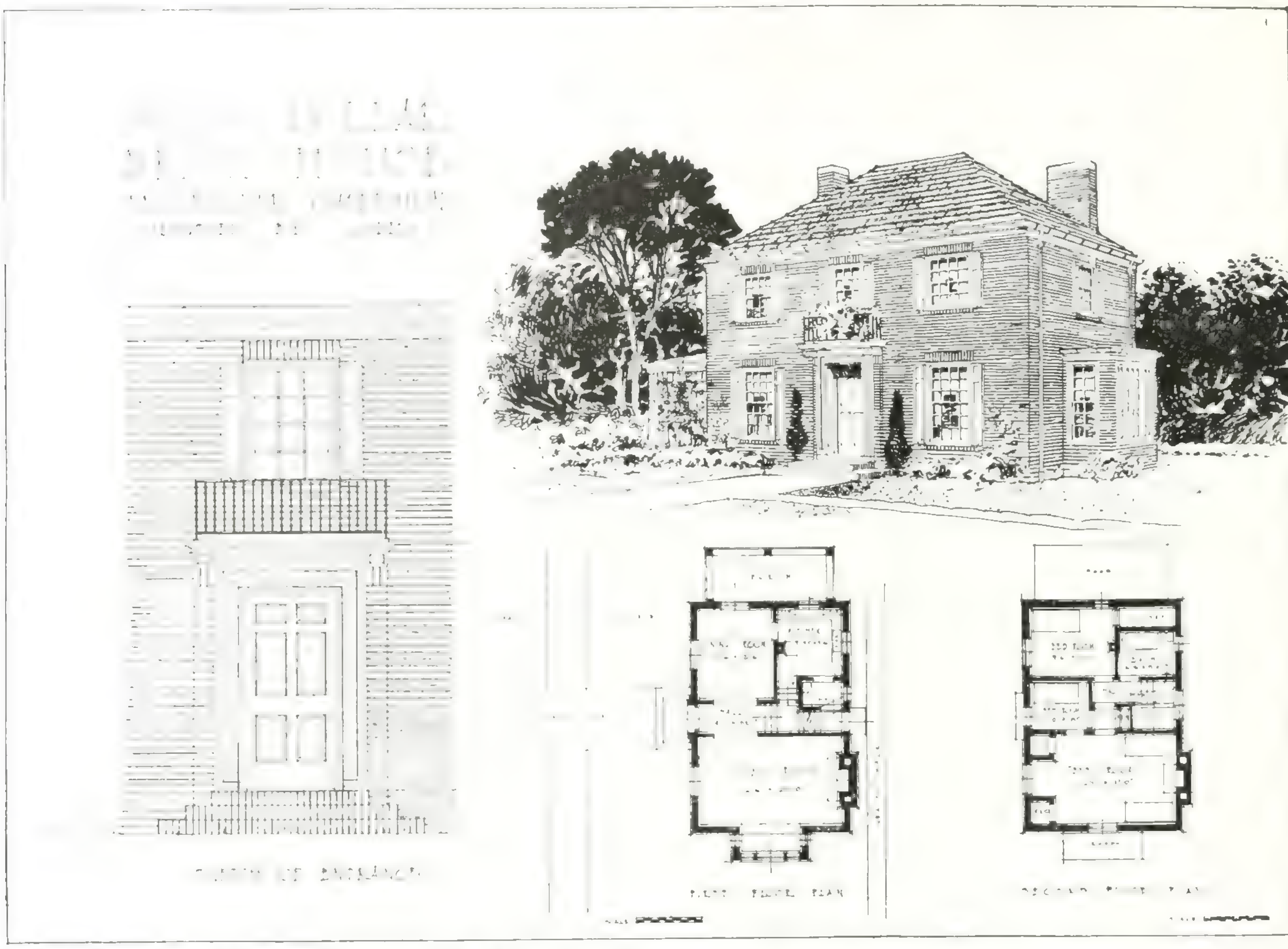
Awards in recent competition conducted by the "Brick Builder," Boston. Of interest to designers and architectural students.

THE DEVELOPMENT OF BRICK, in domestic architectural design, has been more pronounced in moderate priced dwelling in England, possibly, than any other country in the world. The domestic architecture of England is, without question, superior to residential design in any other country in the world, and the English designer of moderate priced dwellings is truly a builder in brick. During the past decade, however, the architects of the Eastern States in the American Union have shown a strong tendency toward the development of the artistic application of brick in dwellings, from the moderate priced cottage to the luxurious mansion, and it may be said that in this connection they have done some noteworthy work, and the brick buildings as designed to day by architects of ability are of a vastly better type than those erected twenty years ago. There is no question about the fact that the architectural possibilities of brick, especially in domestic work, even to day are not thoroughly appreciated by many of our architects. The recent work of our Canadian architects has shown a better appreciation of possibilities of this grand old building material in their higher priced residences, but we have not as yet developed as much as we should have in the in the artistic and practical use of bricks in the moderate and low priced dwellings.

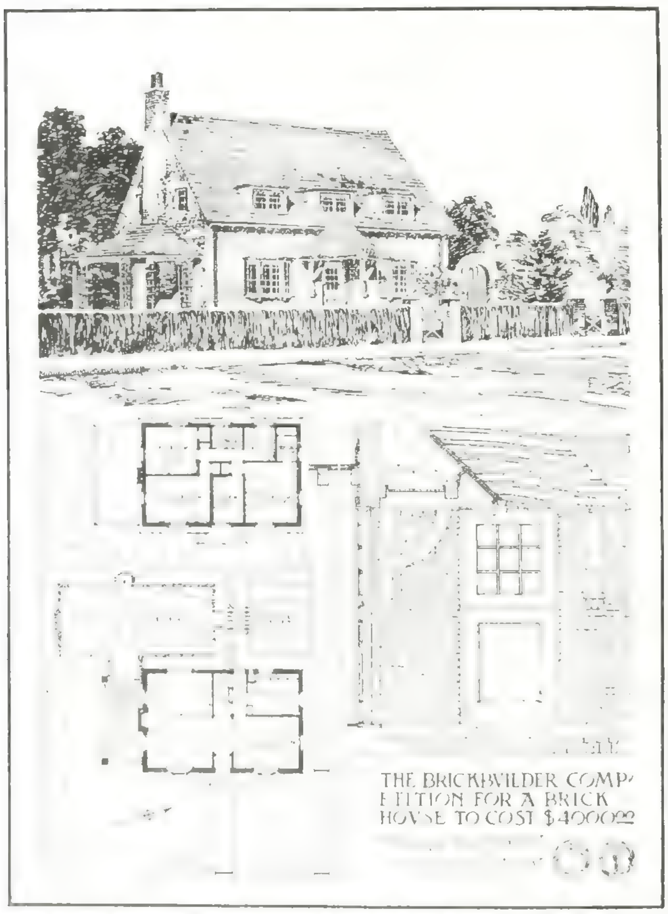
The *"Brickbuilder,"* of Boston, recently conducted a competition for a brick house to cost $4,000, and the designs submitted which were awarded prizes are, to say the least, most interesting. The report of the Jury of Award as published in the *"Brickbuilder"* was as follows:

The mandatory conditions of the program for this competition (A Brick House, the cost not to exceed $4,000.00) necessarily made the problem rather a difficult one if the condition as to cost was to be met, and it was so recognized by the jury, who approached their part of the problem in rather a skeptical frame of mind as to the ability of any one to produce a design which should meet this condition and at the same time have the charm and good planning which should be demanded in a competition of this kind. It was recognized by the judges that in the vast majority of competitions for low priced houses held within the past few years, apparently no attention had been paid to the condition as to cost, whereas, in practice, in houses of this class it is a vital factor, a small variation from the limit set being of serious importance to the prospective builder of a moderate cost house.

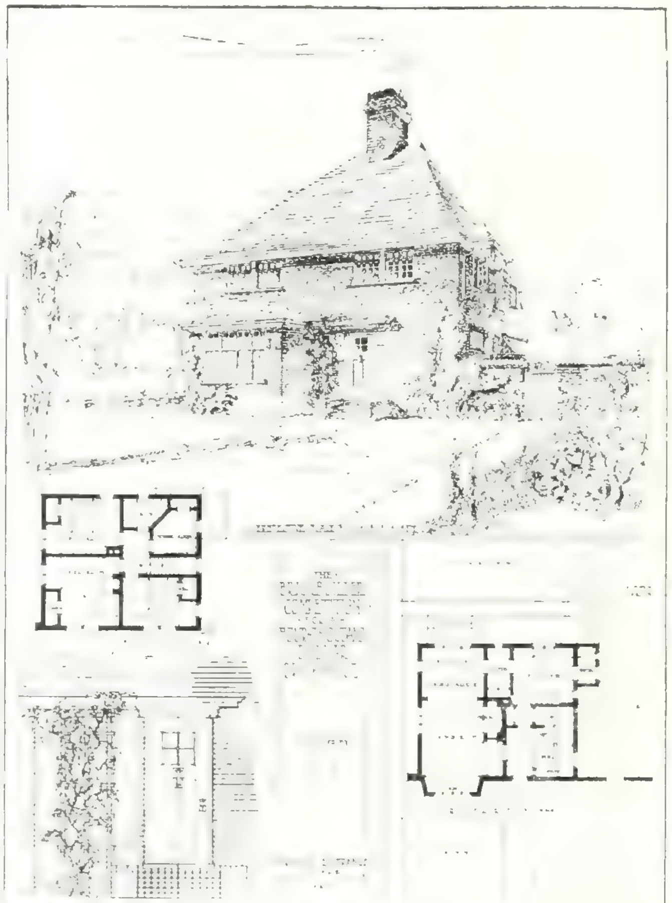
After consideration, $5.00 was agreed upon as a fair price per square foot, though it was recognized as rather low for building in the immediate vicinity of the larger



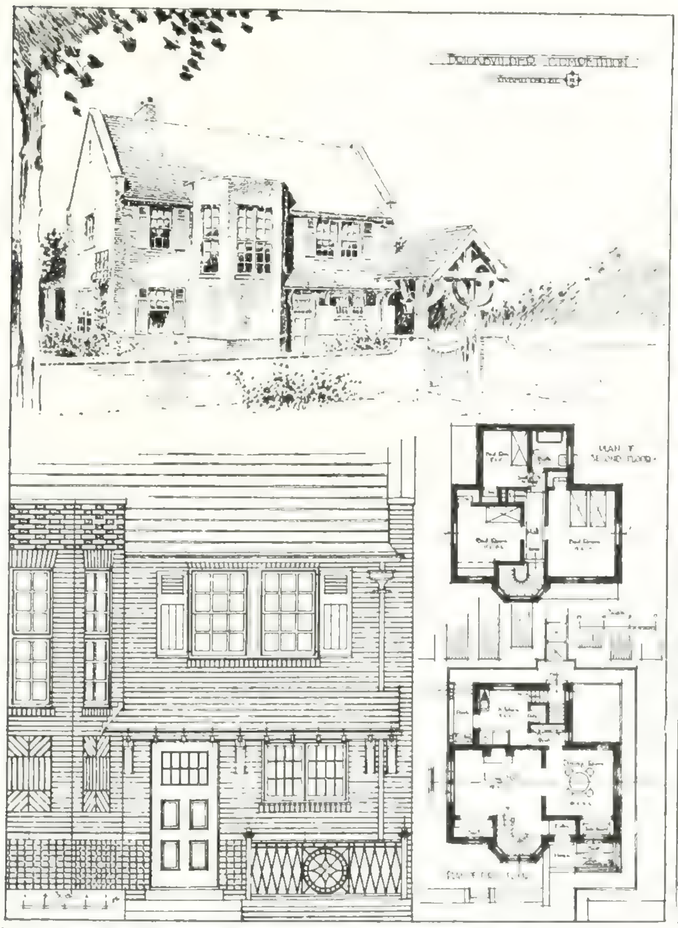
Second Prize Design, Competition for a Small Brick House, Submitted by Francis D. Bulman, Boston, Mass.



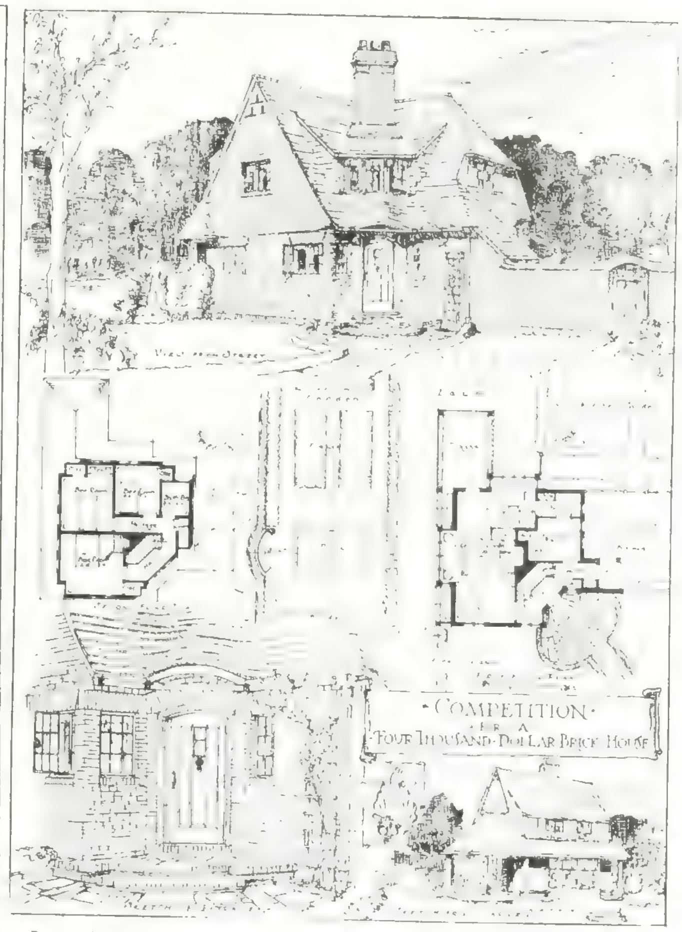
Third Prize Design, Competition for a Small Brick House. Submitted by Stewart Wagner, New York City.



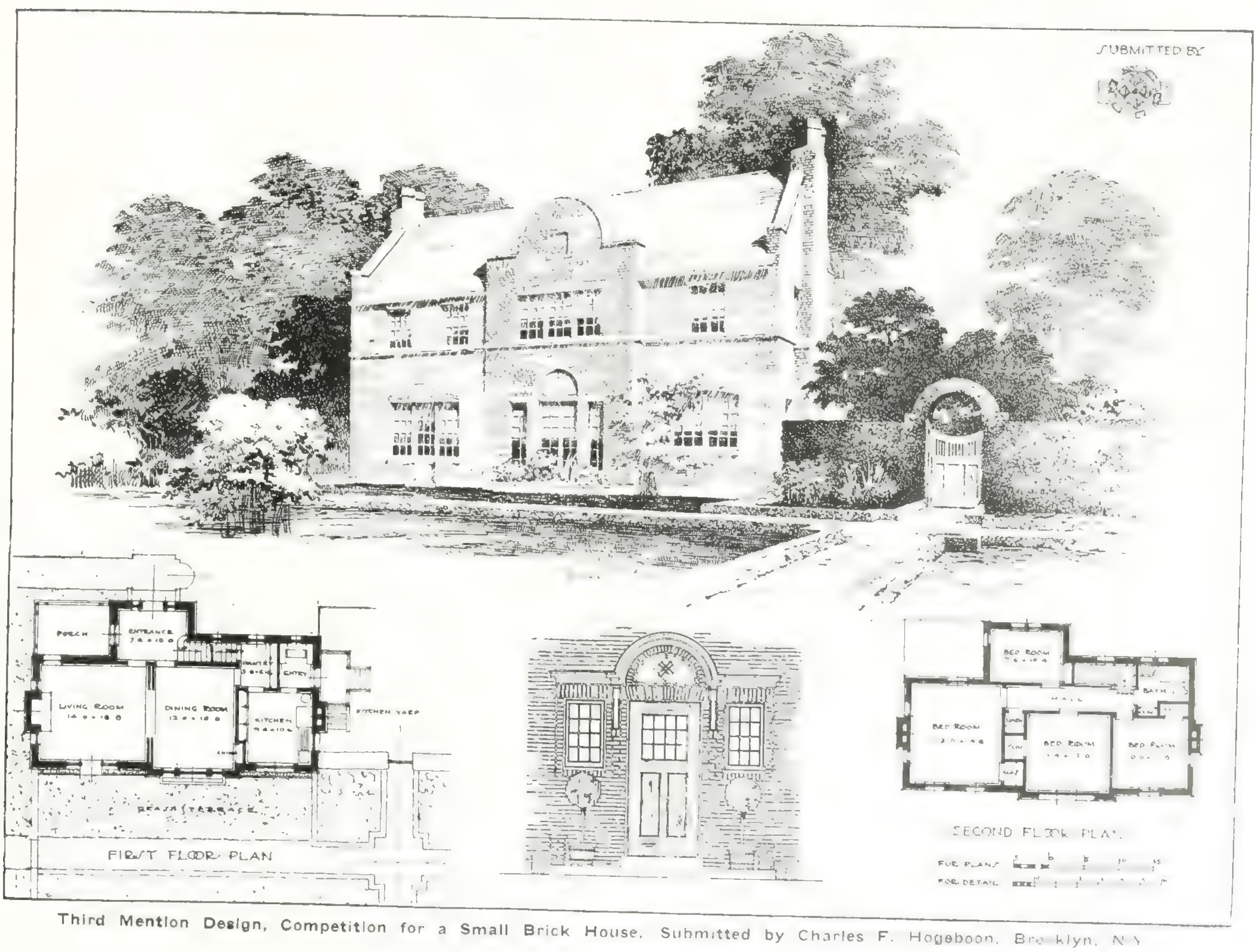
Fourth Prize Design, Competition for a Small Brick House. Submitted by A. R. Nadel, Boston, Mass..



First Mention Design, Competition for a Small Brick House. Submitted by C. Edward Arnemann, Weehawken, N.J.

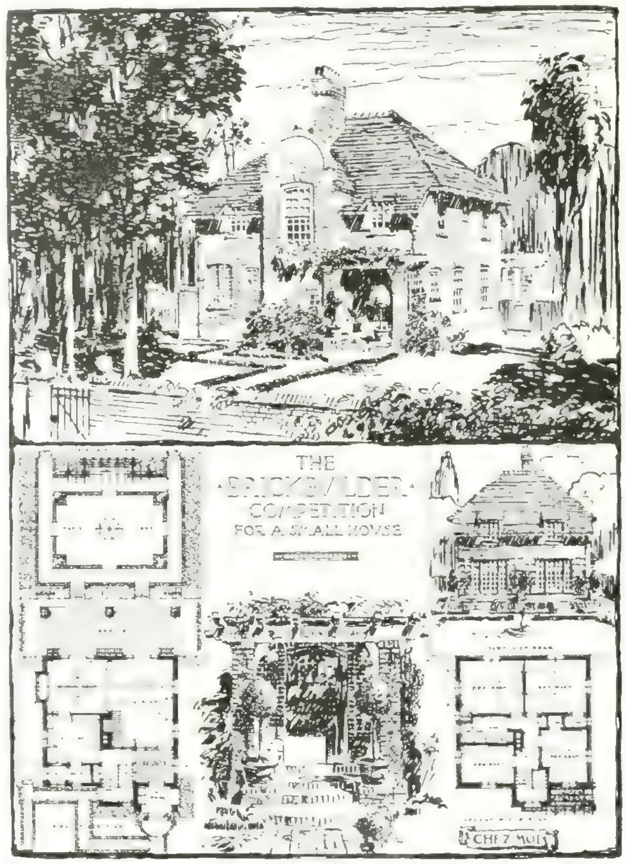


Second Mention Design, Competition for a Small Brick House. Submitted by D. D. Barnes and W. A. Neale, Boston, Mass.



Third Mention Design, Competition for a Small Brick House. Submitted by Charles F. Hogeboon, Brooklyn, N.Y.

Fourth Mention Design, Submitted by Albert G. Hopkins, Boston, Mass.



Fifth Mention Design, Submitted by Charles D. Schneider, Cleveland, Ohio.

cities. This set a limit of 800 square feet to the allowable area. While this simplified the work of the judges in considering the three hundred and twelve designs submitted, they were disappointed in the large number which were necessarily ruled out of competition; nevertheless it was felt that after this test the best designs remained for further consideration. The problem necessarily demanded great simplicity both in plan and elevation, and its solution a careful discrimination as to what should and what should not be included in a house of this class. The conditions of the program made the plan of secondary consideration; their practicability and general arrangement were, however, steadily kept in mind.

First Prize. A very able and charming design with good details, a design which would be most interesting if executed. The plan is one of the best arranged and effective of those submitted.

Second Prize. A very simple and characteristic brick design of the Colonial type, which would depend for its effectiveness very largely on the texture of brick and method of laying. The cornice is unfortunately weak. The plan, however, is excellent, and the design one, on the whole, which gives the greatest promise of being built within the appropriation.

Third Prize. A simple, straightforward design, economical in plan and construction. While the second floor has been sacrificed by the method of roofing the gain in economy is justified by the results on the exterior. The second floor would be improved if there were but one room over the living room—three bedrooms being all that could reasonably be required in a house of this character.

Fourth Prize. A design rather reminiscent of English work and one which would probably be even more interesting in execution than in the drawing.

First Mention. A good brick design which is injured by the large scale of the openings in the stair bay, while the composition is hurt by the importance given to the entrance gate.

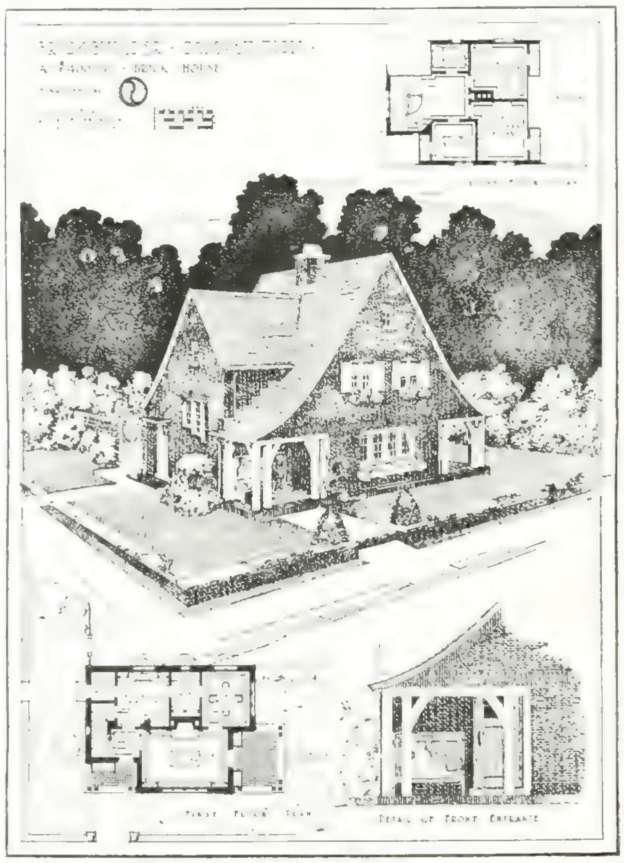
Second Mention. An interesting and unusual plan. The garden elevation is the simpler and the better of the two given.

Third Mention. A very interesting treatment beautifully presented. The details are good but would add materially to the cost of construction.

Fourth Mention. A design which on account of its great simplicity is a good solution of the problem; one which would again depend largely for its effect on the kind of brick work and method of laying.

Fifth Mention. This design was felt to be rather too much broken up and lacking in the simplicity requisite for a house of this class, though interesting in its effect.

Sixth Mention. This design is the most picturesque of all the designs considered. It is, however, hardly fitted to be carried out entirely in brick.



Sixth Mention Design, Submitted by Howard A. Goodspeed, Boston, Mass.

MACHINERY AND TRADE

ARCHITECTURAL VARNISHES

THE DOUGALL VARNISH COMPANY, Limited, successors to McCaskill, Dougall and Company, Montreal, announced that they will be in their new office and factory at the corner of Manufacturers' and D'Argenson Sts., Point St. Charles, by the first of the year. Owing to an alliance recently entered into by this firm and the Murphy Varnish Company, of Newark, N.J., the later concern will furnish the McDougall Company with their formulas and processes for fine cabinet and architectural varnish, and henceforth these varnishes will be manufactured in Montreal, by expert varnish makers who have been engaged for this purpose. In this new departure, the company will maintain that high standard of general excellency, which has resulted in their railway and carriage varnishes, being so broadly known and adopted throughout the Dominion; and architects and cabinet and piano makers will be enabled to obtain in the home market high quality and durable varnishes, that will meet, in every particular, their most exacting requirements. Mr. Dougall still retains his interest in the new concern, and will continue as its president and managing director. The new offices and factory of the company will be model in every way and with the combined experience of both firms at its command, the company is in a position to manufacture products of a quality that will find a large and ready demand.

CORRECTION

WE BEG to take this opportunity to correct an error in connection with the advertisement of Benjamin Moore and Company, Toronto, appearing in our November issue, which stated that their "iron-clad paints" were used on the steel work of the new Pennsylvania Terminus, New York. This should have read "The Grand Central Station," a contract possibly of equal importance and magnitude. It might be mentioned, however, as regards the Pennsylvania Station, that the "Benjamin Moore products" were broadly specified, as is evidenced by the fact that the company supplied more "concrete paint" for this structure than all other concerns put together. The selection in either of the above cases, was made purely on the basis of quality, and it is upon this basis that the company has built up its large business, both in Canada and the United States. One of the reasons for this firm's success, is the fact that they have made a business of specialization and have therefore been in a position to market the highest quality paints and products that can be manufactured for architectural and structural purposes. Among their specialities are such well known products, other than those previously mentioned, as "Muresco" Wall Finish, "Sani-Flat" Oil paint, and "Impervo Brand" Varnish. Over a half million pounds of "Muresco" alone, were sold in Canada this year.

ELECTRICAL SUPPLIES

THE BRUSH ELECTRICAL ENGINEERING COMPANY, Limited, of London and Loughborough, one of the leading engineering concerns in England, has established a Canadian branch through the Canada Ford Company, Canadian Express Building, Montreal, who will handle all their well-known manufactures, including steam turbines, high speed engines, electric generators, motors, transformers, electric lamps, fans and other apparatus, steam and electric locomotive, and street car and underground rolling stock.

"BITUNAMEL"

THE PROBLEM OF PROTECTING steel and iron from rust and corrosion is something which at the present time is giving engineers and architects no little concern. Investigations have shown in a large number of instances that where proper precautions are not taken in this respect, that the structural life of such materials is infinitely less than originally calculated. Possibly nothing can be cited to more fully bear out this point than the Gillinger Building, New York, a 17-story structure which was recently razed to make way for a larger and more important building. Despite the fact that the steel work had been given three coats of paint, it was found during the process of demolition that rust had developed in certain parts of the structure to an alarming degree, especially from the sixth floor down; and that in general there was very little or no evidence of paint having been used at all.

What is claimed to be one of the best protectives for steel and iron work is known "Bitunamel," an enamel-like coating of a bituminous nature manufactured by the Ault and Wiborg Company, Toronto. Although comparatively new in Canada, this product has been used extensively in the British Isles, where for a number of years back it has successfully withstood the test of a damp and wet atmospheric conditions. Steel plate, pontoons and water tanks coated with "Bitunamel" from 10 to 18 years ago are still perfectly protected, with absolutely no indication of rust of corrosion. Nothing perhaps attests to its virtue in this respect more than the fact that "Bitunamel" is employed on the Cunard Liners and other ocean going vessels as a protection against the action of the salt water. Besides being possessed of great elasticity and tenacity, this product has a great covering capacity and is easily applied, one coat usually being sufficient in most cases. In addition to its advantages for steel work "Bitunamel" is also used extensively for water-proofing stone and concrete foundations, and is being employed in this particular on a number of important structures throughout Canada, including Burwash Hall at Victoria College, Toronto. Samples and full information regarding the many merits of this product, together with a list of buildings and structures on which it is employed, will be sent to architects, engineers and owners upon request.

ACCEPTS NEW POSITION.

MR. CHAS. W. FORTUNE, Heating and Ventilating Engineer, who has been identified with Sheldon, Limited, of Galt, Ont., has severed his connection with that firm, and is now associated with the Bennett and Wright Company, Limited, 72 E. Queen Street, Toronto. Mr. Fortune has a large circle of friends and acquaintances whose wishes for success follow him to his new position.

CONSTRUCTION

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

Vol. 4 — TORONTO, JANUARY, 1911. — No. 2

CONTENTS

TERMS OF SUBSCRIPTION

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H. GAGNIER, Limited, Publishers

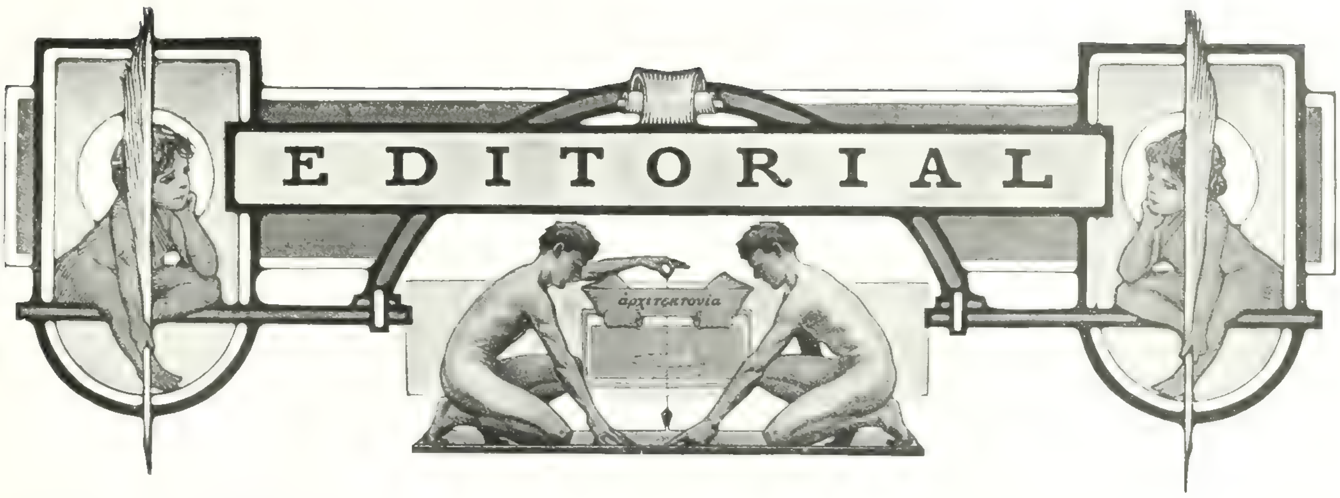
Saturday Night Building

TORONTO - - - - - - CANADA

BRANCH OFFICES

MONTREAL—Board of Trade Building. LONDON, ENG.—Byron House, 85 Fleet St. E.C.

Detail of Half-Timber Work, Residence of Dr. W. T. McArthur, Los Angeles, California. R. Mackay Fripp, Architect. (See page 50.)



Building Statistics for November—Returns from twenty-four important centres show average increase of 64 per cent. over same month of last year.

THE WINTER SEASON LET UP in building operations held in anticipation by the more pessimistic, has as yet failed to put in its appearance. Judging from the present state of activities, the Canadian builder no longer cares the snap of his finger for the frost, the snow, or the sweep of the wind. Experience has taught him to meet weather conditions as they come, and his work is no longer confined to specific seasons, but one that keeps him busy from one end of the year to the other. Nothing more clearly demonstrates this than the comparative figures for the month of November, submitted to CONSTRUCTION from 24 important centres throughout the Dominion. These figures show a most gratifying state of progress on practically all sides, with individual gains in some cases such as has never before been attained in the history of the community they represent.

An average gain of 64 per cent., representing an investment of $8,051,419, as against $4,719,564 in the corresponding year of 1909, tells them the story of the month's progress in brief, and while the amount noted is slightly less than that recorded in October, it nevertheless indicates a growth that is well in keeping with the remarkable development that has characterized the season throughout.

Possibly the most pronounced feature of the month was not so much the universal activity that obtained in general, as it was the heavy proportionate gains made in all parts. Toronto, as is its usual wont, stands well at the head of the list with an amount of $2,040,030, a splendid total to top off the heavy successive gains already to her credit; while Vancouver registers an amount for permits issued of $1,897,895, which is a most remarkable showing in view of this city's past performance. These totals are the largest reported for the month, and the gains are 5 per cent. and 211 per cent. in order named.

Although three more losses are noted than in the previous month, it must be remembered that the number of cities reporting is again one third as great. Apart from Halifax's loss of 76 per cent. and the decrease in Lethbridge of 27 per cent., the falling off, collectively, but little affects the exceedingly active conditions which otherwise prevailed. The highest increase for the month goes to Port Arthur, whose mighty development is reflected in a gain of 1,263 per cent., representing an investment of $182,016 as compared with $13,350 in the months of November, 1909. Ontario, in fact, turned itself to good account in practically every direction. Berlin recorded an increase of 365 per cent., Hamilton a gain of 44 per cent., and Brantford is ahead by 162 per cent. A big advance is also noted in the case of Fort William, which registered 198 per cent., and this is equally true of St. Thomas, which annexed a gain of 432 per cent. Fort William's total amounts to $411,480, which is $273,515 in excess of her previous corresponding figures. Again, Ottawa, which witnessed operations to the extent of $230,100, has an increase of 12 per cent.; Windsor records a gain of 27 per cent.; and Kingston, which does not submit comparative figures, reports operations to the extent of $23,965. The only two reversals noted in this province occur in the case of London and Peterboro, but considering the investment in either cases these declines are of very small proportions.

In the western section of the Dominion the headway made was equally pronounced. Aside from Vancouver's phenominal upturn previously mentioned, many of the cities reporting forged ahead in a most substantial manner. Especially can this be said in the case of Calgary, which undertook new work amounting to $590,604, equal to a gain of 179 per cent. This total, which is slightly in excess of that noted in the previous month, speaks volumes for the wonderful development which this city is experiencing. Edmonton, where a falling off of 16 per cent. is noted, was, however, less fortunate; as was also the city of Lethbridge, whose decrease has been previously stated. In Saskatchewan, both Regina and Moose Jaw slightly topped their figures for the same period of 1909, the investment in each case being approximately $50,000. Prince Albert sends in a stated amount of $240,000, without corresponding figures for the previous year; while Saskatoon, which issues permits aggregating $184,210, shows a gain of 647 per cent. Substantial strides were also made in Winnipeg and Victoria, which have to their credit gains of 27 and 94 per cent. in the order named. Brandon, however, is in the arrear to the ex-

	Permits for November, 1910.	Permits for November, 1909.	Increase. Per cent.	Decrease. Per cent.
Berlin, Ont.	$27,950	$6.000	365 83	
Brandon, Man.	4,400	6,430		31 57
Brantford, Ont. ..	98,400	37,550	162 05	
Calgary, Alta. ...	590.604	211,550	179.17	
Edmonton, Alta. .	52,606	63,365		16.98
Fort William, Ont.	411,480	137,965	198 25	
Halifax, N.S.	24,350	104,575		76 72
Hamilton, Ont. ..	239,225	165,850	44.24	
Kingston, Ont. ..	23,965			
Lethbridge, Alta.	69,755	96,755		27.91
London, Ont.	31,074	37,475		15.48
Montreal, Que. ..	905,427	479,540	88 81	
Moose Jaw, Sask.	52,000	51,350	1 26	
Ottawa, Ont.	230,100	205,100	12.19	
Peterborough, Ont.	8,570	15.075		43 16
Port Arthur, Ont.	182,016	13.350	1263 41	
Prince Albert, Sask.	240,500			
Regina, Sask. ...	50 240	49,205	2 10	
Saskatoon, Sask.	184,210	24,635	647.76	
St. John, N.B. ..	66,900	33,900	97 34	
St. Thomas, Ont.	44,300	7,600	482 89	
Sydney, N.S.	15,737	10,070	56 27	
Toronto, Ont. ..	2,040,030	1,940,650	5 12	
Vancouver, B.C. . .	1,897,885	610,189	211.03	
Victoria, B.C. ...	104 295	53,585	94 63	
Windsor, Ont. ..	84,200	66,000	27 57	
Winnipeg, Man. .	371,200	291,800	27 21	
	$8,051,419	$4,719,564	64 99	

[illegible]

[illegible] to the front, with a gain of 88 per cent. Permits were [illegible] enjoyed a great expansion, and at no time during the year has a decrease been experienced. St. John also shows an advance by a gain of 90 per cent., as does also Sydney, where the total for the month is 56 per cent. in excess of the previous corresponding month.

Altogether, the year has been a most remarkable one in many respects. Toronto's total for the year is over $20,000,000; Montreal, $15,000,000; Winnipeg, $14,000,- [illegible] other cities also have amounts that are well up in the seven figures. As regards the immediate outlook, prospects were never brighter, and in practically every section and corner in the Dominion architects and builders are at present making preparations for a large volume of work to be carried out in the early months of 1911.

¶ The Future of the Roof—French Designer predicts that ærial navigation will bring about both its architectural and constructive transformation.

IN CONSIDER[illegible] manifest as regards the aesthetic in building design, there is just an element of speculation as to what will be the ultimate architectural status of the roof. Outside of the residential districts, it is a much unaesthetic, sadly neglected and disfiguring feature of the average building. Possibly not so to the pedestrian on the street, for whom its ungainly appearance is hidden by cornice [illegible] which fits in well in this connection—its shortcomings are conspicuously evident.

As it applies to our commercial and industrial buildings, with a few possible exceptions, architecture to be seen at its best must be viewed from the bottom up and from the top down. From the upper windows of the modern office building, or the tower of the public edifice, the sight which greets the eye is anything but an inspiring one. Instead of any semblance of order, one is confronted with a choatic riot of hideous disorder, which [illegible] its ugliness, as to strike one with amazement at the [illegible] point reveals. For apart from its purpose as a covering, the roof has but little in its make up to commend it. In its present considered state, it adds nothing to the prestige or rarer qualities of the "Mother" of all arts, but rather [illegible] selled and unkempt head.

Not that architecture has always appeared in this unfavorable light, for in Egypt, Jerusalem, and countries of the Levant, there are many examples of buildings, both old and new, where the roof is as interestingly considered from an aesthetic point as any other part of the build[illegible] through a representative collection gallery of architectural photographs, fully bears out the correctness of this statement. Even at the present day in certain parts of [illegible] line but on this Continent the roof of the average com[illegible] other than that which is purely utilitarian and unadorn[illegible] coat a multitude of rags, so the cornice and parapet conceals the ugliness of the roof from the street below.

[illegible] into its own. At least this is prophesied by Mr. M. E. Henard, Architect of the City of Paris, who, in a paper on the "Cities of the Future," read before the recent Town Planning Conference, stated that "with the resources afforded by the use of armored cement it is easy to cover buildings with platforms upon which small flower beds and verdant shrubberies could be laid out. The most important result is that these terraces at an early date would be used for landing stages for aeroplanes, and when this has been accomplished, the physiognomy of the town will be changed. All the terraces will become landing stages for flying automobiles. Aviators will be able to fly from one terrace to another, starting and landing as they please." The natural consequence of this new state of things, to quote Mr. Henard further, "will be that each building will have to be furnished with big elevators, capable of raising the machines ready to start and to take them to their garage on their return. Lifts of this description would also be used to house motor cars. The elevation of the courtyard which would result from the raising of the road would permit of all necessary garages being located underground.

"The profound revolution which aviation is producing in the public mind is so great, and opens up such wide vistas, that we may indulge in the belief that all this will be realized. The conquest of the aid will bring with it peace and wealth. The cities of the future, more easily than the cities of the past, will be capable of transformation and embellishment. In them will be erected magnificent towers to call the flying giants from all points of the horizon, and perhaps ere long the great capitals will erect higher and higher their lofty beacons to attack the stormy clouds themselves."

It is quite evident from this, that when the architects take to flying, and whisk their way to and from their offices in a Wright biplane or Bleriot, a much needed improvement as regards the roof will be brought about. In the meantime we must be content to view its ugliness through opaque glasses, and to encourage for the sake of a consummate architecture, the exhilarating and exciting pastime of aerial navigation.

¶ Architects or Brokers?—The question of professional integrity as regards the authorship of buildings.—Interesting letter of anonymous writer on the subject.

FROM TIME TO TIME one hears much concerning the authorship of buildings that leave a grave doubt in the mind as to where the credit really belongs. This, as a rule, is brought about by a statement which charges one architect with appropriating under his own name, work that was in reality designed by another. It seems that there are certain instances where the identity of the rightful designer has been completely submerged, owing to the fact that circumstances had placed him in an advisory or subordinate capacity at the time the plan was executed, but yet it hardly follows that the reputation and professional integrity of the majority of architects can be justly assailed on these grounds. Touching upon a controversy regarding the disputed authorship of the old New York City Hall, "Vindex," in a letter published a short time ago in the *Architectural Record*, deals interestingly with this important subject. 'Doubtless,' says the writer, 'the great majority of architects do the work they pretend to do. Still, it were desirable that there should not be five per cent. or one per cent. of basis for censure. A distinguished American architect, lately deceased, concerning whose own authorship of the work that went out with his office-stamp upon it there never was any question, was hugely disgusted whenever it appeared that there was such a question about the work that bore the office-stamp of any one of his contemporaries and competitors. Yes, he remarked of a rather exceptionally good piece of work emanating from an office in which good work was not the rule, 'that is weak, but not infamous. It does not show the same nasty mind as the bulk of his work. He had a better draughtsman that year than usual.' But when it seemed to be demonstrated that some architect confined his attention to getting the jobs and handed them over to some underling to do, he exclaimed in disgust: 'Are we architects or are we brokers?' "

"This architect used to say that the only way of finding out whether an architect did his own work or had it done was to watch it from year to year, and note the difference. But, we know that even this test is not final, that a work may go one for a decade, even for a generation, under one man's name, which is really done by another whose name is not known out of the office in which he works, or out of some strictly limited social and artistic circle. In England it is held to be 'bad form' for an employed draughtsman to claim his own work, even among his own acquaintances. The theory, promulgated by employing architects, is that not only the work of the employed, but the reputation of it, is an asset of the office and not of the employed individual. So Charles Reade, when once reproached by an 'anonymuncule' or a 'pseudonymuncule,' for stealing a Frenchman's brains, vehemently retorted that he did not steal them, but honestly paid for them and had bought permission to use a plot, scene, or incident, or whatever it may have been. Whereto, Anthony Trollope retorted, with justice, that Charles had missed the point, that the gravamen of the charge 'was not that of taking another man's property, but of passing off as his own creation that which he did not himself create.' That is precisely the point. The memory of McComb would not be vindicated if he had produced, as possibly he might have produced, a quit claim receipt from Mangin, covering all Mangin's right, title and interest to the plans for the City Hall.

"As to Charles Reade, he might have said of himself, as Johnson said of Dryden, that 'his known wealth was so great that he might borrow without impeaching his credit.' And that is, unfortunately or fortunately, the case with a considerable proportion of the architects who put their names to work that they did not do. They could have done it better, or at least as well. But they were engrossed by another job. Or they were hunting another job. 'Peradventure they were on a journey.' Europe becomes very attractive when the job is secured. The [illegible] in these cases, is ours:

'Ah, but the artist that was gone.'

"How desirable, if possible, some regulation whereby an architect should be prevented from taking more work than he can personally attend to and really do.

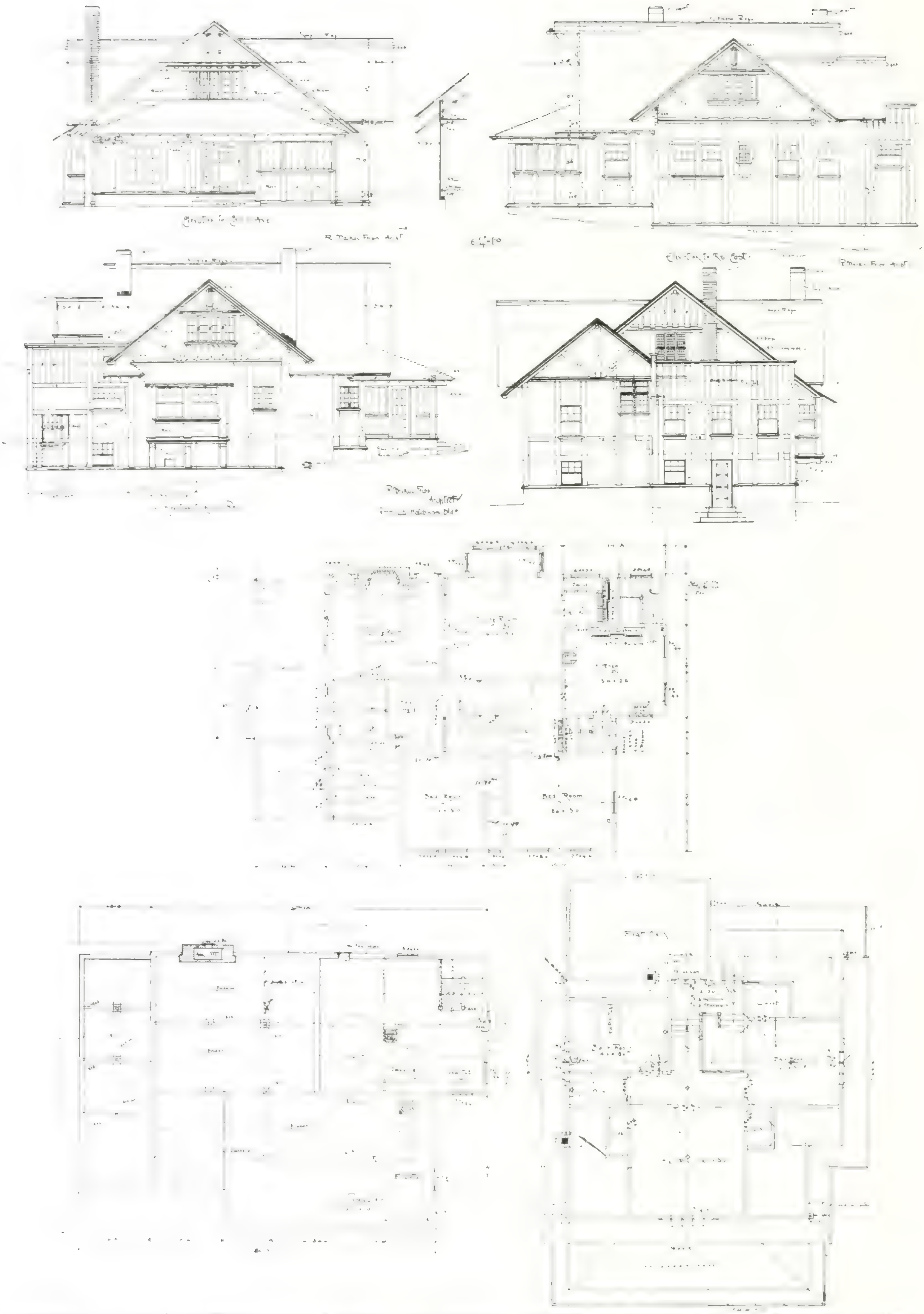
"It is 'commercialism' evidently enough, that is at the bottom of the defection of this kind of architect from his appointed mission of design, the desire to have more to do than he can do himself. Every architect who is an artist knows when he is yielding to this temptation, knows when he is taking more work than he can do, knows that he ought to be ashamed of himself. But also, of course, there is always the hustler, the 'architect,' the proprietor of an officeful of draughtsmen whose work he can neither do nor really judge, and who aspires to the status of an artist because he needs that reputation in his business as a hustler, who has facilities for getting jobs, but no faculty for doing them. Morally he is perhaps above the perverted artist, knowing no better. Artistically he is above nobody, being an aesthical 'chump.' Still he is exasperating. To have him affix his office imprint on work of which he does not know whether it is good or bad, is bad enough. But to have him look you in the face and tell you that he personally did a thing which you hnow him to have been personally incapable of doing, when the thing has turned out to be a success, and when you may know the thing to have been done by [illegible] is not only irritating but infuriating. When he goes [illegible] perverted artist who might have done the thing in question, only he didn't. Then it is that one yearns to 'do the brass [illegible] exposure of the 'chump' who is not commercialized only because he was born exclusively commercial. But it cannot be expected that the artist shall often secure such a posthumous revenge upon the chump as it appears Mangin has secured upon McComb."

IN CONNECTION WITH the article on the New York Cement Show, appearing elsewhere in this issue, it should be kept in mind that the Canadian Cement and Concrete Association will hold a similar exhibition in the St. Lawrence Arena, Toronto, from March 6 to 11, 1911. Judging from the arrangements being made at the present time, this year's event promises to be a most representative and successful affair in every way. Not only will there be a most complete array of cement products and concrete machinery and appliances, displayed by the foremost manufacturers in Canada, but some of the most interesting exhibits of the New York Show will also be seen at the same time. Mr. William Snaith, 57 Adelaide street east, Toronto, the writer of the article in question, is both secretary of the Association and manager of the coming Cement Show, and his visit to New York has suggested a number of original and noteworthy ideas that will make this year's exhibition at Toronto a big attraction both to the allied interests it represents and the lay public as well.

THE CO-OPERATIVE POLICY adopted by the municipal government of Bockenheim, a suburb of Frankfort, Germany, to assist local capitalists in providing low-priced sanitary dwellings for the working class, is something that can well commend itself to other communities having similar problems to solve. The latest step taken in this direction consists of a block, incorporating five groups of four buildings each, erected by a local stock company known as the Mietheim-Aktiengesellschaft. The houses occupy a site of sixty acres (7,176 sq. yds.), and are built around a court. In each house are eight dwellings, composed of two rooms with a kitchen and appurtenances, in addition to cellar and ground space placed at the disposal of each respective tenant. The city's part in the scheme consisted of the providing of the site which was ceded with the stipulation that the concession would expire in 1980, when the ground would revert to the municipality. According to a contract made with the city the average rental of these dwellings is to be 30 marks ($7.14 per month). The total costs of constructing the block of houses, 160 dwellings in all, was approximately 730,000 marks ($173,740). The granting of the land for similar purposes by many cities and towns on this continent would prove to be a highly advantageous undertaking; as it would not only work out an economic betterment of benefit to a community in general, but in the accumulation of the yearly taxes would pay the municipality a substantial interest on land to which it would have a permanent claim.

CORRECTION

ON PAGE 40 of the December issue of CONSTRUCTION, in connection with the advertisement of the Standard Ideal Company, Messrs. E. & W. S. Maxwell are credited with being the architects for the Bank of Toronto's St. Catherine street branch in Montreal. In this we were unfortunately in error, as this important structure was designed by and erected under the supervision of Messrs. Ross & McFarlane, Montreal. CONSTRUCTION regrets the occurrence of this mistake.



... of B. S. Walker, Earl Road (West Collingwood), Vancouver, B.C. R. Mackay Fripp, Architect.

Home of Mrs. A. E. L[illegible]. A Shingle Clad Californian Cottage Which is Typically Bungalow in Design. R. M[illegible] Architect.

TYPES OF PACIFIC COAST HOUSES

The bungalow and its influence on domestic work. Examples of British Columbia and Southern California Homes that are noteworthy both in architectural lines and composition.

I [illegible] essential traits of this particular style. This does not, of course, necessarily imply that the vast majority of the Pacific Coast dwellings are specifically of the bungalow type as perhaps no section offers a greater diversity of styles in the character of its homes; but it holds, nevertheless, that certain characteristic features which have developed with the bungalow are being extensively adopted and used with no little success in practically all classes of residential buildings.

While this influence is strikingly evident in the low straight lines, overhanging eaves and inclosed porch of the average exterior, it is perhaps even more conspicuously displayed in the interior where built in devices make for compactness of plan and structural utility dictates to a large extent the architectural character of the rooms. In many cases panelling of native woods enter extensively into the wall scheme and the ceiling beams are, as often as not, made to serve a real structural purpose. These woods, as a rule, are richly grained and stained in soft harmonizing tones that produce a most satisfying and restful effect. Where plaster is principally used, the mill work is of the simplest character and generally follows the straight lines of the mission furniture. Frequently where a house is other than of frame construction, the brick work or building tile is left exposed on the interior [illegible]

Of course this refers particularly to the better and more thoroughly considered homes, as in many of the cheaper houses, especially the smaller Californian structures that are typically bungalow in design, the interior [illegible] and which often gives better results than if other materials were employed. With the latter character of dwellings, mild climate conditions have made possible a very light form of construction, and the availability and cheapness of good [illegible] California where these houses are little better than mere shells, and owing to the extreme dryness of the climate have no foundation other than sills placed directly on the ground; although in the more northerly situated district of British Columbia, even the cheapest characted of dwellings are built along more substantial and enduring lines. As a rule, these bungalows are either covered with shingles, or with wide spaced clap boarding. Sometimes the shingles are of a larger size than those adopted in the East, and are often left unstained, the native wood in many cases producing a warm and pleasant effect.

However, it is not so much the low cost bungalow, engaging as it is, with which one is most forcibly impressed, but rather certain characteristics which have been evolved through its development, and which have enabled architects to incorporate in their work common features which bring their residential buildings into closer relations with each other. For, in this connection, one must not

Studio, Home of Mrs. Lathrop, Showing a Decidedly Simple Scheme made Attractive by Ceiling Beams, a Brick Fireplace and High Placed End Windows. R. Mackay Fripp, Architect.

[illegible] of the fact that while small frame buildings are in the preponderance, many of the bungalows of the Pacific Coast district are of brick, hollow tile, or concrete construction, and this also holds true in the case of the half timber houses and other types of larger residential buildings which occur throughout that section with considerable frequency. All houses, whether large or small, however, have something of the bungalow in common, and it is by adopting and perpetuating the good traditions which have come with this style that designers are suc-

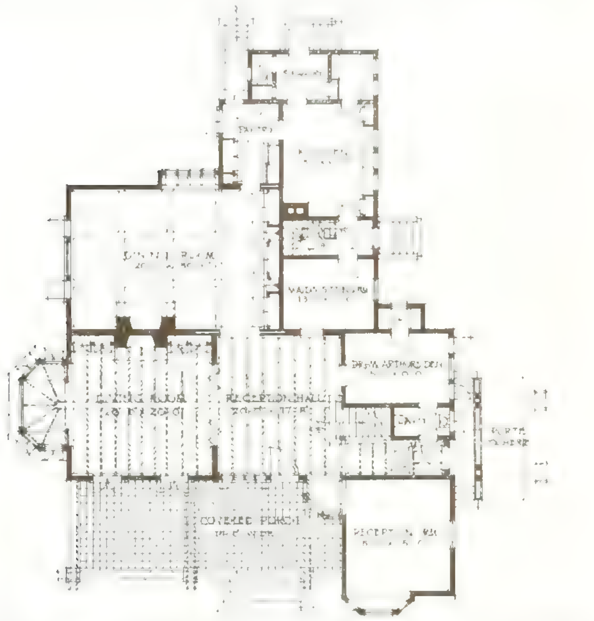
Residence of Dr. W. T. McArthur, Los Angeles—An Attractive Southern California Home in Half-Timber Design. R. Mackay Fripp, Architect.

Residence of Dr. W. T. McArthur, Los Angeles—Showing the Carriage Approach and Porte Cochere. The Wall Construction is of Frame with Cement Plaster on Metal Lath, a Type of Construction not Uncommon in Many Parts of California. R. Mackay Fripp, Architect.

Living Room, Residence of Dr. W. T. McArthur, Looking Towards the Reception Hall. The Woodwork is [illegible] Oak, Stained and Waxed. Note the Unusually Long Vista from One Interior to the Other. R. Mackay Fripp, Architect.

[illegible] general composition.

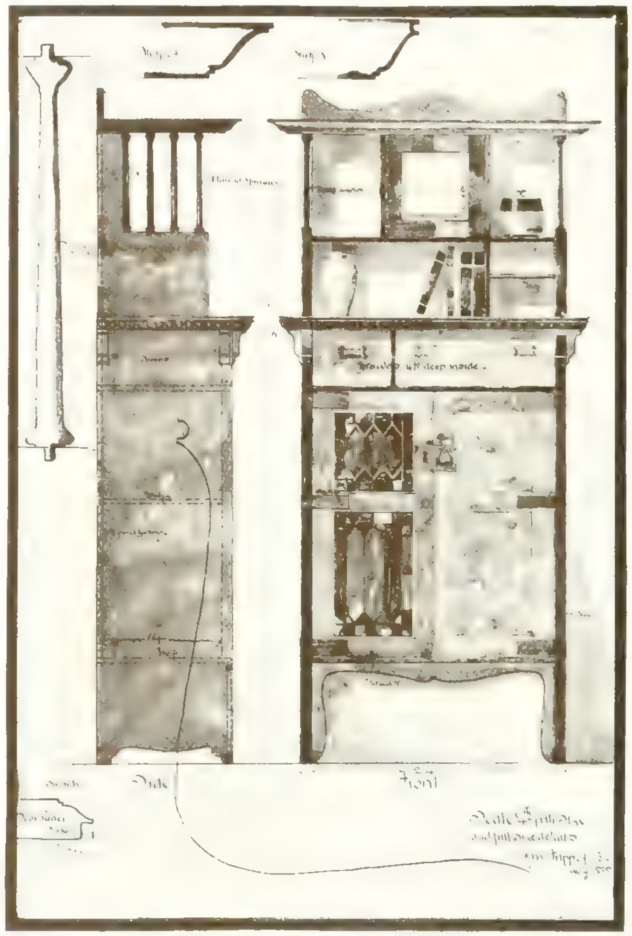
[illegible] display the perverted architectural tendency which pre- [illegible]



Ground Floor Plan, Residence of W. T. McArthur. R. Mackay Fripp, Architect.

[illegible] the present time, and to more fully indicate how seriously [illegible]

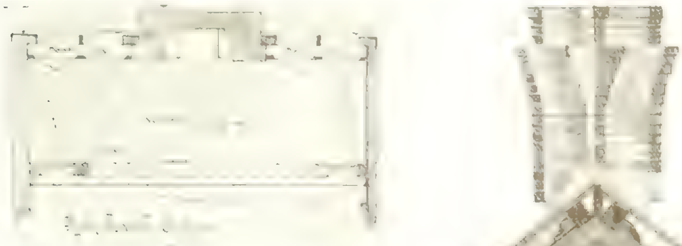
[illegible] many interesting effects are worked out in other native materials beside wood. This is to be noted, for instance, in terrace walls and outside chimney pieces built of water washed stone [illegible]

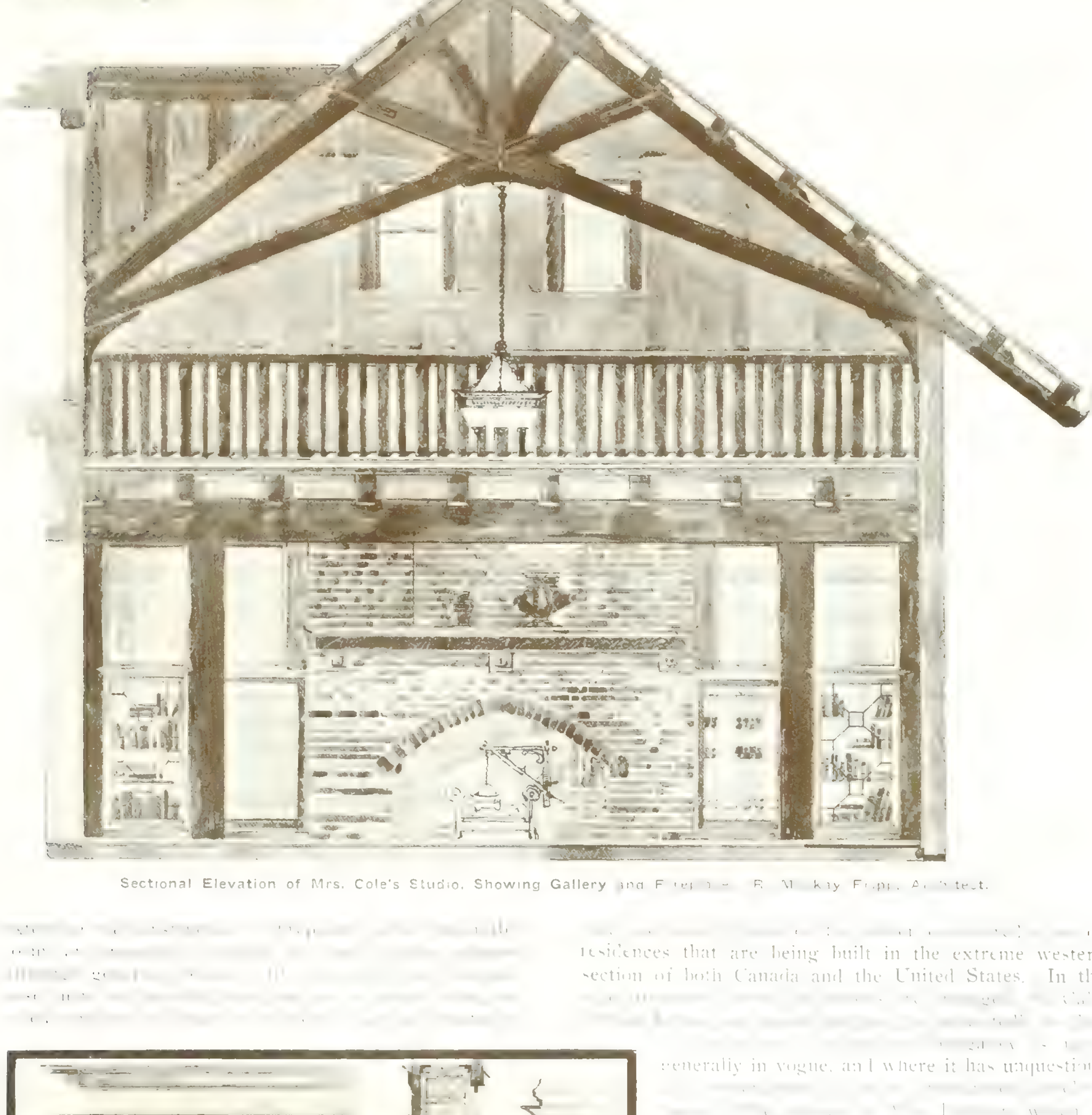


Design for a [illegible] Cabinet. R. Mackay Fripp, Architect.

cases the effect produced is delightfully rugged and picturesque, and where shingles or siding is employed, it adds [illegible] the building. Stone of this character is also used to some

Sketch Elevation of Studio Erected for Mrs. Cole. R. Mackay Fripp, Architect.





Sectional Elevation of Mrs. Cole's Studio, Showing Gallery and Fireplace. R. Mackay Fripp, Architect.

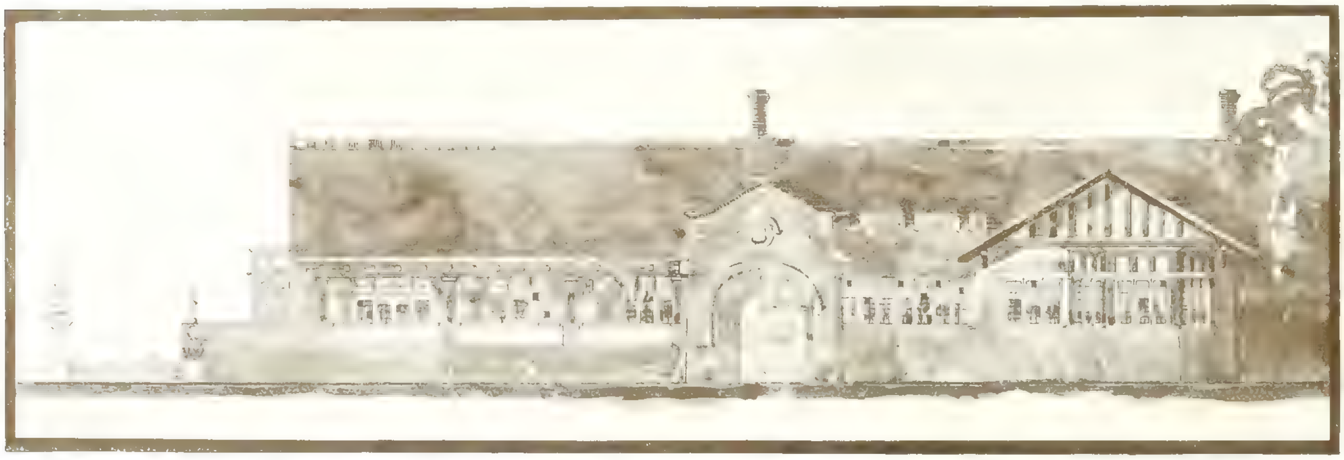
residences that are being built in the extreme western section of both Canada and the United States. In the

generally in vogue, and where it has unquestion-

of this style, and is one of the inexpensive character of small homes which are found in great

ing insincere or affected about this little shingle clad structure. It expresses itself openly and frankly and its lines and distributions of its windows are more commendable in every way than those of its neighbor seen in the same view. The interior view of this home shows the owner's studio, which is principally executed in plaster and inexpensively finished. It will be noted that the mill work is of the simplest character and that the homelike feeling of the scheme is produced mainly by the beamed ceiling and small high placed windows on either side of the fire

Detail for Walnut Side-Board. Designed by R. Mackay Fripp, Architect.



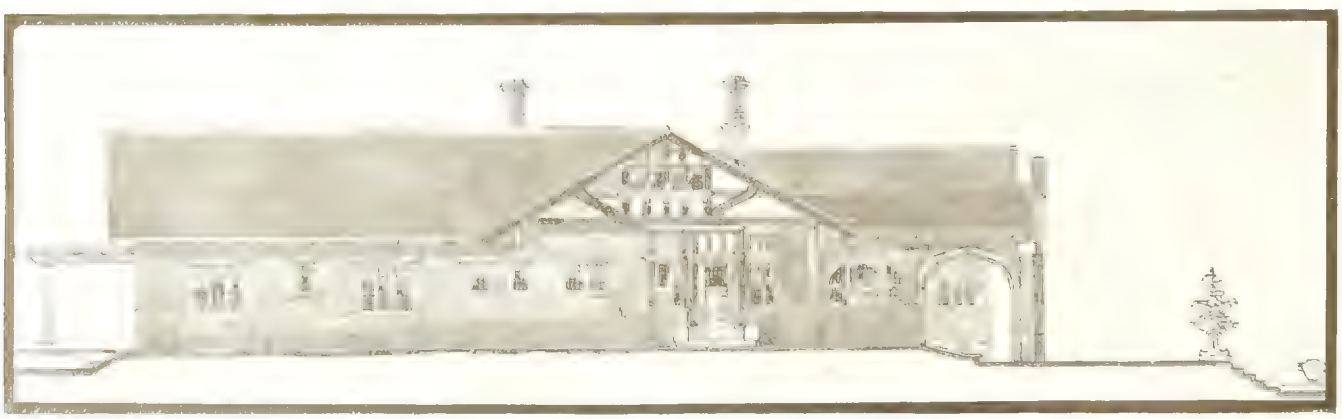
Front Elevation of a One-Story Concrete and Hollow Tile Residence, Riverdale, California. R. Mackay Fripp, Architect.

Recessed Stone Fireplace (Above House), with Oak Seats, Book Cases and Screens.

Ground Plan, Showing Scheme of Rooms and Formal Garden.

The two-story bungalow of Mrs. Coles, which is designed as an art studio, differs somewhat in its composition, in that the exterior is finished in clap-boards with cemented plastered gables, while heavy timber work is introduced in the columns and beam supporting the balcony above the bay window and entrance. This assists in giving the entrance an inset and private effect. A pleasing feature is the door with its wide strapped hinges, and also worthy of note are the windows which are executed principally in Norman squares joined by wide leads. On the interior the walls are finished with high wainscotting of slash grained Douglas fir stained in willow green. The open timber roof and gallery, together with the fireplace of the main room, are shown in an accompanying sectional elevation.

Although in many interiors the effects worked out are mere pretensions as far as structural character is concerned, yet a large number of owners are recog-



Terrace Front of Above House, Showing Approach to Sunken Garden. R. Mackay Fripp, Architect.

Garden Front, Residence of Mrs. H. B. King. Another Interesting California Home in Half Timber Design. R. Mackay Fripp, Architect.

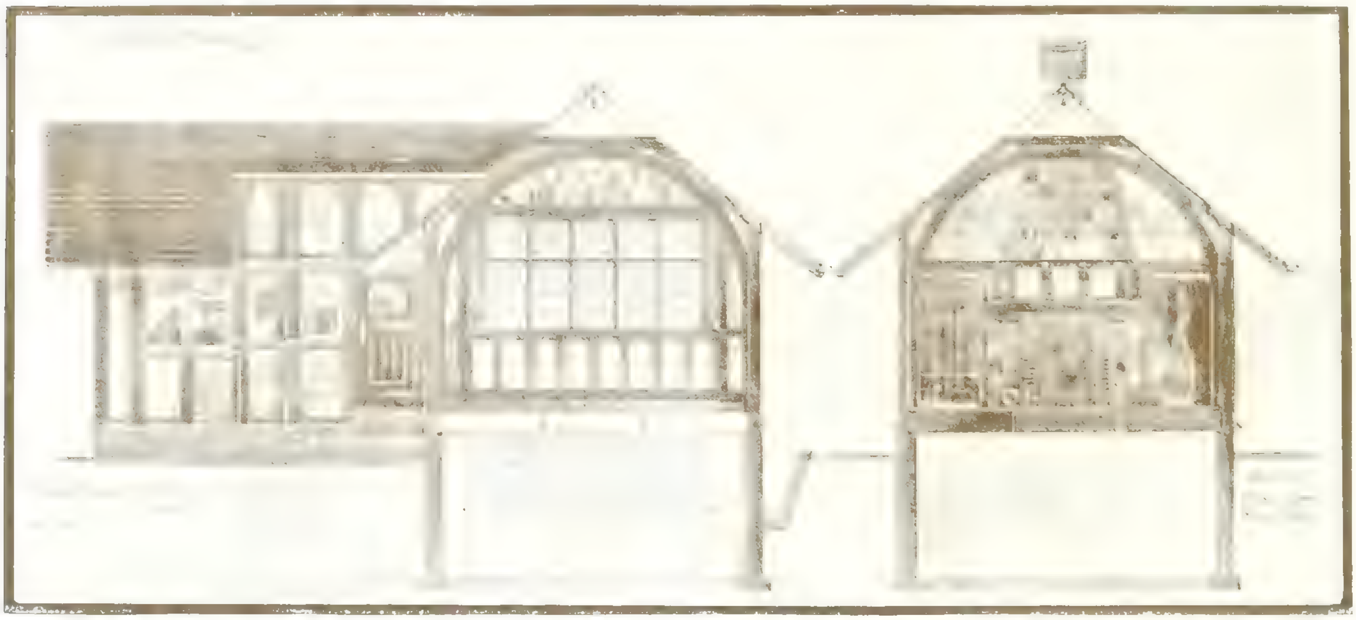
[illegible] their buildings. Again brick, hollow-tile and concrete is being extensively employed in some of the more expensive and important structures. An example of the more substantial type of house is shown in the sketch for a one-story concrete hollow-tile residence built at Riverdale, Cali- [illegible] this house is worked out on elaborate lines with all rooms grouped about an open court having a pergola on its exposed sides. A wide terrace encloses the house on two sides, while the dining room and service department overlook a sunken garden. A feature in connection with the court is the paved cloister onto which all rooms open by French doors. The main porch is covered, and is approached either along a wide brick paved pergola or through the porch cochere. The interior scheme is suggested in the accompanying illustration showing the recessed fireplace off the living room, this interior being carried out in native woods with a heavy beamed [illegible]

[illegible] house [illegible] brick [illegible] tile construction, the materials of the exterior walls are also made to serve as a part of the interior scheme. This is to be seen in the several views showing the floor plan and sectional elevations of an addition made to a house at Santa Monica. Here the building tile above the [illegible] forms an effective frieze above the strapped dado with inset panels below.

Two Southern Californian dwellings of much larger dimensions are the residence of Dr. W. T. MacArthur, Los Angeles, and the home of [illegible] King, [illegible] timber design. In the former house all the rooms on the main floor open off the reception hall, and unusually long vistas from one interior to the other have been obtained without in any way sacrificing the compactness of the plan. The exterior walls are of frame construction plastered with rough-cast cement on metal lath, an interesting feature being the covered porch which is paved and fourteen feet in width. Scraped white oak is used on the interior throughout, and the [illegible] room, hall and dining room are finished and panelled

Residence of Mrs. H. B. King, as it is Seen from the [illegible]. R. Mackay Fripp, Architect.

Detail of Covered Porch, Residence of Mrs. H. B. King. R. Mackay Fripp, Architect.

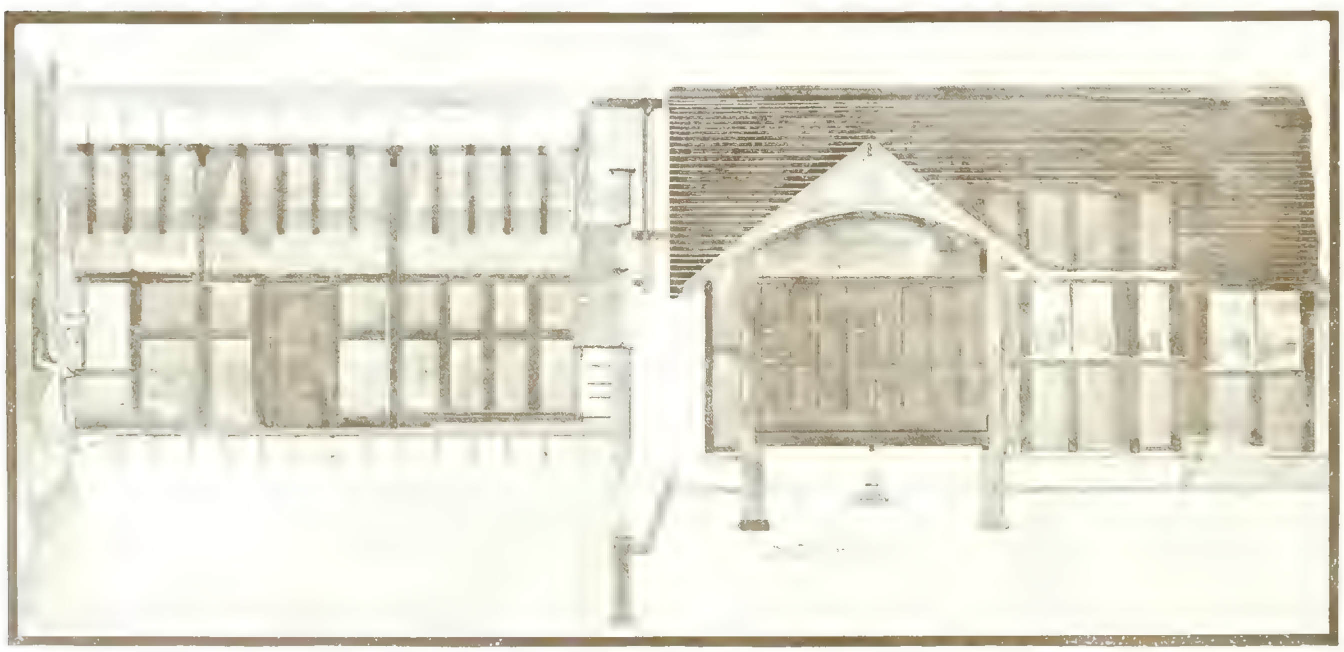


Garden Entrance and Section of Music Room, Addition to House at Santa Monica, California. R. Mackay Fripp, Architect.

[illegible] terra cotta tile to which the plaster is directly applied. [illegible] for effect. The interior is finished throughout in a handsome manner with scraped oak and native woods, while [illegible] the architectuaral scheme. The covered porch, a photographic detail of which is shown, is partially enclosed and paved.

Included in Mr. Fripp's British Columbia work are several very interesting structures. One in particular, the residence of Dr. Richardson, situated at the corner of Harwood and Bidwell Streets, Vancouver, with its series of small gables and well distributed windows, being decidedly picturesque in design. This house commands an exceptionally fine view of English Bay ,and the plan is wholly dictated by the site, the entire width of which is occupied by the building. The exterior is covered with shingled stained a soft brown, and the [illegible] large porch covered by an upper extension which is sup-

Floor Plan, Addition to House at Santa Monica. R. Mackay Fripp, Architect.

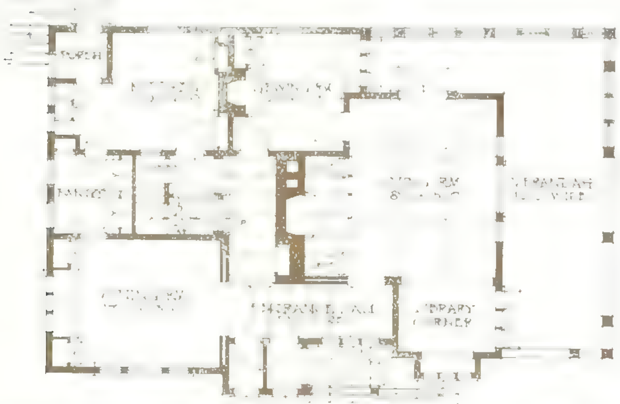


Wall Section of Music Room and Section of Den, Addition to House at Santa Monica. The Wall Scheme in the Music Room is Carried Out with a Strapped Dado Stained Brown and Set in with Light Royal Blue Plaster Panels, the Freize above being Formed by Leaving the Red Building Tiles Exposed. R. Mackay Fripp, Architect.


Residence of Dr. Richardson, Corner of Harwood and Bidwell Streets, Vancouver, B.C. An Interesting House Built of Native Wood. The View to the Right Shows the Large Verandah, Which Gives the Owner an Exceptionally Fine Outlook Over English Bay. R. Mackay Fripp, Architect.

[illegible] is a large brick fireplace with built-in seats on either side, and also a library corner which is situated in an [illegible]

[illegible] in the same city in the corner of Pendren and Broughton [illegible]



Ground Floor Plan, Residence of Dr. Richardson, Vancouver, B.C. R. Mackay Fripp, Architect..

[illegible] of the den and drawing room all being arranged to meet [illegible] desirable prospect. Dark overburnt brick, clap boards and [illegible]

[illegible] taken from the saw and stained. The interior work, such as the ceiling, beams, wainscotting and moulding is carried out in select native woods scraped and stained, and the tiling, grates and hardware throughout are of special design. The illustration of the hall gives a very excellent idea of the character of the interior, and shows the splendid results which are obtained from indigenous woods.

An attractive country house, farther out from the city, designed by the same author, is the residence of H. C. Janion, which stands on a three acre site just off the New Westminster road. Much of the character of this house results from the arrangement of the roof lines, and the interesting distribution of small windows. The lower portion of the house is finished with brown stained clap [illegible] of a harmonizing tone, and finished with cement plastered gables. A noteworthy feature of the plan is the living room and dining alcove which are combined in one interior. At the end of the room is a large fireplace flanked with seats and bookcases, while in the dining room end is a fixed sideboard and a smaller fireplace set in between built in china cabinets. These fireplaces are built of brick and are unique in design. The woodwork is stained bog oak and the walls are finished with rough plaster colored a dark seaweed green.

The bungalow of B. S. Walker is located on Earls road, West Collingwood, a suburb of Vancouver, on a site that slopes rapidly from front to back. It was originally a small building which was recently enlarged, the original portion of the structure being converted into a kitchen, rear stair-hall and pantry. The plan in general provides for roomy interiors that are compactly arranged. The [illegible]


[illegible] Residence of Dr. [illegible], Vancouver, B.C. R. [illegible]

Residence of Mrs. A. E. Hepburn, Corner Pendrell and Broughton Streets, Vancouver, B.C. An Attractive Brick and Cement Stucco House. The Bricks are of a Dark Over-Burned Variety, and the Timber Work is Left at Taken from the Saw and Stained. R. Mackay Fripp, Architect.

[illegible]

Fireplace, Residence of Mrs. A. E. Hepburn, Vancouver, B.C. R. Mackay Fripp, Architect.

only is the residence of E. L. Sproatt, Burnaby, B.C. [illegible] foundations and chimney of this house are built of water-worn stone taken from a near-by creek, [illegible] the interior finish of the house was cut in the neighboring district. The exterior is stained three tones of forest green and is simple and interesting in its scheme; both the window treatment and simple extension forming the porte [illegible] the interior all the main rooms have beamed ceilings and panelled walls, while built in seats and fireplaces form an important feature of the general scheme.

Included in the illustrations are two eleva- [illegible] by the same author in a competition for St. Mark's [illegible] interesting not only in that they provide for a structure of noteworthy design, but also because the scheme as indicated by the cross section [illegible] interior scheme. The plan provides for a seating capacity of twelve hundred worshippers, which was one of the conditions of the competition, but a design was finally selected in which this ruling did not obtain. The plan is excellent in its arrangement, with well-placed entrances, wide aisles and an unobstructive view from practically any part of the building. The scheme provides for the exterior walls built of stone, and tile flooring in the main entrance and vestibule.

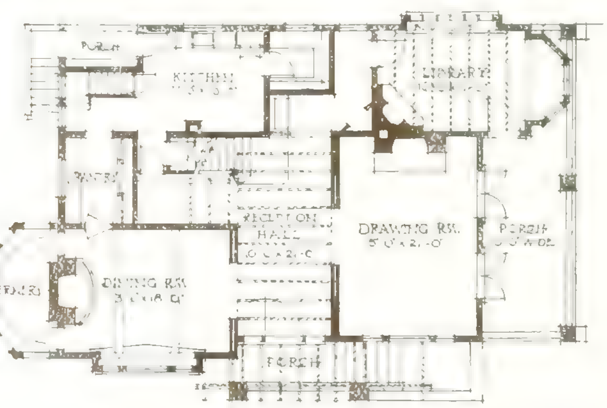
THE DISCOVERY OF LESNES ABBEY

IT SEEMS SCARCELY POSSIBLE, says the BUILDER, London, that an abbey approaching Westminster Abbey in size, and within twelve miles of Charing Cross, should have been completely lost sight of in the last 350 years.

Yet such is the case with the Augustinian Abbey of Lesnes (Lessness), which is situated midway between Woolwich and Erith, at the foot of the high ground that slopes to the Thames marshes. At a period before the river wall was built the Thames would flow almost up to the doors of the abbey.

So completely was all knowledge of the building lost that the only existing plan shows a structure of about one-quarter the proper size, and in the wrong position.

About a year ago the Woolwich Antiquarian Society were induced to make a series of trial diggings about [illegible]



Ground Floor Plan. Residence of Mrs. A. E. Hepburn, Vancouver, B.C. R. Mackay Fripp, Architect.

upon the foundations of a doorway into the original building. A few more excavations sufficed to show the general plan and to point to likely spots for further dig-

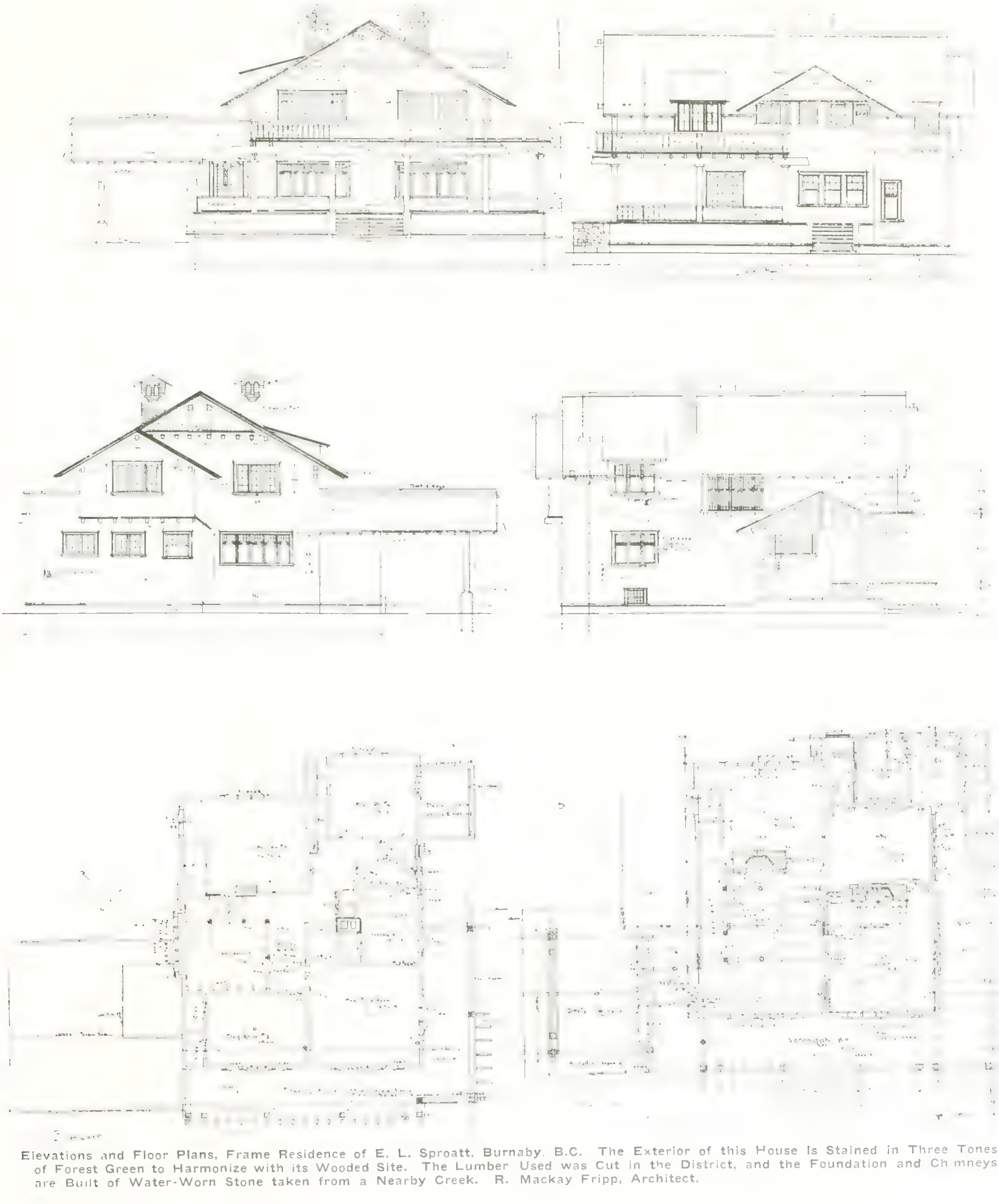
Reception Hall and Staircase, Residence of Mrs. A. E. Hepburn, Vancouver, B.C. Executed In Select Native Woods. R. Mackay Fripp, Architect.

ging. By this means most of the external walls have been uncovered from the floor to a height of 3 or 4 ft., and there has been revealed a building about 250 ft. long (east to west), and 150 ft. across the transepts.

The plan is cruciform, with a nave 140 ft. long by 75 ft. wide, transepts 40 ft. wide, and presbytery 40 ft. wide.

dressed Cæn stone; the lower parts of the columns are richly moulded, and have a carved leaf on the external angles of the plinth. Several other buildings are indicated, such as cloisters, frater, chapter-house, etc.

On the east of the north transept there are three small chapels, one of which leads into a vault built of nicely squared chalk blocks, and in the wall of another



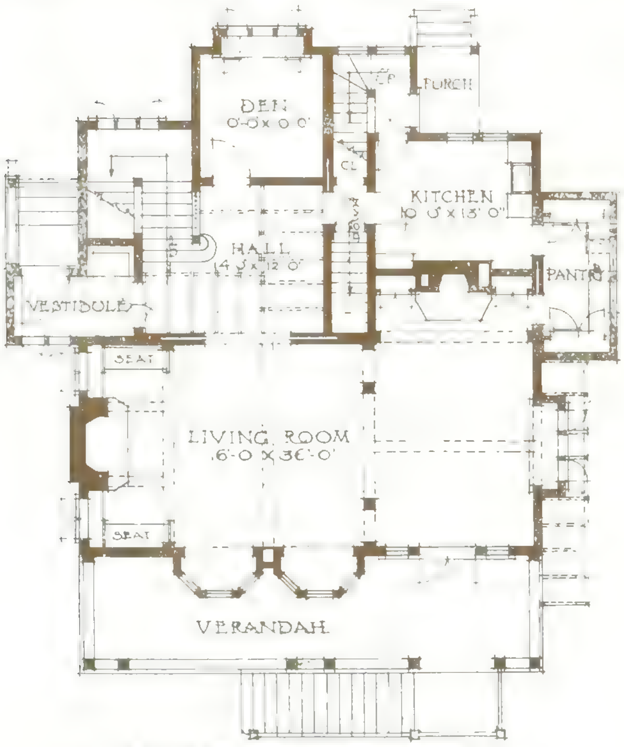
Elevations and Floor Plans, Frame Residence of E. L. Sproatt, Burnaby, B.C. The Exterior of this House Is Stained in Three Tones of Forest Green to Harmonize with its Wooded Site. The Lumber Used was Cut in the District, and the Foundation and Chimneys are Built of Water-Worn Stone taken from a Nearby Creek. R. Mackay Fripp, Architect.

At the junction of the nave with the transepts there was a square tower of 40 ft. by 40 ft. base, and of which there remain two splendidly preserved rectangular bases to clusters of columns that supported the tower. These bases are about 8 ft. by 5 ft., and are built of finely

was found a stone coffin with a lead shell containing some bones.

The foundations are of roughly squared chalk blocks set in a mortar containing abundant shells. The walls are built of flint and Kentish ragstone, and are lined

Country House of H. C. Janion, Situated off New Westminster Road, Vancouver, B.C. R. Mackay Fripp, Architect.

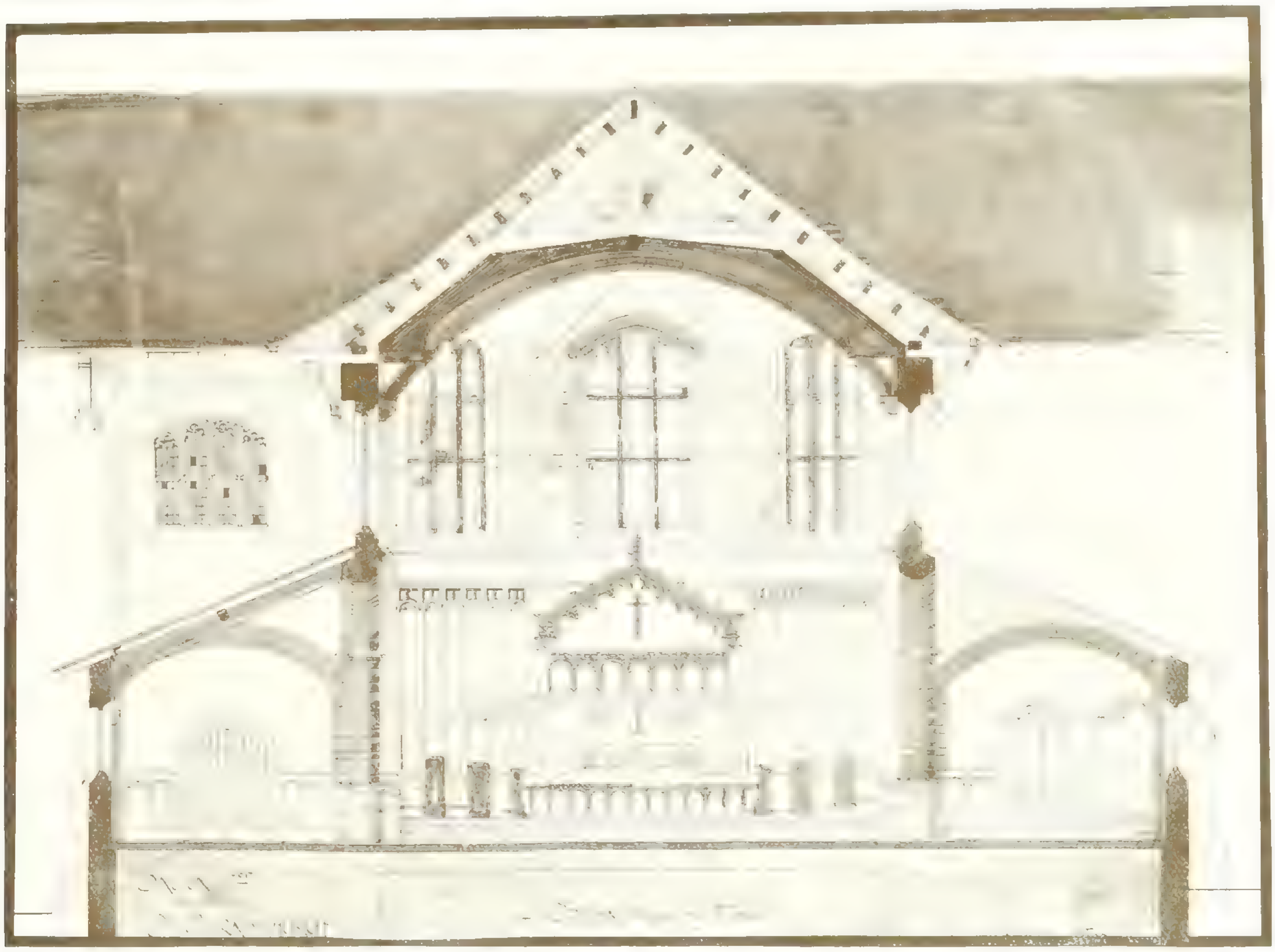


Ground Floor Plan, Country House of H. C. Janion. R. Mackay Fripp, Architect

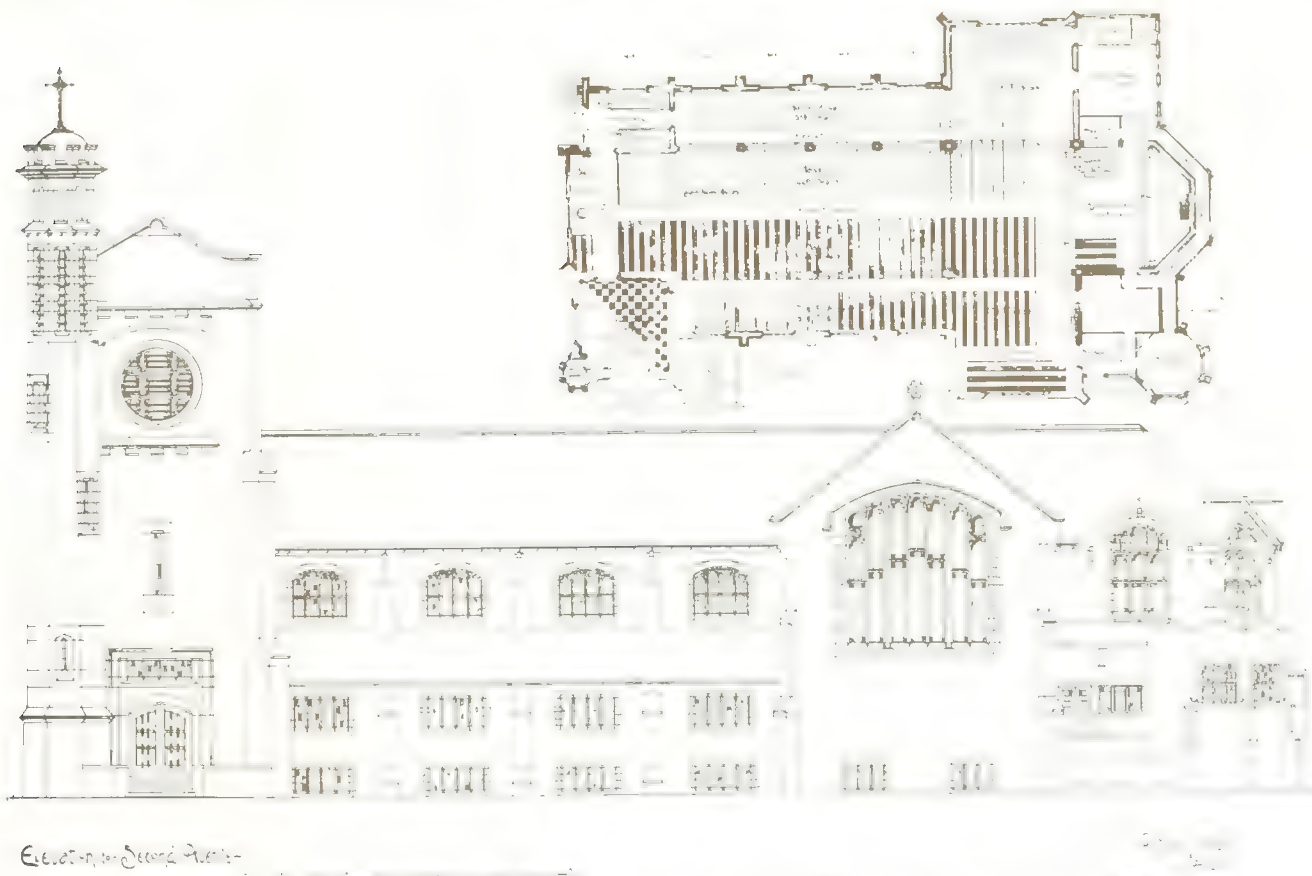
Fireplace in Bedroom, Residence of H. C. Janion Vancouver, B.C. R. Mackay Fripp, Architect

bathstone

... Stained Bog Oak and the Rough Plastered Walls are Colored a Dark Sea-Weed Green. Note the Open Fireplaces and Built-in Cabinets. R. Mackay Fripp, Architect.



Sectional Elevation, Competitive Design for St. Mark's Church, Kitsilano, B.C.—R. Mackay Fripp, Architect.



Longitudinal Elevation and Floor Plan, Competitive Design for St. Mark's Church, Kitsilano, B.C.

the abbey. The floors show large numbers of encaustic tiles of various designs, and some sepulchral slabs of Wealden marble; one of an abbot in the XIIIth century, and another one that had once had the monumental [illegible]

The abbey was founded in 1178, by Richard de Luci, who received the grant of a manor from Henry I., was a trusted friend of Stephen (in whose reign he was Constable of the Tower), and Chief Justiciar of England for Henry II. He gave up this latter office to become one of the first canons of the abbey as an expiation of what he considered to be his share of the murder of Thomas a Becket. Richard de Luci died here in 1179, and was buried in the quire of his church, but his grave has been ransacked long ere this, and its position is now unknown.

The history of the abbey is rather obscure, but what there is, is of the usual kind; want of money, charges of extravagance against the abbot, lawsuits with other religious orders, *et hoc genus omne*, until the building was suppressed by Cardinal Wolsey for the endowment of his college at Oxford. It is interesting to note that at the west end (main doorway) the excavations have revealed a bed of ashes containing what was molten lead, suggesting that a bonfire had been lighted here under the large archway which had melted the lead from the roof. What the fire would not bring down was probably attacked with pick and crowbar; in any case, what was the site of the Augustinian Abbey (second in value) in Kent was completely obliterated by rainwash and vegetation, and all knowledge of it lost until a year ago.

THE CITY OF THE FUTURE

By L CORNFORD

"Its Chance of Being" as set forth in a paper read before the recent Town Planning Conference held at London, England.

THE INEXHAUSTIBLE TREASURES of the past lie open to the dexterous pilfering of that chartered thief, the artist. The needs of man remain unchanged since the first civilization, and in every age he has found the ultimate expression of his desire. Architecture is the concrete secretion of the mind. You shall tell a man by the token of the house in which he dwells.

His highest aspiration is worship; and, according to the nature of the god he served, are the temples of his devotion. The Egyptians approached their deity amid groves of gigantic columns, lotus headed; the Greeks wrought the fane of the immortals to the needlepoint of perfection. There they stand to day, the marble monuments of faultless achievement, high uplifted on the haunted hills of deathless story, an eternal witness to the divinity that dwells in man.

The Roman stole from the Greek, and built as he lived, that his work might endure for ever. So deep into the living rock did he grave his record, that to-day we are still spelling out the legend, whose significance not all the fiery makers of the Renaissance could exhaust.

The Northman owed his Gothic to the Roman, whom he submerged, but whose spirit he could not overwhelm. The Gothic grew from out the Roman, and increased and died, as a tree might spring from amid the fallen columns of an antique temple, and tower into the sunlight, flourishing greatly, until its vigour passed and the foliage withered, and the strong limbs put forth no more leaves.

If those who build the city of the future will take what what serves their need from the cities of the past, what they shall build will be a new thing answering to the new need. But when all is said, the likeness of the temple of the city of the future cannot be foreshadowed, unless the religion of the future be first understood.

As in the building of temples, so in the raising of monuments to the lesser divinities, the gods of law, of learning, of healing, and of art. According to man's conception of the place occupied in the spiritual order of dignities, so will he mould the building which is at once the instrument of his activity and the symbol of his emotion.

The past, which remains our instruction and our hope, displays in all the wistful silence of antiquity, the Roman house of the many chambers and the flowered quadrangle, the Roman villa set among the vineyards and the corn, the discreet and peaceful mansion whereto the ladies and the gallants who dwell for ever in Ser Boccassio's pages, fled from the plague struck city. In a later age, the town houses of France and of Germany, the castles and the hunting lodges, witness to a high and an urbane civilization. In our own country, we preserve what we believe to be the most beautiful houses, great or small, in the world. But the most of them are relics of a happier time.

To come to the present, what the plain citizen, the humble man of heart, hopes for in this Conference, is that he may at last obtain his modest desire—a fit home in which he may worship his domestic gods in peace. And here—if I may venture to suggest it—lies the kernal of the matter. The State is made up of individuals. The unit is the family. When all that is implied in that sacred and immemorial cult be rightly and beautifully expressed in architecture, the rest will follow. When Mr. Smith possesses in peace his own solid little home, he will attend to the town hall.

What are the chances that he will ever get what he wants? In other words, what chance has the ideal city of coming into being?

Now there are three enterprises in this life which can not be achieved by a committee—love and war and art. We are here concerned with the third—with art. In art there must be one man who is wholly responsible for the job. The plain citizen, who is sincerely eager to recreate his town, or his city, or his village, or his house, must before all things recognize the eternal fact, that it is perfectly useless to entrust the business to a department, or a council, or a committee. It must be done by one man. The business of the department, or the council, or the committee, is to arrive at some general agreement with regard to what it is they want done. They must then call in the professional to do it. Indeed, if they be wise, they will call him at the beginning, and ask him what it is they want done. For a committee commonly owns no more than a vague notion that it wants something. It must be so, because collective intelligence is always inferior to individual intelligence.

The future of English cities, of English towns, of English villages, does not depend upon the collective groupings of popularly elected bodies, but upon their ability to recognize the fact of their own natural, but fathomless, ignorance.

We read to day in the newspapers a deal of edifying reflections upon the beauty and the necessity of design, the holiness of fresh air, the salutary effect of living like an intelligent person, instead of like a filthy savage. But the artist has known these things always. He has always known what was wanted. But he has not been allowed to provide it.

The chances that the ideal city of the future will ever come into being depend upon that freedom of the artist which can only be conferred upon him by the layman.

SMOKE CONSUMING FURNACE. ∴ ∴

VERY EXCELLENT RESULTS tending towards the abatement of an evil common in almost every thriving community, are being met with in Carlsbad, Austria, through the agency of a smoke-consuming furnace, which is the invention of Alvis Sichert, a local architect. According to recent report, this furnace has proven so satisfactory in practical use that it is being widely adopted [illegible] equipment of buildings of both municipal and private character. The invention itself is a simple one, but so effective is it in operation that the poorest quality of Bohemian coal may be used with a combustion 84.7 per cent. without practically any smoke or soot resulting. One feature of the furnace is that it creates a draught of hot air which is carried down on the fire from above, and [illegible] beats back the smoke [illegible] to rise and consumes it completely. The coal is placed in a feeding box, and slides therefrom over an inclined grate to a flat grate, and the whole surface of the two grates is uniformly covered. The inclined grate is provided at its upper half with narrow [illegible] apertures [illegible] polygonal grate, and at its lower half with wider longitudinal apertures. The flat grate likewise has longitudinal apertures. The fire is started on the flat grate and forms an intense flame jet which extends over the inclined grate to the flues. During this operation the coal on the upper half of the inclined grate up to the feeding box gives off its gases and slides gradually downward on to the flat grate as the combustion on the latter proceeds, [illegible] the grate through an air valve and the [illegible] may be regulated in accordance with the degree of heat to be attained. In the ash pit immediately beneath the flat grate are the inlet openings of the air supply passages for consuming the smoke. Through these passages the air previously heated in the ash pit enters the ascending passages, passes into the arched passages, is heated therein and passes through apertures directly into the combustion chamber and combining with the flame produces a [illegible] smokeless combustion. By this procedure all particles of smoke, soot, and sulphur from the coal are entirely consumed. The flame burns quite white and passes out through the flues as a smokeless flame to the chamber in which it is to be used for any special purpose.

Moreover, in combination with each of the ascending flues, a further air supply passage is provided for the direct supply of external air, so that in the case of coal containing a large amount of sulphur a sufficient quantity of air may be supplied through the ascending flues to the arched flues and through these to the combustion chamber, when with a low fire the valve is to a great extent closed. The passages can be controlled by dampers. If the grate surface is quite covered and an intense fire is required, the valve must be fully opened. By this means, a large quantity of air enters the ash pit and passes through the air flues into the arched flues above the fire.

This process keep step with the development of the fire in the combustion chamber. When a slower fire is desired, the valve is more nearly closed, the supply of air is less, and, therefore, the fire is lowered. With a slower fire less smoke is produced and less air is required to burn it.

THE IMMEDIATE FUTURE IN ENGLAND

By PROF. C. H. REILLY, M.A.

An abstract of a paper read before the International Town Planning Conference, dealing with the subject of "Cities of the Future

IT WOULD BE TEMPTING in discussing the city of the future to dream of the time when, in the perfect town organized for all human activities and pleasures, our art of architecture shall have found its final and noblest expression. For the town of the future, like the cathedral of the past, will be the handiwork of many artists inspired by one faith. I do not conceive it in its most perfect form as the work of one brain, however complete its government. Its main structural lines or plan, expressing its essential life and government, like the plan of the mediæval cathedral, only more subtle in its conception, for there is in it the additional element of growth, may be—indeed must be—predetermined for the perfect whole to be achieved. So far, therefore, it will of necessity be the work of the master mind among us. But within the plan, as within the cathedral, there is room for many artists, if each is working with the same end in view. And the faith that is required is the ardent desire to interpret in its highest terms the character of the civilization, the ideas and aspirations of the citizens. Our art at every epoch, from its limitation which are at the same time the sources of its strength, must always be a reflection, more or less complete, of the civilization of the moment. All that we as architects can do is to ensure that it reflects the best rather than the worst, the more refined rather than the more vulgar elements.

The first step is to come to some clearer conception of the meaning of this new growth, of the people who will cause it, of the kind of life they will live, and of the hopes they will entertain or we may entertain on their behalf. We have all seen during the last thirty years the fruitlessness of trying to impose one alien set of ideas after another upon a new condition of living.

It is a consistent and truthful expression of character which gives the charm and permanent value to the older parts of our towns. Where we have, as in York, narrow winding lanes, overhanging barge boarded houses, we feel at once the character of the life of the Middle Ages—the close, intimate, neighborly life crowded within the city walls.

Or take the stately squares of Bloomsbury and the West Central portion of London—the most liberal town planning yet achieved in England. We see that such a neighborhood corresponds truthfully to an era of greater leisure, to a culture more reposeful and refined.

Still later districts in the despised plaster period, districts of formal villas set in what are now faded London gardens with their trellis arbors and verandahs, their cement vases and broken statues, represent an idea of refinement and detachment. We can see that the haphazard muddled buildings of the late Victorian period, the vast sporadic growths of no particular character which have surrounded our towns and villages, were the outcome of a new class of society with new needs attempting to accomplish its own desires.

Now I take it that the main difference between this period and the one on which we are just entering is that education has now had time to bring about, if not a better, at any rate a new standard of taste, and that the futility of disorganized individual effort has at last been clearly realized. In Germany, apart altogether from any questions of art, the value of organization in building development has been understood and practiced for several decades. We are ourselves only just beginning to see that for the benevolent despotism of the great landlords, which till the middle of the nineteenth century was fairly successful, we must substitute an organized democracy if we are to have anything but chaos. The *laissez faire* period of town growth corresponding to the last half of the last century has proved its wastefulness as well as its hideousness; hence our town planning bills and our co-operative suburbs. The note of the new period therefore is organization the suppression of rampant individualism for certain general amenities. And if the amenities at present most shrilly called for are greater air and greater garden space, it does not follow that they will stop there. Further refinement in building, quieter exteriors which will better compose with the general schemes more simply shaped and better proportioned rooms which will permit of more refined furnishings, are but the next step in the same direction.

If the house of the future suburb is on the one hand to express something of the new submission of the individual to the community, and on the other hand to answer [illegible] to these requirements is indeed the most pressing architectural problem in the city of the immediate future.

[illegible] greater restraint and refinement, so in the centre a further suppression of the individual taste for the good of the [illegible] future city could aid the movement by exercising a wiser and stronger control, not so much of design, for that is a shy thing, apt to wither under official restraints, but of such general things as bulk and colour, which more than anything else affect the massing and composition. Colour has a special importance, for if the buildings and streets in all big towns are approximating to a common [illegible] pathetic colour arising from the nature of the site, of the atmosphere, and of the materials available.

When the idea of the town, as an organized entity, at once the result of and the perfect means whereby the best energies of its citizens can do their appointed work, is realized, it will grow in the minds of all until it is conceived as the ultimate work of art, to the making of which, as architects, it is our high fortune to be called."

EFFECT OF FROST ON FRESH CONCRETE

IN VIEW OF THE FACT that freshly-mixed concrete, which has frozen and again thawed before setting in place, is commonly believed to be useless, a number of experiments for the purpose of testing this point have recently been conducted by Prof. H. Burchartz, at the Royal Testing Station of Gross-Lichterfelde, Berlin. The results show that mortar and concrete, if allowed to warm up again to the ordinary temperature before setting in place, are very little affected by a few hours' freezing. The setting time is little altered, although, if the temperature of laying the mortar is low, the setting is, of course, greatly retarded. Prolonged freezing, continued for several days, prevents the mortar from hardening properly, dry mixtures suffering more than wet. For example, 28-day strength of 1 : 3 briquettes was found to be only 40 per cent. of its normal value after 3 days' freezing (followed by thawing) if mixed comparatively dry, but 62 per cent of its normal value if mixed wet. The effect on 1 : 5 concrete was still greater, the strength of the dry concrete falling to 14 per cent., and that of the wet concrete only to 67 per cent. Against this, however, must be set the much greater strength of the dry concrete under normal conditions, the difference quite compensating for the apparent advantage of the wet mix-[illegible]

BARREN JACK DAM, NEW SOUTH WALES

[illegible] UNDER [illegible] Age, on the Murrumbidgee River in New South Wales, a masonry dam for irrigation storage purposes which ranks among the large storage dams of the world. This structure, known as the Barren Jack Dam, is being built by the Government of New South Wales under the direction of Mr. L. A. B. Wade, M. Inst. C.E., chief engineer for rivers, water supply and drainage of the Public Works Department. Barren Jack Dam is very similar in design and dimensions to the Roosevelt dam, recently completed on the Salt River project of the United States Reclamation Service. The dam is of cyclopean concrete with "plums" of the granite of which the sides of the gorge are formed. The base of the dam is 163 feet wide and 20 feet high, with vertical sides. At this point the gravity section begins with a width of 145 feet, the reduction being wholly at the down-stream side. Above this base the up-stream face has a batter of 1 in 20, and the down-stream one slopes at 1 horizontal to $1\frac{1}{2}$ vertical up to 60 feet below crest. Above this the upper face is curved to a gravity section so as to finish with a width of the dam at top of 18 feet. The maximum depth of water behind the dam will be 224 feet, and the capacity, which approximates to that of the Assuan dam before it was raised, will amount to 33,380 millions of cubic feet. When the dam is full the main river will be backed up for 40 miles, and two important tributaries, 24 miles and 19 miles, respectively. These consequences involve diversions of roads, reconstruction of bridges, etc., and, including the 26-mile material railway, account for the to- [illegible]

[illegible] State's resources in building materials is about to be adopt [illegible] Mineralogist is arranging for a permanent exhibit in the [illegible] the space between the main office of the State Mineralo- [illegible] structed entirely of native products contributed principally [illegible] workmanship to carry out their part of the project. Up to the present time over twenty eight different materials have been selected, including brick, terra cotta, cement, various colored granites from all sections of the state, California-made glass, gypsum and stucco, infusorial earth fire proofing and deafening products, and local quarried lime stone. Native marble will also be extensively used, while a number of other materials will be selected to augment those already chosen. The design for the arcade, which is said to be attractive in its architectural treatment, is the work of a local architect. The main arch will be executed in terra cotta, and of the other two important features of this character, one will be constructed of granite and the other of sand stone. The idea in itself suggests the advisability of a similar undertaking in connection with the Canadian National Exhibition held annually in Toronto. A carefully conceived permanent structure displaying in a practical way the Dominion's wealth in this respect and erected for the sole purpose of exhibiting Canadian building materials and appliances would not only prove to be a noteworthy attraction in a general way, but would deeply interest thousands of prospective owners who annually attend this important event, and thereby serve to educate the people to adopt in their proposed buildings, products of the home market. Material firms and large contractors in Canada can well consider the advantages of such a step as the proportionate cost would be quite small, and a suitable site would, in all probability, be provided by the Exhibition Board, who, of course would naturally become the real possessor of the building.

THE SHRINKAGE OF CLAYS is very different in various clays. If the shrinkage is very great there is considerable danger of cracking and warping. The shrinkage can be lessened by the mixing of sand, brick dust or grog. The shrinkage can be divided into two kinds—the drying shrinkage and the fire shrinkage. The fire shrinkage varies considerably also, and depends a great deal on the temperature at which the cla yis burnt. In some cases the shrinkage by burning is not noticeable; on the contrary, the cla yhas expended. This is due to a very high percentage of sand or silica in the clay. The size of molds and dies should ine very case be very carefully calculated with the drying and burning shrinkage, so that the clay product, after being burnt, will show the right dimensions.—*Tonwaarenfabrikant No.* 16, 1910.

CONSTRUCTION

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

Vol. 1 Toronto, January, 1911 No. 2

CURRENT TOPICS

BY THE RECONSTRUCTION of the Waterford Bridge, Ireland will shortly have one of the most important ferro-concrete structure of its kind in the United Kingdom. The new St. John Bridge, Kilkenny, is another recent structure of this type. The Kilkenny bridge has a 140 foot span and successfully withstood a test of 300 tons dead weight which rested on the bridge for several days.

* * *

ACCORDING TO STATISTICS published by Georges Risler in a French Review, London with 14 per cent. free space, has a percentage of 1.9 per cent. deaths from tuberculosis; Berlin, with 10 per cent. free space, has 2.2 per cent., and Paris, with 4.5 per cent., shows a death percentage from consumption of 5.1 per cent. This would seem to prove that the sums spent in providing parks, play grounds, etc., are well repaid by the improved health of the city. In Paris itself the districts around the Champs Elysees, which are surrounded by woods and parks, show a death percentage from tuberculosis of only 1 per cent., while the congested areas show 10.5 per cent.

* * *

THE CEMENT BLOCK TOWN is at last to become an accomplished fact. At Metlane Falls, the new town in Steele County, Washington, every store, office, business building and dwelling now being built or to be undertaken in the future will be veneered with cement blocks, a product of a million dollar plant under construction at the present time. The sidewalks and curbings will also be of cement. As to what the general architectural effect will be, remains to be seen; but at least the town in itself will be consistently concrete. The factory, which covers thirty acres, will be in full operation by February next. An electric plant costing \$350,000, designed to generate 10,000 horse power is also nearing completion.

SEVERAL MONTHS BACK the municipal council of Yarmouth, Nova Scotia, invited contractors to submit tenders for the erection of a solid brick fire hall in the north part of the city. According to the aldermen all bids were excessive, so the city decided to purchase all necessary materials and build the structure by day labor. The work is being carried out under the supervision of a foreman engaged by the week, and last reports indicate very satisfactory progress in every way. This is the city's first venture of the kind, and as to whether its experience in this case will justify future undertakings of a similar nature remains to be seen.

* * *

A BRITISH MANUFACTURER, according to U. S. Consul Halstead, Birmingham, has constructed a water-cart propelled by steam, with a water-containing tank 13 feet in length by 4 feet 6 inches in diameter, built of steel plates three sixteenths of an inch thick, strongly braced and riveted, with a total capacity of 1,200 gallons. This tank is divided into two sections, one with a capacity of 1,000 gallons for street-watering purposes and the other a 200-gallon section for water for the boiler. There are two independent spray boxes at the rear with a spray that can be adjusted from 4 to 30 feet. It is calculated that with a medium spray the wagon can water 2 miles of road without refilling.

* * *

IN CERTAIN PARTS of South America, the houses of the poor are constructed of a vast variety of odds and ends, and frequently exhibit much ingenuity in the making. They are rambling one-story buildings, with a framework of odd bits of timber, the rest made up of scraps of sheet iron, mud, straw, old kerosene tins, and what-not. To a considerable extent the adobe house is in use —that is, one built of straw with a timber framework. For a better grade of house sheet iron is largely employed, and in brick and masonry houses sheet-iron roofs appear to be supplanting tiling. In the timberless regions of Argentina lumber, either native or imported, is too expesive to be used for anything except the interior finish of a building.

* * *

ON THE BANKS OF AWBEG, between Mallow and Fermo, County Cork, Ireland, says the *Strand Magazine*, is a remarkable edifice known as "Johnny Roche's Tower." It was built solely by the labor of the man after whom it was called, an absolutely unschooled individual, who occupied it for a number of years. Roche also erected a somewhat unusual mill, constructing the water-wheel after a special design of his own. Although this eccentric person died twenty years ago, his buildings are still a subject of curious interest. His last act was to build a tomb in the middle of the river's bed, but owing to the fact that his less original relatives deemed the last resting place he had chosen an un-Christian sepulchre, he was buried elsewhere.

* * *

BUENOS AYRES SETS AN EXAMPLE to the entire world as to what can be accomplished in the way of civic improvements by a few years of ceaseless activity. During the past nine years, according to the report of Senor Carlus Thays, Director of the Public Park Board of the Argentine capital, much has been done to materially add to the typography and natural advantages of the Argentine capital. In addition to planting over 142,000 trees during this short space of time, over 80 well distributed parks have been opened throughout the city. The principal part is the great Plaza Del Congresso, situated in the heart of the metropolis, which was carried out simultaneously to the development of the beautiful botanical garden. The trees are planted throughout the parks and along the system of driveways, pines of Neuquen (*Araucari imbricata*) alternating with palms, (*Cocos australis*) from from Misiones territory.

A SMOKE CONSUMER and fuel economizer, the invention of a Rotherham, England, man, has just been successfully demonstrated in a test recently conducted before the municipal official of that place. The test, which was carried out at municipal works, established the efficacy of the device beyond peradventure.

Coal was fed into the furnace of a boiler generating steam with the usual result, the emission of black smoke from the chimney; then the "consumer" was put into operation and the effect was at once apparent. In the place of the black defilement there was only a slight trace of the products of combustion. The change is affected by an arrangement of a series of devices so placed in the flues as to intercept the smoke and cause it to be ignited by the flames of the fire. Two air circulators are so placed as to allow the desired quantity of external air to be circulated among these devices, causing the smoke to be properly ignited and consumed around the boiler flues before entering the chimney. There is nothing to get out of order, and the claim is that a saving of fuel is effected. An important claim is that the apparatus can be affixed during a week end to almost any type of boiler. As to fuel economy, the experiments are not yet completed.

* * *

DOMESTIC CONDITIONS are evidently about to take a new turn if a scheme now projected in the suburbs of London (Eng.), to build 123 houses without kitchens is eventually carried out. The idea is a rather Utopian one, based upon a co-operative system, so that more leisure will be given to house-keepers for more mental and physical recreation, and for the better care and training of children. Householders, though living separately in their own houses, will be able to avoid much household drudgery and cooking, and the expense and trouble of servants by getting such meals as they require sent to their houses from a central hall or by taking their meals in the common dining room there. Not only are kitchens to be omitted, but the purpose of the home, according to the scheme to be worked out, is to be further perverted by establishing central billiard halls, recreation rooms, library and nurseries. A cursory examination into the project would seemingly indicate that it holds every incentive for a man to stay away from his immediate family; while, as for women, with a convenient *creche* in the neighborhood, they would find little else to do but graduate in the ranks of the militants. While the scheme itself is not impossible, it has a strong "Bellamic" flavor, and is a good thing for any sound and healthy community to leave alone.

* * *

EXPERIMENTS TO PRODUCE IRON and steel from native ores by the electric process which have been made in Norway, partly by Government aid, during the last three or four years, have given such promising results that private interest has been greatly awakened, and the industry now promises to become one of considerable importance. Up to the present time, Norwegian iron ore has in many cases proved to be of such a poor quality that smelting by the old process was found profitless. Concerned in the projected development in this field, is a company styled the Hardinger Electric Iron and Steel Works, which has practically completed organization This concern will locate its plant at Ullensvang in Hardinger on the west coast, with the object of producing iron and steel from Norwegian ores by a patented electric process of Swedish origin. The company has secured electric energy from the adjoining water power at Tysse for a period of thirty years, at a cost of $8.04 per horse power; the plant, when operating to its full capacity, requiring 4,200 horse power. Another concern which will also enter this particular field is a company known as the Det Norske Aktieselskab and Electrokemish Industri, which is now in process of oganization, and with which is identified a large number of influential and successful capitalists and business men.

THAT CONCRETE STRENGTHENS with age is now generally conceded, says a writer in a Northern daily; but there are still in many quarters grave doubts entertained as to the durability and immunity from rust of the embedded steel bars. And it is right that this should not be taken lightly on trust. In a building of reinforced concrete the steel upon which the stability of the structure is dependent is buried deep out of sight, and cannot be easily examined, and if there were the least possibility of the bars slowly rusting to breaking point, and of the brittle concrete consequently snapping without warning, the use of the material would have to be condemned whatever its other advantages might be. But evidence is accumulating to prove the reverse. In the construction of St. Paul's Cathedral iron chains were used, and were bedded in hydraulic lime. There was occasion a year or two ago to uncover portions of these, when it was found that the iron was as bright as on the day when it was covered over. To go still further back through the centuries, the Romans used hydraulic lime concrete very extensively in building the Pantheon and the domed baths of Caracalla and Diocletian. In places iron ties were used, cast into the concrete, and, although the projecting parts of such ties have long ago rusted away, concrete blocks are to be found with the ends still embedded, and an examination of these shows that, even after the lapse of some two thousand years, the iron is perfectly preserved from rust. In all the cases above referred to, the concrete employed was made not of cement but of hydraulic lime, and no one will question the overwhelming superiority as a protective agent of concrete made from modern high class cement It would almost appear, then, that even in face of the importance of unerring certainty in this matter, the case for the immunity of reinforcements from rust is sufficiently established.—*Building World.*

* * *

SOME INTERESTING DETAILS concerning ancient methods of brick-making are given in a brief digest by the *Slate Trade Gazette*, of a lecture delivered recently by Mr. A. B. Searle, before the Royal Society of Arts. According to the lecturer, the manufacture of dried bricks in primeval times involved a large amount of physical labor, as the clay paste had to be beaten into a mass a few inches thick, and then trodden until it became homogeneous and uniform in composition. This was the method employed by Egyptian brick-makers, and was still used in many important steel works in the manufacture of bricks for special purposes. The greatest discovery of the ancient Egyptians was the introduction of chopped straw, the primary object of which is twofold: (1) To enable the workmen to develop the distinctive natures of the clay paste and obtain maximum plasticity; (2) the insoluble portion of the straw taken from the liquid used in making the paste served as a non-plastic medium, which enabled the bricks to dry without cracking. An American engineer discovered this five years ago. In the light of this knowledge the full extent of the punishment of the Israelites, when they were ordered to make bricks without straw, could be realized, for it meant they had to make from one and a half times to twice as many bricks to get the same result. Whereas the Egyptians in their moulds only made one brick at a time, Central Americans used to make several. In the latter case, a rough wooden frame about 24 in. long, 24 in. wide, and 9 in. thick, with a partition across the middle, was used. This was filled with paste, and, when removed, left two bricks, about ½ in. apart. Even so the process was a slow one, and a man seldom made more than 150 bricks per day. The bricks were allowed to remain in the air until sufficiently dry, and were then turned on their edges for the sun to beat upon them. Such bricks, under favorable conditions, would last for a long time; indeed, in the absence of frost or moisture, they would last indefinitely.

DEVELOPMENT OF SINGLE STORY SCHOOLS

By HERBERT M. CLARK

The Manor Lane School, Lewisham,—a modern example in London, England. Provides accommodation for 817 children. Features of its design, plan and ground space.

THE WORK [illegible] manner in which the London County Council and its skilful architects overcome the difficulties that beset them.

They provide, in addition to the public elementary schools and higher grade schools, buildings for special instruction, such as cookery, laundry, domestic economy, and manual training in wood and metal; also schools for the mentally and physically defective, which definition comprises the feeble minded, the deaf and the blind. To [illegible] Industrial and Truant schools, divisional offices, and lastly the very important item—swimming baths.

In glancing at their work and remembering that it is based on an experience of thirty-five years, we may perchance find, not only new methods of reducing maintenance charges or trifling labor-saving devices worked out in detail—tested, approved and adopted—but ideas in the abstract which, amplified or transformed, we may crystal [illegible] confront us in this country.

Twelve hundred schools are under the control of the Council. Of these a small number only has been built by the Council which, indeed, only took over the schools and all the responsibilities of the London School Board some five or six years ago. Since this transfer the Council has been directly responsible for the creation of all new schools and also for the maintenance of all schools—new and old. This arrangement makes for a thoroughness of planning and construction such we cannot hope to find when a school is built by one body and handed over to another for maintenance. In either case the ratepayer must find the money, and it is improbable that he will grumble at an arrangement which, while slightly increasing prime cost, reduces very considerably subsequent maintenance charges. Many Canadians on seeing the work might wish to voice the wearisome phrase to the effect that "the Englishman builds for the Day of Judgment." A careful consideration, however, of the special conditions goes far to justify this solidity of construction. Imagine twelve hundred schools carelessly constructed by scamped methods! One shudders to think of the maintenance bills.

Any consideration of the subject before us would be incomplete without a reference to the late Mr. T. J. Bailey, F.R.I.B.A., who for many years was the supervising architect of the London School Board, the body which preceded the London County Council. The enthusiasm and special knowledge which he brought to his task added weight to his opinions, and the Council's constructional methods of to-day are based on those principles of design which he evolved from his ripe experience.

The question of site selection clearly illustrates one of the difficulties of the London County Council architect. Real estate in some parts of the Council's area is frequently very valuable. In some central sections the cost is almost prohibitive. Yet it is just these central sections which are most crowded and which therefore require the largest schools. The excessive cost of real estate necessarily restricts the dimensions of the site, and in such cases only the smallest possible area consistent with the requirements of the school is acquired. Yet even so, the site frequently costs more than the building.

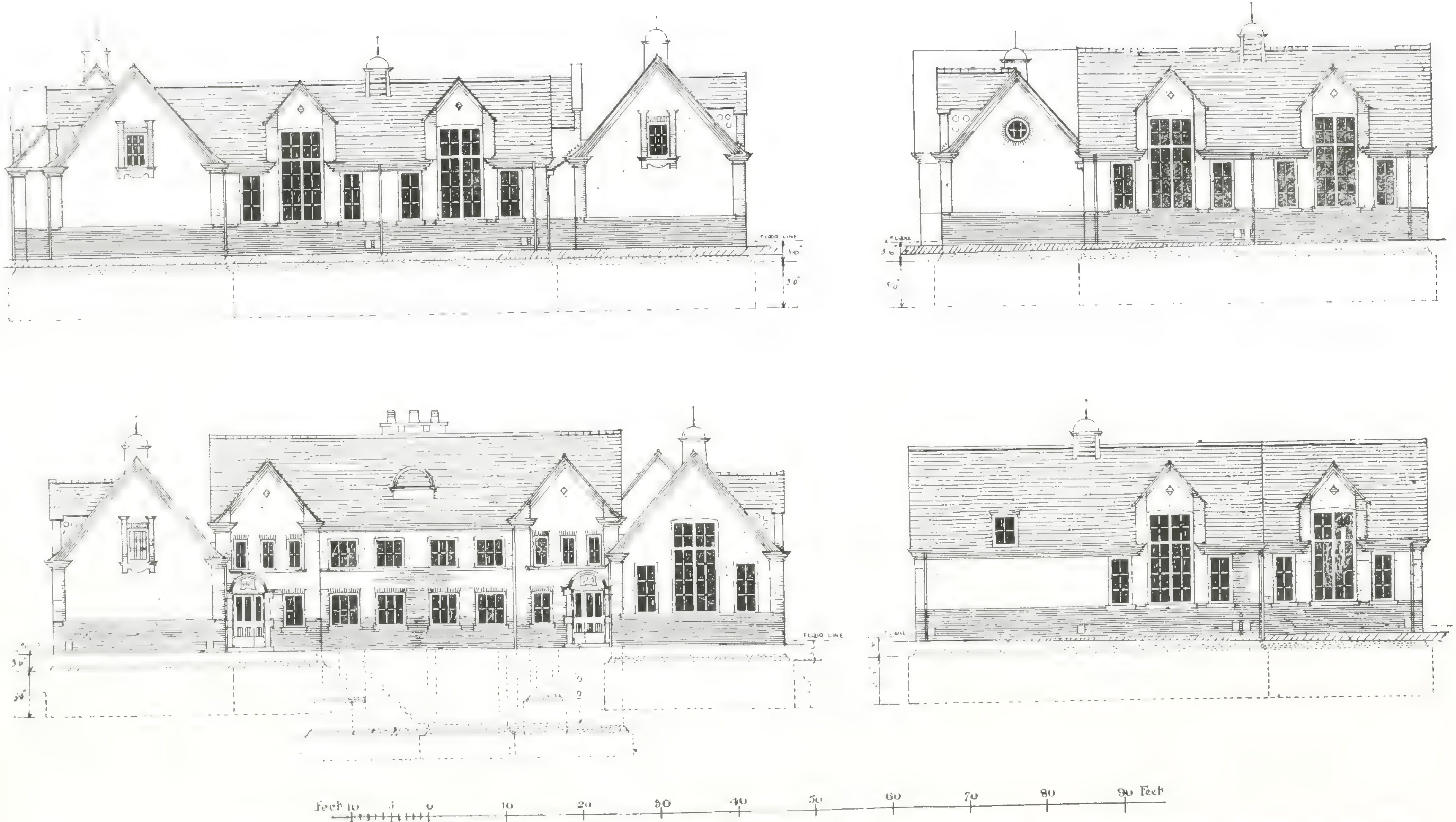
The Council is empowered by the Education Act to schedule and acquire such lands as they may require for their various purposes. Yet this does not mean that they can acquire sites as and how they please.

There is frequently strong local opposition to the site that they consider best for the purpose of a new school, which forces them to a site which they would not have chosen preferentially. Considerations of economy frequently prevail to avoid compensation or complication with adjoining land owners. Furthermore, there is a standing order of the House of Lords to the effect that any public body demolishing more than a certain number of houses of the working class in one parish in a single session is liable for re housing. This clause seriously curtails the practicable limits of sites in London proper, as the Council avoid responsibilities outside their own functions. Furthermore, in the crowded districts of London, where streets are narrow and houses thick, the largest schools are necessarily required and the smallest sites obtainable.

The Council's architect doubtless seeks, as an ideal site, one of about two acres, rectangular, with the longest side as a street frontage and having a western aspect streetwards. Whilst the plans of the building must secure proper provision of light and air, immunity is also sought from the noise of traffic, and an open playground space of at least thirty superficial feet for each child, of such a shape that it is available for games. The Council see no objection to girls and infants using the same playground. Where the sites are sufficiently large and level, schools of one storey only are usually built, consisting of classrooms grouped round a central hall—a feature considered essential by the Council for boys—a similar building for girls with an infants' department as a separate building. An excellent example of this type of school is the Manor Lane School at Lewisham, which provides accommodation for 817 children and infants. It is the newest example of the London County Council's schools, indeed the boys' school is not yet completed; it embodies the latest improvements in all directions, and the careful design and thoroughness of construction betray the masterly hand of the late Mr. Bailey.

The site has a southerly frontage of 552 feet 6 inches, with a depth of 166 feet 6 inches, the deduction of a fraction at the east end reducing the north frontage to 446 feet 6 inches. In approaching the school, attention is at once attracted by the excellent little school keeper's house, which commands the entrance. A glance at the plan shows the compactness of the design. An excellent feature is the "porch," a built out window, which enables the keeper to overlook the playground and assist in supervision.

Although the school is described as a single storey building, it would be well to state at once, in order to avoid confusion when looking at elevations and sections,



Girls' Building, Manor Lane School, Lewisham, England, of which the Boys' Structure is an Exact Counterpart, both in Design and Plan. The Upper Drawings Show the North and West Elevations; and the Lower Ones, the South Façade and West End of the Building.

that there is a "mazzanine," actually a partiol "first floor," consisting of four rooms, reserved for the teachers.

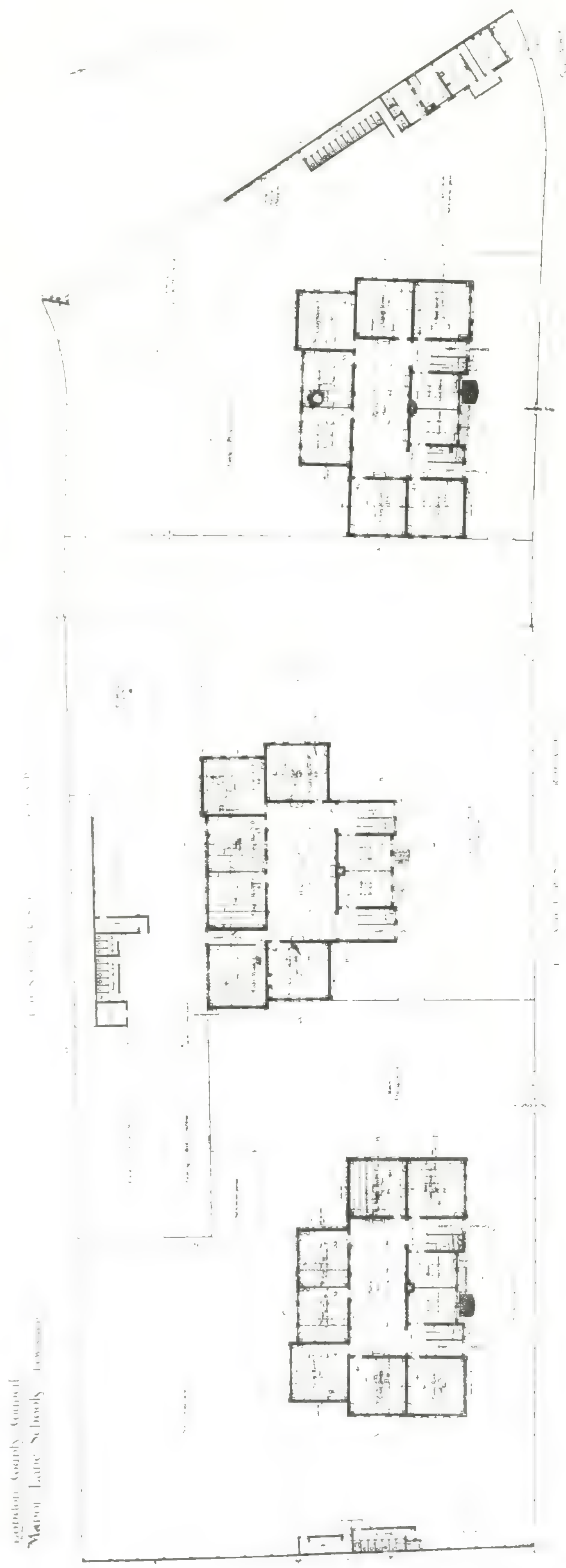
We pass immediately to the girls' building which is a duplicate of that provided for the boys, and renders consideration of the latter unnecessary. The plan shows roughly a central hall, seven classrooms and two cloak rooms—and before any criticism is attempted regarding the disposition of these rooms, it must be borne in mind that practically every one of the Council's schools has required enlargement. With this probability in view the disposition has been made to allow of additions.

Very substantial are the walls, and the work is everywhere thorough; a liberal use of glazed bricks being evident in the dados and stairways, and concrete with a top layer of tar is employed up to the floor-boards. All brickwork is built in cement and material known as "fire-resisting"—the English equivalent of our term of "fireproof"—is used throughout.

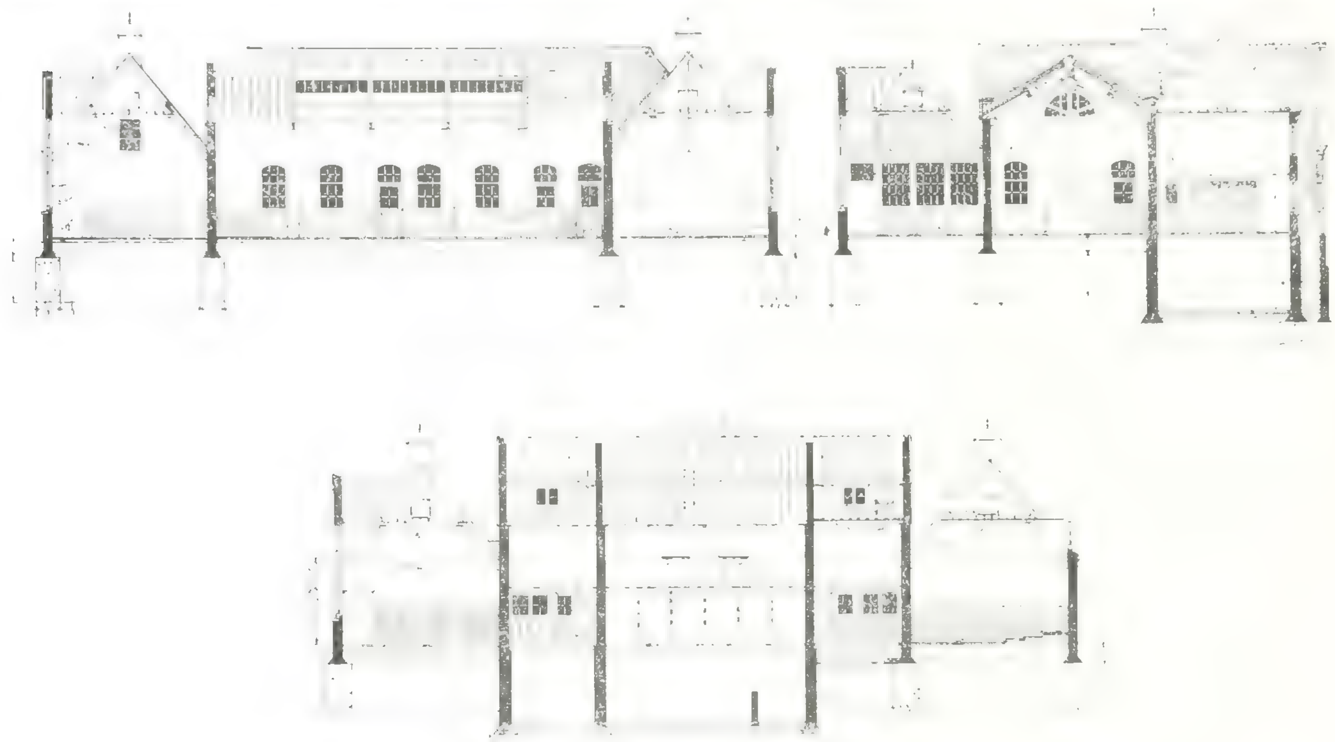
One feature noted is that scrapers and door mats are placed outside all doors, and all outer doors are covered with an iron "kicking plate"—extending from the bottom eighteen inches up, a serviceable addition; also that latches are very strongly made. Within the inner door and adjoining the entrances are properly placed cloakrooms, in which simple umbrella racks with channel and outlet and wash-basins are provided, with a double hook for each pupil. Each cloakroom has a coil of heating pipes, and ventilation is provided by an air inlet under windows and a "wired" door panel. The main hall is some fifty feet by twenty, and the classrooms and corridors open on to this by doors which swing both ways. It is carried well up above the mazzanine, and the sloping glass room is crowned by a ventilating ridge—a T shaped opening extending the full length of the roof, which can be partially or completely closed by a handle and pinion.

The dimensions of the classrooms are governed by what is known as the "ten foot" system. Forty children are accommodated in each classroom which, for the sake of the teacher's voice, does not exceed twenty feet square approximately. The Council aims to provide 140 cubic feet of air space per child—boy, girl, or infant—which requires a classroom not less than fourteen feet in height; also to place the furthest scholars not more than 20 feet from the windows, getting their light from the left.

Dual desks are provided so that the teacher may get to the side of each child, and the three or four back rows are placed on steps rising five inches, for infants the stepping is four inches. A piece of g



Model Ground Scheme and Floor Plans of Three One-Story Buildings Comprising the Manor Lane School, Recently Erected by the London County Council at Lewisham, England. This School Affords Accommodations for 817 Children, and Provides for a Complete Segregation of Boys and Girls in Addition to a Separate Structure for Infant or Kindergarten Classes. Each Building Has its Own Separate Play-Ground with an Allowance of at least Thirty Superficial Feet for Each Pupil; while Additional Space is Reserved for Nature Study and Athletic Sports. It will be Noted that the Lavatories, which are Modern in their Equipment, are Kept Apart from Each Respective Structure; and Attention is also Called to the Compactly Arranged School Master's House which Commands the Entrance at the Extreme Left of the Leahurst Road. The Site has an Extreme Frontage of 566 Feet, with a Depth of 166 Feet, and all Buildings are of "Fire-resisting" Construction Throughout.



Longitudinal and Cross Sections, Girls' Building, Manor Lane School, Lewisham, England.

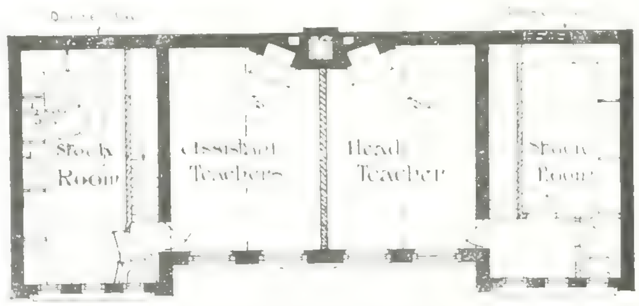
48 inches by 36 inches [illegible] at the back has been found to be [illegible] blackboard. [illegible] with the [illegible] [illegible] ceiling of [illegible] room. The [illegible] back paper and are [illegible] finished. A picture-rail is also provided for the hanging of maps, etc. [illegible] and to reduce the [illegible] glass doors and glass partitions are wired and bedded in wash leather which is held in position with cups and screws. The windows are carried up to the ceiling, and

Roof Plan, Girls' Building, Manor Lane School, Lewisham—Showing the Skylight and Ventilating Ridge over Main Hallway.

[illegible] back of the room is also arranged.

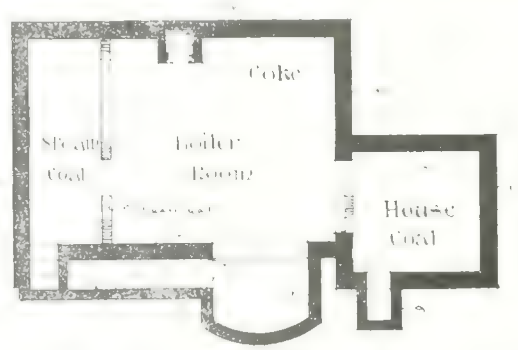
The general appearance of the classroom is bright, business-like and satisfying. It gives the impression that the teacher should make all pupils hear well without effort and without unduly taxing his voice, and that he should [illegible]

A word is here necessary concerning the Council's policy with regard to heating and ventilating. Much attention has been paid to this matter, for the beneficial effects of good ventilation on both teacher and class are indisputable. Many systems have been tried—and found [illegible] of ventilation is in most cases rendered impossible on account



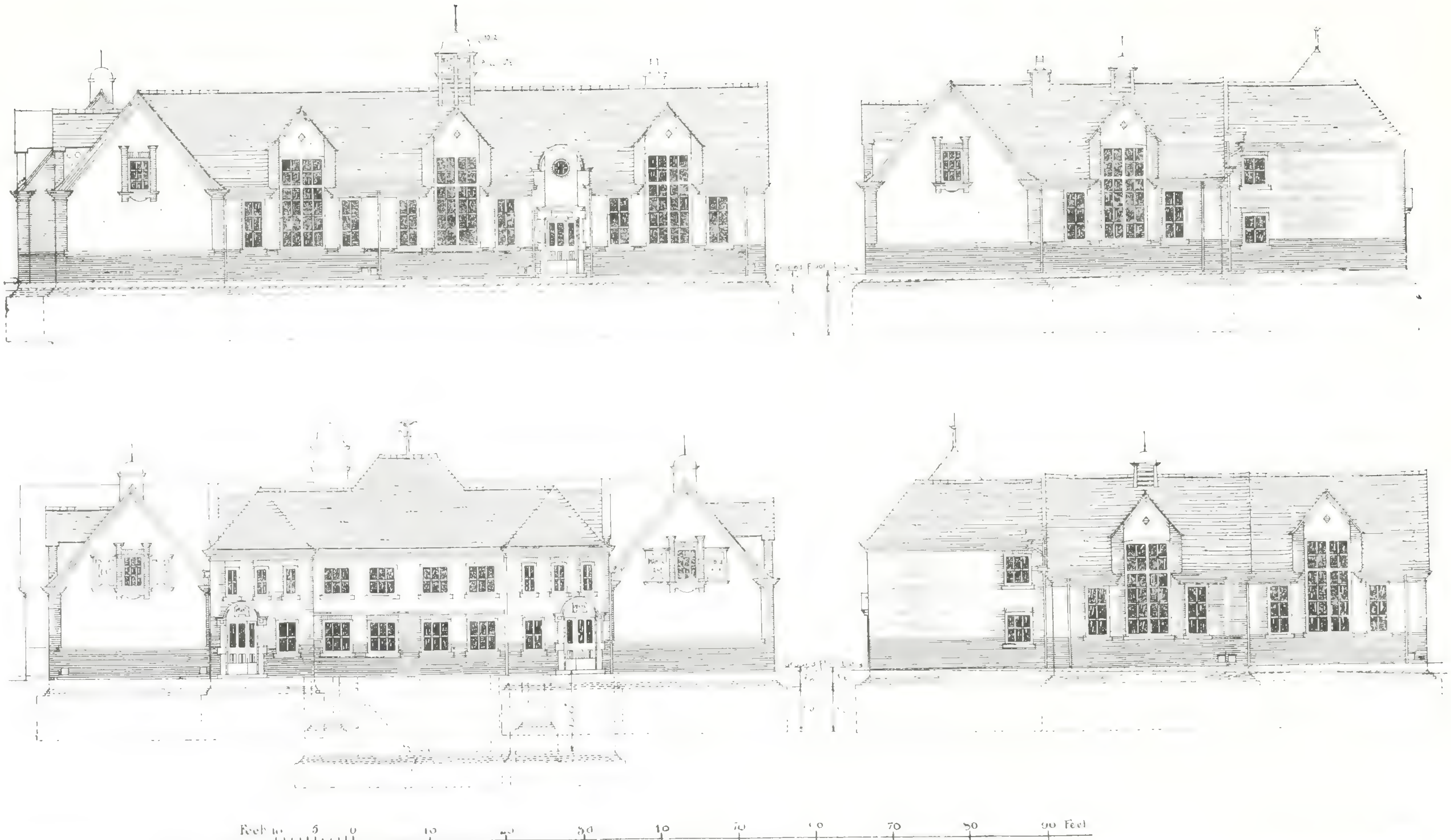
First or Mezzanine Floor, Girls' Building, Manor Lane School, Lewisham—Showing the Accommodation Provided for the Teaching Staff.

of [illegible] the [illegible]. The Plenum system has not given much satisfaction. In [illegible]

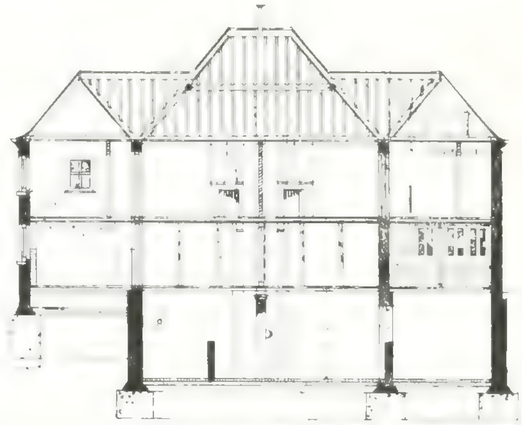


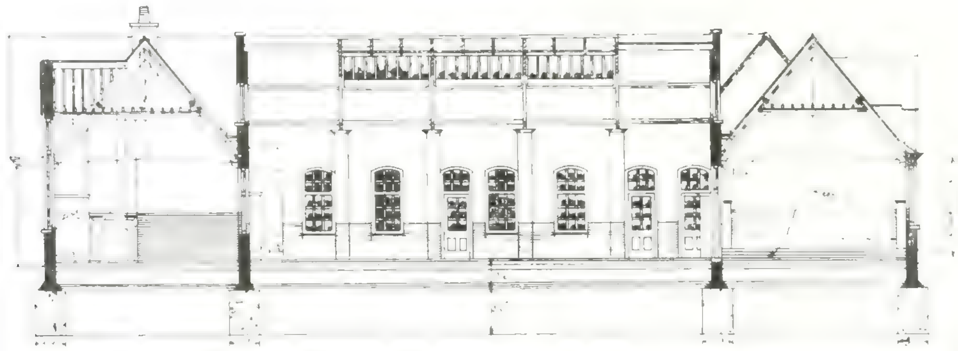
Basement Plan, Girls' Building, Manor Lane School, Lewisham.

flues were black with dirt after running the first day's work, while black balls of moist grease, the size of shot, were scattered over the rooms and its occupants. This,



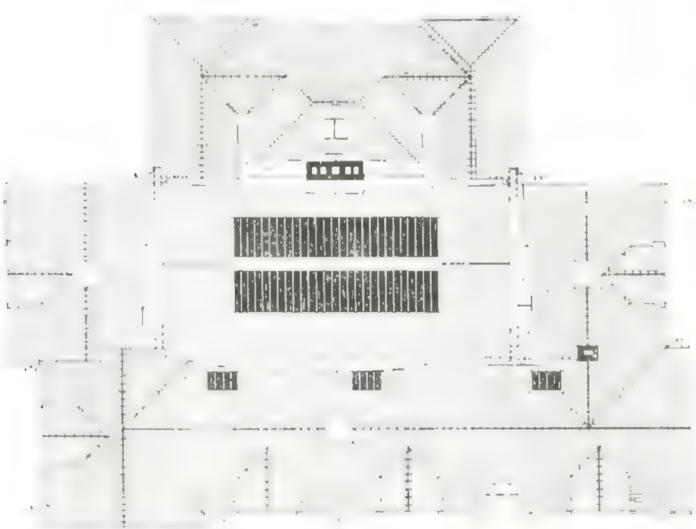
North, West, South and East Elevations, Infants or Kindergarten Building, Manor Lane School, Lewisham—Both this Building and the Boys' and Girls' Schools, it Might be Well to Mention, while Strictly One-Story Structures, have a Partial First or Mezzanine Floor for the Teachers' Use, Hence the Upper Window Seen in South Elevation.





Longitudinal and Cross Sections, Infants' or Kindergarten Building, Manor Lane School, Lewisham.

it is true, was not the fault of the Plenum system, but it has also been found uncertain in practice; as where it has been a complete success in one case, it has proven a failure in another under exactly similar conditions. The late Mr. Bailey tried trunks from the ceiling line of each room gathered into groups with a single outlet equal to the combined area of the group, and with a coil of hot pipes in it to promote an upcast. This had the desired effect as far as ventilation was concerned, but it could not be recommended for schools of more than one storey on account of the sounds from lower rooms being conveyed

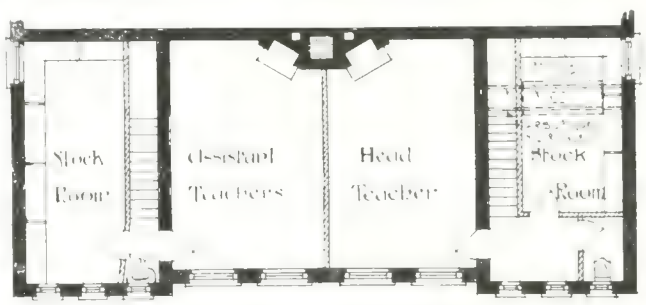


Roof Plan, Infants' Building, Manor Lane School, Lewisham.

to the rooms above to the disturbance of classes. Fresh air shafts known as Tobin pipes were introduced for inlets of fresh air, and a separate flue built in the chimney stack with opening at ceiling line for extraction, but the heat of the room frequently converted the extract shaft into an inlet shaft with confusing results. No one realized better than Mr. Bailey the excellent ventilation provided [illegible]

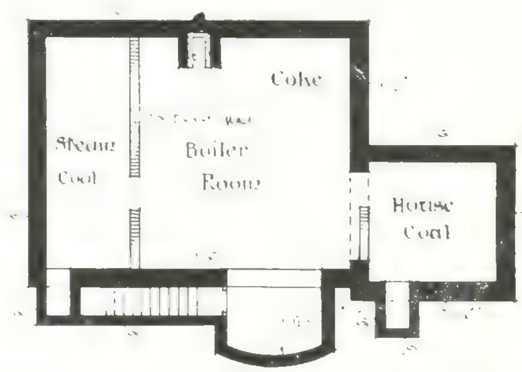
The method of heating adopted in the Manor Lane schools consist of a low pressure hot water syste[m of] pipes round the walls just above the floor, to which are connected a couple of radiators in each room. In the hall there are six radiators.

For ventilating purposes there are two air shafts placed at the back of each room, the air entering through a grat-



Mezzanine Floor, Infants' Building, Manor Lane School, Lewisham.

ing some eighteen inches square, which opens on to the playground and is placed sufficiently above the level of the ground lines to prevent the entrance of dust, etc. Inside the room the shaft, which is provided with a



Basement Plan, Infants' Building, Manor Lane School, Lewisham.

wooden door to permit of cleaning, is carried up some six feet above the floor line, the opening in the top is grated

(Continued on page 78.)

THE NEW MUNICIPAL BUILDING NEW YORK CITY

Important edifice now being built to house the various civic departments of the American Metropolis. Some facts concerning its design, dimensions and constructive features.

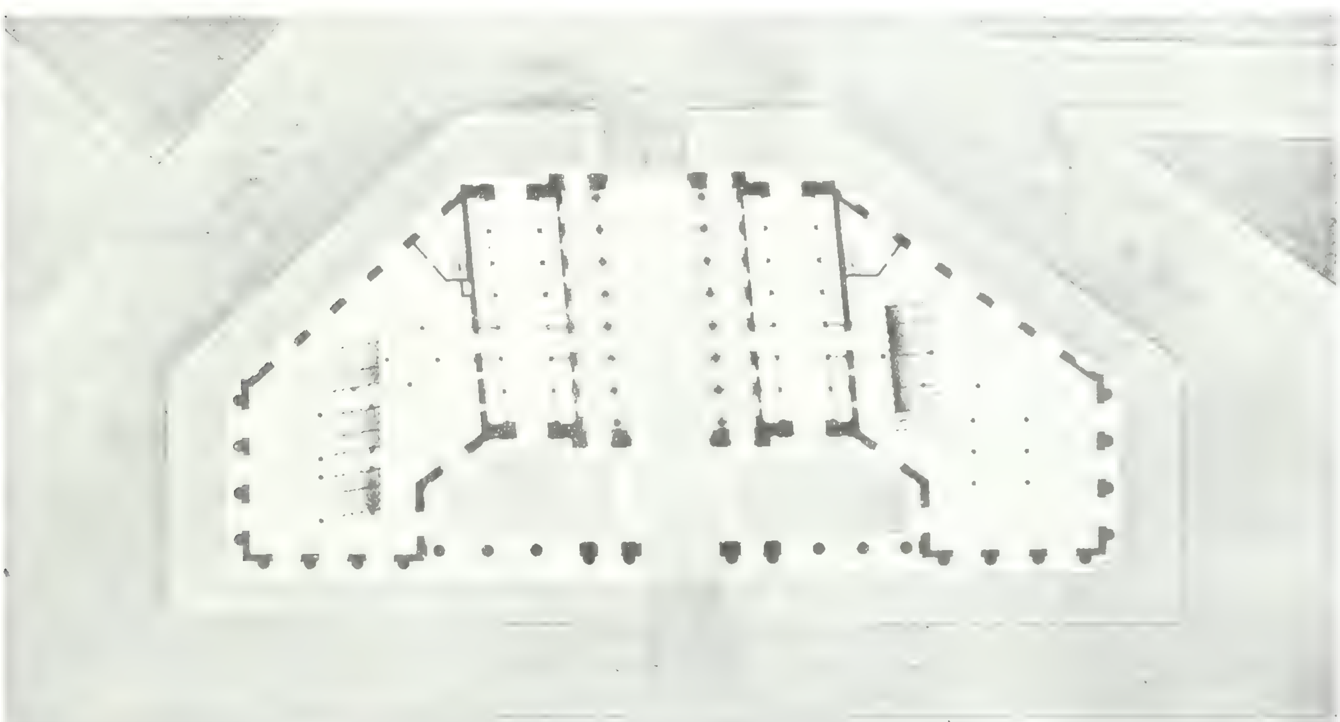
NO PROJECT on the building line in New York City during the past few years has excited more general interest than the new City Hall which is now in the course of construction at the junction of Park Row, Centre and Durane streets. This can be said both on account of its designs and extreme dimensions, and also because of certain constructional features which the undertaking involves. Rising to an extreme height of 615 feet, the building when completed will be well in scale with many of the mammoth office structures for which New York is already noted; and the importance attached to its erection is attracting no little attention in architectural and engineering circles both on this Continent and in the countries abroad.

In plan the building covers a six-sided or semi-octagonal area, giving a frontage on Centre street of 375 feet by an extreme depth of 165 feet, while in elevation, as will be seen by the accompanying drawings, it will attain a height of 40 stories, 15 of which will be in the form of a central tower rising from the main roof. The lower portion of the structure, which is bisected by Chamber street (which runs on a slightly diagonal line almost directly through the centre of the site), will be joined by an arch of forty foot span with a crown just beneath the fourth story, above which the floors will continue through in an unbroken manner from one extreme to the other. From the street line to the main roof of the building is 357 feet and above this the tower extends upwards to a height of 203 feet.

Allowing for the effects of wind pressure, it is estimated that the total weight of the building, including its contents, will be 330 million pounds, the whole of which will be carried by rivetted steel columns.

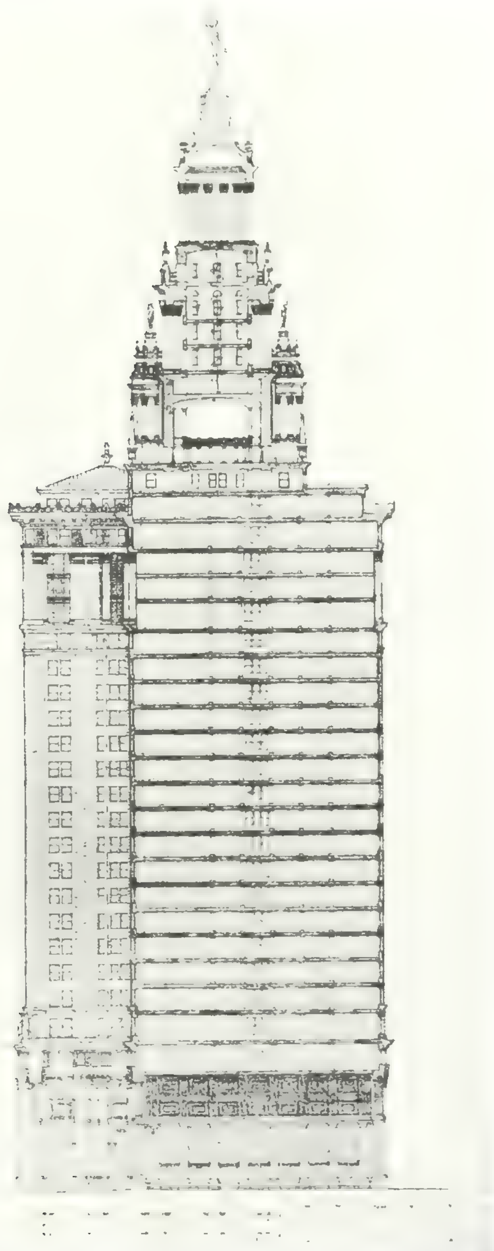
The portion above the street level will comprise public rooms and offices, the construction up to the fortieth floor being of the fire protected steel cage type, the enclosing walls faced with granite, and the main steelwork cased in brick, terra-cotta, and concrete, according to position. Beyond the fortieth story, the tower will be continued in the form of a masonry lantern, 35 feet high by 25 feet diameter, to be surmounted by a statue 25 feet high.

Of more than usual interest is the foundation work, which in itself comprises a gigantic engineering undertaking. In the original specifications it was provided that the columns should be based upon concrete filled caissons sunk to solid rock, but as the rock is not encountered along the northern side of the site nearer than 200 feet below the street level, it was afterwards agreed that 38 of the caissons should be sunk to the depth of about 77 feet, where they find a bed of compact sand, to which the loads will be transfered at the rate of six tons per square foot. The remaining caissons are sunk through water, quicksand and gravel to solid rock at the maximum depth of 140 feet below street level. Owing to the fact that space is provided for a station to be constructed on the Rapid Transit Subway, both the basement and sub-basement are considerably in excess of the ground dimensions of the building proper. One difficulty was met with in the



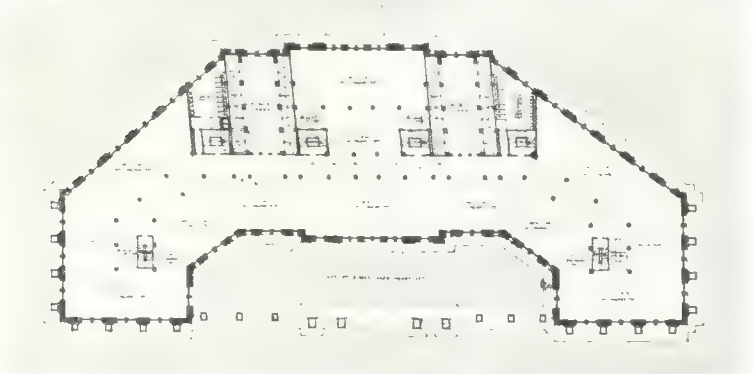
Ground Floor Plan, New Municipal Building, New York City, Showing the Position of Chambers Street, which Bisects the Lower Portion of the Structure, and which is Arched Over Just Beneath the Fourth Floor Line. McKim, Mead and White, Architects.

Design for the New Municipal Building, Now being Erected in New York City at the Intersection of Park Row and Centre and Duane Streets. The Importance Attracted to This Structure, Owing to the Vastness of its External Dimensions and the Constructional Features Involved, is Attracting no little Attention in Architectural and Engineering Circles, both on this Continent and Abroad. McKim, Mead and White, Architects.



Cross Section, New Municipal Buildings, New York City. McKim, Mead and White, Architects.

various curved tracks which interfered to some extent with the symmetrical arrangement of the columns, and it was necessary to provide a special system of large girders in the floor above for the support of the superstructure. The upper basement floor will be occupied chiefly by halls, passages and stairs for the use of railway passengers. The basement story also provides space for the installation of mechanical plant and for storage purposes.



Typical Plan of Upper Floors, New Municipal Building, New York City. McKim, Mead and White, Architects.

As the Municipal Building is in the immediate vicinity of the Brooklyn Bridge terminal, the Hall of Records, and the World Building, all with comparatively shallow foundations on sand, the responsibility attaching to the design and execution of these foundations was naturally very

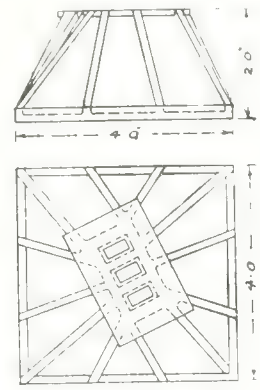


Fig. 1.

great, and fully justified the exceptional care taken by all concerned.

Owing to the exceptional depth penetrated, the working pressure reached something like 40 lb. to 42 lb. per square inch, inevitably involving risk to the men employed, in spite of the most elaborate precautions for guarding against caisson disease. The working-chambers of the caissons for the Municipal Building were made of reinforced concrete with the exception of ten in timber and sixteen in steel. The largest caisson measures 31 feet by 26 feet in section, and carries five columns with the aggregate load of nearly 5,000 tons.

Owing to the great depth attained, the skin friction on the caissons reached about 650 lb. per square foot, and to overcome this, enormous loads were necessary, amounting in some cases to nearly 1,000 tons made up of cast iron blocks. The caissons were filled with concrete in the proportion of 1: 2: 4, mixed wet.

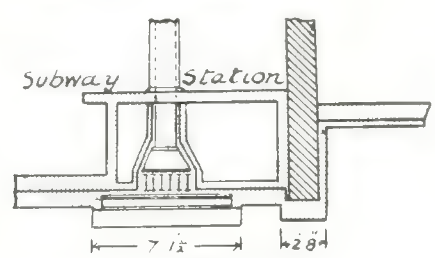


Fig. 2.

The magnitude of the foundation works, and the need for prompt execution, were responsible for the employment of from 800 to 900 men, and an extensive installation of plant, including steam boilers and engines with the collective capacity of over 1,200 horse-power, air compressing machinery, pumps, cranes and hoists, concrete mixers, and other appliances. One novel feature of the plant was a pump sunk to the depth of 75 feet below stereet level for the removal of subsoil water, which was forced up to foundation level for use by the contractors.

Many of the principal columns carry loads of 1,000,000 lbs. and upwards, the greatest load being 5,475,000 lbs. on column No. 73, with the sectional area of 521.5 sq. in. All the columns are machined at each end and provided with cap plates, 3/4-in. thick. They are placed upon cast steel or cast iron bases, the largest of which measure 6 ft. sq. at the bottom, and all are finished at the top by a planed surface. Most of the bases are symmetrical, but in several cases, owing to the oblique arrangement of the columns, the upper surface is set at an angle as illustrated in Fig. 1, which may be taken as a typical instance, although the special bases vary considerably according to the necessities of different cases.

The column bases are placed on distributing beams transmitting their load to grillages over the caissons. Fig. 2 represents a column base and grillage in the Subway station, and incidentally shows the manner in which the lower part of the column is protected against fire.

Some of the column loads are so heavy that duplica-

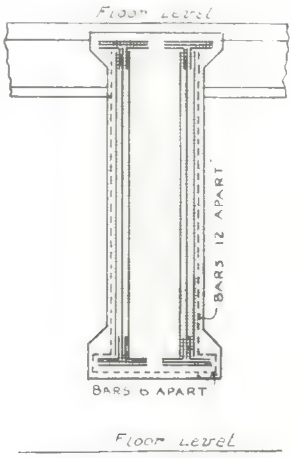


Fig. 3.

tion of the distributing girders is necessary, as illustrated in Fig. 3, where the distributing girders are connected by cast iron separators, and the grillage beams by separators formed of piping and tie-bolts. As a further precaution, the distributing girders are provided with double cover plates on the upper and lower flanges.

Although most of the floor beams are of quite ordinary dimensions, the building contains some very large girders, with the web ranging from 44 in. up to 120 in. deep. One of the triple plate girders parallel to Chambers street is built up of three web plates, 124 in. deep by $\frac{7}{8}$ in. thick, each with four 6 in. by $\frac{7}{8}$ in. flange angles, six 16 in. by $\frac{5}{8}$ in. flange cover plates, and two 122-in. by $\frac{3}{8}$-in. web stiffening plates. Fig. 4 is a section showing the fire protection of two large girders by means of concrete, reinforced near the outer surface by $\frac{1}{4}$ in. diameter bars, a method also insuring protection against rusting.

Several of the heavy girders mentioned are employed for the support of columns in the upper part of the building. A remarkable structural member applied to the

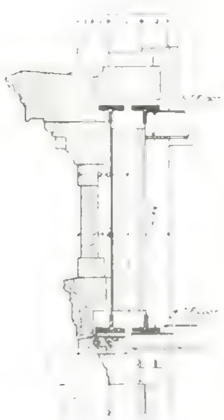


Fig. 4.

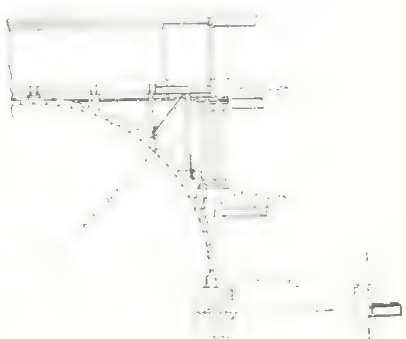


Fig. 6.

same purpose is the truss, of which a drawing is reproduced in Fig. 5. This member is 50 ft. long from centre to centre of the main columns, and 26 feet deep all over. Extending from the third to the fifty story, it carries two loads of 3,204,000 lb. and 1,029,000 lb., respectively, concentrated at two points. The truss is protected against fire by a casing of concrete, filling all interior spaces, and being of the minimum thickness of 3 in. outside the projecting parts of the steelwork.

Fig. 6 is a drawing which shows the construction over Chambers street between the second and the fifth stories, the arch being added for architectural effect.

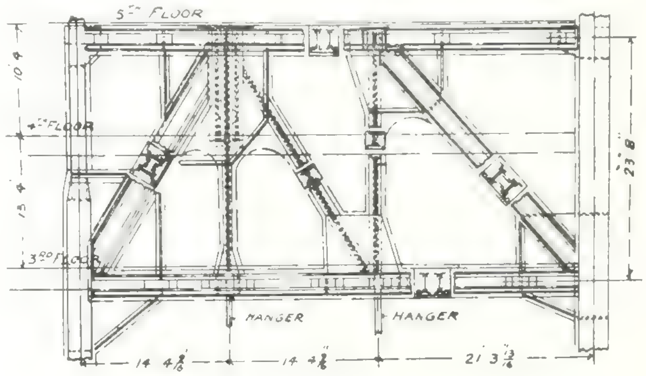


Fig. 5.

Fig. 7 is a section typical of the girder and masonry construction in the principal facade of the building, and Fig. 8 represents the cantilever arrangement for carrying the heavy masonry cornice and parapet projecting several feet at twenty-fifth floor level.

All beams, girders, and trusses projecting beyond floor and ceiling surfaces are protected by concrete. Columns below street level are cased in concrete with the minimum thickness of 4 in., and above the same level by hollow tile, also with the minimum thickness of 4 in., except in a few cases where brick is employed. Hollow tile

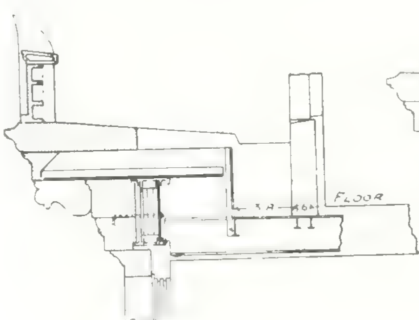


Fig. 8.

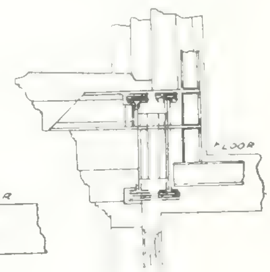
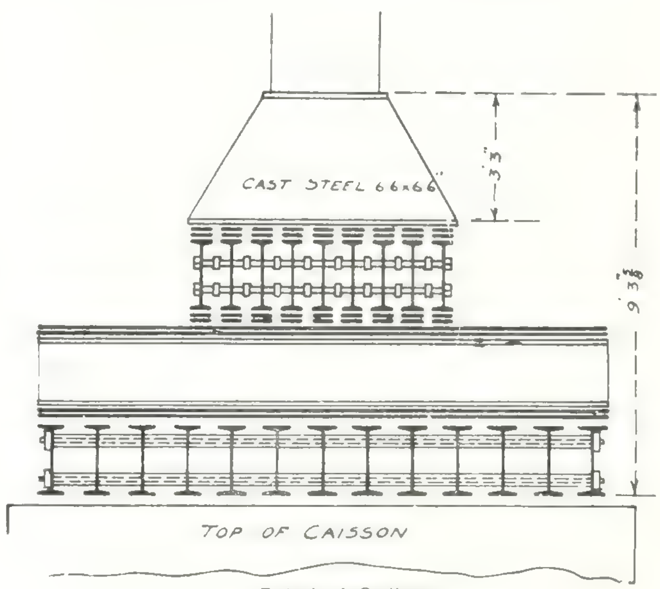


Fig. 7.

is used for most of the partitions, 4 in. thick for heights up to 18 ft., and 6 in. thick where that limit is exceeded.

The architects for the building, which will cost approximately $9,000,000, are Messrs. McKim, Mead & White, and the consulting engineers, Messrs. Purdy & Henderson. It is estimated that the structure, when completed, will save the city close on to $450,000 per annum, which is now being expended for temporary offices.



Detail of Grillage.

THE ARCHITECT
WHAT TO EXPECT OF HIM

By ARTHUR C. CLAUSEN

"He must be a structural engineer and a mathematician, and at the same time an artist and a business man."

ALTHOUGH an architect's commission for the planning of a home or building is a very small part of the total investment, yet upon his ability depends, to a large extent, the best and proper expenditure of the entire building funds. To be successful, an architect must be versatile. He must at once be a structural engineer and a mathematician; an artist and a business man. His profession is both an art and a science. The mathematical part is mentioned here first since mathematical accuracy, both as to scale and dimensions, is absolutely necessary throughout all his work.

Drawings containing a lack of the proper amount of dimensions, or inaccurate dimensions, are useless, for workmen accustomed to following the plans without question will, if the dimensions are inaccurate, sometimes make serious mistakes, costing the owner of the home or building several times what he paid his architect, to rectify them. The contractor has a right to expect compensation for all extra work required through any inaccuracies on the drawings.

Wherever the strength of materials has to be figured, it is very necessary that the architect should know their relative strength so that they will sustain the weight which they have to carry in a safe and economical manner. Even a home sometimes presents difficult structural problems, although, of course, they are not as prominent or as vital as in the construction of buildings. The strength of materials should never be guessed at, since there are accurate ways of figuring all materials based upon previous tests and experiments. A strong tendency on the part of many architects lies in the direction of making homes or buildings far stronger than required, thus compelling the owner to pay for beams or girders which are several times as strong as necessary.

An architect must be an artist—an artist who paints with materials. All good designing is done in the head. The home is first built in imagination, the architect's drawings and specifications being only the systematic means of conveying to workmen the instructions which will enable them to build this mental picture with material. The artistic element in the designing of a home is very essential, both in making it a lasting joy to its owner and for the pleasure it affords him to receive the credit given his good taste by admiring friends and neighbors. The architect must be a man of sentiment, since sentiments enters into the planning of a home to a large extent, it being in sentiment that the home has its conception.

As an artist, the architect takes into consideration not only the harmonious arrangement and decorative features of the room within, but their outward effect upon the exterior of a home; as, for example, the windows, front entrance, the fireplace, when built on an outside wall; and not only the artistic grouping of doors and windows is considered, but their practical arrangement also, so as to preserve wall spaces in appropriate places for such wall furniture as pianos, bookcases, beds and bureaus.

He must be a thorough business man; a man of unquestionable integrity, especially when he is called upon to superintend the construction of a home or building. In this capacity, he is sole arbitrator between the contractor and the owner. He must not only be tactful, but very frank and fair, with all concerned. Sometimes he is put in the very embarrassing position of having to decide against his client in favor of the contractor; but more often the decision is in favor of the client and against the contractor. When disputes arise between contractor and owner, as they frequently do, his decision must be entirely impartial.

Some people have the wrong impression that an architect's decision should invariably be in his client's favor; but such is not the case. An architect should always go on the principle of an owner paying the proper price for everything obtained, and the contractor's giving him everything that he pays for. Neither should be allowed to take undue advantage of the other. The architect who will for a price, allow a contractor to put inferior materials into a building, or who will specify certain inferior materials for a commission, is not worthy of his profession. Such a man, in the first place, has not sentiment enough to properly plan a home. His very pride, alone, if he is a man of quality, would rebel against the idea of inferior materials or workmanship going into monuments of his ability. The homes and buildings which he plans and designs are the foundation-stones on which rest his reputation. The stronger that foundation, the more secure the reputation. If the foundation becomes weak and rotten with corruption, his reputation soon crumbles and falls.

Now that the reader knows in a general way what an architect is, or should be, it is an easy matter to deduct from this what to expect of him.

After consulting with an architect, either by correspondence or in person, and having frankly informed him of the amount you wish to spend, the location of the house and your general idea as to its plan and design, your architect should give you his price for the preparation of the complete plans, specifications and details. Prices are sometimes quoted on the percentage basis; a certain per cent. on the final cost of the house being the architect's commission. The most satisfactory way, however, for both architect and client, is to have a definite price agreed upon. This will remove entirely any question of the architect's trying to increase the cost of the house in order to increase his commission; and it should be thoroughly understood between architect and client that the architect is to provide all necessary drawings for the complete, convenient, and proper construction of the house or building.

Cases have been known where the architect has claimed that his price included the furnishing of only one set of plans, and where he has charged exorbitant prices for additional sets. Such a man, of course, is not dealing with his client honestly. He is taking advantage of his client's ignorance. In the first place, it is his duty, as an advisor, to inform his client of all the pitfalls into which he is apt to run, and not to deliberately make them for him.

No building, no matter how small, can be built conveniently with less than three sets of plans. The owner should have one at his home, as a matter of convenience in keeping track of and following up the work, taking estimates on various items, etc. There should always be one set of plans at the building during its construction, so as not to inconvenience the foreman at any time. Since the mill requires a set of plans for a considerable length of time during the construction of the home, in order to get out the various items of mill-work and deliver them as they are needed, an extra set should be provided for this purpose. When the home costs over seven or eight thousand dollars, there should be provided additional sets, as the size or manner in which the building is being constructed may require.

Never consider an architect's estimate of cost as accurate. It cannot be, except by coincidence, since he has not the gift of prophecy and can only state approximately what the lowest bid will be from several contractors who may vary in their estimates over twenty per cent.

One of the principle advantages of employing an architect is that both the planning and building of a home are reduced to a system. In this profession, as in all other professions or trades involving a multitude of details, system means economy. Few people have the slightest idea as to how much thought and time is put into the preparation of the plans and specifications for the construction of a modern home. Give your architect time. Plans cannot be made with a rubber stamp. Every home is a problem in itself, and it takes time to work out the best solution of it.

Employing a competent architect should mean to the home-builder: 1. Saving of time and worry. 2. Saving of cost through the application of system. 3. Substantial construction. 4. Home-like arrangement of rooms. 5. An attractive home. 6. The advantage of taking competitive bids, thereby reducing the cost and of letting the contract on a business-like basis. 7. Having three or more sets of accurately prepared plans and specifications to work from. 8. Knowing just what will be included in the finished structure, thereby saving a long list of extras for things that could not be possibly covered in a rough pencil sketch.

Planning a home is like selecting a wife. What suits one man seldom suits another. Each must choose according to his own taste. To the uninitiated, the planning and building of a home or building is a very difficult and complicated matter. A right mental attitude, however, toward success in such an undertaking, as in all other things, will reduce the problem to a minimum.

SINGLE STORY SCHOOLS —Cont'd from page 72

to prevent the insertion of rubbish, and is provided with a lid which is held open by a bolt and can be used to close the ventilator entirely. For the extraction of foul air each room has a roof ventilator connected by flues, with a turret rising well above the roof ridge, a method which seems to answer its purpose well. Note that the space below the stepping is both heated and ventilated, rendering the rooms more wholesome and sanitary than would be the case otherwise.

In the infants' school the heating and ventilating is the same, except that in the babies' classroom, with which each infant school is equipped, provision is invariably made for an open grate fire in addition. Indeed, the infant school differs very slightly in construction from the girls'; the door handles, of course, are lowered and the height of glass panels diminished from 4 feet to 3 feet 3 inches.

The basement consists of the boiler room, the space for coke, and a dwarf wall assists the storage of steam coal. Space is also provided for house coal. Note that the glass grating, or window, which gives light to this basement, is of such size that when removed it leaves an opening sufficiently large for the removal of the boiler without structural demolition, should a change of boilers be necessary.

The staircases in the Council's schools are never less than 3 feet 9 inches nor more than 5 feet wide, with flights of not more than seven or eight steps. These run direct, and have ample landing space. The treads are about 13 inches, and the risers six inches. The staircase landings have doors which swing outwards, and are without locks and unfastened so that, in case of emergency, no obstruction is offered.

On the first floor, or mezzanine, the accommodation provided is exclusively for the teachers. It consists of four rooms, one for the headmaster, two for stock purposes, and the assistant teachers' room, which is adjoined by a lavatory and has an open grate fire, together with a gas cooking range on which the teachers can prepare their meals. This range is mounted on a stone base, and an enamelled plate is placed behind it on the wall to catch grease. Such is the completeness of the system evolved by the Council.

In its system of playgrounds the Council provides for an average space of from thirty to thirty five superficial feet per child. A greater area than this tends to promote undue roughness and increases the difficulty of effective supervision. When a greater tract is available, the excess area is fenced off and used only as an athletic field when such events are scheduled. Frequently, of course, this "thirty feet" is not available; indeed, in some crowded parts of the city ten to twelve feet has to suffice. In these cases provision for the boys and infants is made on the ground level, and a roof playground is provided for the girls. It is interesting to note that these roof playgrounds are not entirely walled, but have lengths of railings or panels fitted with iron grilles, experience having shown that the natural curiosity of the child to see what lies beyond a solid wall, often otherwise leads to serious consequences.

The playgrounds are tar paved and properly drained, and all existing trees are carefully preserved. In the Manor Lane schools a small area in each department is left impaired for "nature study," and a portion is also left for a garden. Another portion some 50 x 20 feet in an angle facing south west is roofed in, with sides enclosed and a seat placed against the wall at the back

There are no lavatories in the main building for children; these are in the open playground at a reasonable distance, the number provided being two per cent. for the boys and rather more for girls and infants.

The work here, as elsewhere, is most thorough and substantial. The rail gate to the lavatories, which is locked at night, rests on a steel pin revolving in a gun metal bush; the cup being inverted, uppermost, with the pin below—a variation of the old method. The groups of lavatories are covered by a corrugated galvanized iron roof. To each half door of the lavatories a heavy galvanized chain is attached to prevent doors being swung back too far and injuring children. All screws susceptible to the effects of weather are brass or copper. No iron is used, and therefore there is no corrosion. Indeed, the flap windows of the teachers' wash rooms in the main building have phosphor bronze hinges, which are practically indestructible.

A study of the plans, elevation and sections will reveal many interesting points that cannot be touched on in the space at my disposal, which permits consideration of one type of school only. The measurements and foundation lines are exceedingly interesting, and are well worth studying. The appearance of the finished building is most satisfying, being plain and unpretentious, yet solid, workmanlike and not without beauty of line. There is a growing feeling that the aesthetic should be insisted upon in these school buildings by the introduction of beautiful tiles or enamelled bricks in the interior, in order to assist in the cultivation of a love of beauty in the child. The question of cost, however, will probably debar much progress in this direction for some time. The cost is already considerable. An unofficial but practical and trustworthy estimate places the cost of the Manor Lane schools for the accommodation of 817 children at \$100 per head—say \$82,000—which includes buildings, heating and lighting, but not site. A heavy prime cost perhaps, but not excessive, when one considers the increase in the cost of building in London in the last few years and the extraordinary solidity and completeness of construction. Prime cost is directly related to the maintenance bill. What is the maintenance bill of a modern London County Council school? The assistant architect of the Council informed me that in *fourteen schools* completed under his direction ten years ago, *not one penny* has been spent for maintenance, except for broken panes of glass. Can we make a proportional showing to compare with this?

THE RESTORATION OF THE CAMPANILE OF VENICE

Task of Rebuilding Famous Old Tower now nearing completion. Bell of San Marco to again ring out on April 25th, 1911.

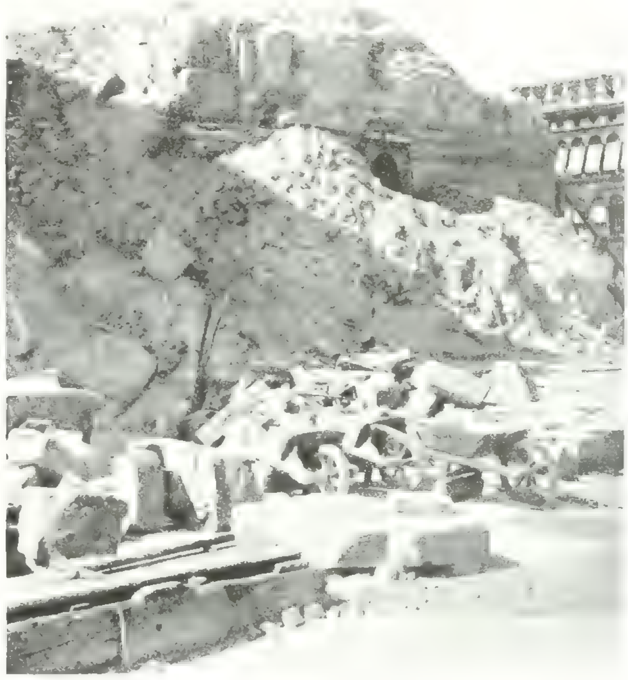
THE TASK OF REBUILDING the Campanile of Venice is now nearing completion, and the "City of the Gondolier" is about to again assume its much wonted appearance. But little remains to be done, save the mellowing touch of time to bring the tower back in full consonance with its surroundings; and it is confidently expected that the bells of San Marco will break their nine years' silence and again ring out on St. Mark's Day, April 25, 1911.

The restoration of this famous tower—which collapsed

The New Campanile, Venice, as it Appeared Three Months Back, Ready for the Placing of its Pyramidal Apex.

suddenly on July 14, 1902, after a proud existence of 1,014 years—has proved a greater undertaking than anticipated, some of the details presenting technical difficulties. The intention was to reproduce the old tower as faithfully as possible, and with that object in view the bricks, of which there are over a million, were specially selected and laid. The bricks are each 12 in. long, 6 in. wide, and 3 in. deep, and the clay is twice mixed to secure homogeneity. These bricks, however, contained salt, which threatened to turn the tower white, and such an outcry was raised among the Venetians that the work was suspended while an inquiry was held. It was found that by prolonged soaking in water the salt was removed.

The tower is quadrangular, nearly 40 ft. square at the base, and 350 ft. high, including the pinnacle in the shape of a pyramid, the summit being crowned by the figure of an angel with spread wings. The foundations of the ancient buildings were found to be good but none too wide, so that considerable strengthening had to be effected. No



The Base of the Old Campanile a Few Days After the Collapse

scaffolding has been used, a sliding platform being contrived to rise with the progress of the building.

The Inner and the Outer Shafts

The shaft, which was completed last December, is composed of an inner and an outer shaft between which mounts the inclined plane which leads to the bell chamber. The walls of the outer shaft are 6 ft. thick and the inclined plane is lit by thirty six windows. In the new tower the shafts are bound together by iron rods, and the pilas-

The Original Loggette, Showing Its Sadly Damaged State, Following the Fall of the Tower.

Sectional View of the New Campanile, Venice, which is Now in the Final Stages of Completion. This Illustration Gives an Accurate Idea of the Substructural Work Carried Out to Increase the Size of the Old Foundation, Which Was Found to be of Insufficient Width.

ters at the angles of the inner shaft are similarly united. This will cause any future fall of the [illegible] mass instead of a gentle [illegible]

Excavating the Ground Around Foundation of Campanile, Preparatory to the Work of Restoration.

[illegible] among the ruins of the old Campanile resulted in the finding of nearly all the fragments of the beautiful bronze doors, statues, and basreliefs of Sansovino's famous loggetta, which has been restored with wonderful care and devotion. The estimated cost of the present tower is over 2,000,000 francs, this sum having been [illegible] the state.

When the tower fell, of the five bells only the largest was not broken; the other four have been replaced and were presented to his beloved Venice by Pope Pius X. The lions of St. Mark, which originally occupied the centres of the north and south sides of the attic and were defaced during the French occupation, are to be replaced.

[illegible]

The tower has a strangely hard [illegible] time-mellowed facade of the church of St. Mark with its wild horses and curious oriental-looking domes, and seems [illegible] which [illegible] Venetian waterways. The Venetians were, however, wise to rebuild the Campaile, for the long, low lines [illegible] sky-piercing shaft to complete the [illegible] of St. Paul's to lift its sombre roofs in an upward [illegible]

The bells of the old Campanile were shattered by the fall of the tower, but they have now, as stated above, been replaced by the generosity of the present Pope. They were cast on St. Mark's Day, April 25, and will again be solemnly rung from the tower on St. Mark's Day of next year.

Entering the archway at the base of the tower one ascends by a series of sloping ways made of reinforced concrete. The interior brickwork is a marvel of fine setting, and when struck with the hand a portion of it will resound like a drum. Reaching the present summit one is able to examine the progress with the stonework of the dado, which in turn will support the pyramidal apex [illegible] figure [illegible] that when wintry winds sweep over the Venetian lagoons the strain upon the tower on this figure will be reduced to a minimum. The view from the summit of the tower [illegible] from this elevation none of the canals are visible, and the only one of the innumerable bridges which one can discern is the Ponte del LovoJa Veneitan corruption of the Italian word, Lupo, which signifies a wolf.

"By kind permission of Professor Guiseppe del Piccolo, chief superintendent of the reconstruction of the loggetta, [illegible] "to witness the remarkable work which has been accomplished within one of the arcades of the Doge's Palace. Here, within the shadow of the beautiful staircase which mounts to the upper story, and within sight of the window from which Silvio Pellico looked out during his many years of confinement, there has been pieced together with infinite pains the wonderful Renaissance facade of Sansovino."

[illegible]

To give an example of the method which has been pursued one may take the case of three columns of *breccia coralina* which form part of the facade facing St. Mark's. One has been put together in thirteen pieces, another in thirty two pieces, while a third was so much damaged that it has had to be replaced by a block of Asiatic marble known as *sette basi dorato*, so called from a block of this marble having been found in a villa near Rome belonging to [illegible]

U.S. Consul Albert Halstead, of Birmingham, in a recent report, calls attention to the announcement by a British journal of a new rust proofing process for iron and steel. The article is boiled in 1 gallon of water to which is added 4 ounces of phosphoric acid, and 1 ounce of iron filings. A black noncorroding coating is produced. No explanation, however, as to the exact formula of the preparation itself is given.

Widening the Foundation, Showing the Old Masonry Work and the Piling for the New Section.

THE NEW YORK CEMENT SHOW

By WM. SNAITH

Interesting decorative scheme and outstanding features of important event as described by the Secretary of the Canadian Cement and Concrete Ass'n

THE DIRECTORS of the New York Cement Show [illegible] Cement King, and they adorned his temporary palace in Madison Square Gardens with paintings, hangings and statuary, provided music for the amusement of his royal subjects, lectures for his lieutenants and dinner and discussions for the captains of his industry.

This year's show was probably the greatest exhibit of concrete products ever assembled under one roof, and it proved a revelation to the most enthusiastic and optimistic believers in concrete construction. A magnificent collection of nearly five hundred photographs of European and British work in reinforced concrete lent an international air to the affair, while in the exhibits every part of the United States was represented.

Addresses and lectures, illustrated by stereopticon views and moving pictures, by men of prominence were given twice daily in the Concert Hall of the Garden. Every afternoon and evening those who attended the show were treated to a concert by Sousa's Band. This being the first time this organization has ever taken part in anything in which it has not been the premier attraction, it can be pardoned if it failed, with such music as Wagner's Evening Star Song, to drown the concerted efforts of a battery of mixers, tampers and block machines and the cement gun.

Madison Square Garden was most attractively decorated for the occasion. The ceiling was draped in green and white bunting—a restful and beautiful combination. At either end of the hall were large painted canvasses showing beautiful scenes, with walls and columns and arch bridges tacitly understood to be of reinforced concrete. The bandstand was draped with a profusion of flags. A peculiarly pleasing feature lay in the uniformity of the stalls of the exhibition. Stately columns and walls surmounted by gratings divided the floor space into symmetrical sections. The signs were an excellent imitation of concrete and were all the same size, forming an appropriate background, suspended from the tops of the columns. In addition to the ceiling clusters and lights, each of the stall columns was surmounted by triple cluster globes of high illuminating power. Everybody was interested in concrete, knowingly or not; and no one could walk through the broad isles without finding many things to stop and look at. The farmer found a model of a farmhouse—barns, silo, fence posts—all made of concrete. Model houses complete in every detail of structural and artistic effect were in evidence on all sides. The manufacturer saw a panorama of a cement mill in operation by day and night, showing not only the working of the plant, revolving kilns and moving trains, but the surrounding country in various lights and colors as the day changed to night. Let us quote a paragraph or two showing the aspect of the show to "feminine eyes," which is reproduced from the daily bulletin issued at the show by *Rock Products:*

"Most beautiful of all exhibits are those which show the artistic possibilities of cement. Classic fountains modeled with all the art that characterizes the productions of the most famous sculptors can be seen in the purest of white cement. Stately columns and pedestals, garden benches and beautiful tables, sun dials and vases, flower boxes and urns, as well as the most exquisite statuary, are here. Grinning gargoyles, fascinating elves, coquettish cupids, grotesque dragons, every famous type of antique and modern decorative art, all are shown, and in every detail are as perfect as though wrought in the Cararra marbles of Italy.

"Color is not wanting in the exhibits, for cement lends itself most admirably to the soft green tones so favored for garden decoration, and to the warm red and brown hues used in decorative architectural works. Like a bit of old Nuremburg is a circular bas relief tinted by some truly artistic old German visitor who, enchanted by its beauty of modeling, asked permission to tint it with some especially fine pigments, which he had years ago learned how to use in the quaint old German city.

"The Cement Show is a show that will be remembered for its instructive features as well as for its artistic qualities. Every woman who attends it will build "castles in the air," and every castle will be of concrete products! The woman of means who is fortunate enough to own a country estate will plan Italian gardens, a pergola, or some other artistic improvement for her property.

"The woman whose ambition is to own a cozy home in some suburban section will start to draw floor plans of "her concrete house," and dream happy dreams of a cement cottage that will boast of a red cement tile roof and a spotless kitchen laid in cement tiles. Fond fancy may even add cement window boxes, glowing with scarlet posies."

From the professional standpoint three things appear of striking importance, the development of water proofing, metal forms, and the Edison poured concrete house. Water proofing may be done in two ways. The concrete can be made impervious to water when made by mixing in it the correct amount of water-proofing material; it is important that the strength of the concrete should not be impared by the addition. The water proofing material may be applied in the same way as paint, and by its presence prevent water from entering. Both methods were well represented and demonstrated practically in ingenious ways. There were several systems of metal forms. This would appear to be a logical development of the concrete industry, the combined result of the necessity for standardization and the steady upward trend of the price of lumber. In every case these systems can show records of having been applied successfully for several years in actual building construction. The model of Edison's poured concrete house attracted the critical attention of the expert and the interest of the ordinary spectator. The moulds for an entire house are not yet complete, nor has the inventor, so far, attempted to pour a house. His experiment in this latter regard has now been deferred till spring. The examples of work done in the way of decorative pieces for the house were remarkable. With 1½ inch aggregate in slabs about two inches thick the finest lines of the ornamentation were intact throughout, and the broken ends showed the aggregate within 1-32 inch of the surface.

One of the Portland cement companies showed the application of cement in producing pleasing garden effects, and incidentally disclosed how thoroughly wooden construction is competed with as regards landscape decoration. The main feature was a pergola the full length of the exhibit. Supported on six satyr-headed pillars were the massive beams carrying the lighter crosspieces. The grain was brought out so perfectly that it is safe to say that many of those who saw it left with the impression that it was wood throughout.

There were many valuable and interesting papers read at the convention meetings, but the one of most interest to the greatest number was the lecture on the Panama Canal by the Hon. Martin B. Madden, of Chicago. It was illustrated by moving pictures showing a number of operations in the construction of the canal across the Isthmus of Panama. In the course of his remarks, he outlined the course of the United States Government in undertaking and preparing for the work, and gave as his opinion that the canal could never have been built had it not been for the modern development of concrete construction.

THE CITY BEAUTIFUL

By F. W. FITZPATRICK

Architects the real obstructionists to its advancement. Should work along co-operative lines. How the building department can assist.

HOPEFUL signs are everywhere seen of an awakening of our cities to the fact that, even as great commercial or even manufacturing centres, they need not necessarily be ugly. Municipal societies are bending every effort toward beautifying the existing cities and toward the sane planning of additions and growths thereto, and few cities are there now, where some club, or board of trade or other body of representative citizens has not made a comprehensive plan for a civic-centre, the widening of certain streets, the creation or reclamation of certain parks and boulevards. In some cities huge sums have already been expended in the work of building up to such a plan. It is a good investment. Our railroads appreciate that and are no longer stingy in providing beautiful stations and surrounding them with parking, handsome approaches, fountains and what not. The city government themselves realize that doing things properly, paying some attention to the æsthetic as well as the more essentially practical end of municipal work and "improvements" is sound policy and meets with the favor of the people. Paris has spent millions lavishly to virtually replan and rebuild itself and with such great advantages to its own interests, and such profit to the property owners, that it is beginning another period of artistic "Renaissance" that will involve the city's expenditure of over $100,000,000. Our cities have seen all that and, though a bit timidly, are doing something, some [illegible] but all little, in the same direction.

Now, strange as it may seem, the real obstructionists in this movement are the architects. It is a bit paradoxical, too, for the movement was seconded if not started by them, they preach it loudest, you'll find them in the van, probably chairmen and presidents of those very societies or clubs that are making the greatest headway. And, worst of all, they don't seem to know or realize that they are arch offenders. And it all springs from an overdose of the ego. Each architect wants to do something individual, characteristic, he cannot and will not merge himself into and for the benefit of the whole, the common good.

Of what use is it to plant beautiful, wide streets, keeping all the wires underground, prohibiting unseemly signs, and all that sort of thing if the buildings lining those streets are at daggers' points to each other? A city is, after all, but an aggregation of buildings; without them there is no city; and whatever its plan, however gorgeous its parks and noble its streets, its buildings are its chiefest feature, and it is beautiful or ugly exactly as are its buildings. Taken individually, many of our latest buildings in every city are beautiful, as isolated units they are well designed, but not the slightest effect has been made to blend them into the surroundings, no consideration has been given the city, the *ensemble*. True, most of our cities are suffering from an inheritance of appalling freaks and "impossible" buildings, bequeathed from former generations; nevertheless, the suggestion of a Denver editor is pretty pat, that "every architect should be placed under bonds to keep the peace between buildings." That so many of our existing structures are monstrosities should be but an added incentive, the task being that much harder, to our architects to so build all about them as to minimize rather than accentuate their ugliness, to adopt tones and colors in the newer buildings that will at least not scream at each other or the old ones and to so plan the new, generally much taller buildings, too, that they may divert attention from the old without challenging unfavorable criticism themselves.

All this is possible, but, strange as it may seem, you [illegible] get them to budge one inch. You have to compel, force them into it. So with fire-preventive construction, with sanitary plumbing, with sensible heights of buildings—compulsion was our only salvation. We might have waited twenty years for the architects to do safe building of their own volition and then counted those who would do it on the fingers of one hand; by making strict building laws forbidding anything but fire-resisting buildings in certain districts we have secured the desired end in less than five. In some European cities building restrictions are such that a cornice line, the height of buildings, is maintained for blocks, whole streets, colors must be uniform, in fact so much regulation is the order that beauty (the aim of it all) is overstepped and almost dismal monotony is the rule. I do not suggest such ultra-regulations, but we should have something to keep things a wee bit more in consonance than they now are.

Some, the hypercritical, will again sling "paternalism" and start up declaiming some spread-eagle talk about "individual rights," etc., etc., for there has been opposition to every move made for the improvement of our cities. Less than thirty years ago one of the loudest howls I ever heard went up when cities began to build the sidewalks and charge the property with the cost. The good citizens wanted to retain the right to make them of wood, of stone, of brick, of anything they thought best and at any level so that you were going up and down steps and ever walked with greatest danger of your own neck and other portions of your anatomy. "Liberty" and "rights," nonsense!

What I do clamor for is just a start at a beautiful city by compulsion. Let us begin with only the more important buildings, say those costing over $50,000, at first. Let it be part of the building department's duty to examine those plans not alone to see if lot lines are preserved, the proper materials for safety specified, the thickness of walls correct and all that, but further that that building will not too riotously clash with the others in the same block. Not necessarily must the color be the same as that of the other buildings, but a certain harmony must be preserved, a style that may differ but yet blends in, a higher or a lower structure, but with some lines bound in with its neighbors. In other words, something to compel that those buildings be designed as part of a whole and not an isolated, absolutely independent unit. What I've been trying to get at is to remove the curse of the "twenty-five feet" idea. Go along our streets and the impression you'll get of each block is of a huge plate of cake, not one, nice, well-iced cake, but a sort of "Washington pie" affair made up of slices of wedding, pound, sponge, raisin, every imaginable cake, all sizes and conditions, jumbled together, each piece good in itself, but the whole an unappetizing mess.

"A pretty big duty to saddle upon the building department," say you. Granted, but in nearly every city there is some architects' association or some architects' club. Let the city invite that association to appoint a committee, say five of its most able men to assist the building department. As individuals, architects will kick up all sorts of shines and try to outwit the building department, but once make them a part of that department, give them an official status and official obligations and they'll turn things upside down to keep the other fellows and each other well within bounds, towing the line. It's a queer trait, but human.

Even if the building department can but suggest and not order that this or that be done to conform to a general scheme, an entire effect, it will bear good fruit, so good that the authority will soon be enlarged and made

(*Concluded on page 85.*)

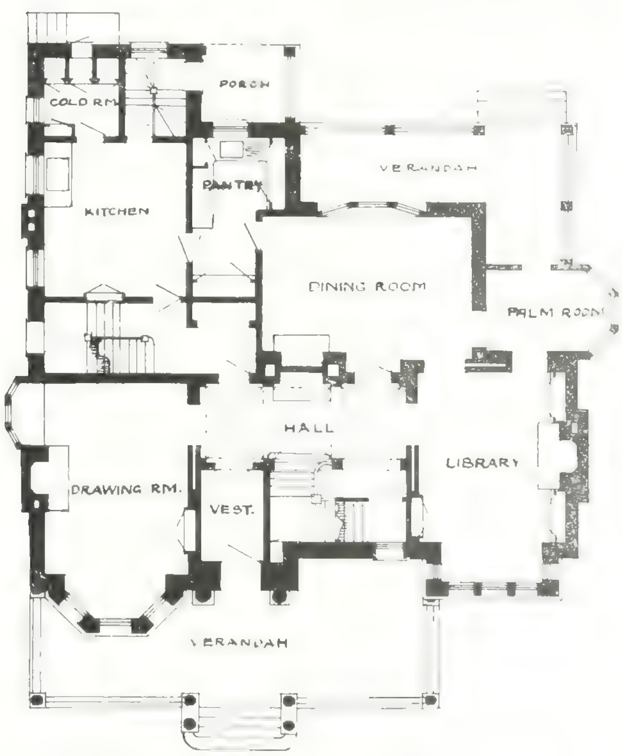
Residence of W. T. White, 39 Queen's Park, Toronto—An Attractive Brick House which is Designed to Fit in with the Natural Feature of an Interesting Site. Geo. W. Gouinlock, Architect.

[illegible] Residence of W. T. White, 39 Queen's Park, Toronto—Showing Detail of Fireplace [illegible]. Geo. W. Gouinlock, Architect.

RESIDENCE OF W. T. WHITE TORONTO

Attractive brick house at 39 Queen's Park, which is designed to take advantage of the natural features of its site.

ONE OF THE MOST troublesome tasks of Canadian architects in domestic work is the designing of a home for a colorless site. Our cities and towns have grown so rapidly, that it is very often necessary for those who would build to suit their more aesthetic taste, to go to the suburbs to find the environs necessary to give the home the desired setting. To build within the limits of a city like Toronto to-day, means very often that the owner must be satisfied with a treeless lot on a treeless street. Queen's Park, however, is an exception in this regard, and in the summer months when the trees and foliage are at their best, it would be difficult to conceive of a centrally located district in any large city where nature has been more generous or where the natural features have been more reverently preserved. Of course, land values in this somewhat down town district of Toronto are quite high, yet the additional cost in this respect seems to be more than compensated by the beautiful old elms and oaks that have been permitted



Ground Floor Plan, Residence of W. T. White, 39 Queen's Park, Toronto. Geo. W. Gouinlock, Architect.

either by chance or design to hold their lofty heads to the breezes, and that make this thoroughfare one of the most ideal residential streets in Toronto.

In this connection herewith is shown a photographic reproduction of the residence of Mr. W. T. White, 39 Queen's Park, as it is seen at the height of the summer season. Situated back from a beautifully kept hedge such as one is wont to see in old England, and nestling behind two old seers of the forest, this house gives an adequate idea of the natural features which abound in the immediate vicinity.

The exterior walls are built of red brick laid up in white mortar joints; and the design with its prominent bays and deep verendah and balcony, is such as to admirably fit in with the splendid advantage which the site offers.

On the ground floor [illegible] the drawing room and library with the intervening space at the front of the house taken up by the vestibule and main staircase. Both of these interiors have large fireplaces and windows overlooking both the front and side lawns, the prospect being most agreeable on all sides. In the dining room is a built in sideboard, while adjoining both this interior and the library is a palm room terminating a semi-octagonal bay. Opening from the latter room is a large verandah spanning the entire width of the dining room, which overlooks the rear garden. The kitchen which is conveniently connected to the dining room by a

Second Floor Plan, Residence of W. T. White, 39 Queen's Park, Toronto. Geo. W. Gouinlock, Architect.

[illegible] be reached either from the main hall or the rear porch.

Up stairs are three large bed rooms with built-in wardrobes, [illegible] room having an open fire-place and a door leading into an enclosed rear balcony. The floors throughout are hardwood, and the appointments are such as to produce a full degree of harmony in the general scheme.

The designing and supervising architect of this house was Mr. Geo. W. Gouinlock, Toronto.

THE CITY BEAUTIFUL.—Cont'd from page 83

Cont'd from page 83

to apply to all buildings of whatever cost. My contention has always been that the true province of a building department was to not only direct the practical, the safe construction of all buildings, but also to thoroughly censor the design. We legislate against dangerous things, we forbid certain manufactories within a city, we bar certain smells, unnecessary noises, why limit our authority to the prevention of offenses against our noses and our ears? Surely our eyes deserve some consideration, too. The "opposition" will add that it would be a shame to have an ex-builder or plumber or carpenter paw over their plans and direct changes in their designs. If the calibre of the building department is not high whose fault is it? Raise the pay, raise the requirements so that a real architect may be secured for that job, and then give him an "advisory committee" and skilled help.

Interior of the Farmers National Bank at Owatonna, Minn. A Striking Illustration of the Possibilities which Brick Offers for Architectural Effects in Wall, Counter and Partition Construction. Note the General Treatment and the Rich Tone of the Entire Scheme. Louis H. Sullivan, Architect.

BRICKS

A·DEPARTMENT·DEALING WITH·THE·ARCHITECTURAL AND·CONSTRUCTIVE POSSIBILITIES·OF·BRICK

BRICK HINTS FOR THE ARCHITECT—BRICK POINTERS FOR THE CONTRACTOR—BRICK SUGGESTIONS FOR THE MANUFACTURER

THE CANADIAN CLAY-WORKERS' CONVENTION

Eighth annual meeting proves to be a notable event. Replete with interesting addresses and spirited discussions on various economic and technical phases of the industry.

THE EIGHTH ANNUAL CONVENTION of the Canadian [illegible] Manufacturers' Association, at the Prince George Hotel, Toronto, December 14-16, was by far the best attended, most representative, and most promising in the way of organization and actual accomplishment of any meeting that has yet been held by this progressive body. Replete with instructive paper and enlivened by subjects and discussions on various technical and economic phases of the industry, the members in attendance found much to interest them during the three days the gathering was in session. From the opening meeting on Wednesday afternoon, December 14th, when addresses of welcome were made by Messrs. William Pears, of the Toronto Builders' Exchange, and C. A. Millar, of the Standard Brick Company, until the close of the convention, the proceedings throughout were characterized by a business-like earnestness that crowded into the time available much that should be of geinuine value and assistance to those present.

President McCredie, in his annual address, referred to Toronto as an ideal convention city. He had been informed that it was the largest brick-making centre in the Dominion, and it was to be hoped that the convention would be permanently located there. The past year had been a most prosperous one, and present indications were that manufacturers would be out of stock before the opening of next season. Many have orders that will carry them well into 1911. During the eight years of its existence, the Association had accomplished much. It had been a great benefit to its members, not only in helping to solve the many difficult problems encountered in their work, but also in developing a spirit of co-operation where acute competition and rivalry previously existed.

As regards the technical education, the attitude of the Association was indeed gratifying. While there was little apparent in the way of actual results, he felt certain that the members, owing to the firms' stand taken in this matter, would soon see a properly equipped school of ceramics established at Toronto or Ottawa. As clay workers, he said the members have not done as much for the promoting of the industry as they might have done. They have been plodding along the beaten path, trying to fill orders, without adopting the more aggressive methods. In support of his contention he referred to a convention of a rival industry held sometime ago at London, Ont., and the amount expended for publicity and exhibit purposes. The clay workers did not appreciate as fully as they should the importance of their products, for which Canada, in its great up-building and development, offered a vast field. Many things were to be learned by a gathering such as is held once a year. There was still to be solved the problem of economical burning, and this would not be worked out until they had a continuous kiln for the small brick-maker. This in itself offers a field that may well engage the attention of the Association until it had learned to operate their plants without wasting fuel. The speaker concluded his remarks by thanking the machinery men for their help and interest in the Association's affairs. He felt sure that the Association owed them more than the members are willing to admit.

The report of the secretary treasurer, Mr. O. D. McKinnon, showed the affairs of the Association to be in a most satisfactory condition, with all expenses for the year fully liquidated and a cash balance on hand.

Technical Education

Following the president's address, considerable time was taken up with a discussion on technical education. This was participated in principally by members of the special committee appointed at last year's convention to go fully into this important matter. Mr. J. S. McCannell, of Milton, Ont., dwelt upon the commercial and industrial advantages that have accrued to Germany, owing to its splendid system for technical training. With every new industry, the German started in at the bottom and studied every detail in connection with the education of the workmen required. There was no subject of more vital importance to the clay workers of Canada as they had all experienced the difficulty of obtaining good men. Mr. McCannell also referred to the work of the Royal Commission on Technical Education, whose investigations, he believed, would be of much benefit to the commercial and industrial interests of the Dominion.

Mr. S. J. Fox, M.P.P., stated the effort to secure more adequate advantages in this connection was not new. Some little time back, he was a member of a committee appointed by the Ontario Government to visit the School of Ceramics at the State University in Columbus, Ohio, with a view to submitting a report on the advisability of establishing a chair of ceramics at the local University. The recommendation of the committee was favorable, but no definite action has yet been taken in the matter. Mr. Fox urged the Association to send a resolution to the Dominion Government. In his opinion, the clay workers had every right to consideration, as the combined values of their plants and deposits were one of the country's most valuable assets.

In keeping with the general sentiment of the members in this regard, a resolution was adopted to the effect "that this convention heartily approves of the Technical Commission appointed by the Dominion Government, and would urge upon the Commission the necessity of considering the interests of the clay-workers of the Dominion, and would suggest a formation of the department for the study of ceramics, as it is one of Canada's largest and most important industries."

A committee was appointed to wait upon the Commission at its next sitting in Toronto to urge the necessity for prompt action.

Among other business which came up for consideration were two amendments to the constitution regarding the election of officers. One was the proposal to make it compulsory for the president-elect to have two years' experience; and the other was to appoint the executive from past presidents. Considerable opposition, however, developed regarding any change, and it was finally decided to leave the manner of electing officers practically as it stood before.

Papers and Discussion

The second day of the convention was taken up almost entirely with papers and addresses, covering a wide range of subject matter. These were in capable hands, and at no time throughout the session did interest in the proceedings lag. A most valuable and interesting talk was given by Mr. E. Biglow, of New London, Ohio, who was invited by the Association to address the convention on the subject of "Tile Manufacture." In the course of his remarks, Mr. Biglow explained in detail the process of manufacture regarding this particular branch of the industry. He laid stress upon the necessity for care in the preparation of clay in the manufacture of this tile, and also pointed out the importance of proper kiln construction in the successful operation of a plant. It was to the interest of the manufacturer to use only the very best material. Personally, he favored the use of long arched brick, twenty two inches long, for the top of fire boxes, also large blocks for the side of fire boxes. The kilns should be lined with nine inches of fire-brick laid mostly as headers with through joints and good fire clay. Referring to water-smoking, the speaker stated that this process required close attention. After the tile is dried the heat should be increased until it is all through the kilns. The kiln should not be allowed to settle until there is a white heat at the bottom. This could be avoided by proper care in firing.

At the conclusion of Mr. Biglow's address, a paper on "Kiln Construction" was read by Mr. J. H. Warwood. Kindred subjects were also dealt with by Mr. J. W. Ball, Toronto, and Mr. B. Broadwell, Kingsville, Ont. The former gave a paper on "Kiln Troubles" and the latter on "Kiln Design." Both Mr. Ball's and Mr. Warwood's papers are reproduced in full in this issue.

Plant Equipment

Plant equipment was taken up in addresses made by Mr. Charles A. Millar, of the Standard Brick Company, Toronto, and Mr. A. M. Wickens, of the Canadian Casualty & Boiler Inspection Company, who selected as their respective subjects "Electrical Installation" and the "Advantages of Steam Equipment." Both of these addresses proved exceedingly interesting, and they provoked considerable discussion at the close of each speaker's remarks. According to Mr. Millar's contention, electricity offered the brick-maker many advantages, in that it was not only economical and reliable, but also because it helped greatly to keep the plant clean and presentable. It was superior to steam equipment in many other respects as well. During the year there were no shut downs; no waste of power. The simple operation of a switch started everything at once. It was quite possible to dispense with the services of an engineer and fireman. Regarding installation, Mr. Millar gave the members the benefit of much practical and useful information. Motors should be placed on a perfectly dry bed, preferably hollow. Induction motors with a voltage of 550 were the best, in his opinion, for the heavier class of work. Electricity was not only a reliable agency, but it also assured the manufacturer steady and uniform power. Besides, it had both safety and comfort as well as economy in its favor. As to cost, a 50 h.p. motor could be purchased for from five to six hundred dollars.

Mr. Wickens, in speaking of the "Advantages of Steam Equipment," stated that while electricity as a motor power was perhaps satisfactory in small yards where only natural means for drying were adopted, he was strongly of the opinion, that where the output is large, and artificial means of drying were employed, an up-to date steam plant would be the cheapest to operate. It was unfair to compare up to-date electrical equipment with an ordinary steam plant. If electricity is used for power, and steam for drying, the cost of coal should be added to the cost of power, because in the case of a steam plant the drying could be done by the exhaust steam from the engine. Where steam is employed the best results are obtained where the combustion is most perfect. In order that this should obtain, it is necessary to mix the coal and air together, because it is the oxygen in the air combining with the carbon of the coal that makes combustion and brings the heat from the coal. One pound of pure carbon has 14,800 B.T.U. of heat and the ordinary mine run of coal contains from 12,000 to 13,500 B.T.U. For perfect combustion, one atom of oxygen in the air combines with two atoms of carbon. The chemical result is carbonic acid gas and an incandescent fire that requires 12 pounds of air per pound of coal and represents 14,500 B.T.U. In practice it is necessary to supply double the required amount of air because of the fact that it is impossible to thoroughly mix the air and coal. The consequence is that unburned oxygen passes through the furnace. If the quantity of air is diminished one half the amount required, then one atom of oxygen only combines with one atom of carbon, and the result is oxide gas. The number of heat units one pound of this gas will supply is only 4,800 B.T.U. It gives a bright looking fire, but only one-third of the heat that it is possible to generate. Coal to be used to the best advantage should be burned rapidly; not less than from 10 to 12 pounds per hour per square foot of grate surface. The grate surface should be so proportioned that this speed of combustion can be maintained with the fire from 8 to 10 inches thick. The more dense the fire the more chimney draft is required to supply the grate with air. The coal should be evenly spread and fresh fuel put on the thinner places to maintain a level fire. The air should enter under the grates, and all checks and cracks in the boiler or kiln walls should be repaired and made tight so as to avoid loss in heat. The boiler should be set so that the escaping gases have abundant room to roll as they pass along the smoke stack. Cramped flues and furnaces fail to give up a large percentage of their heat. Mr. Wickens believed that a well-designed and well kept steam plant had many economic advantages in its favor.

During the session Mr. Biglow and Mr. McCredie gave their experiences in the manufacture of hollow clay blocks, and a paper was also read by Mr. H. E. Hunt, of Toronto on "The Proper Care of Moulds."

The annual banquet of the Association was held at McConkey's on Thursday evening. Covers were laid for fifty and a sumptuous repast and witty and interesting speeches made the affair a most enjoyable one in every way. Mr. J. W. Ball, of Toronto, presided as toastmaster, and addresses were given by Mr. Wm. McCredie, C. A. Millar, B. E. Bechtel, J. S. McCannell, S. J. Fox, M.P.P., G. F. Hamilton, Henry Simpson, A Berg, Geo. Crain, Alfred Wagstaffe, G. P. Merks and others. A feature of the menu was a fine moose ham supplied by Vice-President John L. Minor.

Piece Work and Day Work

The convention closed on Friday morning, following a discussion on the relative merits of "Piece Work and Day Work," which was participated in by Messrs. J. S. McCannell, S. J. Fox and W. H. Freeborn. In the course of his remarks, Mr. McCannell stated that it was impossible perhaps to apply either day work or piece work, or still further the bonus system, and say that any one is the best. What might be considered the best in one plant might not work out at all in another. Employees could not be expected to make a success of either piece work or day work, unless the plant is kept in first class running shape. With day work a workman is sure of his day's pay, but he had no incentive to spur him on to his best efforts. A system that can be worked out so as to be agreeable to both parties undoubtedly offer an advantage to both the employer and the employee. On piece work an employee is encouraged to apply himself diligently as he is working more for himself. The harder he works the more he makes. If he gets more work [illegible] reducing the cost of his product, and his employee shares in his gain also. With piece work there would be a definite idea as to what the work is worth. Both parties should have confidence in one another and there should be an understanding that if a good day's pay is made the work should not be cut down. The speaker believed the inducements were greater for the piece worker to take better care of his machine than the day worker. A gang of men would sometimes overlook defects in the working of a machine that would in all probability be taken into consideration if they were on piece work. A system that will keep machinery to its maximum of output [illegible] saving in more ways than one. Less capital will be required as less machinery will do the work. As a point in question, Mr. McCannell cited a factory that turned out more work in a week working nine hours a day with the Saturday half holiday than it did formerly with ten-hour days, six full days per week. With less hours of labor, the employees made more money. It was a known fact that in the times of keen competition, the firm that could produce goods at the minimum cost is serving its own interests as well as those of its employees. Where a man is employed on the day work system he has a fixed amount for his services in view, and in some cases may not be willing to risk a certainty for what he thinks is an uncertainty. In cases like this the piece work system should be fully explained, and the employees should be impressed with the fact that the object is more money and not less. In one case, a company that worked according to the piece work system installed a machine which was new to its employees. To overcome the difficulty the machine was worked two months on day work. As soon as the men understood its operation they saw that it was possible to make more money by the piece work system. Once the elements of uncertainty as to the pay is eliminated, the employees will work harder and more cheerfully and accomplish more in a shorter time than was done before. In some cases the premium or bonus system is employed successfully in place of piece work or day work. In this way the employee is sure of a stated amount each work, while the harder he works the greater is his earnings. In conclusion, Mr. McCannell stated that any part or system that will promote good feeling between employee and employer, and make an employee feel that his work is worth while and that he has a chance to make all there is in the work, is the proper system to have.

Mr. S. J. Fox, M.P.P., stated that personally he favored piece work where it could be done, but that there was a good deal of work that could not be carried out except by day labor. He separated the workmen into three classes: the careless, lazy and shifty; the steady and honest laborer; and the man who is full of energy, and who found more concern in his work than mere quitting time and pay day. With these three classes, all employed by the day, at the same work, it is very hard to pay each a different rate of wage. If they are placed at different jobs, it was then possible to grade the men so that the most deserving would get the best place and higher pay. The speaker declared that the steady and honest man was not to be despised, as he was like oil to the plant, making the working smooth. With day work, it was the employer who suffered from the shiftless and lazy fellow; while on the other hand, it was the quick and active workman who was a disadvantage, owing to the fact that the employer did not dare to pay him more than the others. The advantage of piece work was that it acted as a stimulus on the man. Each was placed on his metal and had a chance to increase his output and earn more money. It was good policy to place the shiftless man on work which he could not spoil, and not in a gang of good men. The success of a plant depended a great deal on the grading of the men, the division of the work, and the elimination of drones in all departments.

Toronto was selected as the meeting place for the next convention, and the election of officers for the ensuing year resulted as follows: President, Robert Davies, Toronto; 1st vice-president, D. A. Lochrie, Toronto; 2nd vice-president, W. H. Freeborn, Brantford; 3rd vice-president, David Martin, Thamesville, Ont.; auditors, S. J. Fox and J. S. McCannell; executive, Joseph Russell, M.P., Toronto; W. McCredie, Lyons; J. S. McCannell, Milton; C. A. Millar, Toronto; S. J. Fox, Lindsay. D. O. McKinnon, Toronto, was re-elected secretary-treasurer.

DEFECTS IN MANUFACTURE DUE TO KILN TROUBLES

Paper read by J. W. Ball before the eighth annual convention of the Canadian Clay Manufacturers Association.

IN THE MANUFACTURE of all kinds of clay goods that have to be subject to the process of burning, it should be the aim of each and every manufacturer to see that these goods enter the kiln in the best possible condition so that such goods can issue from the kiln in like manner. In many cases there seems to be no consideration for the quality and condition that the ware enters the kiln, the only time that notice is taken in this particular line is when the goods issue from the kiln, and then they begin to consider what shall be done, what means they should adopt when, as a matter of fact, the trouble has nothing to do with the kiln or burning. If we look carefully into some of the processes of manufacture, we shall find them of the crudest type, in many cases the materials have no preparation at all, just simply passed into the brickmaking machine. If nature has not done its work well it receives no assistance from the manufacturer, therefore, one cannot wonder that when the bricks are subject to the burning this process finds the defects and shows them up plainly. If you take some of these bricks and break them through you will find some very variable conditions; some of these particles are in solid mass as large as ½ in. and more, and some of the finest. This erratic condition of the material adds greatly to the trouble in drying and should the bricks pass this process satisfactorily, it is very doubtful whether they will pass the burning process. You are all aware as practical men that the finer the material is ground the greater the contraction, also the density of the body is increased; the coarser the material, the less contraction and the porosity of the brick is increased. Now if you have these two conditions existing in one brick, can you wonder that trouble will eventually come. The uneven contraction will cause it to crack, and in many cases break asunder. The trouble which originated with either nature or lack of preparation of the material is laid in many cases to kiln trouble, when as a matter of fact it had nothing to do with it, only to show the defect of manufacture.

Stiff Mud Plants

Another source of trouble found especially in stiff mud plants is that many plants making this particular brick lack drying capacity to thoroughly dry the bricks before they enter the kiln. In many cases owing to this defect the process of drying is speedily pushed to keep ahead of the brick making machine. A stiff mud plant should have considerably more drying capacity than a soft mud plant of the same output. This is owing to the pores of the brick being closer and the brick denser with this method of manufacture. However, in many instances, the brick enter the kiln in no condition for burning, and before this operation can commence, this added moisture must need be extracted while the bricks are under an enormous pressure, especially those in the bottom. In many cases these brick crush and crack with the weight while they are taking this hot moisture bath. This is not the only difficulty with wet brick being set into the kiln, but it has a material effect on the color, and makes them look as if they had had a special slip rubbed upon them for no particular purpose; and when drawn from the kiln the manufacturer is at a loss to understand why some of his bricks are a good color while others are not, and what caused the unsightly appearance and, in many cases, instead of going to the seat of trouble, he looks at his kiln as usual when the difficulty lies elsewhere.

Another point that perhaps is overlooked more than any other, is that in some plants where the dryer capacity is insufficient, the heat in the dryer is kept very high to try and get over the wet brick condition, so that the bricks may enter the kiln dry. These bricks come out of the dryer very hot, and are taken straight to the cold kilns and set where they have to stand for a few days and get cold again before burning operations take place. In some cases these bricks have to travel quite a long distance to the kilns in very bad weather, and are, therefore, subject to conditions altogether different from the dryer. This sudden change has a very material effect on some clays and will cause it to check on the surface and break the skin. In many cases they are called fire checks, caused by uneven firing, and this is laid to kiln troubles. Had these bricks been allowed to stand at the end of the dryer to cool off, or perhaps the dryer increased so that the heat need not have been kept at so high a temperature, they would not have been checked and would no doubt have come from the kiln in first class condition. However, the kiln gets the blame and the burner is at fault for irregular firing.

The Dry Press Process.

Take the dry press process. Brick made by this process require great care in every branch of its manufacture if the best results are to be obtained. There is no need for me to mention any particular process which I think necessary for this kind of brick. Suffice it to say that after every care has been exercised in its manufacture, it then requires the skill of a practical burner to get the best results. A few points in this process is that the material must be prepared and the press must give enormous pressure to bring about a perfect solidity without breaking the brick through the centre. Now I wish it to be distinctly understood that it makes no difference what kind of a kiln you have, what kind of a burner you have, if this brick is not thoroughly made, it is impossible to burn it. The reasons are, that this process of brick-making eliminates that great chemical action that takes place in every other process, namely, that it has not sufficient water used in its process to cause that density and adhesiveness which water and raw material render in a plastic state. Therefore, it depends very largely upon the amount of pressure it gets to bring about this density. It is very necessary that this particular brick be manufactured under the very best conditions. Take now, for instance, bricks made by this process of not too well prepared material. The man at the press has to be constantly changing his pressure wheel. The press cannot give the amount of pressure necessary to make good brick, therefore, the bricks pass into a kiln in a half-dense condition, and when drawn they have very little sound, and are of a very spongy nature, and no amount of burning could put into that brick the solidity and firmness the press ought to have put there. On the other hand, the brick made by this process with the material properly mixed and subjected to the right amount of pressure, can be burned successfully and will issue from the kiln with a sound, solid and homogeneous nature. It is a well known fact in this process that the denser the brick, the easier to burn.

The above are only a few instances of the troubles that are encountered when the bricks issue from the kiln, and in many instances are attributed to the burning, which to my mind, should not be. Let every manufacturer of brick stand at his kiln door, and allow nothing to enter his kiln but what is in a fit state, and to my mind, he will be greatly surprised at the small amount of trouble his kilns are giving him.

There is no doubt that all present know that the kiln has got troubles enough of its own without making it responsible for troubles that do not belong to it. After years of experience with all kinds of kilns and burning all kinds of goods, I have yet to find a kiln that will work satisfactorily on its own account. From the time the kiln is filled and burning commenced, until the time it is cooled down, it is always a source of anxiety on the part of the conscientious burner. Kiln troubles are many and varied and would require experience of all those interested in the business to give a full list of all troubles that are encountered in the burning of clay goods. Conditions in various parts of the country vary. It is not often you can meet conditions alike, even in two places close together, and it is a well known fact that two kilns built exactly alike, side by side, do not work exactly the same, hence, what troubles one class of people have with their kilns, does not affect another, and so on.

Safeguards in Burning

However, there are certain conditions that should always be taken into consideration and lines can be adopted that will be a safeguard to those interested in the business. In the burning of brick, there are certain objects to be obtained. First is the removal of the moisture contained in the material. To remove this moisture means that the burning must commence very slowly and continue very slowly until the brick has got warm right through its body. To push the burning to any extent before this has taken place means that the sudden expansion will destroy the bond and with many clays will cause what is known as blowing and spelching, especially with tiles, etc. Therefore, it is very necessary that this part of the burning should be continued with due caution. The next stage of burning is what is known as the oxydization period. During this period all the carbonaceous matter is extracted from the bricks. If this period of burning is too rapidly pushed, it neglects to take away this carbonaceous matter, and during the vitrification will make itself visible by expanding the bricks, sometimes to twice their normal size, and will show black or blue core when drawn. To carry a burning kiln through this stage successfully it should be treated to a steady rising temperature, created by a regular supply of fuel, namely, small fires and often, and at all times with a good draft maintained. It is surprising how quickly a kiln can be burned when "small fires and often" is the method employed.

The next period of burning is what is known as the vitrification period when the brick changes from a perishable to a non perishable material. Vitrification should never take place until the bricks are clear of all carbonaceous matter. It is at this period that the bricks not only receive their hardness and suitability as a building material, but also receive their color. Therefore, it is very necessary that the burner should think of these things before he pronounces his kiln finished. There are many troubles with kilns owing to negligence or carelessness on the part of those in charge. Erratic firing is one drawback. At one period the heat in the fire-box is at melting point, at other times it is far below what its normal condition should be. It is during this erratic stage of burning that you have what is known as fire checking, for the brick are first hot, and then cold, and to make up for this cooling, the burners in many cases pile on large fires, little thinking that the amount of dead coal is only holding back the heat and allowing cold air to rush into the kiln, and playing upon the ware. You can get an example of what takes place by watching the safety valve on your boiler when it is discharging steam. The fireman opens the door and allows the cold air to pass in; the result is that the valve stops in a very short time. A point of [illegible] which is carried out in good practice is that the burner who is going to put fresh coal on his fire should always push back the hot embers to the back of his grates and place the fresh coal upon the front, so that all carbon coming from the fresh coal, with the mixture of oxygen as it passes over the hot embers, become ignited before passing into the kiln. This system of burning is very preferable to the other method of placing coals directly on top of the fire, as a newly made fire of this description for a short time is of no value for the generating of heat. It also gets cleaner ware, better combustion, and takes less fuel for the amount of heat generated. A point of great importance in the burning of brick, etc., is that after the kiln is finished burning, the cooling takes place. With some clays this is a very important factor, especially when the kiln has reached a temperature of dark red heat. This is the time when air-checking takes place in vitrified ware. It is very seldom that the clay will air-check when it is at its hottest temperature. Therefore, great caution should be used at this particular stage that the heat should be allowed to escape from the kiln, and air excluded.

Another trouble that is sometimes experienced in the burning of particularly down draft kilns, is that the heat is not properly distributed at the bottom. A great deal of this can be overcome by the regulation in burning, allowing sufficient air to pass into the fire boxes to drive the heat from the top to the bottom. Too close firing is the source of this trouble.

There are many other troubles with kilns too numerous for me to mention, and troubles that are peculiar to the person that is using his own particular kiln. A few of these troubles are lack of draft, irregular draft, back-blowing, cold spots, sooting and others, which no doubt many of those present have encountered in their experience as brick makers. It would be too difficult for me to stand up and enumerate these troubles and to give their remedies. Therefore, I hope a few remarks I have been able to make will be of material benefit to some members of the convention.

MODERN KILN-CONSTRUCTION

By J. H. WARWOOD.

Different types of kiln and other relative merits. Paper read before the Toronto Convention of the Canadian Clay Products Manufacturers Ass'n.

THERE ARE MANY [illegible]

[illegible] withstanding the fact that there are many [illegible] and also another type, multiple-chimney [illegible]

[illegible]

THE ANNUAL BANQUET of the Montreal Builders' Exchange will be held in the Green Banquet Hall of the Windsor Hotel on the evening of January 18. The event this year promises to be a most notable one. Among the invited guests who have signified their intention to attend are Hon. L. P. Brodeur, Minister of Marine and Fisheries, and the Hon. Geo. P. Graham, Minister of Railways and Canals. It is also hoped that the Hon. Sir Lomer Gouin, Premier of Quebec, and Hon. L. A. Taschereau, Minister of Public Works and Labor, Quebec, will honor the banquet with their presence. The following have been invited to represent sister associations: Geo. L. Cains, president, Board of Trade; Lt.-Col. Robt. Gardner, president Canadian Manufacturers' Association; and O. S. Perrault, president, Chambre de Commerce; Thos. Raymond, president, P.Q. Architects' Association.

CONSTRUCTION

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CONTENTS

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TORONTO - - - - - CANADA

BRANCH OFFICES

MONTREAL Board of Trade Building. LONDON, ENG. Byron House, 85 Fleet St. E.C.

Elevation Facing St. George St. Accepted Design for the Proposed New Knox College, Toronto. Chapman and McGiffin, Architects.

Elevation Facing University Lawn. Accepted Design for the Proposed New Knox College, Toronto. Chapman and McGiffin, Architects. (See Page 49)

Review of Building Operations for 1910—Comparative figures show a period of unparalleled progress—Big gains made in practically all sections.

THE GRAND TOTAL for building operations in 1909 recedes to a position of secondary importance, when compared to the enormous investment made in 1910. There is every reason to believe that the year 1911 will be a still greater and more widespread period of activity in every way than the one which has just come to a close. At no time in the past has the country experienced a more satisfactory mid winter season, nor at any time has it looked forward to so heavy a volume of important work as it scheduled immediately ahead. The turn of the calendar witnessed precisely the same accelerating tendency which obtained a year ago, with all sections pushing steadily onward in a growth and development which far overshadows the records of progress made in any previous corresponding period.

Official returns submitted to CONSTRUCTION from twenty-four cities located in every province and section of the Dominion record an aggregate total for permits issued, amounting to $94,129,423, as against $64,509,620 in the year of 1909. This represents an average gain of 45 per cent., or a volume of work nearly half again as great as was carried out in the preceding twelve months. Although a few more losses are recorded than were noted in the last annual report, the figures in a number of instances fail materially to reflect the full extent of prosperity actually enjoyed. This is equally true concerning many of the cities which registered gains. Vancouver for instance, where the volume of new building amounted to $13,150,365, reports that in territory contiguous to the city and which should in every way come within the scope of its jurisdiction, operations were carried on to the extent of $4,000,000, of which no record has been kept. Montreal likewise has a valid claim in this respect, and if the work in the suburbs of the city were included, it would substantially add to the handsome total of $15,815,859 otherwise attained. Montreal's gain as it stands, is 103 per cent. a most splendid showing to say the least, while that of Vancouver (63 per cent) is no less remarkable when one considers the big advance made in the previous year.

All in all, Canada can regard its accomplishment for the year with no little degree of satisfaction. Toronto's mighty total of $21,127,782 in itself, which is approximately three millions more than was noted in her previous figures, attests eloquently to a growing commercial and industrial importance, such as possibly cannot be duplicated by any city of like size on the entire continent. Ontario on the whole, prospered exceedingly well, although the majority of decreases noted, fell in this province. Ottawa failed to equal her previous figures by 32 per cent.. Fort William is behind by 19 per cent., and Windsor and London are in the arrear to the extent of 5 and 7 per cent in order named. The amounts registered in all these places, however, are almost double the totals recorded in 1908. On the other hand, Hamilton undertook new work aggregating in cost $2,604,605 as compared with $1,623,100 in the year before. Berlin surpassed its former mark by 81 per cent.; Brantford shot forward 55 per cent.; Peterboro made a gain of 50 per cent.; and Port Arthur and St Thomas advanced relatively 81 and 9 per cent. In all cases, the results noted are gratifying to the extreme.

In Manitoba, Winnipeg made good the early forecast of a fifteen million dollar year. Her amount in fact, is just a trifle better, and judging from the splendid showing made in the final month when the aggregate value for permits amounted to close onto a million, operations in the next twelve months will be proportionally greater

	Permits for December, 1910.	Permits for December, 1909.	Increase, per cent.	Decrease, per cent.	Permits for 1910.	Permits for 1909.	Increase, per cent.	Decrease, per cent.
Berlin, Ont.					$347,546	$191,000	81.96	
Brandon, Man.	$7,000	$25,000		73.08	1,224,385	350,120	249.70	
Brantford, Ont.	62,500	121,350		48.50	681,030	439,335	55.01	
Calgary, Alta.	354,300	151,550	133.78		5,589,594	2,420,450	130 93	
Edmonton, Alta.	141,321	9,780	1,345 00		2,161,356	2,128,161	1.09	
Fort William, Ont.	404,135	247,800	63.09		2,381,125	2,970,365		19.84
Halifax, N.S.	18,770	33,550		44.06	471,140	630,379		25.27
Hamilton, Ont.	49,550	69,300		28.50	2,604,605	1,623,100	60.47	
Lethbridge, Alta.	25,450	33,885		24 90	1,210,810	1,268,215		4.53
London, Ont.	63,085	32,155	96.19		805,074	850,134		5.31
Montreal, Que.	856,800	167,885	410.34		15,815,859	7,783,621	103.19	
Ottawa, Ont.	174,350	104,125	67.44		3,040,350	4,527,590		32.85
Peterboro, Ont.	9,240	2,095	341.05		517,958	343,489	50.79	
Port Arthur, Ont.	76,800				1,062,616	584,810	81.70	
Prince Albert, Sask.	3,000	4,680		35 90	662,475	141,810	367.15	
Regina, Sask.	20,625	9,025	128.53		2,351,288	744,479	215.83	
St. John, N.B.	12,800	4,800	166.66		520,275	368,550	41.17	
St. Thomas, Ont.	10,150	5,700	78.07		286,650	261,600	9.57	
Sydney, N.S.	12,800	7,700	66.23		347,554	160,470	116.58	
Toronto, Ont.	1,353,265	1,593,365		15.07	21,127,783	18,139,247	16.47	
Vancouver, B.C.	958,775	512,919	86 92		13,150,365	7,258,565	81.17	
Victoria, B.C.	129,800	71,700	81.03		2,271,095	1,673,420	35.71	
Windsor, Ont.	22,700	2,500	808 00		392,040	423,885		7 52
Winnipeg, Man.	970,250	33,425	2,802 76		15,106,450	9,226,825	63.72	
	$5,737,466	$3,245,289	76.79		$94,129,423	$64,509,620	45.91	

Brandon also, with a total of $1,224,385 to her credit, representing a gain of 249 per cent., deserves to an unusual degree. These figures reflect in a fairly general manner, the extension of activity throughout the west in general. Saskatchewan, too, moved at a lively clip as is evidenced in Regina's total of $2,351,288, and Prince Albert's advance of 367 per cent., the highest percentage increase noted for the year. The only loss in the entire west occurred in the case of Lethbridge, which failed to equal its former figures by 4 per cent, a decrease considering the heavy investment made in 1909 of very slight proportion indeed. Calgary on the other hand has $5,509,594 to her credit, and Edmonton a total of $2,161,356, the increase in either case being 130 and 1 per cent. respectively. Another gain worthy of note is that of Victoria, (35 per cent.) which in addition to Vancouver's big increase previously mentioned indicates a most wholesome state of affairs in the Pacific Coast district.

In the Maritime Provinces, both St. John and Sydney topped their previous figures, although Halifax is in the arrear by 25 per cent. St. John and Sydney's increase is 41 and 9 per cent. in order named, and the amounts noted show a steady and consistent growth, which is quite representative of the east in general.

Considering the remarkably sound manner in which the year closed, and the larger volume of important work immediately ahead, 1911 will be a hummer in every respect. Of course, the Reciprocity Pact is something to be reckoned with; and as to what effect it might exert on manufacturing and [illegible] improvements, remains to be seen. Aside from this one uncertain feature, however, the country has never before beheld such a promising outlook, and architects, contractors and material firms can well prepare for a period of unparalleled activity and development.

¶ Proposed Reciprocity Pact a vote-baiting political trick—Advantages to be gained outweighed by concessions made and loss of fiscal independence.

DESPITE THE CLAMOR OF a party ridden press in support of the proposed reciprocity pact now before Parliament, a careful dissection of the long list of proposed changes in the Canadian schedules, makes it evident to every broad minded Canadian, whose judgment is free from political prejudice, that the Government has been made a "catspaw" of by a United States Government that is madly grabbing at "a straw" in an effort to preserve its very existence. With all due deference to the Hon. Mr. Fielding, and with all reasonable consideration for his ability as Canada's Minister of Finance, it is plain that the proposal he has asked the Canadian Parliament to acept is one arranged and intended as a political trick to secure votes rather than an equitable tariff arrangement designed to promote the national and industrial welfare of Canada.

A careful examination of the proposed changes demonstrates very plainly that it was the agricultural interests, especially of the West, that Mr. Fielding and his colleague, Mr. Paterson, kept before them. The interests of the manufacturer, the laborer and the consumer were subverted to those of the farmer. It is perfectly right and proper that all reasonable encouragement should be given the growth and development of agriculture, especially in a vast undeveloped country, rich in its enormous areas of uncultivate productive lands. And where this industry is to be materially benefited it is reasonable and fair that certain sacrifices should be made by the other industries of the country for the general upbuilding of the nation.

[illegible] Mr. Fielding's proposed schedules would lead one to believe that slight unimportant decreases in the tariff on a limited number of manufactured articles that would not materially affect our industrial interests were conceded in consideration of great, sweeping reductions in the United States tariff on our farm products, such as would be of material benefit to the Canadian farmer. However, a careful examination of the prices of farm produce in both countries, together with market conditions under existing tariffs, shows very plainly that the acquisition of the United States market will not enhance prices one iota. Much emphasis is laid upon the importance of free wheat into United States and the Government press is shouting loudly about the increased prices that the grain growers of the West are to receive for their wheat. The facts of the matter are that the United States exported, during our fiscal year ending March, 1910, over 75 per cent. as much wheat to the British Isles as did Canada. If the United States were a better market for wheat than England, why should they export to that market. Great Britain is the greatest wheat importing country in the world, and the prices are controlled from England, not Chicago. It is true that speculation in the Chicago wheat market, ever so often, abnormally raises the price of wheat for a brief period, but these high prices seldom reach the producer. The dependence upon the speculative Chicago market is not a desirable condition. The consuming market dictates the prices of wheat and that market is Great Britain, which Canada now enjoys and which is prepared to consume all the wheat we have to export, or would have for exportation if we produced five times the amount we send to that market to day. In consideration of these facts, it is perfectly clear that the much boasted concession wrung from the American negotiations of free wheat will not affect the price of wheat to the producer in Canada one iota.

With other grains similar conditions prevail, and it is difficult to find where any material benefit will accrue to the farmer. It has been declared that free barley will be a great boon to the Ontario farmer, while the truth of the matter is that practically the only purpose for which barley is used to any great extent is distilling and malting, and we find that malt barley is debarred by a duty of 45 cents per cwt. In the matter of garden stuff, livestock, meats, fruits, etc., the market prices of this class of farm products is practically the same in the consuming centres of the United States as they are in Canada. Free traffic of these commodities, therefore, cannot affect prices to any appreciable extent in either country.

While it is not the policy of Construction to enter into the discussion of agricultural matters, a careful review of the proposals as they will affect the farmer is necessary in the discussion of a proposed trade agreement, which promises to shake our whole industrial fabric for the supposed benefit of the agricultural interests of the country. The whole plea of the Government in favor of the pact is based upon their contentions that it will benefit the farmer.

Thus for the purpose of securing to itself the support and votes of the Canadian farmer through a dangerous, misleading series of changes in our already inadequate tariff, the Canadian Government has committed itself to an agreement that in its effect will destroy Canadian trade independence, and place it at the mercy of the fickle and panicky propensities of its greatest commercial competitor.

It has approved of an arrangement that will destroy our fiscal independence and tie our hands in such future legislation such as we might find it expedient to enact, either for the protection of our natural resources or our manufactured products.

It has made itself a party to a policy that will carry away the wealth of our natural resources to give employment to a vast army of American laborers, and thus rob us of the chief value of our natural wealth, that of converting our materials into finished products for the markets of the world. This is one of President Taft's chief arguments for the acceptance of the pact by the United States Congress.

The changes will divert the traffic north and south. This will inevitably be a great blow to the trade between the East and West. It will retard the growth of many Canadian ports and shipping centres and will affect very materially the great trunk lines that have been so heavily subsidized by the country to bring the West closer to the world's markets. These great railway systems were financed and built at great expense to the country at a time when the United States stood obdurate in its determination to either force annexation or complete commercial isolation upon Canada.

The reduction in duties on certain lines of manufactured goods though apparently slight places additional weight to the present burden upon our striving industries in their efforts to grow and develop in the face of the ruinous competition of the highly specialized manufacturers of the United States. However, the greatest evil in these reductions is not so much in the direct effect upon the industries concerned as the uncertainty that it creates with American and English capitalists and manfacturers who have been contemplating the investment of large sums of money in the establishment of plants in Canada. The reduction shows a tendency toward a downward movement in our protective tariff, and capitalists and manufacturers will be loath to erect plants in Canada with the prospect that in a few years the "entering wedge" will be driven a little farther and the protection bars will be thrown open to the United States.

Another feature of the effect of the pact, which must appeal to every far seeing Canadian, is the inevitable check it will have upon our trade relations with the mother country. We have worked hard and diligently for many years to cultivate the British market. Vast sums of British money have flown into Canada for the development of our country, and now while we are enjoying unbounded prosperity it is proposed to compete an arrangement with the United States that will prejudice our commercial relation with the mother country and divert our trade toward the country that a few years ago would have seen us starve on their own doorstep.

When the proposed legislation comes before the House for discussion, it is difficult to presage what the position of the Opposition will be. Recently we have not been accustomed to expect much from Mr. Borden and his colleagues. Nobody seems to have sufficient backbone to declare a policy. The Opposition seems, recently, to have reduced itself to a lot of croakers that follow the tail end of Government legislation without any preconceived policy. Instead of preparing a policy based upon the national welfare of the country, apparently a canvass is made of dissatisfied or disgruntled interests, opposed to Government measures, and a vote baiting policy is adopted. It is to be hoped, however, that this opportunity will be seized by the Opposition and that they will formulate a policy designed to best promote the national welfare of the country, and thus sanely and honestly oppose this blow at the National Policy and at Canada's integrity as a part of the British Empire.

¶ Proposed Changes in Building Materials—Spirit of Pact a check on the establishing of manufacturing plants in Canada by foreign interests.

THE PROPOSED CHANGES, so far as they affect building materials, are but few and not highly important. However, as outlined above, in most cases they serve to give an increased advantage to the dumped products of the highly organized and specialized manufacturers of the United States.

There are six lines of products affected by the proposed reductions. Cement is reduced 5½ cents per barrel; freestone, granite, limestone, sandstone, etc., 7½ per cent.; roofing slates, 20 cents per hundred sq. ft.; vitrified paving brick, not ornamented, 5 per cent.; manufactured asbestos, 2½ per cent.; plumbing fixtures, 2½ per cent.

The reduction of 5½ cents per barrel on Portland cement, on the face of it, does not appear to be a very disastrous change as far as the Canadian cement manufacturer is concerned. But when the very unsatisfactory and unsteady conditions of cement prices that prevailed up to a year ago brought about by the ruinous conditions imposed by the dumping of the surplus products of large United States mills are taken into consideration, it can readily be seen that any change that may tend to give the United States manufacturer a further advantage in the Canadian market cannot be viewed with favor by the cement manufacturers in Canada.

The cement mills operating in the United States today have an aggregate capacity considerably in excess of the country's consummation, due principally to the rapidly increasing popularity of concrete as a structural material. As a result of this much advertised fact, a large number of cement projects have been promoted and many large plants have been erected and placed in operation during the past few years. The outcome was inevitable. The total capacity of the mills grew more rapidly than the consumption increased. Cement is one of the commodities that the United States cannot export except to Canada, and if it were not that we maintain a reasonably fair tariff on cement the American mills would dump their over-production at times when, because of building conditions in the United States, the consumption would fall below normal, thereby crippling the cement industry in Canada, temporarily, if not permanently ruining it.

Again, it must be remembered that the Canadian cement manufacturer has several other conditions to contend with that operate in favor of his American competitor. Coal, which is one of the largest items of expense in the production of cement, costs him from 20 to 25 per cent. more than it does at the American mills. Labor costs from 30 to 35 per cent. more in Canada and our freight rates here are, in some instances, more than double those generally prevalent in the United States. Conditions in the Canadian West are still worse. The cost of the production of cement there is more than double that in our Eastern mills.

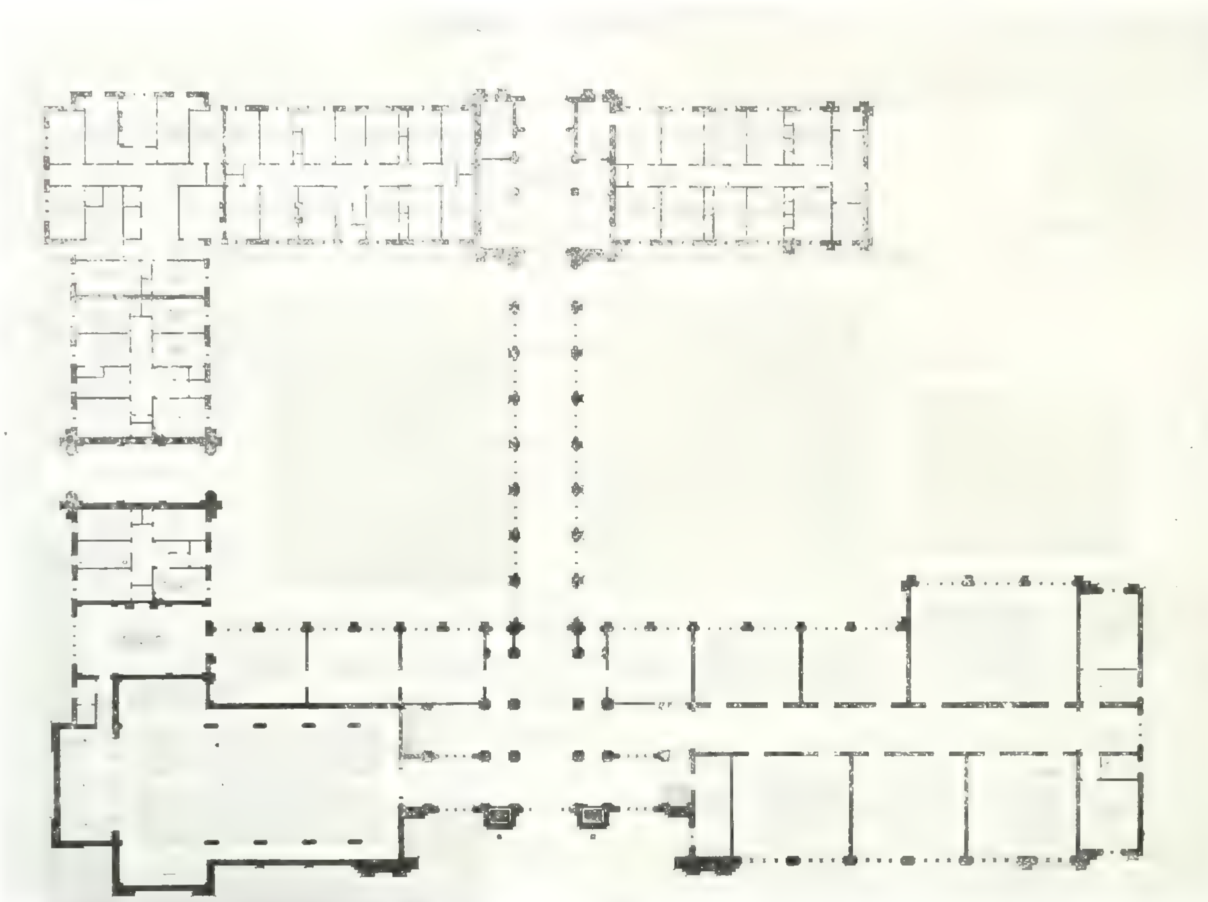
So it may be seen that this very important industry, which up to a year ago was almost hopelessly demoralized, has every reason to protest against any further reduction in the tariff on cement. While it is right and proper that cement, a material that of recent years has entered so largely into all kinds of construction work, should and must be supplied at a reasonable and fair price, conditions must not be created whereby the periodical dumping of foreign mills during times of depression is permitted to demoralize the industry in Canada.

The reduction of 7½ per cent. on granite does not seem to be either necessary or expedient. Our granite quarries in Quebec are producing some of the finest stone quarried in America, and the reason for this change is not evident.

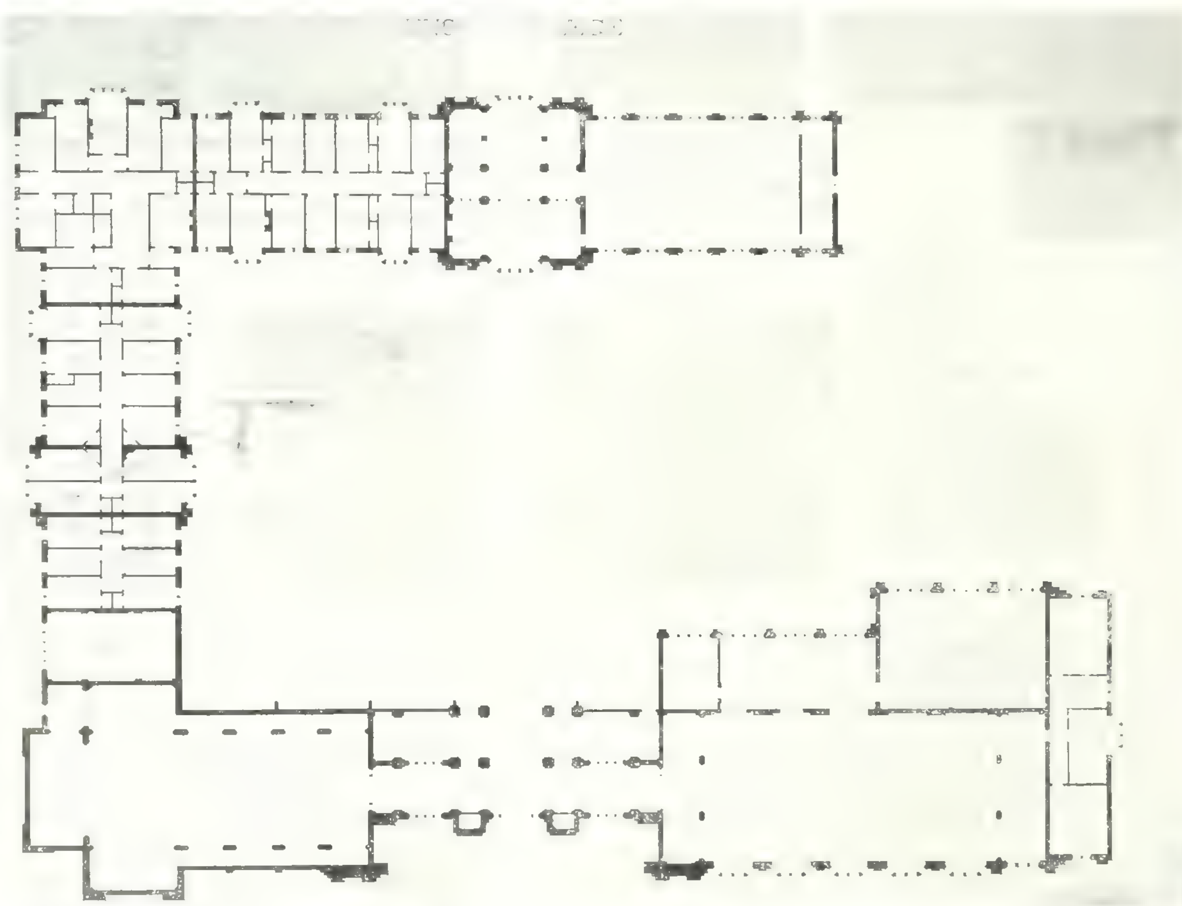
The reduction on roofing slates and vitrified bricks will affect considerably our existing British preference and will have a tendency to give the United States a stronger hold on this market.

The reduction of 2½ per cent. on asbestos products sounds ridiculous. Canada produces 95 per cent. of the commercial asbestos in the world. All the raw asbestos used by United States comes from our Canadian mines. It is manufactured there and returned to us. Until recently practically every article in the manufacture of which asbestos entered was imported from the United States. A large new plant is in operation now in Montreal and Mr. Fielding proposes to reduce the duty of 2½ per cent.

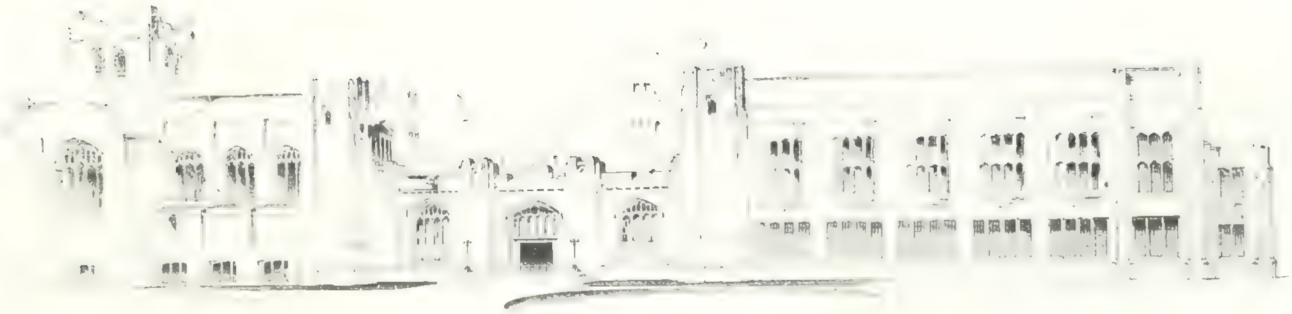
The reduction of 2½ per cent. on plumbing fixtures will simply open a little wider the Canadian market to the operations of the "bath tub" trust of the United States, the methods of which the U.S. Federal Courts now have under investigation.



Ground Floor Plan. Winning Design for Proposed New Knox College, Toronto. Chapman and McGiffin, Architects.



First Floor Plan, Winning Design for Proposed New Knox College, Toronto. Chapman and McGiffin, Architects.



Perspective View, Winning Design for Proposed New Knox College, Toronto. Chapman and McGiffin, Architects.

THE NEW KNOX COLLEGE COMPETITION

Conditions of Programme, and designs submitted in competition recently conducted in Toronto for important addition to University group.

CONSIDERING the many unsatisfactory phases and disappointing outcomes, within the immediate past, of several undertakings of a similar nature, the recent competition for the new Knox College, Toronto, stands out with no little prominence as an instance in which the architects who participated were able to compete under conditions which, if not altogether ideal, were at least most satisfactory in many respects. It was by far the most successful competition held in Ontario for some little time back, and especially can this be said in view of the recent Government House fiasco, and the marked dissatisfaction that made itself manifest in the prolonged and somewhat acrimonious controversy which followed the award in connection with the proposed Hamilton Library. With two eminently qualified assessors, acting in conjunction with the building committee in formulating the programme and making the award, it embodied a condition in the conducting of architectural competitions, which representative bodies of the profession have been demanding for some time as necessary for the best interests of all parties concerned. Further than this, the promoters did not break faith with the architects by rejecting their plans and calling for a new competition; nor did they underestimate the value of the services for which they asked, as is evidenced in the fact that the successful competitor was awarded the commission for the work, while three others were compensated to the extent of $500 each, for the time, trouble and expense which their services involved. Moreover, the programme was noteworthy in that it restricted the right to compete to architects who were *bona fide* residents of Canada, something which cannot be said regarding a number of competitions which have been carried out of late in connection with some of our more important commercial and semi-public buildings. Under circumstances such as these, the architects who submitted designs have much less reason to complain than they have had in many cases heretofore.

That the confidence of the building committee in the ability of Canadian architects to successfully design this important structure was not by any means misplaced, is amply attested to in the number of excellent designs submitted in addition to the one chosen, any of which if carried out would make a notable addition to the University group. Outside of the fact that the programme in the wording of its terms was possibly insufficiently clear on one or two points, there was very little ground on which it could be criticized. With a few modifications of a minor nature, it would admirably serve as a model for future undertakings of this character. The full text of the programme, together with the several illustrations and descriptions by the respective authors setting forth the features of their plan, published herewith, we believe will be of special interest to our readers.

Conditions for Competition

1. The Board of Management of Knox College, Toronto, are the Promoters of this Competition.

2. The Competition is restricted to Architects, or firms of Architects, practising in Canada for at least one year previous to the issue of these conditions.

3. The First Prize in this Competition shall be the Commission for the designing and superintending of the erection of the proposed building at such time as the same shall be proceeded with on the usual terms, One Thousand Dollars, to be paid to the winner within one week of the announcement of the award, this One Thousand Dollars being subsequently merged in the amount of the Commission when the work goes on.

4. The authors of the three designs which the Assessors consider the best after awarding of the First Prize (which designs are to be bracketted in their report as equal) shall be paid Five Hundred Dollars each within one week of the announcement of the award.

The Board of Assessors shall consist of the following:

5. Frank Darling, Esq., of the Firm of Darling & Pearson, Architects, Toronto.

Percy E. Nobbs, Esq., Professor of Architecture, McGill University, Montreal, together with two others to be appointed by the Building Committee of Knox College.

The award of the Assessors shall be accepted by the Promoters.

The Professional Assessors are responsible for the Conditions herein set forth, and in reporting their award shall make such recommendation to the Promoters as to improvements in the [illegible] study of the problem may suggest.

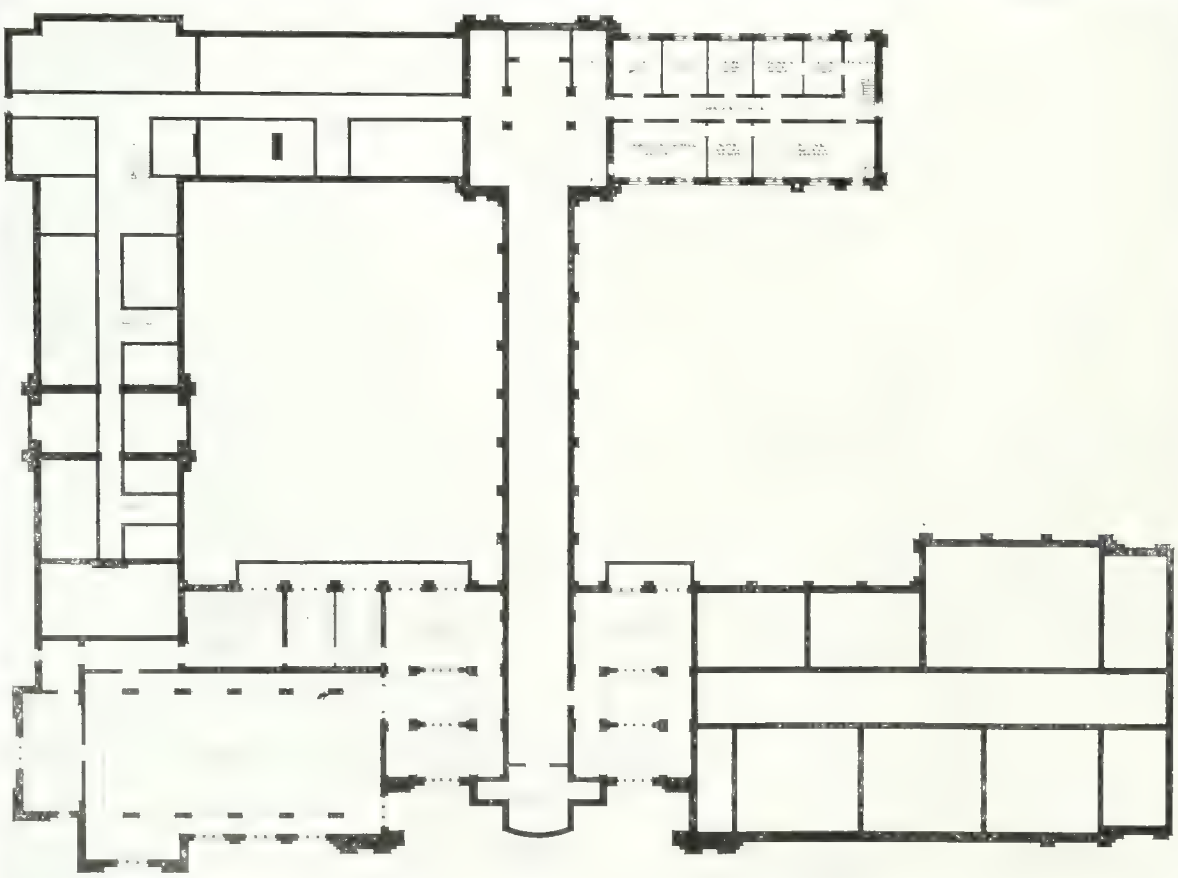
Any suggestions subsequent to the "award report" which the Professional Assessors may furnish will be given as honourary advice.

6. The award shall be made within thirty days of the date for the [illegible] of the drawings and the drawings shall be exhibited in Toronto with the names of the authors attached for a period of [illegible] or more days immediately subsequent to the award.

All drawings shall be returned to the various competitors immediately on the close of the exhibition.

7. The Promoters desire and expect to receive in this competition a carefully studied general scheme, whose complete character shall be intelligibly illustrated in the competition drawings, and whose execution would realize the requirements herein set forth

Perspective, Looking South into Quadrangle. Winning Design for Proposed New Knox College, Toronto. Chapman and McGiffin, Architects.



Basement Plan, Winning Design for Proposed New Knox College, Toronto. Chapman and McGiffin, Architects.

PREPARATION AND DELIVERY OF THE COMPETITION DRAWINGS

1. The drawings submitted (except Block Plan) shall be made to a scale of one inch to eight feet and shall comprise the following only.

(a) A Block Plan drawn to a suitable scale.

(b) Elevations to this scale of all frontages.

(c) Floor plan for each story, including basement and roof.

(d) Sufficient sections to clearly illustrate the scheme proposed.

(e) A perspective drawing is required showing principally the frontage of the Building towards the lawn with the horizontal line taken ten feet above the ground level. This drawing may be executed in any monochrome medium and in whatever manner the Competitor prefers. Should the competitor desire to submit further perspective sketches no objection will be raised.

2. The scale drawings shall be made in India ink on white paper, delivered flat in portfolios and not framed, or mounted on cardboard or stretchers.

The walls and partitions to be blacked in solid.

The external elevations may be washed in with cast shadows.

Windows openings shall be rendered in dark grey.

Watered ink may be used to indicate different planes of distance and textures of wall materials.

All rooms and corridors shall be figured for dimensions and area.

The main titles shall be in Roman capitals, all other lettering, notes and figuring shall be in plain block type.

No colour is to be used in any of the drawings.

The size of each and every sheet of drawings submitted shall be thirty-six by forty-four inches; this to include all borders, titles, lettering, etc.; the portfolios to be made just large enough to comfortably hold them.

Perspective drawings may be set up from such scale as may be desired, so long as the size of the sheet mentioned is not exceeded.

Competitors are requested in the interest of the judges not to employ more sheets than are necessary to properly illustrate their design. Two elevations could very possibly go on each sheet—one above the other—and sections and elevations on others. Sectional drawings may be skeleton only, no elaborate detail being shown.

3. The Competitor shall submit with the drawings a typewritten unsigned statement, briefly describing the arrangement of the building, its construction and materials, with an explicit statement of the rate at which the work is estimated to cube, (exclusive of equipment) together with a guaranteed computation of the number of cubic feet in the building properly worked out, with description as to what method is followed in working out the cubical contents.

The type of heating and ventilating proposed shall be taken up in this statement.

4. The drawings must have no motto or device of any kind nor any hand writing, or other means of identification. With each set of drawings is to be enclosed a blank sealed envelope containing the name of the author, together with a statement that the designs and drawings have been prepared in his own office, under his own supervision. Envelopes will not be opened until after the award has been made.

5. Any infringement of these regulations or disclosures of identity may be held sufficient grounds for the exclusion of the drawings from the competition.

All questions asked by the Competitors must be addressed to Rev. Dr. John Somerville, Confederation Life Building, Toronto, not later than July first, 1910, and such answers as the Assessors give will be sent within fourteen days thereafter to all Competitors asking questions or who may have notified Dr. Somerville of their intention to compete.

7. The drawings and the descriptive statement shall be enclosed in a blank sealed package, which, together with the blank envelope, shall be again enclosed in a second sealed covering, addressed and delivered to Rev. John Somerville between 9 a.m. and noon on Tuesday, the 1st of November, 1910.

THE ARCHITECT AND THE WORK

1. The Architect whose design shall be awarded [illegible] shall, if required, make such changes in plan and arrangement as shall be necessary to meet with the views of the Building Committee to be appointed by the Promoters.

2. After the plans have been finally accepted by the Building Committee and the Promoters, the Architect shall prepare working drawings and specifications and shall supervise the work during the construction of the building. Subject to the approval of the Building Committee aforesaid, he shall have control of all matters of arrangement, design and execution.

3. All drawings and specifications as instruments of service, are to remain the property of the Architect, but one record copy on tracing linen of the plans, elevations and sections of the work as executed, to the scale of one inch to eight feet, shall be furnished to the Promoters when the works are completed, together with a set of specifications amended to correspond with the works as carried out. And also a correct figured plan of all the drains inside and outside the building.

4. The Architect shall appoint a thoroughly competent Clerk of Works, approved by the Building Committee. The Architect shall regulate the duties of the Clerk of Works and shall have power to discharge him for cause.

Such Clerk of Works shall devote his whole time to the job and shall be paid by the Promoters.

5. The Architect shall appoint a qualified Professional Heating and Ventilating Engineer (not a Contracting Firm or a member of one) approved by the Building Committee. The fees of such Engineer shall be paid by the Architect out of his own commission.

6. For all these and such other services as are usual ond incidental and necessary thereto, the Architect shall receive the usual commission of five per cent. on the total cost of the works.

SITE AND CHARACTER OF THE PROPOSED BUILDING

1. The site is bounded on the West side by St. George Street, on the East side by the University Lawn and lies between adjoining properties on the North and South, over which the Promoters have no rights of light.

The site measures 337 feet 9½ inches from North to South by 233 feet 5 inches from East to West.

The surface of the site is practically level.

No portion of the building shall be nearer to St. George Street than 20 feet, and all outside steps or vestibule approaches on the East side must be entirely within the figures given above.

2. An unobstructed open public passageway, six feet wide, is to be reserved across the South end of the property.

On the street frontage the buildings may, if necessary, extend approximately two hundred feet northwards from the Southern boundary of the property. On the lawn frontage no part of the building may extend more than two hundred and eighty-five feet northward from the Southern boundary of the property; the ground westward from this point may if necessary be occupied to a depth of seventy or eighty feet.

3. The remainder of the property to the north is reserved for future extension, and for the present cannot be utilized.

It is desired that competitors indicate on the block plan their suggestion for the future extension of the residential portions of the buildings over this Northern part of the property.

4. The scheme contemplates a group of connected buildings serving the double purpose of a Teaching, or Academic, Block and a Residential College—the former to have a main entrance from the University Lawn; the latter to be entered from St. George St.

These two blocks connected by a cross block, will roughly form a sort of irregular letter "H."

Care must be taken that the interior courts so formed shall have plenty of light, air and sun.

5. No part of the proposed buildings intended for residential purposes shall occupy any portion of the ground facing the University Lawn, while on the other hand no part of the buildings used for Academic purposes shall occupy any portion of the ground fronting on St. George Street.

6. The chapel and library shall be considered as being part of the Academic Block, the dining room as part of the Residential Block.

7. Persons entering the buildings from St. George Street must have easy, direct and dignified access right through to the Academic side; in other words, people anywhere in the buildings must be able to leave them equally conveniently, either by the University Lawn or St. George Street entrances. See that this intercommunication between the blocks is thoroughly well lighted, cheerful, and architecturally attractive.

8. The Main Building of University College, as well as the Library across the Lawn opposite the proposed new buildings for Knox College, are built of a light grey stone in a round arched Norman style of Architecture, and the Promoters consider that generally speaking, this character of design should be followed, and that any radical change from the colour, material or scale of the University College Building should be avoided as much as possible, at any rate so far as such portions of the new buildings as would be visible from the Lawn are concerned.

The elaboration of detail, ornament and carving which exist in the University College Building cannot of course be expected to be reproduced, but this omission will not prevent the general architectural feeling of the building being followed.

9. The Promoters desire that if possible, the whole of the building should be of grey stone, but if the cost of this is prohibitive, then at least the portion visible from the lawn should be of this material. They wish also that such attention be given to the Eastern facade that it may prove a worthy companion to University College. That care should be taken to make the interior courts distinctive architectural features, and that the Residential portion should be homelike in appearance, rather than Institutional. It is desired also that the Dining Hall should form an attractive feature of the Residential section.

10. That portion of the building devoted to Academic purposes must be fireproof throughout—while in the remainder of the building judgment must be used in the planning of fire walls, staircases, etc., to check the spread of fire as much as possible.

The buildings throughout must be designed and constructed in a thoroughly substantial manner.

11. With the exception of the distribution, and general outline herein mentioned, the whole of the planning and design, and to a large extent the style, is purposely left to the discretion of the competitors as it is desired to obtain as many independent solutions of the problem as possible.

12. The sum the Promoters expect to have at their disposal for building, exclusive of equipment, is Four Hundred Thousand Dollars ($400,000.)

ACCOMMODATION

1. The following accommodation is required:

Class Rooms:

	Superficial	Area
One Class Room of	1,200	
Three Class Rooms each of	750	
Two Class Rooms of	500	
		4,400
Board Room	[illegible]	
Business Office	[illegible]	
Principal's Room	[illegible]	
Reception Room	400	
Six Professors' Rooms each	300	
		[illegible]
Librarian's Office	[illegible]	
Museum Room	[illegible]	
Private Readers' Room	[illegible]	
		1,200

2. Provide ... Professors' Lavatory [illegible]

vate Room and also a Lavatory for the Principal in communication with [illegible] Room.

Provide [illegible] rooms, 200 superficial feet each, one for men and one for women, with small lavatory connecting with each. These may be in the basement, if necessary.

All lavatories throughout must have windows opening directly into the open air.

3. Rooms in the Academic Block are to have good high ceilings and to be very well lighted. Special attention being given to ventilation.

4. The Library Department is to have a Stack Room with a capacity of [illegible],000 volumes, a Reading Room with shelving round walls to hold 2,000 volumes, and accommodation for sixty readers comfortably seated at tables. Indicate on the plan the position of tables and stools, delivery desk, etc., also the stacks in the Stack Room.

Provide also a Librarian's Office, a Magazine Room and a Private Reading Room as before mentioned.

All the above are to be kept together and so arranged as to afford convenient intercommunication and supervision.

5. A chapel is required with seating capacity for from four hundred and fifty to five hundred persons. The chapel should be so placed that it may if found necessary, be omitted for the present and built when funds are forthcoming.

It is desired that the chapel should form a feature of the design both inside and out.

6. It is suggested that some portion of the basement should be so arranged that sufficient height can be obtained for a gymnasium well lighted, with dressing rooms, baths and lavatory in connection. This is not contemplated at present but it would be well if provision were made for it.

RESIDENTIAL BLOCK

7. Accommodation is required for about one hundred students in residence, consisting of at least three or four separate houses or groups of rooms.

Each separate house or group of rooms shall have its own entrance staircase, etc., and shall in all respects be self contained.

The majority of the bedrooms are to be arranged for a single occupant and interspersed among them will be a few suites of rooms consisting of two small bedrooms with a study common to both.

Each house shall have a small reception room on the ground floor and on each floor adequate bathroom and lavatory accommodation, linen room, H.M. sink, etc.

All bedrooms must have closets.

8. There is no reason why each house should be a counterpart of the others or that each should contain an exact same number of rooms—a little variety would be an advantage and add to the homelike character of College.

9. One large common room, and also a Reading Room are required to be provided in connection with the whole Residential Block.

10. The Dining Hall is to be arranged so as to seat comfortably about one hundred and fifty people with a slightly raised dias at one end for the high table.

Connected with it must be adequate provision for serving room, pantry, scullery, kitchen, ice boxes, stewards' offices, servants' dining room, etc., commensurate with the work that will be necessary.

There would be no objection to everything but the Dining Hall and the Serving Room being in the basement.

Connection should be gained to each separate house from the basement in order to facilitate the housekeeping service.

11. Entirely cut off from the students' quarters provision must be made for Living Apartments for the Steward and his family and for eight women servants, with proper bath room accommodation.

Provide also bedrooms for Janitor and Fireman.

12. Somewhere in the residential section shall be a room, so arranged as to be easily isolated from the rest of the building, and capable of being fitted up as a small hospital ward with lavatory accommodation and accommodation for a nurse connected therewith.

The drawings reproduced in this connection, which includes the work of all but two of the competitors, whose designs were not available for this issue, will give those who did not view the exhibited plans an excellent opportunity to judge the relative merits of the designs submitted.

The Winning Design

The features of the design of Messrs. Chapman & McGiffin, Toronto, which was accorded first place, and which calls for an imposing building in Gothic treatment, are described by the authors as follows:

The connecting link between the academic block and residence college has been reduced to a cloister enclosed and heated during winter. The chapel and library facing the University lawn have been separated by a low arcade suggestive of entrance into a quadrangle beyond, and the dining hall has been placed on the St. George Street elevation for the following reasons:

First.—To give the two courts the effect of one large quadrangle with a broad opening from the University lawn, by means of which the extent of a quadrangle bounded by the chapel, the library, the dining hall, and the residences, could be appreciated from the University lawn, and the requirement of a group of connected buildings most effectively fulfilled, thereby carrying out the established traditions in Oxford and Cambridge.

Second.—To avoid spoiling this opportunity by dividing these courts with a high building, so that it would be necessary to keep the north and south sides open to fulfill the requirements of plenty of light, air, and sun. These open sides, which would be the most important sides as viewed from the college, would be adjoining uncontrolled property, the building upon which might ruin all the attractiveness of the courts. The recession from the building line as well as the six foot passage would protect the light and air sufficiently of the bedrooms facing south as the residence building is not high.

Third.—To avoid competition with the adjoining University College by repeating the motif of a large central feature flanked by two wings, practically on the same plane, the duplication of which would either be to the detriment of Knox College, owing to the omission of the enrichment, or to the detriment of the University College, owing to the preponderating mass. By throwing the preponderating mass on the central feature back from the face all impressiveness can be given to Knox College without affecting the proper relation it should bear to the University College, besides obtaining the great attractiveness, that the distance or depth of a composition always exercises.

Fourth.—To add interest to the west elevation by placing the dining hall on St. George Street, thereby breaking the monotony of what in the future, would probably be over three hundred feet of residence about on the same plane, and on a narrow street.

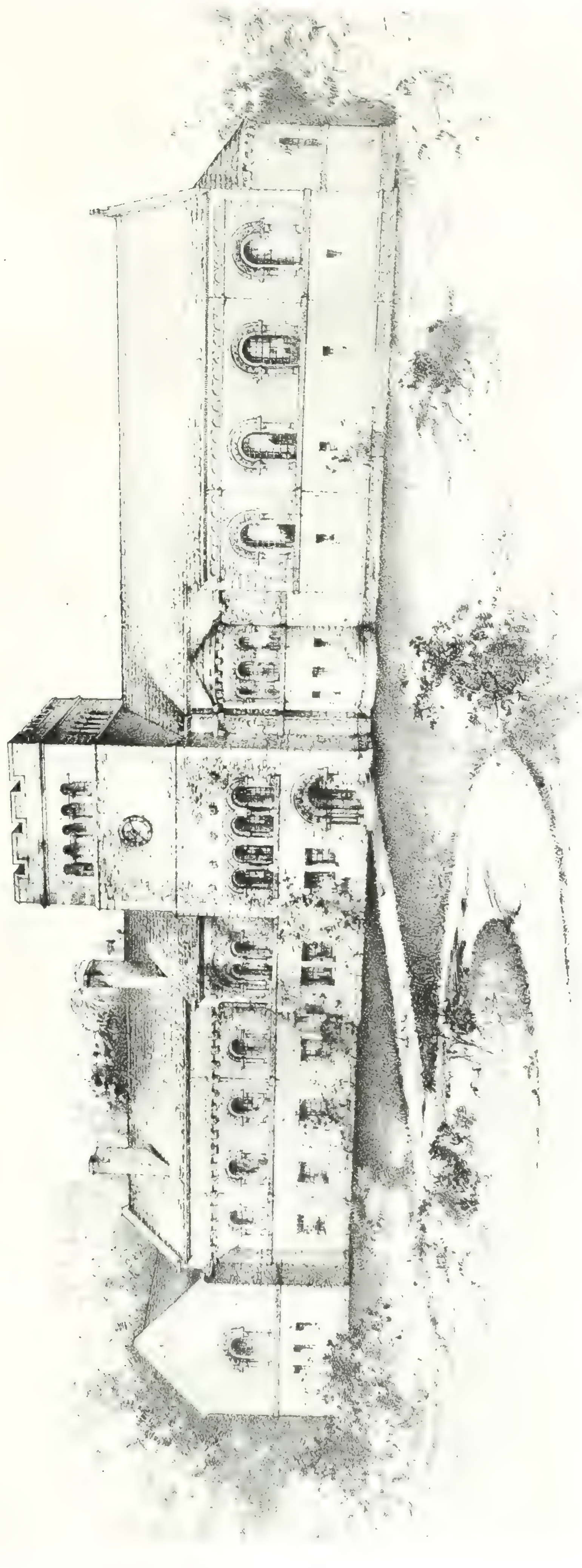
The block plan shows the broad open treatment of plan obtained with the large quadrangle surrounded by the chapel, library, dining hall, and residences and intercepted by the cross communication, from which all this can be viewed, as well as, in the future extension, the smaller probably garden quadrangle opening off it at the north. There would be an opening into the northern quadrangle, similar to that leading from the 6 foot lane on the south through the archway, though which a charming glimpse of the quadrangle would be obtained.

Character of Design.

The style illustrated has been chosen because it lends itself to modern academic lighting requirement and has far more of the academic and ecclesiastical character than the style of University College, which is more suggestive of a museum than academic building. The University building stripped of its interesting ornament, which gives it that charming bejewelled archaelogical character leaves a rather crude and clumsy character to work in for modern school requirements, and if Knox College was designed in a purer and more classic form of the round arched Norman style than the University College the latter would lose most of its charm by comparison. We have taken the liberty, however, of submitting an alternate drawing illustrating the effect of our design with the detail transposed, should your Board have reasons for a closer adherence to the Mother Building. The color, material, and most important of all the scale has been closely adhered to.

Detail Arrangement of Plan.

ACADEMIC BLOCK.—The two monumental elements of the plan, the chapel and the library, have been kept on the same axis, so that from the large vaulted entrance hall one has a view on the left up a short, but broad flight of stairs, through the glazed tracery of the entrance into the vaulted chapel beyond, and on the right, one has the same monumental approach to the library with the suggestive view of the library beyond. The administrative portion has been kept in a distinctive and attractive position and in easy communication with the chancel of the chapel. The board room is arranged with a high ceiling, so that an unusually attractive room can be obtained;



Perspective View (Overlooking University Lawn). Competitive Design of Messrs. Wickson and Gregg for Proposed New Knox College, Toronto.

access to the chancel for the choir can be obtained by an entrance at the end of the class room axis, into the gallery of the gymnasium and into the passage under south transept communicating from Principal's room to chancel.

RESIDENTIAL BLOCK. To add to the homelike and self-contained character of the college, it has been deemed advisable to enter the residences from the large open quadrangle rather than the street. There are four separate houses, containing one hundred and one bed-rooms, four reception rooms, twelve sitting rooms, and twelve bath-rooms.

The entrance to dining-hall is up a broad flight of stairs in a vaulted entrance hall, similar in arrangement to that of Christ Church, Oxford, and on the same floor adjoining the dining-hall is the common reunion room. The reading room and an extra reunion room for special reunions are above this; and above this, in the upper part of the tower, entirely cut off, is the hospital.

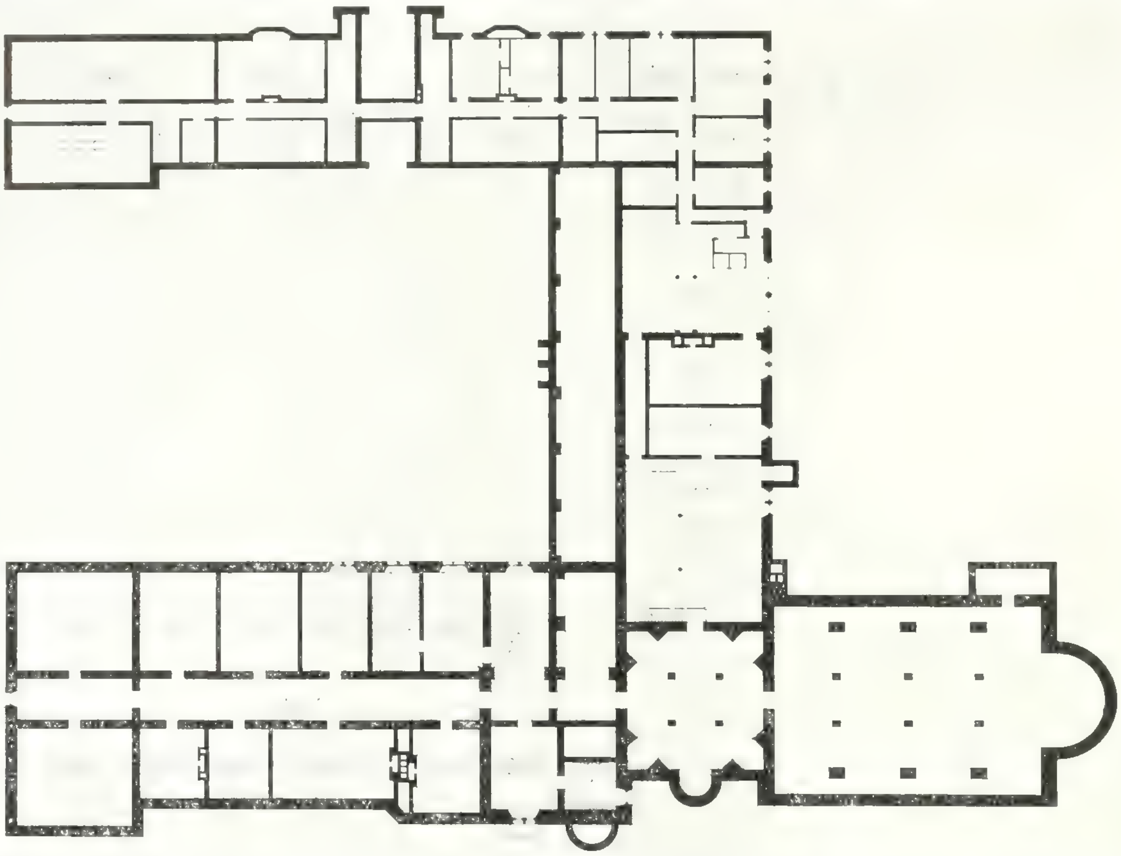
The exceptionally fine view from the dining-hall, reunion rooms, and reading room into quadrangle and beyond on to the University lawn might be noted; and attention is also called to the use of the roof of the cloister as a promenade for the students in seasonable weather.

Materials, Cubical Contents and Cost.

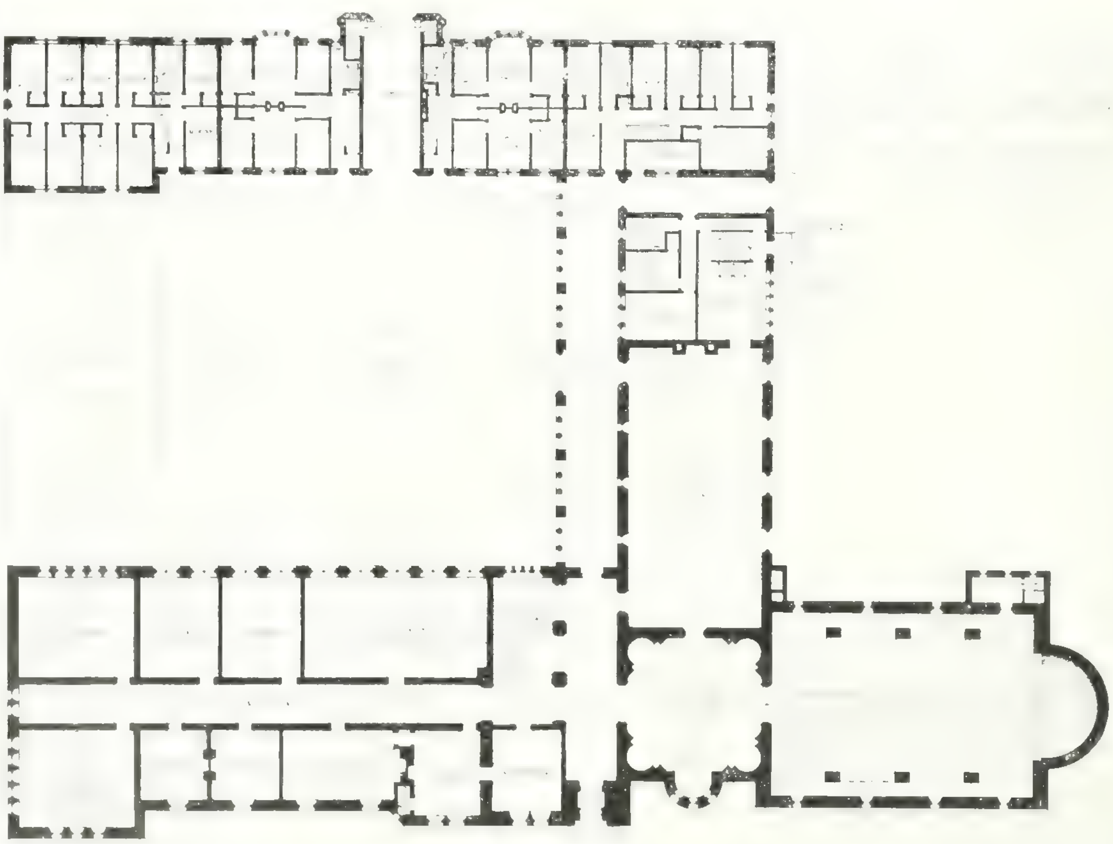
All the exterior material would be Credit Valley grey stone with probably Indiana limestone trimmings and tracery. The academic portion, west entrance tower, and dining-hall would be first-class fireproof construction; and the residence portion would be semi-fireproof with fire proof halls and staircase and with hardwood trim and metal sash.

The cubical contents of the residences proper totals 369,873 cubic feet and it has been estimated that this portion will cube at twenty-five cents	$92,468.25
The cubical contents of the west entrance tower and dining-hall totals to 218,573 cubic feet, and it has been estimated that this portion will cube at thirty cents.	65,571.90
The cubical contents of the academic block, including the cloister, totals 670,590 cubic feet, and it has been estimated that this portion will cube at thirty-two cents, or a total of	214,588.80
This brings the total cost to . .	$372,628.95

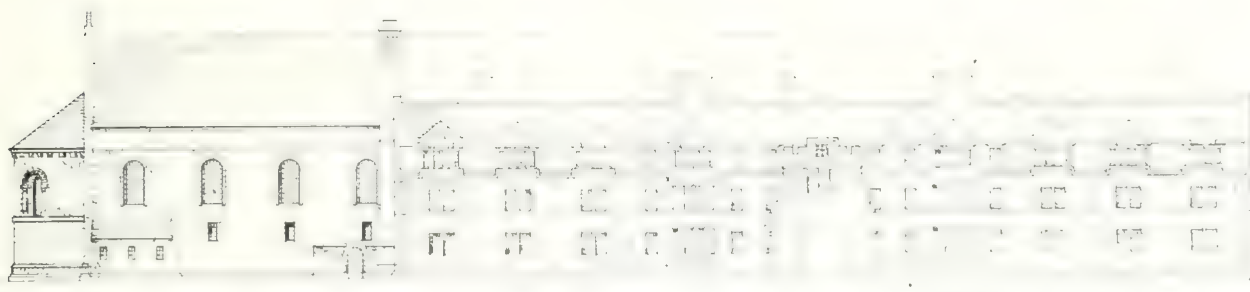
In estimating the cube, the full areas have been taken into account and the heights from the bottom of



Basement Plan, Competitive Design of Messrs. Wickson and Gregg for Proposed new Knox College, Toronto.

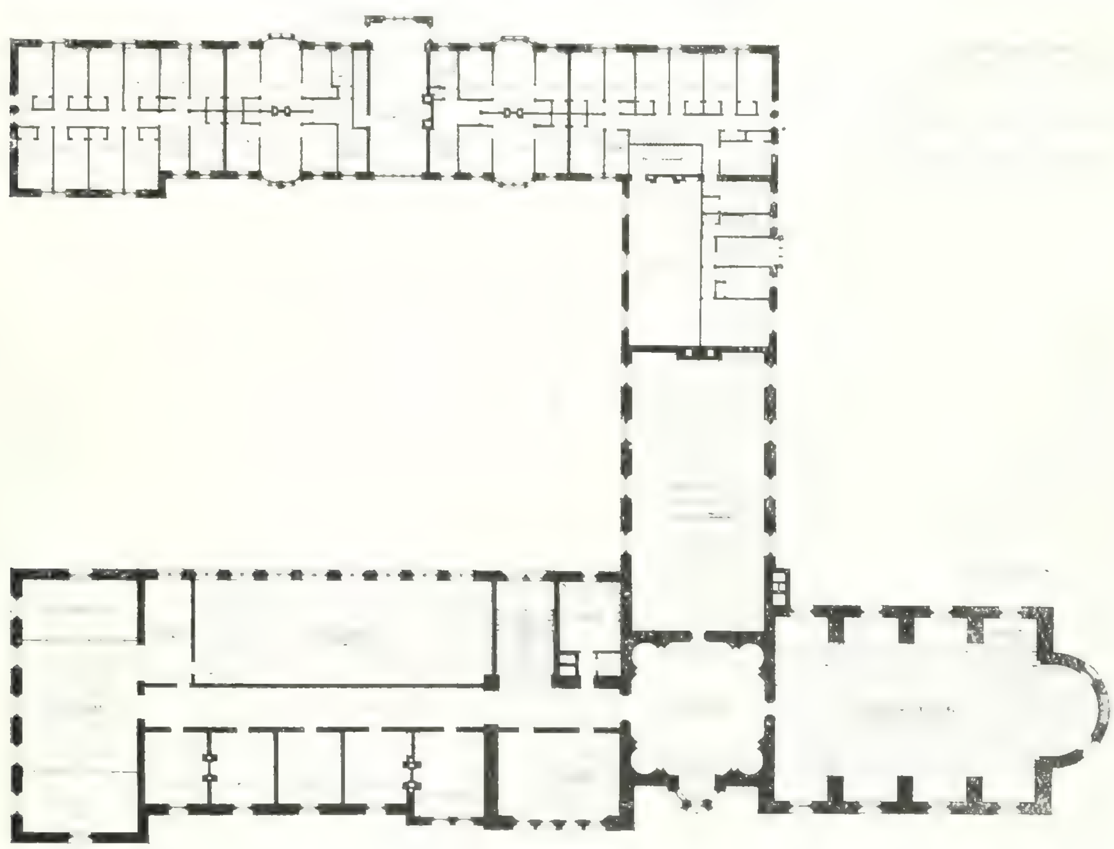


Ground Floor Plan, Competitive Design of Messrs. Wickson and Gregg for Proposed new Knox College, Toronto.



West (St. George St.) Elevation, Competitive Design of Messrs. Wickson and Gregg for Proposed New Knox College, Toronto.

the foundations or one foot below cellar floor to top of the flat roofs and to the average height of all pitched roofs. The cubical contents have been carefully estimated and are correct.

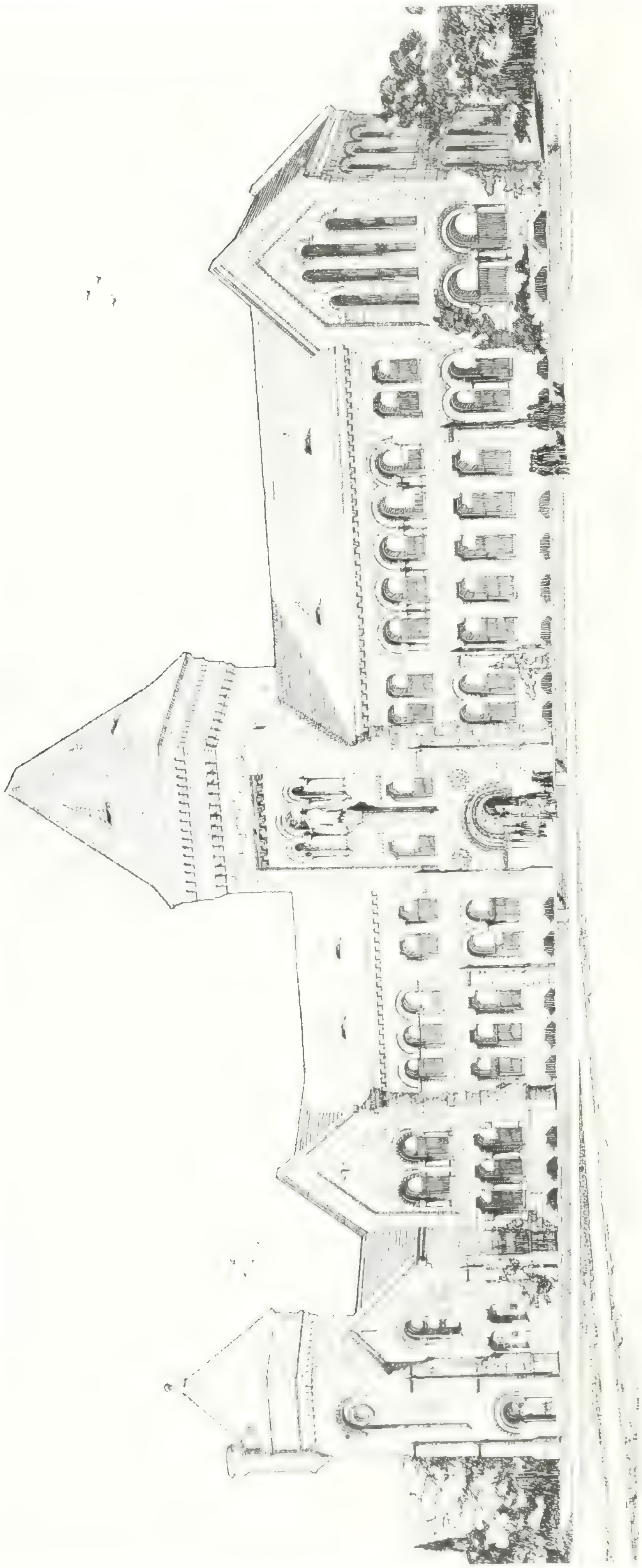


First Floor Plan, Competitive Design of Messrs. Wickson and Gregg for Proposed New Knox College, Toronto.

Heating and Ventilation

It has been assumed that the modern method of heating a group of buildings from a central power or heating plant will be adopted for this building, particularly as the method is being at present adopted for the existing University buildings. On this assumption the steam pipes would be brought in at the centre of the building to a large central passage indicated on the basement plan. This passage would also contain the fresh air room, the air being brought down the towers flanking the entrance, and forced by the fan through ducts to the side walls of the library and class rooms on the right, and on the left under the gymnasium gallery to the side walls of the chapel and straight down the passage to the side walls of the dining hall and reunion room. All bed-rooms in the residential block would be heated by direct radiation. The library, academic rooms and din-

East Elevation of Residential Wing and Section of Dining Hall, Competitive Design of Messrs. Wickson and Gregg for Proposed new Knox College, Toronto.



Perspective View (Overlooking University Lawn). Competitive Design of Architect John M. Lyle for Proposed New Knox College, Toronto.

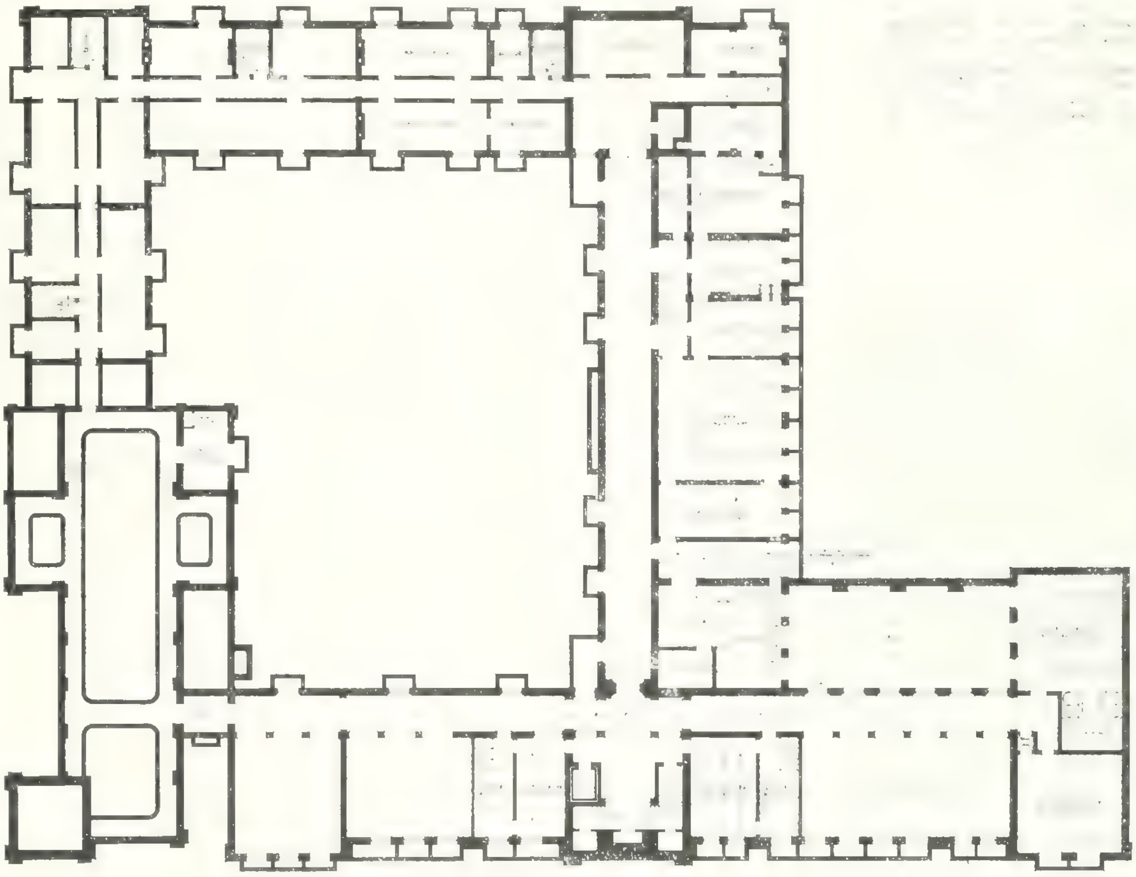
ing halls would be ventilated by indirect radiation and heated by direct radiation. The foul air would be taken off near the floors, assembled in the roof space and exhausted through louvre openings in the towers.

Messrs. Wickson & Gregg's Design

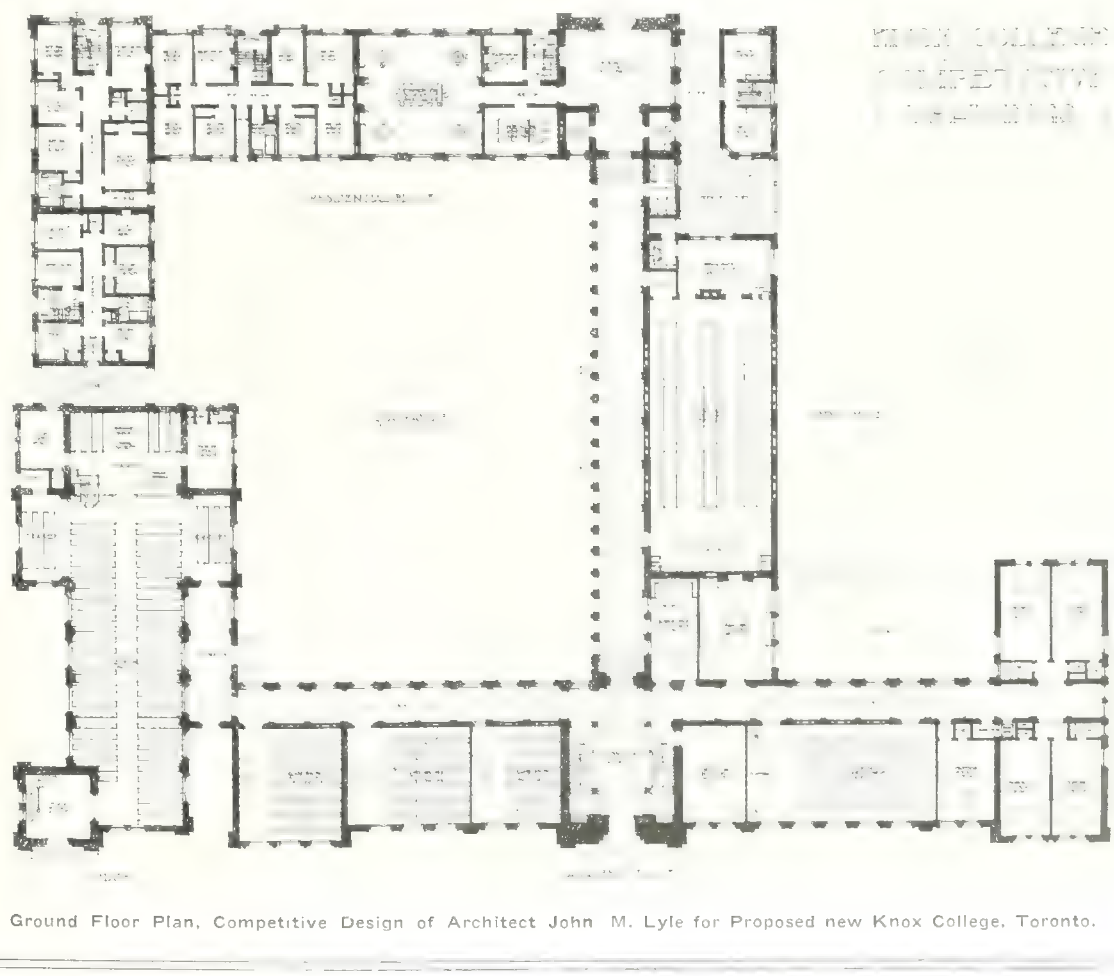
In accordance with the expressed wish of the promoters, the round arched Norman style has been adopted, a style which seems appropriate not only on account of the relation of the proposed building to the University and to the Library opposite, but also for the reason that it seemed a natural development of the plan and expressive of the general purposes of the building. In designing the Academic building, the fact has been borne in mind that the University should be the dominant building in the campus group, and that while the College should have a distinctive character of its own, it should be of less height than the University and much more simple in general outline and detail. As the material has much to do with the design, the suggestion is that the building, where so indicated in elevations, should be carried out in the roughly dressed stonework known as Scotch masonry, and elsewhere in rubble stone with wide joints.

The instructions given in the programme as regards the general arrangements, the sizes of rooms, etc., have been closely followed; while the planning of all halls, corridors and stairs, and the general disposition of the rooms, have been carefully studied to give easy and direct means of intercommunication, and also with a view to ease of supervision, both from the collegiate and housekeeping standpoints, thus ensuring a low cost for maintenance. The University campus may be reached from St. George street by way of the quadrangle, cloister and main hall. This route is intended to be a convenient one, without having the disadvantage of appearing to be a thoroughfare for the general public. It will be noted that what might be called the living rooms, viz.:—the general reading rooms, the students' reading room and the dining hall, will all have south light.

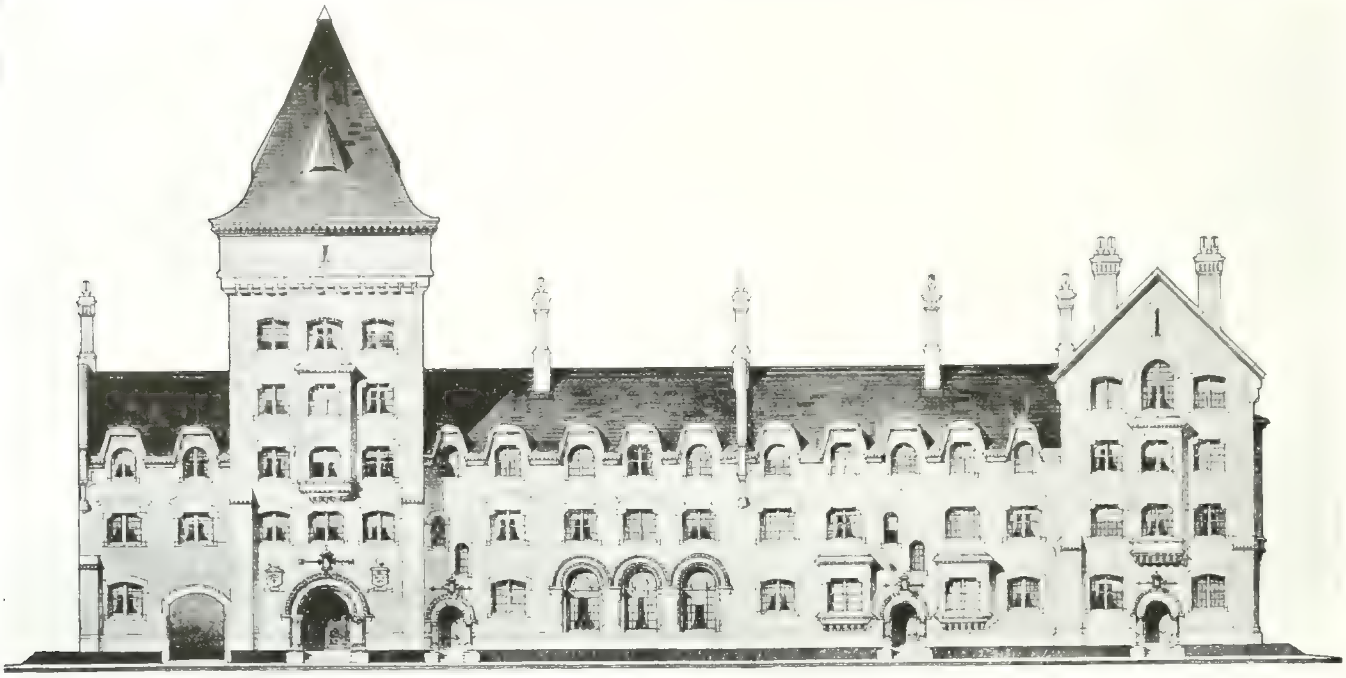
The principal's room and business offices are placed near the entrance, so as to be easy of access and to reduce interference with class work by the public; and all the class rooms have been arranged with ample light according to established rules, the window openings being one-fifth the floor area. The reading rooms have been placed on the second floor and as far as possible from the entrance in order to ensure quiet. The main reading room will be of extra height



Basement Plan, Competitive Design of Architect John M. Lyle for Proposed new Knox College, Toronto.



Ground Floor Plan, Competitive Design of Architect John M. Lyle for Proposed new Knox College, Toronto.

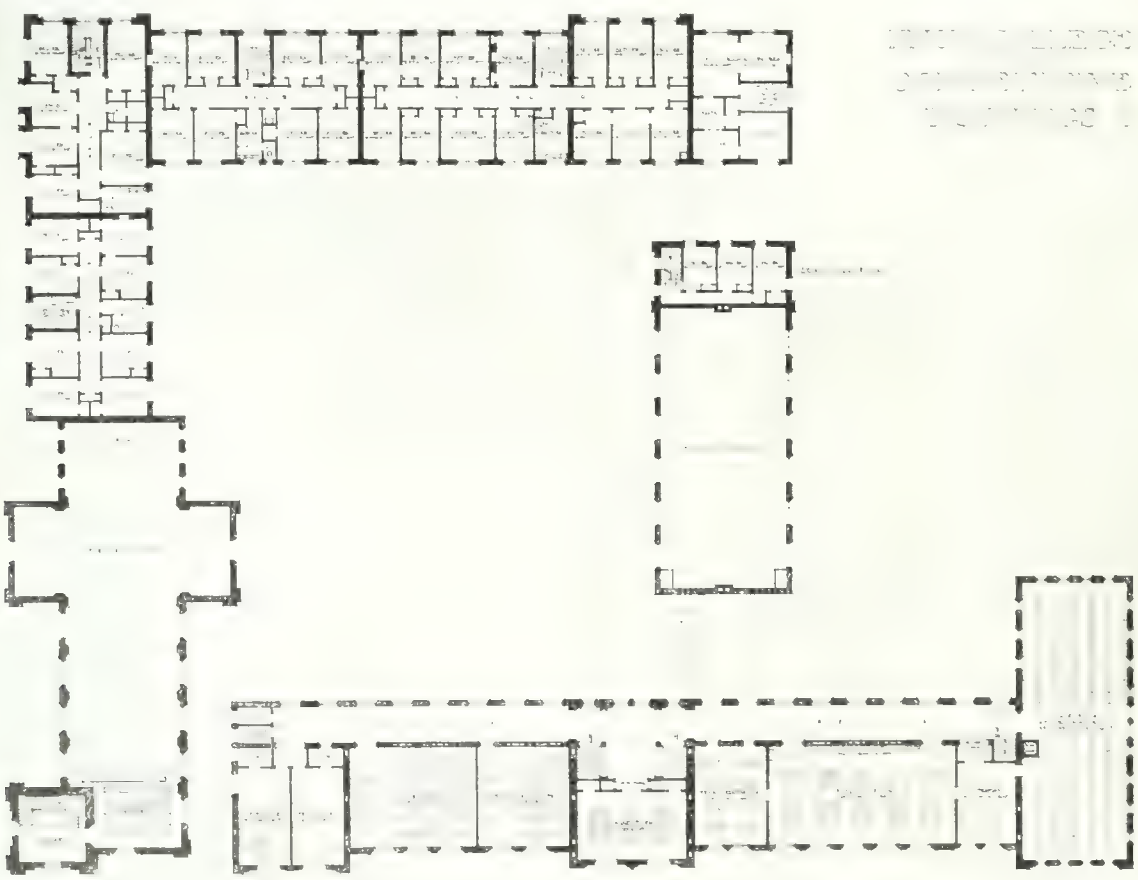


St. George Street Elevation, Competitive Design of Architect John M. Lyle for Proposed New Knox College, Toronto.

with open timbered ceiling. The stack room contains shelf room for 75,000 volumes in two tiers of fireproof stacks. It is supposed that the lower tier will provide space for all books in general use and thus little stair-climbing will be required of the librarian.

door and the windows will have metal frames and wire glass.

The Memorial Hall is intended not only as an architectural feature of interest and as a suitable place for tablets or busts in memory of eminent men of past days,



First Floor Plan, Competitive Design of Architect John M. Lyle for Proposed new Knox College, Toronto.

While the whole of the academic building is of fireproof construction, as an additional security the only entrance to this room will be safeguarded by a fireproof

but it is also planned to serve as an everyday place of meeting for professors and students and as an antechamber or vestibule for the chapel. The gallery above should prove an interesting architectural feature and from the small balconies views may be obtained of chapel and dining hall. The chapel is designed to seat comfortably 416 persons and the arrangement of nave, aisles and apse should lend itself to a fine architectural effect. If desired, a gallery could be built at the south end, thus increasing the capacity to accommodate 504 in all.

The dining hall is situated so as to be equally convenient to residence and class rooms, and the plan is arranged so that on great occasions it may be entered from the Memorial Hall. The steward's quarters are convenient of access from the cloister and there is also direct connection between his apartments and the service department. The students' reading room is located on the second floor of Cross Block and is reached by entrance at west end of cloister.

Five separate houses have been provided, affording accommodation for 89 students, each suite comprising two bedrooms and a common study. The entrance to these residences will be from the quadrangle, from which the students can quickly reach dining hall or class rooms. In stormy weather, students may descend to the basement corridor and by this means reach any part of the building under cover. A common room for students' meetings, games, etc., is placed over the St. George Street entrance, with separate entrance from ground level. If desired, this entrance could be arranged from the landing of second floor stairs in residence adjoining. In the two central houses, it is supposed that the study rooms will serve for reception rooms. In the north and south houses, separate reception rooms have been provided.

Instead of using any of the unassigned rooms in the basement for the purpose of a gymnasium which the programme suggests might be required in the future, it is proposed that a separate building might be erected near the north boundary when this portion of the college property is available. If the residence be extended to the north and the Gymnasium building built, a second quadrangle will be formed on the north side of Cross Block.

If more accommodation be required for students, it is proposed to build the additional residence building to the north. By reference to the first floor plan, it will be seen that a passage has been provided from the west end of cloister through the connecting block. Future residences may then have entrances on east side, with access from St. George Street through a second archway and access through above mentioned corridor to main quadrangle.

It has already been suggested that a gymnasium be built near the north boundary of lot and if at any time, it is desired to have additional accommodation for class rooms, etc., another building might be erected on the south side of lot.

It is proposed to heat the whole building on the direct steam vacuum system with automatic thermostatic control in all main rooms in academic building, dining hall and reading rooms. In the class rooms, reading rooms and chapel, ventilation will be obtained by means of a mechanically driven fan located in basement, which will supply fresh air and a similar apparatus to be located in chamber in the roof space to remove the foul air. Exhaust ventilators will be placed in serving pantry which will also ventilate the dining room. This arrangement will prevent the odors of cooking from being drawn into the dining room. The kitchen and all toilet rooms will be connected with the exhaust chamber. A boiler room has been provided in basement, but if arrangements can be made to heat the building from the University plant, this room can be utilized for other purposes.

It is proposed that the academic building shall have fireproof floors, partitions and roof. In the cross block and residence building, the floors and roof will be of ordinary timber construction, but it is intended that the different houses be separated by brick walls. In order to form an estimate of the probable cost, the building has been cubed as follows:—

Academic Building (including tower)	626,420 cubic feet.
Chapel	210,728 " "
Cross Block	205,394 " "
Residence	270,387 " "
Total	1,312,929 " "

Taking the total cost at $400,000, the price per cubic foot will be 30½ cents, and it is believed that the building can be erected for this amount, this opinion being based on the actual cost of recently erected public buildings in the City of Toronto. In cubing the building, the figures were obtained by taking the height of the various portions of the buildings from the level of basement floor to the centre of the space between the angle of wall and roof and the apex of roof. Although the whole of the basement will not be required for actual use, yet it is recommended that it be excavated throughout, thus assisting in keeping the building dry and giving proper space for the installation and care of the heating pipes, etc.

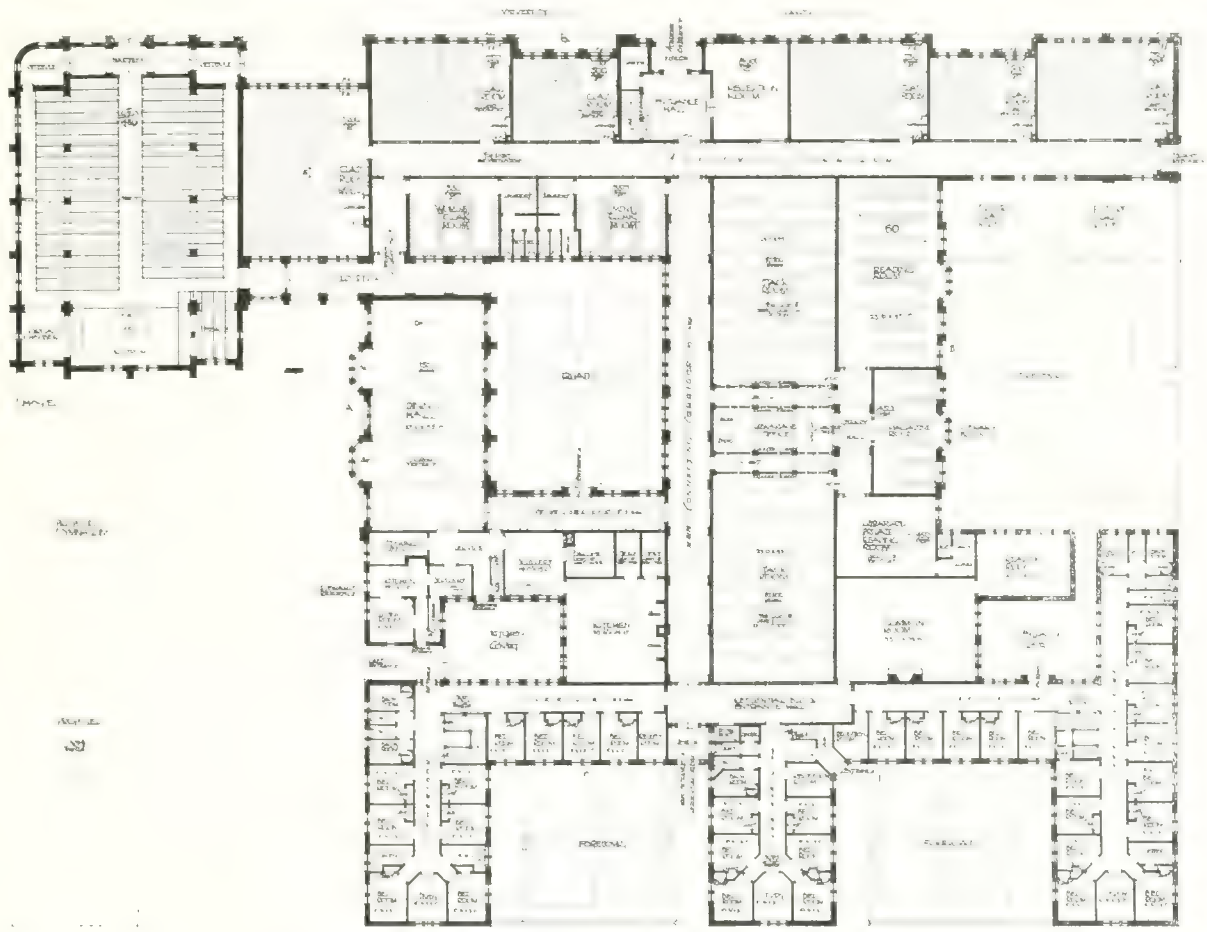
Architect John M. Lyle's Plan

As the programme suggested that the general architectural feeling of the University College building should be followed, an effort has been made to reproduce the spirit of this edifice. The numerous high-peaked towers breaking the sky-line in many places, and the general roof character was also adopted as being characteristic of this most interesting group. In studying the problem it was concluded that one of the principal features in determining the character of the plan was the location of the chapel. As the terms of the competition make known that it is the intention of the promoters to enlarge the academic building at some future time, the chapel has been placed to the left of this structure so as to allow for a free expanson of an academic building to the west. The plan is also arranged so as not to interfere with the circulation to the future wing through the academic buildinг attractive, all classes have been ing has been carried out allows for a quadrangle as large and as open as possible. In order to make the life in the epidemic building attractive, all classes have been placed on the lawn side abutting the corridor giving directly out on the interior quadrangles, thus making a bright attractive corridor and allowing the students to have a pleasant outlook. The dining room has been placed on the ground floor level in the connecting link which is distinctly referred to in the programme, as is also the interior courts so formed. In studying this part of the problem an effort was made to place the dining room on the St. George Street elevation, but it was found, owing to the restrictive dimensions given the programme, that it was impossible to do this and get a satisfactory arrangement or a large enough dining room with the proper service.

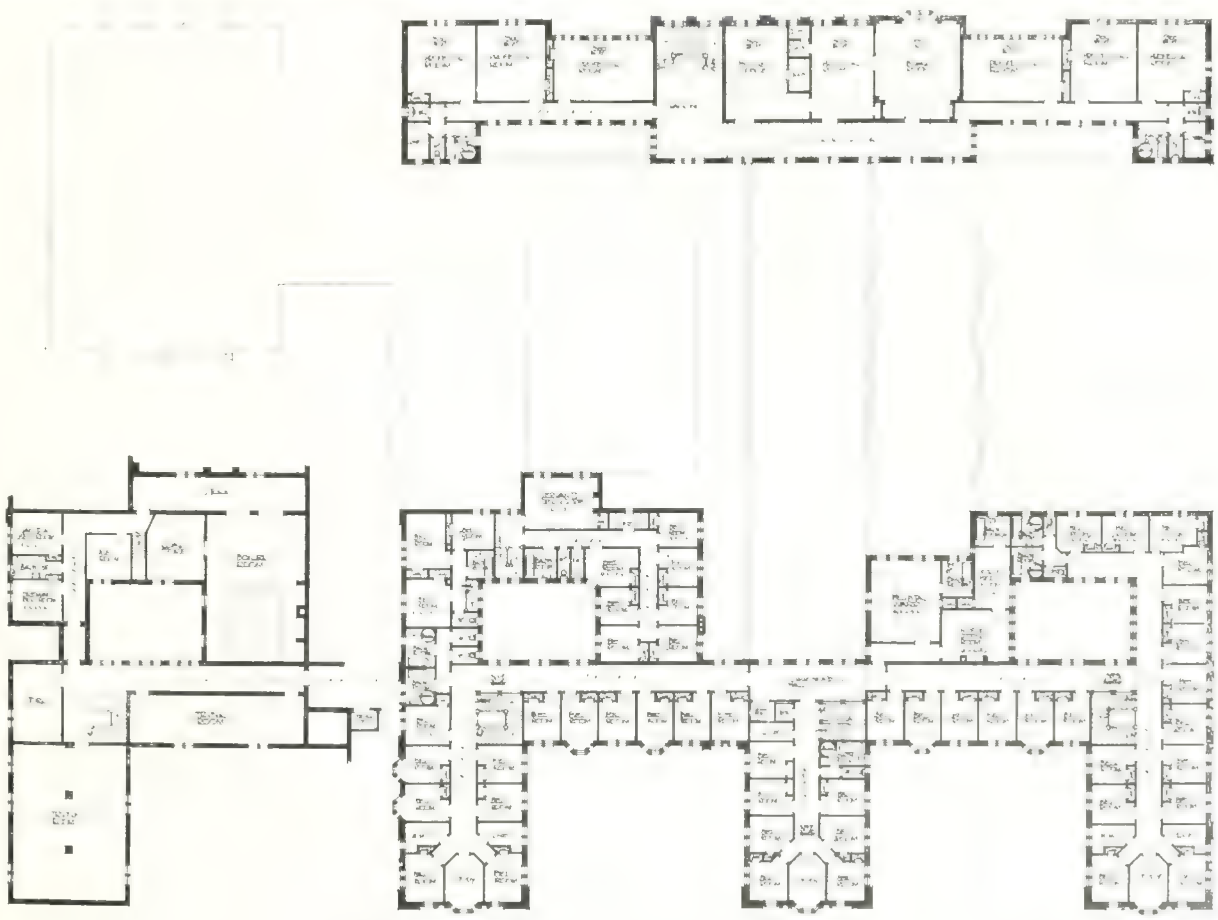
Architect G. W. Gouinlock's Design

The whole of the accommodation required is worked out in a compact form, thus providing the greatest convenience in arrangement and allowing for adequate supervision and lighting. With this object in view, the different parts of the structure are so placed as to give all courts an ample amount of light, air and sun. No part of the building intended for residential purposes occupies any portion of the ground facing the University lawn; while on the other hand no portion used for academic purposes occupies any part of the ground facing St. George Street. The chapel can be entered directly from the main building, and is so arranged that it

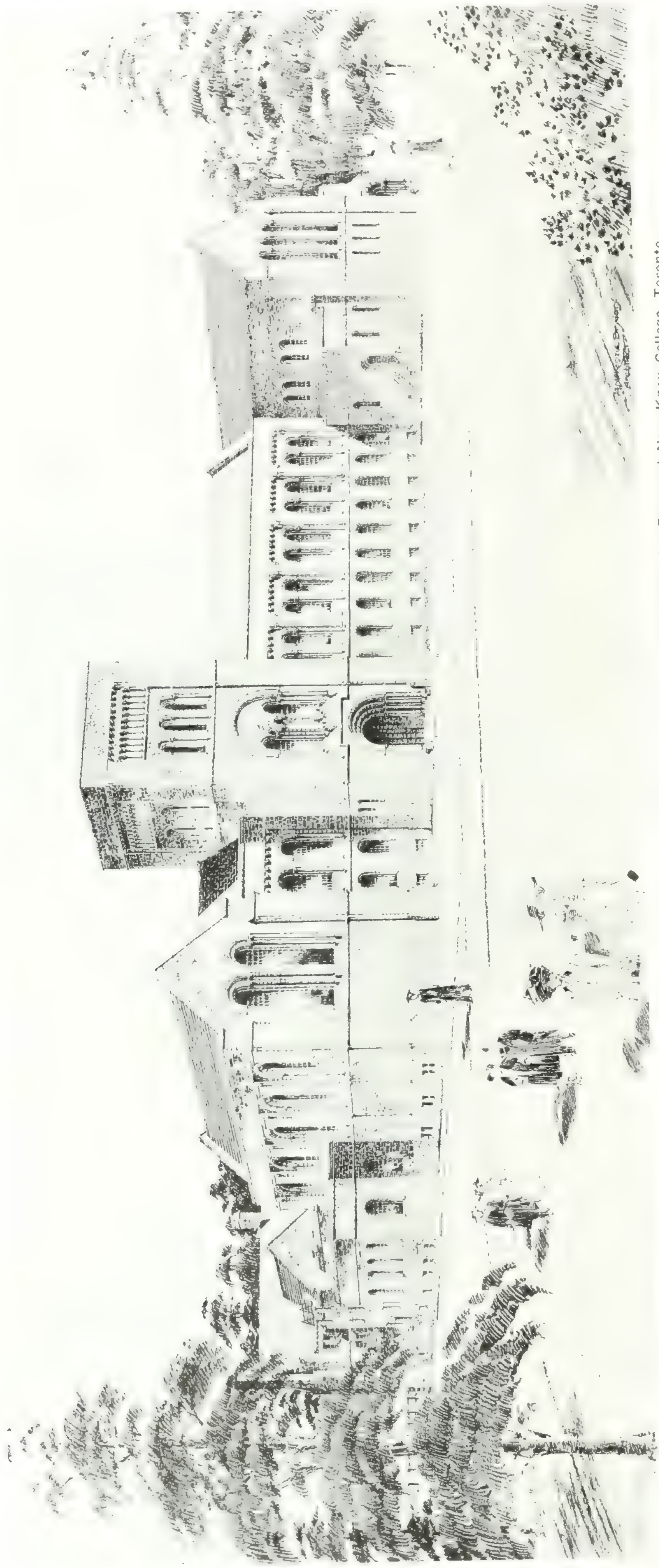
Competitive Design of Architect George W. Gouinlock for Proposed New Knox College, Toronto.



Ground Floor Plan, Competitive Design of Architect George W. Gouinlock for Proposed new Knox College, Toronto.



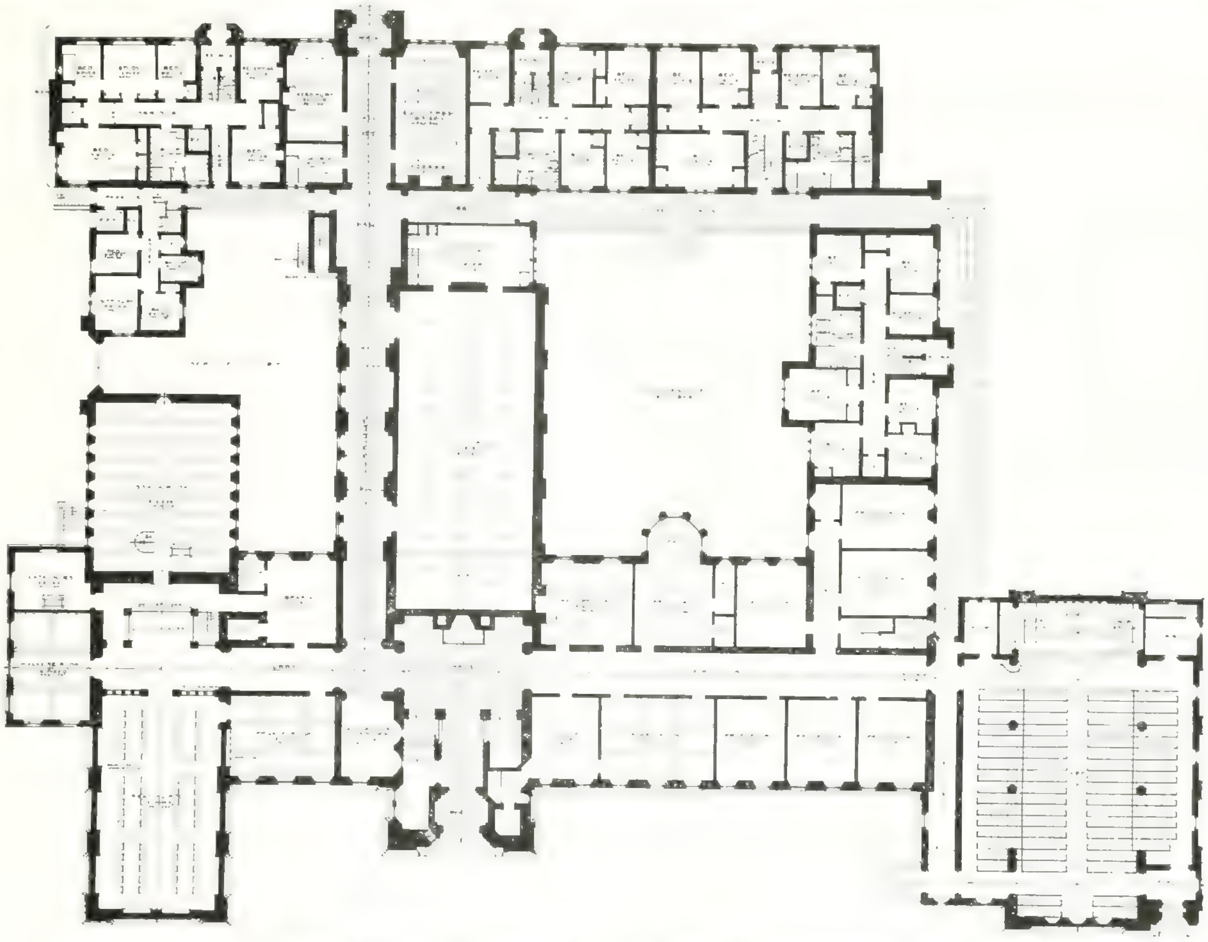
First Floor Plan, Competitive Design of Architect George W. Gouinlock for Proposed new Knox College, Toronto.



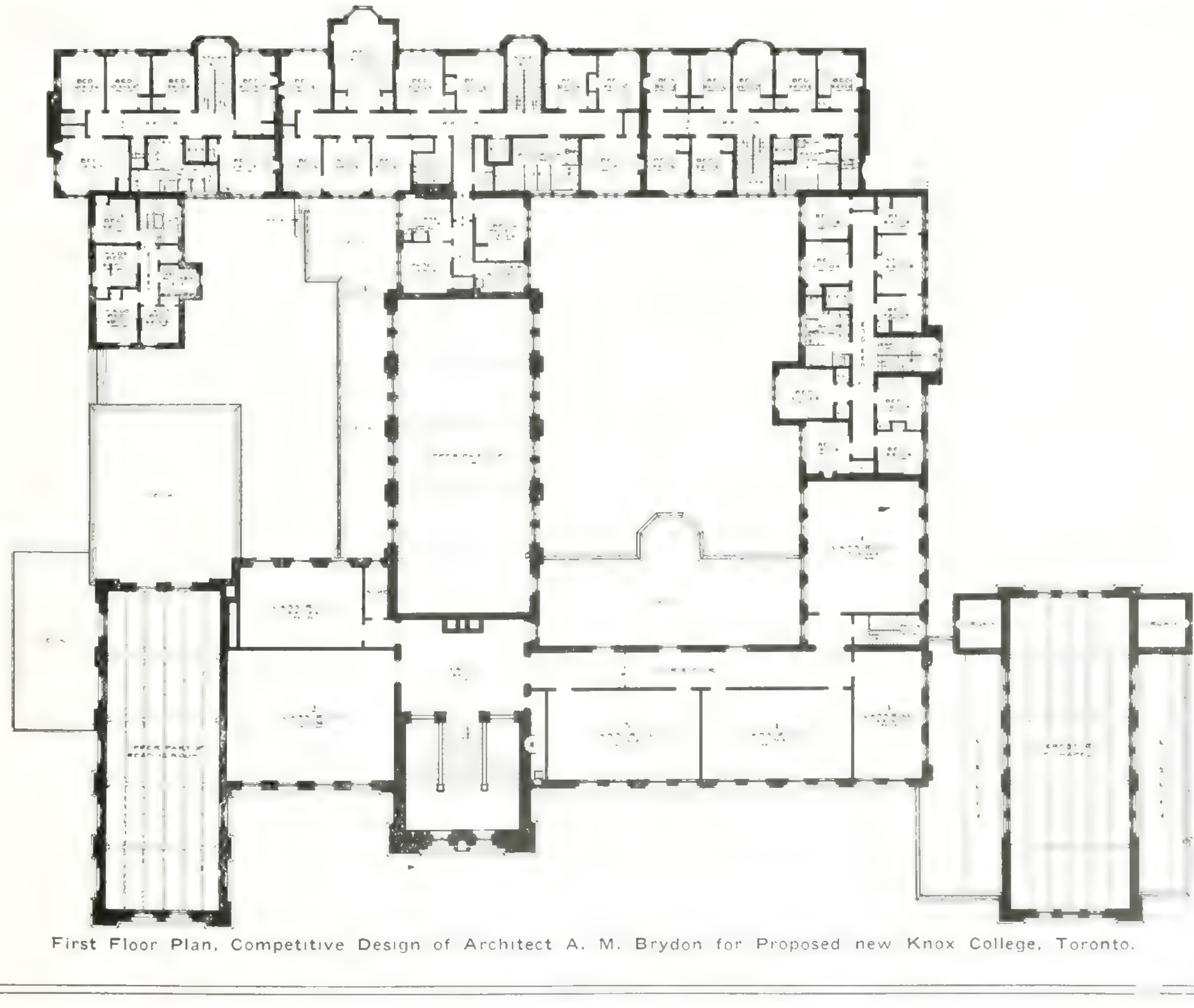
Perspective View (Overlooking University Lawn), Competitive Design of Architect A. M. Brydon for Proposed New Knox College, Toronto.

could be omitted for the present and built when funds are forthcoming. Both the entrance from the University lawn and St. George Street affords direct and dignified access right through to either side by means of a well-lighted and architecturally treated corridor, ten feet wide, which being centrally located, is designed a facility egress from the building equally as convenient from either side. The class rooms which have high ceilings are all placed on the ground floor overlooking the University lawn, and all windows are taken right up to the ceiling. These rooms have cross ventilation. The library has been planned to be of equal distance from the academic and residential portions. The librarian's office and delivery desk have been centrally placed, so as to afford means for the librarian to have complete supervision over the students not only when entering and leaving, but when occupying any of the rooms constituting the library section. All of these rooms are kept well together and are well lighted and ventilated, thus making this portion complete in itself. As regards the residential portion special care has been taken to make it as home-like as possible; the different hostels being planned so that they can be entered with an equal degree of convenience from the inside of the building by means of the communicating corridors, or from independent outside entrances. The common room has been centrally placed so as to make it equally accessible to any of the three hostels. A special feature has been made of the dining hall both internally and externally, this portion being cut off from the rest of the building by a corridor providing ample light and ventilation, which would effectually prevent any odor from entering the main building. The kitchen and offices are placed immediately adjacent on the same floor. The steward's residence and servants' quarters are also cut off from the students' section, while the hospital ward which has been located on the first floor, is competely isolated from the rest of the building.

The exterior has been designed in a simple style, with mullioned windows and stone copings and strings, well in keeping with University College and eminently suitable to a scholastic building. It is intended that the walls should be of light Credit Valley stone laid up in irregular coursed ashler, with cut jambs and reveals; the roof of green slate, and the interior fireproof throughout. Regarding heating and ventilation this has not been taken up in detail but it is intended that the system of heating would be of low pressure steam; while that of ventilation would consist of air drawn through ducts by electrically driven fans and distributed into class rooms, lecture rooms,

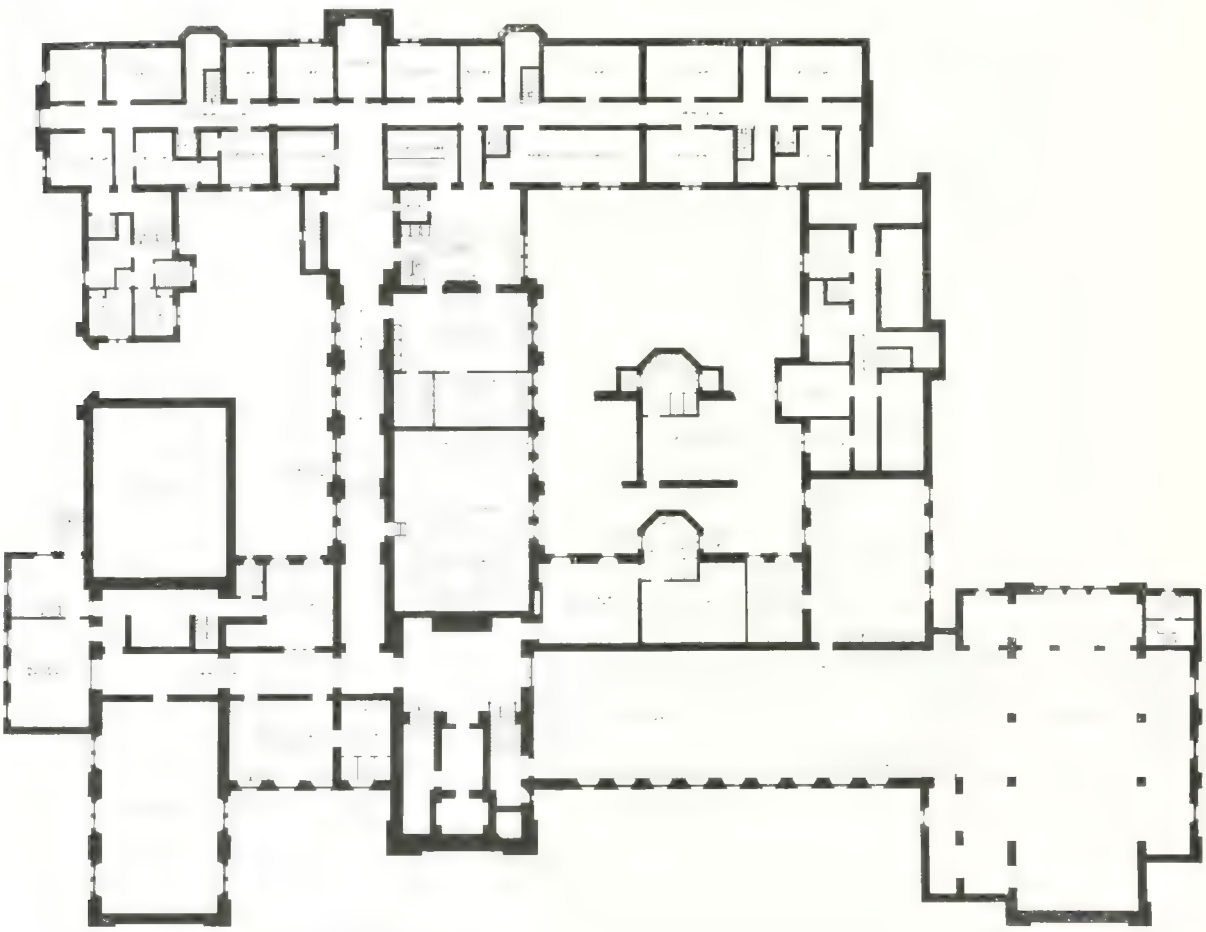


Ground Floor Plan. Competitive Design of Architect A. M. Brydon for Proposed new Knox College, Toronto.



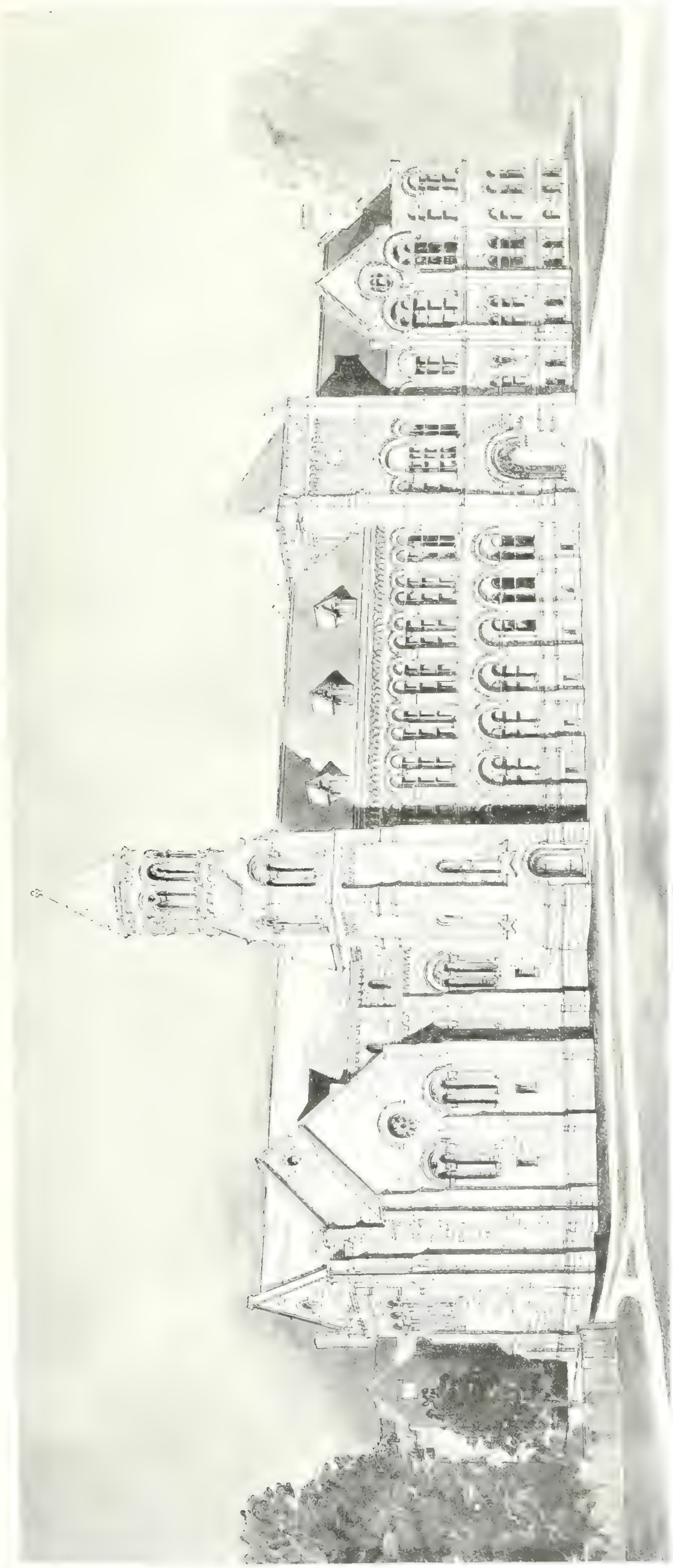
First Floor Plan. Competitive Design of Architect A. M. Brydon for Proposed new Knox College, Toronto.

West Elevation, Competitive Design of Architect A. M. Brydon for Proposed New Knox College, Toronto.



Basement Plan, Competitive Design of Architect A. M. Brydon for Proposed new Knox College, Toronto.

North Elevation, Competitive Design of Architect A. M. Brydon for Proposed New Knox College, Toronto.



Perspective View (Overlooking University Lawn), Competitive Design of Architect G. W. King for Proposed New Knox College, Toronto.

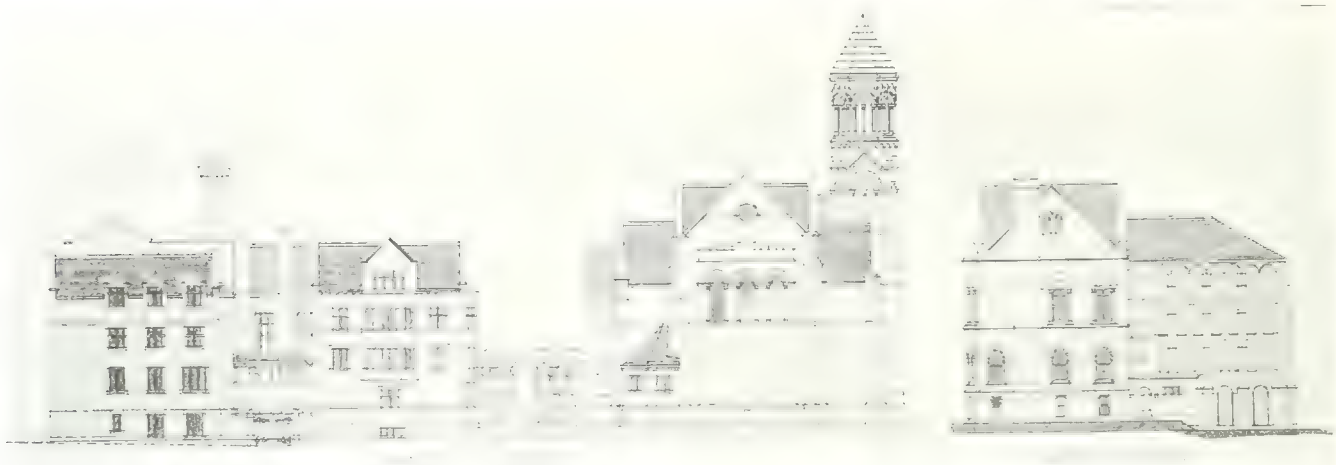
corridors, etc.; the fans to be placed in the roof space with a system of ducts for carrying the air from the different parts of the building and exhausting it at the ventilating turrets.

The cubical contents of the building (measured from the bottom of the footings to half way in the height of the roof are 1,048,709 cu. feet). The contract price for a somewhat similar building, fireproof throughout, was recently let at a figure equivalent to 38c. per cubic foot, including heating and ventilation. On this basis it is estimated that the sum available ($400,000) to be expended upon this building, is amply sufficient to carry out the work as designed in a substantial and satisfactory manner.

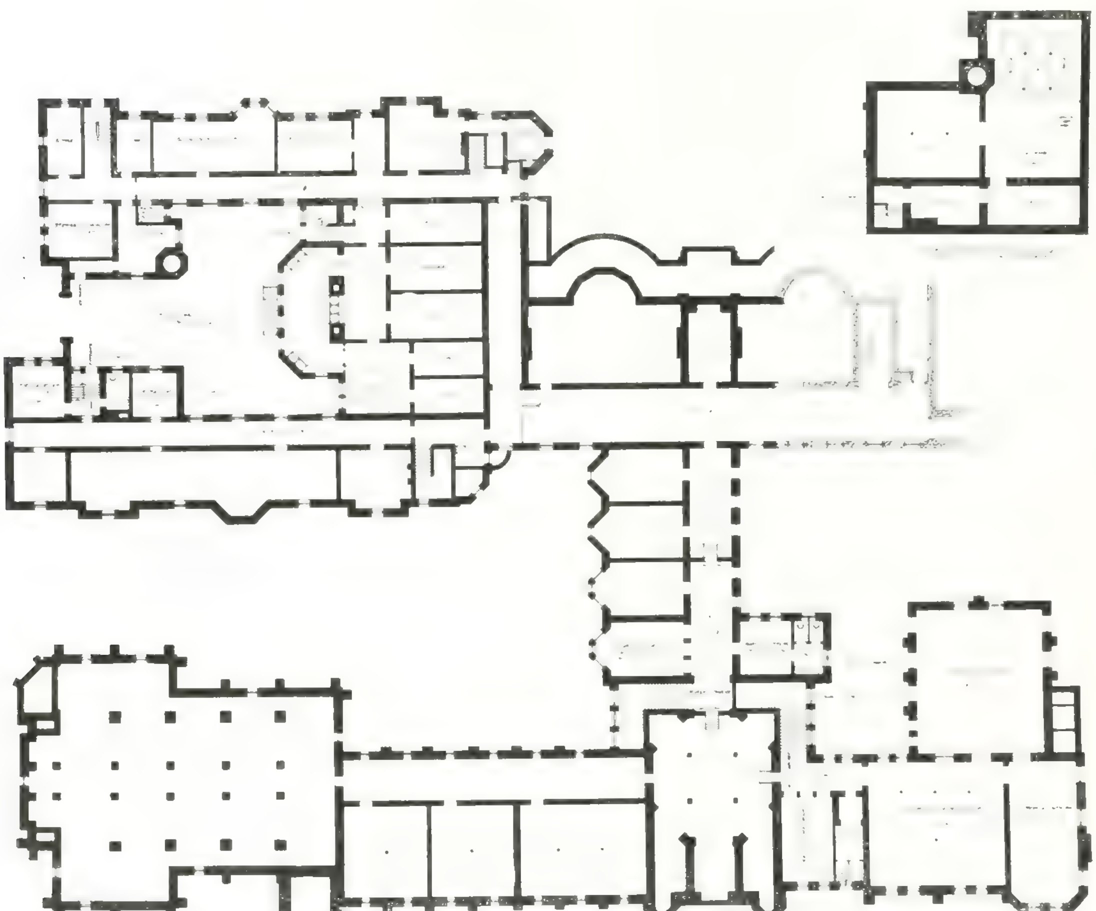
Architect G. W. King's Design

The key note of this design has been taken from instructions, as to the centre corridor directly communicating all buildings with entrances from University Lawn and St. George St., so that all persons leaving the buildings can do so equally convenient by either entrance. This has been taken to mean that all students must enter and leave their residential quarters as well as from other parts of the buildings through the main corridors by either one of these entrances. The exit doors adjacent to the staircase of the residential blocks leading direct to the open air are shown only for emergency, but should this not be the correct interpretation of the instructions, and principal entrances to the residential blocks be required, then with a little more prominance in the design given to the exits of the centre and south-western block, these can be obtained without in any way altering the general plans. However, a change in the south-eastern block would be necessary, and in this case, it is therefore proposed that this block be reduced 10 feet in length and an entrance made at the south end of corridor with staircase and reception room adjacent, necessitating the omission of four bedrooms. As shown in the plan, the accommodation has been provided in three blocks, and if the centre block is only partly built to roughly the 200 feet line, the accommodation would be as indicated. It was thought necessary to clearly illustrate this design, to draw the centre block complete, but if a reduction be required then a temporary staircase could be placed directly adjoining the St. George Street entrance at T. S. lavatory at T. L., and the common room divided for the time being.

The general reading and common rooms are centrally located and con[illegible]

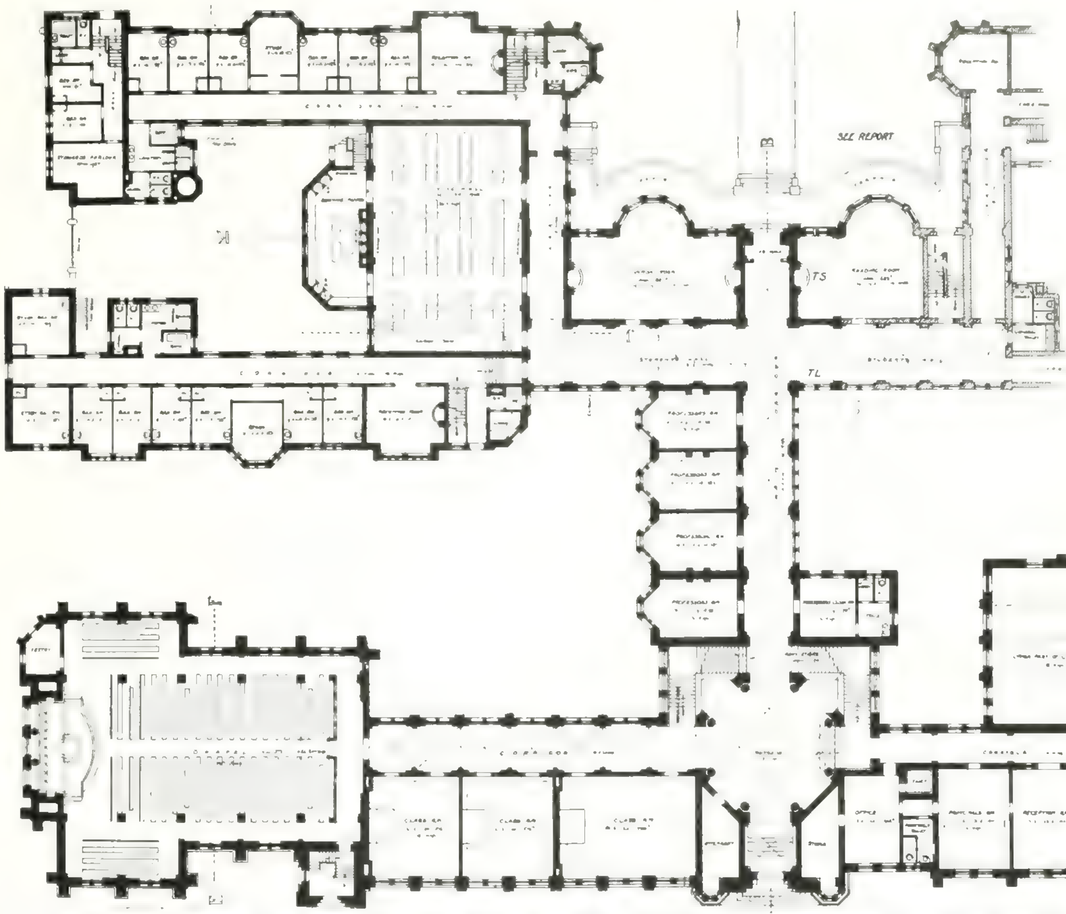


South and North Elevation, Competitive Design of Architect G. W. King for Proposed New Knox College, Toronto.

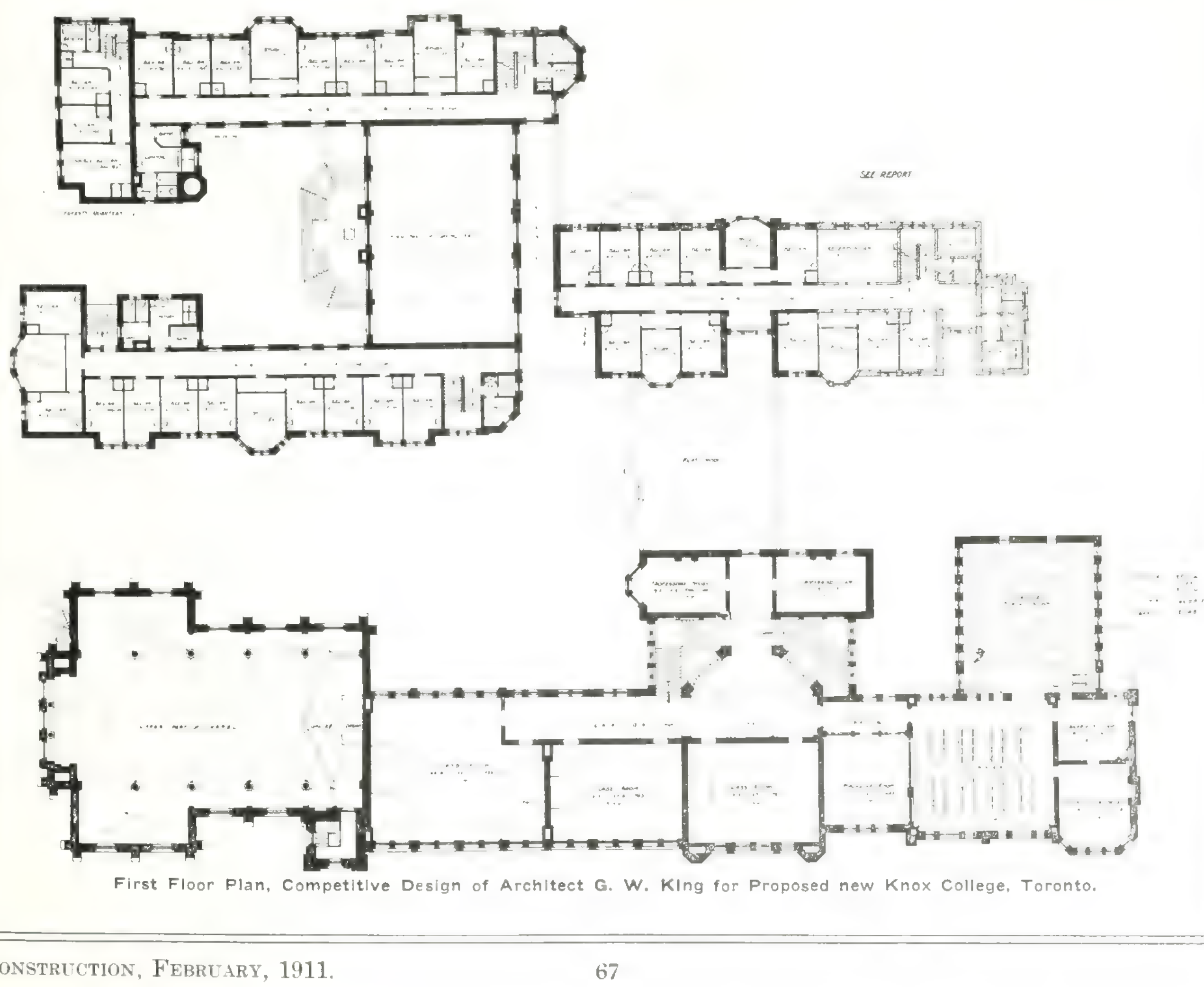


Basement Plan, Competitive Design of Architect G. W. King for Proposed new Knox College, Toronto.

West Elevation, Competitive Design of Architect G. W. King for Proposed New Knox College, Toronto.



Ground Floor Plan, Competitive Design of Architect G. W. King for Proposed new Knox College, Toronto.



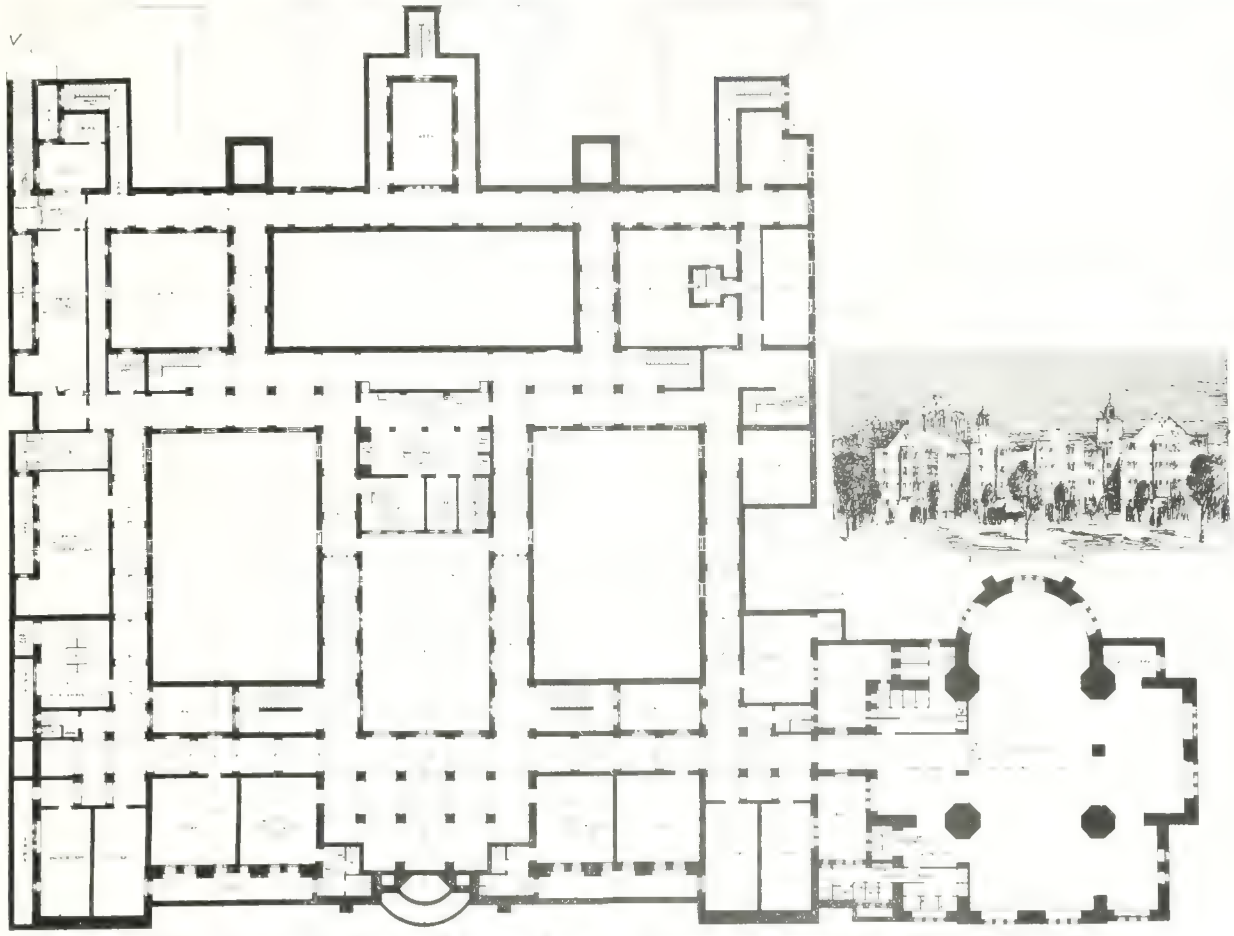
First Floor Plan, Competitive Design of Architect G. W. King for Proposed new Knox College, Toronto.

Perspective View (overlooking University Lawn), Competitive Design of Messrs. Bevan and Moore, for Proposed New Knox College, Toronto.

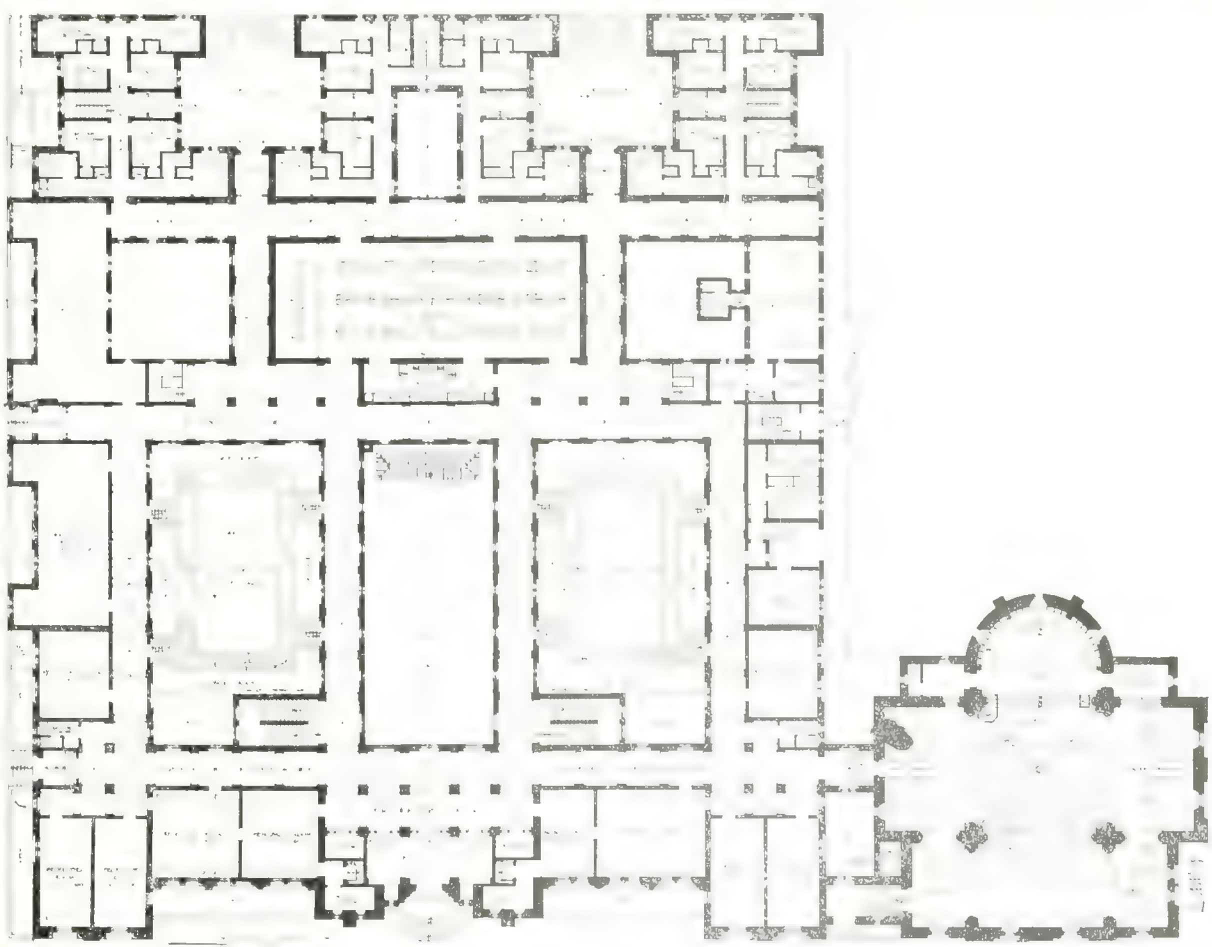
their rooms being situated off the centre corridor, the other two Professors' studies being placed on the first floor. The dining hall has been placed to the south of the main hall, with serving pantry adjoining and kitchen directly under and servants' quarters provided in the lower floor of the south western block, and a connected building at southern end for the accommodation of steward on the two lower floors and for eight female servants on the two upper floors. The steward's office is in direct communication with kitchen and servants' quarters and overlooking the kitchen yards and entrances, which yard is entirely surrounded on three sides (being open to the south) with buildings, making a complete and compact arrangement for the de- [illegible] from the front. The servants' bedrooms are entirely isolated, and the windows are so placed that there is no view from any window to students' quarters. The [illegible] to a minimum, the boilers which are entirely shut off from the servants' quarters, being placed under kitchen yard at a level convenient for the direct flow of steam to heaters on the lower floors.

Attention is also called to the position of the rooms for administration purposes, these being so placed that there would be no continual thoroughfare passing through this corridor. Allowance has also been made for a private entrance for the Governors. The height of these rooms are shown at 12 feet which gives additional height to lower floors for the proposed dressing and bath rooms. Space for gymnasium has also been arranged for under the lower stack room with a height of 18 feet without increased depth. All the class rooms have been placed on two floors, the large one being on first floor allowing for an additionally high ceiling. The library is well shut off, with direct communication to staircases placed over the administration offices; and the chapel has been placed prominently at the southern end.

As regards the character of construction, the scheme provides for the external walls of the academic block, above grade line, to be faced with an approved stone laid up in rock faced random rubble, having not less than 6 in. beds in ball, with 10 per cent. of surface bond stones running within 4 ins. of the internal face of walls and intermediate bond stones half through walls. All of this is to be backed up with hard stock bricks set in Portland Cement mortar, and lined with 4 in. hollow terra cotta blocks properly bonded with walls as



Basement Plan, Competitive Design of Messrs. Bevan and Moore, for Proposed New Knox College, Toronto.



Ground Floor Plan, Competitive Design of Messrs. Brown and Moore for Proposed New Knox College, Toronto.

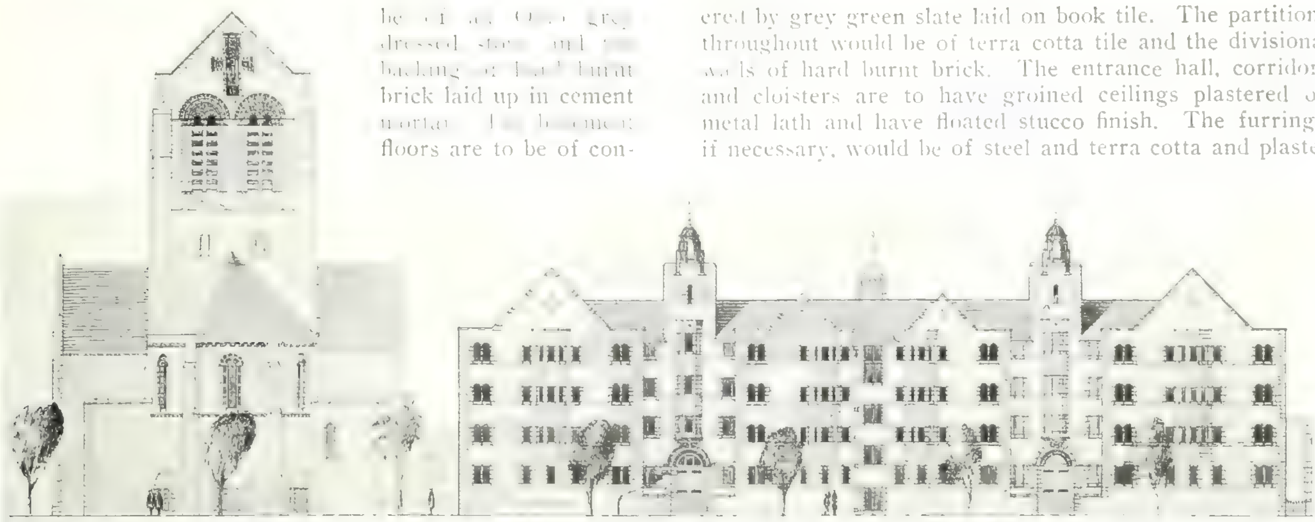
built. All beds over 6 ins. are to be brick sizes, and the cut stone work is to be as per details, perfectly bedded, bonded, cramped and dowelled where necessary, with face left from the tool. The face walls of vestibule, and the rotunda columns, arches and staircases of academic block, are to be of Ohio stone, with the staircases covered with patent non-slipable metal threads; while the internal walls are to be of hard stock brick laid in English bond in cement mortar and furnished with all necessary bond stones and plates, anchor hoop irons, etc. The floor system of the structure is to consist of steel beam encased in concrete with reinforced concrete slabs between wood sleepers and spaces filled with concrete. This will be finished with deafening and marble super-floors in class rooms and first floor corridors, and quarter cut oak in administration section. All corridors in students' sections of basement and ground story, as well as the lavatories throughout, are to have floors finished with marble terrenzo having 6 in. base turned up all around. The roofs will be carried by steel trusses and covered with hollow terra cotta or book tiles, finished with slate; the flat roofs to be asphalt direct on concrete. In the residential block, the main central corridor running north and south, and the vestibule of the St. George St. entrance, together with the floor and ceiling of reading and common rooms and the staircases leading to first floor level, are to be fireproof in character with the main hall and corridor finished in every respect similar to the academic block. The external walls of this building are to be similar to those previously described in connection with the academic block, except for the face walls around kitchen yard, which will be carried out in stock brick. It is intended to heat the buildings by low pressure steam; the steam mains to be run on ceilings of corridors for all radiators aboe lower floor, and separate mains in trenches under lower floor for all radiators on lower floor and return mains. The ventilation of the chapel, class rooms and library is to be obtained by heated fresh air ducts radiating from celler of the academic block, and supplied by a fan and electric motor; the foul air being drawn off by heated flues carried to the roof, and discharged through opening in tower. The cubical contents of the building, arrived at according to terms of programme, are 1,515,287 feet; and it is estimated on the basis made that the structures can be carried out in a substantial and satisfactory manner at a total cost of $367,640, including heating all other branches of the work.

Messrs. Bevan & Moore's Design

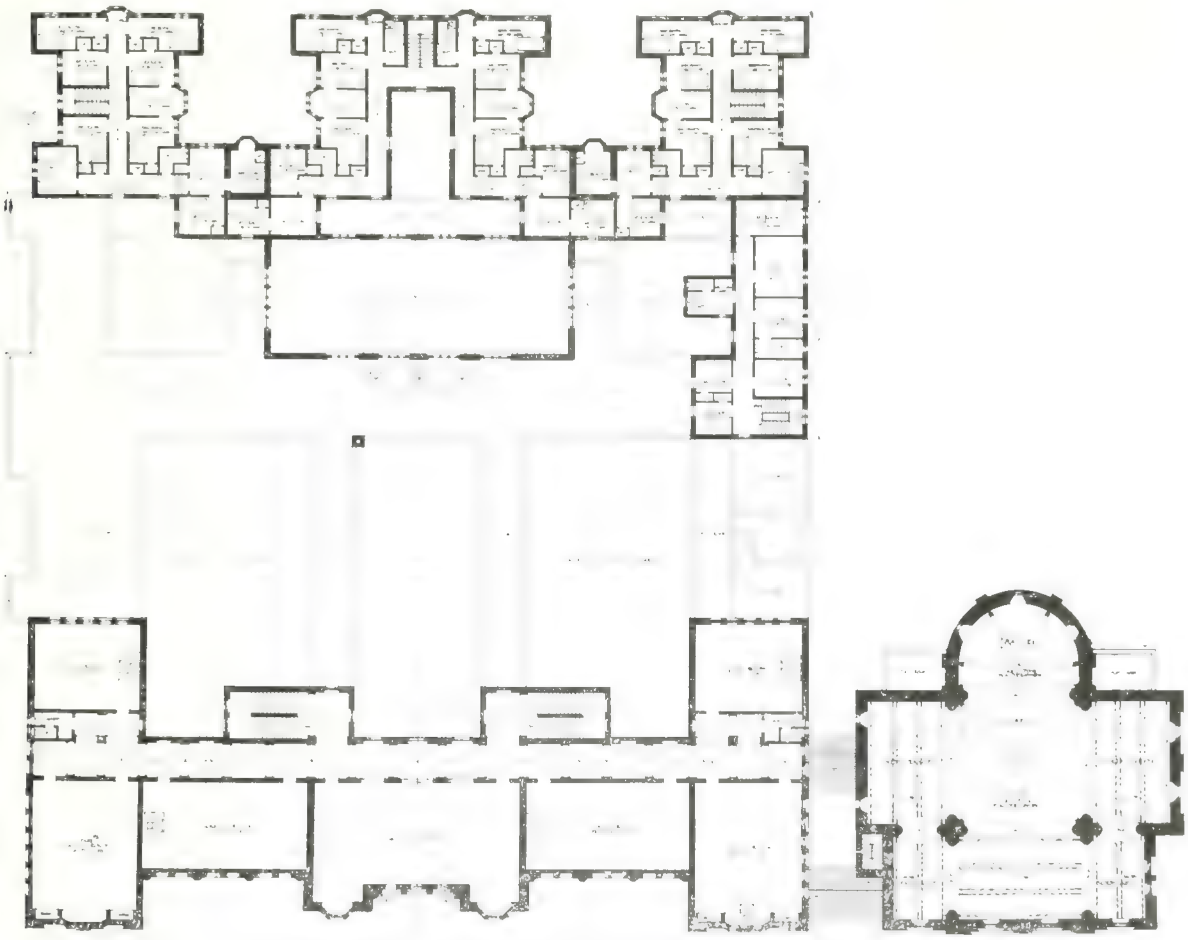
This design is based upon the requirements contained in the "conditions," and the objects have been to produce a scheme which should be at once simple and expressive of its purpose, well lighted in all its parts, and with spacious corridors and cloisters affording ready access to all parts of the building. As required the academic building has its principal entrance facing Universty Lawn, while that of the residential block is placed on St. George St. These respective blocks are connected by cloisters enclosing quadrangles. The principle entrance of the academic block leads to a specious vestibule with small rooms for janitor and telephone on either side, and opens on to a well-lighted hall with main corridor 8 feet wide running north and south. The principal's room with its laboratory and reception room are placed to the left (south) and the business offices and board-room to the right. The six Professors' rooms are located at the north and south end of the corridor, viz: thre eat each end with their respective laboratory accommodations. Two wide, easy ascending staircases enclosed by masonry walls, opposite the entrance hall, give direct access to the basement and the floors above. It will be noted that the various departments are arranged so that all rooms comprising each suite, are kept well together on one floor. For instance, all class rooms with necessary lavatory accommodations for men and women are placed on the first floor. These abut the wide corridor and are unilaterally lighted from the left side. The library department, situated on the second floor, is also compactly arranged. The large and lofty reading roo mwhich is centrally located, and the adjcining librarian's office which is separated from the stack room by glazed windows, as well as the private reading and magazine rooms, are well brought within a compass which permits of ready and complete supervision of the entire suite.

The chapel, which would seat 500 without the use of galeries, while designed to form a consistent part of the general scheme, is practically detched in plan and could, therefore, if necessary, be omitted until some future time without interfering any with the remainder of the group. As designed it is intended to be a feature in the scheme quadrangles are sufficiently large to secure plently of sun, light and air and should not only prove an advantage to the students, for retirement for studying and reading during summer months, but should form an attractive feature and pleasant outlook from the windows overlooking same. The four cloister walks would greatly facilitate communication between the academic and residential portions of the building, and with their groined plaster cellings should be architecturally attractive.

The residences which face St. George St. would be entered from two fore-courts, in which centrally situated would be the entrances to the main building under two small towers for the use of the public. The total accommodation on the four floors would be 97 bedrooms and 18 studies; if found necessary some of the studies could be utilized as bedrooms. All these rooms are arranged to be well lighted and ventilated. To the north of the dining-room, occupying the same relative position on the plan as the students' common room, is the hospital ward cut off from the rest of the building, with its nurses' room and ventilated lavatory block. The dining hall, which would form a feature of the residential block, is a lofty room centrally located and affording accommodations for 150 persons. This room is entirely surrounded by corridors and is, therefore, well lighted, well ventilated and easy of access. The kitchen is in the basement with scullery, pantry, store an doffices adjoining. A point worth noting is that the residences abut on a corridor enabling the students to enter the dining room, common hall, reading room, hospital ward and academic block under cover. The steward's apartments which have a separate entrance from the outside, are placed on the first floor, as are also the seravnts' bedrooms which are arranged so as not to be overlooked by the adjoining residences. Provisions are made in the plan to permit of an extension of the residences over the students' common room, in the form of a wing similar to the students' department on the north side. It would also be possible to make an extensio non the west end of the north wing of academic block. The chief characteristics of the period of work chosen, viz., Norman, being solidity and breadth of wall surface, it was felt that, as far as consistent with the requirement of the case, such characteristics should be embodied in the design; and whereas small windows so prevalent during the period of work would hardly be permissible in a modern scholastic building, an endeavor has been made to emphasize masonry features so that the windows would not be unduly in evidence. The chapel tower which is of Early Norman French character would dominate the buildings giving point and emphasis to the design, and constitute its crowning feature. The academic building has been designed as a fireproof structure, and by the use of automatic fire doors and shutters, the corridors in intersections may be cut off completely from the other buildings. The construction calls for super-structure walls of Credit Valley grey stone laid up in random work of similar character to the masonry in the main building of the Toronto University. The trimmings would be of [illegible] Ohio grey dressed stone and the backing of hard burnt brick laid up in cement mortar. The basement floors are to be of concret by grey green slate laid on book tile. The partitions throughout would be of terra cotta tile and the divisional walls of hard burnt brick. The entrance hall, corridors and cloisters are to have groined ceilings plastered on metal lath and have floated stucco finish. The furrings, if necessary, would be of steel and terra cotta and plaster



West Elevation of Chapel and Residential Block, Competitive Design of Messrs. Bevan and Moore, for Proposed New Knox College, Toronto.



First Floor Plan, Competitive Design of Messrs. Bevan and Moore, for Proposed New Knox College, Toronto.

crete, and all other floors and the flat roofs of reinforced concrete (slab construction on steel beams); the roof to be carried by light steel trusses and frames, and cov-

South Elevation of Residential and Academic Blocks, Competitive Design of Messrs. Bevan & Moore, for Proposed New Knox College, Toronto.

of three coat work on metal lath. With the exception of the administration rooms it is proposed to make the interior finish of hospital character, the plastering to be returned into window frames and wood trim omitted wherever possible. It is intended that the superstructure walls of the residential section should be of similar materials and construction to those in the academic block with the exception of the area rear walls, dining room, serving pantry, etc., which would be carried out in grey brick. The general floor and roof construction would be of wood frame carried on walls and steel beams where required, and the corridor floors of reinforced concrete. The building would be heated by a direct system of a low pressure steam; cast iron radiators being placed throughout in convenient positions, and the heat supplied by the central heating system circulating through a proper system of flow and return pipes. A plenum supply and exhaust system is proposed for the academic block, with supply and exhaust fans located at convenient points and operated by electric power. These could be so arranged that they could be cut in or out at such times as would be required. The ventilation of the dining room would be outwardly through the serving room and kitchen. The laboratory ventilation, of course, would be separate; the exhaust through the laboratories creating a vacuum, while all corridors, etc., would be a source of air supply. The estimated cubic contents and cost submitted herewith are the result of careful accurate figuring based on experience in the erection of buildings of a similar nature. Due allowances were made for the difference in character, architecturally and structurally of the various buildings.

	Contents.	Cost Per Cub. Foot.	Total.
Academic Building	568,392	.30	$170,517
Residential Building ..	556,041	.25	139,010
Residential Building ..	111,733	.22	24,581
Chapel	363,391	.37	135,000
			$469,108

The figure of $135,000 for chapel is on the basis of complete scheme, as shown by drawings.

Architect A. M. Brydon's Design

The general scheme is strictly in conformity with the published condition. The educational department of the academic block, which consists of six class rooms, six professors' rooms, principal's room, reception room, board room, office, etc., is arranged to the east, keeping the class rooms all as far as possible to the main front. The professors' rooms are planned in conjunction with a private stairs. In the staircase is enclosed the professors' lavatory, which is private and easily accessible from both floors. The principal's room is conveniently grouped with the office, board room and reception room, and is in a quiet part of the building with windows facing the quadrangles. The reception room, which is placed next to the entrance hall is easily reached by professors and visitors, and is especially convenient to the principal's room.

The library department forms the south wing of this block. By keeping the reading room east and west, and well back to the building line, good lighting is permanently insured. The magazine room can only be entered by passing the desk and efficient supervision of all the tables in the main reading room is secured. Access to the private reading room is obtained by two entrances. One is under complete supervision, and is easily reached from the distribution desk; while the other is intended for the private use of the faculty. The books can be called for by speaking tube telephones between the room and the desks. This makes it unnecessary for the members of the faculty to enter the general portion of the library. The librarian's office can be reached from both the corridor and the desk, while convenient to it and the desk is a cataloguing room. This latter room is situated over the receiving room to which it connects with a book elevator. Provisions are made in the basement for a file room for the storage of back numbers of periodicals and papers. The stack room of three tiers and of ample capacity for the number of volumes required. The wall construction would be of white enamel brick and the floor of white marble slabs, insuring complete lighting. Bookcase recesses are provided for under the windows of the main reading room.

While the chapel is connected with the main building it is so planned that it can be omitted and erected at a later date. Should the building of the chapel be delayed, the door at the north end of the corridor could have outside steps and a vestibule, the door to which could be used as a private entrance for the faculty. After the erection of the chapel, private access would be obtained from the south east chapel entrance. The basement plan provides for a gymnasium extending from the tower to the north wall of the chapel. This allows for a circular running track over 100 yards in length, which could be suspended if so desired. The north wall would be carried on girders built in with steel supports during the erection of the main block, the filling being knocked out when the chapel is built. The residential portion, which consists of four separate houses, is arranged on St. George street, and then returns eastward to the north block. Access to each house is gained by the basement, and sleeping accommodations are provided for 95 persons. The steward's house, with servants' apartments above, is entirely separate from the students' quarters; while the maids' bedroom windows are kept outward from the court and cannot be overlooked from this side. The janitor's and fireman's bedrooms, with lavatory accommodations, are also in the steward's wing, and a freight elevator is provided for the easy delivery of stores, which are taken down to the receiving room and then conveeyed to the various store-rooms near the kitchen premises. The students' boxes on arrival would be delivered at this entrance and then conveyed through the basement to the particular house to which they were assigned. The hospital is centrally situated, and is arranged so that it can be completely isolated if necessary. The plan permits of the nurse leaving the building by the iron stairs from the deck roof, and this latter feature could also be used by a convalescent patient for exercising purposes. One or two rooms can be cut off as required, and food for the nurse and patients would be supplied by a dumb waiter from the pantry.

The construction of the academic block and the main dining room would be fireproof with terra cotta floors and partitions, and care would be taken to deafen the class room partitions with slagwool. The residential block would be of good ordinary domestic construction, while all internal partitions wherever superposed would be carried up in brick. All outside walls would be Georgetown rubble work backed with brick, and all heavy walls would be hollow so that the plastering could be done directly on the brick. The basement walls as well as those of the stack room would also be hollow. The trimmings would be of Bedford limestone and all opening windows would have steel casements or hoppers. In the residential block the division walls are carried up above the roof to prevent spread of fire; and the openings in the basement and kitchen offices which penetrate these walls would be protected by fire walls.

The ventilation of the educational block, building and dining room would be on a forced draught system. Two fan chambers would be used to supply the fresh air, one situated over the dressing boxees having a 10 foot by 6 foot ceiling and drawing the air from the quadrangle. Theo ther fan would draw air from the east front of the building. The air taken from these positions would be free from dust since it would be obtained from large grass areas. The use of two fans has the advantage of reducing the dimensions of ducts, which in a building of this size would be considerable. The extra cost on the fans would be covered or largely reduced by the smaller cost of ducts. The extract fans would be situated in a chamber 10 feet 6 inches high in the tower over the belfry. The ducts in the roof space would connect to two ducts in the belfry and the foul air passing up through the fan would discharge from a louvre in the tower roof. The fresh aid would enter 8 feet above floor lever, and be drawn off 6 inches below floor level. No air would be blown into the lavatories, but a small fan would extract from them. The air supplied the chapel would be allowed to escape in flues from the floor, depending on internal

(Continued on page 74)

CONSTRUCTION

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

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

Vol. 4 Toronto, February, 1911 No. 3

CURRENT TOPICS

CERRO DE PASCO, PERU is the highest town in the world. While there are mining camps and Indian villages at a great elevation, there [illegible] with a railway station, telegraph, [illegible], shops, clubs, hospitals and [illegible]. Cerro de Pasco is 14,200 feet above the level of the sea, and it is a wonderful example of South American enterprise.

* * *

THE CURVED BRIDGES OF JAPAN are of three kinds—first, those known as spectacle bridges, with an arch in the centre suggesting a pair of spectacles; second, the camel back bridges, which go up very high indeed; third, the ordinary one arch, semi-circular bridges. The reason the Japanese so often have curved bridges is because until modern times they could not build them flat, and even to-day there is no keystone to the Japanese arches. A great many of two classes of bridges—the camel back and the high curved bridges—are found in the palace grounds at Pekin, in China.

* * *

CONCRETE CONSTRUCTION, both block and monolithic form, is being extensively adopted for basements and foundation work, facings, door and window sills, etc., in the rebuilding of Campbellton, N.B. The past season saw a large amount of work of this character carried out in connection with the erection of permanent buildings; and at the present time during the quiet of the winter months, a large number of contractors are busying themselves with the preparation of forms and molds in anticipation of a widespread use of this material in the spring and summer periods.

THE PALLADIUM, the new music hall, built on the site of the old Hengler's Circus in London, is said to be a wonderful place of its kind. Its stalls alone will seat nearly 1,300. Its palm court will give tea to a thousand at once. It has a larger Royal Box than any in London, a post office on the premises, writing-rooms and tape machines. It has a Louis Quinze salon with a ceiling that "almost exactly resembles porcelain."

* * *

FIVE HUNDRED MILES OF TRACK will be constructed by the C.P.R. in the West during the coming summer, according to a statement ascribed to Vice-President William Whyte of the company. This will include the completion of a double tracking of the line between Winnipeg and Brandon, in addition to considerable double tracking around Moose Jaw, which is becoming an important shipping centre. It is estimated that the work will cost $10,000,000.

* * *

A HOTEL CONTAINING 1,600 ROOMS and one thousand baths is to be erected in New York City on a site bounded by Broadway and Sixth avenue, Thirty-third and Thirty fourth streets. The accommodations to be provided will be considerably in excess of anything now offered by present existing world famed hostelries. The structure is to be known as the Greely Square Hotel, and will be built at an outlay of $14,000,000. It is to be ready for occupancy September 1st, 1912.

* * *

THE CLOCK IN THE TOWER of the Metropolitan Building, New York, is the largest four dial clock in the world. Its dials are 26½ feet in diameter, the minute hands 17 feet long, and the numerals 4 feet high. Some idea to the giant mechanism required in its operation is obtained from the fact that the hands on each dial weighs 1,700 pounds alone. Connected with the clock is a chime of four bells, while at the top of the tower, 700 feet from the ground, is a lantern, from which the quarter-hours are recorded by an electric flash which can be seen for a distance of thirty miles by over six million people.

* * *

BOMBAY AND CALCUTTA, according to a despatch from the latter city, are about to be rebuilt on a colossal scale by the British Colonial Government in order to rid those ancient communities of the danger from plague, which for years has proven such a menace to civilization. The scheme of improvements includes miles of new roads to run through the congested districts, and the establishing of parks and up to date tenement houses. Trolley lines are also to be built, and sewers and other sanitary advantages as well are to be provided. The cost of rebuilding the two cities will be approximately $53,000,000, or about $26,000,000 in either case. On this Continent, it is said, the expenditure for a similar project would be greatly in excess of this amount.

* * *

A NEW METHOD of drying humid walls, says the *Slate Trade Gazette*, has been devised by a Belgian architect. It consists in embedding inclined porous tubes in the walls, the direction of the tubes in plan being perpendicular to the wall surfaces. By capillary action these tubes continually absorb moisture from the wall, for the air which they contain, being in the same hygrometric condition as that of the interior of the building, is relatively dry, and readily takes up the moisture. The act of vaporizing ensuing therefore reduces the temperature of the air passing from the tube and being constantly replaced by dryer and warmer air. The tubes are placed sufficiently close together to leave no intervals between their zones of influence. In new buildings the places for the tubes are left, but the tubes themselves are not inserted until the mortar has set. It is stated that the method has been tried at Versailles.

RECENT REPORTS state that the Australian Government has selected Canberra, New South Wales, as a site for a new capital city, and that architects and landscape artists from practically all parts of the world will be invited to submit competitive designs for the proposed buildings and the laying out of an elaborate ground scheme. The site is described as lying among a series of hills of slight altitude, with exceptional advantages for the location of the principal buildings. It will probably be some little time before an actual start will be made on the projected structures, although the Government has already appropriated a substantial sum for the preliminary work.

* * *

ORGANIZATION is now being perfected for the Ninth International Congress of Architects to be held at Rome next year in connection with the Jubilee Exhibition. Among questions to come up for discussion will be: (1) Armored cement, as used in various countries, and the possibilities of its being utilized for large buildings of a monumental character, having due regard to the technical and decorative asptcts of the question. (2) Rules governing international competitions in architecture. (3) Regulations and plans relating to buildings and artistic considerations in towns. (4) Professional instruction and diplomas for architects. (5) Duties and privileges of architects in relation to their clients. (6) Practice of architects of various nationalities.

* * *

A PORTABLE THEATRE, offering the advantages and comforts of a modern playhouse, is a new feature in the French theatrical world, which will start on a journey through France in the early part of April. This unique "Thespian chariot," as it is termed, is the outcome of an idea conceived in the mind of M. Gemier, director of the Theatre Antoine, Paris, to give the less populous and secondary cities an opportunity to enjoy a higher and more consistently staged class of attraction than those to which they are usually accustomed. The theatre is built on the principle of the balloon shed, and it will be hauled in vans drawn by eight road locomotives. Though portable, everything necessary to a first-class theatre will be incorporated in its make-up, including properties, stage, and what is more essential from a box office standpoint—an auditorium that will seat an audience of 1,500. It will also carry its own lighting and heating system, together with a fire-extinguishing plant, consisting of an electric rotary engine, and a tank on wheels which will be filled before each performance. The company will comprise twenty players, an orchestra, and forty carpenters and stage hands.

* * *

ALTHOUGH INNUMERABLE VISITORS have seen the round tower of Glendalough, near Dublin, says G. H. Orpen in the Journal of the Royal Society of Antiquaries of Ireland, one feature appears to have been unnoticed by them, as well as by archæologists. Almost directly under the elevated doorway, about 15 in. above the slightly projecting base is a rectangular hole about eight by six inches, pierced right through the wall. The two side stones of this hole are "thorough stones," and it is roofed by two stones. The wall is about four feet thick, and the doorway about 10 feet above the ground. What was the purpose of this hole? It was certainly an original feature, and this was not a loophole for a missile. In all probability it was a spy-hole, to enable the occupants of the tower to ascertain, before opening the door, who was demanding admittance. Such a squint was not uncommon in after centuries beside the doorway of castles and even of ordinary houses. There is an example at Athlone, in a house near the bridge, bearing the date 1632. . Mr. Orpen says that if his interpretation is correct it supports Peirie's theory that round towers were erected as "keeps" as well as belfries.

CAREFUL INSPECTION is necessary while stucco work is in progress, says a writer in the Architects' and Builders' Magazine, to see that the wire or metal lath is properly fastened and that the stucco is properly mixed of good ingredients and is applied in sufficient thickness. Usually two coat work totals in thickness not much over one half inch. This runs close to the limit of safety and a one inch coating is sure to be far more satisfactory, lasting and durable. The writer calls to mind a house on Long Island where the wire lath was fastened directly to the studding and a stucco rich in cement troweled on to a thickness of about one inch on the face squeezed through to the back, forming a bond about one quarter inch in thickness. This house has stood for years. The walls are uncracked, because the foundations were good, and the house has always been dry inside and easily heated in winter.

* * *

IT IS ABOUT TWO YEARS since Mr. Gifford Pinchot, then Chief Forester of the United States, having made, under the instructions of the Federal Government, an inquiry into the timber resources of the States, reported that at the present rate of consumption the timber limits of the United States would be all gone in twenty three years. This estimate is alarming, not only on account of the source from which it springs, but also because it is admittedly based on the assumption that the present rate of timber consumption in America will remain at to day's figure. Statistics show that, notwithstanding the great increase in the use of concrete, iron, and steel throughout the United States, the use of timber per head of the population was almost doubled in the past twenty years. The stumpage, or standing timber, of the United States is currently estimated at 1,400,000,000,000 ft. This was the figures accepted by Mr. Pinchot when he made his famous estimate of the complete exhaustion of the forest reserves of the United States in twenty-three years from 1908. But some authorities have put the standing timber as high as 2,000,000,000,000 ft., and, accepting that figure, the evil day might be postponed for thirty-three years. In a portion of the Southern States of the American Union a relatively small belt of valuable timber is left, chiefly cypress, cedar, and long leaf yellow pine, but it is estimated by the best authorities that within seven years this belt will have been cut clean. In Eastern Canada, deforestation has proceeded at the same rapid rate as in the Eastern States of America. The virgin forests have been cut away, with the exception of isolated belts which are held by strong hands. Eighteen years ago standing timber in Ontario was practically worth nothing. A settler clearing his land for crops would then have been glad to get $2.50 per 1,000 ft. for the cut timber, which would just about have paid for clearing the ground and hauling the timber to market. To-day such timber would fetch at least $14 per 1,000 ft.

KNOX COLLEGE COMPETITION.—Continued from page 72.

pressure. Air would be blown into the corridors of the dwellings, and rooms not having open fireplaces would have flues leading to the roof space and there connected to the chimney stacks, and operated by asperation coils. Separate extract ducts would ventilate bathrooms. The heating of the entire building would be from the boilers placed under the dining room. A low pressure gravity return steam system would be used. Direct radiation would not be employed throughout. The various sections of the building would be under separate control so that the engineer in charge might cut off any portion if necessary.

MODERN NAVAL ARCHITECTURE

By HERBERT M. CLARK

Unique interior treatment of S.S. Royal Edward. A beautiful example of the architect-decorator's art. Attention to lighting, both natural and artificial, essential. Elimination of waste spaces feature of plan.

THE CLOSE RELATION which the work of the naval architect bears to the work of his colleague ashore may not be readily apparent. Yet it is a fact that the architect who designs hotels, residences and like work may study with great advantage the architecture of a modern steamer. In each case the designer is confronted with the same great problem—the successful combination of utility with beauty. And, though we workers on land may lack the unlimited financial expenditure permitted to the architect of this steamer, let us remember that the naval architect, too, has to effect economies. He must economise space to a degree that few of us suspect. He must utilize every square inch of surface and then beautify it, and as he works within limitations and under difficulties which are not of his own making, his methods are worthy of study.

One of the best examples of modern architecture is the steamship "Royal Edward," not only on account of the original and graceful treatment of the interior of the vessel structurally, but also on account of the fact that the public rooms and *cabines de luxe* are magnificent and unique samples of what can be done by the architect-decorator when, unhampered by any financial restrictions, he is permitted to work out in absolute harmony of detail the creations of his mind. Such work is rare on sea or land. Let us, therefore, make a brief examination of this vessel, confident that by so doing we shall gleam many valuable ideas and some valuable lessons. Glance, for example, at the illustration of the principal stairway and entrance hall. By means of a large and handsomely designed well overhead, ample natural light is provided over the staircase which gives easy access from deck to deck and is convenient to both public and private rooms. The illustration shows the hallway in dark panelled wood, the ceiling, in plaster panels, is framed by dark oak ceiling beams, which contrast pleasantly with the light colored plaster. The design of the wrought iron balustrade is bold, yet light and open. Notice how the disposition of the staircases and especially how the graceful sweep of the balustrade enhance the effect of spaciousness, an effect which the photograph does not adequately convey.

Within the prescribed limits of steamship architecture it is no mean achievement to light, satisfactorily, a dining saloon sixty feet by seventy-five. The result so successfully attained is due in a large measure to the adoption of a decorative schme of cream and white colors which have the further merit of giving a "freshness" so advantageous in a dining saloon. The decoration is Georgian, but, by a skilful use of circular windows, graceful supporting brackets, and much beautiful executed carving, the architect has avoided the severity so frequently present in the Georgian style.

The ceiling consists of white panels of simple design separated by beams bearing a carved conventional design. It is studded with delicately shaped lamps of cut glass and bronze, which present a delightfully sparkling, jewel-like appearance. In the centre is a lofty glass dome which sheds a silvery light to the central area of the saloon, and also assists in ventilation. The upholstery is rose pink and the floor of polished teak is laid with Wilton carpet runners to harmonize. The entrance doors opening on the grand staircase are of polished nut brown mahogany. The great charm of this saloon is the effect of "airiness" and space, together with the exquisite wood carving which is reminiscent of the best period of Grinling Gibbons. Indeed, the carving around the entrance doorways invites comparison with the best productions of that master worker.

The dome of the dining saloon, to which reference has been made, is carried up through the centre of the library, where it forms practically a large circular air-shaft of glass, conveying a toned light to the centre of the room. In the hands of a less imaginative architect it might well have marred the appearance of the whole room, but it has been boldly utilized to secure a very striking effect. Picture to yourself graceful chairs and lounges of grey oak, richly upholstered in rare shades of green, with curtains and carpets harmonizing, a ceiling of panelled grey plaster with slender beams of dark oak, and at the far end, the glass fronted bookcase in similar wood. The walls are also of the same oak, with delicate beading and mouldings enclosing panels most exquisitely carved. The carving throughout is by hand, the most trivial fragment of a design being finished with exquisite care, and suggests the rich work in the Chateau of Rambouillet, with the atmosphere of

S.S. Royal Edward.

Section of Library, S.S. Royal Edward, Showing the Central Light Shaft which Forms a Continuation of the Dining Room Dome.

Main Dining Saloon, S.S. Royal Edward. Note the Effect of "Airiness" and Space, and the Character of the Decorations Throughout.

which the whole room is reminiscent. In the centre, the eye is attracted by the windowed air shaft, the interior of which conforms to the decoration of the dining room below and the exterior of it to that of the library—sedate white Georgian seen through a frame of luxurious Louis XV.—a striking contrast of styles very skilfully worked out. This room is most successful. The architect has utilized to the full the space at his command and he appears to have revelled in the task of surmounting the very great structural difficulties. The

Entrance Hall and Staircase, S.S. Royal Edward.

whole scheme of decoration, with its subtle blending of line and color, betrays the light hand of an artist.

Above the library is the music room, which is treated in the delicate style of Louis XVI., ivory-white woodwork, tastefully panelled, chairs and lounges of the same color, with rich upholstery of Pastel blue. The same thorough attention to minute details is again evident, whether it be clock or candle bracket, and it would be difficult to equal the daintiness of this beautiful saloon. The treatment of the piano side of the room is particularly happy. A semi circular recess, which is setteed, frames a grate fire chimney place, and above the chimney piece is a plain plate glass mirror.

In the centre is the ingenious lighting and ventilating well from the library and dining saloon below, which here tapers off to a small diameter. The clever treatment of this difficult subject and the decorative effect obtained is worthy of a brief description. A circular metal-work balustrade, oval shaped, protects a leaded glass dome which springs from the floor level in a graceful curve. This dome, which caps the air shaft at its larger diameter, supports a base on which rests a hollow column some three feet in diameter. This column supports, in its turn, the centre of the music room dome, and is quartered vertically by oak beading, presenting a twelve sided surface. Each surface is faced with small oblong mirrors placed vertically and latticed with brass strips in the manner of the celebrated Gallery of Mirrors in the Palace of Versailles. As the photograph shows, the work is beautifully executed and, in the delicate surroundings, the effect is unique.

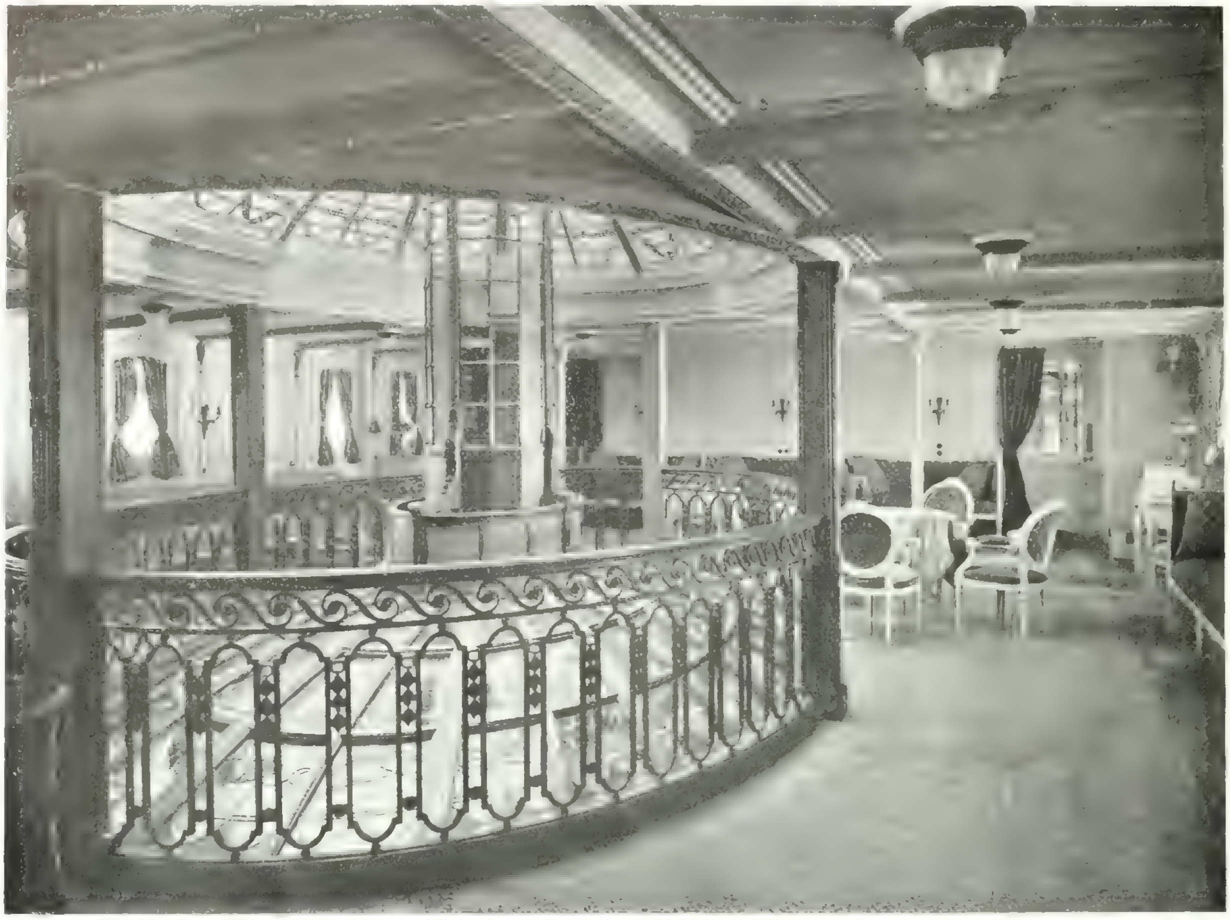
The smoke room, containing 2,000 feet of floor space, gave the architect great scope. He has taken full advantage of the possibilities and has produced a beautiful room. He has adopted the Elizabethan style—a happy choice, since the reign of Elizabeth saw the introduction of tobacco to the English-speaking world. Beneath a central glass dome, which is protected by a quaint iron grille, dull finished, are placed some fourteen most comfortable club arm chairs of red leather. These chairs are movable, and constitute a most agreeable departure from the cast iron convention of fixed chairs or immovable sofas. Surrounding these chairs, and leaving ample walking space, are a series of little bays, each containing table, chairs and lounge, and separated by false windows. All the upholstery is in red leather, which harmonizes well with the general scheme. The ceiling and walls are of square-panelled oak, and the posts supporting the old-time oak ceiling beams are in oak picked out with black wood. The floor is covered with interlocking rubber tiles. Details, such as quaint metal lamp shades, heavy oak chairs, even the old brass clock, combine to present a most successful reproduction of an Elizabethan baronial hall.

The cabines de luxe, each consisting of sitting-room, bedroom and bathroom, are treated in varying styles. Satinwood, oak, mahogany, walnut and other woods are used, each suite receiving individual decoration and being most tastefully furnished. They are most successful, the Sheraton suite, to take one example, being delightfully worked out. The architect has utilized to the full the possibilities of the various woods and, as elsewhere, has made every minute detail to conform and harmonize to the whole. The illustrations convey some idea of the excellence and daintiness of these suites.

We pass a series of bathrooms, which are of the most approved system and are laid with black and white encaustic tiles, and descending, glance at the installation of electric light. The power plant consists of three sets of

Detail of Dome, Main Dining Saloon, S.S. Royal Edward.

combined engines and dynamos, of the compound type, any two of which are capable of generating and supplying light equal to 28,800 candle-power, and of supplying the necessary current for a large number of cluster cargo lamps, and for all signal lamps, thermo-tanks, motors, fans, etc. The current is transmitted by insulated cable of high conductivity, all the wiring being done on the double wire distribution box system. The main switch-



First Class Music Room, S.S. Royal Edward. An Interesting Louis XVI Interior Finished in Ivory White Woodwork, with Pastel Blue Upholstering for Lounge and Chairs. Note the Treatment of Light and Ventilating Shaft above Library and Dining Salon.

Library, S.S. Royal Edward. Finished in Grey Oak, with Richly Upholstered Furniture in Rare Shades of Green, and Curtains and Carpets of Harmonizing Tones.

Cafe, S.S. Royal Edward—A Handsomely Appointed Interior in Regency Style with Panelled Walls of Light Oak. The Floor is of Light Oak Blocks, with the Grain of Each Block laid at Right Angle to the Next, forming a Subdued Chess Board Effect.

Smoking Room, S.S. Royal Edward, which Contains over 2,000 sq. ft. of Floor Space, and Offers the Comfort and Advantages of a Lounge Room in the Modern Club.

Sitting Room, Cabin de Luxe, S.S. Royal Edward. Note the Dainty, Refreshing and Inviting Appearance of the General Scheme.

Room in Private Suite, S.S. Royal Edward, Showing the Rich Wall Panelling and Ceiling Lights.

boards are fitted with ammeters, voltmeter and switch, pilot lamps and switches, double pole switches and fuses for each of the generators, and change-over switches and double pole fuses for each of the main circuits. The instruments are of the moving coil type, and the whole switchboard is arranged for easy handling. Two way switches are fitted for the electric lights, convenient to the berths in all first and second-class cabins, also two separate bell pushes; in addition, there are plugs for electric curling-irons in each first-class cabin. Space prevents more than a passing reference to other auxiliary machinery. Mention must be made of the unique Clayton fire extinguishing apparatus. This machine readily generates and delivers 25,000 cubic feet of fire-extinguishing gas per hour. By means of pipes led to each compartment the machine extracts the air, simultaneously delivering sulphur dioxide into it. When the fire is extinguished this gas is withdrawn by suction.

There is a complete refrigerating plant for fresh provisions and cargo and ice making machinery, and a distilling plant, consisting of two large evaporators, which produce one hundred tons of fresh water from sea water every twenty-four hours, and two distilling condensers producing 12,000 gallons of pure drinking water daily. The various pumps of the ship, connected up, could discharge 2,000 tons of water per hour.

The provision for the heating and ventilating of the steamer is equally adequate. To meet the changes of temperature experienced between Canada and England, the steamer is equipped with a thermo-tank system for both heating and cooling. These tanks are not only capable of renewing the air ten times in an hour, but are also capable of maintaining the air at a temperature of 65 deg. Fahr. with the surrounding atmosphere at zero. In addition to the thermo tank system there are electric exhaust fans throughout the ship.

Proceeding now to the upper deck we reach the last of the public rooms—the cafe. Perhaps here the architect was most handicapped, and his treatment of this room is an excellent example of good work produced under difficult conditions. Exigencies of space have required a low ceiling—low, that is, in comparison with the loftiness of the other public rooms, for although ten feet separates ceiling from floor, the ceiling necessarily appears low in a room some forty five feet square. Yet, in spite of these limitations, the architect has secured a light, warm effect, unmarred by any sense of oppression overhead. He has chosen the Regency style, the walls being of light oak, with carved panels of graceful design and of varying breadth, so well disposed that an excellent balance is secured. The floor is of square light oak blocks, the grain of each block right angled to the next, forming a subdued chess board design which, being of the same light color as the walls, helps to secure a receding effect. The furnishings are faultless examples of Louis XV. style, lounges and chairs of the prevailing light oak being upholstered in old crimson pink, and the same color is carried out in lamp shades and table covers. The lighting is from six side windows and a large ceiling dome, the light flittering through crimson pink curtains. The ceiling calls for special comment in view of the difficulty of diffusing an even light throughout. Light oak beams cut the ceiling into panels, which are of white plaster, smooth finished with a carved flower border of conventional design. Here, as indeed in each of the rooms, one is impressed by the extraordinary attention paid to artificial lighting, and the charming results so obtained should encourage some of us to emulate this thoroughness. The lights in this cafe number some forty-five, disposed in the ceiling and on walls and tables. Considering the size of the room, the number is far from excessive, the lights being arranged so as to secure a subdued, evenly distributed light throughout. By day or by night this room, with its warm yet delicate coloring, gives a feeling of absolute restfulness.

The elevator attracts notice by its economy of space. This utilization of waste spaces everywhere is most impressive, or rather the absolute elimination of waste spaces. They simply do not exist, a result only to be obtained by great care and a capacity to form beforehand a nice judgment of the ultimate result.

The work of this naval architect bristles with ideas and suggestions. There is one man certainly who will continue to envy his vast knowledge of woods, and his skill in handling their decorative values. Most of us might imitate the extraordinary care bestowed on the lighting—both daylight and artificially—the perfect finish of the smallest detail (everyone of the innumerable carved panels in these rooms is backed by cotton wool to prevent cracking) and the forethought in dealing with spaces. It is thus that he clothes unsightly posts and beams with beauty and grace, and, by a subtle blending of line and color, creates out of space—spaciousness. In each room, whatever the style of the decoration, he catches the exact note, and the note rings true, unmarred by any jarring triviality. And, with a brother worker's appreciation of the difficulties overcome, we study his handiwork, not with criticism, but rather with that feeling of elated satisfaction with which we gaze upon a fellow craftsman's work that is good, very good.

THE C.C.C.A. CEMENT SHOW AND CONVENTION

This year's event at Toronto promises many interesting and instructive features. Exhibition and convention to be representative in every way.

MUCH OF GENUINE INTEREST is promised at the coming Cement Show to be held at the St Lawrence Arena, Toronto, during the week of March 6-11. If the preparations now being made by the Canadian Cement and Concrete Association, under whose auspices the exhibition is to be conducted, are to be taken as an indication, this year's event will measure in every may the rapidly extending scope of the important industry whose interests it represents. Already the major portion of the vast exhibition hall has been taken up, and judging from the large number of firms applying for space, every nook and corner of the arena will be well occupied at the appointed time. During the past few weeks the executive committee has been arranging for several novel and instructive features, one of which will be a cement gun similar to that which proved an attraction at the New York show. There is also a likelihood that the exhibition will include a miniature cement plant in which the manufacture of cement from the raw material will be practically demonstrated. In addition to this, an effort is being made to secure the model of Mr. Edison's concrete house, although the danger of breakage in transit is liable to preclude the possibility of its shipment to Toronto.

Aside from its educational value, an exhibition of this character strikingly illustrates the vast strides the cement industry is making. The first show of any magnitude held in Chicago four years ago, proved so successful that an affair of this kind has since become an important annual event. The Canadian cement interests has not been slow to realize the value of such an undertaking, and this year's show will be the third of its kind held in the Dominion. It is interesting, in this connection, to note that a cement show was conducted in Toronto two years before it was felt that a similar project could be successfully launched in New York. The coming exhibition will witness a big improvement in every respect over the two preceding events. The manufacture of cement itself from the raw material, its mixing into concrete in the most up-to-date mixing machines, and

(*Concluded on page 93.*)

ANNUAL REPORT OF QUEBEC ASS'N OF ARCHITECTS

Summary of year's work shows transaction of large volume of business. Affiliation and Technical Education among important matters considered. Series of interesting lectures arranged for. Officers for 1911.

THE ANNUAL REPORT of Secretary J. Emile Vanier, of the Quebec Association of Architects, which is set forth in substance in this instance, shows that the Association in the last twelve months has given thoughtful consideration to a large number of important subjects relating to matters bearing directly on the interests of the profession, as well as dealing with contemplated schemes of both a civic and economic nature.

During the year twenty meetings of the Council were held and five new candidates were registered, thus giving the Association a total enrollment of 125 members. Of the new members, Messrs. J. E. Adamson and J. S. Bergerson were admitted after examination; Mr. I. M. Gordon, A.B.I.B.A., and Prof. Jules Poivert by credentials, and the J. E. Pagean re registered. Five students—Charles Baudouin, Donat Beaupre, Ernest Gagnon, R. Riche and L. Venne—all of whom passed the necessary preliminary examination, were also enrolled. A special general meeting was held June 20, at which the by laws regarding examinations was changed so to conform to the requirements of the charter, which calls for two examinations a year.

One of the more important matters up for consideration was the question regarding the formation of a Dominion Institute. This was dealt with at a special general meeting of the Association held on June 20th, and was approved on the following basis:—

1st. That a Dominion Institute of Architects must consist of properly organized Provincial Associations, Archtects in Provinces where there are no provincial associations, are advised to form one or join an existing provincial association.

2nd. That all Provncial Associations must first be organized on a basis equal to the charters granted to the Ontario Association of Architects, the Alberta Association of Architects or the Province of Quebec Association of Architects.

3rd. That the qualifications for membership be established by examination equal to these set by the above mentioned Associations or that of the Royal Institute of British Architects. That examination shall be conrolled by the respective Provincial Association.

4th. That n order to establish a uniformity of standard, the curriculum and examination papers from each Provincial Association be submitted to an advisory Board appointed by the Dominion Institute and consisting of representatives from each association, whose duty shall be to give such advice to provincial associations as will tend to raise and unify the standard. Such advisory Board to be appointed for two years by way of trial.

5thThat membership in such provincial associations shall "ipso facto" constitute membership in the Dominion Institute, but that, on the other hand, membership in the Dominion Institute shall not constitute membership in any or all of the provincial associations.

6th. The Council of the Institute to be composed of delegates appointed by the respective Provincial associations.

7th. All officers of the Institute to be elected by the Council.

8th. Each Provincial Association to pay to the Dominion Council a per capita fee, or a fixed sum per association.

9th. That the present charter of the Royal Architectural Institute of Canada be amended accordingly.

At this meeting the Vice-President was delegated to represent the Association at the third annual assembly of the Royal Architectural Institute of Canada, held at Winnipeg in August; and a motion was passed authorizing the latter body to take such steps as were deemed necessary to lay the matter before the Dominion House, with a proviso that the whole matter be first referred back to the provincial association for their approval before being submitted to the Government. This has since been complied with, and a draft of the proposed charter is now being considered by a special committee appointed for that purpose.

Regarding proposed amendments to Montreal's building code, the Building By-law Committee of the Association reports that after being approached on several occasions, the City Council has appointed a board of experts to revise the existing regulations, and that Mr. Joseph Venne has been to represent the Association. In this connection the Association recommends the following restrictions as desirable: (1), Prescribed building lines on all residential streets; (2), minimum size for interior courts with no skylights over; (3), regulation of advertising signs; (4), the extension of fire limits north to Sherbrooke Street, west to Atwater Ave., east to Delorimer Ave., and south to the river and canal. In the reorganization of the Department of Buildings it is recommended that both the Sanitary Inspectors and the Boilers Inspectors' departments be added to the Department of Building: that elevators be inspected by the city, and that the Inspection Department be strengthened, with the staff to consist of (1), Superintendent of buildings, to be in charge of the whole department; (2), Chief Building Inspector; (3), four assistant building inspectors, each to be in charge of a section of the city; (4), an engineer in charge of steel work, concrete, etc.; (5), two elevator and fire escape inspectors; (6), sanitary inspector's staff; (7), boiler inspector's staff; (8), adequate clerical staff. It is further recommended that electrical inspection by the Board of Fire Underwriters be made practically compulsory, and that a certificate be issued in each case, so as to protect the city's interest.

Another important matter referred to is technical education, in connection with which it is stated that a delegation from the Association awaited on the Royal Technical Commission last September, to urge the necessity of (a), the classification of mechanics in all building trades into three classes, the men to be paid according to their certificate; and (b), the establishing of properly equipped technical schools in all large cities, where each branch of the building trades could be studied both practically and theoretically, with the necessary lessons in drawings. With these two points gained, it was felt that there would be little excuse for the poor class of workmanship too often seen at the present time.

A close vigilance was also exercised during the year by the Association as regard illegality of practice, and five persons were inscribed against by the Legal Committee for non-compliance of the law. One of these cases came up on Dec. 27th, with favorable results, while another was settled out of court to the entire satisfaction of the council.

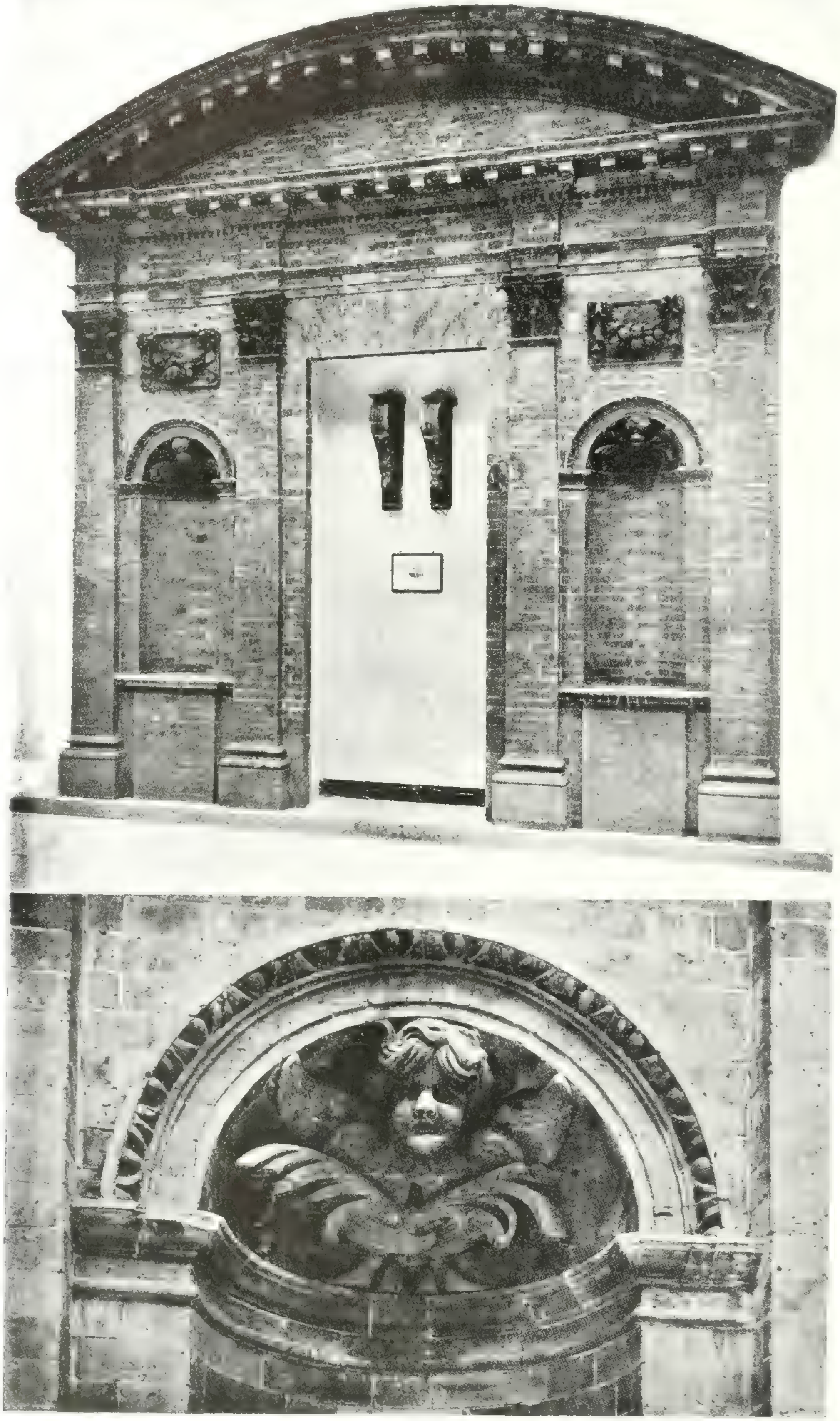
As regards civic improvements, various plans prepared by the Association in connection with suggested improvements for Montreal has been presented by a duly authorized committee to the Royal Metropolitan Parks Commission for its consideration. In addition to these, the commission has received a number of ideas and plans from different societies and individuals, but as to what extent the various schemes will effect its final recommendation, yet remains to be seen. The question of calling in an expert had been discussed, and the understanding is that the commission has had the advantage of professional advice from Mr. Olmstead, of Boston, in

(*Concluded on page* 91.)

BRICKS

A·DEPARTMENT·DEALING WITH·THE·ARCHITECTURAL AND·CONSTRUCTIVE POSSIBILITIES·OF·BRICK

BRICK HINTS FOR THE ARCHITECT-BRICK POINTERS FOR THE CONTRACTOR-BRICK SUGGESTIONS FOR THE MANUFACTURER



Brickwork from a House at Enfield, now in the South Kensington Museum.

A SHORT HISTORY OF BRICKWORK

By PHILLIP J. TURNER, F.R.I.B.A.

Biblical records of the early use of bricks. The brick-work of Italy and England. Charm of color obtained by great architects of the Renaissance absent in the brick-work of to-day.

IN ALMOST EVERY COUNTRY and age the manufacture and use of bricks for building purposes is to be found. To commence with the earliest times, one recalls how that, with bricks baked at Shinai, the descendants of Noah founded Babel about the year 2247 B.C., as recorded in Gen. xi., 3: "Go to, let us make brick and burn them thoroughly; and they had brick for stone, and lime had they for mortar."

Josephus adds, in connection with this, the additional information that the bricks were cemented together with mortar made of bitumen, so that it would be impervious to water. In Exodus v. is recorded the refusal of Pharoah to provide the children of Israel with straw for making bricks about the year 1491 B.C., and if one goes further into Biblical history, ii. Sam. xii. 31, David's prisoners, it is recorded, are given the hard labors of working in the brick kiln.

In profane history, Herodotus has given an interesting description of the building of the walls of Babylon, in which he states that the clay that was dug out of the trenches (afterwards to form the moat) was made into bricks as soon as it was carried up and burnt in kilns; afterwards hot asphalt was used for cement, and between every thirtieth course of bricks, mats of woven reeds were placed. This bitumen was found in the river Is, a tributary of the Euphrates — in great quantities in the form of lumps floating in the stream.

The Babylonian bricks were usually burnt in kilns, while those of Nineveh and Egypt were in the main only sun dried. This can be readily appreciated, as the people of Babylonia had a changeable climate with damp weather in contrast to the Egyptian's dry and sunny atmosphere. The Romans had bricks of various sizes, according to the purposes for which they were required, but all of these were much thinner than ordinary bricks now in use. The burnt bricks of the early Romans were exactly like those of the present day in Italy, which are in fact tiles made of clay beaten flat.

These ancient bricks are often stamped, and the name in most of the makes, a brand of a tree, a plant, an animal, or a deity. Besides these common emblems, one sometimes finds added as well the date of the consulate.

Italian bricks, ancient as well as modern, are frequently scored on the underside or bed to form key for the mortar.

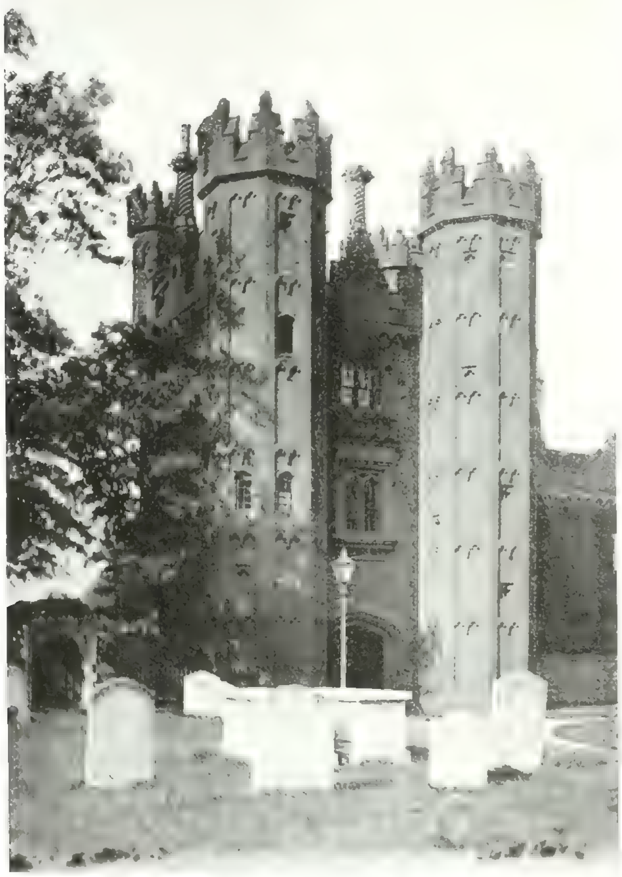
Into England we find that the Romans brought their universal methods of brick-concrete construction, and from that period dates the beginning of the use of brick-work in that country. Bricks must have been made on an enormous scale by these early occupiers of the country, and sites of the Roman brick kilns are still to be found. In the construction of their walls, the Romans usually employed bricks only in layers, or bands, at intervals varying from one to about four feet apart for the purpose of binding the work together. These bands occasionally consisted of single courses, but more commonly of two or three courses and sometimes of as many as five. As soon as the Romans abandoned Britain, the art of the brickmaker is supposed to have fallen into disuse, and for many centuries brick buildings were not erected

Battleford Hall, Suffolk, England—A Modern Addition to a 17th Century House. Note the Brick Stepped Gables and Dark Headers. Phillip J. Turner, F.R.I.B.A., Architect.

though tiles were made in large quantities for roofing purposes and for pavements. It seems strange that a country familiar for 300 years with the Romans' methods of scientific construction should not have striven to continue its sane tradition; instead, we find that the Saxons seemed utterly unappreciative and ignorant of the use of the material as used by the Romans, and examples are actually to be found of Roman voussoir bricks being used upside down in their arches.

The principal part of the dwelling houses in England in early times were naturally made of wood, and it is difficult to conceive, except in stone districts, how the chimneys to the early houses could have been constructed without the use of brick. Many of the early buildings, however, contain large quantities of Roman bricks, no doubt taken from those buildings which were scattered all over the country.

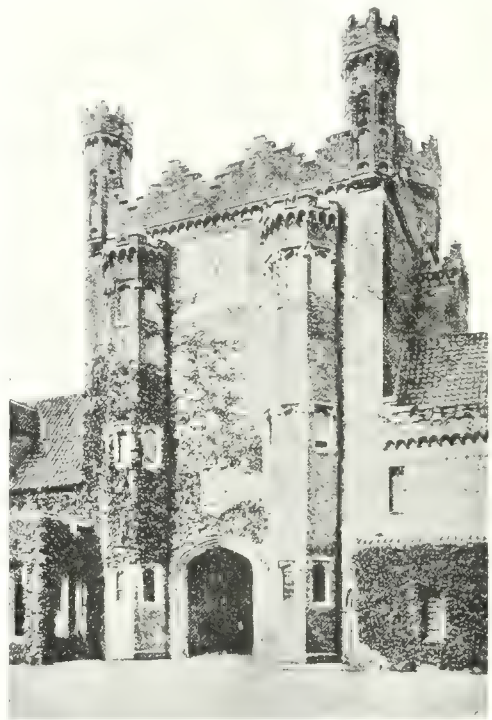
The Abbey Church of St. Albans is a very striking illustration of this. It is said that the Saxon abbot collected a vast store of material to build a new abbey



Hadleigh Deanery, Suffolk, England.

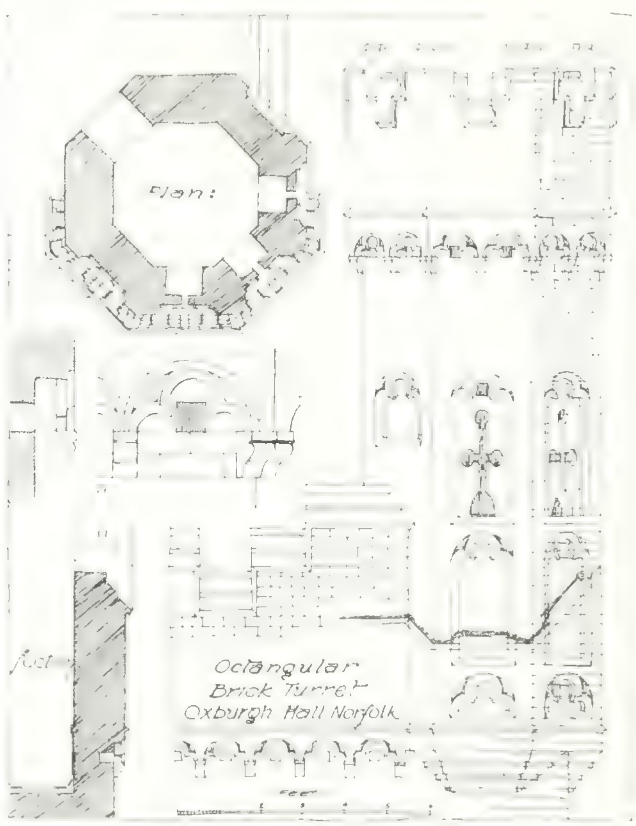
church, but in consequence of a dreadful famine which arrived just before the Conquest, they were compelled to sell the stone, etc., which they had collected, and in 1077, wishing to rebuild the church, the bricks from the old Roman city of Verulam were taken, and with these he constructed the church. Some of these piers and arches still remain, and the truth of this story appears clear from the fact that the Roman mortar, the characteristics of which are so well known, appears in many places, where it still adheres tenaciously to the bricks.

For an extended period in the past brickwork was looked upon by many authorities as a very inferior material, fit only to be covered with compo and never fit to be used in church or other important buildings. It is true, in this connection, that most of the Gothic Cathedrals of England and of France are invariably constructed of stone, but at the same time it must not be forgotten that throughout large tracts of Europe, brick was the natural, and, indeed, the popular material during the most palmy days of architecture in the Middle Ages. This is especially noticeable in Holland, in the southwest of France, in Northern Germany, and the Low Countries,



Oxburgh Hall, Norfolk, England.

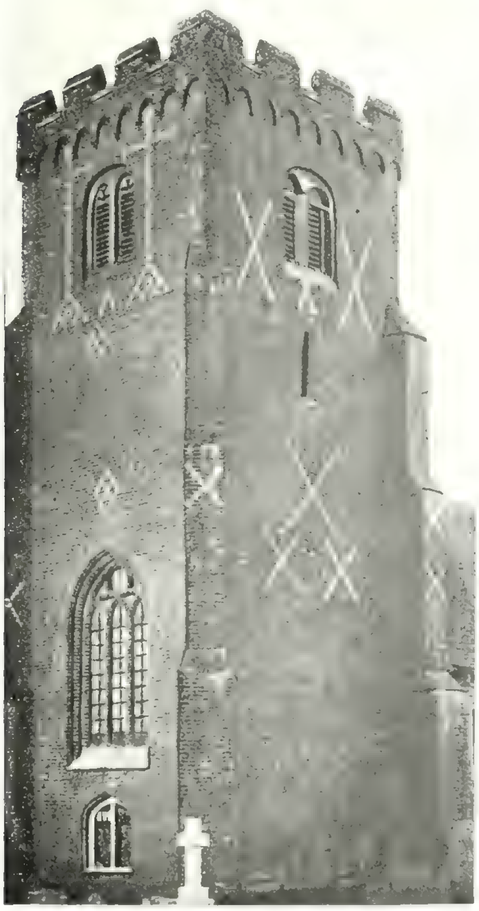
in large tracts in Spain, and throughout Northern Italy, where stone was either scarce or not to be obtained, and where brick was both everywhere in evidence and most fearlessly used.



Details of Early English Brickwork.

The treatment of brickwork in Italy is far superior to any remains of brickwork of the Middle Ages that one find in England, for, with a rare exception here and there, brick was not used to any great extent between the time of the Romans and the fifteenth century, and when it was used, it is seldom remarkable for any singular beauty or originality.

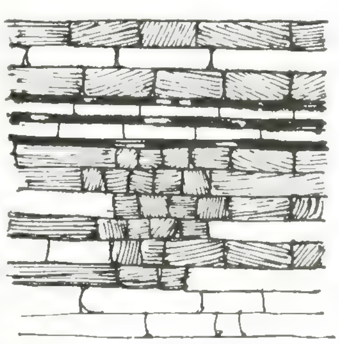
Italian brickwork is almost always executed with nothing but red brick, and rarely is stone used in conjunction with it. The Italian bricks of the Middle Ages are generally a little larger than those in common use to-



Tower of Sandon Church, Essex, England.

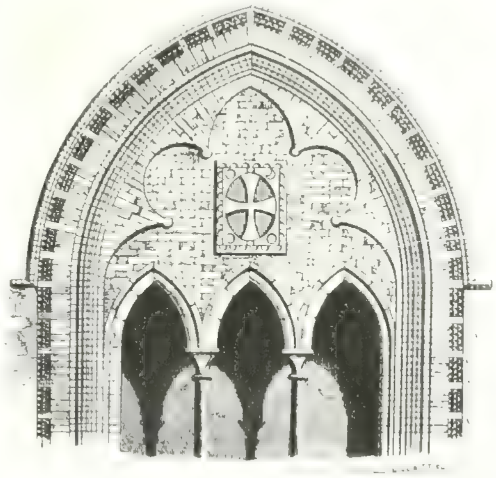
day, and are built coarsely with a wide joint of mortar. Such bricks as were used for windows, doors, and other ornamental work where they would be especially noticed, were often built of a finer clay, and the moldings executed with the greatest care and skill. Many splendid examples of this character of work are still extant. The moldings, as at Cremona Cathedral, are especially elaborate and the cusping is formed with great success. (See illustration.) Some of the details of this Italian work is well worthy of study, and in the example just quoted, attention is drawn to the fact that the cusps are not formed by means of bricks molded in the form of a cusp, but with ordinary bricks, built with the same radiating lines as those of the arch to which they belonged, and cut and rubbed to the necessary outline.

Roman Theatre, Tillebonne.



Soissory.

The Italians produced a very beautiful effect in another way in many of their buildings, and that was by the

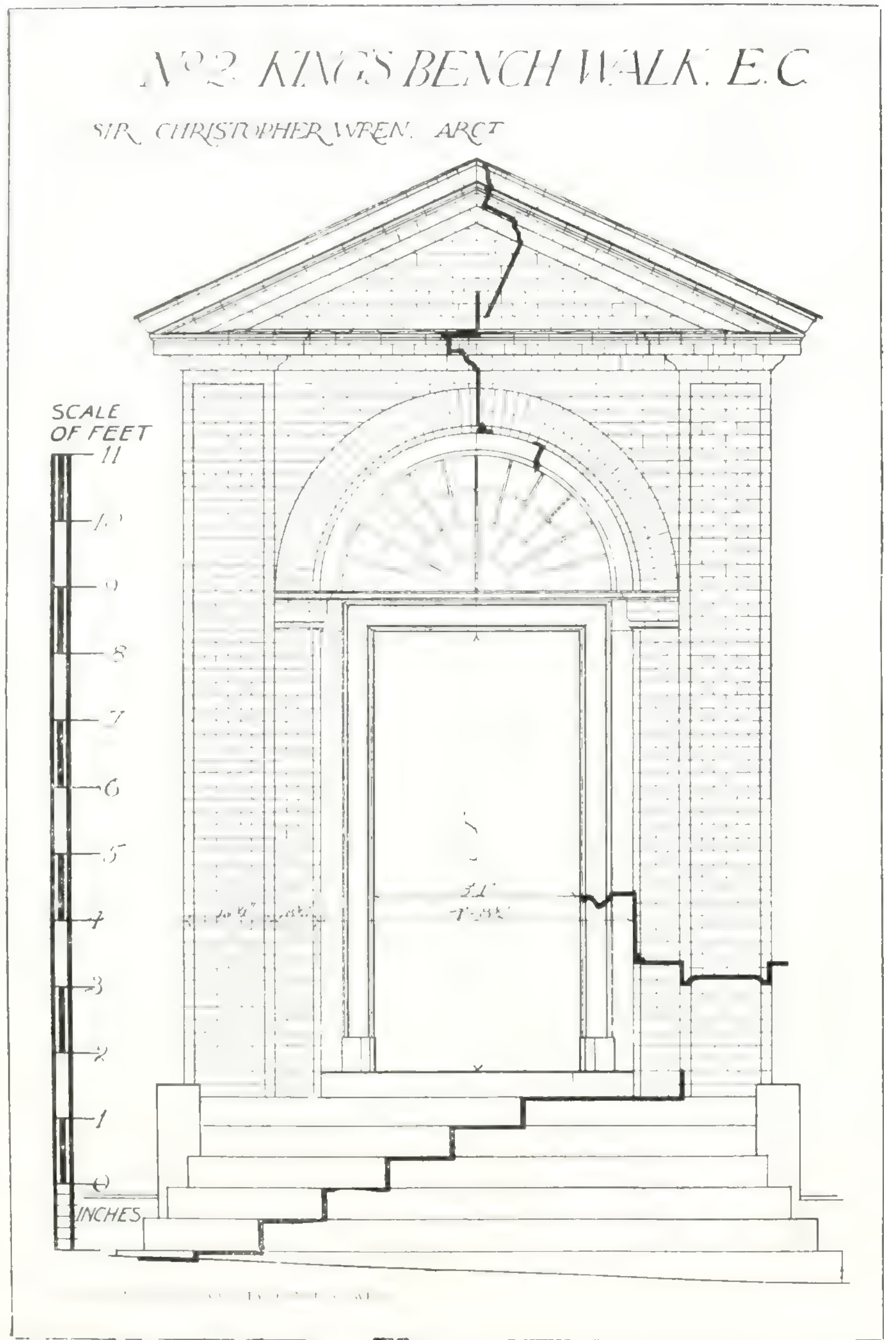


Window in North Transept, Cremona Cathedral.

alteration of stone and brick. They were generally most successful in this treatment of their work, which cannot be said of all work of the present day designed on these lines. Owing to the nature of the material, brick is not suitable for tracery, and the Italian work, as a general rule, appears most satisfactory and pleasing to the eye when the cusped head of the light is executed in stone, within an enclosing arch of line upon line of brickwork, a small portion of stone being used for the traceries. (See sketch, this page). One of the finest examples of this work is that of the magnificent walls of San Zenone at Verona, in which a deep red brick is used in courses alternating with a very warm colored stone. No doubt, the success of this design lies, after all, in the utter disregard of regularity in the setting out of the courses; for, beginning at the base of the walls we find alternating with courses of stone, first a band of three courses of brick, after this one course of brick, four courses, five courses, two courses, one course, and then the cornice, which is mainly of stone, but relieved by two courses of narrow bricks. As mentioned before, though brick was very little used as a building material in England from 420 A.D., the time of the Roman evacuation, to 1260, the first cause of its re-use was the growing scarcity of stone as well as of timber. The constant destruction of timber buildings must have hastened the introduction of a more fire resisting material.

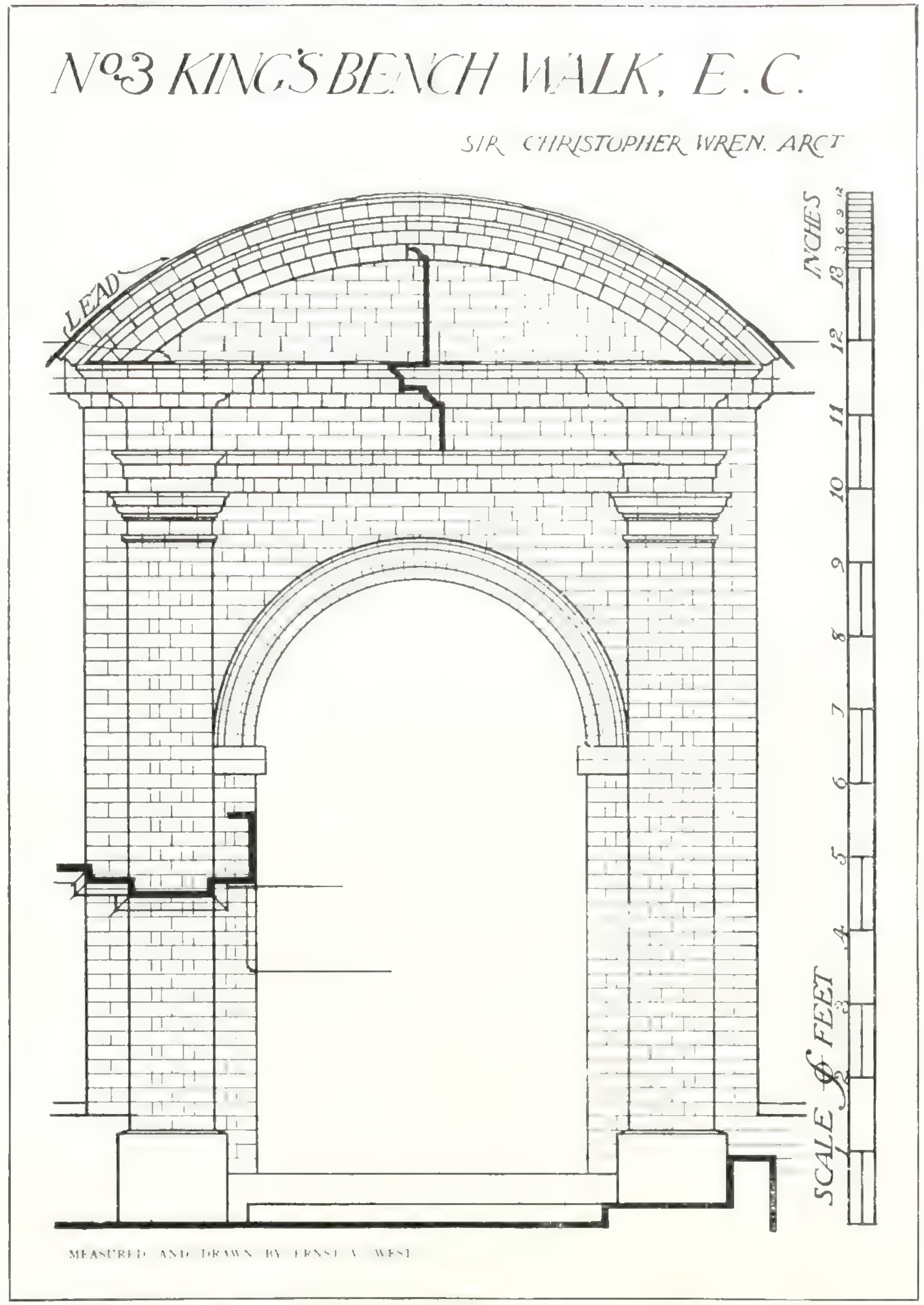
Example of Italian Brickwork with Cusp Head of Window Executed in Stone.

Reference might be made to the price of bricks in the early days, as records are in existence showing that bricks sold in the reign of Edward III. for six shillings per 1,000, and in the fifteenth century the price was still a little less! The size of bricks is also worthy of attention; in many fifteenth century buildings in England they are made 9 in. x 4½ in. x 1½ in. which, so great an authority as the late George E. Street considered a better proportion than the modern bricks of to-day. Those of Little Denham Hall, Suffolk, built in 1260, and which is con-



Courtesy of Architectural Review

Detail of Doorway, No. 2 King's Bench Walk, London, E.C.



Courtesy of Architectural Review

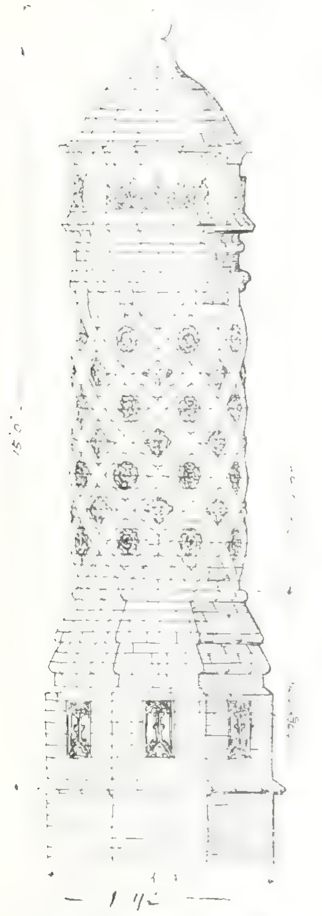
Detail of Doorway, No. 3 King's Bench Walk, London, E.C.

South Front, East Barsham Manor House, Norfolk, England

sidered the earliest brick building [illegible] by English workmen, are 9[illegible] in. x 4[illegible] in. x 2[illegible] in.

Other sizes of bricks of different ages and countries, to mention only a few, are: Babylonian, 12[illegible] in. x 12[illegible] in. x 2½ in.; Roman (St. Albans), 18 in. x 12 in. x 1[illegible] in.; Roman (London Wall), 17½ in. x 11¾ in. x 1¼ in. and 7 in. x 7 in. x 1 in.; Chinese Great Wall, 15 in. x 7½ in. x 4 in.

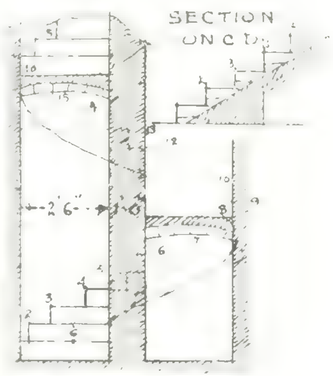
Church work in brick is not common in England, except in Essex, where several country churches may be found almost entirely built of this material. A pleasing design is that of Sandon Church (see illustration) with its tower, magnificent diapered crosses of vitrified bricks, and brick dome in its upper stage. Though brick was but sparsely used in English church building, its possibilities were quickly grasped for domestic work, and one finds in the work of the Tudor ages especially, many charming examples of how this material should be used.



Turret on South Front, East Barsham Manor House.

An essential feature of this period is the natural enrichment of diaper patterns in the use of vitrified headers. Regularity of pattern was not always adhered to, but the aim of the builders of the Middle Ages, it seems, was always to obtain richness of effect.

The Tudor period produced those marvellous specimens of the bricklayers still, namely—the elaborate chimneys. These were quite a new thought to the architect of this age, as up to quite a late date, smoke had blackened the rafters of the great Gothic halls and was allowed to escape merely through a [illegible] in the roof. These chimneys were characterized by battlemented caps, projecting angles or octagonal [illegible] and [illegible]. They were made essentially a feature of the design of the whole building with [illegible]; what is perhaps more important still, they were [illegible] height; the architects of these times, in fact, were not afraid of their chimneys being seen, as one might conclude is the case with many architects of the present days, where the general rule appears to be to keep the chimneys as low and insignificant as possible. With the death of Henry VIII., [illegible] chimneys ceased rapid[illegible] [illegible] 1500 on the new Renaissance note, foreign in tone, made its influence felt in all the more famous mansions; and terra cotta, a new material suited to the desire for richness in detail, came into favor, and was used in conjunction with brickwork of this time. It is worth noting, however, that terra-cotta was only used [illegible] in England so long as the [illegible] workmen were present there. It never took the place as one of the building materials of that country.



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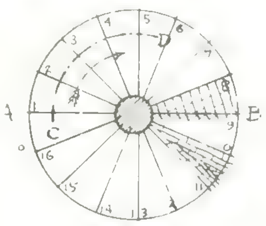
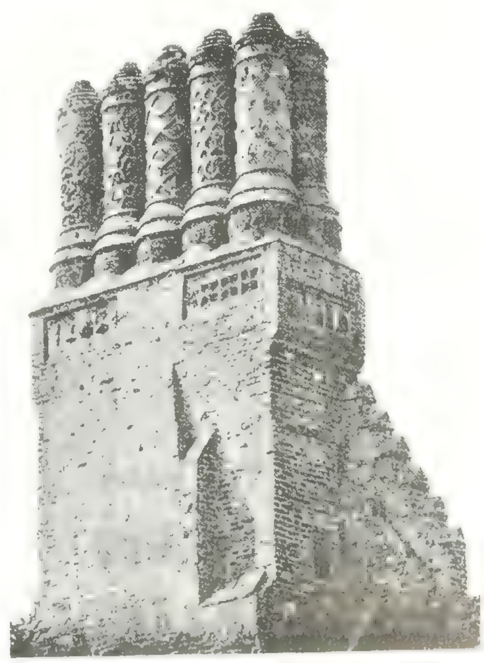


PLAN

Detail of Brick Staircase.

Brick newel stairs of the early defensive houses are from a constructional point of view both original and ingenious, and one is surprised at the intricate problems the bricklayers of the Middle Ages were able to overcome [illegible] centering. In the well known stairs at [illegible] Place (1500 A.D.) the newel, vault, handrail and treads are brick throughout. In referring to these staircases, it is interesting to find, as pointed out by F. E. Kidder in his work on Building Construction, that spiral stairs of brick are commonly made in Madras, India. They are built without any centering, and the cost locally is less than one third of an iron stairs. As brick is such a good fire resisting material, these stairs might be advantageously employed in this country, if workmen could be found to build them. The dimensions of a typical Madras spiral staircase are given as follows.

Diameter of stairs, wall to wall, inside—6 feet.



Chimney Stack, East Barsham, Norfolk

Diameter of newel, in centre—1 foot.

Head way, from top of step to arching overhead—7 feet 1½ inches.

Risers, each—6 inches.

Tread at wall—1 foot 2⅛ inches.

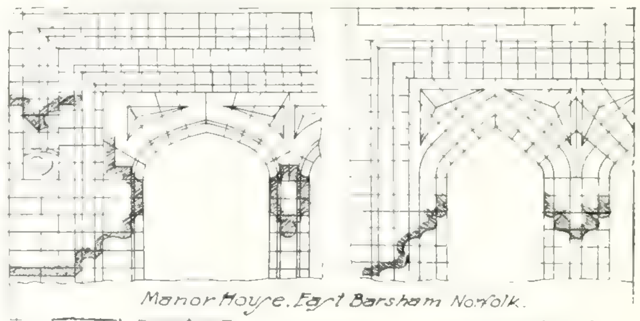
Tread at newel—2⅜ inches.

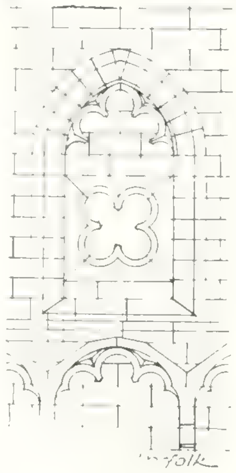
Square-headed windows in Tudor times were difficult to construct prior to the use of straight arches with radiating voussoirs. This latter treatment of soft bricks with their joints, known as "rubbed and gauged work," became the characteristic feature of all Georgian work, and was used and handled with great success in every form by Sir Christopher Wren. Though, during the Elizabethan period, brick was more generally used than at any previous period, its interest and elaboration declined for a time with the advance of the Renaissance, and the general brick revival, which continued till the nineteenth century, did not become general until the latter half of the seventeenth century.

"Rubbed brickwork," which is brickwork not cast as is terra cotta, but rubbed to section, or carved for ornament, was laid with very fine joints. Sir C. Wren was one of the first to make use of this class of brickwork, which was probably introduced by the Dutch noblemen who came over with William III.

South Front, Gifford Hall.

Classic cornices large in scale were built up of 2½ in. brick, and dentils and modillions were also added, with the addition in the earlier work of tiles for the fillets. In the Renaissance period, the Orders formed the great decorative resource in the use of brick by the architects of that time, and the super-imposed Orders of the Jacobean days were replaced by one large Order, usually Doric, this being easier to execute in brick than the others. Architectural ornament was always carried out in brick, with a very fine joint, as is seen in the house at Enfield. (See illustration.) Probably no finer example exists anywhere than this example of Renaissance brickwork in showing the possibilities of carved brickwork and also of the limitations of the material. Where the detail was especially intricate and fine (and this is especially to be seen in Ionic capitals), the work was sometimes



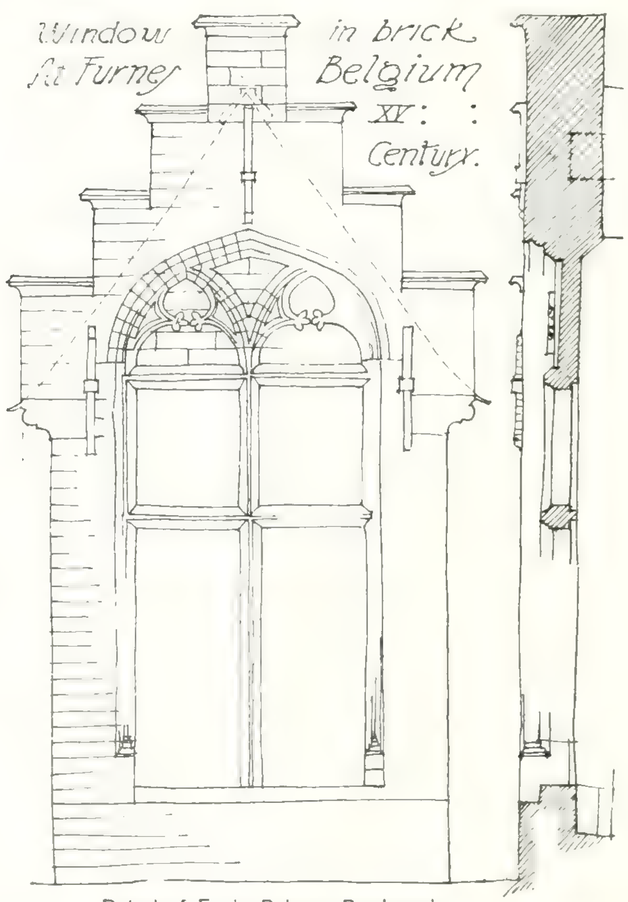


Examples of English Brickwork.

made from one homogenous block by using a substance of a resinous nature, which made the joints almost imperceptible.

The Renaissance architects also learnt the value of color effects by using a yellow or purple brick for the background of their work, and a red or different colored brick for the quoins and dressings of window and door openings. In this way some delightful results were obtained, as the contrasts are never at any time glaring, but seem to blend harmoniusly one with the other.

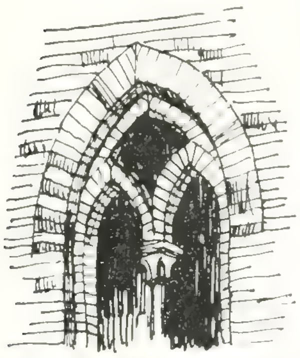
Although Sir Christopher Wren preferred stone for his churches, he used brick in domestic work with his natural strength and decision, considering it as suitable for the palace as for the smallest cottage. The execution of his brickwork, as might be seen by the doorways illustrated on page 88, is as excellent as its design. In his well known work at Kensington Palace, the artist's knowledge of the limitations of brickwork is well brought out. The carving, copings, and cells are all of stone, whilst the protected portions, as the heads of niches, are beautifully formed in brick (see page 84). Again at



Detail of Early Belgian Brickwork.

Hampton Court Palace, Wren has obtained a pleasing effect of color by using a dull red in the lower story, and the bright red of gauged brick above.

It is of interest to note that Sir C. Wren, realizing the reliability of brick as a constructive material, erected the cone in the dome of St. Paul's Cathedral in this material. The bricks here differ in size from those in ordinary use of the time, in that they are made double the length, so as to extend quite through the thickness of the dome. Following on the last work of this master architect came a decline, which was hastened by the general introduction of stucco late in the eighteenth century. Not only did this destroy the artistic value of brickwork, but it caused also an inferior quality of construction as well.



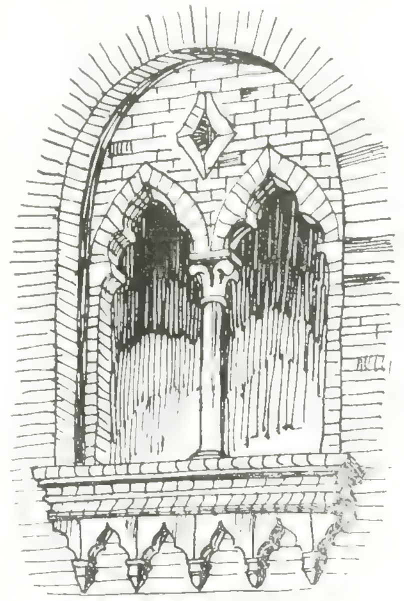
Brick Window, Campitallo, Italy.

Brickmaking of the present day, though developing on scientific lines has not equally improved the artistic quality of brickwork as a whole, and so long as pressed bricks are in favor on this Continent, and other such hard surfaces, that charm of color obtained by the great architects of the Renaissance in England, through the natural weathering of rubbed brickwork, and sand-faced bricks, together with their practical knowledge of the right use of this material, will never be seen to the same extent in the brickwork of to-day.

ANNUAL REPORT OF P.Q.A.A.—Cont'd from Page 82.

drawing up its report to the Government. In this connection it is recommended that should this report, in the opinion of the incoming committee, contain any detrimental suggestion, omission or defect, the Association should not take an actual part in criticising the plan. The committee was also given to understand that the City Engineer was engaged in planning a driveway from the head of Mountain Street to the foot of Pine Ave., along lines embodied in the general scheme advocated by the Association. The following resolution was adopted at a joint meeting of the committee, and a committee appointed by the City Improvement League, held Jan. 4th, 1911, to discuss the subdivision of the Redpath property above Pine Ave., and that of the Brunet and Molson properties, all of which abut upon Mount Royal Park: "That all properties abutting on any park when subdivided should be bounded by a road, as by this means one prevents the view fro mthe park being destroyed by overlooking backyards of residences: and that it is desirable that a committee be formed to take the necessary steps to see that the sub-divisions of the Redpath and Brunet properties comply with this idea."

Reference is made in the report, to Mr. Henry Vivian, M.P., for Birkenhead, Eng., an expert on the Garden City planning, who kindly consented, on his visit to Montreal, to hold an informal discussion with members of the committee on various aspects of city improvement, including housing of the poor; also to Dr. Charles Elliott, ex-Pres. of Harvard University, who delivered an address December 3rd, on the "Metropolitan Park Commission of Boston" at a recent meeting held under the auspices of the City Improvement League to which members of the Association were invited. It is also suggested in the report that the Association keep a record of all historic or old buildings of architectural interest in the Province of Quebec, and all members having photographs or meassure drawings of sufficient interest, should furnish a copy of same for the Association's collection. The Association proposes to hold an "Esquisse" competition in which the subject will be drawn En Loge, nine hours being allowed for its development. It is intended that the first three in this competition should take place in one of the class B. projects of the Beaux Arts Society, the work to be judged by a committee of three local architects.



Window, Coccagllo, Italy.

Concerning the principle of inaugurating a travelling scholarship for students of architecture which was approved at the last annual meeting, the report states that the members of the Association have been approached wih a view of obtaining subscriptions towards this fund, as a first instalment towards the capital necessary should be made by the members themselves in order to prove their interest in the scholarship before approaching the Government and others for aid. Up to the present time the sum of $500 has been promised.

Regarding the students' classes, it is stated that very encouraging progress is being made under the patronage of Mr. W. S. Maxwell, who has kindly consented to give a generous portion of his time to the settling of problems and criticizing the work of the draughtsman. At the present time the Atelier consists of 15 members and the work is being done principally in connection with the Beaux Arts Society of Architects. Ten out of the fifteen members submitted rendered designs during the past session, and out of this number no less than eight were awarded mentions.

Banqueting Hall, Kensington Palace.

Lectures arranged for by the Council are as follows: Jan. 12th, Prof. Poivert on "Beauty in Architecture"; Jan. 12th, Prof. P. E. Nobbs on "Ornament"; Jan. 24th, Dr. Fryer on "The Europe of the Renaissance"; Feb. 7th, Prof. Ludlow, on "The Renaissance in Italy"; Feb. 21st, Prof. Beaugé Champagne, on "The Renaissance in France"; Mar. 7th, Mr. Burgess, on "The Renaissance on [illegible] March 21st.—Mr. P. J. Turner, on "The Masonic Art of the Middle Ages." April 4th.—Mr. Beaulac, on "Sprinkler Tank Supports."

The following officers have been elected for the ensuing year: J. R. Gardiner, President; Ludger Lemieux, 1st Vice-President; J. E. P. Dussault, 2nd Vice-President; J. Emile Vanier, Secretary; W. S. Maxwell, Treasurer; J. Venne, Councillor; Hugh Vallance, Councillor; Thomas Raymond, Councillor; G. A. Monette, Councillor; Stevens Haskell, Councillor; Jos. Perrault, Councillor; and Messrs. Cecil S. Burgess and Eugene Payette were appointed auditors.

MACHINERY & TRADE

THE TRUSSED CONCRETE STEEL COMPANY is erecting a large modern factory in connection with its plant at Walkerville, Ont., for the exclusive manufacture of a new type of steel window sash which the company is about to place on the market. In addition to being light, durable and economical, it is said that the particular type of sash in question has a number of other excellent individual points to recommend its adoption.

THE ALL-CONCRETE HOUSE

THE ALL-CONCRETE HOUSE, absolutely devoid of wood or other materials in its make-up, is no longer a novelty in the sense in which the word applies to building construction. Examples of this type are by no means uncommon, nor are the many advantages of concrete for domestic construction unkown to the building fraternity and the more intelligent portion of the lay public. The great problem with the builder has not been to produce a house of this character in itself, so much as it has been to produce one at a cost that will bring the durable and sanitary features which it offers well within the means of the average person. It was with this object, that Mr. Edison set to work on his now famous monolithic or "poured-concrete" house, which has excited no little comment in the daily press during the past three or four years, and which was exhibited in model form at the recent New York cement show. The one drawback to great inventor's idea, other than that of the enormous outlay required in the cost of molds, is the fact that his scheme allows of little or no variation as regards architectural design and plan; and a group of dwellings built according, would be monotonous in arrangement, and commonplace in their decorative treatment. Mr. Edison, however, is not the only one who has given thought to this important subject. Working along similar lines, the American Building Corporation of New York, has perfected and patented a system whereby any style of house can be constructed complete—walls, floors, roofs, outside trim, stairs, partitions, etc., without the use of wood. In this respect the American Building Corporation not only takes priority over Mr. Edison in the field of practical operation, but moreover, overcome the main objection to his scheme, in that a house erected according to this system can be built after the design and plan of any architect. Recognizing [illegible] held [illegible] Canada [illegible] enterprising firm, W. J. Bellingham and Company, of Montreal and Toronto, has secured the exclusive rights of this system for the Dominion, and have already started the erection of a number of dwellings, after plans prepared by Architects Ross and McFarlane, of Montreal, in order to demonstrate its practicability. These houses, an illustration of which is reproduced herewith, are most interesting in the character of their design, and they show the possibilities of concrete for artistic effect in residential work, where this system is employed. The walls, floors, partitions, stairs, balustrades and mantels, will be formed into one solid piece of concrete construction. An advantage claimed for the Bellingham type of house is that it is not only fireproof in every particular, but that the initial cost will be practically the first, last and only expense to the owner. It is further maintained that the type of molds used elminates the present heavy cost of concrete forms, which is said to be usually 30 per cent. or more of the entire cost of the building. In addition to this, the molds can be easily operated and repeatedly used, and any design of house can be built from the same molds. The Bellingham Company is arranging to sublet the right to use the molds in different parts of Canada on a royalty basis, and will send full particulars upon request.

NEW CONTRACTING FIRM

ONE OF THE MORE RECENT firms of importance to engage in the engineering and contracting line, is the Standard Structural Company of Toronto. This concern makes a specialty of factories, office buildings, warehouses, foundations, municipal work, reinforced concrete work, and all contracting of a general character. One of its more recent contracts is the factory of the Standard Sanitary Manufacturing Company at Lansdowne and Royce Avenues, Toronto, which covers a tract about a block square. The construction of this plant, which is three stories high in its main parts, is fireproof throughout, the material employed being reinforced concrete, steel and indestructable brick, with "fenestra sash" windows. A feature of the factory is the foundry building which includes in its equipment a modern turn table that automatically operates to a set position. There is possibly no turn table of its kind to-day in another factory in Canada. The manner in which the entire plant is carried out shows close attention to thoroughness and constructive detail. The Standard Structural Company has a large working organization, and its equipment is such as to enable it to carry out important contracts with thoroughness and expedition. In this connection it wishes to announce that its engineering staff is at the disposal of the architect and that no contract is too large or too small for the firm's personal attention.

Group of One-piece Concrete Dwellings, to be Built by Bellingham & Company at Montreal. Ross & McFarlane, Architects.

C.C.C.A. CEMENT SHOW AND EXHIBITION.

Cont'd from page 81.

examples of the finest concrete work so far produced and divide the attention of the visitor with the variety of machinery used in the production of cement blocks; the many water-proofing compounds; types of reinforcement and other features and novelties which will be found in abundance. To the engineer, the architect, the contractor, the business man, the investor and the home builder, this year's show will offer much [illegible] of constructive, economic and interesting knowledge. It will attract the attention and thought of everyone who is interested in permanent construction and an enduring architecture. The most modern methods and best practice in every branch of the industry will be demonstrated. During the exhibition one of the city's best orchestras will play both in the afternoons and evenings.

As in the past the convention of the Canadian Cement and Concrete Association will be held in connection with the show. Papers of practical and technical interest will be provided by many Canadian and American authorities on cement and concrete construction. The programme, which is practically completed, will be announced shortly. All firms who are desirous of being represented at the exhibition should lose no time in getting in touch with Wm. Snaith, 57 Adelaide St. E., Toronto, who is Secretary of the Association, and who [illegible] of the show in hand.

MESSRS BROWN AND VALLANCE, architects, Montreal, have opened an office in the McArthur Building, Winnipeg, in order that their rapidly expanding Western practice will receive the full attention it requires. At the present, this firm has a large amount of important work on hand in the Prairie Provinces, including the University Buildings, the King George Hotel, and the Lineham Block at Saskatoon; the Regina Methodist College and several other large buildings which will shortly be erected. The Winnipeg office will be in charge of Mr. E. E. Shepherd, who, for the past four years, has been representative for the Dominion Bridge Co. Mr. Shepherd has had a broad experience in architectural and constructive work, and is exceptionally well qualified for the duties he assumes in connection with his new position.

THE FIRST STRETCH of oil-concrete highway to be laid in Pennsylvania has just recently been completed on the Harrisburg-Linglestown road. It is about a quarter of a mile in length and is between Progress and Paxtonia. The oil-concrete road is an experiment on the part of the state highway commission, which in 1907 rebuilt the highway from the eastern terminus of the city to Paxtonia. The section just laid replaces a quarter of a mile of road constructed of concrete. The new section of road is made of concrete into which are mixed asphaltic oils. The top surface is not arched so much as the rest of the road, the crown being constructed on a basis of three-eighths of an inch to a foot. The crown is the same as that used in laying a brick pavement.

DR. JOHNSON'S HOUSE in Gough square, London, has been acquired by an anonymous purchaser, and is to be placed in the hands of trustees as a national, permanent memorial to the great English moralist and lexicographer. The house has recently received a number of much needed repairs, but these were made so as not to destroy any of the characteristic features of the interior, which is in much the same condition as when Dr. Johnson lived there from 1748 to 1758.

CATALOGUE AND PRICES LISTS from manufacturers of products pertaining to the building line, are desired by Architect G. H. Bugenhegen, who has recently opened an office for practice in the new Stewart Block, Saskatoon.

CONSTRUCTION

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'ENGINEERING · AND · CONTRACTING
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CONTENTS

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BRANCH OFFICES

MONTREAL—Board of Trade Building. LONDON, ENG. Byron House, 85 Fleet St. E.C.

Perspective of Union Bank Building under Course of Erection on King St., Toronto.—Darling & Pearson, Architects.

¶ *Building Returns for January—Twenty-two cities show average gain of 37 per cent.—Vancouver's phenomenal increase the feature of the month.*

ALTHOUGH THE MONTH of January was sixes as far as individual gains and losses were concerned, the aggregate total ($3,100,842) for building operations carried out in the twenty-two cities submitting comparative figures to CONSTRUCTION was 37 per cent. in excess of that noted in the corresponding period of the previous year. The losses, while greater in number than any recorded in the past twenty-four months, indicate but little when the comparative amounts in most cases are taken into consideration, other than the usual period of mid-winter inactivity. Taking everything into account, the situation in general remains but little changed. The gains noted are not only of substantial proportions, but in a number of instances are the largest by far ever made in their respective localities.

Especially is this true as regards Vancouver, whose total investment of $1,412,442, representing a gain of 123 per cent., is not only the highest amount recorded for the month, but is approximately one million dollars in excess of the total of any other city included in the list. The West in fact outstepped the central and eastern portions of the Dominion in the matter of gains. While less assertive than her sister city, Victoria, nevertheless in an expenditure of $151,445, tacked on an increase of 17 per cent.; Calgary undertook new buildings aggregating in value $296,040, as against $106,500 for the same month in the previous year: and Winnipeg, where operations amounted to $199,700, made an advance of 6 per cent. Other gains noted are: Brandon (363 per cent.) and Moose Jaw (14 per cent.), although the corresponding amounts in either case are extremely small. Edmonton and Lethbridge, however, have respective decreases of 12 and 49 per cent, while Regina and Saskatoon are in the arrear to the extent of 62 and 21 per cent. in order named.

Percentage decreases, as previously stated, except in one or two individual cases, amount to little as far as this particular month is concerned. This is quite evident in reviewing the figures of Ontario, where most of the losses were sustained. Toronto's decline of 32 per cent. is by far the most serious set-back experienced throughout the Dominion; yet, despite this reversal, permits were issued amounting to $458,580, which is a very splendid showing, especially in view of the fact that several important projects have been a trifle slow in materializing. Outside of this, it is hardly necessary to summarize the situation in this Province, other than to add that both Hamilton and Windsor are relatively 106 and 192 per cent. ahead of their former figures.

Further east, Montreal, which has the third largest amount noted, records a total of $365,840, or a gain of 129 per cent. Evidently the metropolis intends to duplicate its remarkable growth of the past year. Sydney also has a slight increase, although Halifax is considerable in the arrear of her corresponding amount.

According to reports to hand, every section of the country has a large amount of important work in prospect, much of which will materialize at a very early date. Another month should see operations in full swing and it would be well for contractors and supply firms to make preparation for what will most likely prove the most busy and profitable season that has yet come their way.

	Permits for January, 1911.	Permits for January, 1910.	Inc. Per Cent.	Dec. Per Cent.
Berlin, Ont.	$ 3.850	.	.	.
Brandon, Man.	5 450	$ 1,165	363.83	.
Calgary, Alta.	296 040	106,500	177.97	.
Edmonton, Alta.	38 405	44,090	.	12.90
Fort William, Ont.	9 550	36.890	.	74.12
Halifax, N.S.	8 600	30.650		71.94
Hamilton, Ont.	[illegible]	19,000	106.58	
Lethbridge, Alta.	[illegible]	51,015	.	49.43
London, Ont.	7,030	61,810	.	88.63
Montreal, Que.	365.840	159.510	129.35	
Moose Jaw, Sask.	3.500	3 050	14.75	
Ottawa, Ont.	29,100	57,650		49.53
Port Arthur, Ont.	1 250			
Regina, Sask.	[illegible]	24.585		62.48
Saskatoon, Sask.	12,500	15.900		21.39
St. Thomas, Ont.	1,200	2,800		57.14
Sydney, N.S.	5.750	1 200	379.16	
Toronto, Ont.	458.580	[illegible]		32.77
Vancouver, B.C.	1,412,442	631.311	123.73	
Victoria, B.C.	151,455	128.985	17.42	
Windsor, Ont.	[illegible]	5,550	192 34	
Winnipeg, Man.	199.700	188 000	6 22	
	$3,100.842	$2 251,759	37.48	

Proposed Architectural Copyright Act in England—Its possible Influence upon the Canadian-British Copyright Arrangement—Need for similar Act in Canada.

WITH THE PROSPECT of a tacit understanding being arranged between the Canadian and British Governments at an early date providing for the formulation of a common Copyright Act that will apply to both Canada and the British isles, the following comments by THE BUILDER (London) on the new Copyright Act introduced into the British Parliament last session by Mr. Sidney Buxton, the object of which is to give architecture protection comparable to that enjoyed by the sister arts or to be enjoyed by them, should be of considerable interest to the profession in Canada.

It has not as yet been made public just what amendments to our Copyright Act the Hon. Mr. Fisher will introduce, but his published statements made upon his return from his recent visit to England would lead us to believe some radical changes will be proposed by the Government.

As it is, architecture in Canada is practically without protection. Speculative builders, real estate dealers and owners, show absolutely no regard for the rights of the architect as the sole owner of the designs and the plans of which he is the author. Whole rows of houses are built after stolen plans and the author of the plans does not seem to have any recourse. As to whether the proposed Act will become law in England is not as yet, of course, known, nor is it clear, at present, if such a law were enacted in England, just to what extent its provisions might be adopted in the proposed joint copyright agreement between England and Canada.

Our English contemporary outlines the provisions of the Bill, together with the probable effect of its adoption, in the following:

At the present time, as is generally admitted, architecture is most inadequately protected by the copyright laws. Indeed, it may be said to be, for all practical purposes, entirely without protection, for copyright extends merely to the plans and drawings of a building, and not to the edifice itself. Consequently, any original and artistic piece of architecture may now be imitated with impunity by anyone whose fancy it takes or whose purpose it suits.

Unless the context of the new Act otherwise requires, whatever applies therein to an "artistic work" will also apply to an "architectural work of art." The latter is defined as meaning "any building or structure having an artistic character or design, in respect of such character or design, but not in respect of the processes or methods of its construction." This, it will be seen, is at once, and rightly so, extending protection beyond the mere plans and drawings. But it is extremely doubtful whether the word "*structure*" would be held by a court of law to include a small *model* of a building. It is, however, imperative that architectural models shall enjoy protection; yet the Act does not appear to afford protection to models of any kind—unless "model" may be held to be covered by the term "Work of artistic handicraft," upon which it would not be safe to rely.

"*Publication*," says the Act, "*means the issue of copies to the public, and does not include . . . . the construction of a work of architecture.*" So that, unless the plans or other drawings of a building be issued to the public, a work of architecture will remain for ever an unpublished work—a somewhat curious position in the case of a work of art permanently on view in a public thoroughfare. The Bill vides that "*copyright in an architectural work of art shall not be infringed by making drawings, engravings, or photographs thereof.*" Although it is not so stated—as it ought to be—we may presume that the said photographs, drawings, and engravings may be sold to the public. Were it otherwise, we might have at some future date a situation in which the sale of pictures of Fleet street was prohibited, because of the erection there of a new copyright building! Since, then, elevations and perspective views of a building may be photographed and published by anybody, it will be seen that there is very little left of the original graphic parts of the architectural work of art in which the architect has the sole pictorial copyright—merely the plans of each floor, and such-like. However, until a building be erected in accordance with the plans and drawings made for it, the latter will enjoy complete protection.

The Act states that the first owner of the copyright in any work of art is to be the author thereof, and it is provided that "*Where the work was ordered by some other person and was made for valuable consideration in pursuance of that order, then, in the absence of any agreement in writing to the contrary, the person by whom the work was ordered shall be the first owner of the copyright,* UNLESS THE WORK IS AN ARCHITECTURAL WORK OF ART, *or is an artistic work intended for a public place or building, in which case the author shall be the first owner of the copyright, but shall not be entitled to make, or authorize the making of, reproductions of the work except with the consent of that other person, and that other person shall be entitled to the same remedies in respect of the infringement of the copyright in the work as if he were the owner of the copyright.*"

Architects are here given an advantage over workers in other arts, but in order to prevent friction, which, it is to be feared, is sure to arise occasionally, it will be advisable for them to get, before they commence designing, the written consent of "*that other person*" to authorize the making of reproductions of their work. Where consent is refused, a higher figure should in fairness be paid for designs. Regarding the phrase "*An artistic work intended for a public place or building,*" which occurs in the above question, it is not clear whether the provision as to the ownership of copyright be intended to apply to ANY building or only to a PUBLIC building. Probably the latter is meant—all doubt should be removed—and in that case it is difficult to see why the copyright in a fresco, say, or in a stained glass window, should belong to the author thereof when ordered for a town hall and not when ordered for a private residence.

Careful consideration is required of what remedies are to be provided in the case of an infringement of an architectural work of art. Section 7 says:

"(1) *Where the copyright in any work is infringed by the construction of a building or other structure, the owner of the copyright shall not be entitled to obtain an injunction or interdict to restrain the construction of such other building or structure, or to order its demolition when constructed.* (2) *Such of the other provisions of this Act as confer on the owner of the copyright in any work the same remedies against a person having in his possession for sale or dealing with a pirated copy of the work as if it were his property, or as impose summary penalties, shall not apply in any case to which this section applies.*"

Against these parts quoted is placed the marginal reference "Remedies in the case of architecture." But these are the DENIAL to architects of the remedies to be enjoyed by practitioners of the other arts. Then, what ARE the remedies in the event of an infringement of architectural copyright? It would not do, of course, to stop the erection of an uncompleted building, or to pull down a completed one. As an alternative, however, a penalty might very well be provided to meet the peculiar requirements of architectural work. It might take the form of AD VALOREM damages, calculated on the cost of erecting the building found to be an infringement, or on the value of the copyright building—say, ten per cent. in the case of a deliberate infringement, and five per cent. for an innocent one, in either case an injunction to be granted to restrain the defendant from erecting similar buildings without the consent of the plaintiff.

As the Bill now stands, although architectural copyright is to be extended so as to include the actual buildings when they are of an artistic nature, the remedy architects will have against infringements arising from the erection of similar buildings is buried in obscurity. Apparently they will have none at all!

New Building Code as Proposed by Secretary Fitzpatrick of the International Association of Building Inspectors and Commissioners.

A NEW BOOK dealing with the history of fire, the fire waste, the theory and practice of fire-prevention and fire-proof construction, has just been issued by the American School of Correspondence. It is in cyclopedic form and is written by Architect Fitzpatrick, of Washington, D.C. It is illustrated with hundreds of splendid views of fires and fire's effects and seems to have been gotten up regardless of cost. Though intended primarily as an instruction book for students of building construction, it will be of very great value to every fire department, building department, architect, engineer and builder in the country.

Not the least important feature of the book is the first appearance of the model building code upon which Mr. Fitzpatrick has so long been at work. It is the official code of the Association of Building Commissioners and it is expected that before long it will be the one adopted by most if not all of the larger cities on the American Continent.

Probably no one man has had as much to do with the inception and revision of building codes as has Mr. Fitzpatrick, and this one is the summing up, the putting into one all that experience and skill have devised in the codes that have been written ere this. It defines clearly the functions of a building department and gives it an advisory board. It calls for careful plans for every building by an experienced architect, and makes that architect sign a statement, in securing a permit, that the plans are in accordance with the code and that he is responsible for the building. If an attempt is made to evade the provisions of the code then the department declines to issue permits for other works by that architect. It licenses builders and holds them under bond to build according to the code. It provides for the remission of fees to those who build better than the code exacts for the nature of building planned—an encouragement to build well. It divides the city into "inner fire limits," "outer fire limits" and "boundary limits." Within the inner limits all buildings must be fireproof; all public buildings anywhere have also to be fireproof as also all buildings over 4 stories. In the outer limits all buildings must be fire-retarding in that the outer walls and roofs must be non-combustible. In the suburbs frame buildings may be erected but even there nothing of frame over three stories is allowed, and in those buildings adequate cut-offs and barriers have to be provided. All public and semi-public buildings, hotels, apartments, etc., have to be conspicuously labelled as to the class of construction they are, "fire-proof," "ordinary," or "dangerous," and it is made a misdemeanor to advertise one's building as of a superior class to that it is labelled. The floor loads allowed are also to be conspicuously labelled at each story. The height of buildings is limited to twice the width of the fronting street, with a maximum height of 200 feet. But the maximum height may be taken advantage of anywhere, provided that at a height twice the width of the street the building be recessed back to a line 50 feet from the centre of the street. Towers and domes may, under proper restrictions, be carried up above the 200 feet limit.

[illegible]
to be held at Toronto from March 6th to 11th, inclusive.
[illegible]
programme which has just been announced includes addresses and papers by prominent engineers and authorities identified with various branches of the industry both in
[illegible]
papers will be illustrated with lantern slide. The Exhibition, which, as previously stated, is to be held at the St.
[illegible]
Geo. P. Graham, Minister of Railways and Canals; and the daily meeting of the convention will take place in the lecture room of the Engineers' Club at 96 King street west.

The Lumsden Building, Corner of Yonge and Adelaide Streets, Toronto. A Ten Story Office Structure which Strikingly Illustrates the Architectural Use of Concrete Stone in Exterior Wall Construction. It is the Largest Building in the World Entirely Faced with Manufactured Stone. J. A. Mackenzie, Architect.

The Marlborough-Blenheim Hotel, Atlantic City, N.J. The Largest Reinforced Concrete Building in the World. It is 580 Feet Long, 125 Feet Wide, and Nine Stories High to the Main Roof Line. The Tower Seen in the Foreground Rises to a Height of Approximately Fifteen Stories.

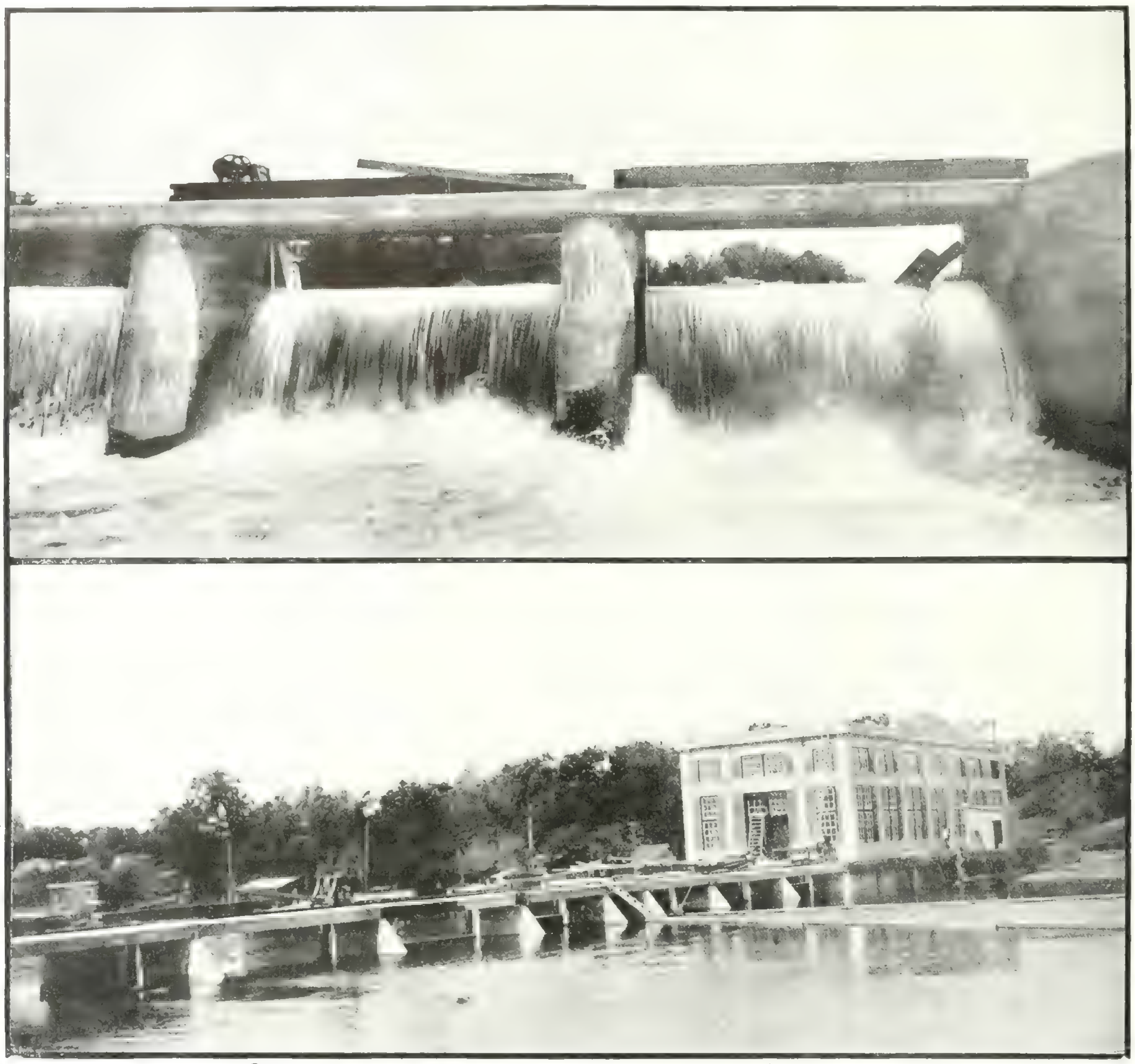
REINFORCED CONCRETE ITS ADVANTAGES AND LIMITATIONS

Specially contributed by Prof. Peter Gillespie, Lecturer on Theory of Construction at Toronto University and President of the Canadian Cement and Concrete Association.

IT IS VERY DOUBTFUL if any industry of modern times has shown a growth comparable with that of Portland cement. Twenty years ago, the aggregate annual production of this material in the United States was half a million barrels; to-day, the estimated yearly output is seventy-five million barrels. In Canada, twenty years ago, the production of Portland cement began in a small mill owned by the Rathbun interests at Marlbank, Ont. To-day, the output in this country is between four and five million barrels, and the industry is just beginning.

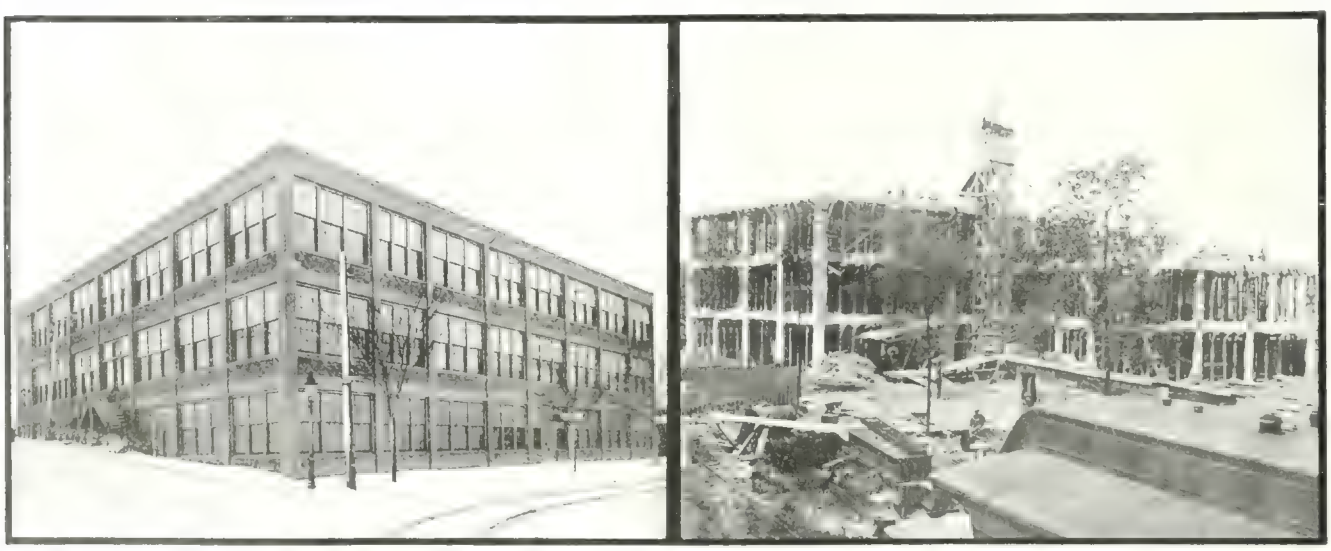
Reinforced concrete, by which is meant a combination of concrete and steel in suitable proportions, dates from 1855, when it is said M. Lambot of Paris constructed a small rowboat of cement mortar in which wire netting was imbedded. This is the beginning of what has proved to be the most important engineering development of the present generation. The structures built of it aggregate millions of dollars in value, and include buildings for every possible purpose. The building entirely of reinforced concrete and the reinforced concrete skeleton with walls, partitions and floors of brick or terra cotta, or with a veneer of tile or stone masonry, are types which are now found in almost every American city.

Engineers have not failed to recognize that reinforced concrete has its limitations as well as its advantages. In buildings where ordinarily steel framing might be used, reinforced concrete proves itself an economical material. For residential buildings and structures of one story, its use is generally of doubtful economy. For isolated roof trusses or girders, high above the ground, the cost of erection is generally prohibitive in competition with steel. Frequently, the brick curtain wall, in structures of the factory or warehouse type, where columns, roof and floor system are of concrete, is preferred. There has been a marked tendency of late years toward this



Reinforced Concrete Waterworks Dam and Power House Built for the Municipality at Peterboro', Ont. William Kennedy, Jr., Engineer. A Character of Work for Which Concrete is Particularly Adapted. Bishop Construction Company, Contractors.

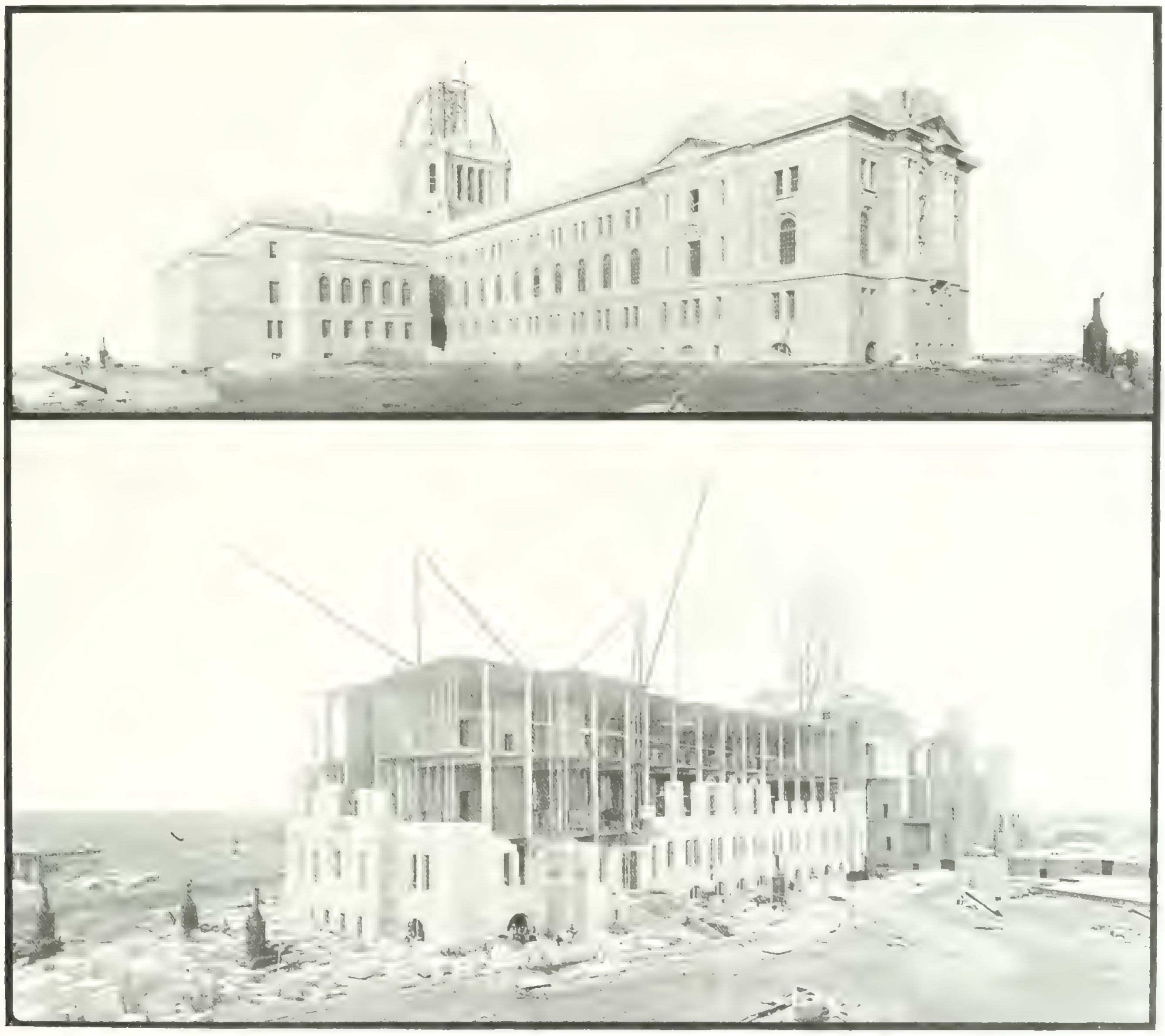
type, and this is due, partly, to the desire for a less monotonous appearance, partly to economy, especially where building regulations are exacting in their requirements as to reinforced concrete (in addition



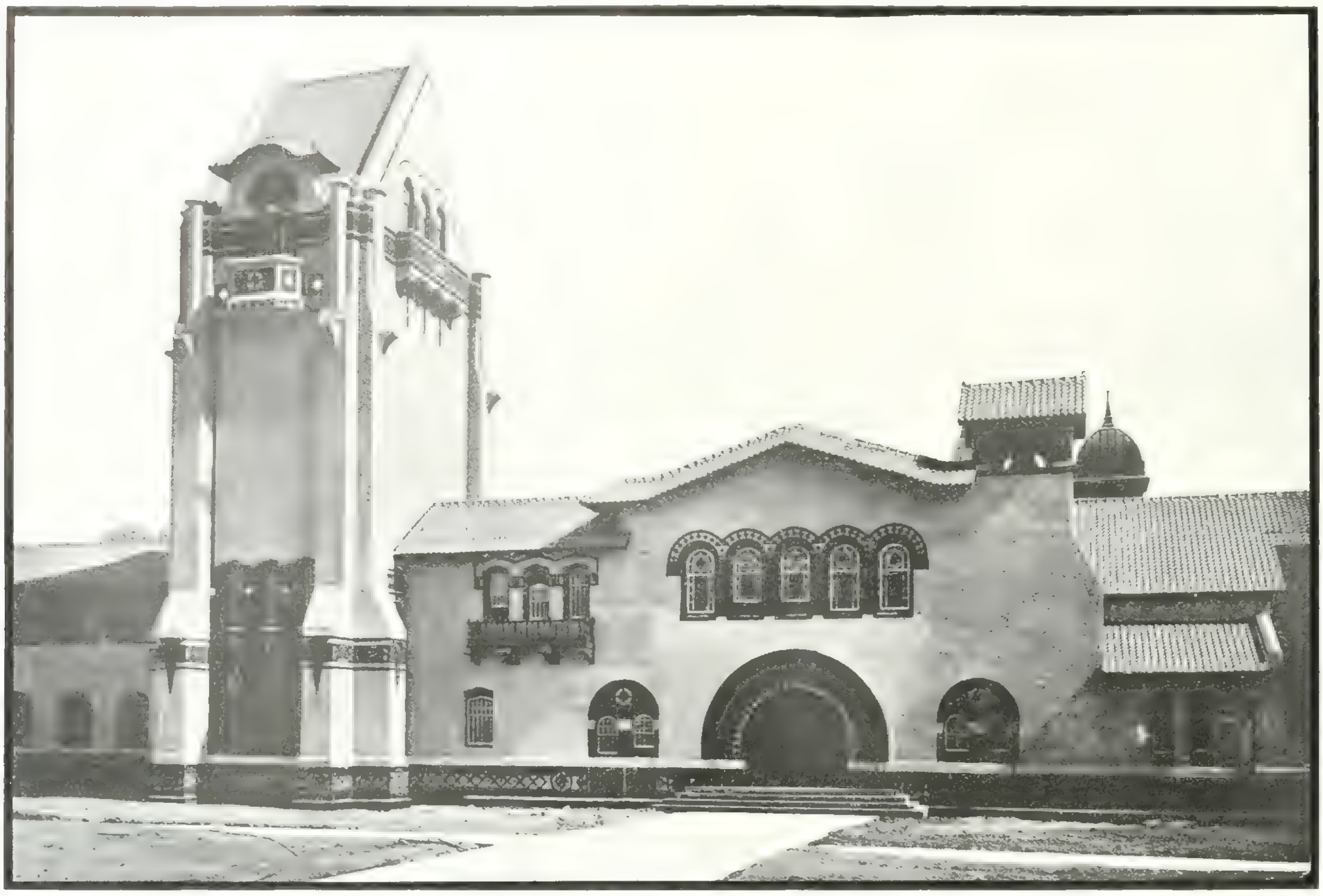
Reinforced Concrete Factory of the Peabody Manufacturing Company, Walkerville, Ont. Showing the Completed Structure and the Form Work when the Building was in Process of Erection. Bishop Construction Company, Contractors.

to which the form work will always be an expensive item); and partly to the comparative ease with which the brick wall may be removed in case lateral extensions at some future time are required. The dead weight in other types of construction will make reinforced concrete an impossibility. A few years ago, the engineering profession and press were much concerned over the boldness of a proposal to construct a 700-ft. Hudson Memorial Arch in New York city. No one as yet has had the temerity to suggest reinforced concrete for the new Transcontinental bridge over the St. Lawrence River at Quebec. The question of upkeep should not be lost sight of. It is generally conceded that reinforced concrete improves with age and does not, like steel or wood, deteriorate through exposure to the elements. It does not require painting and its fire-resisting properties, like those of its rival, terra cotta, are pretty generally conceded. For certain factory buildings, where heavy machinery has to be placed on upper floors, the rigidity and freedom from vibration possessed by a properly constructed reinforced concrete building are very desirable.

If some inventive investigator were to evolve, at moderate cost, a constructive material possessing the lightness of timber, the strength and rigidity of steel, the color variety of brick and the weathering properties of bronze, it would not require a prophet to predict that radical changes in constructive design would sooner or later follow its appearance. Such a substance would possess qualities so different from those of any single material at present known to constructive art, that its applications, and its methods of architectural treatment would be radical departures from the traditional paths. It would find uses never dreamed of as suitable for its predecessors; the elements of structures made of it would be dimensioned according to entirely new rules and the canons of decoration and embellishment would be very radically revised. It would at first be put by enthusiasts to uses for which it was not adapted, for, although possessing a capacity for service without precedent, it would not follow that it must lend itself satisfactorily to the construction, say, of mirrors or floor coverings. It would also be put to legitimate uses, but in ways out of keeping with its resisting



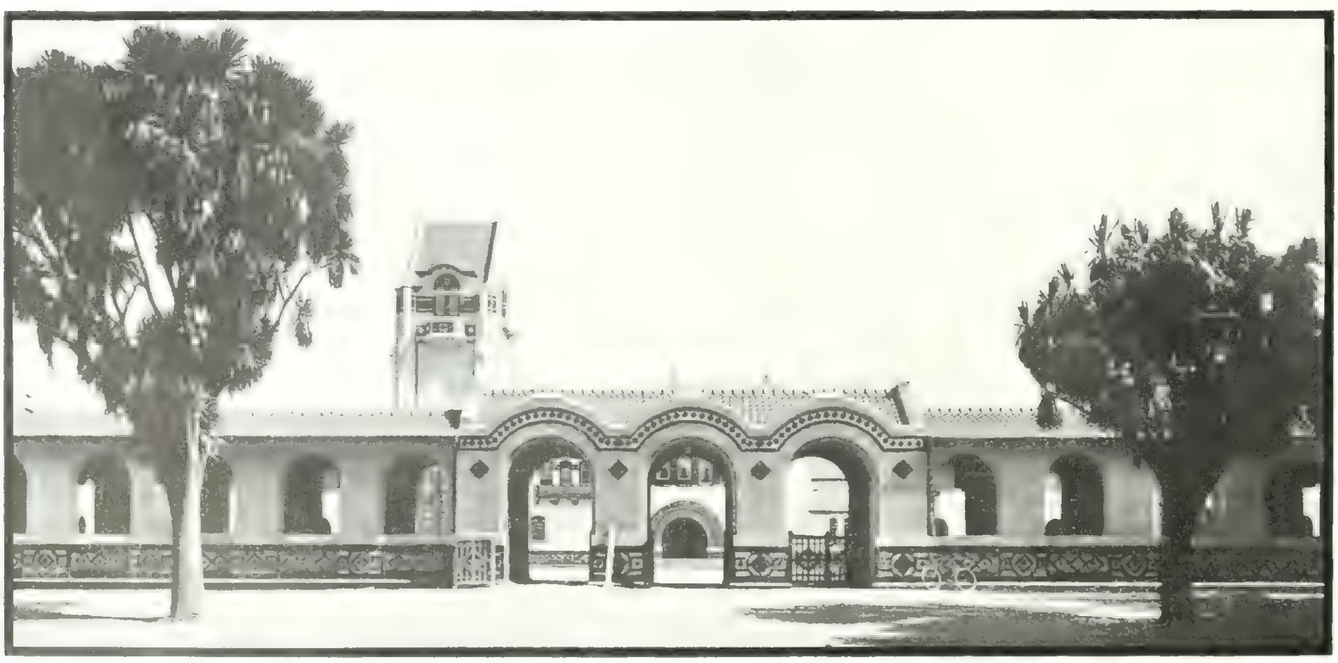
The Saskatchewan Farliament Building, Now in Course of Erection at Regina. The Largest Reinforced Concrete Building in the Canadian West, and the Only Legislative Building of this Type of Construction in the Dominion. The Upper View Shows the Exterior Walls of Stone Practically Completed, and the Lower View the Internal Construction when the Outside Masonry was Only Partially Carried Up. E. & W. S. Maxwell, Architects.



Administration Section and Tower, State Normal School, San Jose, California. A Recently Completed Monolithic Structure which is Noteworthy both as an Example Showing a Frank and Consistent Use of Concrete in Exterior Wall Treatment, and as an Instance which Forcibly Demonstrates the Opportunities Concrete Affords for Architectural design in the Hands of an Architect Who Fully Appreciates the Possibilities of His Material. W. D. Coates, Jr., Architect.

powers, and failure would sometimes follow; and with some, it would be considered a discredited material. Its method of architectural treatment would probably follow at first that of the old materials which it was destined to replace and illogical designs and offensive imitations would result. But time and experience would eventually eliminate defects, and a logical style would ensue. Such changes, however, are always of slow accomplishment.

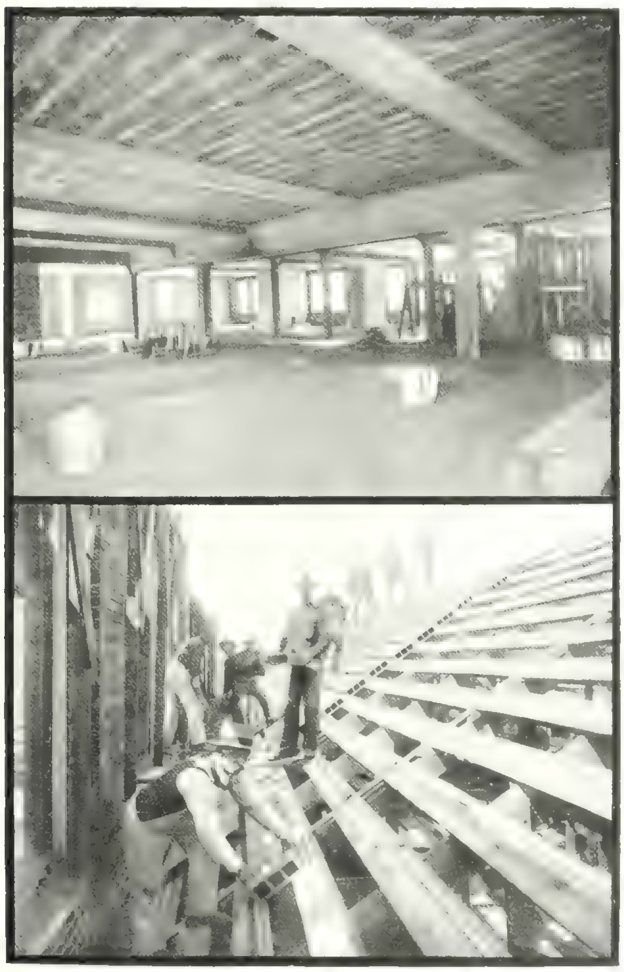
The Revolutionists of France, in their desire to free themselves from the thraldom of despotic kingship, drafted in a day a constitution which they expected would last a century. Tom Paine, in one of his boastful moments, once said that he could write in a month a better Bible than that which had con-



Detail of Entrance, State Normal School, San Jose, California. Showing the Red Brick and Green Tile Inlay on Grey Background, which Harmonizes Effectively with the Red Tile Roof. W. D. Coates, Jr., Architect.

Detail of Library Exterior, State Normal School, San Jose, California. This Building was Erected at a total Cost to the State of $272,000, or a Little Less than 16½ Cents per Cubic Foot. W. D. Coates, Jr., Architect.

sumed sixteen centuries in the making. The signal failure of both endeavors affords an exemplification of the truth that those institutions and traditions which are most esteemed, and which are most stable, are the result of slow growth and gradual evolution. So it is with an architectural style. For centuries, architects and craftsmen have designed for and built in traditional materials, stone and brick and timber, and for a shorter time, in steel; systems of construction architecturally and structurally in keeping with these materials, have been evolved, and these have the sanction of age and the approval of custom. Within the present generation, as stated above, reinforced concrete has entered the field. This is a material which, because of its many undisputed advantages and the increasing cost of the



Concrete and Hollow Tile Construction. Upper View: Interior, Showing Complete Floor. Lower View: Method of Laying Tile on Concrete Roof Supports. This Type of Work Bids Fair to Attain Considerable Popularity, both Owing to Economy in Cost and the Light Yet Strong Form of Construction of Which it Admits.

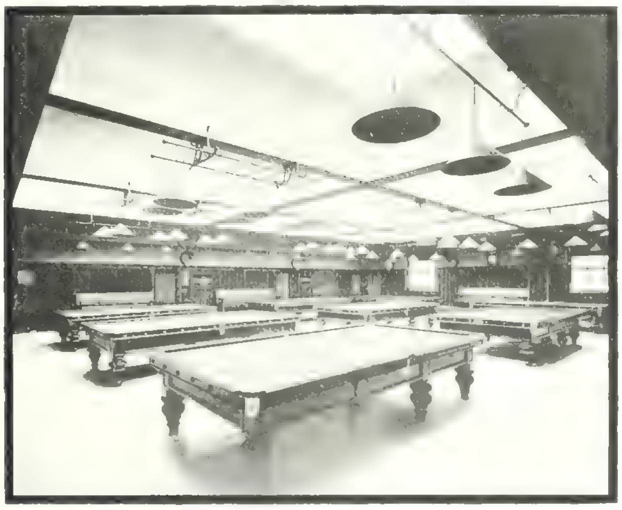
Under Side of Stadium, Harvard University, Cambridge, Mass. Showing Completed Floor. Lower View: Method of Laying Tile struction.

materials which it is gradually replacing, is destined to find a place of growing importance in the architecture of future generations. But the place will not be quickly won. In some respects, too, its position to-day is analogous to that of our hypothetical material. The methods by which it is made, and its mechanical properties when made, render it in many ways a new material. Its internal cohesion and its ability to resist water percolation, make it desirable for foundations, dams, retaining walls, canal construction and the sub-structures of hydroelectric developments. Its ability to resist bending

The Jacobs Building, St. Catherine and St. Alexander Streets, Montreal. Built of Reinforced Concrete with Terra Cotta Exterior Facing, and Notable as Largest Building of this Type of Construction in Canada. Mitchell and Creighton, Architects.

Pemberton Block, Vancouver, B.C. A Large Reinforced Building Which is Interesting as an Example in which the Floor System Extends to Form the Outer Wall Beams, and in this Manner is incidentally Made to Serve as a Simple Decorative Feature for the Brickwork. G. C. Mesher & Company, Architects.

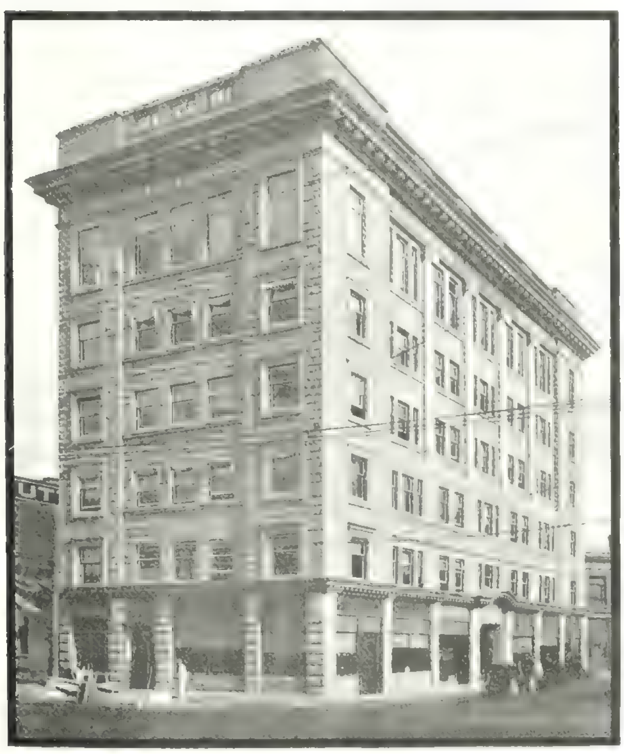
stresses, when adequately reinforced, renders it particularly useful for horizontal spanning. These advantages were soon recognized, and the success attending its use in a purely commercial or utilitarian way, has been undoubted. Needless to say, some disturbance of our cherished notions regarding the proportion of parts has ensued, and some of us have been led to suspect that perhaps in the past, the arbitrary rule has been accorded too much reverence,



Interior View, Pemberton Block, Vancouver, B.C. Showing the 68-Foot Concrete Span Which Extends the Full Length of the Skylight Over Billiard Room.

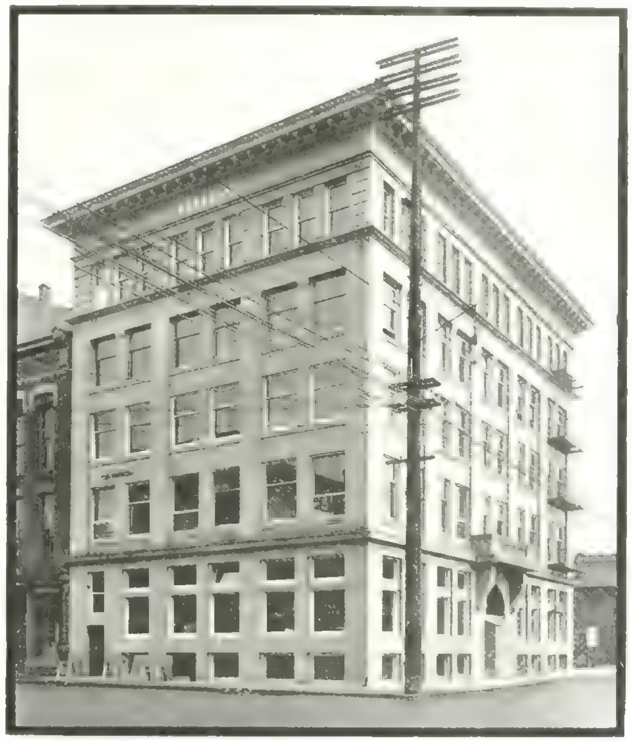
and that there may not be any one set of proportions that, apart from association and training, is inherently more pleasing or beautiful than another. The goddess of Beauty, as conceived by the native African, would be, as Sir Joshua Reynolds asserts, a negress with the tribal features augmented and emphasized.

But it is where attempts to treat the form and sur-



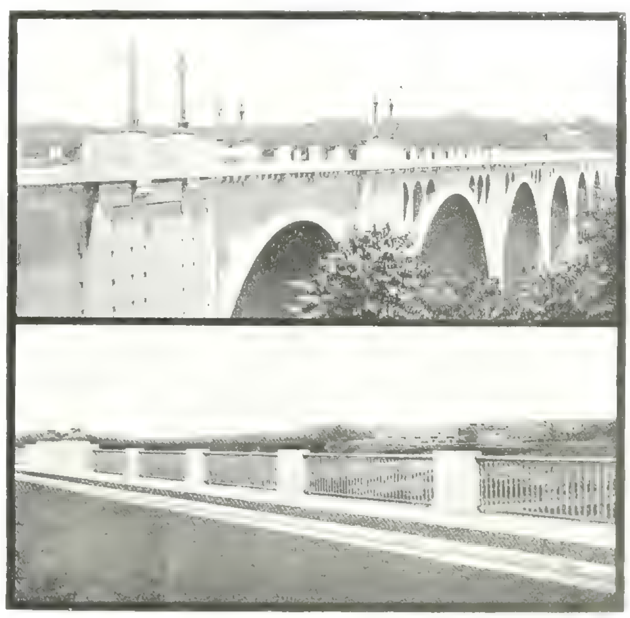
Grain Exchange, Calgary. Faced with Calgary Stone, and Possibly the Largest Reinforced Concrete Commercial Building Between Winnipeg and Vancouver. Hodgson & Bates, Architects.

face of this material in order to attain a pleasing and enriched exterior, that the results have been particularly disappointing. What are the outstanding qualities of reinforced concrete? What are those things which must guide us in the



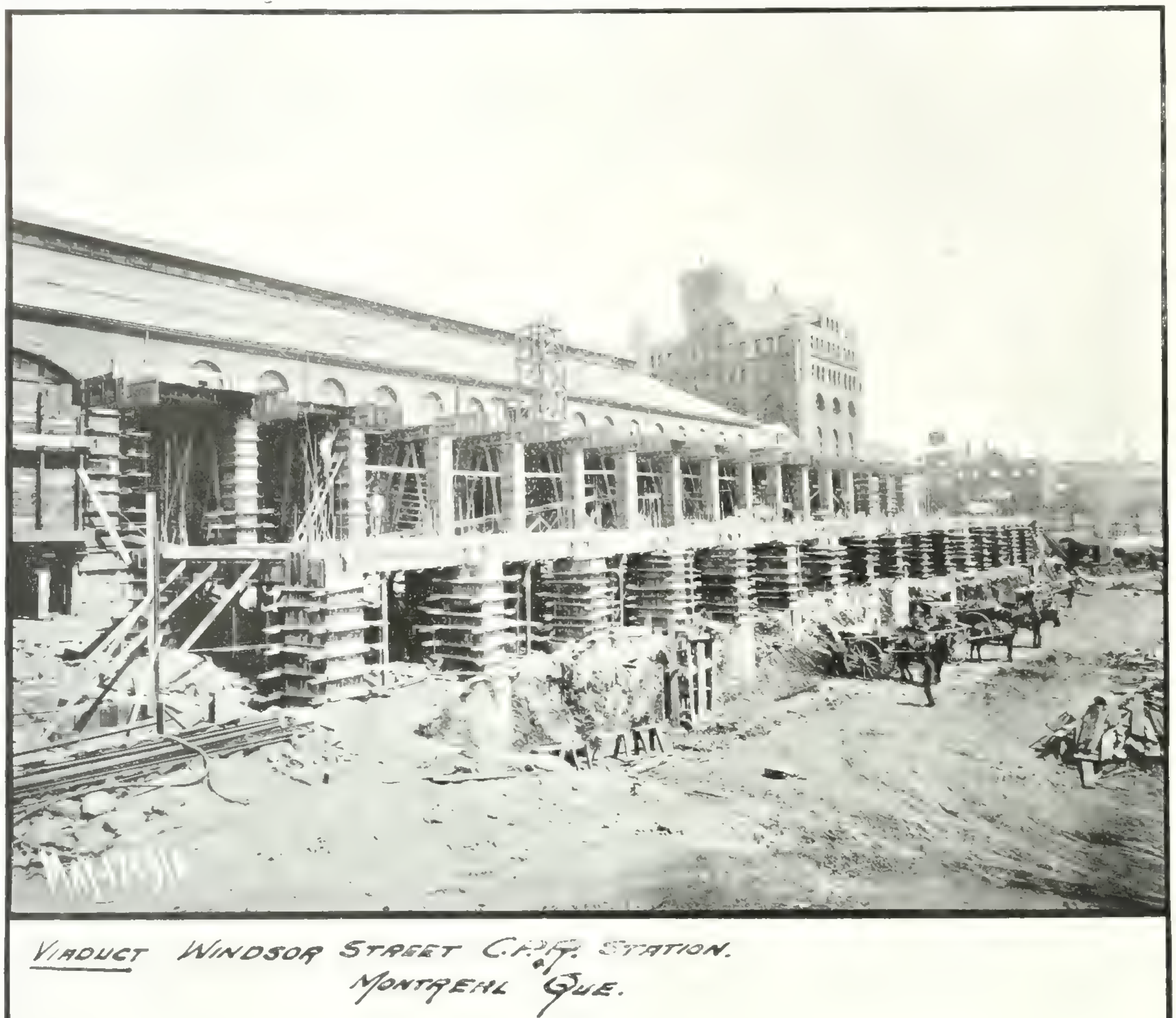
Times Building, Vancouver. Another Recently Erected Reinforced Concrete Building in the Canadian West. W. S. Griffiths, Architect.

co-ordination of quality of material and architectural treatment? They are two in number. In the first

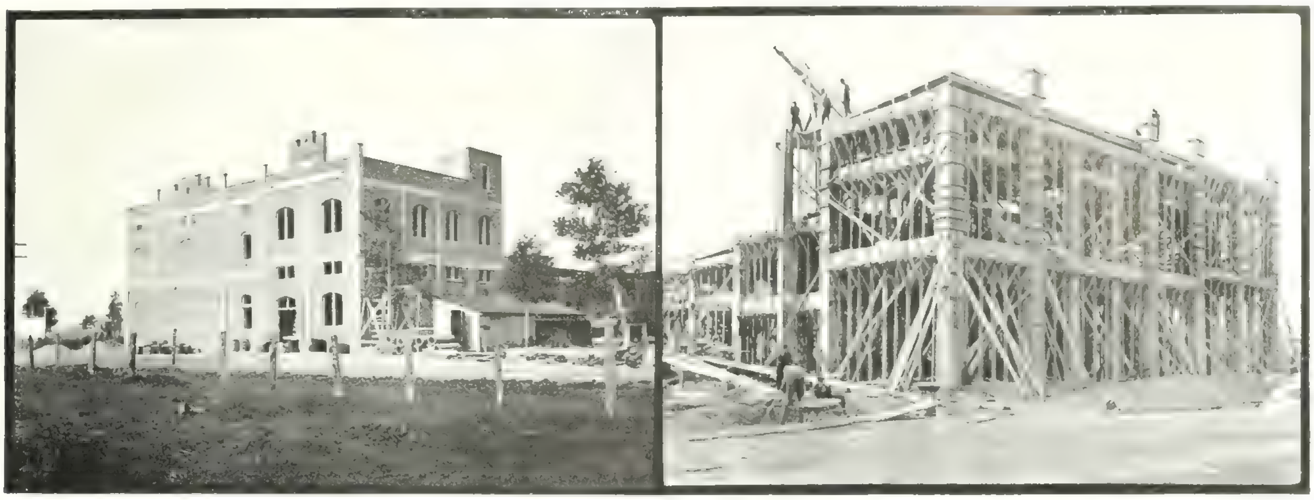


Connecticut Avenue Bridge, Washington, D.C. A Celebrated Example of the Utility of Concrete Which is Not Only Remarkable as the Largest Concrete Bridge in the World, But as a Structure Which Strikingly Illustrates the Use of Moulded Concrete Blocks for Decorative Purposes in Conjunction with Monolithic Masonry Construction. This Bridge was Erected at a Cost of $850 000. It has a Total Height, Including Approaches, of 1,400 Feet, and is 150 Feet Above the Bed of the Gorge at its Highest Point. The Lower View Shows the Railing with its Series of Interspersing Concrete Posts Along the Approach and Deck of the Bridge.

place, it is a moulded material, and in the second, its masonry is monolithic and continuous, not jointed.

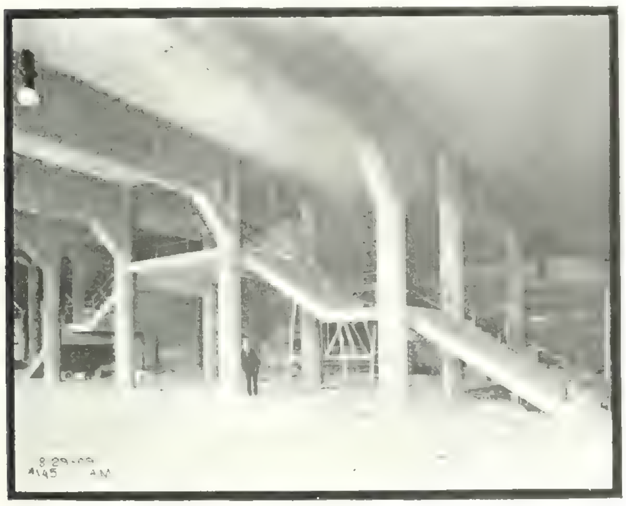


Concrete Viaduct, Windsor Street (C.P.R.) Station, Montreal. Showing Form Work, and Section of Finished Structure, Which is Designed to Carry the Heaviest Type of Locomotives and Passenger Cars. W. S. Painter, Chief Architect. Bishop Construction Company, Contractors.

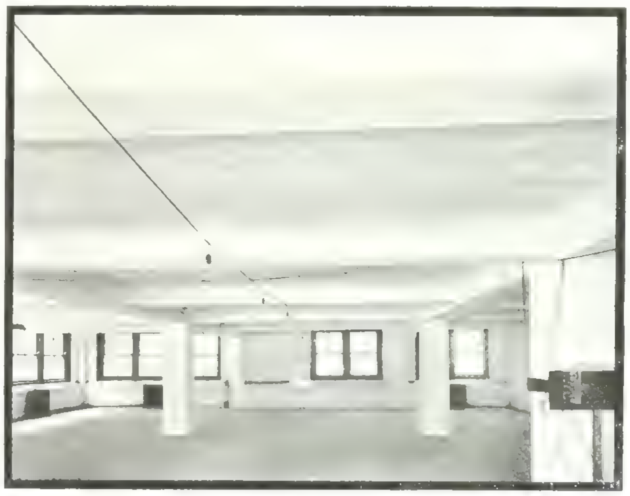


Sudbury Brewery, Sudbury, Ont. A Reinforced Concrete Building in which the Floors are Designed to Carry the Outside Brick Walls. The Views Show the Erection of Form Work and the Structure Practically Completed. Bishop Construction Company, Contractors.

Ornament, if of the mass, will be an integral part of it and must grow out of it. It should not, as in the case of brick or stone masonry, consist of added units of the same material. Hence, mouldings and cornices not suggestive of masonry, are quite permissible; but brackets for the support of such cantilevered projections are inconsistent with its mechanical properties. The reinforced concrete arch is as truly an arch as its historic masonry namesake, inasmuch as it exerts upon its supports a horizontal thrust. The fact that it is capable of sustaining bending stresses—is in fact identical with a curved beam—does not invalidate the statement. But, it knows no *voussoirs* with separating radial joints, and these should not be employed as a means to a decep-



Concrete Stairs Under Grand Stand at State Fair Grounds, Minneapolis, Minn.



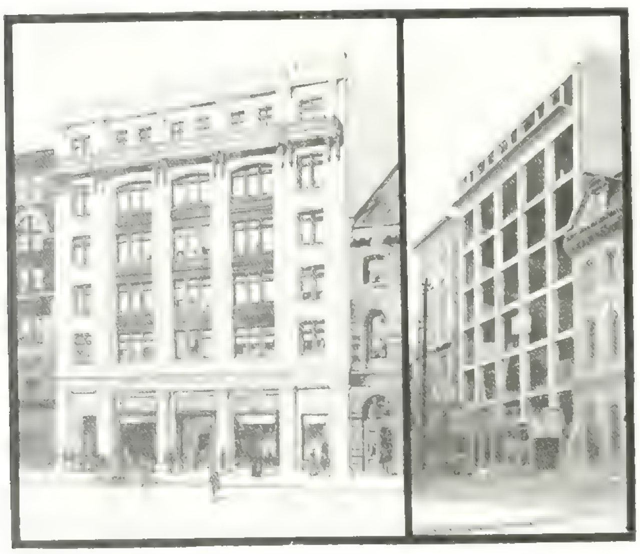
Typical Example of a Concrete Interior.

Smith Biscuit Company's Building, Vancouver, B.C. A Recent Example of the Application of Monolithic Construction to Factory Building Design. W. S. Griffiths, Architect.

Transformer House at Port Colborne, Ont. An Example of Stucco Work on Monolithic Concrete Construction. J. A. Jamieson, Engineer.

Garage of the Ontario Motor Car Company, Toronto. Showing a Richly Detailed Exterior of Cement Stone Inset with Red Brick Panels. Smith, Henchman & Grill, Architects.

tion. If monolithic and jointed masonry be thought of as having changed places in history, it might be conceived that masons, following their introduction to the new material, would be as diligent in concealing mortar joints in their ashlar and range work as some of us of recent years have been in announcing

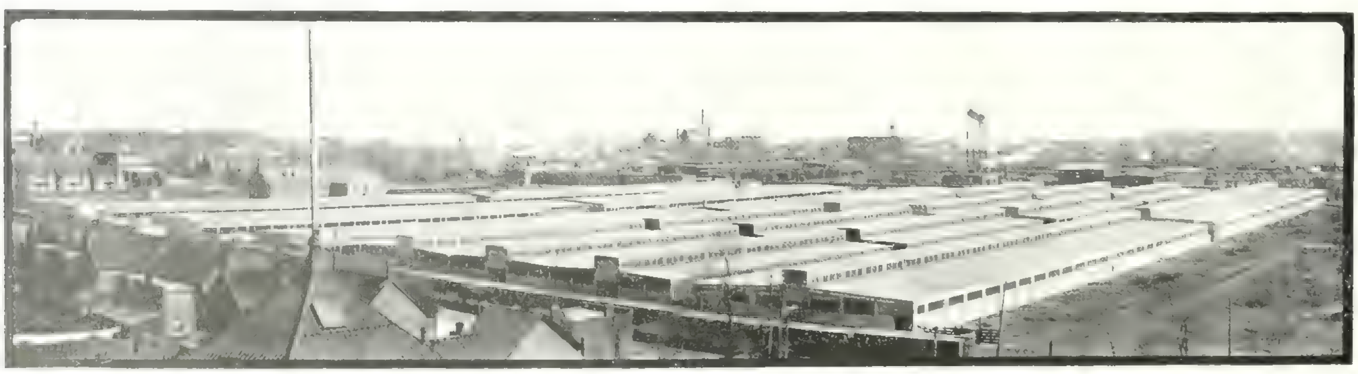


Rosenthal Building, Ottawa. Showing the Designers' Perspective and the Concrete Frame Work Before the Façade Was Carried Up. Weeks & Keefer, Architects.

them. "The day is coming when everyone will know that that single limitation, adaptation of material, is the philosopher's stone for architecture." The imitator usually fails to recognize that the thing imitated has been successful because it follows that this most important law, one indeed which he transgresses in the copying. The column is primarily for sustaining vertical loads. As such, the widened base and cap suggest, respectively, stability and the capacity for receiving weight; but the individual elements, base

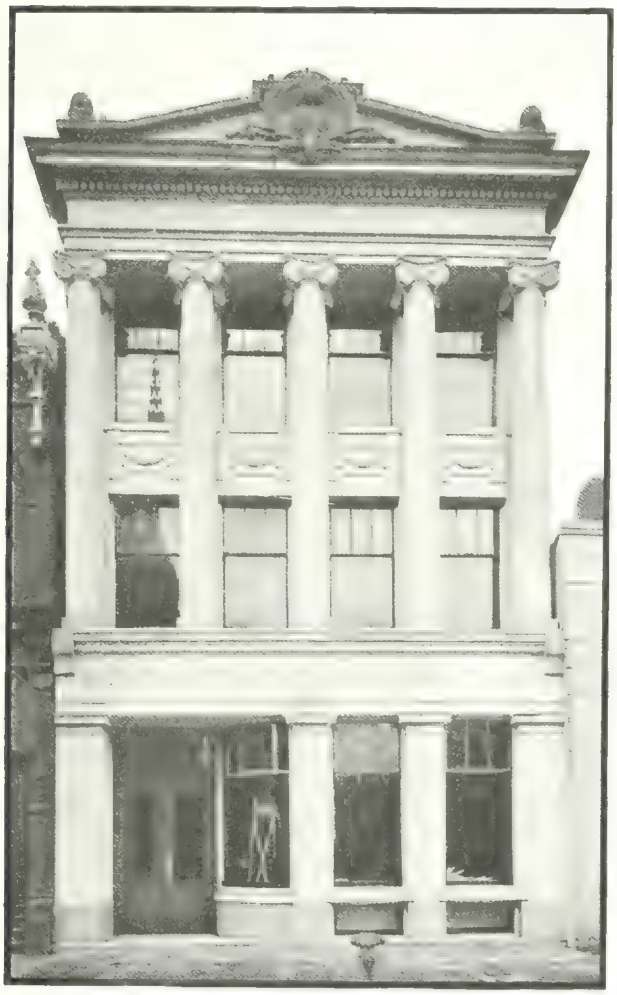
Roman Arch Bridge Over the Severn River. One of the Many Reinforced Concrete Bridges Built at Various Points Throughout Ontario by the Provincial Government.

and shaft, do not exist in the monolithic column. Similarly, the arch and its abutments are one, and it



Group of Concrete Cattle Sheds, Union Stock Yards, West Toronto. Bishop Construction Company, Erecting Engineers.

is inadvisable that the design would suggest the individuality of these elements (except in so far as is required by considerations of stability) when individuality does not exist.



Merchants Fire Insurance Company's Building, Toronto. A Further Example Showing the Use of Manufactured Stone in Exterior Wall Treatment. Beaumont Jarvis, Architect.

A modern steel office building of twenty storeys, clad with its shell of protective masonry and without external embellishment of any kind, would be a public outrage. But the architect with his pilasters and his arches and his cornices, gives to his unpromising parallelopiped a certain attractiveness of form, suggestive possibly of something else, which satisfies the eye although it does not mislead the understanding. The effect is suggestive of what might be attained if the walls were what they pretend to be, and no one essays to condemn a fiction that modern conditions have rendered a necessary means to an end. Similarly, the stucco finish, applied to cement

Entrance to Pinchin & Johnson Varnish Factory, Carlaw Ave., Toronto. An Example of Cement Stone Work which Admirably Demonstrates the Adaptability of this Material for Decorative Detail. J. L. Havill, Architect.

blocks or metal lath is suggestive of what concrete would look like if the wall were in reality what it

Poultry Building, Exhibition Grounds, Toronto. A Red Brick Structure which Shows an Interesting Use of Concrete St[illegible] Doorways, Windows and Foundation Facing. Geo. W. Gouinlock, Architect.

1. Detail of Entrance to Poultry Building, Exhibition Grounds, Toronto. Geo. W. Gouinlock, Architect. 2. Carling Brewing Company's Offices, Simcoe Street, Toronto, the Entire Lower Portion of Which is Executed in Cement Stone.

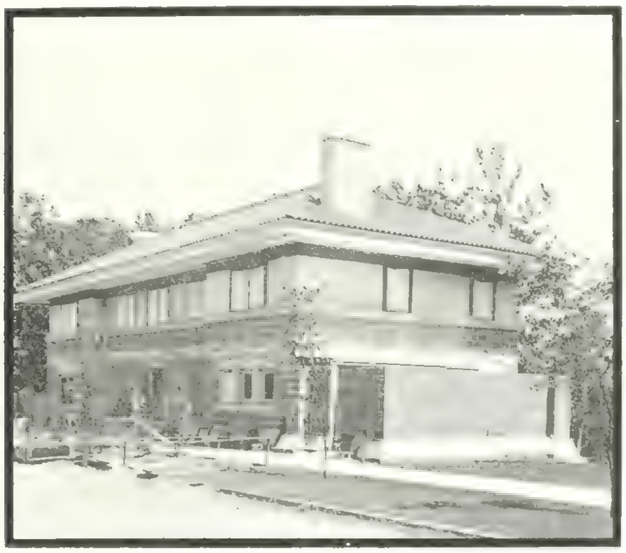
appears to be, one of monolithic concrete. In Europe, the almost universal method of securing architectural decorative effect in concrete work, is by this means, and European builders have attained a skill in its use, scarcely known on this side of the Atlantic. Where stucco is used, the lintel and the keystone and whatever else is essentially of other materials, should be suppressed. If wood be employed for eaves or cornices, or tiles for roofing of ornamentation of broad expanses of wall, or bricks for pillars, these materials should be acknowledged, not disguised. The stucco method is a treatment of "concrete as concrete."

As stated previously, the architectural features of reinforced concrete, if of that material, should be of the moulded type. For this purpose, hollow forms are required, and as anything in the way of elaborate design in such necessitates great labor and expense in the form making, it follows that for commercial reasons, such enrichment will generally be quite simple. Other methods must be sought. The monotony of the blank wall must be relieved and the use of brick and tile, in geometrical or conventionalized design, for this purpose has been attended with

Free Masons' Hall, College Street, Toronto. A Recently Completed Structure in Which the Entire Façade is Executed in Cement Stone. Edward & Saunders, Architects.

Detail of Cement Stone Work.—1. Branch of Merchants Bank of Canada, Roncesvalles Avenue and Dundas Street, Toronto. C. J. Gibson, Architect. 2. Branch of the Molsons Bank, Meaford, Ont. Langley & Howland, Toronto, Architects.

much success, and offers an attractive field for the enthusiast to exploit. If stucco be applied to the monolithic concrete wall, it is advisable that the wall be cast in the rough so that the stucco may adhere



A Concrete Block and Cement Stucco Residence. Showing the Lower Portion Before the Plaster is Applied and the Upper Story Finished.

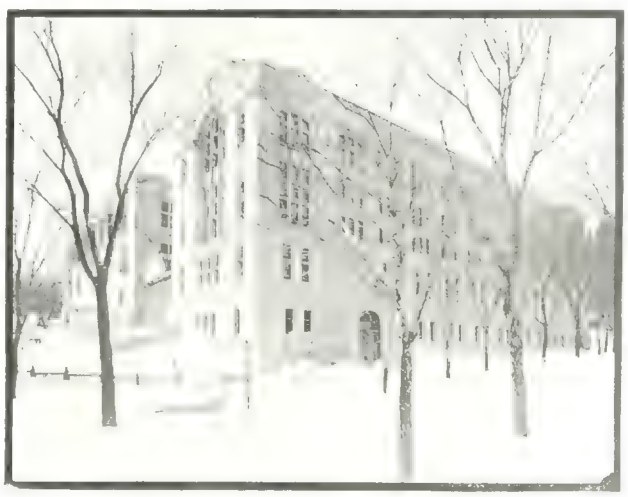
the better. To give a touch of "life" to the surface, the use of the bush hammer is quite effective. This was adopted with gratifying success in the case of the Connecticut avenue bridge at Washington, D.C., and on the Walnut lane bridge at Philadelphia, Pa. The texture of the moulded wall can be improved in various other ways. If the work is of such a character that forms may be removed in 24 hours, that is, before the final hardening has progressed very far, a surface of uniform texture and color may

Querbes School, Outremont, District of Montreal, in Which Concrete Plaster on Metal Lath has been Extensively Adopted, Owing to the Fire-Resisting Properties of this Form of Construction, and the Sanitary Advantages Which it Affords. Joseph Perrault, Architect.

be obtained by rubbing with wooden floats and water only, no cement being used. This can be done by unskilled labor. Another method of treating the surface is by scrubbing it, preferably when still green, with wire brushes. This will remove the outer skin of sand and cement and will expose the underlying aggregates, the effect being to give a lifelike texture to the otherwise sombre gray surface. This process may be rendered somewhat more expeditious by the use of dilute acid, provided the concrete be green. For vertical surfaces, well hardened, the difficulties attending its application are so serious that some process of mechanical chipping or bush hammering is more economical and much quicker. The use of a carborundum block or emery stone with water is an effective though somewhat expensive method of exposing the aggregates in cross section. Needless to say, the finished surface is much smoother than

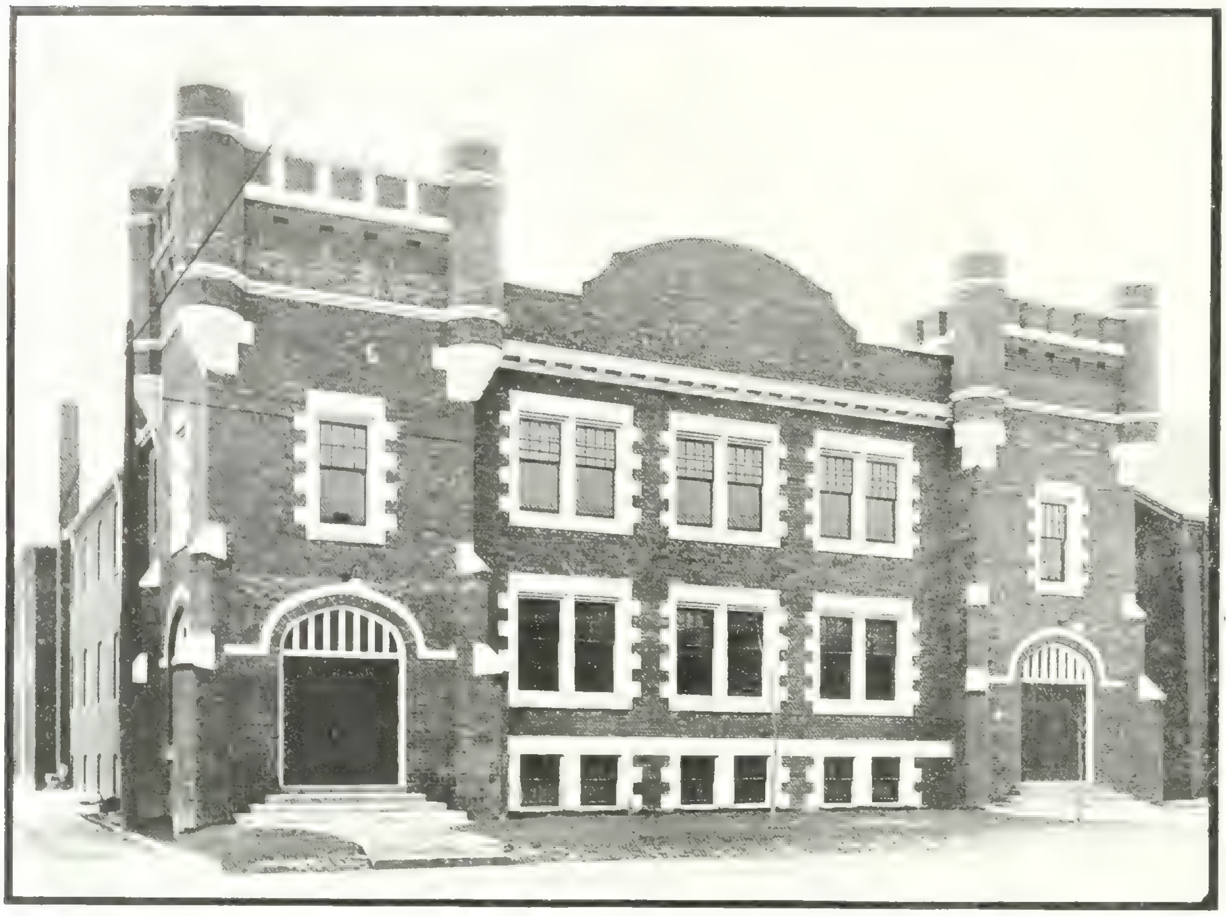
Chateau Laurier, Ottawa's Splendid New Hotel, Now Nearing Completion, and in Which the Structural Parts Throughout are Protected by a Patent Welded Fabric and Concrete Plaster Applied to Metal Lath. Ross and McFarlane, Architects.

by the other process described. Best results from this method are obtained when the aggregates are of the softer kinds, and are selected with a view to securing pleasing variety in color. Still another method of improving surface texture, is by means of the sand blast. This consists in impinging, by means of compressed air, a sharp siliceous sand against the surface to be treated. The outer skin and adhering sand and cement are removed, and the underlying aggregates exposed in a manner similar to that in

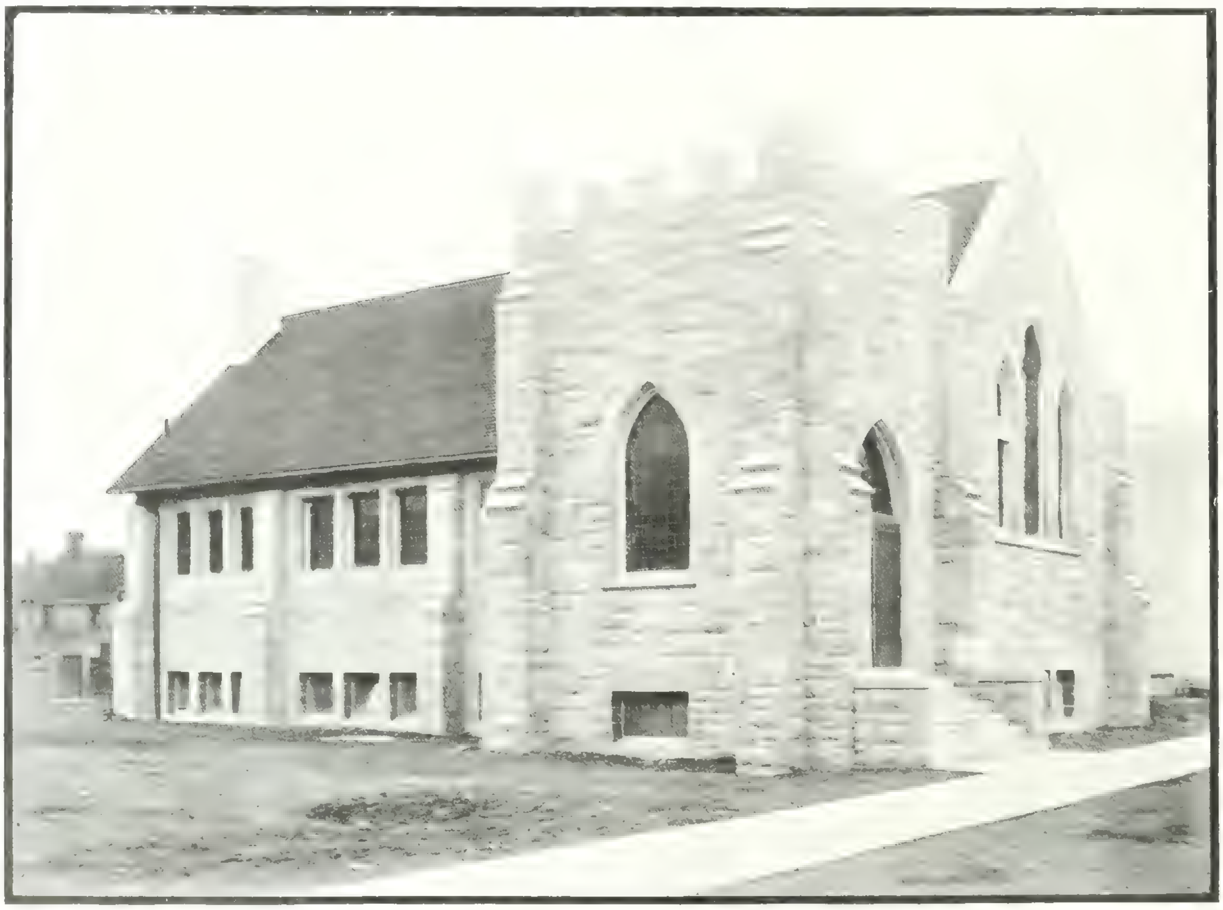


Medical Building, McGill University, Montreal. An Important Structure in Which the Interior Construction Throughout is Rendered Fire-Resisting in Character by the Use of Concrete on Galvanized Expanded Metal Lath. Brown and Vallance, Architects.

which the brushing or acid washes are employed. Mr. Richard L. Humphrey, in an address before the Concrete Institute in London some months ago,



Cement Stone Trimmings on Brick Background, as Seen in the Dovercourt Presbyterian Sunday School. Simpson & Young, Architects.



St. Paul's Lutheran Evangelical Church, College and Markham Streets, Toronto. Built of Broken Ashlar Cement Stone. Note how Successfully Monotony of Appearance has been Eliminated in the Face of the Stone, and the Close Resemblance it Bears to Pitched Sandstone. C. F. Wagner, Architect.

CONSTRUCTION

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

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

Vol. 4 Toronto, March, 1911 No. 4

CURRENT TOPICS

AT THE ANNUAL MEETING of the London Builders' Exchange the following were elected officers for 1911: Past President, George Everett; President, John Jones; First Vice-President, William J. Nutkin; Second Vice-President, E. R. Dennis; Secretary-treasurer, G. S. Gold; Auditors, D. Ferguson and T. R. Wright; Directors, George Belton, Thos. Ridge, John Pulerborough, Charles Gould and John Maker. Messrs. Ferguson and Wright were appointed to represent the Exchange on the Western Fair Board.

* * *

DOCK AND HARBOR improvements, aggregating $70,000,000, to be carried out on the Thames estuary, has been recommended by the port authorities of London. The scheme contemplated is far-reaching in its scope, and includes the dredging of the river channel from Tilbury to London Bridge, together with the construction of three docks at the former place of 65, 126 and 138 acres respectively, to accommodate the largest vessels now afloat or projected. The adoption of the proposals made by the engineers is said to be imperative if London is still to maintain its prestige as the first port of the world.

A LIMIT OF 200 FEET is to be placed on all buildings erected in Chicago after September 1st next. This was voted for by the Committee on Buildings at a recent meeting, and is now before the City Council for final sanction. It was agreed to permit the 260-foot limitation (20 storeys) which has prevailed for several years, to continue in force for a reasonable period, in order to allow property-owners sufficient opportunity to start construction if it was their intention to build above the new limit when the land was acquired.

* * *

AN OLD LANDMARK OF QUEBEC to pass out of existence is the large stone grist and saw mill on the Black River at St. Pie, which was recently destroyed by fire. The mill was built about eighty years ago by Seigneur Descelles of St. Hyacinthe, whose seigneury extended for many miles about. According to the old tenure laws the seigneur was obliged to build the mill for his tenants and they in turn were required to bring their grain to him to be ground. In the early days before roads were built, settlers were often seen carrying a single bag of grain along footpaths through the wood to the old "grist," which for some time back had ceased to operate in this capacity.

IN THE NEW SIXTEEN STORY office structure to be erected at King and Yonge streets, Toronto, the C.P.R. will have the tallest building in the British Empire. It will be one story higher than the Traders Bank building, which now has that distinction. The construction will be of steel and hollow tile, with glazed terra cotta exterior walls, while a feature of the design is to be the colonnade work of either facade. Accommodations are to be provided for the general passenger, freight, express and steamship offices, telegraph headquarters, solicitor's department, central public ticket offices, and the offices of all executives in charge of the Ontario division. The building will cover a ground area of 8,500 square feet, and will cost complete over a million dollars.

* * *

THERE IS A PROBABILITY that the Dominion Government will either make extensive improvements to the present Government House at Ottawa, or else erect a more palatial residence for the Governor-General. At least this is to be inferred from the recent remarks of the Minister of Public Works, who, in reply to a question brought up in connection with an appropriation for immediate repairs to Rideau Hall, stated that while improvements involving an expenditure of $300,000 were proposed, it would be better to dispose of the property, which is valued at $700,000, and erect a new Government House—one that would be more in keeping with the dignity of its purpose—on some commanding site in the city. Rideau Hall, in the opinion of Dr. Pugsley, was not a credit to the country.

CALGARY IS JOINING in the movement recently inaugurated in a large number of cities in Canada and the United States to limit the height of buildings. Both Fire Chief Smart and Building Inspector Harrison are of the opinion that a measure should be passed prohibiting structures from extending up over eight stories or between 90 and 100 feet. The contention advanced is that Calgary, like most other Western cities, has unrestricted territory for development on all sides, and that a regulation of this kind would render conditions less dangerous in case of fire, prevent inflated land values, and operate more to the economic advantages of the city in general.

* * *

A RECENT VOTING CONTEST was held in the United States among architects and architectural students, with the object of securing the views of the profession as to the ten most beautiful buildings in the United States. The buildings which were given this distinction were as follows: The Capitol and the Congressional Library in Washington; the Public Library and Trinity Church in Boston; Columbia Library, Trinity Church, St. Patrick's Cathedral, the City Hall, and Madison Square Garden in New York, and the Vanderbilt residence, Biltmore, in North Carolina. All of these buildings are in the east. Three of them are libraries and three are churches. One capitol, one city hall, one place of amusement, and one residence complete the list. Not a single State capitol, or theatre or gallery of art, or monumental museum has a place.

* * *

OFFICERS OF THE ALBERTA ASSOCIATION of Architects for the current year, as elected at the annual meeting recently held at Calgary, are as follows: J. C. Hopkins, Edmonton, honorary president; S. M. Lang, Calgary, president; R. W. Lines, Edmonton, honorary secretary; L. M. Gotch, Calgary, secretary; D. S. McElroy, Calgary, treasurer; G. M. Lang, W. S. Bates, James Henderson, L. M. Gotch, and R. W. Lines, examiners; A. Pierie, J. J. O'Gara, auditors; R. W. Lines, librarian. The report for the past year, which was adopted, showed the affairs of the association to be in a very satisfactory condition. In addition to transacting a large amount of important business during the period of three days the convention was in session, a deputation from the Calgary Builders' Exchange, which came to urge upon the association the advisability of adopting a standard form of contract, was also received. After considerable discussion it was decided to appoint a committee of architects to meet delegates from the various Exchanges throughout Alberta, for the purpose of going fully into this subject, with a view to adopting a form of contract for the province that will be satisfactory to all parties. The visiting architects were hospitably entertained by the local Chapter, and over thirty members in all were in attendance at the daily meetings. Calgary was the unanimous choice for the next assembly, and in all probability will become the permanent headquarters for the association.

ONE OF THE MORE IMPORTANT constructional works now in progress in the United States is the mile-wide $20,000,000 dam which is being built across the Mississippi River at Keokuk, Iowa. Some idea as to the enormity of the project is gained from the fact that it will give steady employment to a force of 750 men for a period covering thirty months. The dam will generate 250,000 horse-power, to be used in the development of electrical energy for towns and cities in the Mississippi belt. Already 60,000 horse-power has been contracted for St. Louis, 200 miles distant. This will be the first dam to extend entirely across the Mississippi, and it was necessary to secure a franchise from Congress before the work could be started.

* * *

THE ENGINEERS' CLUB OF TORONTO has elected the following officers for the ensuing year: President, Capt. Kilealy Gamble; first vice-president, Willis Chipman; second vice-president, W. H. T. Haultain; third vice-president, Chas. H. Hays; directors, J. J. Ashworth, R. A. Baldwin, C. H. Acton Bond, C. H. Burke, W. A. Bucke, C. M. Canniff, W. E. Douglas, E. A. James, L. J. Street, Jas. B. Tyrrell and P. F. Young; secretary-treasurer, R. B. Wolsey. The registration of the club is now about 400, and the remodelled and enlarged quarters makes it an ideal meeting place for the members. The property adjoining the old rooms on the east has been secured and altered and redecorated to form a part of the general suite. The lower floor has also been leased and converted into a large modernly appointed dining-room, thus making the advantages of the club complete.

* * *

ENGLAND'S FIRST SKY SCRAPER, as the new building now under construction for the Royal Liverpool Insurance Company is called, is the most important commercial or office structure having concrete as its basic material that has yet been undertaken in the British Isles. It is 301 feet long, by 177 feet 6 inches wide, with a height of 360 feet from the basement to the top of the dome. Concrete reinforced by steel is used as a base for the walls, over which a veneer of granite is being placed. The estimated quantity of concrete used in the framework of this building is about 17,000 cubic yards, which is prepared by an electrically driven mixing machine, provided with a tank which automatically discharges the correct volume of water for each bach made, the water tank being connected with the city mains. The whole of the mixing plant is located in the basement of the building in order that the component parts may be delivered in chutes from the street level to the bins below. The work turned out for a day of nine hours with this mixing plant is said to be upward of 100 cubic yards. All the concrete is transported to the floor under construction by steel wagons of the side-tip pattern on hoists, electrically driven from the basement. The concrete used in the construction of this building is composed of 6 parts, as follows: Three parts broken granite, 2 parts sand, and 1 part Portland cement.

RELATIVE MERITS OF PURE AND BLENDED CEMENTS

Report covering results of initial series of thirty year test now being conducted by the German Government.

EXHAUSTIVE DATA relating to two series of official tests made to determine the effect of the blending or adulteration of cement by the addition of tufa and other materials, is contained in the 1909 publication recently issued by the commission in charge of the Royal Prussian material-testing station at Lichterfelde West, near Berlin.

Following the initial experiment made in Charlottenburg during the summer of 1898, a large number of tests constituting the first series were carried out at Westerland, on the island of Sylt, in the North Sea, with a view to ascertaining the comparative pressure resistance and tensile strength of mortar blocks made from various pure cements and from cement blended in certain proportions.

The blocks were seasoned in specially constructed containers, one-half of each kind of blocks in fresh water and one-half in salt or sea water. The blocks were made by adding each of the following binding materials to ordinary sand and to raw coarse-grained sand: (1) Portland cement, (2) Portland cement mixed with finely ground tufa, and (3) Portland cement mixed with fine sand. The first provisional report of the tests was made in the fall of 1899 and subsequent reports at various times until 1908. The results indicate that in fresh water the blended mortars remain inferior to those unblended, in both resistance and tensile strength, while in sea water the tufa cement mortars were equal to the unblended mortars in tensile strength, and after a year the compressive strength of the blended mortars was nearly as great as that of the unblended. The commission therefore decided that, within certain limits, Portland cement might profitably be blended with tufa in mortars to be used in sea water constructions, and especially in mortars whose cement content is comparatively low.

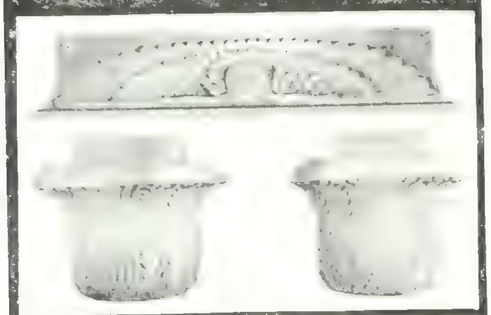
The second series of tests now being carried out at Westerland were begun in 1902, by a specially appointed commission of the Prussian Ministry of Public Works, and are to continue during a period of 30 years. The purpose is to test various cement mortars and concretes, blended and unblended, when used in the construction of quays; to determine the chemical effects of sea water upon these materials, as compared with fresh water, and the mechanical washing effects of the tides, open sea, etc. Mortars and concretes of various percentages of (1) cement and sand, (2) cement, tufa, and sand, and (3) tufa, fat lime (Fettkalk), and sand, were used in making (1) concrete facing blocks of the dimensions used in quay constructions, (2) large concrete cubes or blocks to be tested with reference to their compression resistance, and (3) smaller sample pieces of mortar and concrete for testing their compression resistance and tensile strength.

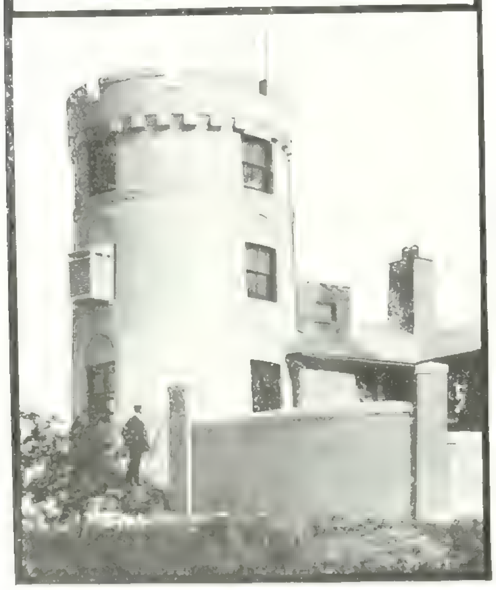
The concrete facing blocks were allowed to season under a covering of moist sand—one-half of each kind of mortar or concrete mixture—for a period of three months, and the other half for a period of one year. The facing blocks after being seasoned were used in quay constructions where they are continually being observed with reference to the chemical and mechanical effects of the sea water. The large concrete blocks of each mixture were seasoned, first in sand, some for nine days and some for one year, after which they were stored in special containers, one-half of each kind in fresh water and the other half in sea water. Tests of the compressive strength of the large blocks were made after periods of 28 days, 1 year, and 5 years, and are still to be made after periods of 15 and 30 years. The sample mortar and concrete pieces were subjected to the same seasoning conditions and were tested with reference to compression and tensile strength at the same time as the corresponding concrete blocks.

The results of the observations of 140 concrete facing blocks, which are given in the report from the Royal material testing station, have led the commission to decide that, from the point of view of durability when exposed to the action of the open sea, the blending of cement with tufa is of questionable or at least only limited value. The results of the tests thus far made of the compressive strength of the large concrete blocks and of the compressive and tensile strength of the sample mortar and concrete pieces seem to corroborate the conclusions reached by the commission in the first official series described. The conclusions are to the effect that the chemically disintegrating effects of sea water upon cement concretes and mortars in closed containers, and therefore not exposed to the washing effects of the open sea, are somewhat counteracted and diminished by blending with tufa, and especially in concrete and mortar whose cement content is low.

REINFORCED CONCRETE.—By Prof. P. Gillespie.—Cont'd from page 63.

stated that one discovery he had made on his recent trip abroad, was that concrete could be polished as successfully as marble. This led him to remark that he felt that there was for artificial stone to be used for ornamental purposes, a most encouraging future. In conclusion, let it be said that reinforced concrete, like all other materials of construction, has many limitations. While almost ideal for certain situations and types of construction, it is quite impossible for others. Structurally and æsthetically, its best service is secured often when in combination with other materials. While in the past efforts to secure pleasing results, architecturally, have not usually been successful, this has generally been traceable to the much-to-be-expected influence of traditional methods of treatment belonging properly to older and different materials. A logical style is undoubtedly on the even of development, the dominating principle of which must be the harmonization of treatment with function and characteristics of the material employed.





The Manifold Uses of Concrete as Exemplified in Various Phases, comprising Structural, Architectural and Decorative Work.

1—Huge Reinforced Concrete Bridge Built Across the Maumee River at Waterville, Ohio. This Structure is Designed to Carry Over 500 Tons on Each Span. It is 1,200 Feet Long and 45 Feet High, and Was Erected at a Cost of $77,000. There are Twelve Spans in all, the Two Largest of which (90 Ft. Each) are Seen in the Accompanying view.

2—Interior of Fireproof Residence, Showing Solid Reinforced Concrete Staircase in a Design that is Admirably Suited to the Material. Both this Feature and the Walls, Which are Built of Cement Blocks of a Rich Texture, Reveal the Natural Qualities of Concrete in a Scheme that is Both Highly Acceptable and Pleasing.

3—Building of the Sphinx Senior Society, Dartmouth College, Hanover, N.H., which Shows in the Treatment of its Doorway and Cornice the Adaptability of Concrete for Decorative Purposes. The Walls Consist of Two Separated Concrete Sections, the Inner Wall Being Vertical and the Outer One Slightly Battered.

4—Detail of Concrete Caps, and Sun and Serpent Plaque Over Doorway, Sphinx Building, Dartmouth College, Which, Together With the Columns, Seen in Fig. 2, Were Cast in Glue Molds.

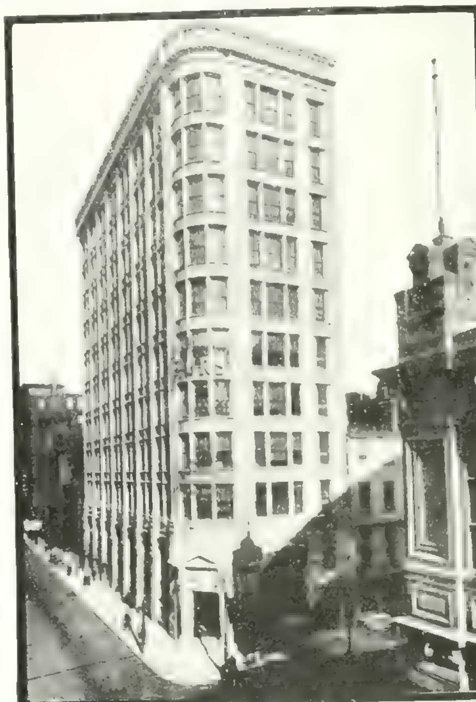
5—Blue Hill Observatory of A. Lawrence Rotch, at Milton, Mass. A Strikingly Singular Monolithic Building in Circular Design, Which Shows an Unusual and Interesting Adaptation of Concrete to a Difficult Form of Structural Work.

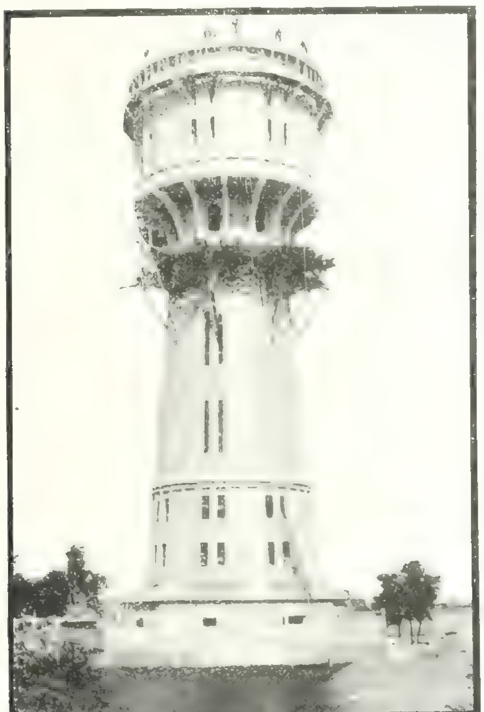
6—The People's Trust Building, Philadelphia, Pa., Used for Banking and Manufacturing Purposes, and Built Throughout of Reinforced Concrete. It is Notable as an Example of One of the Types of Modern Commercial Structures in Which this Form of Construction Has Been Successfully Adopted.

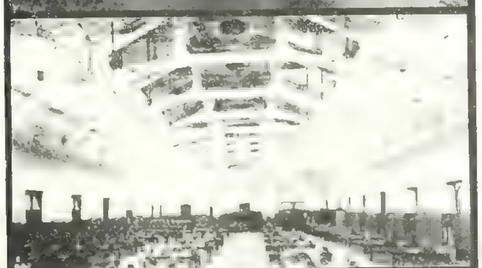
7—Elevated Water Tank at Nanterre, Paris, Representing a Class of Work in Which Concrete is Now Quite Generally Employed. Here the Supporting Mass is Finished With Field Stone. Note the Boldness of Design and the Stability of Character Which the Materials and General Treatment Denotes.

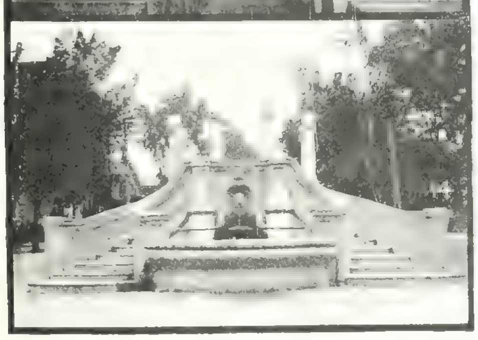
8—One of the Four Concrete Lions Forming the Decorative Features of the Newels at Either End of the Connecticut Avenue Bridge, Washington, D.C.

9—Palacio Tornquoi, Belgrano, Buenos Aires. A South American Example of Concrete Block Construction in Residential Work of the More Expensive Type.









Concrete in Devious Forms of Structural Expression Illustrating the Broad Possibilities of the Material and Its Successful Adoption in Specific Instances. :-: :-: :-:

10—Concrete Block Water Tower at Uccle, a Suburb of Brussels, Belgium. This tower was Built for the International Exposition of 1910, and probably has no equal as an Example of Artistic Concrete Block Construction Either on this Continent or in any Other of Europe. It is 145 Feet from Base to Summit and has a Tank with a Capacity of 280,000 gallons.. The Blocks are used Without Moulding of any kind Excepting that seen in the Concrete Reinforcing Struts Surrounding the Base of the Tank Proper. On the Interior is a Continuous Winding Staircase Connecting six Floors, Divided off into Rooms or Compartments.

11—Interior of Central Telegraph Hall of the General Post Office, Budapest—Showing the System of Reinforced Concrete Roof Trusses, which were Calculated as Rigid Frames (lattices without diagonal struts), with the Aid of the Theory of Elastic Deformation. This Interior is Noteworthy as Demonstrating both the Engineering Advantages and Scope for Architectural Treatment Which Reinforced Concrete Offers.

12—Gothic Window and Canopied Niche, Second Congregational Church, Lynn, Mass., in which the Under Cut Tracery and Mouldings So Necessary to the Architectural Success of a Building of this Style, is Executed in Concrete Stone.

13—Interior of Second Congregational Church, Lynn, Mass., Showing the Chancel and Wall Arches, Columns, Traceried Windows and Frames, all constructed of Cement Stone.

14—Concrete Band Stand and Fountain at Port Henry, N.Y. The Material Used in this Structure Consists of One Part Cement to Eleven Parts Ore Tailing, and the Resultant Composition, together with the Graceful Architectural Lines and General Treatment Produces a Most Beautiful Effect.

15—Hexagonal Grille of Reinforced Concrete Forming an Effective Screen for Simple Designed Flower Boxes of a Modern Residence.

16—Pergola of Cement Concrete. An Interesting Garden Feature Designed by McKim, Mead and White.

17—Reinforced Concrete Garage. Emile G. Perrott, of the firm of Ballinger and Perrot, Architects and Engineers, Philadelphia, Pa. Showing a Simple, Interesting, Decorative Effect Produced by Colored Moravian Tiles, which were Set in the Panels after the Forms were Removed and the Concrete had Hardened.

18—Peristyle of Cement Concrete at Washington, Conn. Note the Detail and Finished Treatment which the Columns and Entablature in the Foreground Indicate.

19—Home of Carlton Macy at Woodmere, Long Island, showing an Interesting Application of Concrete to Residential Design.

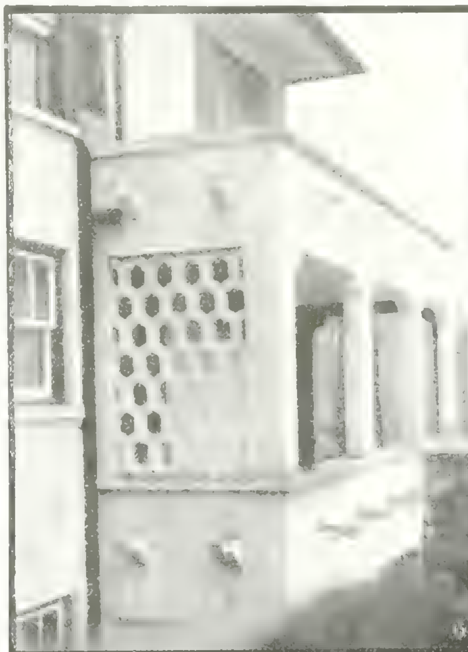


Fig. 5.—Arch Bridge of 60 Feet Span, on Timothy Street, Newmarket. This Structure Being a Permanent Bridge in a Growing Town, Special Care was Taken to Secure a Pleasing Appearance by Accentuating the Arch Ring, Relieving the Spandrels by Pilasters and Employing a Special Decorative Feature in the Railing. Barber & Young, Engineers.

Fig. 6.—The Wadsworth Arch Bridge over the Humber River at Weston, Ont. It is Believed that the Span of this Bridge, 118 Feet 6 Inches, is the Longest Yet Attained in Concrete in Canada, and that This is the Only Completed Example of a Ribbed or Open Spandrel Arch in the Country. Barber & Young, Engineers.

Fig. 1.—The Middle Road Bridge over the Etobicoke River Between the Counties of York and Peel. This 82-foot Span is the Only Concrete Truss Span in Canada, and One of the First in America. Existing Masonry Abutments and a 5 Per Cent. Grade were Among the Conditions Responsible for its Adoption. Barber & Young, Engineers

THE FITNESS OF CONCRETE FOR HIGHWAY BRIDGES

By C. R. YOUNG
A.M. Can. Soc. C.E.

A consideration of the properties of concrete construction affecting its suitability for employment in Highway Bridge Work.

WHEN ANY NEW material of construction is introduced, it becomes the duty of the engineer to thoroughly and impartially investigate its properties and fitness for use in engineering works. No one who has the interests of sound and economical construction at heart can afford to adopt a new material without question, or, on the other hand, to dismiss it with a wave of the hand as unworthy of consideration. Who can say that in actual construction, or under service conditions, it may not exhibit serious defects in no way evident upon a first examination, or that it may not possess properties of a value and importance far beyond one's original expectations? Some of the comments made by eminent engineers twenty years ago concerning the improbability of steel ever being extensively used in bridge construction now afford interesting and humorous reading. No small service is therefore rendered the race by any one who aids in defining the value and limitations of a new material of construction.

Reinforced concrete construction has in the past generation demanded and been given that close scrutiny due any promising innovation. While *concrete* is in no sense a new material, having been extensively used well nigh upon twenty centuries ago, the composite material *reinforced concrete* is of modern origin. The earliest recorded use of it was by M. Lambot, a French constructor, who in 1855 built a boat of this material, employing a wire netting to bind the mass together and secure it against cracking. Not long after, in 1867, M. Joseph Monier, a French gardener, constructed pots for shrubs, tanks, reservoirs and other receptacles of the same material. From these small beginnings the use of the material has grown to the most phenom-

Member of firm of Barber & Young, Bridge and Structural Engineers, Toronto.

enal proportions in little more than a generation. So extensive has its application become, and so unique have been some of its uses, that we are now equally prepared to find it applied to the construction of household vessels and utensils or great arch bridges hundreds of feet in span. This rapid development of a constructional practice must necessarily have been accompanied and rendered possible by a great

Fig. 2.—Deck Girder Bridge of 33 Feet Span on Beecher Street, Brockville. The "Stubby" Appearance of Short Span Concrete Girders with Solid Parapets is Avoided by the use of a Gas-Pipe Railing. Barber & Young, Engineers.

deal of investigation and experiment. The properties of the material and the forms of construction most suitable for its employment have been the subject of patient study and research by thousands of investigators and engineers in Europe and America who have made this particular field the centre of their activities. No phase of the subject has necessitated more careful attention and impartial weighing of evidence than the many serious and disquieting failures which have occurred in reinforced concrete structures and particularly so since in the case of a comparatively novel form of construction the fault is ascribed by most people to the unsuitability of the new departure for strong and permanent engineering works. If in the face of this critical investigation and in spite of many disastrous failures, the use of the material has grown by leaps and bounds, as has been the case, even its most hostile critics cannot but admit that reinforced concrete must possess some very valuable properties and must tolerably well satisfy the tests of a suitable material for engineering construction. In discussing the application of the material to bridge work, it will be of particular interest to ascertain how well it conforms to the exacting requirements of this particular class of construction.

The important requirements of any material for bridge work, or of a form of construction depending upon the use of that material, may be stated as follows:

(1) Low initial cost.
(2) Local distribution of expenditure.
(3) Ease and rapidity of field construction.
(4) Reserve strength and reliability.
(5) Adaptability to special construction.
(6) Low cost of maintenance.
(7) Durability.
(8) Freedom from vibration and excessive deflection.
(9) Æsthetic properties.

Low Initial Cost.

(1) Undoubtedly the first test which any new material or form of construction for bridge work must pass is its commercial practicability. In this regard concrete, both plain and reinforced, possesses some important merits. It is well known that while concrete, like stone, has but little resistance to tension, it has a high compressive strength. A field of application for the resistance of stresses might therefore be found in such parts of a structure as are subjected to compression, but its practicable use in these parts would depend upon the cost being lower than for steel or some other material performing an equal service.

Under ordinary commercial and constructional conditions now obtaining, the cost of the concrete required to resist a certain compressive stress is less than that of the steel required for the same purpose. Assuming permissible compressive and bending stresses on concrete as 450 and 650 pounds per square inch respectively, and similar stresses on structural steel in columns and beams as 12,000 and 16,000 pounds per square inch, and further, assuming the cost of concrete in columns and beams as $10.00 per cubic yard, including forms, and the cost of structural steel at 5 cents per pound erected, we find that plain concrete columns or posts cost about two-thirds as much as steel columns and the compression halves of beams about 40 per cent. as much as the similar portions of steel beams.

With this in view, it is to be expected that a saving in cost may be effected in many instances by using concrete rather than steel in viaduct posts, beam or girder spans and arches. For example, the writer's firm found recently as a result of a careful estimate that the bents of a viaduct 48 feet high could be constructed of reinforced concrete for 70 per cent. of the cost of steel bents. Short girder spans can

Fig. 3.—Through Girder Bridge of 50 Feet Span at Unionville, Ont. A Less Economical Type than the Deck Span of Fig. 2, but Necessitated Where the Clearance Above the Water is Restricted. Jas. McDougall, Engineer.

generally be constructed of reinforced concrete more cheaply than of steel, but on account of the fact that the volume of concrete capable of resisting a given stress weighs about 7¼ times as much as the volume of steel required to perform the same service, the weight of girder spans much over 50 feet in length becomes very great and they can no longer be built in competition with steel. Thus, the cost of the superstructure of the Beecher street bridge, Brockville (Fig. 2), a structure of 33 feet span, was, according to actual tender, some 10 per cent. less than

Fig. 4.—A Comparatively Plain but Pleasing Arch Bridge of 70 Feet Span at Kirkham's Mills, Township of Scarboro'. This is a Type of Permanent Structure Suited to Rural Situations where the Foundations and the Rise are Satisfactory. Barber & Young, Engineers.

it would have been if constructed of steel, and the same may be said of several similar spans built for the same town during the last year. The 50 ft. concrete girder span at Unionville, Ont., shown in Fig. 3, illustrates a structure of about the limiting size for economical girder construction in reinforced concrete. On account of the special care required with the foundations of arch bridges, the relative costs of concrete arch bridges and of steel structures is largely governed by this feature. It may be said, however, that assuming the same treatment of foundations in the two cases, very often a concrete arch bridge may be constructed at no greater cost than a steel bridge of the same capacity as in the case of the Timothy street bridge, Newmarket (Fig. 5), the Kirkham bridge, Township of Scarboro (Fig. 4), and the Wadsworth bridge, Weston (Figs. 6, 7 and 8). For highway spans of over 50 feet the exigencies of competitive bidding quite frequently throw the advantage one way or the other, showing that there is little difference in cost under the same conditions.

Local Distribution of Expenditure.

(2) The distribution of the expenditure for a bridge is often of importance to a community. For example, if a bridge is to be constructed in a town possessing a bridge shop employing local labor, it would be of some advantage to the community to have part of the cost of the superstructure returned to the people in wages. Such cases are not very common, however, since it generally happens that a steel structure is purchased at some distance from the location of the bridge and the cost of it is taken out of the district. With concrete structures, on the other hand, a large part of the cost is returned to the residents of the locality for sand, stone or gravel, lumber, teams and labor. In general, the cement and reinforcing steel must be purchased elsewhere, but in the typical case, assuming an all-concrete structure, 75 or 80 per cent. of the total cost would be spent in the community as against 40 to 50 per cent. of the cost of a steel bridge with concrete substructure.

Ease and Rapidity of Field Construction.

(3) Concrete superstructures are, in practice, not generally erected as quickly or as easily as superstructures of steel, whatever may be said in theory. In the case of the latter, assuming reasonable delivery of steel from the mills and promptness on the part of the contracting bridge company, the steel for a bridge of moderate proportions can be delivered at the site of the bridge by the time the substructure is completed and sufficiently seasoned to allow erection to proceed. This being the case, the steel bridge can be completed in quicker time, since the construction of falsework and the assembling, riveting up and construction of the floor is a much less laborious and lengthy operation than is involved in the building of falsework and forms for a concrete bridge, the placing of reinforcement and concrete, curing, stripping, and finishing. In any work in which the element of time is an all-important factor, the choice of a steel superstructure is therefore advisable. Although concrete work has been, and is constantly, carried on

Fig. 7.—A View of the Wadsworth Bridge, Weston, from Underneath. The Massiveness of the Ribs and the General Size of the Structure is Apparent by Comparison with the Figures in the Illustration. Barber & Young, Engineers.

successfully in frosty weather, its prosecution is always attended by added cost and trouble, so that the liability of construction work continuing into cold weather should be given full consideration in the choice of the kind of bridge.

Reserve Strength and Reliability.

(4) A property of concrete of great importance in bridge construction is its increase of strength with age. Instead of growing weaker as time passes, its powers of resistance are augmented so that a *good* concrete a year old is 45 per cent. stronger than the same concrete when a month old, and the growth of strength still proceeds, but at a less rapid rate. This does not, of course, mean that the strength of an entire bridge of reinforced concrete increases with age or that it will safely accommodate a heavier loading than that for which it was originally designed. To take this advantage of the increased strength of the concrete, it would be necessary to make special provision in designing the portions of the structure subjected to tension by increasing the amount of reinforcement.

Fig. 8.—The Wadsworth Arch Bridge, with the Rib Forms Erected. These Forms were Supported by Distributing Trusses Resting Upon Timber Bents Founded on the Rocky Bed of the River. Barber & Young, Engineers.

The degree of confidence which may be reposed in a concrete bridge is in direct ratio to the care with which it has been designed and constructed. On account of the *apparent* simplicity of concrete construction, much more liberty is taken with it by the layman than would be thought of with a steel structure. Quite frequently the design is by a local handy-man, or if not, the construction is probably supervised by some one whose previous experience with this material is limited to the building of a barn wall or a silo. Little wonder need therefore be expressed if the materials are bad, the mixture poor, the reinforcement misplaced or insufficient, the foundations shallow and the entire work sloppy and disreputable. With such work many disastrous failures have occurred and will continue to occur until those interested learn that the design and construction of reinforced concrete bridges is a matter requiring a great deal of special knowledge possessed only by engineers experienced in this class of work.

Adaptability to Special Construction.

(5) Since concrete may be moulded in almost any form, it is of great use in bridge work for many cases of special construction. Thus its use in floors for steel highway bridges has become practically universal in Ontario during the last 10 or 15 years, and has solved the problem of the increasing difficulty of securing suitable timber for such work at a reasonable cost. Although the material has been used for a great many years in sub-aqueous work in piers and abutments, its use above water has revolutionized the construction of bridge substructures in 15 or 20 years. While formerly timber or stone masonry were used exclusively, but very few examples of recent construction of this type could be found in the country. Moulded rails and railing posts for bridges with concrete superstructures make it possible to employ a harmonious design throughout, as in Figs. 2, 4, 5 and 6. Fitting a bridge to a particular local condition is often facilitated by the use of concrete. For example, in the case of a horse-shoe culvert for the Toronto and York Radial Railway at Newmarket (Fig. 9), the structure was fashioned to support and retain the fill with the least possible amount of material.

Low Cost of Maintenance.

(6) Concrete bridges which have been properly designed and constructed so that no cracking has occurred to permit the entrance of water to the embedded steel, and which contain no poor or deteriorating material, should require no maintenance. Painting, an important item of expense in steel bridges, is sot necessary in structures of concrete. Indeed, the only maintenance charge on a properly constructed concrete bridge would be the re-gravelling of the roadway for a structure carrying a fill and possibly the re-filling or re-caulking of expansion joints.

Durability.

(7) No concrete bridge work (except sub-aqueous foundations) of an age over 15 to 20 years existing in Canada, an estimate of the probable life of such structures in our climate must of necessity be based upon conjecture. In other lands there is abundant evidence of long life for such bridges. In ancient Rome, concrete bridges and domes built upwards of 2,000 years ago are standing to-day, but little impaired by time. Some 75 miles below the City of Mexico there is an old concrete highway bridge consisting of two spans of 40 feet each, built in the early part of the sixteenth century. The fact that it is

Fig. 9.—A Horse-shoe Culvert on the Toronto and York Radial Railway at Newmarket, Ont. The Close Conformity of the Lines of the Structure with the Fill Indicate an Economical Design. Barber & Young, Engineers.

now used as a railway bridge is satisfactory proof of its successful defiance of the elements for four hundred years. The earliest reinforced concrete bridge in America was an arch span erected in Golden Gate Park, San Francisco, in 1889, or some 21 years ago, and while its existence has not been of long duration, it has during that time proved entirely satisfactory. Basing one's opinion upon the evidence obtainable from structures in other lands, and bearing in mind that stone masonry, a material offering greater opportunity of attack by the elements, has endured for centuries in our climate, it seems reasonable to expect of well-constructed concrete bridges a life of at least a hundred years, and in all probability one of much greater duration.

Freedom from Vibration and Excessive Deflection.

(8) On account of the great weight of a concrete bridge in relation to the loads to be supported, the vibration accompanying the rapid passage of moving loads is almost imperceptible. For this reason there is little likelihood of an all-concrete highway bridge ever being prejudicially affected by the trotting of horses over it. The trifling impact effect resulting from any such causes would be quite insufficient, in the opinion of the writer, to ever break the bond of the steel to the concrete—the only serious development which might be feared. The deflection in an all-concrete bridge under live load is also trifling and capable of determination only by precise measurements, for the reason that the load is in general small in comparison with the dead weight of the structure itself. This in itself conduces to longevity of the bridge, since the racking effect of secondary stresses on the joints is thereby reduced to a minimum. Apart from the probable effect of excessive vibration and deflection on the life of a bridge, it is wise for sentimental reasons alone to avoid these, since most people regard a bridge which is subject to pronounced vibration and deflection as a weak and unsafe bridge. In this regard the application of concrete to bridge work has effected a most valuable improvement, for no other form of structure except the masonry arch is so singularly free from these objectionable characteristics.

Æsthetic Properties.

(9) Concrete being so closely akin to stone, the material in which the development of architecture has taken place, permits of artistic expression not possible with wood or steel. Slavish copying of constructional features from stone architecture does not give the desired results, however, and new and artistic forms are being developed in which the suggestion of a poured material is conveyed by long curves and the absence of joint lines. Forms of structures not generally built in steel for small bridges because of increased shop costs, may sometimes be moulded of concrete at no additional cost over less attractive ones. For example, the reinforced concrete trusses of the Middle Road bridge (Figs. 1 and 10) cost no more with a curved top chord than they would have cost with parallel chords. One serious drawback which concrete possesses from the æsthetic point of view, however, is its unsightly appearance unless given a special surface finish. No matter how well designed or carefully constructed a bridge may be, if the surface is blotched or discolored and exhibits pronounced form marks or evidences of patching, the good work of the engineer in all other particulars will be overlooked. There is no use, therefore, in attempting to secure a pleasing design unless the surface is left of even texture and of uniform color by some suitable finishing process.

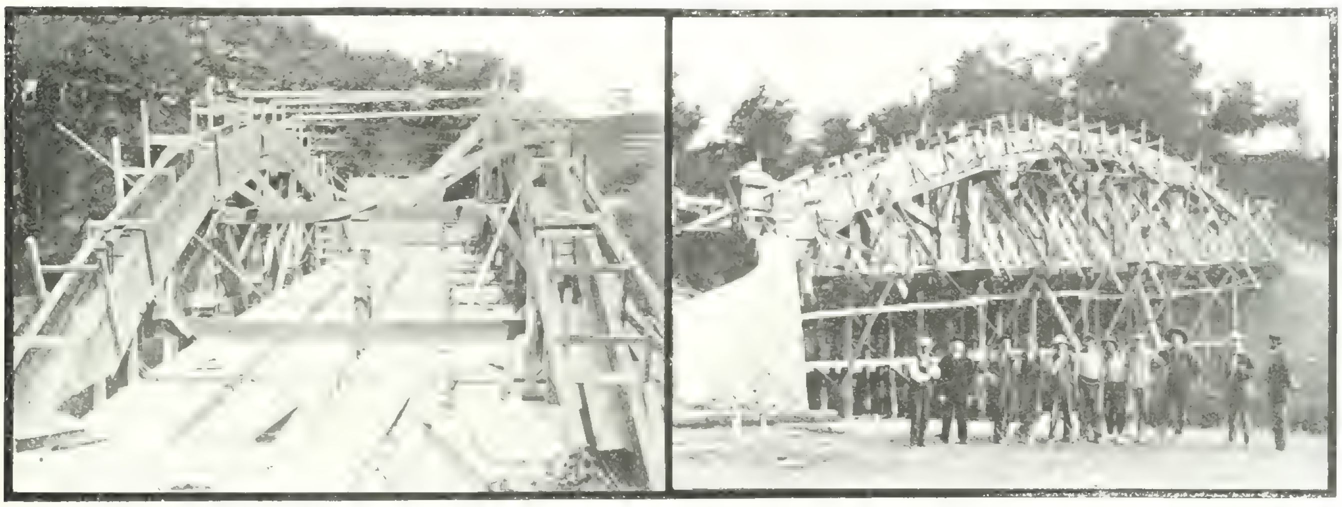


Fig 10.—Two Stages in the Construction of the Forms of the Middle Road Bridge. In this Type of Structure the Form Work Constitutes a Large Part of the Cost, but is Largely Offset by Economy of Material. Special Care was Taken to Detect and Prevent any Lateral Movement of the Trusses During Concreting. Barber & Young, Engineers.

Types of Concrete Bridges.

The forms of concrete structures, heretofore found desirable for bridge work, are the girder, the arch, and the truss span. Each of these forms possesses its own special merit and the choice of type for a given situation will be governed solely by a careful study of local conditions.

The concrete girder has, as has already been pointed out, the virtue of employing a relatively cheap material—concrete—for its compression flange, and using steel only where concrete would be incapable of economical service. In the form of the deck girder, that is where the main girders lie wholly beneath the floor, as in Fig. 2, the concrete girder has its most economical application, for the floor slab in this case performs the double duty of transferring the loads to the girders and acting as the compression flanges of the girders The through girder span, shown in Fig. 3, is not as economical since the main girders must be placed far enough apart to provide the prescribed clear roadway, and since heavy reinforcement must generally be provided in the top flanges of the girders to compensate for the small area of concrete available. In many instances, of course, the through type must be adopted because of restricted height above the water.

In the form of the arch, concrete had its first introduction to bridge work. As a material exactly analogous to stone it would be expected that a field of application would first be found for it as a substitute for the older material and the most rational employment of it was in arches or in the only situation where stone could be employed in bridge work. While within the legitimate field of the reinforced concrete girder—under 50 or 60 feet in span—there is little difference in cost between a girder and an arch span for the same crossing, the spandrel-filled arch, at least, possesses two most valuable points of superiority. The loads which most seriously tax our bridges and are generally the immediate cause of their replacement are the heavy and constantly increasing concentrated loads consisting of threshing engines, road rollers or motor trucks. Such loadings as these produce maximum stresses in the floor system of a girder span or of an open spandrel arch, but do not affect spandrel filled arches at all seriously. The uniformly distributed load of a large herd of cattle is more serious on such a structure than a concentrated rolling load, but since the former loading does not increase in weight from year to year a properly designed bridge of any type is not likely to suffer from this cause. The spandrel-filled arch therefore possesses important reserve strength for future increases in rolling loads not shared by the girder. Another advantage attaching itself to the concrete arch of either the full or the open-spandrel type is the fact that the reinforcement of the rib of a properly-designed arch is never called upon to perform full duty except during the conjunction of a special loading with the extremes of heat and cold, and then only for a short time. Since the probability is that these particular loads will not happen to pass over the bridge at the time when the temperature at the bridge site is at the extreme limit, an every-day additional element of security exists in the reinforced concrete arch. On the other hand, the engineering difficulties attending the design and construction of a concrete arch span are very much greater than for a girder span. The safe and economical design of an arch is an exceedingly laborious and difficult proceeding. Unless the designer wishes to take chances or is willing to waste material, this work cannot be avoided. Securing a structure against cracking by proper reinforcement or by expansion joints is another delicate task not at all likely to be appreciated by the layman. Further, the adoption of the concrete arch is indefensible unless a rigid, immovable foundation bed can be secured. In general this will preclude the construction of arches on soft clay or sand foundations, although it can be done successfully by careful batter piling or by the provision of abutment ties. In no particular is more sane judgment required than in the foundation problems connected with arches.

Beyond the natural field of application of the reinforced concrete girder and where an arch is impracticable because of insufficient rise or poor foundations, the reinforced concrete truss span such as shown in Fig. 1 may be advantageously employed. In spite of the objections which have naturally been raised to a structure of this novel type, there is no reason why it should not be employed wherever economically practicable. There may be some just cause of objection to the concrete truss span without diagonals, in which the distortion of the panel must be resisted wholly by the stiffness of the joints, but the same objection cannot be registered against the truss with diagonals, such as that of Fig. 1. If it is legitimate to employ reinforced concrete beams in which exist tensile stresses of as great magnitude as the compressive stresses, surely it is permissible to use a form of structure containing tension members of reinforced concrete, especially if ample reinforcement is inserted at the joints to take care of secondary stresses, as was done in the case of the Middle Road bridge.

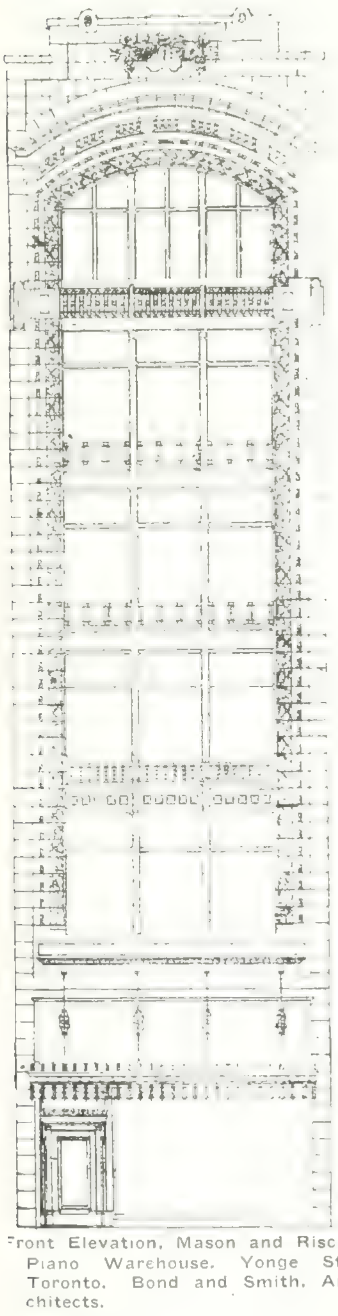
Having regard, therefore, to the tests to which a new form of construction must conform in order to possess fitness for bridge work, it appears that concrete is in general a very satisfactory material and one which, when properly employed, cannot fail to prove a most valuable asset to the constructor. It must be pointed out, however, that it possesses some serious limitations, among which is the *apparent* simplicity of its use. Persons possessing no special knowledge of the material or of the forms of construction to which it is applied, are thereby often led to attempt, to their subsequent sorrow, work which only an expert would be justified in undertaking.

The structures illustrated in this article are among those recently designed and erected under the supervision of Barber & Young, Bridge and Structural Engineers, Toronto, with the exception of the Unionville girder (Fig. 3), which was designed and erected under the former engineer of the County of York, the late James McDougall.

CONCRETE AND SAWDUST is a somewhat unusual combination adopted in the super-floor construction of the new public library at Springfield, Mass., in order to secure a suitable base on which to lay a cork carpet and into which nails could be driven. Several experiments were necessary to get the exact proportions required for a durable surface, but this was eventually determined to the satisfaction of all parties concerned.

MASON & RISCH PIANO WAREHOUSE TORONTO

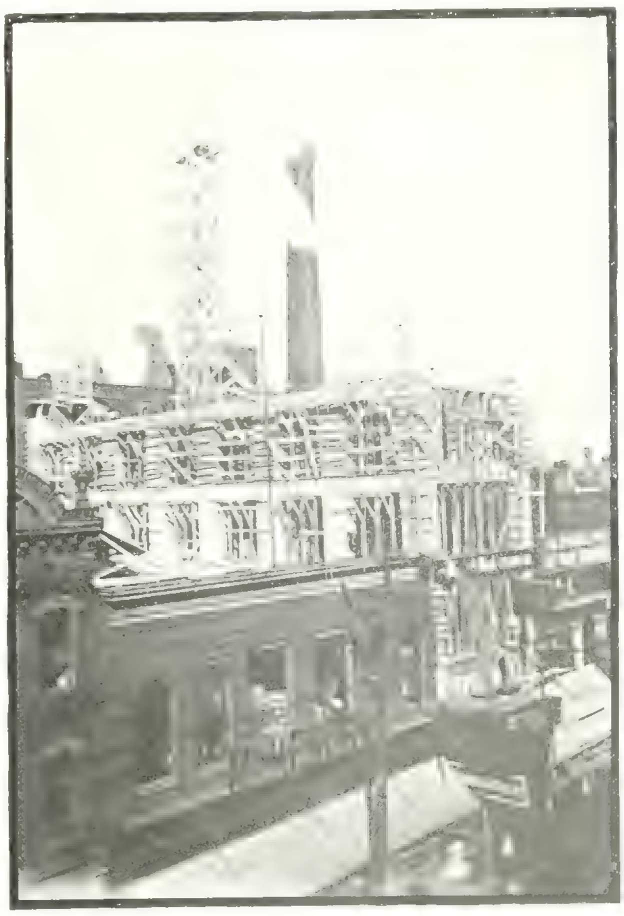
An exemplification of the use of concrete and hollow tile in modern building construction. Problems encountered and overcome, and features of plan.



Front Elevation, Mason and Risch Piano Warehouse, Yonge St., Toronto. Bond and Smith, Architects.

THE MASON & RISCH piano warehouse, now under construction at 230 Yonge street, Toronto, presents many noteworthy and interesting features. Ultimately it will be a ten story building, and the footings and columns have been designed with this end in view. At the present time, however, not more than six storeys and basement will be built.

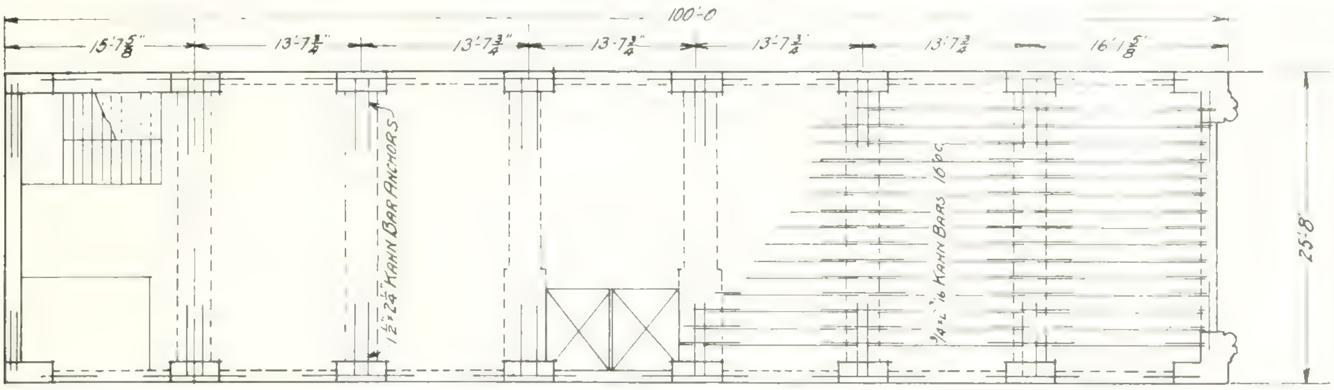
On account of the narrow lot it was necessary to scrutinize very carefully the different methods of construction to determine which would take up the least room. As large buildings are contemplated on either side, an arrangement was entered into by which the centre line of the walls and columns of the Mason & Risch building would coincide with the party line in each case, thus saving to each interested party as much space as would ordinarily have been occupied by half the thickness of the walls. In other words, the walls and columns are built to be common to both buildings. Skeleton construction in reinforced concrete was finally decided on, both on account of the economy in space as well as cost. Only wall columns are employed and these only twenty inches thick, three inches only being on the lots on either side. The necessary strength was secured by enlarging the columns along a line parallel with the longitudinal axis of the building. A special means for providing a connection with the proposed new building had to be devised by the architects. This is illustrated in the small diagram A. The columns are built projecting three inches on the next lot, but they carry the whole of the party wall. The new column required when the proposed adjacent building is erected will have to carry only the floor and roof panels of the new building. Consequently it need not be so large as the present column, which is shown by dotted line in the diagram. It will be seen that in this way the architects have secured an equitable and symmetrical solution of the problem. The dotted line of course presumes a concrete column. If a steel column, fireproofed, be used, it will naturally be larger, as it will require to be surrounded by about nine inches of brick.



Progress View, Mason & Risch Piano Warehouse, Toronto. Showing the Form Work. The Tower on the Right Indicates the Ultimate Height of the Building. Bond & Smith, Architects.

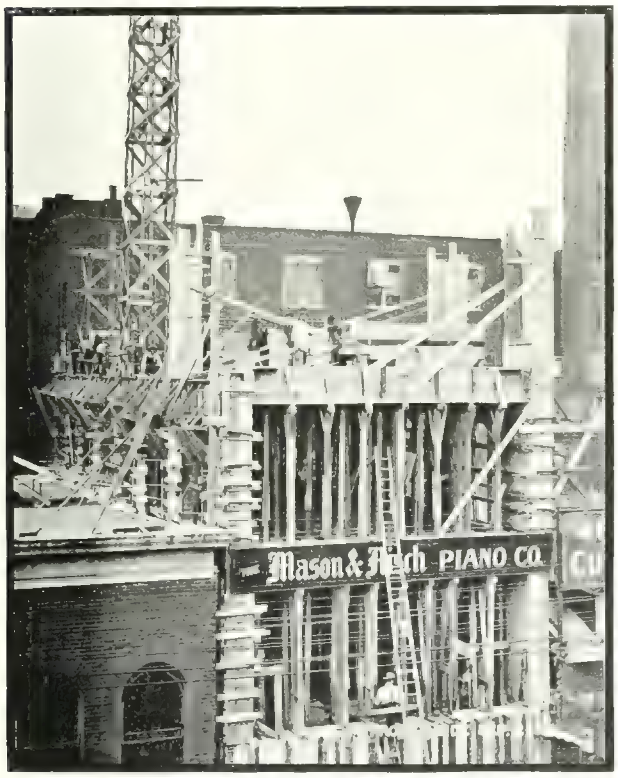
Progress View, Mason & Risch Piano Warehouse, Yonge Street, Toronto. Showing the Hy-Rib Wall (partly plastered) Which was Put in Position to Enclose the McKendry Millinery Store on the South Lot Before the Brick Work of the Intervening Party Wall was Carried Up. Bond & Smith, Architects.

Progress View, Mason & Risch Piano Warehouse, Yonge Street, Toronto. Showing the Concrete Mixer and Limited Space Available in Which to Carry on Operations. On the Left is Seen the Beginning of Column Steel Before Column Boxes Have Been Placed. Bond & Smith, Architects.



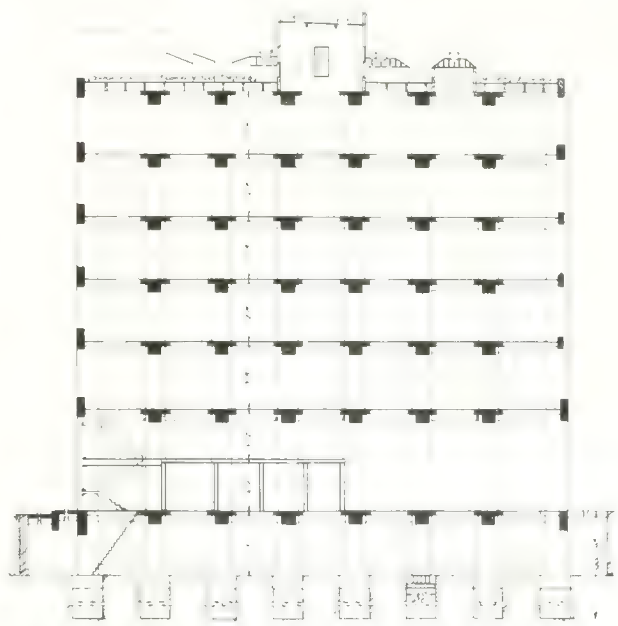
Typical Floor Plan, Mason & Risch Piano Warehouse, Toronto. Showing the Spacing of Beams, Columns and Floor Steel, Together With the Length and Width of the Building. Bond & Smith Architects.

It was originally intended to have a large concrete footing under the walls and columns, but as the bearing value of the soil when tested was very low,



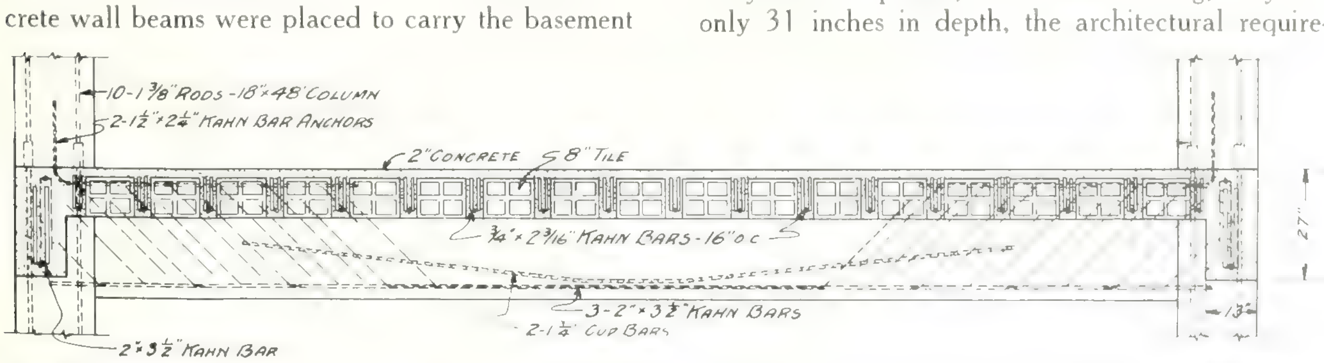
View of Mason & Risch Building, Toronto. Showing the Structure Up to the Fourth Story, Thirty five Days After Foundation Was Completed. Bond & Smith, Architects.

it was decided to carry caisson footings to solid rock. These caissons are circular in design, 8 ft. in diameter under each column. Rock was reached about 48 feet below the sidewalk level. Between the caissons at about the basement floor level, reinforced concrete wall beams were placed to carry the basement walls. It might be interesting to note just here the adaptability of concrete. The narrow lot made it necessary to economize on every inch. The columns of the Mason & Risch building, as has been said, are only 20 inches thick, but despite this they are of enormous strength. This result is obtained by



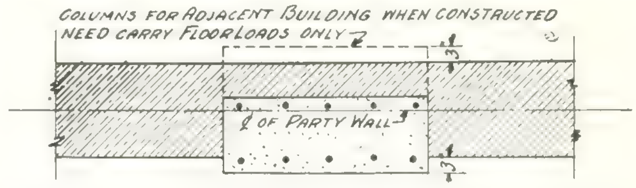
Longtudinal Section, Mason & Risch Piano Warehouse, Toronto. Bond & Smith, Architects.

spreading the column along the longitudinal axis of the building, making it oblong in shape; in other words, the dimensions being 20 inches thick, and 4 feet long. Then again the same facility of concrete for lending itself to particular or exacting conditions may be noted in the construction of the beams. Although these beams have a span of 26 feet and carry 14-foot panels, warehouse loading, they are only 31 inches in depth, the architectural require-



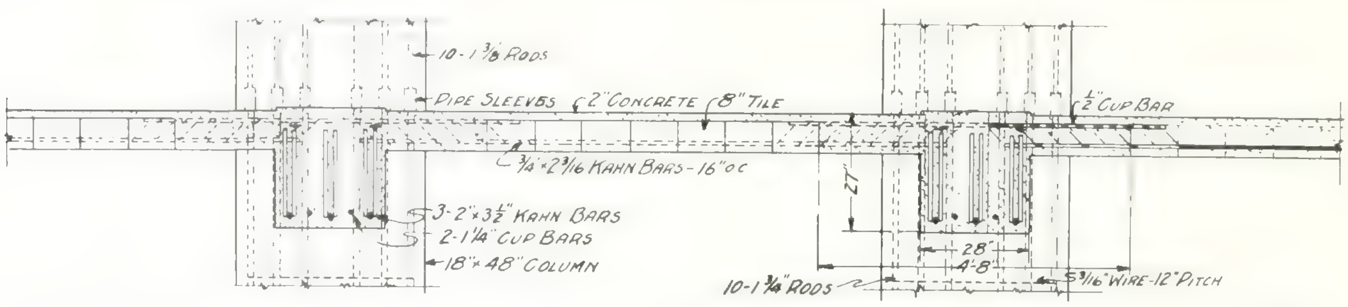
Transverse Section of Typical Floor, Mason & Risch Piano Warehouse, Toronto. Showing Alternating Arrangement of Hollow Tile and Concrete Joists, Together with Typical Floor Beam, 25-Foot Span, Reinforced with Kahn Bars. Note the Narrow Width of Column. Bond & Smith, Architects.

ments imposing this restriction. The necessary amount of concrete in compression is obtained by widening the beams and using a portion of the adjacent slab as a stiffener or for compressive value, the whole being technically known as a "T" beam. Another feature of this building was its rapid erection. The old building was wrecked and site cleared early in July, the excavations completed and caissons and foundations begun on August 1st. In almost two months, these were carried 48 feet below grade level to solid rock, the six-story superstructure and basement built, the roof placed and half the brick walls carried up. This was accomplished in face of the fact that two other large buildings, one on the north and the other on the south, had to be supported, the old walls torn out and replaced with new walls, and that the work had to be done on a site almost inconceivably congested with equipment and materials. Of course this was only possible by working night gangs. A narrow lane at the rear helped matters somewhat, and as each floor was built, or a short time after, additional space became available. Speed was a prime factor, as the owners were bound by agreement to have the walls of the adjoining building, occupied by the Wm. McKendry millinery establishment, rebuilt and finished by August 20th, in time for the fall opening and the National Exhi-



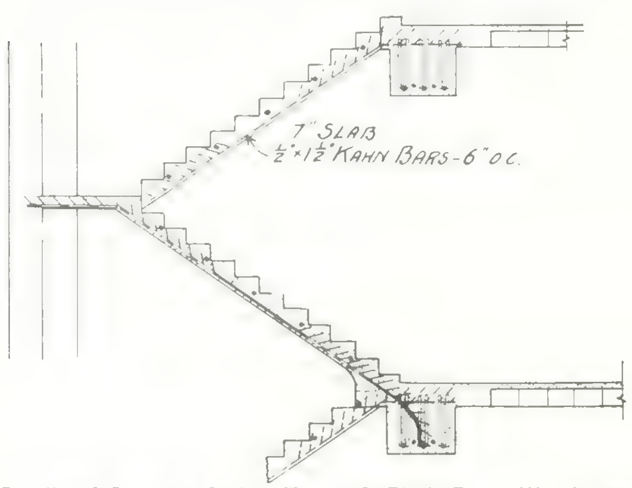
Mason & Risch Piano Warehouse, Toronto Diagram A, Showing Portion of Party Wall. Note the Method Adopted to Provide Connections for Proposed Building on Adjacent Lot. Bond & Smith, Architects.

as novel as it was ingenious, nothing less than doing the plastering and interior finish called for in the McKendry store before the brick wall was carried up to it. Afterwards, the brick wall was built up against the plaster, which reverses the procedure usually adopted. The solution was made practicable in the first instance by a requirement of the City Architect, which at first thought appeared a hardship. It was required that a light steel framework be provided to carry the ends of the joists of the McKendry building while the wall was being rebuilt. This consisted of a light steel column about 14 feet on centres, across the top of which was an "I" beam, supporting the ends of the joists. Since a steel framework was called for, it was utilized as a support for sheets of Hy-Rib, a form of reinforcement for walls, partitions and concrete slabs, consisting of steel lath and



Longitudinal Section of Typical Floor, Mason & Risch Piano Warehouse, Toronto. Showing Location of Columns and Disposition of Steel Bars. Although the Columns are Approximately 14-Foot Centres, Making the Floor Panel 14x25 Ft., it Will be Noted that the Total Thickness of Hollow Tiles and Concrete Joists is Only 10 Inches. Bond & Smith, Architects.

bition. About the 1st of August work was just started above the basement floor level, and it looked doubtful if the owners' undertaking could be carried out. The task in fact would have been an impossible one had it been necessary to have waited for the



Details of Concrete Stairs, Mason & Risch Piano Warehouse, Toronto. Bond & Smith, Architects.

walls of the new building, but at this point the architects solved the difficulty for all parties with a scheme

channels combined in one sheet and doing away with studs and joists. This Hy-Rib was laid horizontally from column to column and plastered, and a rigid finished wall, which had also been waterproofed, was ready for the McKendry firm on August 19th, on which date they moved back their cases and shelves to the new wall, a day ahead of the specified time. Afterwards the brick wall was built against the plastered Hy-Rib, the Hy-Ribs so called providing furring and a 3/4-inch air space. The floors of the new building were constructed of hollow tile blocks, placed end to end between the beams in rows at 16 inch centres, allowing a 4 inch concrete joist between. These blocks were 12 x 12 x 8 inches in depth. Over all was laid 2 inches of concrete, which in turn will carry a 2-inch strip, or cinder concrete fill having embedded 2-inch wooden strips at 16 inch centres, to which the floor boards will be nailed. This construction gives a floor that is not only light in itself, but sound proof and resonant, which feature is an important consideration in a piano warehouse. Attention might be called in this connection to a novel theory of the owners, which it is proposed to adopt by placing the nailing strips in the cinder concrete at regular intervals corresponding to the node points in a musical note.

The concrete used throughout the building was the regular 1:2:4 mix, the cement mortar in the Hy-Rib walls being a 1:3 mix, with Trus-Con waterproofing paste added, which was also used in the basement floors and walls. In carrying out the work, the standard specifications of the Trussed Concrete Steel Company were followed, except where different from the city building by-law, in which case the latter was adhered to.

The foregoing describes in a general way the structural features of this building. When completed it will be as fireproof as modern science can devise and will boast of the most modern installations in heating, lighting and ventilating equipments and in artistic appearance both on the exterior and interior. It is intended to be excelled by no other building of its kind in the city.

The architects, Messrs. Bond & Smith, who evidently spent much time and thought in preparation of the plans and in carrying out the project, have succeeded admirably in solving the many difficult problems which were presented from time to time, owing to the limited space for operations and the limited time for the execution of the contract. As previously stated, one of the considerations which influenced the architects to use reinforced concrete was the question of cost. Tenders were called for on a structural steel job, but the figures submitted were found to be $7,000 in excess of the amount required for erecting the building in reinforced concrete. The Kahn system of reinforced concrete was used throughout. The contractors were the Bishop Construction Company of Toronto and Montreal, who not only turned out a most satisfactory job, but did so expeditiously, and in a thorough workmanlike manner. T. H. Sinclaire was the contractors' superintendent of construction, and Alec. Browning the architects' representative on the ground.

MERIT OF INVESTMENT

A PAPER ENTITLED "Building Construction from an Investment Point of View," was read by Mr. G. Richard Davis of New York, before the recent convention of Building Managers and Owners, held at Washington, D.C. While the author dealt with large apartment buildings in his own city, some of his remarks will prove of interest to Canadian architects.

The ideal apartment building, from the standpoint of the investor, he pointed out, is that building which is so constructed as to yield a maximum income at a minimum cost of erection and maintenance consistent with the best methods and workmanship of construction.

The author stated that, interviewing 100 tenants, all occupants of a high-class apartment house, putting to them the question as to what points they considered the most vital in renting apartments, the answers obtained were practically unanimous in placing the importance of the following considerations in this order: First, location; second, light and air; third, size of rooms; fourth, arrangements; fifth, equipment; and sixth, character of finish, style, etc. An important consideration is how the building is finished, for the more attractive the structure the quicker it will draw tenants. A pleasing elevation of a building is desirable, but it is needless to say that extravagance is as bad as false economy, or more so, and the amount of money spent on the front elevation of many of our finest buildings has greatly increased the cost of construction, while adding little or nothing to the rentability of the building.

The second point is how to build at a minimum cost consistent with obtaining a first-class structure. A good architect, a good engineer, first-class superintendence and plenty of it, are all vital and necessary. Nothing is too good to put in a building to complete its mechanical and structural equipment. The best lasts a long time, and poor material and workmanship bring continuous trouble and the worst results. A broad knowledge of building construction, of the different kinds of makes and substitutes and the latest inventions in the building material world, the desirability, the cost and substantiality of each of them, are things that every builder should know.

The third phase of building construction is that of obtaining the minimum cost of maintenance after the building is constructed. To do this the building must be properly constructed, properly equipped, and, withal, economically so. Consideration should be given always to the economical cost of maintenance. One boiler in a building of any size is a mistake, no matter how large; two boilers are more economical; their original cost may be greater, but the cost of maintenance is less. A small coal room is a mistake; it costs more to buy coal in small quantities than in large. Two pumps are necessary; the cost of their maintenance is much less by using one pump for one month and the other pump for the following month.

THE BRITISH PARLIAMENT during its coming session will be called upon to consider sixteen bills to confer power for the installation of railless electric car systems. Five of these bills are promoted by the British Electric Railless Traction Co., Ltd., and the first electric cars of this type to operate in Great Britain will be delivered by this company to two Yorkshire towns in the near future. It is claimed that the railless system is as cheap to operate as the ordinary track street car, while the capital expenditure involved in street work is only one-fourth to one-third of the $70,000 to $75,000 per mile required for the usual street car system. The system, it is further maintained, has advantages over petrol motive power, that the cars are lighter than the ordinary motor bus, run with very little vibration or noise, and that the rubber tires prevent any great wear upon road surfaces.

Creamery Building, Estate of O. C. Barber, Barberton, Ohio. Showing the Concrete Blocks of Outside Walls Laid Bare at Corners and Intervals of Surface to Form Decorative Trimming for Brick Panels. Harpster & Bliss, Architects.

One of the Small Buildings, Estate of O. C. Barber, Barberton, Ohio, Which, Like the Residence and Creamery Building, is Essentially of Concrete Block Construction. Harpster & Bliss, Architects.

Country Residence on Model Farm of O. C. Barber, Two Miles East of Barberton, Ohio. Built Throughout of Concrete Blocks With a Brick Panel Veneer on the Exterior. The Interior Walls and Partitions Consist of Rough Blocks, Furred with Expanded Metal and Plastered; the Basement Walls Being Tarred on the Outside and Finished With White Faced Blocks Within. Over 42,000 24-inch Blocks Were Required in the Construction of this Building Alone. Harpster & Bliss, Architects.

MODERN EXAMPLES OF CONCRETE BLOCK CONSTRUCTION

The textural qualities and logical possibilities of the material as revealed in recent work. Model group of farm buildings and interesting structures of factory, residential and club house design

ONE CANNOT COMPARE present day work with the early examples of concrete block construction without being impressed with the marked evolution that has taken place in the manufacture of this product. It must be admitted that a few years back concrete block construction was virtually devoid of anything which gave definite promise of the widespread use it has since attained. Most of the early examples, indeed, revealed little to indicate the true textural qualities or logical possibilities of the material. Too often the process of skimping, the sacrifice of quality in an endeavor to produce cheaply, resulted in a product without sufficient cement to properly bind the aggregates together. Again, block manufacturers, in the eagerness to duplicate rock face and other effects, gave their product a stiff and mechanical appearance which greatly detracted from its proper value as a material for architectural expression.

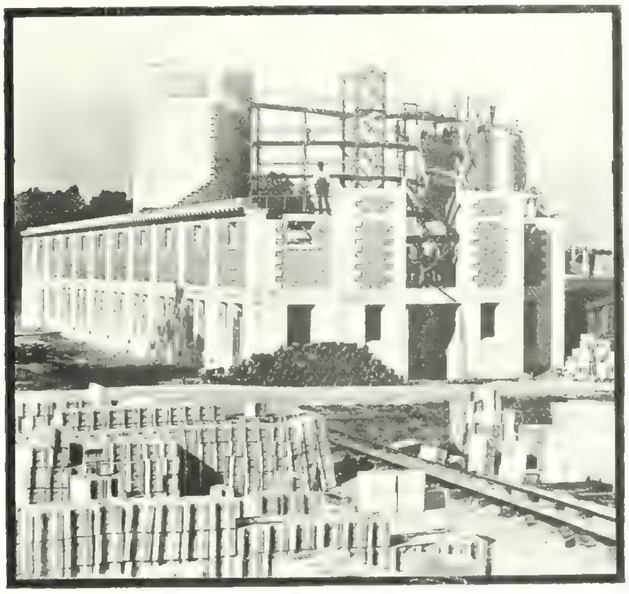
While the outgrowth of a condition which demanded an economical form of permanent building construction in communities where suitable clay for the manufacture of brick was unavailable, concrete blocks are not only being extensively adopted today in almost every type of building, but are competing with no little success in localities in which other materials have heretofore been exclusively specified. Gradually but surely, the early prejudices which led building designers to reject this character of product as an undesirable architectural element, are being successfully overcome. As a structural unit, the value of a well made concrete block has never been doubted. Realizing its worth in this respect, manufacturers have come to the conclusion that a material having merits of its own should not be an imitation of another product,

Cattle Barn, Estate of O. C. Barber, Barberton, Ohio, in Which 82,000 24-inch Concrete Blocks Were Used. This Building is 280 Feet Long and 50 Feet Wide. An Interesting Feature is the Concrete Block Silo, Which is 50 Feet High and Has an Outside Diameter of 24 Feet. Harpster & Bliss, Architects.

Residence of Rev. William Potter, Dundas, Ont. A Six-Room and Attic Dwelling Structure Constructed of Concrete Blocks, and Erected at a Complete Cost of $2,600. M. H. Hewitt, Architect.

Sydenham Club, Owen Sound, Ont., which Shows an Attractive Use of Plain-Faced Blocks in Wall and Gable Treatment. Forster and Clark, Architects.

but should denote in character what it really is, and nothing more. Furthermore, they have turned their attention to producing blocks with every care to precision of detail, so as to meet in every way the most exacting requirement of the architect's design;



View of Another Large Concrete Block Building on the Estate of O. C. Barber, Barberton, Ohio, Which Also Shows Two Silos in Course of Construction. Harpster & Bliss, Architects.

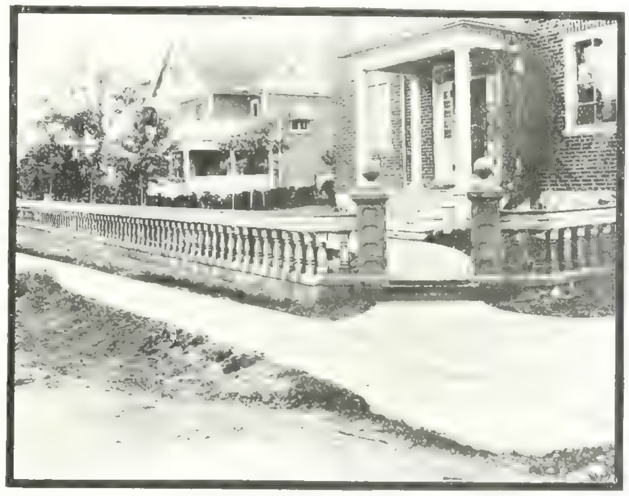
and are relying on the author's adaptation to give fit and proper expression to the new material he employs.

As with all other materials, the artistic side of concrete block construction must primarily be the outgrowth of its structural application. The attempt at the offset, to make it "a thing of beauty and a joy forever" without consulting the canons governing architectural design, was a deplorable mistake —one which fortunately the manufacturers quickly realized and undertook to rectify. Recent work, as shown in the accompanying illustrations, when compared with early examples, shows the admirable

Concrete Block Building of Molsons Bank at Revelstoke, B.C.

progress that has been made, and how thoroughly logical and acceptable concrete blocks are as a building material when carefully produced and properly applied. These views illustrate in a limited way the use of concrete blocks in farm buildings, residence, factory and club house construction. Among them are several buildings of an interesting group recently erected on the model country estate of O. C. Barber, about two miles east of Barberton, Ohio, which is noteworthy as the largest concrete block contract that has yet been executed. It might be interesting in this connection to note that the brick panels seen in the illustrations form an exterior surface veneer only, and that brick work is used to this extent only. The wall construction and partition work throughout are of concrete blocks, and this applies to every building on the estate, including residence, cattle barns, power plant, grain storage, silos, etc.

One advantage which concrete blocks offer, is the fact that, consisting of large units, the blocks can be easily handled and laid in the wall at a lower



Concrete Fence Built by Henry Prest at Hanover, Ont.

cost than that required when a material of smaller units is employed. Probably it is in this particular more than in the material itself wherein the economy of concrete block construction lies, as a well made block, like a well made brick, requires proper materials and proper seasoning, and cannot be produced without some sacrifice in cost. . The future of the concrete block is indeed a most promising one. In districts where suitable clay is not to be found it is destined to become an acknowledged and accepted material for practically every type of building construction; while in other communities where the older materials have for many years held sway, it will be adopted to no little extent: First, because of its fire-resisting and sanitary qualities; second, because of the economy in construction which it effects, and last, but not least, because its logical possibilities for structural and decorative work are now more fully recognized than ever before.

Relative to the foregoing, the standard specifications approved by the National Association of Cement Users (U.S.A.) for "architectural concrete blocks" appended hereto, will undoubtedly prove of interest to the reader. After a brief reference to the importance of using a standard grade of cement, the draft of the specifications is as follows:

Residence of Judge Smith at Britannia Height, Near Ottawa. An Attractively Designed Nine Room Concrete Block House Which Was Built at a Cost, Including Hot Water Heating, of $5,400.

Home of G. W. Daniels, St. Stephen's, N.B. A $3,500 Nine-Room House Built of Rock-Faced Concrete Blocks.

Factory of G. C. Conn, Manufacturer of Musical Instruments, Elkhart, Indiana. A Modern Example of Stucco Work on Concrete Block Construction.

Materials.

Fine Aggregate shall consist of sand, crushed stone, or gravel screenings, graded from fine to coarse, passing when dry a screen having 1/4 in. diameter holes, shall be preferably of silicious materials, clean, coarse, free from vegetable loam or other deleterious matter, and not more than 6 per cent. shall pass a sieve having 100 meshes per linear inch. Mortars composed of one part Portland cement and three parts fine aggregate by weight when made into briquets shall show a tensile strength of at least 70 per cent. of the strength of 1:3 mortar of the same consistency made with the same cement and standard Ottawa sand.

Coarse Aggregate shall consist of inert material, graded in size, such as crushed stone or gravel, which is retained on a screen having 1/4 in. diameter holes and will pass a 1 1/4 in. ring, shall be clean, hard, durable, and free from all deleterious matter. Aggregates containing soft, flat or elongated particles, shall be excluded.

Water shall be clean, free from oil, acid, strong alkalies or vegetable matter.

Proportions.

A bag of Portland cement weighing 94 pounds shall be considered as one (1) cubic foot. All concrete shall be prepared and mixed in quantities requiring one or more full bags of cement; the use of any device for mechanically proportioning the materials is prohibited.

Backing. The backing of all block shall be made of one part Portland cement, two parts fine aggregate and four parts coarse aggregate (1:2:4).

Facing. The facing shall consist of one part Portland cement, two parts fine aggregate (1:2), and shall be one (1) inch in thickness. It shall be thoroughly tamped into place in the mold and the backing immediately deposited. In order to prevent checks and hair cracks troweling will not be permitted. Only cement of the same color shall be used. Cements causing efflorescence shall not be used. The facing material shall not be allowed to become lumpy and shall be screened if necessary. Where color is required, only mineral colors shall be used.

Mixing.

The ingredients of concrete shall be thoroughly mixed dry, sufficient water added to obtain the de-

Plant of the Angldide Scale Company, Elkhart, Indiana, in Course of Construction. Showing the Cement Block Walls of a Modern Factory Before the Exterior Stucco is Applied.

sired consistency, and the mixing shall continue until the cement is uniformly distributed and the mass is uniform in color and homogeneous.
a. Measuring Proportions. Methods of measurement of the proportions of the various ingredients, including the water, shall be used which will secure separate uniform measurements at all times.
b. Machine Mixing. When the conditions will permit, a machine mixer of a type which insures the proper mixing of the materials throughout the mass shall be used.
c. Hand Mixing. When it is necessary to mix by hand, the mixing shall be on a water-tight platform and the materials shall be turned until they are homogeneous in appearance and color.
d. Consistency. The materials shall be mixed so as to provide sufficient water to insure a proper bonding and a dense concrete free from voids.
e. Retempering. Retempering mortar or concrete, *i.e.*, re-mixing with water after it has partially set, shall not be permitted.

Reinforcement.

Bending. Sufficient metal reinforcement shall be provided to carry all stresses produced by the loads to which the blocks will be subjected.
Shrinkage. No shrinkage reinforcement is required in blocks whose least dimension is more than one-third of the length, such length being less than three (3) feet. All blocks less than four (4) inches square shall have in the center at least one bar equal to ½ of 1 per cent. of the cross section. All blocks over four (4) inches square shall have at least four ¼ in. square bars, with mechanical grip, extending throughout the length of the stone, one bar to be placed in each corner. All blocks of over fifty (50) square inches in cross section shall have reinforcement equal to at least ½ of 1 per cent. of the cross-sectional area. The reinforcement shall be placed within ½ in. of the face of the block, and the bars shall not be more than 8 inches between centres, care being taken to place a bar in each corner or projection. Bars shall be hooped with bands or wires not more than 8 inches between centres.

Protection of Corners.

All corners and edges shall be sharp and well defined. They shall have true horizontal and vertical lines and no block will be accepted that is chipped or marred in any manner.

Curing.

Natural Curing. For the purpose of securing proper curing, the blocks shall be protected from the sun and strong currents of air, shall be sprinkled at such regular intervals as necessary to prevent drying, and such other precautions taken as to enable the final set to take place under the most favorable conditions. At least twenty (20) days shall be allowed for curing.
Steam Curing. The blocks shall be removed from the molds as soon as the conditions will permit and shall be placed in an atmosphere of steam saturated with moisture for a period of at least forty-eight (48) hours. The blocks shall then be removed and stored for at least fourteen (14) days before use, being sprinkled three times a day during the first seven days. Care to be taken to maintain the temperature at not less than 60 degrees Fahr.

Laying.

Before laying, the various blocks and adjoining work shall be thoroughly moistened to prevent the absorption of water from the mortar. The mortar shall be composed of one part Portland cement, three parts sand and one part thoroughly slacked lime.

Blocks Cast in Place.

If the blocks is cast in place the forms shall be sandpapered, shellaced, oiled, and if necessary sprinkled. A 1:2 mixture one (1) inch thick shall be placed next to the forms and a backing of very wet concrete of 1:2:4 mixture added. In order to prevent checks and hair cracks troweling will not be permitted. All blocks shall be properly protected until accepted. All blocks shall have uniform color.
The publishers of CONSTRUCTION are indebted to the Ideal Concrete Machinery Company of London, Ont., and South Bend., Indiana, for the loan of photographs from which the illustrations used in connection with this article were reproduced.

THE MANUFACTURE OF SAND-LIME BRICK IN GERMANY

Number of plants in operation shows growing importance of industry. Recent improvement effected in process of manufacture. Different methods of production.

WITHIN THE PAST few years, the manufacture of sand-lime bricks, or kalksandsteine as the product is called, has assumed such large proportions in Germany as to come well within the scope of what might be termed the country's rapidly expanding industries. The remarkable development in this direction is forcibly emphasized by the fact that from 1897 to 1902 alone over eight plants were established, while from that time on a steady and consistent growth has been constantly in evidence. In all, Germany has now 280 plants in operation, and the great improvements effected in the process of manufacture enables the concerns thus engaged to turn out an excellent brick both as to texture and color and structural character. As to selling price, sand-lime bricks market at an average cost of 2 marks ($0.476) less per 1,000 than clay bricks. The cost of production is said to be 9 to 12 marks ($2.142 to $2.856) per 1,000, but it is difficult to generalize on this, as no two localities are situated alike as to raw materials. In 1902 the German Reichstag purchased 9,000,000 bricks of this kind for the construction of army buildings, and the material proved so satisfactory in this case that several important contracts have been let for Government work subsequently undertaken.

Original Method of Manufacture.

The elementary facts in the brick business in Germany are that clay does not exist everywhere, whereas sand is found almost everywhere and can be used at a lower cost. The processes of manufacturing sand-lime bricks are numerous, some being protected by patents. The original method of manufacture was as follows:

Fat lime slaked to a thick milk is mixed with 6 to 12 times its own quantity of coarse sand and then carefully kneaded either by hand or in a mixing machine. Bricks are then formed in an ordinary clay press and after 24 hours, being then slightly dry, are stacked together and assume sufficient hardness after three or four weeks. The hardening process is accelerated by dipping the slightly dry bricks in a very thin solution of silicate of potash.

Thus a very cheap material can be produced for agricultural buildings where lime and good sand are available. The bricks are frost proof and rather compact, and no extensive machinery is required. Lime-sand bricks produced upon an industrial scale are the pressed product of a complete mixture of lime and sand hardened under steam pressure of an average minimum compressive strength of 140 kilos per square centimeter (308.64 pounds per 0.155 square inch). This mortar contains 5 to 8 per cent. of lime, and upon being pressed into bricks—which are then exposed to a steam pressure, usually under 72 atmospheres during 8 to 10 hours—the bricks can be used at once.

Increasing Success of this Type.

The foregoing process is based upon the discovery, in 1880, of Dr. Michaelisin, that salicylic acid can be decomposed; that is to say, can be caused to form hydrated silicate of lime by chemical combination with lime, from hydrate of lime only in a very high temperature and in the presence of steam. This high-pressure process has been developed in Germany since 1898, and it is believed that from 800 million to 1.000 million bricks of this kind are being manufactured annually. Bricks of this kind are rivalling clay bricks with increasing success, their adoption being furthered by the facts that (1) an extraordinarily small quantity of lime is necessary, since the poorest mortar requires more sand than lime; (2) sand can be found almost everywhere; (3) the time required to manufacture is short and the general expenses low; (4) and they can be manufactured at all seasons of the year.

Fat lime is used ordinarily in the manufacture of these bricks and hydraulic lime very seldom. Dolomite lime, which slakes slowly, is not available. Any kind of quartz sand which is free from clay and not too coarse can be used.

Variations in Component Elements.

The various processes are distinguished from each other by the method of treating the lime. In some the lime is completely slaked to powder or paste before being mixed with sand, this being the ordinary hydrate process. Elsewhere the lime is ground to powder (quicklime powder), then mixed with sand, and then slaked. The hardening of the bricks is always done in the same manner—in a hardening boiler. According to the first, or hydrate, process, the mixed material remains at first amorphous, and then gradually becomes crystalline, whereas in the quicklime process the mixture assumes a crystalline form immediately, which is said to be why the bricks possess a greater solidity from the beginning. However it is alleged that the quicklime process requires a larger dose of lime, and that the completed bricks are too dense, thus absorbing less water and allowing the passage of less air.

According to Burchartz, there is no material difference between the several kinds of lime-sand bricks, as regards density and water absorption, and all kinds of lime-sand bricks increase in compactness within certain limits.

In the pure hydrate process the lime is slaked to powder in a slaking drum or hardening boiler, after having been ground finely. In the mixed processes it is slaked in drums with part of the sand, and then, or perhaps after having been stored in silos, it is mixed with the rest of the sand. In the quicklime process ground burnt lime is mixed with the entire quantity of sand, water being added steadily to the mixture, which is then pressed, either after having been stored in silos or without previous storing.

Presses of various kinds are in use which have a daily capacity of about 24,000 bricks, which are perfect in shape. Lorries loaded with 900 bricks are moved into cylindrical hardening boilers, which are about 2 meters (6.56 feet) wide and 6.25 meters (20.50 feet) long, in which they remain about nine hours under a steam pressure of 8 atmospheres.

Tests for Strength, etc.

In 255 tests the compressive strength varied greatly, the average, however, being 153 kilos per square centimeter (337.30 pounds per 0.155 square inch), which is the tenacity required in a brick of good quality.

Deviations from the average are less than in the clay brick, a result of the greater symmetry of the lime-sand brick in shape and structure. The loss of strength through the absorption of water averaged 14 per cent., and from the effect of frost 17 per cent. The average absorption of water amounted to 14.9 per cent. weight and 26.3 per cent. volume, percentages also less in the case of lime-sand bricks than with clay bricks. All bricks tested proved to be frost-proof. In fire tests and in practical experience these bricks have shown the same properties as clay bricks in regard to the influence of fire and water used in extinguishing it.

Fireplaces, factory chimneys, ring ovens, etc., have been constructed with lime-sand bricks with good results. The adhesive property of the mortar on the bricks has been tested, by using the same kinds of mortar on lime-sand and clay bricks, the results being generally in favor of the former type of brick. The weight of structures made from this material is but slightly greater than though built with clay, and, according to an order issued in 1907, no greater weight may be estimated in statistical calculations than was ascertained in the use of clay bricks.

Because of their regular form and uniform dimensions, these bricks can be laid more easily, and can also more readily be cut. This regularity of form and their trim appearance has led to a frequent use of lime-sand bricks as facing stones, it being also possible to color them.

Patents for Special Types.

German patents 138935 and 151945 protect the manufacture of nonconducting bricks which are made of a mixture of sand, lime, and fullers earth. After the steaming, bricks of this kind can be burned, and before being burned may be soaked with "wasserglas" (silicate of potassium or sodium). German patent 158615 protects a process for the elimination of the objection that the color of sand-lime bricks changes in rainy weather. According to this process the bricks are covered with a glaze while under steam pressure, which glaze, upon being burned with the bricks, dissolves and combines with the lime silicate in the brick. Various colored glazes may be applied by the process employed.

THE ART OF ARCHITECTURE AND REGISTRATION

Abstract of a paper read before the Guild of Assistants by H. Guicharde Todd, F.S.A. Scot., M.S.A.

THE ARCHITECTURAL PROFESSION in Canada has to a very pronounced degree given consideration to registration. In almost every country in the world this has proven a very live question. Many columns have been devoted to the discussion of this subject in CONSTRUCTION *during the past three years. In England factions have been created both for and against the proposal, in their views as to its ethical and practical effect upon the profession. The following paper, read before the Guild of Architects' Assistants, recently, gives a fair as well as interesting statement of the position of the faction of the profession favoring registration.* —EDITOR'S NOTE.

THE FUTURE OF ART IN ARCHITECTURE and the professional welfare of its exponents are to a great extent in the hands of the present generation, and two policies are put forward for consideration as ameliorations of the present unsatisfactory state of affairs in art and professional practice.

The registration of architects, as has been proved by several plebiscites, is supported by the great majority of architects, who appear to consider that the reorganization of the profession is necessary; and architectural copyright is brought forward by a section which professes to more particularly study the future of our art while protecting the interests of professional men. The policy of registration is particularly worthy of the notice of this Society, for this Guild is described as "the only Society formed and organized by architects' assistants to protect their interests," and it is apparent that the object of this body is to ensure some sort of security to assistants in the architectural profession. Security, that most precious jewel of civilization, is entirely the work of law. Without law there is no security, and consequently not even a certainty of subsistence; and it follows that if this Society is not prepared to support the logical measure which will give security to the architectural profession and its individual members, it will fail in its apparent object, in one direction at least.

It has been said that registration will limit the liberty of the architect and be opposed to the welfare of art; but this contention does not appear to be well founded. Sir James Mackintosh, the eminent lawyer and essayist of the earlier portion of the last century, said: "The description of liberty which seems to me the most comprehensive is that of *security against wrong.* Liberty is, therefore, the object of all government." The registration of architects means the ultimate government of the profession by the profession to ensure *security against wrong;* but it is not only in the personal protection of the members of the profession that the policy of registration is worthy of consideration, and the probable effects of such a policy on art must be studied.

Art in architecture is acknowledged by the majority of our most prominent architects to be in a very unsatisfactory state; and the introduction of an Architectural Copyright Bill at first sight appears to be a necessary measure for the protection of the personal property and standing of the architect; but a reference (at the risk of being personal) to the published opinions of some of our leading architects on the present state of architectural art may be helpful.

The symposium on architecture recently conducted in The New Age by Mr. Huntley Carter is a valuable collection of opinions, which should be of great interest to all architects and artists who look at architecture and art widely; and more particularly to those who, through registration, hope to see the mistress art take a proper plae in our social life. The opinions of the eminent contributors to this symposium show a general despondence as regards the progress of our art, and Mr. Mervyn E. Macartney, F.S.A., F.R.I.B.A., and Mr. Edward Warren, F.S.A., F.R.I.B.A., who contribute interesting articles, are both of the opinion that the present unsatisfactory state of art and architecture is due to the ignorance and apathy of the public.

Mr. Macartney says: "Little more can be done by architects themselves until the public expresses some sort of approbation," and also, "In London we accept all kinds of vulgar fripperies from stockbrokers turned architects." Does it not follow that the public very naturally expresses little approbation of the vulgar fripperies of stockbroker-architects? And does it not also follow that, if "architects themselves" confine the energies of stockbrokers to stockbroking, art and architecture will benefit, and the public express some kind of approbation for the works of a profession which is a definite profession? Mr. Macartney further says: "It would, however, have to be conceded at the outset that the general taste in this, the mistress art, is at a lower ebb than at any time even of the eighteenth century"; and, "In England up to the middle of the eighteenth century taste in architecture was fairly general. Every gentleman understood its principles, and several of them were not without ability in its practice." So that in this, the twentieth century, although we know that "the mistress art is at a lower ebb than at any time even of the eighteenth century," we have stockbrokers, auctioneers and certificated bailiffs as exponents of the mistress art, and supplying "all kinds of vulgar fripperies" acceptable to the greatest city in the world, and this in place of the favorable atmosphere which existed in the first half of the eighteenth century.

No true architect whose desire is the welfare of his art objects to a stockbroker, auctioneer, or bailiff becoming an architect, provided that the gentleman is qualified by nature and attainments to practise the profession in keeping with the canons of art and professional etiquette; but every architect with a soul above the mere utilitarian routine of business must object to the unnecessary degradation of architecture by the works of the individuals who have given our streets their vulgar fripperies in such profusion. The registration of architects would not necessarily make every building in our streets a work of art, but it would undoubtedly, in future years, prevent the utterly unqualified and ignorant man from practising as an architect. Mr. Macartney truly says: "A tradition in architecture cannot be built up in a day"; but, as public approbation is necessary to the progress of tradition, it is reasonable to expect that by gaining public approbation and notice through a non-controversial Registration Bill, approved by the public through their elected representatives in Parliament, further public approbation, understanding, and appreciation of the profession and its aims would follow.

Mr. Macartney says: "It is only the great gullible public who think that painters alone are capable of producing art, so they muddle along, and when they want a bit of 'art' they buy it from the painter. The assumption that painters can do architecture is doubtless based on this feeling that 'art' may be obtained in sample and applied to building—a square foot or a yard at a time."

In the first place, it is obviously the duty of architects to see that the public are not gulled, and even before "the public expresses some sort of approbation" it is possible for "architects themselves" to do much towards gaining that approbation. It is also due to the art of architecture from its exponents that approbation should be gained, and as in politics measures are supported because of the sincerity and through the personalities of their originators and supporters, so must public approbation of architecture be gained by sincerity and whole-hearted and businesslike action by its practitioners, and by keeping the importance of architecture continually in the public eye.

Architects may not advertise for their own personal benefit; but architects as a body can surely advertise the importance of their art by drawing public attention to it on every possible occasion. The Town Planning Conference has done much to convince the public of the importance of the architectural profession; but it must be remembered that the subject of town planning owes its present prominence very largely to the fact that it has been brought to the public notice through political channels, the Town Planning Bill having been commented on by every journal of importance, and the subject having all the prominence of a political measure.

It is obvious that the introduction of a Bill for the registration of architects would also attract notice and convince a large proportion of the general public of the importance of the architectural profession. The public apathy which Mr. Macartney and Mr. Warren deplore may be in some measure due to the fact that there is no obvious care of the public interest taken by architects as a profession. The public looks after its own interests through local by-laws and surveyors, whose functions are supervisory of the architect's work; and although this is necessary, and probably always will be necessary, it has a tendency to an antagonistic feeling which is regrettable and might be somewhat relieved.

In the medical profession the diploma of public health (D.P.H.), held by so many doctors, has convinced the public that public health is made a serious study by medical men; the profession is looked up to, and the public interests in that sphere are felt to be safe in its hands.

The institution of a diploma in civil architecture might well fill a corresponding place in the architectural profession, and have the same effect in convincing the public that architects are solicitous for their well-being, by endeavoring to give them artistic and suitable as well as sanitary and well-built buildings; but such a diploma could be of little use so long as the professions of stockbroking and architecture are interchangeable.

Public approbation is necessary to the progress of art; but the public cannot be forced to appreciate art and architecture, therefore it must be led to that appreciation; and the first step likely to convince at least a large section of the public of the importance of architecture would be the initiation of the policy of registration, and the consequent access of dignity and standing in the public eye which that measure would confer on the members of the profession.

The benefits of such a consummation are obvious and would be twofold—beneficial to the profession and to the public; for the interests of the public, the profession and the art which it professes are inseparable. The public would be safeguarded against the practice of irresponsible or altogether ignorant practitioners, architects would have a professional standing to lose, and if this were once appreciated by the public the importance of good architectural work would be recognized.

The responsible architect, in keeping with the definition of security already given, can only be the architect who has something to lose, and under registration that would be his professional standing. At the present moment any architect guilty of unprofessional conduct, however gross, provided he keeps within the limits of the law, would only lose his standing in the eyes of his professional brethren, and could not be prevented from describing himself as an architect and a member of an honorable profession and training pupils to any number; but under registration, as generally understood, any such person found guilty of serious professional malpractice would no longer be able to describe himself as an architect or recover professional fees at law.

The registration of architects would make it possible to obtain reliable statistics regarding the profession and all matters concerning it; and, as an executive force, the local influence of the provincial societies would be most valuable, as under a wise measure of registration their standing would be enhanced by their official connection as educational bodies with the central authority; and through the whole of this land societies working in the interests of art and architecture would be supervised to some extent by a central body, possibly similar to the Central Council suggested in the Architects' Registration Bill.

The Central Council hitherto provided for in that Bill would consist of architects of the highest standing, elected to represent the various existing architectural bodies, metropolitan and provincial, in numbers proportionate to the importance of the bodies which they represented, and inclusive of representatives of architects qualified for registration who are unattached to any professional society.

This Council would administer the code of ethics of the profession, and it is hard to imagine how such an arrangement could be prejudicial to art in architecture. In addition to this comprehensive policy, a Bill to protect architectural copyright is proposed, a Bill which should be of great interest to this Society and its members, as well as to the profession generally; to the members of this Guild, as assistants, because it is conceivable that their ideas in many cases will automatically become the copyright of their employers; and to the profession generally, because the promoters of this policy are prepared to hand over, quite unnecessarily, the management of purely professional matters to members of the legal profession, who can hardly be judges of what constitutes originality in architectural design.

It is amusing to find that the first great proposal for many years, professedly in the interests of architects, should be so obviously in the interests of the legal profession, and such a Gilbertian position can only bring ridicule on architects and give the public cause to believe that architects cannot manage their own affairs. Under registration the names of practitioners guilty of the malpractice of unjustifiably copying plans or elevations to the detriment of their professional brethren could be removed from the registration list, and this action would be a parallel to being struck off the rolls in the legal and medical professions. Lawyers and medical men have wisely kept the management of their own affairs in their own hands, and it cannot be said that it presses unfairly on the members of these professions, as only in the case of aggravated malpractice is the power of ejection exercised.

As architects can be the only judges of what constitutes infringement of architectural design, the elevation of some eminent architect to the Bench to deal with all cases under the Architectural Copyright Act would appear to be necessary, in conjunction with an arrangement whereby architects might take silk and plead at the architectural Bar on matters of art. This may appear to be merely fantastic, but, given an Architectural Copyright Bill to protect originality in art in architecture, it appears to be a logical necessity. An Architectural Copyright Bill in conjunction with an Architects' Registration Bill is more attractive; but architectural copyright under existing conditions does not appear to be in the best interests of architectural progress. Registration, on the other hand, would appear to tend towards architectural progress. Mr. Reginald Blomfield, A.R.A., in his contribution to the symposium already mentioned, says that "only a trained architect can be an architect," and as under registration in the next generation all architects would undergo some approved training and their pupils would be also trained it follows that a profession trained to some extent would be the result. Registration could not produce genius, or even tend towards the production of genius: but it would tend towards a reduction of the production of utterly bad works of architectural art while it would not in any way hamper the practice of gentlemen who are specially qualified to produce works of outstanding merit and originality.

The registration of architects, by binding the members of the profession together, by enforcing a statutory qualification, by emphasizing the necessity for the study of architecture as an art, and, through the power it would have as a united and definite profession able to speak with one voice, could only have the effect of furthering this ideal of carrying our tradition forward and proving to future critics that this generation was solicitous for the well-being of that art which is undoubtedly the truest index to the culture or civilization of any age.

Italy, Spain, Russia, several of the United States of America, the Transvaal, and some of the Canadian Provinces have successfully adopted registration: while Germany and Hungary compel all public architectural officials to have a Government diploma; and from none of these countries do we hear that the spirit of design in architecture has died in consequence.

Registration stands for statutory qualification, which depends upon architectural education; and architectural education, in whatever light we view it, must appear the most important subject that can engage the attention of the architect, and it is most important that he should now support the policy of registration if he wishes architects to control the necessary qualifying examinations and those second-rate colleges which profess to turn out architects ready to practise after very short periods of tuition, and who simply swell the crowds of badly trained assistants. Statutory qualifications, to be really satisfactory, should be managed from one fountain-head, and no body should be allowed entirely independent powers of examination or registration, and the anomalies which exist in other registered professions should be avoided. In the medical profession, particularly, it is possible to practise with qualifications which are very different in standing.

The public have a right to know if every professional man working in such a way has had a proper architectural training, and is held officially responsible for his professional probity. Registration would provide an official register of names and qualifications, which would be an effective check on the abuse of professional titles or the use of titles which have little or no bearing on the profession practised. In short, it is claimed that the statutory qualification of architects would provide an educated and responsible profession, would benefit the progress of architectural art by convincing the public of the importance of the profession and its work, would make it immediately possible to get statistics on which to base proposals for the improvement of the position of the assistant, and generally raise the profession to that standing which it ought to have in the public estimation.

The progress of art depends upon public support, and the public is always impressed by strength. Miligia said: "If massive columns are close to each other they appear more massive still; and slender columns when wide apart appear slenderer still." It is surely easy and natural for architects to apply this architectural maxim to their professional affairs. Every architect is a column in the structure of the profession, and if architects bind themselves together under registration, in the interests of their art as well as in the public interest, the tendency will be for the public to respond by showing appreciation of architectural refinement and excellence, and condemning the vulgar and inartistic.

THE IMPORTANCE OF BENT GLASS IN ARCHITECTURE

Offers vast scope to architects in designing commercial buildings. Brief treatise on subject by Edwin Bell.

THE VALUE of circular and elliptical curves in lineal design are so well understood by architects, as not to require much to be said here in suggesting their use for designs in important superstructures, but merely to remark that the scope of our architects hitherto has been curtailed in making designs for buildings, especially for commercial purposes where glass largely forms a part. This has arisen from glass for window openings being in flat sheets. It is nearly a hundred years since architects sought for glass to be made to given curves, and while the art of bending glass has been practised to a limited extent for upwards of seventy-five years in the district known as "Glass House Fields," London, England, the extensive use of it by architects for buildings is of much more recent date. Especially of late, in London, Paris, Brussels and other Continental cities, its use has become extensive for show windows, composed wholly and partially of large sheets of bent plate glass which are exceedingly attractive and well repay the proprietors. It has become the practice to brilliantly illuminate the streets at night which (in moderate weather) are acceptable promenades. Store or shop keepers advertise their wares after closing hours by a well-lighted window and this is made more effective when the public can go under the shelter of the main buildings; many of the finest shop fronts being so constructed as to admit of this; some receding back for a considerable distance from the street line, almost producing an arcade effect, while others are so arranged as to form a rotunda. These, where frontage admits, have spacious imposing vestibules which are dressed at night in some ready way like an ordinary window. The effect of these display windows is very beautiful, some having their ceilings adorned with mirrors in bold geometrical design interspersed with electric illuminating lamps.

Excellence, utility and even charming effects are secured by using bent plate glass for shop fronts, not obtained by straight lines. Glass, like sheet metal, has imparted to it a stiffness when bent, so that where the superstructure admits of it, bent panes of glass may be joined together in a continuous line by very light bars. In fact, where conditions are favorable, bars may be dispensed with, the two edges of the panes being merely butted together, thereby obtaining a very pleasing effect.

Where bent glass is used, the design should have a bold treatment with the curves to as large a radius as possible. These curves produce the best effect, besides being the cheapest. A section of an ellipse is equally as effective as a segment of a circle; such bent plates being bent over their entire surfaces, however slight it might be. The original richness of plate glass is not only preserved, but is enhanced by the charms of its curvature. Canadian architects have not had the advantage which bent glass affords until quite recently, owing to its having to be imported from Europe. After waiting months for bent glass, it often happened that it would be found to have been broken in transit. Bent plates of very large dimensions are now easily obtained from Canadian glass benders, thus enabling our architects to develop a character of store front design that would compare favorably with the most attractive fronts of Continental creations.

CEMENT FLOORS, particularly in office buildings or warehouses, which do not have the advantage of obtaining the necessary moisture from the atmosphere such as outside floors and sidewalks on which the dew falls at night, if not properly protected and kept damp, become prematurely dry and are therefore more or less porous and weak, causing easy abrasion under foot traffic, or what is commonly known as dusting.

Care should be exercised in keeping such floors damp by covering with wet sand, wet hay or straw, for a week or more until the floor has properly hardened. If this has not been done and the floors are found to dust under foot traffic, the following remedy will be found very easy to accomplish, economical and effective.

Wash the floor thoroughly with clean water, scrubbing with a stiff broom or scrubbing brush, removing all dirt and loose particles. Allow the surface to dry; as soon as dry apply a solution of one part waterglass (sodium silicate) of 40° Baume, and 3 to 4 parts of water, the proportion of water depending upon the porosity of the concrete. The denser the concrete the weaker the solution required. Stir well, and apply this mixture with a brush (a large whitewash brush with long handle will be found the most economical). Do not mix a greater quantity than you can use in an hour.

If this solution is sufficiently thin, it will penetrate the pores of the concrete. Allow the concrete surface thus treated to dry. As soon as dry, wash off with clean water, using a mop. Again allow surface to dry and apply the solution as before. Allow to dry and again wash off with clean water, using a mop. As soon as the surface is again dry, apply the solution as before. If the third coat does not flush to the surface, apply another coat as above.

The sodium silicate which remains on the surface, not having come in contact with the other alkalies in the concrete, is readily soluble in water and can therefore be easily washed off, thus evening up the color and texture of the floor. That which has penetrated into the pores, having come in contact with the other alkalies in the concrete, has formed into an insoluble and very hard material, hardening the surface, preventing dusting and adding materially to the wearing value of the floor.

CEMENT PAPERS CONSOLIDATE

CEMENT AGE, of New York, with which *Concrete Engineering* has recently been consolidated, has put in its appearance in its new form, and the publishers are to be warmly complimented on the general excellence of the initial number, which shows several noteworthy improvements over the already high standard of magazine previously issued. By the amalgamation effected, the broad scope of subject matter covered in the past has been greatly enlarged upon, especially as regards the engineering branch of the industry, which vastly increases the usefulness of the publication to architects, engineers and contractors interested in the uses and possibilities of cement and concrete in structural undertakings. As in the past, the publication will be issued under the editorship of Mr. Robert Lesley, vice-president of the American Society for Testing Materials, and an Associate of the American Society of Civil Engineers, who is one of the most prominent figures in the cement industry on the American continent. The new magazine, which is ideal in typographical character and general arrangement, is slightly larger than the previous size of *Cement Age*, and has a type page 6 x 9 inches, thus retaining the distinctive magazine form which has been a popular feature of the older publication. A two-column make-up is a further innovation, and the increased space afforded by the change will undoubtedly prove more acceptable to both readers and advertisers. It is evident from the initial issue that the publishers propose to preserve the best features of both magazines, thus maintaining the prestige each has won. The use of cement from the architectural and engineering standpoints, as well as its manufacture, will be thoroughly covered by the new journal, together with the popular features that are of such great interest to the general public. Allen Brett, editor of *Concrete Engineering* for the past two years, and Arthur E. Warner, formerly business manager, have both become identified with the new publication, the former in the capacity of associate editor and the latter as business manager of the Western field. Aside from this addition to the editorial and managerial end, no change has been effected in the old staff of *Cement Age*, Mr. Lesley continuing as editor; Frederic F. Lincoln as president of the company, in charge of the New York office and Eastern advertising field, and Edward A. Trego as associate editor.

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CONTENTS

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THE LATE
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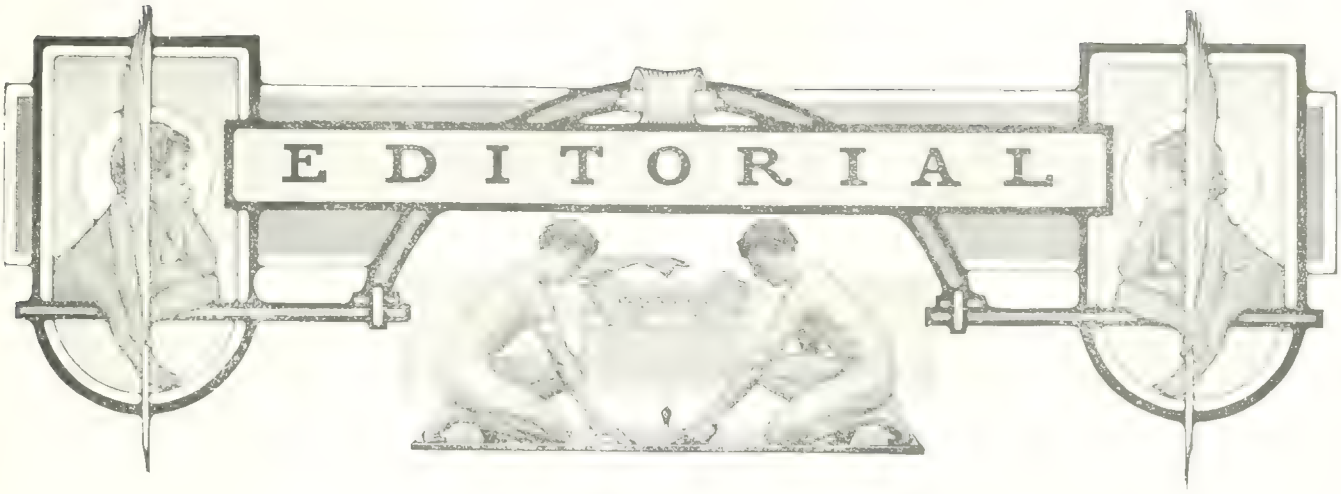


The late John M. Carrere—Pioneer Worker in modern school of American Architectural design, and highly esteemed by both confreres and public.

NO MORE WIDESPREAD regret has been felt in architectural circles in recent years than that occasioned by the death of the late John M. Carrere, which occurred in New York recently under most distressing circumstances. As a man highly esteemed and honored by his confreres, respected by the public and recognized as one of the foremost, if not the foremost designer on this continent, the deceased held a position in the architectural profession which falls to the lot of but few men in this particular calling of life.

John M. Carrere was one of the pioneers who undertook to establish an American style of architecture. He, together with his partner, Thomas Hastings, and the members of the firm of McKim, Mead & White, were responsible for the introduction of the *beaux art* influence with its spirit of Italian and French Renaissance. The work of Mr. Carrere, along with his co-adherents, has been the chief factor in bringing about the present American architectural revival.

Mr. Carrere was the son of John Mervin Carrere and Anna Louisa Maxwell. He was born in Rio de Janeiro on Nov. 9, 1858. He received his education in Europe, graduating from the Ecole des Beaux Arts in 1882. He achieved great success with Thomas Hastings in designing many notable buildings. The firm known as Carrere and Hastings were architects for the New York Public Library, the new National Academy of Design, the New Theatre, the Cathedral of St. John the Divine, and the Alcazar and Ponce de Leon Hotels at St. Augustine, Fla. The artistic merits of these structures reflect much of Mr. Carrere's personal talent. In 1886 Mr. Carrere married Marion Dell of Jacksonville, Fla. His wife and two daughters, Anna M. and Dell, survive him. He is also survived by his mother, Mrs. A. L. M. Carrere, and his brothers, J. Maxwell and Henri Valente Carrere.

Mr. Carrere was a member of the New York Chapter of the American Institute of Architects and was twice its president. He was also the founder and twice president of the Beaux Arts Society of New York city. He was delegate to the Fine Arts Federation and a member of the Architectural League of New York. He was also a member of many prominent clubs, including the Century, Players, Baltusrol Golf, City and the Richmond County Country Clubs.

Building Returns for March—Substantial improvement noted over preceding month—Twenty-three cities register average gain of 37 per cent.

FEWER LOSSES than were noted in the previous month, and a substantial improvement as compared with the corresponding period of last year, is the summary of CONSTRUCTION'S report in brief for building operations carried out in twenty-three representative Canadian cities during the month of February. In reviewing the situation, the same accelerating tendency is observed as that which obtained at the beginning of last year, and this in itself is a pretty reliable indication that the volume of work ahead is to assume greater proportions than has ever been attained in a like period before. Permits issued in the twenty-three centres referred to amounted to $4,015,958, as against $3,000,127 in the same month of last year, which represents an average of gain of 34 per cent.—a most satisfactory showing to say the least, especially so, when one takes into account the heavy operations which were carried on right up to the close of the fall season.

Ontario, as in the previous month, experienced the hardest rub, five of the seven losses noted falling in this province. Ottawa dropped behind to the extent of 33 per cent., and Fort William and London registered respective decreases of 21 and 35 per cent. The losses noted in the case of Stratford and St. Thomas, while indicating a large decrease per cent., are really unimportant. On the other hand, Toronto has a total of $969,590, which is 18 per cent. better than her corresponding amount; Hamilton doubled her previous figures by undertaking work aggregating in cost $75,450; and Windsor and Brantford succeeded in surpassing their former mark to the extent of 614 per cent. and 180 per cent. in order named.

In the West, a marked onward movement was in evidence on practically all sides. Lethbridge's setback (20 per cent.) alone is the only thing which prevented the centres reporting from having a perfect score. Vancouver not only surpassed the million mark, but again has the highest total for the month registered in the Dominion. Everything seems to indicate that Vancouver is just entering what is to be a period of growth that will be much more marvellous and rapid in every way than even the high state of development through which it has already passed. While less pronounced from an investment standpoint, Victoria's total of $182,940, representing a gain of 20 per cent., shows excellent progress, and as much can be said regarding the total of Calgary ($333,660), and the amount of Winnipeg ($432,500), both of which reflect a most satisfactory and wholesome condition. Edmonton, also, with a gain of 187 per cent., notes a substantial upturn; Regina is ahead by 104 per cent.; and Moose Jaw tacks on a gain of 27 per cent., although in the latter case the corresponding amounts are quite small.

Without the figures of Montreal, the Eastern section would be rather slimly represented, although it is known that a large number of places in both Quebec and the Maritime Provinces are undertaking considerable construction work. Halifax and Sydney put in a somewhat quiet month and St. John failed to report. Montreal, however, issued permits amounting to $642,428, as compared with $274,030 in February of last year, and has the third largest total in the list. Advices to hand state that Montreal has a big building year in prospect. In fact, reports from practically all sections predict big things, and unless industrial disturbances interfere with conditions, the record for each and every month from now on should double that registered in the year just passed.

	Permits for February, 1911.	Permits for February, 1910.	Increase, per cent.	Decrease, per cent.
Berlin, Ont.	$ 8,600			
Brantford, Ont.	6,600	$ 2,350	180.85	
Calgary, Alta.	333,660	169,800	96.50	
Edmonton, Alta.	83,825	29,130	187.74	
Fort William, Ont.	25,775	32,725		21.24
Halifax, N.S.	6,000	14,525		58.70
Hamilton, Ont.	75,450	37,650	100.40	...
Lethbridge, Alta.	30,000	37,570		20.15
London, Ont.	13,195	20,322		35.08
Montreal, Que.	642,428	274,030	134.44	
Moose Jaw, Sask.	10,200	8,000	27.50	
Ottawa, Ont.	64,500	97,200		33.65
Peterboro', Ont.	5,550	.....		
Port Arthur, Ont.	4,200	....		
Regina, Sask.	67,975	28,255	140.57	
Stratford, Ont.	700	8,000		91.25
St. Thomas, Ont.	1,300	4,700		72.34
Sydney, N.S.	2,030	1,775	14.36	
Toronto, Ont.	969,590	860,440	12.68	
Vancouver, B.C.	1,047,790	880,795	18.95	
Victoria, B.C.	182,940	151,760	20.54	
Windsor, Ont.	37,150	5,200	614.42	
Winnipeg, Man.	432,500	335,900	28.75	
	$4,051,958	$3,000,127	34.44	

Cement Show of C.C.C.A. a Success—Next show for Montreal—Its President responsible for its present existence—Co-operation of interests necessary.

THE CANADIAN CEMENT and Concrete Association conducted, during the month of March, the most successful cement show that has as yet been held in Canada. This association encountered many difficulties in its early history, and had it not been for the persistent and energetic labors of its president, Mr. Peter Gillespie, who is himself in no way financially interested in any branch of the industry, the association would have been no more.

While the cement interests, to some extent, have taken interest in the success of the organizaion and the work that it is doing, they have not lent the cooperation that they should, to effect an organization which was created solely for the purpose of disseminating scientific information relative to the proper and improper use of cement. However, at this time it appears that the Canadian Cement and Concrete Association is past the period of infancy, and although it has not as yet been officially announced, it is generally understood that the next convention will be held in Montreal, where it is to be hoped the association will receive a greater degree of courtesy from the local authorities than was accorded them in Toronto. The show, if taken to Montreal, we feel safe in stating, will be by far the largest and most important ever held by the association.

Ernest Flagg, Architect of Singer Building, in discussing the future of American architectural style, believes that materials should express their utilitarian function.

THE FUTURE OF AMERICAN architectural style, or the style of architecture that shall be adopted in the New World, has been one of the most interesting subjects for discussion in architectural circles in both Canada and the United States during the past decade.

In discussing the future American style, Mr. Ernest Flagg, the architect of the Singer Building of New York, recently made the following comments, which fairly represent the views of the profession on this continent:

Nothing can hinder the advancement of invention and progress of architecture if we meet the problem squarely and bring to its solution common sense, reason, and good taste.

The great hindrance to all advancement in art is the habit of copying. When invention ceases and servile imitation takes its place, progress stops. The blighting effects of this sort of thing, even when well done, can be seen in French architecture after the Revolution. For centuries the beautiful styles called after the French kings had followed each other in orderly sequence, when suddenly it became the fashion to affect the antique—invention stopped, progress ceased, and French art received a blow from which it has hardly yet recovered.

Style in architecture is in the nature of an evolution; it is a thing that is constantly changing. The changes are gradual; so slow indeed as to be imperceptible from year to year, but clearly discernible at longer intervals of time. Like changes of fashion in dress, no one knows who is responsible, because no one person is responsible; but the changes appear as the result of the labors of all those working in that field.

To produce an architectural style it is necessary that all those engaged in the work should proceed along a common way. Here in America we have not yet reached the starting point. Like a bird which rises and circles about before taking its direct flight, we are veering about, making ready to set our course. English influences, French influences, Italian influences, and other influences have been at work, and we have made a sort of salad of them all. Soon some one force will prove itself dominant—at the present time it looks as if that force would be French. As Italian influences dominated in France at the time of the Renaissance, so French influences will perhaps dominate here in what may be our naissance of art, and just as Italian styles became French when transplanted to French soil, so French styles will, if we have the true art instinct, be transformed after taking root on American soil.

The time has almost gone when one stops to consider what style, ancient or modern, he shall adopt for a building; and the time has almost come when one will think only of how, using the style of the time, he can do his share in the onward march of invention and progress. When this movement fairly gathers headway, neither England, France, nor Italy will set our fashions for us; we will evolve them for ourselves.

What our future styles will be no one can predict; neither can one tell what forms our building will take. As in the last twenty years, the elevator and the steel frame have wrought wonderful changes, so future inventions may cause no less important ones.

The role of the architect should be to accept these new conditions frankly and bring to the solution of the problems that present themselves these methods which the architects of the thirteenth century used with such wonderful results in dealing with the new methods of construction of their time. That is to say, the spirit of daring adventure, the spirit of invention, guided by good taste, which transformed every structural feature and engineering expedient into a thing of beauty; the spirit of truthfulness in the use of materials and methods, so that things appeared to be what they were, not, as too often happens nowadays, what they are not.

Let us cast aside shams and makeshifts; let sheet metal no longer masquerade as stone. Let us be more sparing in the use of columns and other architectural features in places where they have no use or meaning, but let us try to give to every material the forms and uses suited to it, and let the exteriors of our buildings tell the story of the plans.

A new generation of architects is now taking the field. These men have had advantages of education which few of their predecessors possessed. They can apply to their work those sound principles of good sense and correct taste which, though coming to us from France, are not French, but universal, for they are the fundamental principles of true art of all times.

From these young men, then, we may expect great things, and, unless all signs fail, we shall in due time have an American style of architecture of which we shall not be ashamed.

¶ *Lord Kitchener believes there should be women architects—Draughtswomen may be possible, but the profession of architecture cannot be successfully practised by women.*

THE EMINENT GENERAL, Lord Kitchener, who knows much about architecture and building construction, has expressed himself in favor of the idea that there should be women architects. In view of the fact that women of to-day have found their way into almost every profession and business, it seems on the face of it that Lord Kitchener is right. But when we remember the atmosphere of the draughting office we cannot but think that architecture is a profession for which women are not well suited. There is no question but what a lady architect would remember the clothes closets, arrangement of pantry, and other details in modern residences that are very often overlooked by the draughtsman, but could she be an architect in the real sense of the word? The true architect, as his title implies, is a master builder who superintends the construction of the building he designs. He must be able to direct the actual work of constructing his building as well as write the specifications for the work. He must be a competent buyer; he must know the comparative value of materials and the relative abilities of contractors. We believe that if draughtswomen could live in, and not object to the usual atmosphere of the draughting office, she would be valuable as a draughtswoman, but she will never make an architect. Lord Kitchener can hardly be taken seriously. He is, evidently on this point, more chivalrous than sincere.

AN IMPORTANT building project reported to be in prospect is a large modern hotel, to be erected by the C.P.R. on the present site of the Murray-Kay, Limited, adjoining the block of land at the corner of King and Yonge streets on which the company will construct its new sixteen storey office structure. The new office building is to be built at once, but it will be some little time yet before the construction of the hotel will be started. The new hostelry, needless to say, will be modern in its appointments.

Head Office Building of the Royal Bank of Canada, 147 St. James Street, Montreal. H. C. Stone, Architect.

View Looking Toward Entrance from the Main Banking Room, Royal Bank of Canada, St. James Street, Montreal, Showing Detail of Doorway and Mezzanine Floor. H. C. Stone, Architect.

Main Banking Room, Royal Bank of Canada, St. James Street, Montreal, Showing the Wall Scheme and Detail of Counters and Screens. H. C. Stone, Architect.

Board Room, Royal Bank of Canada, St. James Street, Montreal. Note the Effective Wall Panelling and Treatment of Fireplace. H. C. Stone, Architect.

Manager's Office, Royal Bank of Canada, St. James Street, Montreal. H. C. Stone, Architect.

SOME FAILURES AND THE LESSONS THEY TEACH

Full text of address delivered by President Peter Gillespie before the Third Annual Convention of the Canadian Cement and Concrete Association.

IT IS A TRUISM often repeated that the public has a short memory. The lessons to be derived from great disasters are soon forgotten except by a very small number. The fatal Iroquois Theatre and Collinwood school disaster of a few years ago, so costly in child life and so much in the public mind for short intervals, showed the necessity of safeguarding the occupants of public buildings. For a time our civic authorities were active in having places of public entertainment carefully inspected. Much was heard for a season about fireproof curtains, accessible exits, fire drill and fireproof schools, but soon the public relapsed into its old ruts. Inspection became less searching and the authorities more forgetful and the public continues to run daily the same risks that the victims of these disasters ran. It sends its children to the same schools and attends itself, the same places of public worship or entertainment, and only becomes conscious as to the chances it is taking when some other horrible calamity occurs. Truly, the public has a short memory.

It is chiefly because humans are humans and not machines that we continue to take chances. A machine can be constructed to do a given thing in a specified way an endless number of times. Whether its work be punching or drilling or cutting, it does it with machine-like precision. It never tires, never grows careless and is never actuated with a spasm of over-zeal or indolence. It is never tempted to scamp its work. It is never influenced by the desire to make excessive profits and never knows the flattery of the multitude or the sting of adverse criticism. It never forgets, never flatters, never tempts, never cajoles, never bluffs and never pleads. But men are differently constituted. They possess the human traits. They are influenced by example, possess passions and emotions, cherish hatred, remember injuries and forget the lessons which great crises in their experience ought to impress on them. The attention of engineers, architects, builders and building departments has been called to the lessons which are taught by the failures of structures designed and erected by them or under their supervision. It is not that the field is a new one that this paper is devoted to so hackneyed a topic, but to emphasize once again, firstly those elements which have contributed to failures, and secondly those corrective or precautionary measures which will tend to prevent their recurrence.

Especially in the use of reinforced concrete has the general reader's attention during the past five years been called to a rather large list of failures, all of them more or less serious and not a few of them having fatal results. Reinforced concrete has been comparatively new in the building art and in its fabrication is very different from other materials with which the constructor is familiar. Unlike steel or wood, its strength increases with age. It is poured into forms, at which time it is plastic, and has to be sustained until it acquires sufficient strength to support itself. It consists of two materials, not one, and since the disposition of these, with respect to each other vitally affects the strength of the product, exercise for great care in this placing is necessary. More perhaps than of any other building material is this true—it possesses great capacity for injury in the making and placing. Following are cited a number of failures of reinforced concrete structures which during the past twelve months or so have occurred, and reference to which in the engineering press has come to the writer's notice. They represent typical cases and an examination of the list will enable us to classify the causes under a few general heads.

The comparatively recent announcement that the great dam across the Colorado River at Austin, Texas, is to be rebuilt has served to recall its failure over a decade ago. It will be remembered that that failure was announced to the world at first as a serious reflection upon the engineering profession because some hydraulic engineers of eminence had been connected with the work. Subsequently, however, when the whole history had been investigated, it was found that the authority of the engineers had been interfered with to such an extent by the city officials in control, that their responsibility had been practically nullified. Indeed, one prominent engineer had resigned rather than have his name further connected with a work over which he had no control.

On February 28, 1910, a reinforced concrete arch of three spans over the Flat Rock River at Edinburgh, Ind., collapsed during an unusually heavy flood. The design had been furnished by a well-known bridge company, but the Bridge Commissioners, in their desire to economize and with a wisdom commensurate with their experience in such matters, decided to omit the piling underneath the abutments and to carry them instead to a somewhat greater depth. And so the bridge was built. The materials supplied and the workmanship throughout seemed to be excellent, but in the season of heavy flood the piers were undermined by scouring and the structure collapsed. There does not appear to be any other cause of failure than the insufficiently supported piers, and the responsibility of course must rest on those who ordered the modification of the original plan.

A concrete dam at Fertile, Minn., was washed out by floods early in April, 1910. The trouble is attributed to the fact that the foundations were not laid sufficiently deep to prevent scouring and undermining, and failure ultimately ensued.

The partial failure of the Bayless reinforced concrete dam at Austin, Pa., in January, 1910, exemplifies a trouble of a slightly different character. The dam was completed in December, 1909, at a cost of upwards of $70,000. On completion, it was observed that there was one small crack 1-16 inch wide, extending from the top of the dam to the ground level. Subsequently others, similar in appearance, developed, and during a heavy freshet on January 23, 1910, a section of the dam between vertical cracks, under the thrust of the impinging water, slid forward some 18 inches. This movement covered a period of some 8 hours and then stopped. Investigation disclosed the information that the failure was due primarily to the fact that the dam was founded upon a bed rock, the successive strata of which were separated by layers of shale or clay. The impounded water, having worked itself under the foundations, had softened the clay, with the result that the upper stratum carrying a portion of the dam had moved forward on the lower. It was stated that the weakness of the concrete was doubtless due to the fact that much of it had been hurriedly placed, part of it in freezing weather. The anchor bolts, which had been grouted into the foundation rock, had moved outward with the rock into which they were anchored.

On April 7, 1910, the collapse of a concrete roof under construction at the new car-barn of the Shore Line Electric Road at Saybrook, Conn., took place and resulted in the death of one man and the injury of two others. The roof was a 4 inch slab of reinforced concrete on girders, about 8 inches on centres and of 37 feet span. The last work had been completed about ten days and the forms were being removed. It was believed that the premature removal of the forms and the excessive loading of the green roof slab with roofing material were the joint causes of the accident.

On July 13, 1910, one of the columns of the concrete groined arch roof to the filter chambers in course of construction at Owen Sound, Ont., collapsed while the centering beneath was being removed. Two men were quite seriously injured. The accident apparently was due primarily to the early removal of forms, combined with the fact that the 18 x 18 inch columns on two sides of the square roof of the arch were quite incapable in themselves of resisting the arch thrust. The forms were removed in only four days after pouring, notwithstanding the fact that seven days was the minimum specified time for removal.

The upper part of a reinforced concrete chimney under construction at the plant of the American Woollen Co., South Royalston, Mass., collapsed on April 9, 1910, causing the death of two men. The chimney was to have been 105 feet high with an inside diameter of 4 feet and an outside diameter of 4 feet 8 inches at the bottom, and with walls varying in thickness from 8 inches at the bottom to 4 inches at the top. The forms used in construction were in two sections, each 3½ feet deep. The procedure was to fill the upper form, then to loosen the lower and set it above the upper for filling. This took one day. Next morning, the form in the lower section was loosened and it was placed on top and filled. Thus, the concrete in any 3½ foot vertical section had less than 24 hours in which to set before its side-supporting forms were removed. The accident occurred when a height of about 70 feet had been reached, the section last uncovered, then only 20 hours old, caving in and carrying the workmen to the ground with it. It is reported that the temperature the day before the break had taken a sudden drop, but it was not at any time below freezing. The failure was undoubtedly due to loading a very green concrete before it had acquired sufficient resisting power, as the materials were good and the design and execution satisfactory.

A reinforced concrete grain elevator of typical design failed under a normal pressure of grain at Springfield, Ohio, on October 24, 1910. As has been rather common in elevator construction where a battery of cylindrical units has been constructed, the unused spaces, external to the cells, but lying within the tangent walls, had been utilized as auxiliary bins. No one saw the beginning of the collapse, so that its exact behavior cannot be stated, but from the appearance afterwards it was evident that the lower section of the wall where the pressure was greatest, was forced out under the pressure of the wheat. This portion sheared off clean at the line where the straight wall connected with the circular wall of the larger bin. The weak point in the structure was that the horizontal rods in the straight wall were not connected to those in the circular, nor were they tied back for any distance into the concrete of the circular walls. It was stated that the plans showed the rods in the straight walls securely fastened into the circular bins and that the failure to so fasten them was due to the negligence of the foreman.

On November 22, 1910, a four-storey reinforced concrete building being erected for the Henke Furniture Co., Cleveland, Ohio, suddenly collapsed, throwing one of the walls over a two-storey frame building next door and so crushing the structure as to cause the death of four of its occupants and the serious injury of seven others. It was of reinforced concrete column and girder construction with hollow tile and concrete floor system, and brick curtain walls varying in thickness from 21 inches at the basement to 13 inches at top floor. A commission of enquiry was immediately appointed, on which were representatives of the Builders' Exchange, the Cleveland

Engineering Society and the Cleveland Chapter of American Institute of Architects. This commission was empowered to take evidence, and to consult every available source of information that might explain the cause of failure. After the wreck had been carefully examined, the design checked over and the witnesses examined, the finding was announced. The failure, it stated, was due primarily to the premature removal of forms in the third storey. It fixed the responsibility on the architects, the contractor, the owner and the Department of Buildings for the city of Cleveland. The architects were adjudged responsible in that they did not give sufficient consideration to the removal of forms, in that they did not give sufficient attention to the materials, and in that they did not give adequate supervision to the work of construction. The contractor was adjudged culpable in that he employed foremen who were entirely ignorant of the intent of plans and specifications or of the nature of the materials they were handling. In consequence, the sand was inferior, the forms were removed prematurely, and that regardless of weather conditions, the green concrete was regularly overstressed, the members were not of the sizes called for in the plans, the concrete composing them was open and porous and sawdust and shavings were found in the bases of columns. In addition, it developed that less cement had been delivered to the building than would have been necessary to construct it had it been built as planned.

The owner was deemed responsible in that he had not employed a special concrete inspector on the work as required by the building regulation.

The Department of Buildings was held responsible in that it had ignored the requirements of that portion of the building code which makes it necessary that the owner employ a special reinforced concrete inspector. It thus appears that the Building Department rather than the building code was at fault.

I have chosen to classify the causes of failure in the above cited cases as follows:

(1) Interference with a suitable design by those in authority, but not possessing a knowledge of engineering practice.

(2) Defective design.

(3) Inferior materials.

(4) Ignorant or wilful disregard of specifications and plans.

The first of these is unfortunately of too common occurrence. In all human probability the Austin dam and the Edinburgh arch would be standing today but for the intervention of the "cock sure aggressive" individual who, when clothed with a little brief authority, becomes a paragon of wisdom on everything under high heaven. This type is found frequently in our municipal councils and it is to be regretted that engineers of wide experience and good judgment sometimes permit themselves to be dominated by them. An engineer's judgment may be in error, but is it not more likely to be productive of good results if it be corrected through consultation with other engineers of equally good standing, than if it be reversed by men entirely untrained in the problems of design and construction.

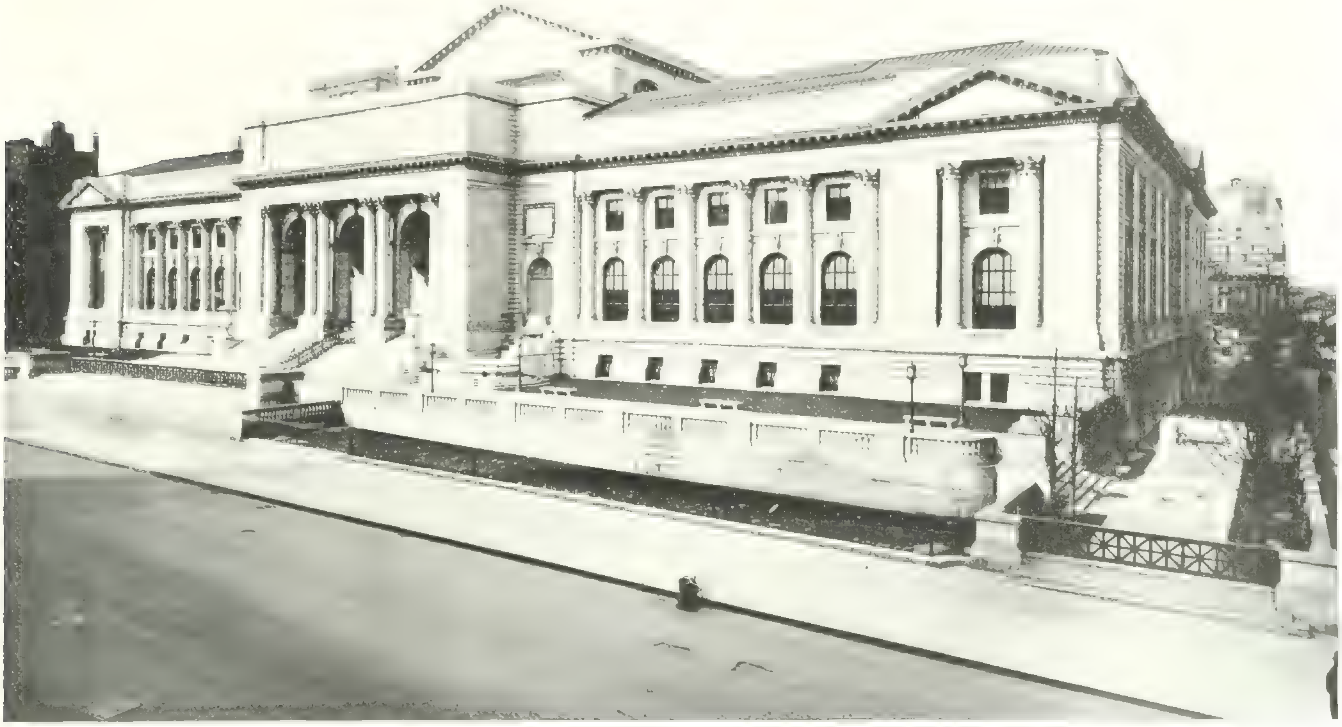
Fortunately, the day of unsafe design in reinforced concrete is becoming a thing of the past. The design of reinforced concrete, like the design in wood or steel, has been reduced or is being reducd, to a standard based on the proportion and strengths of materials which constitute it. There is, therefore, no reason to-day why the average practising engineer should not acquaint himself with concrete designing so that, at least, he can finish his plans with some such detail as he does those for his structures in steel. He may, if he prefers, leave the details to his contractor, who, like the contractor for steel, can make them according to the standards of his practice. He must exert every care in informing himself as to the character of the materials he must employ and of the foundation upon which he proposes to erect his structure. The dams at Fertile, Minn., and at Austin, Pa., furnish illustrations where disaster might have been averted by a careful examination of the underlying strata, prior to construction. The designer must recognize, too, that the safety of his design depends upon the constructor as well as upon himself, since concrete construction is not fixed as is that in steel. An editorial in the "Engineering News," speaking of this phase of a designer's responsibility, asserts that "the design cannot be sent from the drawing table with perfect confidence in its precise reproduction in the structure. It is the joint product of the man in the office and the man in the field, and any design which fails to recognize this is a poor one, no matter how nearly it may conform to accepted standards. No engineer who is not prepared to supervise the construction of a reinforced concrete structure is justified in designing that structure as closely to the safety limit as he is when the construction is to be under his eye."

The prevention of the utilization of inferior material is the work of the engineer, the architect and the inspector. No reinforced concrete work of any magnitude should be constructed without a capable, conscientious inspector. The Henke building suffered from inferior material, as it did from almost every other malady to which reinforced concrete is heir. The remedy for this is vigilant, constant inspection. Failures resulting from the premature removal of forms could invariably have been prevented by the exercise of intelligence and a little precaution. The Henke building disaster, the Own Sound filtration plant accident, the car-barn roof failure at Saybrook, Conn., and the chimney collapse at South Royalston, Mass., were all preventible if careful examination had been made before stressing the concrete, which, possibly due to temperature conditions, had not yet acquired its preliminary strength. The failure of the grain elevator at Springfield, Ohio, was due to the ignorance of a foreman. Any foreman who appreciated the proportions of the materials he was handling would not make the blunder that was made.

The remedy for these evils is the employment of the experienced, intelligent, painstaking inspector. He

Perspective along Principal Approach, New Public Library, New York City. Carrere and Hastings, Architects.

Rear View of New Public Library, New York City, Showing the Bryant Memorial in the Foreground. Carrere and Hastings, Architects.



Main Facade of the New Public Library, Fifth Avenue and Forty-first Street New York City, Carrere and Hastings, Architects.

THE NEW PUBLIC LIBRARY NEW YORK CITY

Magnificent educational building which was recently opened for the first time to permit the public to view the remains of its designer, John M. Carrere.

THE MOST IMPORTANT of great American educational institutions, the New York Library, was opened under rather depressing circumstances. The doors of this building were first opened to the public to view the body of its designer, the late John M. Carrere.

The New York Public Library without question is one of the most remarkable examples in the United States of the typical American aspiration in architecture. Carrere & Hastings, together with McKim, Mead & White, of New York, were the pioneers of the American Renaissance School that has dominated, to a very great extent, the architecture of the larger buildings erected in the United States within the last decade. Not only have the architects of this structure designed the building, a remarkable one, in keeping with the prevalent spirit in American architectural design, but they have also taken into consideration the utilitarian necessities in an educational structure, of such immense proportions. The old idea of the library as a secluded room in which a few scholars could browse at leisure among musty volumes, has given way to the idea that it is essentially a vehicle of popular education—one which should be in some measure supported by public funds and managed chiefly for the purpose of giving the widest possible circulation to its accumulated and accumulating store of books.

Mr. A. C. David, in describing this structure in the "Architectural Record," says:—"The American Public Library has, like all institutional buildings, usually been designed for the purpose of imposing itself upon the public. It has not attempted to solicit patronage by the suggestion of studious detachment. It has announced to the public from some colonated portico that it was a great educational institution, and that the public must for its own good, come in and get educated; and the designers have never felt it necessary to invite patronage by retaining in the building any flavor of domesticity which in Europe has always been associated with such edifices."

In his description of this masterpiece in the New American School, Mr. David describes the building further as follows:—

The main reading-room is one of the most spacious rooms in the world—beautifully proportioned, lighted by a series of windows on both the long sides of the room, and entirely accessible to the stacks. To have obtained a room of these dimensions, so excellently adapted to its purpose in every respect, was a great triumph for the architects. The smaller rooms, also, particularly those like the gallery, whose practical requirements are severe, are also admirably planned for their purposes. These rooms have been supplied with a good light by avoiding anything like a heavy colonnade on the facade; and while most of them (all of them except those situated on the corners) obtain light from only one

Main Rotunda. New Public Library. New York City. Carrere and Hastings. Architects.

Main Reading Room. New Public Library. New York City. Carrere and Hastings. Architects.

Exhibition Room, New Public Library, New York. Carrere and Hastings, Architects

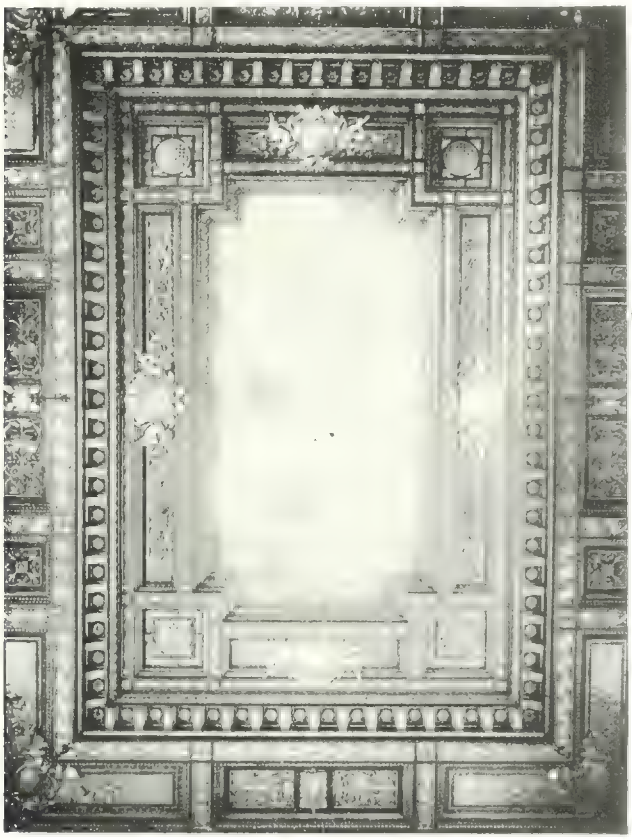
Periodical Reading Room, New Public Library, New York City. Carrere and Hastings, Architects.

One of the Side Staircases, New Public Library, New York City. Carrere and Hastings, Architects.

Periodical Stack Room, New Public Library, New York City. Carrere and Hastings, Architects.

direction, the light is in all except a few cases, all that is needed. The corridors, which parallel to the outer lines of the building between two rows of rooms, one lighted from the street and the other from a court, have to be artificially lighted, but that is as it should be.

It is an interesting fact, however, that the superbly dimensioned reading-room—an apartment 395 feet long, over 75 feet wide, and 50 feet high—has



Panel of Ceiling in Main Reading Room, New Public Library, New York City. Carrere and Hastings, Architects.

practically no salient effect on the exterior of the building. It stretches along the rear of the structure, and this facade is very plainly treated, without any pretence to architectural effect. It is, indeed, designed frankly as the rear of a structure which is not meant to be looked at except on the other sides. Any attempt, consequently, at monumental treatment has been abandoned. The building is designed to be seen from Fifth Avenue and from the side streets. The rear, on Bryant Park, merely takes care of itself; and one of the largest apartments in any edifice in the United States is practically concealed, so far as any positive exterior result is concerned.

The striking fact mentioned in the preceding paragraph is a sufficient characterization of the purpose of the architects. They recognized that they could not plan a room of the required dimensions and light it properly without destroying its value as the primary motive of a monumental building; and in obedience to their settled policy of being loyal primarily to the needs of the plan, they deliberately sacrificed the monumental to the practical aspect of the edifice. What is more, they sacrificed the architectural effect of the interior of the reading-room to the convenience of the management in the handling of the books. This superb apartment is cut in two by an elaborate wooden screen, from which the books contained in the stacks are to be distributed; and it is, consequently, almost impossible to get the full architectural effect of the reading-room, except from some point a long the balcony.

The New York Public Library is not, then, intended to be a great monumental building, which would look almost as well from one point of view as another, and which would be fundamentally an example of pure architectural form. It is designed rather to face on the avenue of a city, and not to seem out of place on such a site. It is essentially and frankly an instance of street architecture; and as an instance of street architecture it is distinguished in its appearance rather than imposing. Not, indeed, that it is lacking in dignity. The facade on Fifth Avenue has poise, as well as distinction; character, as well as good manners. But still it does not insist upon its own peculiar importance, as every monumental building must do. It is content with a somewhat humbler role, but one which is probably more appropriate. It looks ingratiating rather than imposing, and that is probably one reason for its popularity. It is intended for popularity rather than for official use, and the building issues to the people an invitation to enter rather than a command.

From a strictly architectural point of view, there

Carved Wood Ceiling Panel in Exhibition Room, New Public Library, New York City. Carrere and Hastings, Architects.

are many criticisms which can be passed upon the design. The niches and fountains on either side of the entrance—the one monumental feature of the building—are a not very happy and appropriate de-

(*Concluded on page 80.*)

Circulating Library Room, New Public Library, New York City. Carrere and Hastings, Architects.

Trustees' Room, New Public Library, New York City. Carrere and Hastings, Architects.

A FEW POINTS ON REINFORCED CONCRETE DESIGN

Full text of paper read by C. S. L. Herzberg at the Third Annual Convention of the Canadian Cement and Concrete Ass'n.

IN DESIGNING reinforced concrete structures one is continually meeting minor problems upon which very little satisfactory information can be obtained from the numerous treatises on the subject. In the following paper I shall endeavor to enumerate a few points in design which are sometimes apparently not given the attention they deserve.

Footings have probably given more trouble to the designer, the erecting contractor and the owner than anything else in connection with reinforced concrete. Unequal settlement in footings is responsible for numerous unsightly deformities and cracks and some collapses.

The common type of reinforced concrete column footings is, of course, easily dealt with and differs from a plain concrete footing only in its being designed as a flat slab to resist bending instead of being sloped off as a pedestal. In this type of footing the centre of pressure coincides with the centre of gravity of the footing area and the required size is formed directly from the load to be carried and the resisting power per square foot of the soil. Trouble is sometimes caused by having a footing too large in comparison with the size of the other footings in the same building. This is particularly liable to happen in the design of wall column footings in the following manner:—

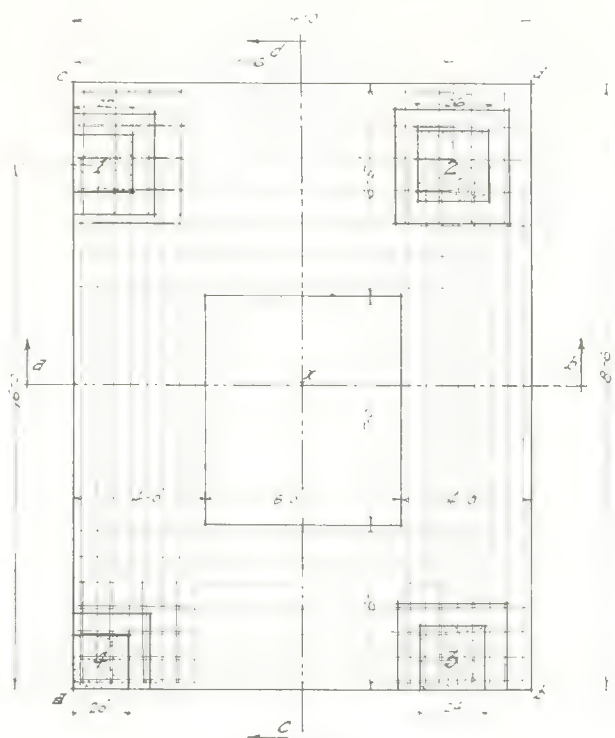
If the footings are designed to carry the total dead and live load, figuring each floor of the building fully loaded, then the interior footings will, under probable loading, not stress the soil as highly as will the wall column footings. The reason for this is, of course, that the load figured to come on the wall column footings is usually about 70 per cent. dead load (which is present under all conditions) and 30 per cent. live load (which is never all there), while that figured on the interior column footings is generally about 40 per cent. dead and 60 per cent. live. As the live load on the footings of a building of five storeys or more is never more than 50 per cent. of the total live load, it will readily be seen that the pressure per square foot is less on interior footings than on exterior ones.

As all soil is compressed under any loading, the interior footings will not settle as much as the exterior ones, and the result is sometimes the cracking of floor beams and slabs.

The difficulty is overcome, to a certain extent, by the custom of reducing the live load by about 50 per cent. in buildings of over a certain number of storeys. This, however, would appear to be insufficient, and it would seem that either a greater reduction should be figured in designing interior footings, or else no reduction at all should be allowed in figuring exterior column footings. It would also appear to be wise to even add a small percentage on corner column footings as a much larger portion of the wall coming on these is dead weight.

It very often occurs that the footings under wall columns cannot be built to extend beyond the outside line of the column. In cases of this kind some sort of combination footing should be used. This is sometimes done by carrying the column in question on a cantilever beam, pinned down at the other end by one of the other columns. Care must be taken in this type to reduce the footing under the second column in proportion to the upward thrust from the end of the cantilever beam.

A simpler method of treating the above is as follows: Consider the wall column in question and the nearest interior column as acting together on a combined footing. Figure the loads coming on both columns



Plan.

and find the position of their resultant load. Add the two loads and divide by the soil value per square foot. This will give the required footing area. Design a footing of this area and varying in width from one end to the other in such a way that the centre of gravity of the area will coincide with the point of application of the resultant from the two column loads. The thickness of the footing and the reinforcing material must now be designed, treating the footing as an inverted beam, supported at the two columns and resisting the upward pressure of the soil, which will be of an intensity per square foot equal to the soil value, minus the weight per square foot of the concrete in the footing.

The above method can be used for designing combination footings for any number of columns.

Figure 1 shows a footing of this type designed to carry the four columns indicated, whose loads were (1) 267,000 lbs., (2) 347,000 lbs., (3) 284,000 lbs., and (4) 197,000 lbs. The soil value assumed was 5,000 lbs. per square foot. Column 1 was a corner column, and 2 and 3 were wall columns, and 4 was an interior column. The footings could not extend beyond the lines ab and ac. The footing was designed as follows:

Sum of column loads = 109,500 lbs.

Sum of moments about side ab = 10,272,166 foot pounds.

Therefore centre of pressure is $\frac{10,272,166}{1,095,000} = 9$ ft. $4\frac{1}{2}$ in. from ab.

Taking moments about line ac, we find centre of pressure is 7 ft. 0 in. from ac.

This locates the point x, the centre of pressure.

Area of footing required = $\frac{109,500}{5,000}$ 219 sq. ft.

The lengths 1 8ft. 6 in. and 14 ft. 0 in. of the sides ac and ab are now arbitrarily assumed.

Area of rectangle abcd	259 sq. ft.
Area of footing required	219 "
Area to be deducted	40 "
Deduct area efgh, 7x6	42 "

Let x = distance from ac to centre of gravity of area to be deducted.

Let y = distance from ab.

Then x $\frac{259\text{x}7 - 217\text{x}7}{42} = 7$ ft. 0 in.

and y = $\frac{259\text{x}9.25 - 217\text{x}9.38}{42}$ 8 ft. 7 in.,

which locates the position of the area efgh, which will give a footing whose centre of gravity coincides with the centre of pressure.

The footing was then designed for bending by treating it as four beams between the four columns, figuring on 5,000 pounds per square foot upward pressure, minus the weight of the concrete in the footing.

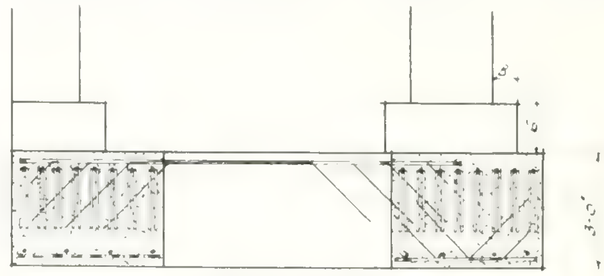
While the centre of pressure will, of course, shift under different conditions of column loading, still the variation cannot be sufficient to cause a serious settlement of any part of the footing.

In some cases it is very difficult to economically combine a wall column footing with any other footing. Where this is the case the footing is increased towards the inside of the building and along the wall. When this is done, the column must, of course, be tied in at the top and figured to resist the bending caused by the eccentric loading on the footing. This bending is generally increased by the bending moment from the eccentricity brought on the column from the floor loads.

A point in designing reinforced concrete which is often overlooked is the bending produced in wall columns carrying long span beams. This moment seldom gives trouble in the lower tiers of columns in a building of any considerable height as, in such cases, the columns are so heavily loaded that the eccentricity is not sufficient to produce actual tension in the outside of the column.

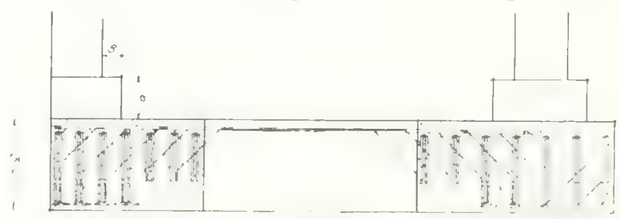
The common practice of designing wall columns 20 per cent. heavier than interior columns does not always overcome this tendency to crack from bending as the extra strength is not applied in the proper place.

Consider the roof columns of a building of considerable width in which the roof beams span from side



Section on Line A-B.

to side with no intermediate support. The usual custom is to carry the column reinforcement to within a few inches of the top of the roof slab and to bend the anchor bars of the beams down into the columns the usual depth to prevent cracking in the supper surfaces of the beams near the ends. In a building designed in this way the result is pretty sure to be cracks across the outer surfaces of the columns, immediately under the level of the bottoms of the beams, even though the roof be under no load other than the dead load of the structure itself. The reason for this is that the beam deflects under its own weight and the weight of slab carried. This deflection produces a tension in the upper surface of the beam at the end, which tension is also present at the outer surface of the column where it is altogether liable to produce large cracks. These cracks can be seen in many buildings. They should be provided against by increasing the reinforcing steel in the outer side of the column. This reinforcement should not be stopped at the roof level, but should be bent in along the upper surface of the beam. The use of plain steel rods for reinforcement in these columns (if the same are not bent over as described) increases the liability to crack, owing to the



Section on Line C-D.

fact that they must be embedded to a greater distance than deformed bars in order to develop their tensile strength. Cracks of this nature are, of course, more unsightly than they are dangerous, for beams supported in this manner are usually designed as non-continuous over the supports, and should be of the required strength whether pinned down to the columns or not. However, the bond with the column is an added strength to the beam and should be preserved.

The placing of brackets under a beam of the above description does not overcome the difficulty and is, in my mind, poor practice. The brackets tend to spread the columns by causing the beam to act as an arch whose thrust is not properly taken care of, and cracks will very likely occur on the outer surface of the columns under the brackets. This construction acts, to a great extent, like a roof truss without a tie rod.

Reverse bending should be given particular attention in the design of highway bridges where heavy moving loads have to be provided for. In short span culverts where a flat slab is used this reverse bending at the abutments, if not properly taken care of, may result in a failure which has all the appearance of a shear failure, and such it may be after a certain point, although it has probably started in tension cracks in the upper surface of the slab.

Consider a culvert, say, 12 feet clear span to be designed to carry a 15 ton road roller. The slab is designed as non-continuous and enough steel is inserted in the bottom to give a resisting moment to properly take care of the total maximum bending moment liable to come on the culvert. In all probability the concrete itself will figure to take care of all the shear at 50 pounds per square inch, and therefore no extra provision is made against failure through shear.

At first glance this culvert would appear to be properly designed to insure against failure from any cause, for, as the slab is not figured continuous over supports it does not seem necessary to put any steel in the top of the slab at the abutments. This conclusion would be safe if the slab were cast separate from the abutments, but if (as is nearly always the case) the abutments and slab are monolithic the following is liable to occur:

A heavy vibratory load comes to the centre of the span and produces considerable deflection and, as the slab is tied down to the abutment, tension is produced in the upper surface of the slab and on the outer surface of the abutments. The slab being thinner than the abutment cracks on top just inside the line of the abutment. Then as the load approaches this point the shear is increased and the cracked concrete is probably not capable of resisting this shear and collapses.

This failure might have been prevented in three ways, namely, by the use of top steel, by the use of steel shear members, or by having a complete horizontal joint between the slab and abutment.

The advantages of what is known as flat ceiling construction are many, the most desirable among them being the appearance produced and the economy in floor height. The chief disadvantage in the most common types is our lack of scientific data on the subject. In a well-known type, opinions differ nearly 100 per cent. as to the bending moment to be figured in slabs under the same loading. In the Engineering Record of 24th December, 1910, there is an account of some measurements made to obtain the strain existing in different portions of a flat slab floor under working loads. From these strains the existing stresses are figured. The results of these measurements appear to indicate that some designers are oversanguine about the carrying capacities of this type of floor.

A more conservative design of flat ceilings is effected by increasing the width of the beams and decreasing their depth until the underside of the beam is flush with the underside of the slab. The slab in these cases is usually made up of small reinforced concrete joists with tile fillers in between and two or three inches of concrete over the top to aid in compressive resistance.

In this type of floor the stresses are known and the strength can be figured along the same lines as the ordinary slab and beam construction. The tile fillers are placed as much as possible below the neutral axis of the slab so as not to decrease the compressive resistance of the concrete, and, of course, they decrease the dead load of the floor. This type of floor is not as economical in steel as the usual slab and beam construction on account of the decreased arm of the resisting couple of the steel in tension and the concrete in compression.

Two-way reinforcement in a rectangular panel, designed according to the accepted theory of reductions in bending moments, effects economy in concrete only. If the bending moments each way be reduced in the usual manner of multiplying by $\frac{A4}{A4 \times B4}$ for the shorter span, and by $\frac{A4}{A4 \times B4}$ for the longer where A represents the shorter span and B the longer, the steel may be slightly reduced by placing less near the edges of the panel than near the centre. This reduction is, however, offset by the fact that, in using bar reinforcement the amount of resistance of the upper layer of steel is decreased by the decrease in the resisting arm of the forces. The saving in concrete is, of course, effected by figuring it to take its full working compression in two directions at right angles to one another.

Before closing I would like to enter a plea for the standardization of unit stresses and formulæ in reinforced concrete design throughout Canada. Some things, of course, cannot be standardized, but such points as ratio of the modulii of elasticity of steel and concrete, the allowable working compressive strength of concrete, both in bending and in direct compression, the limits of the action, etc., might be definitely settled and adhered to by all designers. If it is safe in one city to design a continuous beam uniformly loaded to resist a bending moment of one-twelfh WL., then it is equally safe to do the same in the next city, despite the fact that the second city insists on it being designed for one-eighth WL. Other points might also be strengthened out, such as whether a specification should insist on using 12 for the ratio of the modulus of elasticity of steel to that of concrete when, in another part it calls for a working stress of 350 pounds per square inch for the concrete in a column and 10,000 pounds for compressive steel embedded in the same column.

Design for the Proposed Bank of Commerce Building, Winnipeg. Darling & Pearson, Architects.

CONSTRUCTION

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

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

Vol. 4 Toronto, April, 1911 No. 5

CURRENT TOPICS

A PARTNERSHIP has been formed by Mr. Andrew Sharp, A.R.I.B.A., and Mr. J. Hodge Brown, Toronto, who have opened offices for architectural practice at 18 Wellington street east. The new firm will be known as Sharp & Brown, and will be pleased to receive catalogues, sample and price lists from manufacturers of building materials.

* * *

THE TERM "JERRY BUILT," (which applies to the product of the speculative operator on this continent), according to the suggested derivation advanced by a young Theologian connected with the Manchester, Eng.), Sunday School, comes from the walls of Jericho, which fell merely because a noise or commotion was made near them.

* * *

ANOTHER OF THE EARLY BUILDINGS of Toronto to disappear in the wake of modern business progress, is the small frame structure at 35 and 37 King street west, which was recently demolished to make way for the imposing new edifice to be erected by the Bank of Quebec. The old building was a two-storey structure, with stores below and rooms above. It was built in 1834, and while not noted for any great antiquity, it was nevertheless interesting as indicating the remarkable strides which architecture has taken in recent years.

THE CHINGFORD RESERVOIR now in course of completion on the outskirts of London, (Eng.), has a water area of 416 acres, and will store 3,000 million gallons, or enough to supplement the city's existing supply by 30 million gallons daily.

* * *

AN ANNOUNCEMENT has been received to the effect that Messrs. John M. Watt and Victor J. Blackwell, architects, London, Ont., have entered into a partnership, with offices in the Bank of Toronto Chambers in that city. The new firm will practice under the name of Watt & Blackwell, and the members report an active season's work already in prospect.

* * *

CARBORUNDUM FORMS an important constituent in a flight of concrete stairs built at Paris, France, over which 14,000,000 persons have up to the present shuffled without so much as scratching the surface. The introduction of this new aggregate, it is said, has not only produced a concrete which is eminently serviceable in every way, but one which for wearing qualities, cannot be approached by any other material used for a like purpose.

* * *

RATHER A UNIQUE BUILDING of reinforced concrete is a six-story garage built in Boston which has circular columns of the same diameter in the upper and lower storeys and has long floor spans permitting of a deep turntable well of large diameter in each story. The front wall corresponds with the brick and stone face of an adjacent building, and has a rather elaborate trimming of cornice, dentils, and carved stone, all of which, except the last, are cast integral with the body of the wall.

* * *

A BOARD OF AWARD, consisting of Dr. Douglass, city medical inspector; John D. Atchinson, a prominent local architect, and Dr. Strum, of Chicago, is now engaged in examining the thirteen designs submitted in the recent competition for the Hospital of Contagious Diseases to be built by the city of Winnipeg. The building is to cost $500,000 exclusive of furnishings. It is expected that the name of the successful architect will be announced shortlly, and that the work will be proceeded with this spring.

* * *

THE NEW HOTEL for immigrants, erected by the Argentine Government, was opened by the President of Argentina on January 24, 1911. This structure is at the Darsena Norte, where immigrants are landed in Buenos Aires, and occupies 47,840 square yards. It is practically fireproof, being built of reinforced concrete, and can accommodate 3,200. The building is fitted with all the necessary comforts and has isolation wards for contagious diseases, while the sanitary arrangements in regard to baths, lavatories, etc., are nearly perfect. The various railways will have ticket offices in the hotel, so that immigrants may purchase their tickets direct from the railways, and every facility to reach their destinations in safety will be afforded them.

IT IS ANNOUNCED that the Dominion Railway Commission will recommend to Parliament the construction of new terminal facilities at Halifax, to cost between one million and a half and two million dollars. The project advanced contemplates the removal of the present wooden wharves and their replacement by concrete structures. In carrying out the work, the plans prepared by Mr. Kennedy, Engineer of Montreal Harbor, will likely be followed, with such minor modifications as may be necessary to comply with local requirements.

A SECURE BOND between the upper or wearing surface of a concrete floor, walk or pavement and the lower or foundation layer, can be obtained, says an exchange, when laying the lower layer, by scoring its upper surface crosswise and longitudinally, to form grooved squares, with diagonals or V-shaped depressions across them. Over this surface lay a coarse-mesh woven wire, and on top of this the top layer or wearing surface. The intention of this construction is to hold the two layers together and to prevent the cracking of the top layer by excess of expansion in it over that in the lower layer.

A NOTICE OF MOTION of the intention of the Quebec Government to erect a statue in memory of King Edward VII., was recently given in the Provincial Legislature by the Hon. Mr. Taschereau, Minister of Public Works. The site selected is the historic Plains of Abraham, and as soon as the required legislation has been adopted, the Government will ask a number of prominent sculptors to submit designs for a monument that will both serve as a fitting tribute of respect to His late Majesty, and reflect credit on the province by whom it was erected. The monument will be presented to the Battlefields Commission, who will have charge of its instalation and the unveiling ceremony.

CANADIAN FIRMS intending to participate in the Third Triennial Exhibition of Electrical Engineering and Machinery, to be held at Olympia, London, from September 23 to October 21, should lose no time in securing space, as a large portion of the ground floor and galleries has already been engaged. Although promoted solely by the National Electrical Manufacturers Association, of England, this event is to be international in character, and a large number of American and Continental firms are arranging to make displays. An interesting feature in connection with the exhibition is the fact that all exhibiting firms will participate in the profits, if any, arising from the exhibition, although their liability is limited to their space rental, which is advertised not to be in excess of those of any similar exhibition. The fact that this event will take place in the coronation year, it is urged, is also strongly in its favor, as there will be a large number of colonial buyers visiting in London, who will embrace the opportunity of visiting such an important undertaking, in which many of them will be keenly interested.

THE GREATEST POWER SCHEME yet attempted in India, is now being carried out at Lonavola, Tatas, where the Hydro-Electric Power Supply Company is damming the valleys in the Ghauts for the storage of water power convertible into electric energy. The foundation stone for this important work was laid by the Governor, Sir George Clark, on February 8th just passed. The dams will be 8,900 feet in length and from 32 to 70 feet in height, creating lakes 2,521 acres in extent, with a capacity of 3,000,000,000 cubic feet, with a fall of 1,730 feet. The estimated output, 40,000 horse-power, will be transmitted to Bombay, 43 miles away. The cotton mills will be the chief consumer.

THERE IS A PREVALENT IMPRESSION and it is not confined to those who are ignorant of history, says a writer in the *Literary Guide*, that Gothic architecture is a style essentially sacred and ecclesiastical. The term "Christian architecture" has been applied to it in text-books of authority, while in common parlance even "Church architecture" may every now and then be heard of. The idea is, however, nothing but a curious illusion, due really to the destruction of so much of the secular and preservation of so much of the sacred work of the Gothic period. During that period nobody in Western Europe ever dreamt of building in any other style, whatever the purpose he might have in hand. The art was the natural product of the time, so natural indeed that mediæval writers scarcely ever mention it. No mediæval, it is safe to say, ever thought of it as in any way either Christian or ecclesiastical. Westminster Hall is as much a Gothic building as Westminster Abbey; the great "Cloth Halls" of the Netherlands are very fine Gothic indeed; and every mediæval castle is merely an adaptation of the same style to military purposes. Domestic architecture was for the most part in wood, especially in England; but where stone was used the well-known Gothic features (less conspicuous, naturally, in wood-work) made their appearance at once. The street-fronts of Munster, for example, are "pointed" arcades; and in the wonderful mediæval survival of Rothenburg, where practically the whole town is Gothic, the illusion vanishes altogether. What the Church really did was to give the art an opportunity; to provide, in the greater cathedral and abbey churches, a field for the development, on a magnificent scale, of the marvellous possibilities locked up within it. This it did, and did right royally.

SOME FAILURES, ETC.—Cont'd from page 53

sees that the forms are cleaned before the concrete is poured, that the ingredients are correctly proportioned, that the steel is properly placed and in correct amount, that the members are of dimensions called for by the plans, and that the forms are not removed until the material has acquired sufficient strength to be self-sustaining. The capable inspector is essential to safe construction.

Cast Stone Statuary—Showing Four Interesting Examples of the Use of Cement in the Production of Figure Work.

THE APPLICATION OF CEMENT TO CAST FIGURE WORK

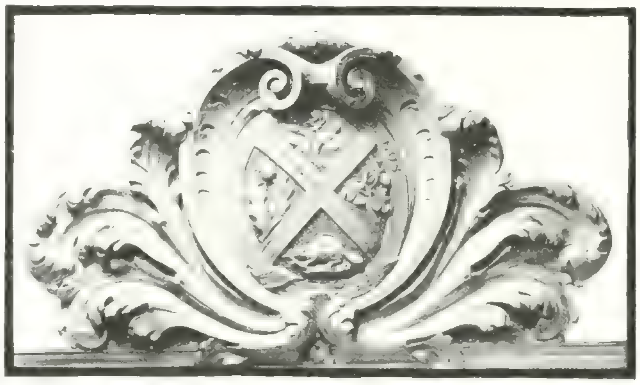
Marvellous examples of its use in modern work reveals the unlimited possibilities of the material in the field of decorative art. Specific instances of its application illustrated.

SIMULTANEOUSLY with the extending utility of cement in structural undertakings, is to be noted the remarkable use of this material for decorative work. While it is true that up to a period of fifteen years ago, the opportunities which cement offers for the reproduction of decorative detail and objects of fine art, were practically unrecognized, from that time on its possibilities in this respect have been sufficiently exploited as to admit of no doubt as to the fitness and value of this material for artistic and enduring effects. Little perhaps did Joseph Monier, the Frenchman, realize, when some forty years back he fashioned a flower pot of reinforced concrete, the broad acceptance which was to follow in the use of concrete as a medium of artistic expression. That Monier's experiment was primarily an investigation to ascertain the structural efficiency of two combining materials rather than an attempt at decorative art, seems patent from the fact that for some little time immediately following attention was particularly given to exploiting the utilitarian advantages of concrete, almost to the exclusion of what it might offer from an æsthetic standpoint. This, however, in itself is a condition which has always obtained with every new and untried product; for while concrete cannot be regarded as new and untried in the sense that its qualities were previously unknown, it must be remembered that for a considerable lapse of time its utlity was virtually classed among the sciences lost.

Italy, where concrete was first adapted to practical utilitarian and practical decorative purposes,

Concrete Garden Seat.

presents undoubtedly the best examples of early work. From the structural elements of aqueducts, and of domestic and civic buildings, culminating in the Pantheon at Rome, to the balustrades, the fountains, and the statues, for their enrichment, the adaptation—to quote an authority—has been perfectly made. A notable example is the celebrated fountain of the Villa Lante, at Viterbo, with its central figures and elaborate system of minor cascades and canals. For some time this was generally thought to be some other material, but is now definitely known to be of concrete, only that with time and some chemical property in the water, it has become smooth, hard and black, like the pietra nera in the mountains near by.



Municipal Coat-of-Arms—Executed in Concrete for the New Public Baths, Montreal.

Marvellous and interesting, however, as this early work is, it is doubtful, providing we wave our ancient prejudices aside, if it is any more alluring in its general attractiveness, or more assertive of artistic competency, than much of the modern decorative work to be seen either on this continent or in other European countries. This, indeed, more than

Cement Cast Replica—Coat-of-Arms of the Bank of Montreal Note the Workmanship and Texture of the Material.

Coat of Arms—Another Example of the Use of Cement Stone in Decorative Work.

any other time, is a period of renaissance as far as the artistic use of concrete is concerned. In the peristyles and pergolas of the formal garden, in the richly wrought detail of the stately home, in the massive entablature and carefully molded cartouche of the public, semi-public and commercial building, in the undercut tracery of the Gothic window, in the trimming and doorway of the factory, in the ornamental street lamp and the statue and band stand of the city square, the application of concrete to artistic ends unfolds itself in a manner which suggests a field of seemingly illimitable possibilities. To-day the architect specifies cement cast stone in his most important work, and the landscape artist adopts it for his finest gardens. The most expert modellers are engaged in its manufacture, in faithfully reproducing detail by its use, according to architectural or decorative requirements. And yet, by no means does its limitations end here.

Lawn Table in Concrete.

One of the most striking, as well as one of the most unique and interesting examples of the application of cement to cast figure work, is to be seen at the famous animal park of Carl Hagenback, at Stelligen, Germany, where a series of wonderful and strikingly realistic representations of the great monsters that inhabited this earth in the remote past, are reproduced in this material. These weird beasts of prehistoric days were executed by Mr. J. Pallenburg, the well-known Continental animal sculptor,

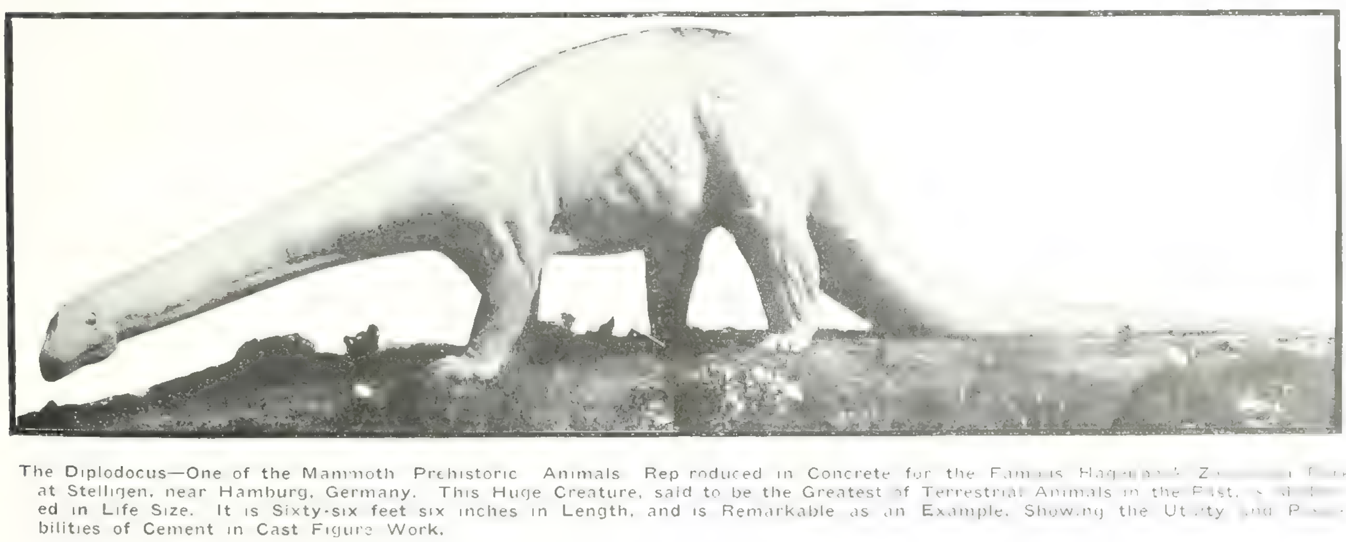
A Richly Detailed Cast Stone Garden Piece.

and are modelled with a truly remarkable life-like fidelity. They are grouped around a delightful little lake, some three acres in extent, and are depicted standing by the water's edge amid the shrubs and trees. In the lake itself are shown huge crocodiles and strange-looking creatures, half fish and half mammal. Added realism is given by representing a few of the beasts in the act of battling with specimens of their kind.

Cast Stone Group Produced by the Brommsgrove Guild, Worcestershire, England.

In order that his representations would be scientifically correct, Mr. Pallenburg spent twelve months in consulting leading naturalists and in making exten-

Ornamental Vases Cast in Cement at the Studio of the Brommsgrove Guild.



The Diplodocus—One of the Mammoth Prehistoric Animals Reproduced in Concrete for the Famous Hagenback's Zoological Park at Stelligen, near Hamburg, Germany. This Huge Creature, said to be the Greatest of Terrestrial Animals in the Past, is Modelled in Life Size. It is Sixty-six feet six inches in Length, and is Remarkable as an Example, Showing the Utility and Possibilities of Cement in Cast Figure Work.

sive drawings and sketches of the most authentic specimens to be found in the leading museums of

A Glimpse of the Landscape in the Hagenback Animal Park at Stelligen, Showing a Group of Cement Cast Prehistoric Beasts About the Water's Edge.

Europe. Valuable assistance was also procured from the American Museum of Natural History in New York. Preparatory to carrying out the actual work, models were built in clay, and these were passed upon by experts and re-made as often as

The Triceratops at the Hagenback Park. These Strange Amphibians Take on Quite a Natural Appearance, both Owing to Their Setting and Elephant-Gray Hue of the Concrete of which They are Composed.

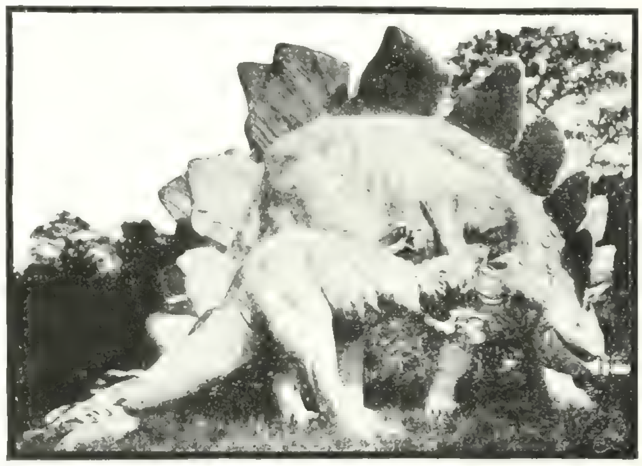
required to arrive at accurate dimensions, before the molds were finally made.

The several views included in the accompanying illustrations give a comprehensive idea of this novel undertaking and how successfully the work has been accomplished. Aside from the unusual conception it represents, it has a picturesque quality and an enduring educational value that entitles it to a place of distinction among unique works in which the use

The [illegible] —Another Huge Monster of the Past, Which is Realistically Reproduced in Concrete at the Hagenback Park.

A Carnivorous Dinosaur Cast in Cement and Forty-eight Feet long, which is also Included in the Hagenback Collection.

of cement is found. Many years hence, these huge man-made rock monsters will be standing, still defying the hand of time, a tribute to their author's skill



The Stegosaurus, an Ungainly Creature with Double Spine Plates and Spiked Tails, Whose Present Day Life-like Representation is due to the Economical Advantages which Concrete Offers for Cast Figure Work.

and an unassailable proof of the lasting and artistic qualities of a material on which the average person a few years back looked askance.

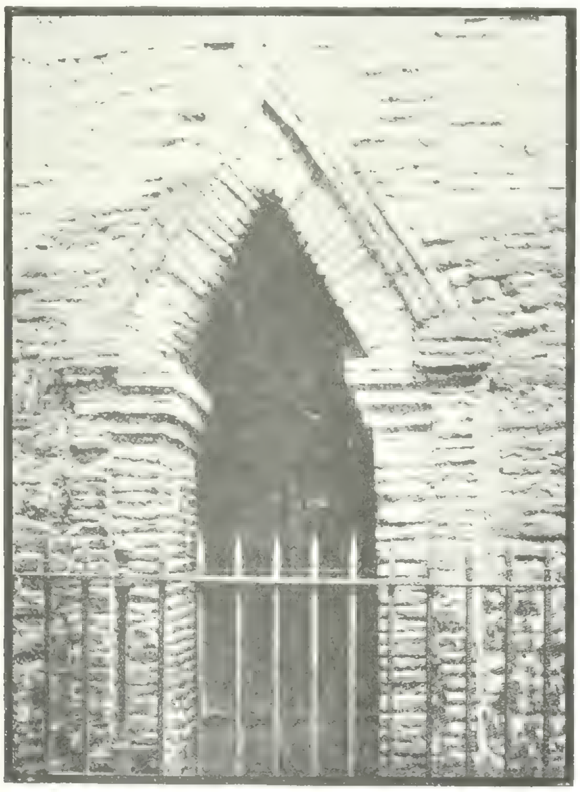
A Prehistoric Bat Modelled in Concrete.

DEVELOPMENT OF ENGLISH BRICKWORK

Complete text of interesting and instructive paper read before a recent meeting of the British Institute of Builders by H. Franklyn Murrell, A.R.I.B.A.

THE NAME BRICKWORK immediately suggests to the younger of us, perhaps, Board of Education examinations and terrifying questions of bond, to the much competing contractor prices per rod, to the sorely tried architect, "What can I get off my brickwork bill?" for a reduction estimate.

Rather than these all-important questions I would call your attention to some of the beautiful works

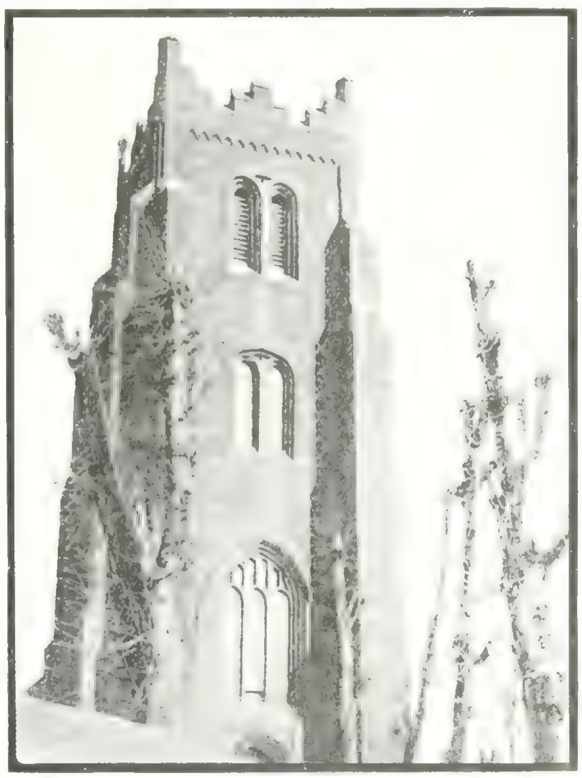


Doorway of Holy Trinity, Colchester, Showing Roman Brick Masonry of an Early Period.

which have been executed in this material in the past, as illustrating its possibilities for architectural design. It is hardly necessary to remark the very early use of bricks, both burnt and sun-dried, as building material. "And they said one to another, 'Go to, let us make bricks and burn them thoroughly.' And they had bricks for stone and slime had they for mortar." So we may claim Babel as the first big brickwork contract, and Shinar Plain as the first paying brickfield.

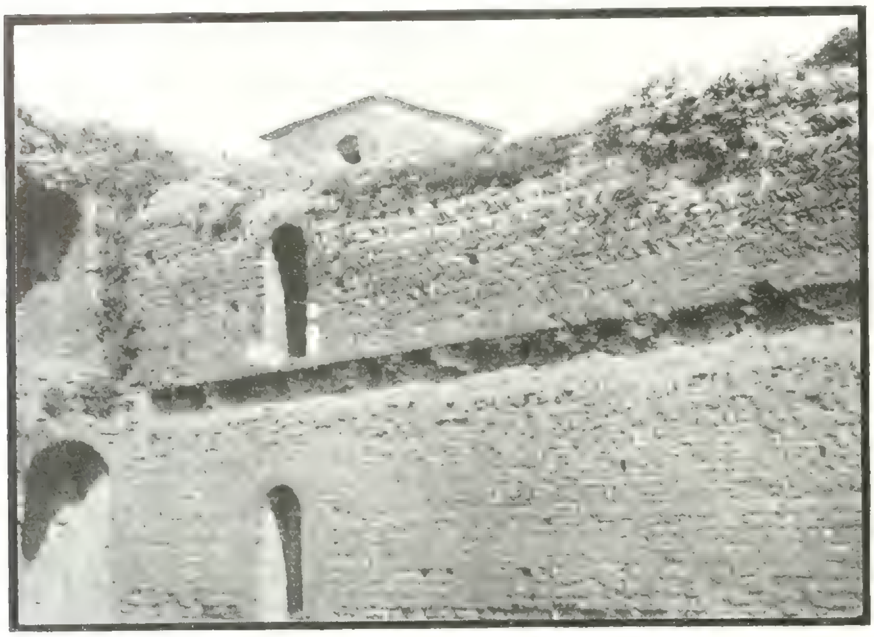
But here it must be admitted that brick for stone has been the continuing truth; men have preferably built in stone, turning to brick generally only in the absence of the finer material. Apart from Santa Sophia I can think of no great historic building of the first order faced in brick. Yet behind the scenes in the dome of the Pantheon and the cone of St. Paul's it is doing its own structural work essential to the stability of these Titans. It is evident that it is naturally suited to an arcuated rather than a trabeated style of architecture. Greek ingenuity could hardly have constructed the architrave of the Parthenon in brick; for brickwork have been reserved triumphs of a more domestic order.

In all countries the natural sequence has been that hill-dwelling peoples with quarries at their doors have built in stone; migrating to the rich clay valleys they have reserved their stone—scarce by reason of expensive transport—for their more monumental buildings, finding in brick a cheap and ready sub-



Tower of St. Mary the Virgin, Ingatestone, Essex, Which is Noted for the Remarkably Fine Pattern Work of its Walls and its Four-light West Window with Brick Tracery.

stitute to meet the needs of their growing commercialism. Stone sings the romance of the hills, brick speaks of the prose of the plain, even to the latest stone-fronted, brick-backed chapel, a compromise of God and mammon. On the other hand, brick has this advantage, that harmonies and contrasts of color can be effected in yellow, red, purple and black, to mention merely the natural colors to which clay may be burnt, to rival the possibilities of marble itself.



Courtyard, Colchester Castle, Showing Interesting Herring-Bone Bond in Roman Brick Wall Built About the Year 1073.

Brickwork has proved itself particularly adapted to the lowlands of this country with their excellent brick earth, abundance of fuel for burning, and sympathetic landscape. I have attempted to show on the map that in England it is possible to draw a geographical brick line diagonally from Somerset to Northants, following the line of the oolite beds as the demarcation north and west of which stone predominates, particularly in historical and monumental architecture, south and east of which brick is the dominant material.

To many of us it is a matter for profound gratitude that London comes in the latter division. Edinburgh in spite of Princes street, Aberdeen in spite of Union street, Oxford in spite of High street, tend to show that the stone city, unless town-planned—as Paris—with spaciousness and scale, is in danger of monotony and dull uniformity. Contrast the higgledy-piggledy charm of Cheyne Walk with the sweeping lines of the Crescent at Bath, the one typical of the homeliness of brick, the other illustrating the dignity of stone.

Evidences of Roman brickwork are spread all over the country, but Essex and Kent especially can show hundreds of churches into which Roman bricks have been subsequently built. Without any question the Eastern counties, particularly Essex, are the richest in Tudor examples. The Home counties, Kent, Surrey and Hertford, can also show good work. In Renaissance and later times the Eastern and Southern counties still contain the finest brickwork, but in the west and north brick was also widely used.

Great Snoring Rectory, Norfolk. An Example of Early Brick and Terra Cotta Work.

Roman Brickwork.

A word first as to Roman brickwork in general. If England learnt her brickwork from Rome, Rome in turn had learnt the method from Egypt. Brick arches, elliptical, semi-circular, pointed, and even inverted arches in foundations are to be found among Egyptian remains. The Greeks also built brick, though not to the same extent, and much of their sun-dried brick has returned to clay, earth-to-earth fashion. Of Greek terra-cotta ornament much fine work is stored in museums. In Roman work brick was usually only a facing to concrete in arch and vault construction; brick ribs and borders were used to hold the concrete filling while setting, and economise wooden centering as far as possible. Brick burning and building do not appear to have been practised in this country prior to the Roman occupation, although existing remains show that the art of pottery was not unknown.

In pre-Roman times the forests of Britain formed the happy hunting-ground of a sporting people whose building needs and ideals were doubtless satisfied by wattle and daub. On the Roman advent at the end of the first century of our era systemized civilization displaced Celtic disorder. As surely as he fortified his camp and levelled his military road, so surely the Roman introduced the brick-covered construction which, thinking imperially, he had designed for universal service from the Euphrates to the Forth. Roman clay working was not confined to the typical 2-inch flat tile, but included fine terra-cotta work such as may be seen in Colchester Museum.

The elaboration of Roman buildings in Britain may be judged from the fact that they took the trouble to quarry Purbeck and to import Cipollino, Porphyry, and other Italian marbles. It is unlikely that they would neglect their favorite art of brick and terra-cotta work with material ready to hand.

The remains of Roman brickwork here are in no way different from those in other parts of the Empire. There are examples at most of the Southern Chesters of the two methods of employing brick construction —"Structura Cæmenticia," a mass of rubble concrete faced with stones, with bonding courses of two or three flat tile bricks, and "Opus testaceum," in which the facing and arch work of structure is brick.

In the north Roman bricks are less in evidence. The Tyne and Solway wall was entirely of stone, though bricks have been found at Inchtuthill, a Roman station in Perthshire. The most important British Roman brickwork is at Dover, in the Pharos Tower and at St. Mary-in-the-Castle. In the walls of the former are the usual bonding courses of flat tiles, some of which have ledges forming a key.

Portions of the walls and bastions at Colchester still remain. An enormous amount of brick must have been manufactured at this city. The traditional sites of Roman kilns are still visible. The withdrawal of the Roman troops abruptly terminated scientific construction in this country.

Reasonably it might have been expected that a people familiar for 300 years with Roman method, and surrounded in all likelihood with magnificent examples of its success, would have striven to continue, at least for a time, its sane traditions. To the unrest and upheaval consequent upon Roman departure and Saxon arrival may be attributed the failure of post-Roman builders to appreciate the Basilica, the Thermæ, and the villas, other than as yards of ready-made material. With an ignorant vandalism, the Saxons misused their stolen material, often building into their arches tapered Roman voussoir bricks upside down, instances such as occur at Britford, near Salisbury.

Saxon obtuseness is also noticeable at St. Pancras Church, Canterbury, where Roman triangular facing bricks are set with their points upwards. Quite remarkable is the tower of Holy Trinity, Colchester, showing throughout a consistently intelligent use of Roman bricks employed in an essentially Saxon manner. Of especial interest is the west door, with its triangular head and slight imposts.

The Norman.

Norman builders, having acquired a developed masonry with the aid of the fine French building stones, introduced into England a stone tradition for church and castle, to be maintained throughout the ages of Romantic faith. Yet in spite of this general truth there exists quite a group of buildings in which the Norman, given a box of Roman bricks, has put them together with vastly more skill and interest than had his Saxon predecessor.

To briefly examine these buildings, St. Albans Abbey, commenced about 1077, was largely constructed with Roman bricks from Verulam.

Colchester Castle, built about 1078, is largely composed of Roman bricks. The fine herring-bone bond in the courtyard shows how effectively this walling could be constructed in tile.

St. Botolph's Priory, Colchester, shows an ingenious use of Roman bricks in columns, arches and arcading.

We are hardly justified in saying that no bricks were burnt in this country from the time of the Roman evacuation in 420 till 1260, the date of Lttle Wenham Hall, Essex, but brickmaking as an industry and brick-building as an art certainly did not exist during that period. Shortage of quantity or inferiority of quality was met by Norman preference by the importation of stone from Caen. But during this period great things were being done in brick in Southern Europe.

Byzantine architecture depended almost entirely for its external effects on brickwork, treated broadly with strongly marked bands of color, whilst the Gothic architecture of Northern Italy is remarkable for the beauty of pattern and richness of color of its brickwork and terra cotta. But if the palmer from the East or the pilgrim from Rome brought back accounts of these brick glories in Asia Minor and Northern Italy, his tale fired the soul of no great brick builder in this country. It is evident that the first cause for the re-use of brick was the growing scarcity, not only of stone, but of timber. The constant destruction of timber buildings by fire must have been a contributory cause to the introduction of a more resisting material. This movement naturally manifested itself first in the Eastern counties and in work of a domestic character.

Little Wenham Hall, Suffolk, built about the year 1260, has long been considered the earliest remaining record of this movement. Here bricks averaging 9¾x4¾x2¼ inches, now dull in color, are mixed with stone and flint in the general walling.

The little chapel of St. Nicholas, Coggeshall, is a most important link in brick history. In plan a simple rectangle, this church must have been constructed not later than the end of the thirteenth century.

A very remarkable development took place in the neighborhood of Hull late in the fourteenth century. It is evident that this brick fashion was imported to this seaport town from the Low Countries, where many early churches are found in brick. According to Leland, in the time of Richard II. Hull seems to have been a completely brick-built town:

"And yn his Tyme the Towne was wonderfully augmented for building, and was enclosed with Diches and the Waul begon and yn continuance ended and made all of Brike, as most part of the Houses of the Towne at that Tyme was."

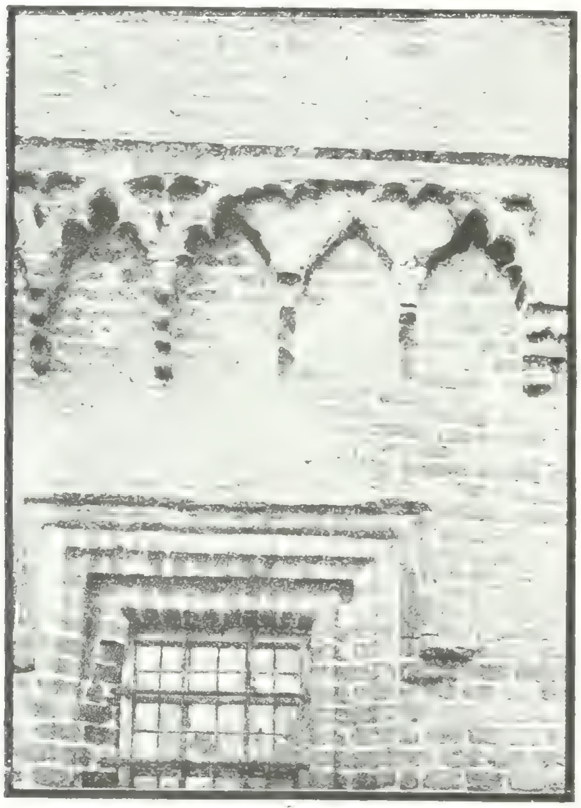
The curious fact appears to be that Bishop Lyttleton saw bricks lying in a trench, having fallen from early stone walls to which they had been applied.

In many churches in the neighborhood of Hull brick facing was used for the general walling. Brick-makers of to-day need not complain of the low price of bricks, for those used for King's Hall, Cambridge, in the reign of Edward III., cost 6s. per 1,000, while in the times of Richard II. and Henry IV. and V. they varied from 5s. 7¾d. to 6s. 8d. per 1,000. But then bricks varied greatly in size. Those used in the Priory at Ely in the reign of Edward II. were 12x6x3 inches; in many fifteenth century buildings in Norfolk and Suffolk those employed are 9x4½x1½ inches.

Church Work, 1400-1500.

Although throughout the Eastern and Southern counties churches may be found with brick walls and facings of fifteenth century date, it was in Essex and Suffolk that brick church architecture mainly developed.

In Norfolk and Suffolk churches brick was often employed as a backing to stone walls; it has been



Brick Corbelling, Rye House, Herts.

suggested that the round towers of these counties were so planned to economize stone. But even in Essex brick features are rare in sacred buildings and are limited to a few towers, porches and arcades. There appears also in England a fatal lack of confidence in this material. This is well illustrated in the porch of Bures St. Mary, Suffolk.

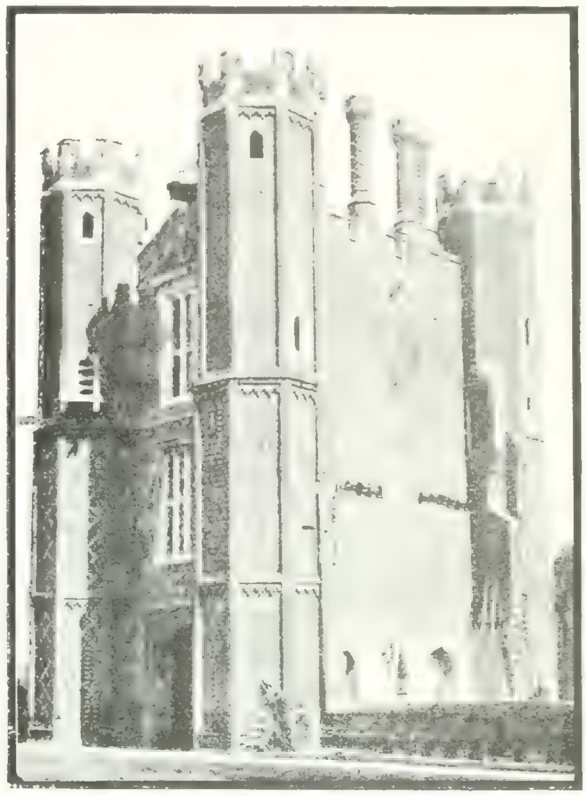
The porch at Sandon is completely brick—arches, tracery, parapet and vaulting.

Towers.

The same church possesses one of the finest brick towers in the country, with magnificent crosses in vitrified headers; over the belfry is a curious brick dome.

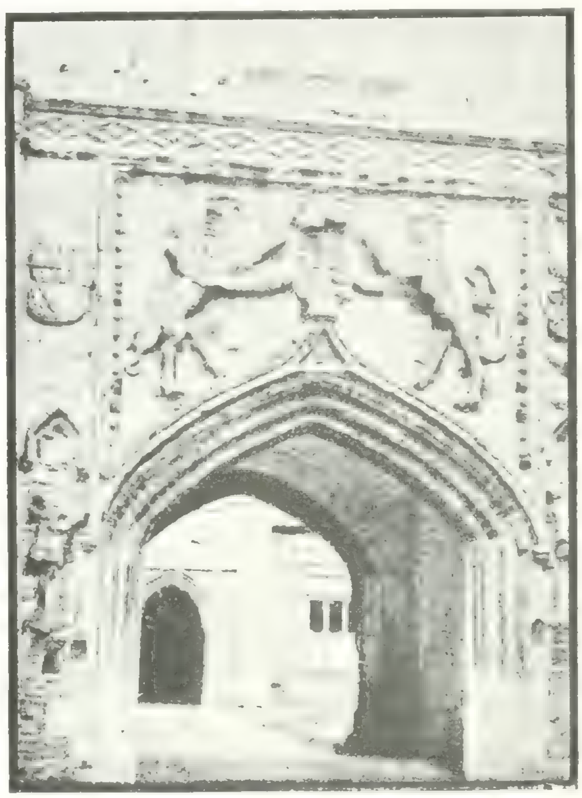
An equally imposing brick tower is that of St. Mary the Virgin, Ingatestone, again with fine crosses and four-light west window with brick tracery.

Very similar is the tower of the neighboring church



Little Leigh Priory, Essex. Built by the Solicitor-General of Henry VIII.

of Fryering; all have winding stairs in brick. Yet another type of tower is that of Chignal Smealey. This church carries the brick idea as far as any



Welterton Manor House, East Barsham, Norfolk.

village church in England. Even to the font and piscina the complete church is brick.

Ingatestone has also its brick arcade in the chancel. Great Baddow has a remarkable clerestory with elaborate tracery, brick even to the cuspings and featherings.

Tudor: General.

Although the use of brick in church building was thus fragmentary and incidental, in house work its possibilities were grasped and a style developed, the most typical of English domestic methods. In cottages and smaller houses brick was early discovered to be suitable filling for half-timber framing. This brick nogging, as abroad, developed great interest and intricacy, as in a street front at Coggeshall, Essex. Natural enrichment by diaper patterns is an essential feature of Tudor brickwork. Originating in the accidental effects of vitrified headers, its decorative value was soon appreciated. Depending necessarily upon bond, the simplest form of diaper is formed by the dark headers of English or Flemish bond.

Regularity of pattern seems less sought after than richness of effect. The diapers particularly on octagonal towers are often unsymmetrical, diagonals beginning and ending with the abruptness of forked lightning. Some remarkably fine pattern work may be seen at the Old Bishop's Palace, Hatfield. In most Tudor work door and window openings were finished in stone, but in the rarer examples with brick mullions, transoms and heads considerable constructional skill is visible.

The square-headed window and straight transom seem to have been a difficulty to be solved by the use of flat arches with radiating voussoirs, a trick to become in Georgian times the motif of a style. Of brick oriel windows few remain, though it might have been expected that its corbelling facilities would have encouraged this treatment. Rye House, Herts, has fine two-light oriels.

Brick Corbelling.

Brick corbelling is a marked feature of the style with a wide range of treatment. Suggested, doubtless, by the machicolated parapets of castellated architecture, it was effectively employed in early chitecture, it was effectively employed in early brickwork. All the great gateways have brick corbelling, as at Hadleigh, Suffolk, suitably marking its stages. It retained its Gothic flavor, well into the fifteenth century, as at Layer Marney, though finest in such early works as Rye House.

Chimneys.

The emphasis and interest given to chimneys make them the most characteristic feature of the style. The mere idea of a chimney at all was a new thought to the early Tudor architect, accustomed to let the smoke curl up and blacken the rafters of his Gothic hall. It is notable that in many completely stone buildings fireplace flues and chimneys were carried up throughout in brick, evidencing that at an early date its fire-resisting qualities were appreciated.

Early chimneys were essentially Gothic in their fantastic skyline; later their detail was elaborated with pattern and moulding. Gothic tradition was long retained in battlemented chimney caps and projecting angles on octagonal shafts reminiscent of gargoyles. With the death of Henry VIII, the elaboration of chimneys ceased. The Elizabethan chimney has a straight stalk and oversailing cap of thin bricks.

The brick newel stairs of the period form an interesting study. They are mainly associated with the early defensive houses, before the prominence given to the upper floors in Elizabeth's time demanded a more spacious stairway. In vaulting under the winding brick treads great constructional ingenuity is shown.

Briefly let us look at some of the famous Tudor mansions in chronological order.

Eton College, partly commenced about 1440, faced in brick with diaper patterns, has very fine chimneys. Its bricks were supplied from a kiln at Slough, still a brick-making district, as shown by the record. "100,000 brike at 10*d*. the thousand, laying by Comanmet of the Erle of Suffolk." Whether the 10*d*. a thousand refers to the price of bricks or the cost of laying, it is equally a startling figure.

Nether Hall, Essex, is near Rye House, Herts, the scene of the "horrid conspiracy." In both cases only the gatehouses remain, but it is evident that in quality this work was never exceeded by the best builders of East Anglia. The construction of the great moulded brick arches at Nether Hall, spanning from turret to turret, is in fine contrast to the trefoil corbelling.

Almost with the turn of the century a new movement was manifested. With the reigns of Henry VII. and Henry VIII., characterized by great domestic building activity, the new Renaissance note, foreign in tone, was struck in all the more famous mansions. With brick architecture approaching its climax foreign influences became more felt, and a new material demanded more in harmony with the brick walling than stone. Hence a new development in English clay art, the introduction of terra-cotta, a material suited by its repetitive richness to the age of the Field of the Cloth of Gold.

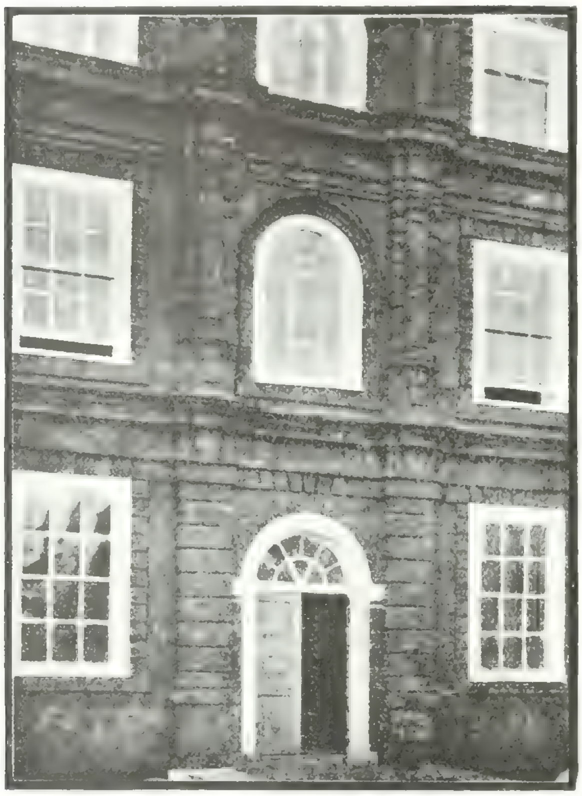
Wolterton Manor House, East Barsham, Norfolk, is in many ways the most remarkable brick house now standing. The general building is of the Henry VII. period; the gate-house appears to have been erected in that of Henry VIII. A panel here, or head there, suggests the Italian terra-cotta worker, but the general architecture is pure Tudor Gothic. Chimneys and turrets, parapets and strings blaze with brick heraldry; yet even here, with brick and terra-cotta triumphant, a suspicion, possibly as to their durability, induced the use of stone for the inner gateway and in the jambs of the gatehouse arch. The magnificent pageantry of this arch has suffered by the decay of its terra cotta, apparently burnt solid to a strong dark red.

Great Snoring Rectory, about a mile from East Barsham, is evidently the work of the same builder, but its terra cotta shows considerably more Italian influence.

Sutton Place, Guildford, one of the great houses of the Henry VIII. period, shows a similar mixture of Tudor and Italian manner in its ornament.

Hampton Court.—The Tudor portions of Hampton Court have fine brick chimneys. Stone is used for most of the architectural features. The terra cotta busts of the "Emperors" were imported from Italy.

Little Leigh's Priory, Essex, is yet another example of the home country mansion of this amazing period built by the Solicitor-General of Henry VIII. Again we have the same arrangement, the fine L-planned portion and the magnificent detached gatehouse.



Kew Palace. Sometimes Designated "The Dutch House" because of its Flemish Bond Which is One of the Early Examples of this Character of Brickwork in England.

With the advent of Elizabeth a distinct change becomes noticeable in the building fashion; brick, though used more widely than in the previous reigns, loses its interest and elaboration for a time with the advance of the Renaissance. This is evident in all the great mansions of the period in every part of the country.

Hatfield House, Hertfordshire; Bramshill, Hampshire, Burton Agnes, Yorkshire; Aston Hall, Warwickshire, and many of the Cambridge colleges are faced in bricks, with stone for all ornamental portions, the chimney alone showing an architectural use of brick.

With the development of the Jacobean style brick is again more in evidence, but showing frequently considerable Dutch influence.

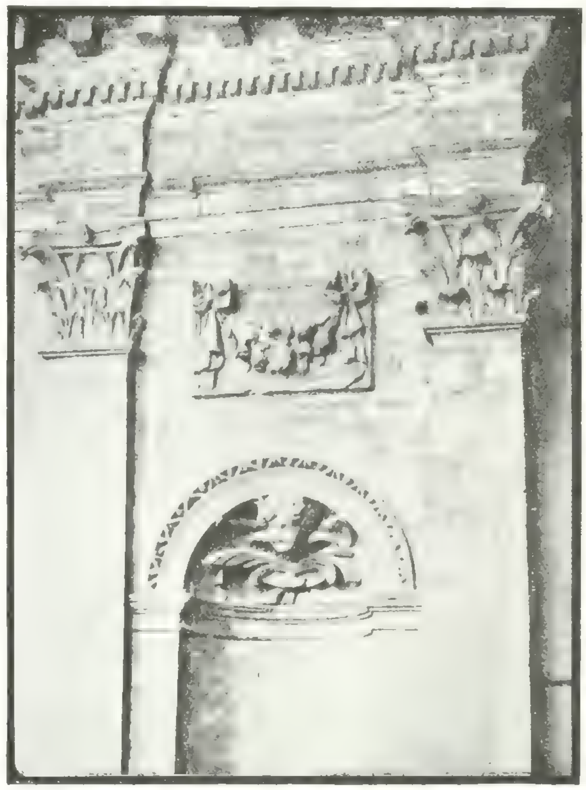
Flemish bond, a term so familiar that we have lost its alien significance, is to be seen for the first time. Kew Palace, sometimes called "The Dutch House," is a good illustration. Its window with projecting architraves of 2-inch rubbers have every third course sunk as a rustication. Some of the columns and caps of the central order are of terra-cotta; the cornices are covered with tiles—always an early indication.

The Grammar School at Rye is another good example, showing the picturesque crude Dutch manner.

All up to the East Coast this Flemish flavor may be detected, especially at such likely places as Lynn and Great Yarmouth. The free use of stepped and double-curved gables in Norfolk and Suffolk may also be traced to the Low Countries. The tumbling-in of gables is also a great feature of these counties.

Renaissance: General.

On the Continent, apart from Holland and Germany, a few Italian palaces and French chateaux, brick was not greatly in evidence during the Renaissance. Perhaps the key to Renaissance brickwork in this country was the flat rubbed brick arch. Without this, stone lintels must have been introduced for sash windows, and the architectural features of doors and windows have fallen into stone to a very much larger extent.



Detail of Brickwork, House at Enfield.

In brick, as in stone, the orders formed the great decorative resource of Renaissance architects. The small super-imposed orders of the Jameses were replaced by the one large order, in brickwork, usually Doric. Heavy Classic cornices were built up of $2\frac{1}{2}$-inch bricks, often with dentils and modillions, tiles being used in early work for the smaller fillet. Effective strings were formed of three or four courses of brick slightly projected. Architectural embellishments have their bricks rubbed to a very fine joint. Fine work, such as Ionic capitals, were made one homogeneous block by the use of a resinous substance, making the joint almost invisible. The natural diaper of vitrified headers is very noticeable, in some districts giving almost the impression of a glazed brick. To this variety of texture was added the interest of broken color. The contrast gained by employing yellow stock or purple for backgrounds. bonding with reds for windows and groins, once realized became general. Inigo Jones, as his master Palladio, was by no means averse to brick, though using it little in his more important works. In Raynham Hall, Chilham Castle and Stoke Park he used it for facing. St. Paul's, Covent Garden, was probably the first use of brick in Renaissance church building proper.

West Woodhay Manor House, an apparently authentic design of Inigo Jones, is the first instance of the typical Renaissance brick house. The old houses in Great Queen Street are of the Inigo Jones period; the combination of the window heads with the aprons of the windows above are suggestive of Pendell House, Bletchingley.

The characteristic strength and decision, the unerring sense of the fitness of things natural to Christopher Wren we find evident in his use of brick. For church work he preferred stone, using brick for constructional portions, and occasionally for economy, as at St. James's, Piccadilly, and the side portions of Bow Church. In domestic work he used it indiscriminately, now for terrace houses on Clapham Common, now for Kensington Palace. Wren's masterly use of color, with the remarkable quality of his brickwork, are the reason of his success even with such simple elements as seen in Kensington Palace and Chelsea Hospital.

Christ's Hospital, designed in 1672, retained its color in the heart of the city for more than 200 years.

The Bluecoat School, Westminster, is an almost perfect study in the proper treatment of brickwork.

The famous Banqueting Hall at Kensington Palace indicates an equally fine sympathy with brickwork, with a clear appreciation of its limitation. All carving, coping and sills are stone, while protected portions like the heads of niches are beautifully formed in brick.

At Hampton Court, Wren uses his color broadly. An ordinary dull red on the ground floor contrasts with the bright red of gauged brick above.

The brick style initiated by Inigo Jones and popularized by Wren became the vernacular for the whole of the eighteenth century. For Queen Anne and Georgian alike, brick was the medium in which were expressed the comfort and dignity of the English country house.

In town houses, as those in High Street, Hertford, the orders are more apparent; in the latter examples cornices and projections are covered in lead.

Windows are frequently framed with moulded brick architraves. There is a house in the Hight Street, Farnham, with heavy brick architraves much like a picture-frame round its windows.

The finest example of the times remaining in London are Nos. 42, 43, 44 St. Martin's Lane. In No. 43 the Roman Doric order is rendered completely in brick, from the fluted pilasters to the guttæ on the soffit of the cornice. No. 44 has a correct Ionic cornice with modillions.

The centre pediment from a house at Enfield now preserved in South Kensington Museum marks the climax of Renaissance art in brickwork. The example is eloquent, not only of the possibilities of carved brick, but also of the limitations of the material. If the gash of a joint line across love's cheek was originally healed with resin, the wound has been opened with subsequent movings.

1750 to 1800.

The climax of Renaissance brickwork was followed by a decline, hastened by the general introduction of stucco late in the eighteenth century. This militated, as always, not only against the artistic value of brickwork, but also against its constructional quality. Many of the bulging fronts and rocking party walls which cause our district surveyors sleepless nights may be attributed to the careless brickwork of the age of Nash. The introduction of Suffolk bricks served by their lack of color only to increase the architectural dulness with which the century closed.

The brilliant work of the past century in every sphere of interest is unquestionable; in architecture it was a period of brilliant revivals. To think of these, the Gothic, the Queen Anne, the Georgian, and if you will, the Byzantine, is to recall to the mind pictures mainly of brick buildings. Although a period of unequalled prosperity, it was yet a period of necessarily cheap building, hence brick; but certainly this was no hardship to the Victorian architect.

Pugin doubtless led the way by the inclusion in his "Examples" of the Tudor works at Oxborough, East Barsham, and Great Snoring, stimulating a movement which was to provide almost every parish in the country with its pseudo-Gothic church, parsonage, or schoolhouse, usually brick.

Among other leaders in this Gothic crusade were Butterfield with his pioneering work at All Saints', Margaret Street; Nesfield, with his lodges in Regent's Park; and Street with his literary research in Northern Italy and practical work in a score of churches. Apart from this introduction of native methods of brickwork in the past and present centuries, a considerable group of buildings exist in which foreign styles have been successfully naturalized in local material; Christ Church, Streatham Hill, is a fine example in yellow stocks. The Westminster Roman Catholic Cathedral, though suggesting to the lay mind a religious power station, to the architect is a successful example of a building of the first importance in brick.

In domestic work, Mr. Norman Shaw's domestic treatment of brick has induced a thousand weaker brethren to cover our town and country-side with Queen Anne and Georgian efforts. The scientific development of brickmaking, though increasing the commercial usefulness of bricks, has not equally improved their artistic quality. It has yet to be proved that pressed facings, though included in some Government specifications, will weather as perfectly as have the rubbed bricks of Wren's Banqueting Hall; the possibilities of glazed brick seem first to have been attempted by Butterfield, as in the interior of "All Saints," but in spite of many other interesting essays their architectural use must be admitted to be still in the experimental stage. In conclusion, it is evident that in the past the development of English brickwork has been advanced by alternating periods of use and disuse, of revival and decline, rather than by steady continuous progress;

That it has attained its present position of general usefulness by a ready adaptability to the complex building requirements of English civilization;

That in the future, whatever method of construction may determine the course of urban architecture, brick is likely to remain the building material most suited to express the amenities of English country life.

CONCRETE BUILDING BLOCKS

By ROBT. F. HAVLIK, M.E

A paper read before the third annual convention of the C.C.C.A., dealing with the manufacture and curing of concrete blocks and their adaptability in building construction.

IN SPEAKING of concrete blocks I am touching upon a subject which has been hatched and rehatched many times over, and yet in spite of all that has been said, we are learning so much more each year in the way of new methods of making concrete products that we wonder how we could begin to have been satisfied with the old methods which in the light of the present day appear so crude. I well remember the crude looking blocks exhibited at the Chicago Cement Show in Dec., of 1906. Water, when poured on same was absorbed instantly. Today as we inspect the products exhibited at our various shows we see an entirely different material, one that is dense, hard and waterproof. Five years ago the so-called concrete blocks were used in cheap buildings only, in foundations and underground. Only cast stone was considered for work where a cut stone effect was desired. A gradual change has taken place since then, however, and the molded concrete block is now being used in some of the finest buildings. Cast stone is no longer as popular as it was then, not because it is not as good as the molded concrete block, but because the block can now be made as good as cast stone at a much lower cost, and since cost is always a prime consideration when the quality is the same, the molded concrete block is destined to play an important part in the building operations of the future. The best testimony we have of this is in the magnificent buildings of the Barber Estate, at Barberton, Ohio. These are being built of molded concrete blocks made in standard machines and special wood and gelatine molds. When such men as Mr. Barber, who want a beautiful effect regardless of price, select molded concrete blocks in place of all other materials, there must be a great value in properly made concrete blocks.

The speaker is fully aware of the fact that an immense amount of inferior work has been done in concrete blocks, but mistakes have been made in every new industry, and it is but natural that mistakes were made in the concrete block industry. But we have passed the mere experimental stage of this industry and concrete blocks are now a staple building material and if we continue to improve them in the future as we have done in the last few years, they will soon be in greater demand than any other one building material. Concrete blocks have everything in their favor. They make a house that is cool in summer and warm in winter, their strength increases with age, whereas nearly all other building materials deteriorate with age; they can be made waterproof, and last, but not least, homes built of blocks cost less in the last analysis than frame buildings, because they require no repairs. But for this fact, many a building now being put up of concrete blocks would be built of frame on account of the prohibitive cost of brick or stone. Thus the concrete block is improving the building construction of to-day both in beauty and permanency.

The concrete block is here to stay. The severe criticism to which it has been subjected in the past has resulted in the greatest possible good in that it has forced the block manufacturer to improve his product, and if we continue improving it as much in the future as in the past, we will soon place it beyond the criticisms of its present severest opponent.

We can improve this industry best by paying more attention to the selection of the materials used and the methods employed in the manufacture of the blocks and placing on the market the best product we can make. The cement should be a Portland cement that will pass standard specifications. So much has been said about the proper selection of aggregates for concrete work that I will not burden you with needless repetition any more than necessary. The most common aggregates used in concrete blocks are sand and gravel, although crushed stone is sometimes used in place of gravel, and stone screenings in place of the former. There is considerable objection to both of these, however, especially the latter, on account of the crusher dust that is always present and clings to the stone particles and prevents the cement from properly bonding with same. It has been my experience that gravel and sand produce a denser and better looking concrete. In many localities, however, sand and gravel cannot be had except at prohibitive prices, whereas crushed stone may be very plentiful. In such cases there is no recourse except to use this material. Whatever the materials, the finer, which is usually sand, should be well graded from ¼-inch to 1-50 or 1-100-inch. The coarse material should be well graded from ¼ to ¾ inch, not to exceed 1 inch. The largest aggregate should never be larger than half the thickness of the thinnest wall of the block. Where a pit run of sand and gravel is used the material should range in size from 1-100 inch to ¾ inch. Both fine and coarse aggregate should be free from clay, dirt, or fine dust, as these but tend to decrease the strength of the block. The water should be free from alkalies.

The next important consideration is that of proportion. There are three principal methods in vogue for determining the proper proportions, the "void"

Diagram, Showing Increase in Crushing Strength, due to Increase in Duration of Steam Treatment

method, proportioning by trial mixtures and proportioning by a study of the mechanical analysis of the various aggregates. The first method is universally acknowledged to be little better than a guess and has been discussed so frequently that I will pass it by without further comment.

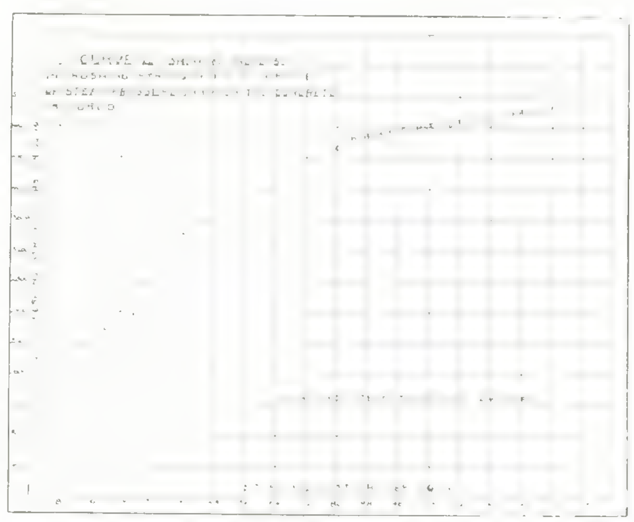
For any given materials which are to be used in their natural state, the second method of proportioning by trial mixtures will be found very satisfactory, but will not show what other changes in the szes of the aggregate could be made. The procedure in this method is very simple. First, get a good scale and rigid cylinder, say a piece of 8-inch or 10-inch pipe, 12 inches long or so. Weigh out and mix together carefully any arbitrary amounts of the cement, sand and gravel to be used, and make the consistency the same as that of the concrete to be used in the blocks. Place this mixture in the pipe, tamping same very carefully in thin layers. When it is in place note the height of same in the pipe. Then weigh out the same amount of cement as before, and the same total weight of sand and gravel, but vary the relative amounts, and repeat the operation, using the same consistency as before. Note the height this mixture occupies in the pipe. That mixture which takes up the least space in the pipe is the best for those materials as they are.

The third method, while a little more difficult for the beginner, when once understood, proves to be the simplest of the three. It permits of the immediate determination of the best combinations of raw materials in their natural state and also how they can be improved upon by adding or screening out certain size aggregates. In 1901 Mr. W. B. Fuller made an extensive series of experiments on the comparative strengths of different proportions of concrete aggregates. All the aggregates used were screened through various sized screens after having been carefully mixed, and the percentages by weight of the materials passing screens of certain meshes were carefully recorded and plotted to curves with the distances on the vertical ordinates representing the percentage by weight passed through screens whose mesh is represented by the distances along the horizontal lines or ordinates. He found that for any given amount of cement the strongest concrete was produced from that combination of aggregates whose mechanical analysis plotted to a curve as above, formed a parabola passing through the zero ordinates and the intersection of the diameter representing the largest stone with the 100 per cent. ordinate. This is discussed in detail in a special chapter by Mr. Fuller, in Thompson & Taylor's treatise on "Concrete, Plain and Reinforced." The percentage by weight of the aggregate smaller than a given size can be easily calculated by the formula for the parabola $d = \frac{p^2 D}{10000}$ or $P = 100 \sqrt{\frac{d}{D}}$ in which P = per cent. of mixture smaller than any given diameter.

d = any given diameter.

D = largest diameter of stone.

From this it will be seen that the per cent. of aggregate smaller than a given diameter, say ½-inch, and larger than a second diameter, say ¼-inch, is obtained by subtracting the percentage smaller than ¼-inch from the percentage smaller than ½-inch. The following table is figured out on this basis and shows the percentage of the various sizes for any given mixture up to 1 inch. Any block maker can



Diagram, Showing Increase in Crushing Strength, due to Increase of Steam Pressure in which the Concrete is Cured.

screen out a sample of his aggregate through standard screens, and carefully determine the percentages of various sized grains present and compare these with the theoretical percentages, and if he finds that he has too much coarse material he can screen out his coarse aggregate and recombine it with the fine in the proper proportions to correspond with the parabolic curve. He can do likewise if he has too much of the fine. This process is called rectifying the aggregates. I am afraid that some are of the opinion that if an aggregate is graded to the parabolic curve that it will produce the strongest concrete with say 12 per cent. cement, and no stronger if 20 per cent. cement be used. This is not true, for the strength will be increased with the increased amount of cement, but for any given amount of cement the strongest concrete will be from that aggregate whose mechanical analysis curve conforms very closely to a parabola. This probably holds true for concrete whose largest stone is ½-inch in diameter or larger. For mortar below number five mesh I think such an aggregate would have too much fine material. I have found the best result with a mixture of very coarse sand and a sand which is quite fine. (See table 1.)

The selection of the aggregates and the proper proportions properly taken care of, the next important consideration is that of properly mixing the concrete. The superiority of machine mixing over hand mixing is an accepted fact, and needs no argument. Mixers should be used by all means and none but power mixers. Hand mixers are man-killers, as anyone will testify who has used one. In choosing a mixer for concrete block work, great care should be taken that it will mix semi-wet concrete, and will handle either dry or damp materials. Every mixer will not do this, neither will every mixer that is satisfactory for a very wet concrete prove equally so for concrete used in blocks. It is an easy matter to mix concrete of the consistency commonly used in monolithic work, but that used in blocks, being drier, is far more difficult to mix.

Facing.

As nearly all concrete blocks are faced, considerable attention should be given this feature in their manufacture. Most blocks are sold on their appearance, so it is essential that the face be very hard and all corners and edges solid. For this reason it is necessary to use richer proportions for the facing than is used in the backing of the blocks. The usual proportions vary from 1½ to 3 parts of aggregate to 1 part of cement. When ordinary sand is used it should be graded from ⅛-inch down to No. 50 mesh, with no material smaller than No. 100 mesh. The proportions can be as low as 1 part of cement to 3 parts of sand. But in white facing, the proportions must be richer, as all available white aggregates are either all one size, as in the case of white sand, or contain too much fine material, as is the case in most crushed white marble. With some white sand and crushed white marble, I obtained very satisfactory results with 3 parts white cement, 2 parts crushed marble and 4 parts white sand.

In colored facing, none but mineral colors should be used. With proper materials and care, it is possible to use as high as 50 per cent. coloring in the proportions of 1 part cement, ½ part color and 1 part aggregate. Dark, deep shades cannot be obtained except with a large percentage of coloring. Colored blocks and brick can be brought to a high polish by grinding. This process exposes the aggregate and produces a very attractive appearance.

A recent innovation is that of the granite facing. This is becoming very popular, and is being used in large cities for public buildings for which the ordinary block would not be considered under any circumstances. The best proportions found for granite facing are 1 part of cement to 2½ parts of granite. The granite should pass a 1⅛-inch screen and be graded to about 1-32-inch. These four facings comprise the principal facings used.

Processes of Manufacture.

A few years ago a subject of considerable discussion amongst machine manufacturers was that of processes of making blocks. Each claimed that his was the only machine in which a wet block could be made and that no other was suitable for that purpose. The facts of the case are that as wet a block can be made on one machine as any other. I find that the limit is reached when the concrete is too wet to bear up its own weight. By this, I mean that beyond a certain consistency the block will settle and instead of being 7¾ inches high it may be 7¼ inches in height. This fact then determines the maximum moisture that can be used in concrete for machine-made products, and will be the same for all makes of machines. It is evident, therefore, that there are but two processes for making concrete products, the poured or cast process, and the molded, or so-called dry process.

In the poured process, the concrete is of such a consistency that it can be poured into moulds which may be of sand, iron, plaster of paris, or gelatine. . . . . In the molded process, the concrete is made as wet as is possible to still permit of molding. It is then tamped or pressed into molds and usually removed immediately. The mold is thus used over and over again. This reduces the cost of the block to a minimum, and enables the block manufacturer to compete with other building materials. Molded concrete is now being made as good as cast stone. This fact, combined with low cost, is bringing the concrete block to the front as one of the best building materials of the day. There has been considerable discussion as to the proper amount of water to use in concrete blocks. Most blocks are used when they are about 28 days old, so it is of the greatest importance to have the blocks as strong as possible at this age. Therefore, the consistency producing the strongest blocks at 28 days is the best. Actual experiments show that blocks which show the highest crushing strength at 28 days are those in which so much water has been used that it will flush to the surface when a pile of concrete is trowelled with a steel trowel or shovel 2 or 3 times. This amounts to from 8 to 10 or 11 per cent. of the total weight of the dry materials. Concrete of this consistency can be used in any block machine. When made wetter the concrete settles and is not as strong. Concrete of this consistency is being used by the largest block plants of the day.

Waterproofing.

Many claim that the block made by the wet process is more waterproof, but I have seen blocks made wet in the molded process which were so waterproof that water would stand on same for a considerable time before being absorbed. Neither process will make concrete absolutely waterproof or nearly so. There are a large number of people who claim that a block with low absorption is all that is needed for practical purposes. This is true to a certain extent, but we must not forget that the average builder who is putting up a fine residence will not consider concrete blocks unless the manufacturer thereof will guarantee them to be absolutely waterproof, or very nearly so, absorbing say not over ½ per cent. of moisture. I have done considerable experimenting, trying to produce such blocks without the use of waterproofing, but have failed to do so. I do not think that it is possible to reduce the absorption below 3 per cent. without the use of a waterproofing. By the use of a waterproofing I have reduced it to 27-100 of 1 per cent., and I think that this absorption was merely due to the surface water on the specimen so that the block itself probably absorbed no water whatever.

It is to be admitted that with proper care and graded materials, concrete blocks can be made reasonably waterproof, but I contend that they are not waterproof enough, in that they retain moisture too long. We are all familiar with the looks of the average concrete block house after a rainstorm. It usually remains dark and damp looking for two or three days, while one that is waterproof dries off in a few hours. Any man would prefer to live in a house that looked as dry a few hours after a rainstorm as before, rather than live in a building that remained a dull slate color for several days, so we should endeavor to turn out blocks that will give these results.

As long as blocks cannot be made as waterproof as this without a waterproofing, I will favor the use of a proper waterproofing. I know well enough that a great number of waterproofings do not produce waterproof concrete, but there are also a number that do.

In testing a waterproofing, full sized blocks should be made with same. Ony such will be a reliable guide. Tests on small cubes are worthless, as such specimens cannot be tamped nearly as thoroughly as a full sized block, and consequently will not be as dense and waterproof. I have often noticed that waterproofing is confused with permeability. A block may be waterproof, and yet be very permeable, and vice versa. Waterproofing refers to the per cent. of water absorbed by a dry specimen compared to the dry weight of same, whereas permeability refers to the amount of water that will pass through the same specimen in a given time, when placed under a pressure of water. It is evident that the concrete block used above grade need not be impermeable, but should be waterproof. A waterproofing may not produce an impermeable block and yet make a waterproof one. In making white face concrete blocks it is absolutely necessary to use waterproofing, as the white aggregates that are most common consist of white sand, which is very fine, and crushed marble or stone, none of which will produce waterproof concrete, the first because it is uniform in size, and the second because it has too much flour.

Even assuming that concrete can be made waterproof with proper materials, the average man cannot get these and must make use of what he has, so it seems to me that the sooner the use of a good waterproofing becomes general, the sooner will concrete building blocks be used to a greater extent and the sooner they will overcome the objections of their present severest critics.

Curing.

When the questions of aggregates, proportions and process of manufacture and waterproofing are settled, the next important consideration is that of curing the product. This feature is oft-times neglected more than any other. The usual procedure is to sprinkle the blocks with water as soon as there is no danger of washing them away. When this is done the bocks should be kept moist constantly for a period of at least two weeks, but preferably four weeks. The temperature should register 600° F., or more, and always be kept above the freezing point. There is no danger in keeping it too high, providing the blocks are kept wet constantly. If they are allowed to dry out, the hardening process is hindered. For this reason, it is customary to keep the blocks under roof for three or four days at least, as it is much easier to keep them moistened under roof than outdoors. This method is extremely simple, so much so that it is surprising how few really apply it fully. Many are doubtless misled by the fact that blocks which are allowed to set until they show signs of drying out, seem harder than those that were sprinkled as soon as they could stand the water. This is true at first, but after a few weeks, the second block will be firmer than the first, and have clean, hard, sharp cut edges.

It is conceded by all who are familiar with the hardening of Portland cement, that it requires both heat and water to properly harden same. It is at once apparent that the ideal method of curing must, therefore, combine both of these features. The only thing that fulfils these conditions is an atmosphere of steam. We find many successful exhaust steam curing plants to-day, but in nearly all of these the temperature is kept below 150° F.

Some five years ago, together with Mr. R J. Wig, after having given this subject careful study, I felt confident that high-pressure saturated steam, which is also at a high temperature, would give the best results. If exhaust steam accelerates the hardening of the cement it is but a step further to assume that high-pressure steam will do so even more rapidly. We put this theory to a thorough test and investigated both the effect on the crushing strength of concrete of variations in the steam pressure and also the duration of the steam treatment. We found that the crushing strength was increased directly with the duration of the steam treatment and also directly with the increase in the steam pressure. Concrete blocks cured in high-pressure steam will be doubled in strength over those cured by sprinkling. This means that in order to get the same strength in the block cured in high-pressure steam, only half the cement need be used. This probably holds true up to the point where the concrete would have so little strength when green on account of lack of cement that it would crumble under its own weight. I do not know for a certainty that blocks can be made of 1 part cement to 8 parts of coarse sand, which, when cured under high-pressure steam will crush at over 2,000 lbs. per square inch or area.

An ordinary block made of 1 part cement and 4 parts sand will crush at about 1,800 lbs. at six months, whereas, the same concrete when cured in high-pressure steam will crush as high as 4,900 lbs. per square inch, thus showing over twice the strength. A 1:8 mixture, cured in high-pressure steam, crushes as high as 2,100 lbs. per square inch, practically as high as the 1:4 air-cured concrete at six months. Since nearly all blocks are used inside of 28 days, we are concerned with their strength at this age. Most building ordinances require a crushing strength of 1,500 lbs. per square inch of net

TABLE I.

This table shows the percentage by weight of any size aggregate required for an ideal mixture, the largest aggregate of which corresponds with one of the sizes given below. For example, if the largest stone is 1" in diam., the % of each of the other sizes is found in column 3. The material smaller than .015" includes the cement. This data is figured by the formula $P=100\sqrt{\frac{d}{D}}$ as explained above.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Diameter of Stone in Inches	% Smaller than Diameter to Left	% Between Dia to Left and Next Larger Dia.	% Smaller than Diameter to Left	% Between Dia to Left and Next Larger Dia.	% Smaller than Diameter to Left	% Between Dia to Left and Next Larger Dia.	% Smaller than Diameter to Left	% Between Dia to Left and Next Larger Dia.	% Smaller than Diameter to Left	% Between Dia to Left and Next Larger Dia.	% Smaller than Diameter to Left	% Between Dia to Left and Next Larger Dia.	% Smaller than Diameter to Left	% Between Dia to Left and Next Larger Dia.	% Smaller than Diameter to left	% Between Dia to Left and Next Larger Dia.
1.00	100.0	0.0														
.75	86.5	13.5	100.0													
.50	70.6	15.9	81.6	18.4	100.0											
.30	54.7	15.9	63.3	18.3	77.5	22.5	100.0									
.25	49.9	4.8	57.7	5.6	70.6	6.9	91.4	8.6	100.0							
.20	44.7	5.2	51.6	6.1	63.3	7.3	81.6	9.8	89.5	10.5	100.0					
.15	38.7	6.0	44.7	6.9	54.8	8.5	70.6	11.0	77.4	12.1	86.5	13.5	100.0			
.10	31.6	7.1	36.5	8.2	44.7	10.1	57.7	12.9	63.2	14.2	70.6	15.9	81.6	18.4	100.0	
.05	22.3	9.3	25.8	10.7	31.6	13.1	40.8	16.9	44.7	18.5	50.0	20.6	57.8	23.9	70.6	29.4
.02	14.1	8.2	16.4	9.4	20.0	11.6	25.8	15.0	28.3	16.4	31.6	18.4	36.5	21.2	45.7	24.9
.015	12.2	1.9	14.2	2.2	17.6	2.4	22.3	3.5	24.5	3.8	27.4	4.2	31.6	4.9	38.7	7.0
Smaller than .015		12.2		14.2		17.6		22.3		24.5		27.4		31.6		38.7
Total		100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0

TABLE II.

This table shows the effect of the duration of steam treatment on the crushing strength of concrete. Proportions of the concrete are 1 part Portland Cement, 3 parts sand, 4½ parts gravel.

Curing Treatment.	Crushing strength in lbs. per sq. in. at 2 and 3 days	7 days
Not steam cured, but sprinkled for 1 week		379
Steam cured at 2½ lbs. steam pressure for 3 hrs.	334	341
" " at 2½ " " " " 6 "	427	484
" " at 2½ " " " " 12 "	517	750
" " at 2½ " " " " 24 "	627	660
" " at 2½ " " " " 72 "	1,095	1,167

TABLE III.

This table shows that the crushing strength obtained by steam curing is permanent. Proportions: 1 part Portland Cement, 3 parts sand, 4½ parts gravel.

Curing Treatment.	Crushing strength in lbs. per sq. in. at 2 and 3 days.	7 days.	28 days.	3 mos.
Not steam cured, but sprinkled for 1 week		379	1,068	1,426
Steam cured at 2½ lbs. for 24 hrs.	627	660	1,382	1,488
" " at 2½ " " 72 "	1,095	1,167	1,270	1,522

TABLE IV.

This table shows the increase in crushing strength of concrete caused by the increase of steam pressure in which same is cured. Proportions: 1 part Portland Cement to 4 parts sand.

	Steam cured at 2 lbs. for 24 hrs.	10 lbs. for 24 hrs.	20 lbs. for 24 hrs.
Crushing strength in lbs. per sq. in. at 2 days	1,815	1,800	2,184
	Steam cured at 40 lbs. for 24 hrs.	**80 lbs. for 24 hrs.**	**80 lbs. for 12 hrs.**
Crushing strength in lbs. per sq. in at 2 days	3,396	4,520	2,540

TABLE V.

Proportions: 1 part Portland Cement to 4 parts sand:
(All these specimens were made same as those given in Table IV., but were cured by sprinkling instead of steaming.)

	Age when tested, 28 days.	3 mos.	6 mos.
Crushing strength in lbs. per sq. in.	1,854	2,286	2,343

A second advantage of high-pressure steam curing is that blocks so cured are ready for the market in two days. A third advantage is that rush orders can be filled as rapidly as the blocks can be made and without danger of breaking the edges of the blocks, which happens so often in handling them when they are but a few days old and cured by sprinkling. Moreover, a very important advantage is that blocks faced with white aggregate any ordinary gray cement, when so cured, will be practically as white as white face blocks.

area of the blocks. If a 1:8 high-pressure steam cured block will crush at 2,100 lbs., it stands to reason that the block maker need not use a 1:4 mixture as he must use in the air cured blocks. He will, therefore, save about half of the cement.

The tables which follow and the curves drawn from same show the increase in strength caused by an increase in the duration of same. The tables are practically the same as those given in the July 1910 issue of the Cement Era. (See Tables 2, 3, 4 and 5, and curves 1 and 2.)

Cost of Cement Blocks.

The cost of concrete blocks is always a very important consideration, especially when it is necessary to compete with other building materials. In a general address of this character, it is impossible to cite cost data that will be applicable to all parts of the country, as the prices of cement and aggregates vary so greatly. The accompanying table, however, will be found of great value in estimating the cost of the materials and labor, but will not include any overhead expenses, such as the salaries of the officers of the company and that of a salesman for disposing of the product. It will be noticed that the data as to the output per man on different sized blocks is figured on hand labor. Wherever a plant is equipped with power tampers, mixers, etc., the output per man will almost be trebled; in fact, in many cases it has been.

Strength of Concrete Blocks.

The use of concrete blocks has been restricted to a large extent in large cities on account of the fact that many city ordinances limit the use of 8-inch blocks to buildings of but one story in height. This is probably due to the fact that the concrete block is a comparatively new building material and the average city authorities do not know much about the strength of same, and in order to properly protect their citizens against any inferior and untried building materials, they adopt measu:es which seem very harsh to those who are in a position to know about the strength of this splendid building material.

There is no reason why concrete blocks should not be just as strong as the concrete used in any monolithic work, and yet, we hear very little about the danger of monolithic concrete collapsing. Reinforced concrete is used to-day in sky-scrapers and all important buildings, for which purpose it has proved itself to be without a peer. The concrete building block is merely one peculiar form of this material, so in this respect it is really a tried and proven material.

In some cities where this question has been investigated, ordinances have been adopted requiring a crushing strength at 28 days of 1,000 lbs. per square inch of gross cross sectional area of the block, as it is used in the building. Assuming a factor of safety of five, which is greater than that used in steel construction, and which is an average used in other work, the allowable stress will be 200 lbs. per square inch of gross cross sectional area. The distance of outside bearing walls of an average dwelling will not be over 25 feet nor will it be greater than this in the average store building. If the distance is any greater, then supporting pillars will be found between the bearing walls.

As an example, let us suppose that the distance between outside bearing walls is 25 feet and that the total floor loads, including the live load and the weight of the floor, is 110 lbs. per square foot, and that the roof load, including the weight of the roof, snow and wind loads, is 57 lbs. per square foot. These loadings are probably higher than what is found in the average building. One 8x8x16-inch block weighs about 50 lbs., or 38 lbs. per lineal foot. Per square foot of wall the weight of the wall will run about 57 lbs., therefore the wall weight per story per lineal foot of wall will be 12x57 or 687 lbs.

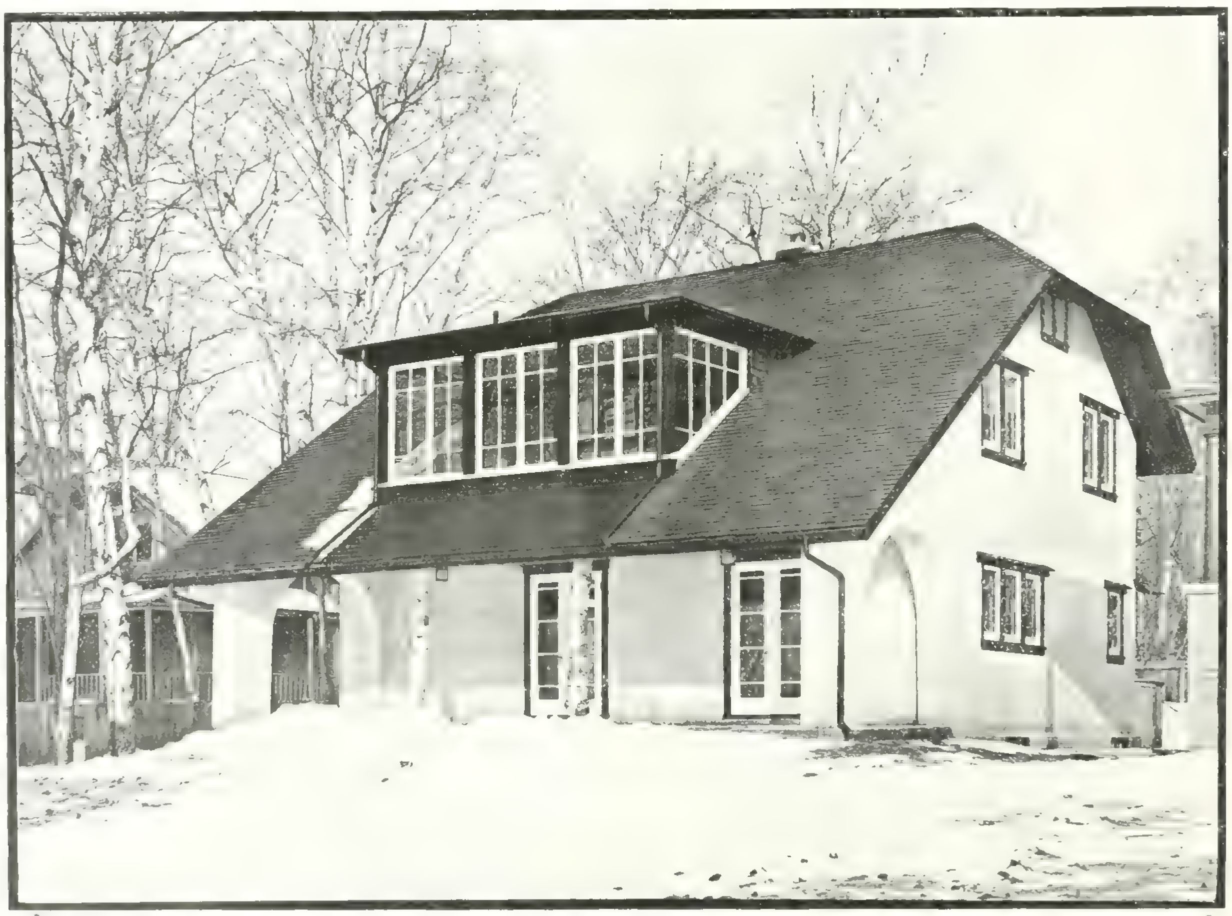
For the sake of simplicity let us consider a strip between two such bearing walls, one foot long and 25 feet wide, or an area of 25 square feet. The floor loads, etc., will be carried by one foot of each side wall. The floor load per story per lineal foot of the two side walls is 25x110 lbs., or 2,750 lbs. The floor load per story per foot of each side wall is half this amount, or 1,375 lbs. The weight of the wall per lineal foot of each side wall is 684 lbs., making a total load per foot of each side wall of 2,059 lbs. per story. An 8x8x16-inch block is 128 square inches in crass sectional area. Assuming a safe loading of 200 lbs. per square inch and a factor safety of five, the allowable load on one 8x8x16-inch block will be 25,600 lbs. Per foot of wall this amounts to 19,200 lbs. This would allow 9 1-3 twelve-foot stories to be carried by an 8-inch concrete block wall, loaded as above.

It must also be remembered that a concrete block crushing at 1,000 lbs. per square inch at 28 days will probably have a crushing strength of 1,200 lbs. per square inch at six months, so that the factor of safety at six months will be six instead of five. In view of these facts, it is hard to understand why any city authorities should limit the use of an 8-inch concrete block to one-story buildings only. They should at least be allowed in two-story buildings, and if necessary the basement wall in such buildings could be made of 10-inch blocks. On this basis the actual factor of safety would be 4x5, or 20, instead of an apparent value of 5.

It is true that some portions of a building will be loaded more heavily than I figured above on account of openings in the wall, but the openings are not likely to run over 25 per cent. to 33 per cent. of the wall area, so the actual factor of safety in any part of the building is likely to be at least 12 where it is allowable to use an 18-inch wall for two storeys. In steel work a safety factor of more than four is seldom required, so it certainly seems to me that any city authorities would be on the safe side if they allowed the use of 8-inch blocks in two-story buildings, for they can safely figure that the actual safety factor in such cases will be 12, and this will continue to increase, for the concrete will increase in strength the older it gets.

We should not feel that city authorities discriminate against the use of concrete blocks, but rather that the associations of cement users are at fault in not paying more attention to the drawing up of proper ordinances which can be presented to the various city authorities, and I heartily recommend, if this Association has not already done so, that it take steps to draw up the proper ordinances that will be fair both to the block manufacturer and user thereof, and figure the allowable thickness of walls on a basis of the crushing strength of the blocks, and also limit

Residence of C. W. Noble, Munroe Park Avenue, Toronto. A Recently Erected House which Shows an Interesting Application of Cement Stucco to Residential Work.



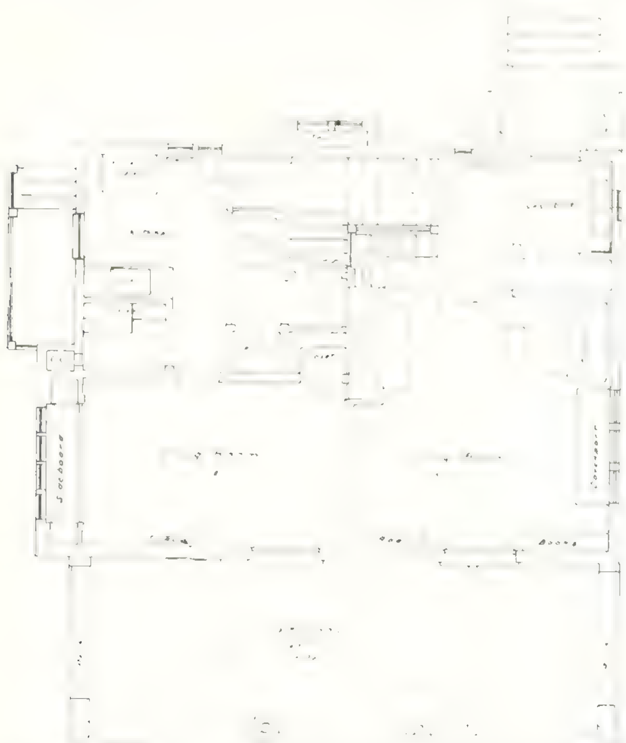
Rear View of Residence of C. W. Noble, Munro Park Avenue, Toronto. Note how Successfully the Stucco Work has been Adapted to the Round Arch Construction, Forming the Roof Support at Either End of the Porch.

THE APPLICATION OF CEMENT STUCCO TO RESIDENTIAL WORK

Cracks and stains, their causes, and how they can be avoided. An interesting example of this type of house.

IN GENERAL, stucco houses do not differ from ordinary structures a great deal, but there are several matters which, seeming trivial, are at the same time quite essential, if one wishes to put up a structure that is going to stand the rigors of our climate. The principal problems one has to deal with are the preventing of cracks, unsightly stains, and how best to procure an outside finish which is both permanent and artistic.

There are two causes for cracks in stucco work, which might be briefly touched upon in order of their importance. One can be ascribed to poor lap-



Ground Floor Plan, Residence of C. W. Noble, Munroe Park Ave., Toronto.

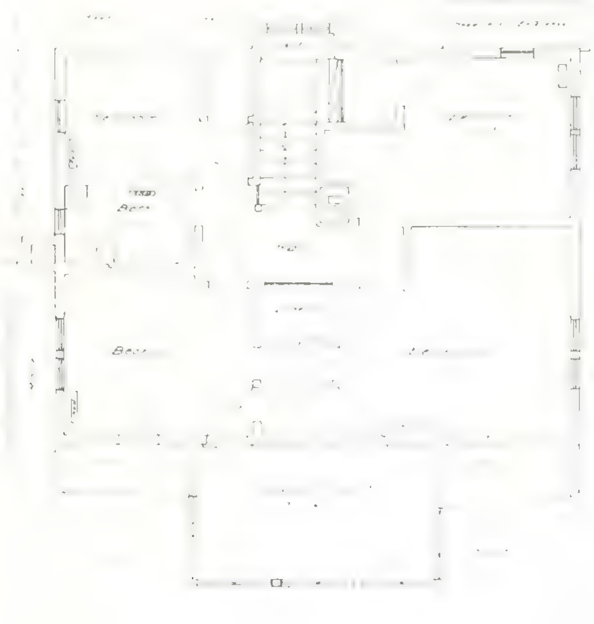
ping of the lath, and the other to the fact that timber expands across the grain and not in a direcion parallel to the grain, when wet. The first results from imperfect workmanship which can be charged directly to the contractor, or the poor quality of inspection given the work. It is important in the erection of a structure of this character that a grade of lath be adopted that provides for a lock-joint, as this insures a lap that is highly efficient. To obviate the second difficulty, it is necessary to guard against having sill plates between stories. In an ordinary structure, the carpenter, after laying his floor joists and his rough floor, cuts all his studs and lays them on the floor and spikes a header along the top, then up-ends the side of his building, braces it there and directs his attention to the other sides of the structure.

Now in a stucco house one must avoid having this header or bond timber, because this places the grain of the timber such wise that in wet weather it will expand and thus produce an unsightly crack between the two stories. The only way to overcome this is to run the studding the full height of the building. In the case of heads over the windows, these will be protected by the casing.

In order to prevent stains, a metal lath having the

Corner in Living Room with Dining Room Through Arch at Left, Residence of C. W. Noble, Munroe Park Ave., Toronto.

best procurable rust protective coating should be used, and in no case for exterior work should lime mortar be applied direct to the lath, but rather a good cement mortar should be used, because cement protects metal from rust, and the most rigid test for



First Floor Plan, Residence of C. W. Noble, Munroe Park Ave., Toronto.

commercial lath is to imbed it in plaster of paris and to place the sample in the presence of moisture.

An interesting house of the stucco type is the residence of C. W. Noble, Munroe Park avenue, Toronto, illustrated herewith. In the construction of this dwelling all of the above essentials have been thoroughly considered, with the results that a structure both permanent in character and attracive in design, has been produced at a minimum cost. Another feature of interest in connection with this dwelling is the bridging between the studs. Hair-felt deadening was placed between the studs and against the interior lath. Pieces 2x2 inches were then placed between the studs for bridging in such a manner that it would not obstruct the free passage of air, thus giving a perfect hollow wall construction running the full height of the building and not cut off between stories.

The verandah posts and verandah beam are made of birch logs. These were cut at an early stage of the work, and while green had holes bored into the heart at several places along the trunk and at the top. These holes were then plugged with Zn So_4 (sinc sulphate). This impregnates the wood and prevents dry rot and disintegration.

THE NEW PUBLIC LIBRARY, NEW YORK CITY.—Continued from page 59.

vice to ornament to stretches of blank wall which flank the entrance porch. The treatment of the two ends of the facade is weak. The scale of the engaged colonnade looks too contracted. The fact has not been sufficiently considered in the design that one sees the building not when one is walking west through Forty-first Street, but when one is walking up or down Fifth Avenue. But blemishes such as those mentioned are not of sufficient importance seriously to attenuate the fundamental impressiveness and attractiveness of the facade. The architects have succeeded in making the library sufficiently imposing and dignified in character to satisfy the prevailing idea that a library is a great educational institution, while, at the same time, they have awakened popular interest by making it look like a pleasant place to enter and use. And this is a great triumph, because there is a real, and sometimes an apparently irreconcilable, conflict between the monumental and practical aspects of such buildings.

The final judgment on the New York Public Library will be, consequently, that it is not a great monument, because considerations of architectural form have in several conspicuous instances been deliberately subordinated to the needs of the plan. In this respect it resembles the new Museums of Fine Arts in Boston. The building is at bottom a compromise between two groups of partly antagonistic demands, and a compromise can hardly ever become a consummate example of architectural form. But, on the other hand, Messrs. Carrere & Hastings have, as in so many other cases, made their compromise successful. Faithful as they have been to the fundamental requirement of adapting the building to its purpose as a library, they have also succeeded in making it look well: and they have succeeded in making it look well partly because the design is appropriate to its function as a building in which books are stored, read and distributed. A merely monumental library always appears somewhat forbidding and remote. The New York Public Library looks attractive, and so far as a large building can, even intimate. And in this respect it differs from the Boston Museum of Fine Arts, which, excellently planned as it may be, presents a dull and rigid architectural mask to the public.

CONCRETE BUILDING BLOCKS—Cont'd from page 83.

the maximum loading to which any part of the wall may be subjected. Such ordinances should cover the method of manufacture, as well.

It will be found that no ordinance can cover all buildings, especially factories and warehouses. In such cases, the size of the pilasters and bearing walls must be figured according to the actual load to be carried by same.

THE LATEST DEVELOPMENT IN STEEL PROTECTION

Complete text of paper presented by C. W. Noble at the Third Annual Convention of the Canadian Cement and Concrete Ass'n.

FOR THE PAST YEAR the writer has been investigating corrosion in steel and the methods of preventing it. The object of the investigation was to determine what improvement, if any, could be made in the protective coating used on metal lath. The investigation brought to light much interesting technical information.

The nature and cause of corrosion were first studied. A very exhaustive investigation of the corrosion of iron and steel exposed to the atmosphere has been recently made by Dr. A. S. Cushman of the U. S. Department of Agriculture. While his studies were confined primarily to the corrosion of fence wire the results are of general value. He states that corrosion is primarily due to the presence in the air of minute quantities of carbonic acid and sulphurous gases. These acid gases are dissolved in falling rain and thus brought into contact with the iron. Their action then depends on the condition of the metal. If it is absolutely uniform in quality the attack is exceedingly slow and impotent. If, owing to the localized presence of impurities, different portions of the metal vary in electrical potential, then the acids and the varying portions of the metal form a miniature electric battery. A current is set up and that portion of the steel which is electro positive as compared with the surrounding metal will be corroded. This explains why certain fence wires will corrode while others with the same exposure will last for many years. The local presence of impurities also explains why steam boilers will pit instead of corroding uniformly.

The action of wet plaster on metal lath depends on the nature of the plaster. Portland cement and lime plasters are strongly alkaline and will not allow the formation of acids in the presence. They therefore prevent the rusting of metal lath. The protection given by Portland Cement is a permanent one. Lime plaster, however, has a greater attraction for moisture than Portland Cement, and while lime protection may be permanent, still need is felt for further investigation before making a definite statement. Such investigation was not made as the matter is a diversion from the subject in hand.

Plaster fo Paris, which is the base of the many brands of patent and hard wall plasters, is actively corrosive. During the setting up process since acids occur in solution it has in a marked degree the tendency to start electric currents, and these currents cause the oxygen mollicules, which are momentarily freed by the chemical changes, to attack the steel. The corrosion is much more rapid than that due to atmospheric exposure. Iron rust, once started, works progressively, and the rusting in this case continues long after the chemical changes in the plaster, with their resulting electric currents, have ceased. It only requires the presence of a normal amount of atmospheric moisture to keep the action going.

The different types of protective coating which were studied fall naturally into three separate classifications, paints, electrical insulators; and galvanizing coatings. Each of these works on a different theory.

1. The painted coating is merely an attempt to shield the steel from the plaster. If well done with an undiluted

oil paint it has some value. Linseed oil is subject to attack by lime and Plaster of Paris, becoming what is known among painters, as "dead." It is then porous and will not prevent corrosion. The first attack of the plaster is however expended on the paint instead of the steel and for this reason the paint coating is of assistance. If the paint holds until the corrosive effect of Plaster of Paris has weakened it has served a useful purpose, if not, it has at least, delayed matters.

Metal lath should be coated with an exceptionally tenacious material. It is shipped in bundles and roughly handled during erection, and the coating is severely tested by scratches. In this respect even the best paint leaves much to be desired, as rust, of course, will immediately start at each scratch. If in the effort to reduce cost, the manufacturer dilutes his paint with gasoline, the resulting coating is valueless, although it can be made very cheap. Unfortunately most paint used for lath protection is thus diluted. Everything considered, the paint coating has the least to recommend it of all of the three types of protection considered.

The coating with electrical insulators proceeds on an entirely different theory. The attempt is here made to prevent the corrosive agent from reaching the lath. The cold japan coating used on metallic lath is of this class. It consists of an asphaltum varnish which is ozydized by the addition of a chemical dryer instead of by baking. It is proof against the action of all types of plaster, and is a perfect insulator as long as the coating itself is perfect. The objection to it is that it is impossible to make it proof against the wear and tear of handling. If it is sufficiently elastic to prevent chipping, then it will scratch. There seems to be no neutral territory between these two difficulties. Its cost, ⅝ of a cent per square yard, is in its favor. While rust will start at the open scratches, the attack can never, as in the case with paint, be made through a "dead" coating. It will probably be long before it will be replaced for medium priced work.

Galvanized coatings work on still a different theory. The electric currents are here allowed to circulate at will while their mischief is prevented. It has been previously stated that the currents flow only between metals which differ in electric potential and that the attack is on that metal which is most strongly electro positive. Now all zinc is more electro positive than any commercial steel, regardless of its impurities. A coating of zinc therefore will cause the currents to run between the steel and the zinc instead of between different portions of the steel, and the attack will be invariably taken by the zinc. Freedom from scratches in this method of protection is unessential. It is only detrimental when the steel is so far exposed as to disclose a localized impurity (a potential rust spot) entirely surrounded by exposed steel. In this case the rust spot would develop. So true is this that metal lath cut from galvanized sheets with all the raw edges exposed will show most excellent results.

In the search for a perfect protective coating only one type of paint Marine Tocholith, was tried. This is not a mixture of oil and pigment and is therefore, strictly speaking, not a paint at all, but as its action is similar to paint, it will be discussed here. It is a modfied Portland cement. Its advantage is due to the fact that it has the property common to all types of Portland cement, of preventing rust, and absorbing a small amount of rust already started. It grows harder with age and in time adheres very tenaciously to the steel. It was found that it would not for several weeks attain sufficient hardness to stand bundling and shipping. The manufacturers submitted a special sample designed to harden with unusual speed, but even this was not commercially feasible. It was rejected on account of its liability to scratching.

Two insulating coatings were considered, a baked and a cold japan coating. The cold japan is merely an improvement in the coating which has been used on lath for several years. It was adopted to replace the old cold japan coating, but on account of the liability to scratching, is not considered an absolutely perfect coating. The baked enamel coating is used to a certain extent in the United States. It requires considerable expense for plant, and only partially overcomes the scratching difficulty. When the lath is bent in forming cornice work the enamel is very apt to break. It is very expensive and is not regarded as sufficiently satisfactory to justify the cost.

A new metal called ingot iron was also considered. This is being used for the manufacture of lath in the United States. The impurity whih causes variation in electrical potential in steel is manganese. A very slight variation in the percentage of manganese makes a wide variation in electric potential. As it seems to be impossible to secure an absolutely uniform distribution of manganese the manufacturers of ingot iron have made a product in which this and practically all other impurities are omitted altogether. The process is a secret one, but the result seems to be well attained. Electric currents are therefore not set up in ingot iron as the result of an acid bath and corrorsion is much slower. Acid tests with ingot iron show remarkable results. Tests with plaster were not sufficient to give a satisfactory verdict.

The metal was rejected for an entirely different reason. Lath cut from ingot iron looks exactly like lath cut from ordinary steel sheets. An architect or contractor purchasing lath for an important contract, and paying an additional price for the best material, wants something more than the assurance of the manufacturer that he is getting the quality he is paying for. He wants the assurance of his own senses. The lack of this cannot be overcome with ingot iron.

Four types of galvanized lath were considered, hot galvanized, electro galvanized, sherardized, and lath cut from a galvanized sheet. None of these require description, except the sherardized coating.

This process was invented in England some seven years ago, by Mr Sherard Cooper-Cole a noted metallurgist. The metal to be treated is packed in zinc dust and baked for several hours at a temperature just below the melting point of zinc. The process and the result is very similar to case hardening. Just as the casting while being case hardened absorbs a part of the carbon in which it is packed so the metal lath while being sherardized absorbs zinc. The process differs from case hardening in the formation, also of a pure zinc coating on the outside of the steel, while no corresponding coating of carbon is formed on a casting.

As galvanizing offers a perfect solution to the difficulty regarding scratches the investigation now began to narrow down to a choice between these four types. Tests, however, which will be described later were being made at this time which showed the probability of considerable damage to the zinc by plaster. It was therefore suggested that the coating should be lead instead of zinc as the formation of lead oxide would protect the lead coating from further destruction. Mr. G. Frank Allen, a noted metallurgist, was consulted. He reported that the suggestion was of no value because lead is electro negative as compared with iron, and the iron would therefore be rusted at the expense of the lead. He proposed an alloy of lead and zinc mixed in such proportion as to be neutral toward iron. This was rejected as against opening up the difficulty regarding scratches.

The simplest manner of making galvanized lath is to cut it from a galvanized sheet. With metal lath the results are very satisfactory, although the coating is frequently cracked at the bends. Whether it would prove so in the diamond mesh type, where the bends in the metal are much more frequent, remains a question. The process was rejected on account of its commercial impracticability. To a technical man who understands how galvanizing protects, there is no difficulty apparent from the raw edges of the strands. It would, however, require considerable explanation to sell such lath to the average layman. Plato once said that a man's reputation is more injured by telling an improbable truth than a plausible lie, and the statement is as true to-day as in Plato's time. If nothing better had been found the process would have been adopted, but was finally rejected.

Hot galvanizing was rejected on account of the cost. The result is no better than that obtained by sherardizing, while the cost is about eight times as great.

Electro galvanizing was rejected on similar grounds. This process is really zinc electro-plating. In order to be efficient there must be sufficient zinc deposited to supply the wasting while the electric currents due to hardening of the plaster are in progress, and still leave an ample residue for further protection. Perfect color is obtained with a quantity of zinc entirely insufficient to provide perfect protection. It is also much cheaper to provide color than protection and unfortunately mere color satisfies the manufacturer. For this reason many American architects in specifying galvanized lath are now stating that it must not be electro galvanized. By continuing the process, any desired quantity of zinc can be deposited, but if sufficient is provided to give a coating equal to the sherardized coating the cost would be many times as great.

The sherardized coating which was finally adopted differs from other types of galvanizing by reason of the zinc iron alloy coming between the pure zinc and the steel. Immediately beneath the surface will be found a thin coating of alloy which is almost entirely of zinc. Going further the percentage of zinc decreases while the iron increases until pure iron is reached. There is, therefore, no contact between two metals of appreciable variation in electric potential. The coating can be considered as made up of a large number of layers, each varying slightly in electric potential from those immediately above and beneath it. While electric currents doubtless exist in these layers they seem to be very weak and very minute and their effect is quite insignificant. A given quantity of zinc is far more efficient in the sherardized coating than when applied in any other manner. Prof Burgess of the chair of metallurgy of the University of Wisconsin, reports that a given quantity of filings from the sherardizing alloy takes fifteen times as long to dissolve in acid as a like quantity of zinc filings from a hot galvanizing bath.

Another reason for choosing sherardizing is that the process cannot be scamped and is practically proof against mistakes in the shop. The zinc dust in which the lath is baked is a very poor conductor of heat. The process starts at the outside of the drums long before it starts at the centre, yet heat must be kept up until the centre is being sherardized. Conversely the process is still going on at the centre for some time after the drums are removed from the oven. The real protective is the alloy which is deposited before the pure zinc. If therefore pure zinc appears at the centre of the sheet one can be sure that the process is perfect.

In order to assist in the selection of a proper coating an attempt was made to devise an accelerated test applicable to the case in hand. The commonly used acid tests do not represent anything like working conditions. Patent plasters are not acids.

A number of specimens were coated with pure Plaster of Paris and kept for two weeks in a bath of exhaust steam. It was supposed that they would thus receive in a short time the effect of as much moisture and warmth as would ordinarily act on them in a long period of years.

The [illegible] disappointment. The temperature [illegible] plaster. Plain uncoated lath ingot iron and cold japanned lath all looked equally rusted. All types of galvanized lath showed rust spots although the electro-galvanized was much the worst of the lot. The samples were submitted to Thomas Heyes & Sons, consulting chemists, for further examination. They reported that the only reason the galvanized coatings looked better than the bare lath is that [illegible] was more loss through oxidization of the zinc than of the iron.

They stated further that the application of steam started an entirely new set of chemical reactions and brought about conditions which never existed at normal temperatures. They reported after further consideration, that they could devise no accelerated test which would fairly represent the action of plaster through a series of years and offered as an alternative a series of very careful quantitive analyses lasting for several months.

By this time evidence obtained rom other sources had shown the superiority of the sherardized process. It remained, however, to see whether the plaster test would develop any unknown weakness. The chemists were instructed to conduct a series of tests on cold japanned and sherardized samples. These were coated with pure Plaster of Paris and carefully watched for five months. From time to time bits of the plaster were chipped off. The plaster film remaining in contact with the lath would then be scraped off and carefully analyzed. From the first these samples showed minute quantities of zinc oxide and metallic zinc dust. This is doubtless loose dust left on the coating from the manufacturing process. The first test showed 0.18 per cent. of such dust but no later tests showed as much as this. No trace of zinc sulphate or iron oxide was formed in any sample although they were watched for carefully.

The [illegible] were clear. Otherwise the results from the cold japanned sample were as good as the other.

The chemists stated that "forever" is too long a time [illegible] Their tests showed however no reason to suppose that sherardized metal lath in a gypsum plaster would not last for a number of generations.

In comparing galvanizing the quantity of protecting zinc must always be considered. Prof. Burgess found that chemically pure zinc from an electro galvanized coating [illegible] times as efficient as the hot galvanizing zinc. This was for equal quantities of metal. The excess zinc on hot galvanized material is wiped off wherever this is possible. Av- [illegible] coating but the latter requires much more zinc. Such a [illegible] amount of zinc were used in both processes the electro [illegible]

Metal lath, when hot galvanized, cannot be wiped off, [illegible] tests would indicate the probable superiority of sherardizing over even this very heavy coat although the cost is only about one-eighth as great. A conclusive test of this [illegible] He had one half a chain hot galvanized without wiping and the other half sherardized. Both chains were hung in sea water. When they were finally removed, the hot [illegible] badly rusted that some of the links could be broken in the fingers. The sherardized chains had turned blue. There were occasional yellow patches which were rubbed off without showing pits or roughnes s below and all the links were evidently as strong as when originally immersed.

SOME EXHIBIT FEATURES AT THE CEMENT SHOW

Comprehensive display practically and artististically conceived, together with representative crowds, contribute to success of recently conducted event

THE THIRD ANNUAL Cement Show held recently in Toronto, takes marked precedence over the two similar events of this character previously conducted in Canada, both as regards the scope and character of exhibits, and from a standpoint of attendance. Nothing, perhaps, more fully points out the need for a yearly affair of this kind than the growing interest which is being taken by both the building fraternity and the lay public in the production and use of cement in structural undertakings. Indeed, the lay public was strikingly in evidence throughout the entire week, paying close attention to the manufacturing features and studying the advantages which concrete offers for both utilitarian and decorative work. The display was at once comprehensive and diversified in character, covering the entire floor space of the St. Lawrence Arena and presenting much of genuine interest and value from both a practical and educational point of view. Features there were, and many of them, from the industrial exhibits, including mixers, concrete block machines, power equipment and cement working tools and appliances, to the adaptation of concrete to practical and artistic ends. Various systems of steel reinforcement and types of metal lath, together with water-proofing compounds and kindred products, were also well represented, while two particularly noteworthy attractions were the miniature cement mill and the cement gun. Manager Snaith, secretary-treasurer of the Canadian Cement and Concrete Association, is to be congratulated, both on the admirable arrangement of the exhibits and the successful manner in which the Show was conducted. Among the visitors to the Show were a large number of architects, and men prominent in public life, including the Hon. Geo. P. Graham, Minister of Railways and Canals, and Honorary President of the Association, who, with a few appropriate remarks, set the wheels in operation on the opening night. Music was furnished during the afternoons and evenings by D'Alesandro's Orchestra, and noticeable in the crowds at both periods of the day was a very representative sprinkling of the gentler sex. Viewed from any angle, the show left little to be desired, and it is an event that can well bear repeating at least once a year. This, at any rate, was the consensus of opinion among the exhibitors, who expressed appreciation of the growing usefulness of exhibitions of this kind and the interest they are awakening in the public's mind.

The exhibits were attractively set in place, and many of the booths vied one with the other for artistic distinction. The miniature cement mill was seen in operation at exhibit of the Canada Cement Company, which occupied a large space in the centre section near the entrance, and the process of converting the raw material into the manufactured product was explained during the week by an expert demonstrator to a large number of interested visitors. Another noteworthy feature in connection with this display was an artistic fireplace built of concrete, from which hot coals sent forth a warm and radiant glow. Mr. La Pierre, who looked after the company's interests, put in a strenuous time renewing old acquaintances, and Managing Director Jones and Sales Manager Ford came up from Montreal, during the week.

Immediately adjoining was Wettlaufer Brothers' extensive array of concrete mixers, including mixers for all character of work, and of any required capacity. All of these, with the exception of the small improved hand mixers, were equipped with lift hoppers and automatic dumping devices, and had steam, gasoline or electric power attachments. The company reports an increasing demand for their mixers as well as for their concrete block and cement pressed brick machines which were also demonstrated to advantage.

The Trussed Concrete Steel Company exhibit was both novel in conception and practical in purpose, being in the form of a small one-storey structure enclosed and roofed in with cement plaster on "Hy-Rib" metal lath, one of this firm's most successful products. This booth proved a big attraction during the entire show. On the interior the "Hy-Rib" was partially exposed in order to demonstrate the perfect bond which results between the lath and the mortar, and the essentially sound and rigid form of construction it effects. In addition to explaining the merits of this product, Mr. T. H. Stevens and his assistant were kept busy answering enquiries regarding the "Kahn System" of reinforcing and other well known products of this concern.

Both the utilitarian and the artistic were in evidence at the booth of the Roman Stone Company. The laundry tubs and kitchen sinks were indeed a revelation in the use of cement for practical domestic purposes, the composition of both types of receptacles being hard, metallic, smooth and dense. The artistic was shown in an exquisitely modelled cast stone lizard and pedestral and imitation marble slabs which were strikingly true in texture to the natural product.

Eadie-Douglas, Montreal and Toronto, made a display of "Ceresit" Waterproofing and "Esco Paints" for structural and bridge work. Specimen casts of "Burmatoft" terra cotta, such as it used for the exterior facing of the Jacobs Building, the largest concrete structure in Montreal, were also introduced, together with "Keystone" gypsum blocks and "Terrano" flooring and stair treads, which are being broadly specified by architects and builders.

One of the most commendable booths at the Show was that of the Cement Products, Limited, of Toronto. This consisted of a garden wall with ornamental post caps and a background built of broken ashlar cement stone. The harmonizing variety in the face of the blocks, the texture and quality of the stone, and the artistic excellence of the display for practical demonstrative purposes won for the product of this firm many a deserved compliment.

Benjamin Moore and Company, Toronto, took advantage of the occasion to explain the merits of Moore's Cement Paints in a neatly arranged exhibit. Among the important buildings in which this paint or coating is used, is the Pennsylvania Terminal Station, New York, which was erroneously accredited in the last issue of CONSTRUCTION as the work of Architects Carrere & Hastings, instead of the firm of Messrs McKim, Mead & White. Aside from serving as a durable, impervious waterproofing protection, this coating, it is said, also enhances the appearance of the concrete. Incidentally, a large number of visitors were made acquainted with other products of this firm, including "Iron Clad" paints, Muresco, Sani-Flat, Impervo Brand Varnishes, Moormel, all of fhich are meeting with a big demand throughout the Dominion.

As on previous occasions, a conspicuous display was made at the booth of the Ideal Concrete Machinery Company, of London, Ont., and South Bend, Indiana, where a large, automatic tamping device turning out block of all sizes and varieties with wonderful facility, proved a powerful magnet. In addition to this practical and interesting feature, a display was made showing the possibilities of steam cured blocks for structural and architectural undertakings. Particularly effective was the grille work forming the lattice of an artistically carried out concrete fence, and made of adjustable units so designed as to be arranged with the openings running in either a perpendicular or horizontal direction. "Tycrete," a new product of the company, was also exhibited to advantage, and judging from the highly complimentary expressions heard, it is bound to have a very popular and lasting vogue. Mr. Pulford, Manager of the London plant, was in charge, while President Wettstien, from South Bend, was in evidence during the latter part of the week.

"Medusa" White Portland Cement and "Medusa" waterproofing compounds were demonstrated at the attractively arranged double space exhibit of the Stinson-Reeb Building Supply Company, Montreal, which was presided over by that congenial spirit—yclept, Kennedy Stinson. Space does not permit us to expatiate on the excellent merits of these products, other than to add that a beautiful placque and several specimens of decorative work executed in this cement, and a number of examples showing the practical application of "Medusa" waterproofing, commanded no little attention. A most noteworhy feature were the "Pauly" cement tiles which were used to form the wall built up around the booth. Other Stinson-Reeb products were also displayed, and these, like the above, appealed to a large number of visitors.

The Canadian Siegwart Beam Company, of Three Rivers, Que., exhibited a section of a concrete beam reinforced according to their system. Toward the end of the week this beam was subjected to a test in which it sustained a distributed load of 9,000 lbs. before showing fracture. The demonstration proved a popular feature, and brought a large number of enquiries regarding the "Siegwart" method of floor construction.

Steel and Radiation, Limited, Toronto, and Montreal, occupied a large and exceedingly well arranged booth, near the main entrance, which comprised such well known products as "Steelcrete" lath and metal reinforcement, "Klutch" bars, and "Fenestra" steel sash. This comprehensive display also included a complete line of metal lockers of which this concern makes a specialty. Adjoining the exhibit was the "cement gun," which was by far the most striking individual feature of the show, and which was demonstrated to eagerly interested throngs throughout the entire week. This "gun" is used for applying and spreading concrete mortar on wall surfaces, and has a discharging capacity of 12 bbls. of cement with the necessary proportion of aggregates, per hour. Steel and Radiation, Limited, have the Canadian rights for this unique and practical machine, and are prepared to sublet privileges for its use in various parts of Canada.

In viewing the exhibit of the Alfred Rogers, Limited, Toronto, it was somewhat of a poser at first glance to tell whether the occurring event was a cement and concrete exhibition or the annual flower display. At least nothing so prosaic as cement in its natural state entered into the scheme of this bower of beauty. On the contrary, it was a 1 : 2 : 4 mix of flowers, ferns and palms, the resultant composition withstanding the most critical analysis of the artistic eye. Mr. Rogers believes that the test of cement is in the using of it, and not in a cursory examination of a mere handful of powdered material. In other words, quality tells, and judging from the number of satisfied customers who sought out this gentleman and his associates at this sequestered spot, the Rogers grade of cement is A1.

Koehring Mixers were demonstrated at the exhibit of the Canada Foundry Company, where Sales Manager Edwards and several capable assistants were in charge. The merits of three different size machines shown were quite evident to any one who called at this booth, and as many called, it is equally evident that the "Koehring" is to have a growing demand in the Canadian market. These mixers are designed to give the maximum output in the minimum time, regardless of the character of work for which they are employed. They are both modern in their attachments and power equipment, and are built to withstand the roughest kind of usage. Every part has been thoroughly considered, and in their manufacture the Canada Foundry Company has well sustained its reputation for manufacturing only high grade products.

The many advantages of "Herrringbone" lath were propounded at the booth of Clarence W. Noble, Home Life Building, Toronto, which was situated abutting the main aisle as one entered. Perhaps the best evidence as to the quality of this "lath" is to be found in the fact that within the past two years the demand for it has increased several times over. For a while the manufacturing resources of Mr. Noble's firm were sorely taxed in trying to keep up with their orders, but now that a new and much larger plant has been erected, this difficuly has been obviated, and this type of lath can be supplied in any quantity and shipped on the shortest notice.

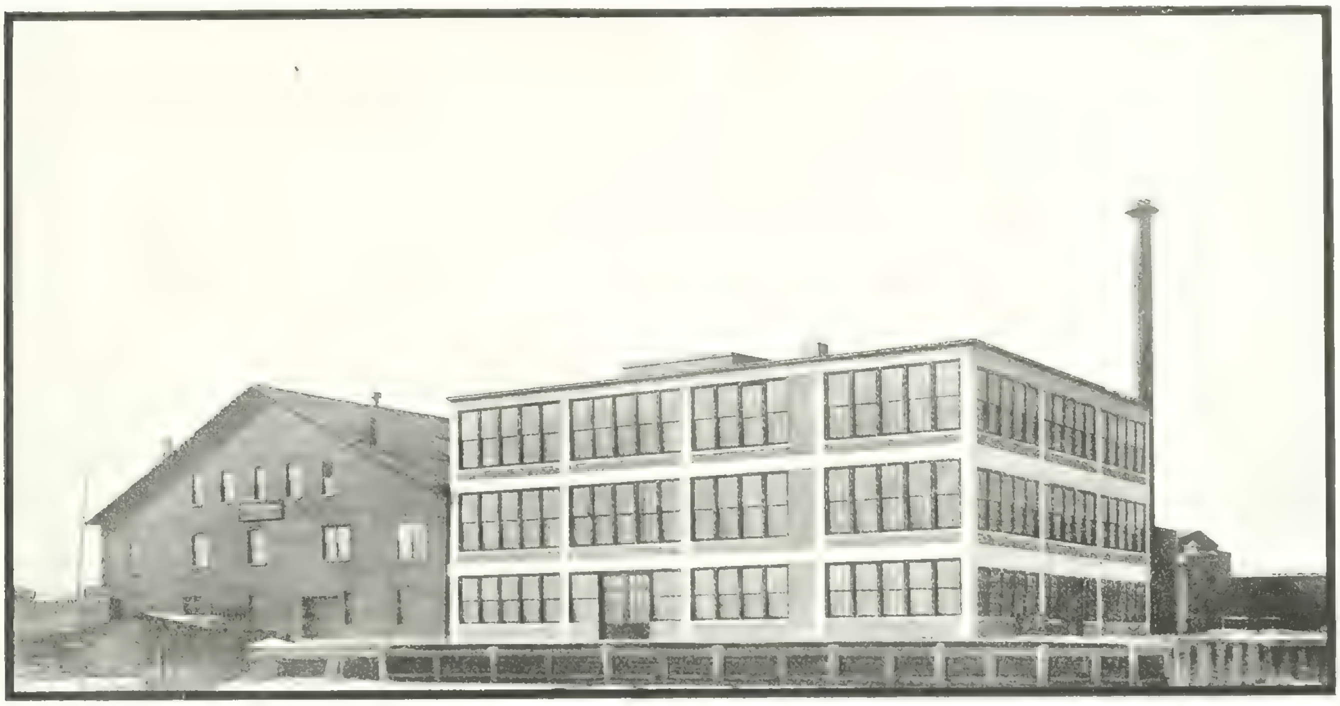
Tech Brothers had an exhibit of cement paints and waterproofing compounds, for which E. F. Dartnell, 157 St. James street, Montreal, and Chellas & Black, Toronto, are agents.

IT IS UNDERSTOOD, says the *Westminster Gazette*, that when the time arrives to consider designs for a Shakespeare memorial national theatre, architects in all countries in the world will be invited to enter into the competition. This would be in accordance with modern practice in such matters. At the present moment, included among other competitions that are open to all, without respect to nationality, are, a monument to the Czar Alexander II. at St. Petersburg, new courts of justice at Athens, a new Presidential palace for Cuba, and the planning of the capitol of the Australian Commonwealth. International competitions of this description are apparently a modern institution, though artists and craftsmen of great ability have at all times readily found employment in foreign countries. England has used these desirable aliens as much as any people. The names of Holbein, Zucchero, Rubens, Vandyke, Roubillac, Angelica Kauffmann and numerous others may be cited as proof, while quite a legion of distinguished living artists who are closely identified with British art were not born under the Union Jack.

CEMENT SALESMEN DINE.

ON FEBRUARY 23RD, Mr. F. P. Jones, General Manager of the Canada Cement Company, gave a banquet for the salesmen of that concern, at the St. Regis, Montreal. Our photo shows Mr. Jones (at the extreme left of the picture) and his selling organization of seventeen experienced men. Mr. W. H. Ford, the Sales Manager of the institution, occupies the seat directly opposite Mr. Jones. It is interesting to note that he company have added five men to their staff of travellers during the past year. The territory has been carefully divided and even the very small towns are regularly covered. In this way the company aim to keep in the closest possible touch with the trade, as well as aiding the consumer of cement wherever he may need the advice and guidance that such trained men are able to supply.

Selling Organization of the Canada Cement Company.



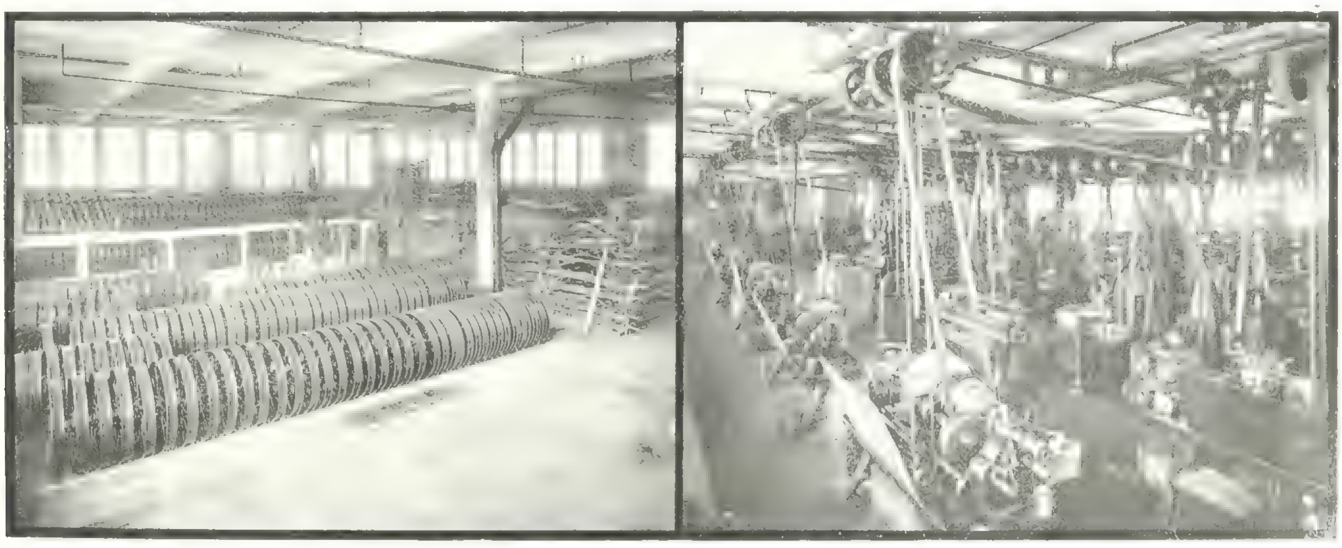
Reinforced Concrete Factory Erected for the Ford Motor Company at Windsor, Ont. Albert Kahn, Architect.

CONCRETE FACTORY OF FORD MOTOR CO.

THE FACTORY of the Ford Motor Company, illustrated in this instance, overlooks the Detroit River at Windsor, Ont., and is built of reinforced concrete construction.

This building, which was designed by Architect Albert Kahn, is a very excellent example of the type of factory construction that has become most popular recently in Canada and the United States. The frame-work is entirely of reinforced concrete, and the curtain walls are of brick. The illustration of this building represents fairly the possibilities of lighting arrangement in reinforced concrete buildings. The size of the building is 72 feet by 80 feet, three stories, and all floors were designed for a live load of 100 pounds per square foot. One of the difficulties encountered by the contractors in the erection of this building was the fact that the foundation soil was exceedingly poor at this point, and it was necessary, therefore, to drive piles for the foundation of the building to rest upon. Two hundred and fifty 30-foot piles were necessary. After the old buildings were removed, piles driven, and the foundation constructed, the building was erected in ten weeks. This is rather an exceptional record in concrete construction. In order that the concrete should be sufficiently dry so that wood floors could be laid without delay, wooden sleepers and concrete-fill between them were put on as soon as the concrete slab was slightly set. In usual practice it is customary to wait until forms are removed before the sleepers and concrete-fill are constructed, and the wooden floors are then laid when this has dried out. This practice, however, does not render possible the quick work done on this building, since concrete must be perfectly dry before wooden floors are laid.

Messrs. Wells & Gray, Toronto, were the contractors for this building and executed what is generally considered a very excellent job.



Views of Paint Shop and Machine Shop in Two Upper Stories, which Show the Heavy Load that the Floors are Designed to Carry. Albert Kahn, Architect.

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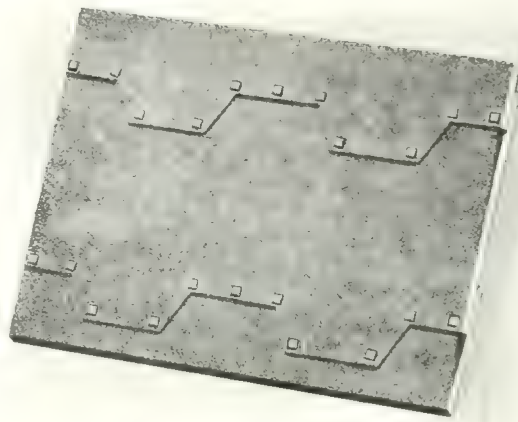

Effect of Ornamental Edge. (Reduced size.)

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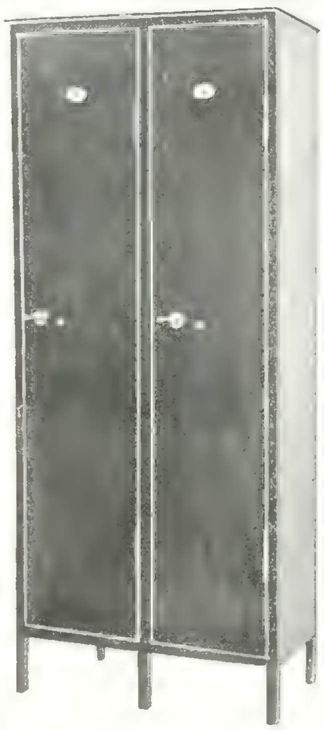

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CONSTRUCTION

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CONTENTS

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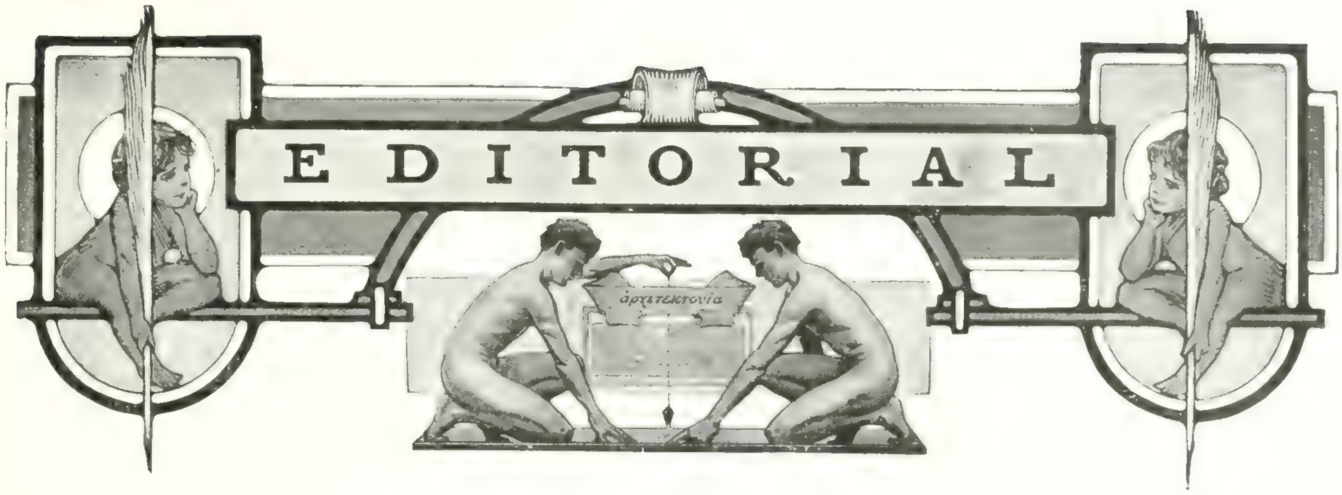
BRANCH OFFICES
MONTREAL—Board of Trade Building. LONDON, ENG. Byron House, 85 Fleet St. E.C.

Perspective View of the Transportation Building now in Process of Erection at Montreal, and Which Will be a Notable Addition to
the Many Imposing Buildings of the Business District. It will Occupy a Site Bounded by St. James, St. Francois Xavier, and
Notre Dame Streets, Covering an Area of Approximately 20,000 Square Feet. The Building is to Be As Fireproof as Modern
Science can Devise, with Steel Frame and Semi-glazed Terra Cotta Exterior. The Entire Ground Floor, Together with a Mez-
zanine, is to be Finished in Marble, and has Been so Arranged as to give Ideal Accommodations for Banking and Office Pur-
poses. A Feature of the Plan is a Broad Arcade Extending Through the Ground Floor from St. James St. to Notre Dame Street,
with an Intersecting Corridor Leading to the St. Francois Xavier Street Entrance, and Having a Monumental Staircase, Giv-
ing Easy Access to the Upper and Lower Floors. Carrere and Hastings and Ross and MacFarlane, Associate Architects.



Building returns for March—Some very substantial individual gains and consistent steady growth in general characterize the month's development.

DOUBLING THE INVESTMENT of the previous month and noting an average gain of 8 per cent. over the corresponding period, the building situation, as indicated in the returns for March submitted to CONSTRUCTION reflects a development which if not proportionately as great as that noted in the early part of last year, shows a state of progress at least equal to that which has existed heretofore. An element of spectacularism as regards certain individual gains, and a consistent, steady, growth in general, both characterized the trend of operations for the month. Of the twenty-six cities reporting, eighteen steered a straight-ahead course, exceeding in some instances their former figures by a tremendously wide margin. Four of the more important places went $1,000,000 or better, seven other registered totals ranging from $100,000 up; while in a number of lesser centres, though the volume of work was not as great and the investment not quite so pronounced, the advance made was such as to give every assurance of a much more prosperous condition than existed in the previous corresponding period.

Winnipeg's heavy decrease (60 per cent.), was by far the biggest offset for the month, and this together with the set back of 38 per cent. experienced in the case of Ottawa, as well as the respective declines of 32 and 53 per cent. noted in the case of Lethbridge and London, put a big crimp in an average gain that otherwise gave every indication of being most promising. As it was, the situation throughout the country, gave the builders little or no reason to complain. Toronto's investment of $2,210,770, netting a gain of 39 per cent., reflects a state of enormous activity; but hardly is the total noted in this case of more striking dimensions than that recorded by Vancouver, where the work projected amounted to $2,147,798, as against $1,806,106 in the same period last year. Unless a false impression prevails, both of the places are about to pass through a year of wonderful expansion, one in fact that will be well worth noting from month to month. Calgary also has designs on big things, as is evidenced by her total of $1,012,260, which is just 143 per cent. better than her previous corresponding amount. Edmonton, which has a gain of 3 per cent., although less active, nevertheless registers a substantial amount, while Medicine Hat, in the same province, by an advance of 1700 per cent., has the biggest proportionate increase noted in the list. Other Western gains are: Victoria, 14 per cent; Moose Jaw, 25 per cent; and Regina 65 per cent., the investment in the latter place amounting to over half a million dollars.

Besides the two losses previously referred to, Ontario sustained decreases in both the case of Peterboro' and St. Thomas, although the falling off in either place, considering the comparative figures, really amounted to little. Aside from this the province in general witnessed a vastly improved condition. Fort William advanced 80 per cent.; Hamilton gained 21 per cent.; and Kingston is ahead by 29 per cent. Gains were also made at Port Arthur and Stratford to the extent of 176 per cent. and 38 per cent. in order named, while Berlin submits a total of $29,295, which is definitely known to represent a larger volume of work than was undertaken in the same period last year.

The province of Quebec is represented by the figures of Montreal and Quebec City, and although the latter failed to furnish comparative amounts, the total registered is such as to indicate good headway. Montreal shows the same unremitting progress that has characterized her remarkable development during the past two years. Permits were issued for new work amounting to $1,101,577, as against $676,804 in the same period last year, the total noted being the third highest amount recorded for the month. East of these points, Halifax and Sydney are respectively in the arrear to the extent of 49 and 30 per cent., and St. John again fails to report. However, there are a number of towns in the maritime section, not included in the list, that are carrying out quite a representative amount of improvements.

As regards Winnipeg, it might be said that with such buildings as the Hudson Bay Company's new department store and a 14 storey structure to be built by an English syndicate in prospect, the outlook is most encouraging. In fact, a spirit of optimism prevails in general, and this in itself is a reliable indication that all sections are moving ahead under full steam and with the throttle wide open.

	Permits for March, 1911.	Permits for March, 1910.	Inc. Per Cent.	Dec. Per Cent.
Berlin, Ont.	$ 29,295	.	.	. . . .
Brantford, Ont.	43,445	$ 11,470	278.77	. . .
Calgary, Alta.	1,012,260	415,800	143.45	.
Edmonton, Alta.	276,825	266,585	3.84	.
Fort William, Ont. .	166,850	92,585	80.21	. .
Halifax, N.S.	22,000	43,800	.	49.77
Hamilton, Ont.	350,300	289,390	21.05	. .
Kingston, Ont.	19,172	14,850	29.10	.
Lethbridge, Alta. ..	81,500	120,420	. .	32.32
London, Ont.	65,638	139,700	. .	53.02
Medicine Hat, Alta.	78,450	4,460	1,700.00	. . . . .
Montreal, Que.	1,101,577	676,804	62.76	. .
Moose Jaw, Sask. ..	74,100	58,825	25.96	. .
Ottawa, Ont.	134,475	219,350	. .	38.70
Peterboro, Ont. ...	6,655	10,327	.	35.56
Port Arthur, Ont. .	14,810	5,365	176.05	.
Quebec, Que.	47,350	. .	.	. . . .
Regina, Sask.	545,025	329,650	65.33	. .
Stratford, Ont.	8,580	6,210	38.16	. . .
St. Thomas, Ont. .	8,650	15,500	.	44.20
Sydney, N.S.	12,440	17,935	.	30.07
Toronto .	2,210,770	1,583,165	39 64	. . .
Toronto, Ont.				
Vancouver, B.C. ..	2,147,798	1,806,106	18.92	. .
Victoria, B.C.	279,945	244,760	14.37	. .
Windsor, Ont.	60,250	27,225	121.30	. .
Winnipeg, Man. ...	1,007,400	2,543,150	.	60.39
	$9,805,560	$8,943,432	8.79	

¶ *Toronto Society of Architects dine—Members discuss employment of foreign architects by Canadian corporations—Exhibition of Canadian work to be arranged shortly.*

A MOST SUCCESSFUL and enjoyable dinner was held by the Toronto Society of Architects at the National Club on Thursday, April 6th, at which about fifty members and guests attended. The discussion of the evening dealt mainly with "the employment of foreign architects on Canadian buildings," and the general feeling shown with regard to this important subject made unmistakably plain that Canadian architects feel very strongly on this subject.

The chair was occupied by the President of the Society, Mr. Acton Bond, who in addressing those present, dwelt upon the advisability of the employment of Canadians as designers of buildings to be erected in Canada. Mr. Bond called upon Mr. John M. Lyle to open up the subject of the evening, and, to say the least, his remarks were most pointed. Attention was called to the oft repeated words of Canadian people that Canadian architects have not had experience in designing large structures, and that it was therefore necessary to go to the United States to secure architects who have established reputations as designers of great buildings. In criticizing this contention, Mr. Lyle asked if all big work to be executed in Canada is to go to foreign designers, how can we ever expect to have Canadian architects who have had experience in designing large buildings? He pointed out that the attitude in no other country in the world was so unmindful of the advantages to be obtained through the establishment of national architecture as that shown by Canadian people. Canada, it was true, was a new country, and although it had not possibly developed in the arts to a degree equal to that of the older countries of the world, at the same time it was necessary to make a start. Art must be encouraged and an architecture developed, and that architecture should be of our own making, and reflect our own national life. This subject proved to be pretty much of a live topic, and the talk of Mr. Lyle was further enlarged by additional remarks from the following guests: Prof. Mavor, of the Chair of Political Economy, Toronto University; E. Wylie Grier, Pres. Ontario Society of Artists; Mr. A. F. Wickson, Pres. of the Ontario Association of Architects; R. Dinnis of the Builders' Exchange; A. Munro Grier, K.C.; C. W. Jeffries, Mr. J. E. Middleton, and Ivan S. Macdonald.

Mr. Wickson referred to the cordial and friendly feeling that existed between the Ontario Association and the Toronto Society of Architects, and he expressed the hope that both would keep working to a common end, and co-operate with each other in striving to promote a better architecture.

Mr. Lyle further on in the evening, announced that an exhibition of the work of Canadian architects would shortly be held in the new Art Galleries under the auspices of the Toronto Society of Architects, to give the Canadian public an opportunity of viewing the work of architects in Canada. This project brought forth a strong expression of approval from those present.

In all, the dinner was a most successful one. The speeches were short, crisp, and to the point, and most of them full of witticisms.

¶ *Mr. Edison makes extravagant statement regarding buildings of the future—Condemns brick and steel and predicts much for concrete.*

IN A RECENT ARTICLE in one of the popular American magazines, Mr. Thomas A. Edison makes some astonishing prophecies as to the improvements that will be brought about during the next fifty years. He tells us that books will be made of nickel paper. That in a book two inches thick there will be 40,000 pages. That these nickel sheets will be more opaque than paper, and will be more easy to print upon. He tells us that all furniture in the future will be made of steel. He further tells us that steel construction will be a thing of the past. He tells us that the "age of steel" about which we brag so much is nothing to brag about. He says we brag about it because we don't know any better. He has also something to say about bricks. He says ancient Egyptian builders used sun-dried bricks, that the sun was too slow for us, and that we built fires to dry out bricks, and that we clung to bricks and stone. But he still goes further, yes, so far that, even though it is a statement by the wizard, we cannot accept it with any great degree of credulity. He says "men are lunatics to keep on building with brick and steel. Reinforced concrete is better and cheaper than either. Builders who stick to brick and steel are behind the times. Men who put up wooden structures are worse than lunatics. It is because we use such building material that fire losses amount to almost $5,000,000 a year. To think what a waste of materials and labors this sum represents. It is all unnecessary. Reinforced concrete is not only cheaper than brick and steel, but is fire-proof. A reinforced concrete building will stand practically forever. Within thirty years all construction will be of reinforced concrete, from the finest mansion to the tallest sky-scraper." He stated that he could reproduce the fifty story Metropolitan tower in concrete, and that an earthquake could not overturn it.

We are prepared to concede that Mr. Edison is an exceedingly well-informed man on many subjects, but had he been more conservative in his remarks with regard to the comparative value of reinforced concrete and other buildings now in use, they would have carried with them very much greater weight with those who know. There is no question but that reinforced concrete has become a very strong factor in modern building construction, but to say that men are lunatics to build of other materials than reinforced concrete, seems rather ridiculous. With regard to bricks, Mr. Edison surely knows the history of the manufacture of brick, why the Egyptians first made brick. Knows about the brick revival by the Byzantines, who established a particular type of architecture. Also of the further revival in Italy, and about the revival that again has taken place in England and is to be seen in America now. There is more than structural value to be considered in a building. If not so, we might all be content to live in mud huts providing they were strong enough and would last long enough.

Reinforced concrete for the structural frame work of a building is becoming more and more popular. First, because of its fireproof character. Second, because of its vibration proof and corrosion proof advantages. But the architectural possibilities of brick are such that at no time can concrete, stone, or any other material, absolutely replace it. Brick, it is true, is not used to-day as a structural material nearly as much as it was twenty years ago, but a concrete skeleton must be clothed, and the most comely clothing that the architect can put upon a concrete skeleton is brick. Mr. Edison talks entirely of monolithic construction, and the facts of the matter are that men who sell reinforcement, men who are in touch with the profession, relative to these matters to-day, sell and recommend a monolithic structure. The disadvantage of building monolithic concrete walls is the cost of the lumber and labor necessary in making the forms into which the concrete is to be deposited. In some cases it is common knowledge that the form work has cost as much as the concrete itself. In other respects, the cost is often more than brick work, and unless it forms a backing to stone or brickwork, it has to be floated or rough-cast externally. It is true, for buildings of some magnitude, of a plain character, free from irregularities of plan, and of a simple design, such as warehouses, farm buildings, and factories, it can be used in most cases to advantage, so far as regards cost, while it may possess much greater strength and durability and freedom from the necessity of repairs, more so than ordinary brick walls.

To quote from a paper written by Mr. Teapotter before the Concrete Institute of London, "it is too early to affirm how long monolithic Portland cement concrete buildings are going to last, but there is not much doubt on that point. The oldest in England probably does not exceed from 45 to 50 years. But, with regard to monolithic concrete walls being weather-proof, I have never known an instance of their being otherwise, if they were cemented or rough-cast externally. As to the immediate future of concrete for buildings and other purposes in large towns, its present use seems to indicate that it will be confined principally to floors and roofs, and in connection with skeleton steel frame construction, and in skeleton reinforced concrete construction. Monolithic reinforced walls will possibly not find much favor. They certainly do not with the architect at the present time. There is the difficulty of external surface treatment, the cost of temporary forms and minor difficulties. The walls of factories, workshops, warehouses, and a similar class of buildings where no architectural treatment is designed, and which are simple in plan and arrangement, can possibly be built at a less cost than with brick or stone, and for farm buildings, concrete is still better adapted, as it is applicable not only to walls, but to pavings for live-stock places and for floors, and almost the entire fitments. Mangers, feeding-troughs, water-troughs, tanks for storing rain-water, stable stall divisions, channel gutters and manure pits are better executed with concrete than with any other material, and at a less cost."

In view of these facts, we do not see that the most enthusiastic practical cement or concrete expert can agree with Mr. Edison, in his most sweeping statements. Mr. Edison undertook to build a monolithic concrete house from a set of iron moulds. His house, he claimed, could be built in a day. We have had no demonstration as yet to prove the practicability of his scheme. Possibly, Mr. Edison's remarks were intended only for the lay public, but they surely sound far fetched to the engineer and architect.

¶ *Tax exemption to encourage erection of buildings—Western Canada cities lead in enactment of tax legislation affecting new improvements.*

IT SEEMS by a comparison with other countries that some of Canada's Western cities are leading the way in the enactment of tax legislation to promote building, and according to the "Architectural Record," in commenting upon the subject, architects cannot be indifferent to the growing movement in favor of exempting from taxes, improvements upon land, or at least of taxing vacant land at a higher rate than improved property. It is pointed out, for example, that in Vancouver—which is the metropolis of British Columbia, and a city of about eighty thousand population—there is no tax on improvements, and that it is enjoying one of the greatest real estate and building booms ever known. Victoria and other towns in the province assess improvements at 50 per cent. or less of their value, while the law calls for full value assessment of land. Edmonton, the capital of Alberta, has exempted improvements for a number of years. In the province of Ontario, it is stated that two hundred and fifty municipalities have petitioned Parliament for power to assess land values at a higher rate than improvements. Other countries within the British Empire are also legislating this way. In New Zealand, nearly one-half of all improvements are exempt from taxation. In New South Wales improvements are not taxed anywhere practically, except in Sydney, the capital, and it is expected that they will shortly be exempted there. It is reported that a great building boom is in progress through New South Wales as the result of this action. In the United Kingdom, over five hundred local taxing bodies, including London, Glasgow, Liverpool and Manchester, are stated to have petitioned Parliament for power to make land values the basis of local taxation. The German Empire is applying this principle to its colonies; and Italian cities levy a special tax on vacant lots, while exempting improvements from taxation for a period of two years.

¶ *The rapidly increasing use of wood for residence interiors renders it necessary to employ some sort of fireproofing compound to minimize the danger from fire.*

THE DISTRESSING CIRCUMSTANCES surrounding the fire in a residence on Indian Road, Toronto, resulting from ignition of a beamed ceiling from the gas jet, stands as an argument in favor of the use of fire-resisting compounds to be applied on interior wood finish. The interior woodwork in the modern residence (very often of a Southern pine) is invariably soaked and saturated with varnish or stain, the principal constituent of which is either turpentine or gasoline. It would seem only reasonable at this time, when such extraordinary precautions are being taken in the fireproofing of the modern business building, that some consideration should be given to the application of methods in house construction that would, at least, not encourage the spread of fire. Owing to its great convenience, economy and pleasing appearance in building construction, timber will probably remain one of the most generally used construction materials so long as a supply is available at reasonable prices.

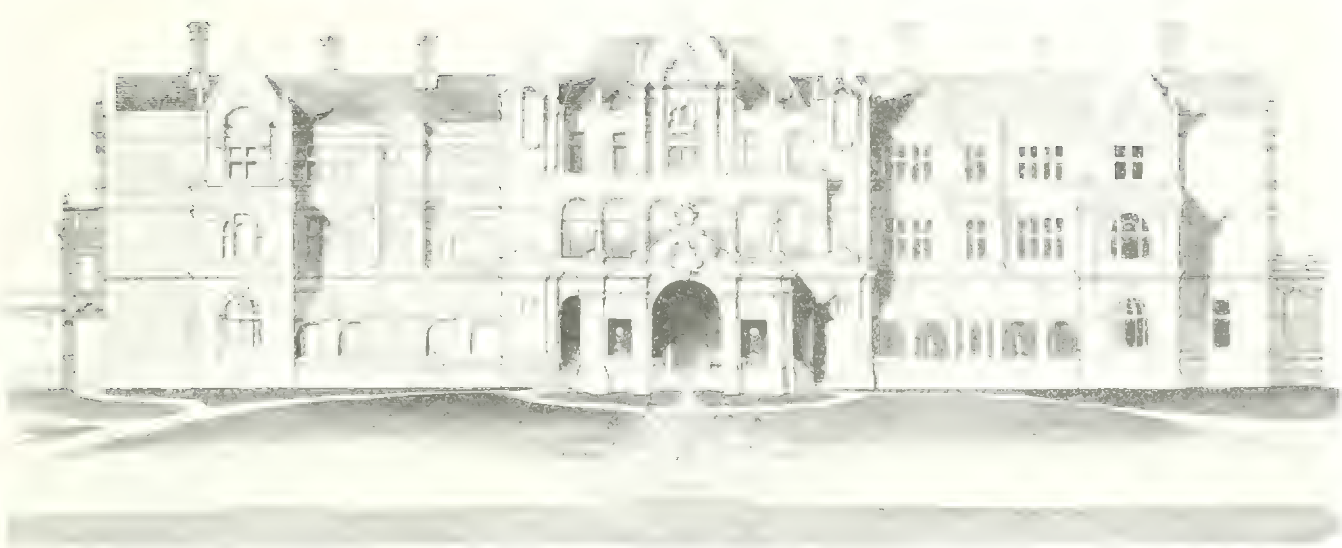
It is desirable, however, in deference to modern views on fire-resisting construction, that timber should no longer play the part of welcoming every outbreak of fire in buildings and of providing excellent fuel for flames.

A process, adopted by a firm in England, consists in submitting wood to vacuum treatment in a closed steel cylinder, where air, moisture, and sap are removed and a chemical solution is forced into the pores and fibres under hydraulic pressure, the timber being afterwards dried in a kiln.

Timber so treated retains its normal strength and quality; it can be worked, painted, polished, nailed, or glued in precisely the same way as untreated wood, from which it differs only in the respect that the stable and non-volatile impregnating crystals impart such resistance to fire that splinters taken from a sample may be held in he flame of a Bunsen burner or in an electric arc without more than local carbonization at the point of contact. No flame is spread, and on removal of the source of heat the charring ceases.

It should be recognized that the object of fire-resisting wood is not to compete with materials calculated to withstand great heat without serious injury. On the contrary, its purpose is to prevent any small outbreak of fire from growing into a serious conflagration. Apart from papers and textile fabrics, ordinary timber is the substance chiefly responsible for feeding the infant flames of a building fire. The timber floors, wainscoting, stairs, doors, window-panes, and other details of the average building constitute the real danger of a conflagration, because when once the woodwork is fairly alight it goes on burning with increasing violence until finally the whole structure is enveloped in flames. It is evident, therefore, that anything calculated to remove or minimize this danger is of much public importance, and for this reason we have pleasure in calling attention to the process briefly described in the present note. We may add that the cost of impregnation is by no means prohibitive, and that wood so treated has been largely used in England by the Office of Works, several county and municipal authorities, railway companies, and industrial firms in building construction and other works.

THAT A YEAR of remarkable railway development lies immediately ahead of the country seems certain from the number of important announcements made by the transportation companies within recent date. The West in particular will witness a period of pronounced activity, and several important projects in that section are already underway. In addition to grading and track-laying, it is stated that the Grand Trunk Pacific will build 140 new stations, and that Canadian Pacific will open fifty new towns on its new lines during the coming summer. The improvements projected will tend to substantially improve the existing lines, besides opening up considerable new territory that has heretofore been undeveloped. In all, the various projects will represent the expenditure of a huge sum.



Front Elevation Facing Bloor Street, Competitive Design (Awarded First Prize), of Architect George W. King, for new Government House, Toronto.

COMPETITIVE DESIGNS FOR ONTARIO GOVERNMENT HOUSE

Illustrations and descriptions outlining features of preliminary studies submitted by five of the eleven competing entrants for new Lieutenant-Governor's Residence, Toronto

PUBLISHED in this connection are several available designs submitted in the recent competition conducted by the Department of Public Works of the Province of Ontario for the proposed new Government House, which was previously commented on editorially in these columns. Although the conditions of the competition were not generally approved of by the profession, certain of the individual schemes presented for consideration are so comprehensively conceived and so commendable developed from the view point of preliminary study, as to warrant the assumption that the reproduction of the accompanying designs, together with the description of the entrants concerning the features of their respective plan, will prove of no little interest to the reader.

Architect George W. King's Design

The design submitted by Architect George W. King, Toronto, which was awarded the first prize, is described by its author as follows:—

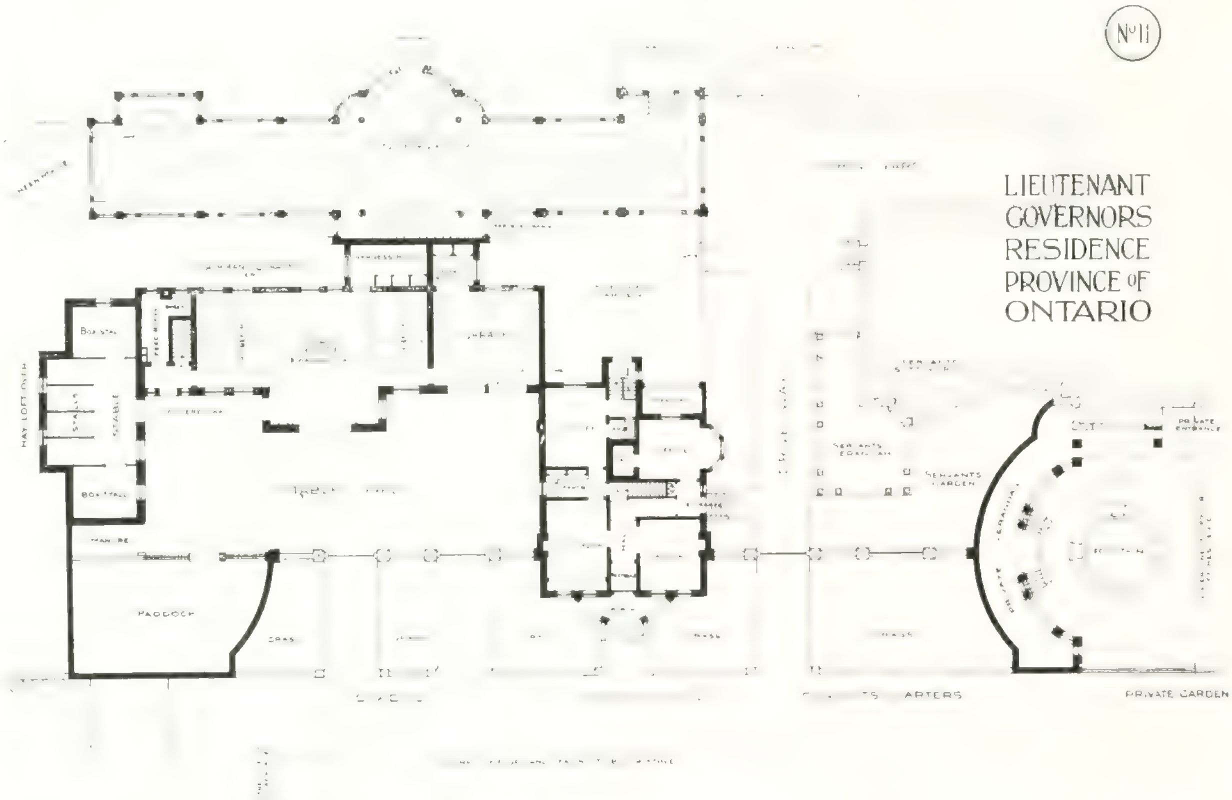
According to the final instructions of the programme, providing for a ball room which could also be utilized for dining purposes and other forms of entertainment, an arrangement is necessary which affords direct communications from this room to both the kitchen quarters and the state and private dining rooms.

While this requirement has brought about a somewhat unusual plan for such a large residence, and has to a certain extent upset the symmetry at the back of the building, it will be observed that all the state rooms can be conveniently utilized either separately or in conjunction one with the other for such functions as the occasion demands, and in connection with the terraces at months of the year when the weather permits. The remaining rooms have been arranged so as to provide direct access to the secretary's office from the hall through the Lieutenant-Governor's private office opening off the library.

It is proposed to put a door across the hall at the grand staircase, so that the private rooms may be entirely shut off at times when gentlemen only are entertained. The arrangement is such that the Lieutenant-Governor's family will be in no way interfered with on occasions of this character. The private entrance, verandah, conservatory and stair-case leading to the bedroom suite allotted to their use and placed immediately between the state rooms and servants' quarters, further assists in this respect. The colonade verandah at the north of private garden shuts off the view of the servants' quarters, and adds to the attractiveness of the scheme on that side of the house, as well as obscuring the garden from public view.

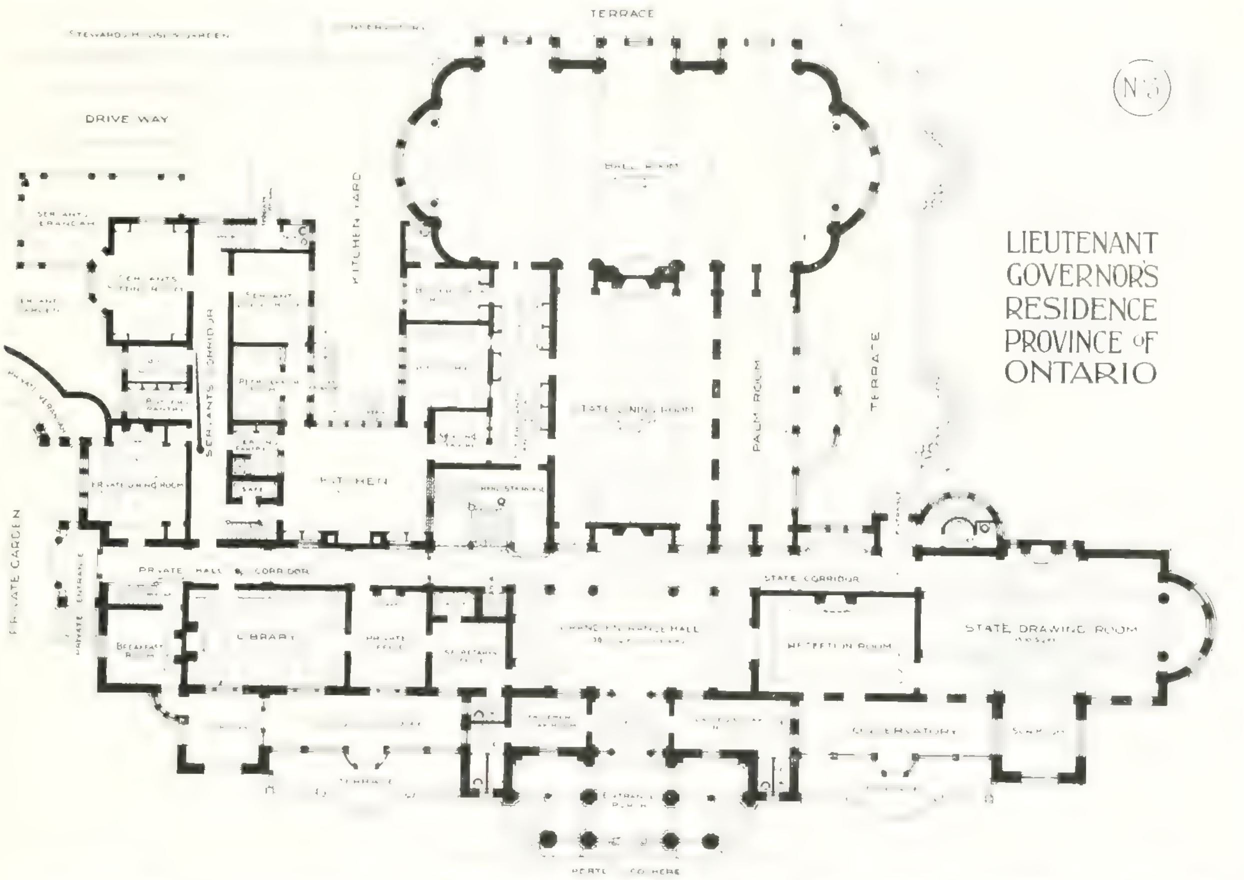
The stair-case at the east end of the corridor is designed specially for the use of the honored guests, and leads direct to the state bedroom apartments.

East Elevation, Competitive Design of Architect George W. King, for new Ontario Government House, Toronto.

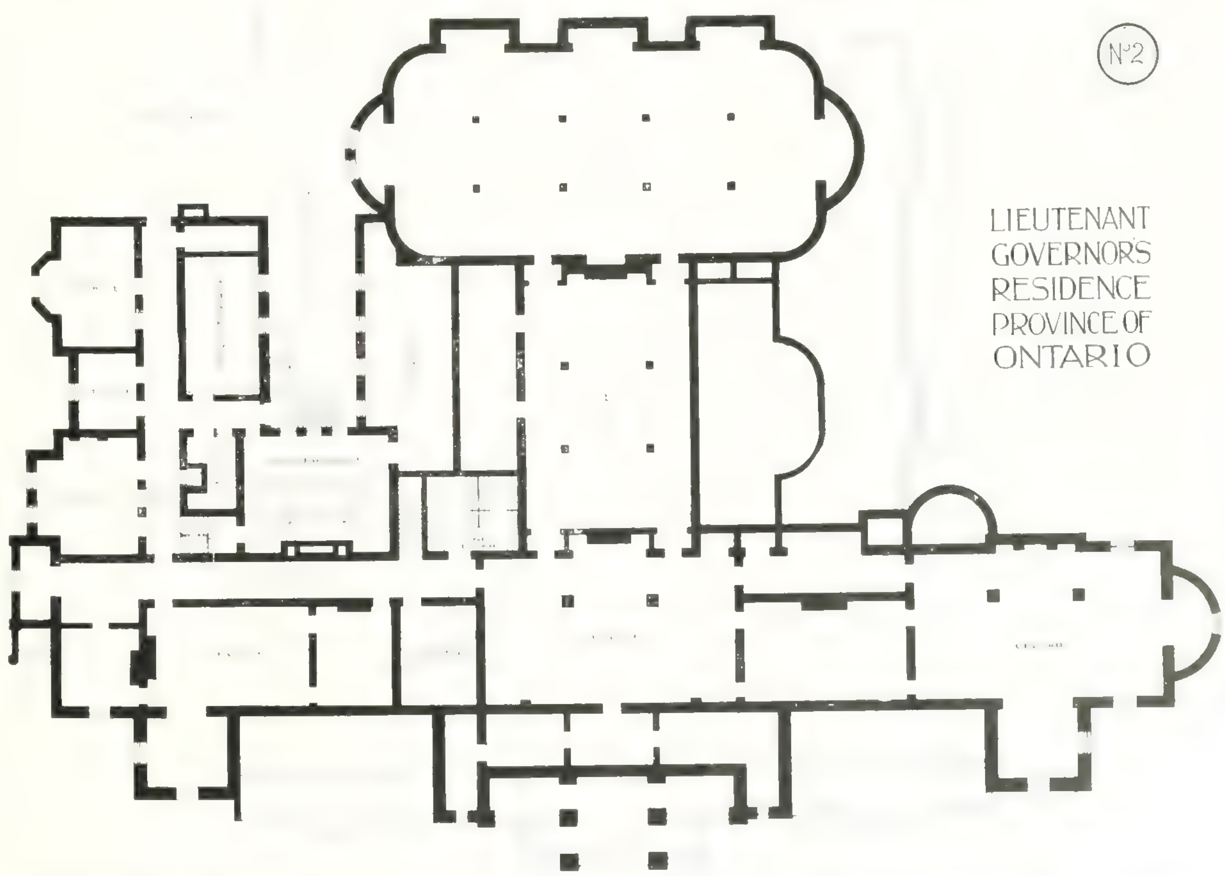


Plan of Steward's House, Stables and Garage, Competitive Design of Architect George W. King for new Ontario Government House, Toronto.

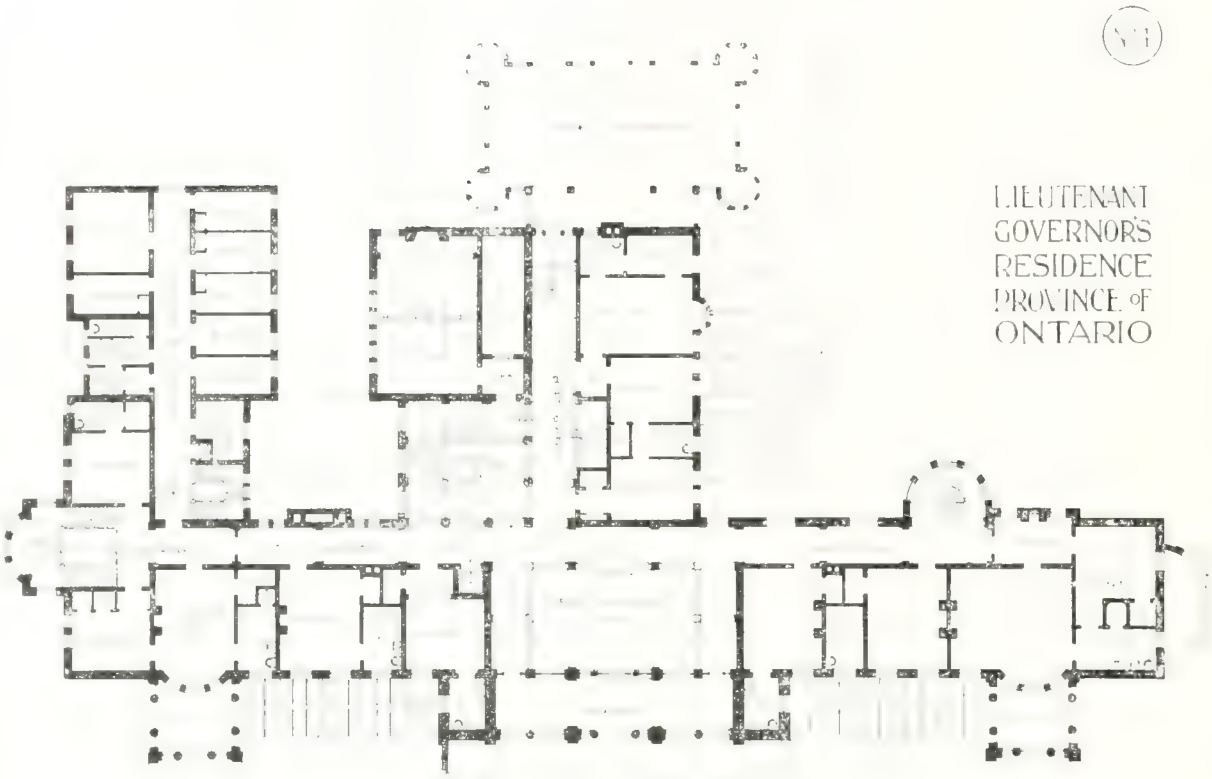
Elevation on Lane, Competitive Design of Architect George W. King, for new Ontario Government House, Toronto.



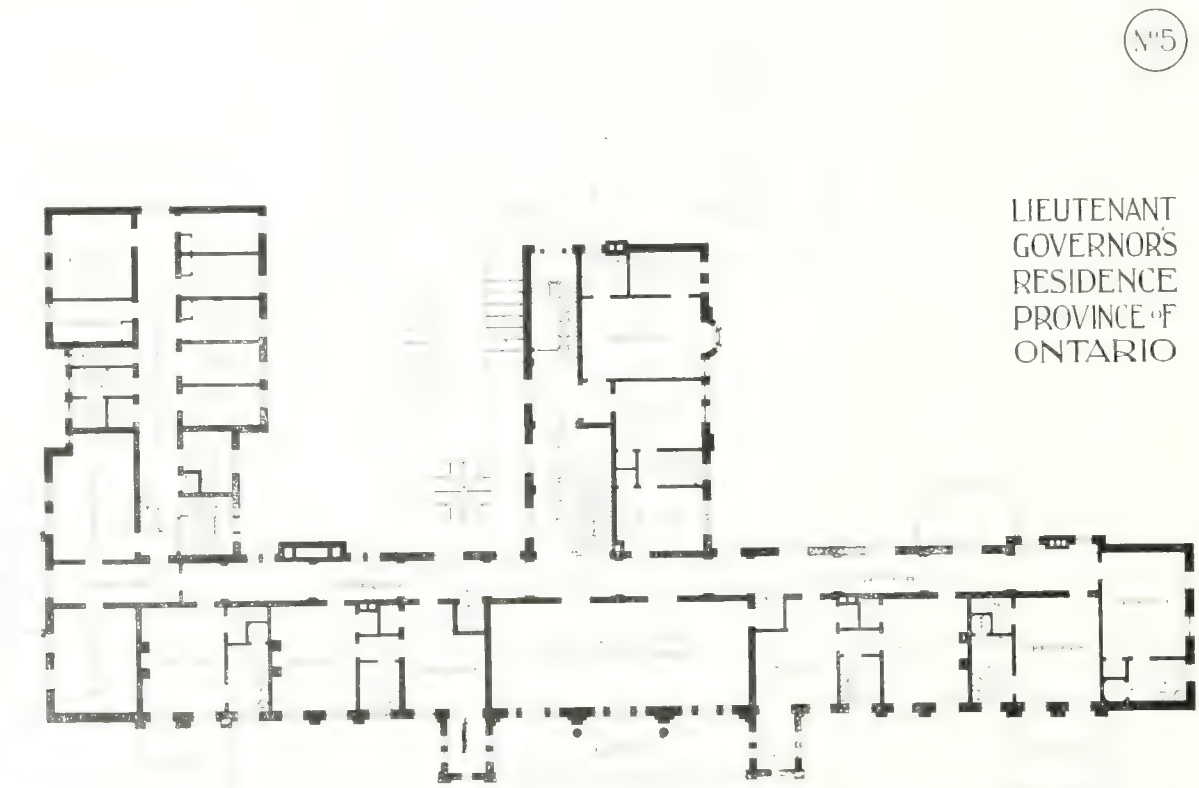
Ground Floor Plan, Competitive Design of Architect George W. King, for new Ontario Government House, Toronto.



Basement Plan, Competitive Design of Architect George W. King, for new Ontario Government House, Toronto.

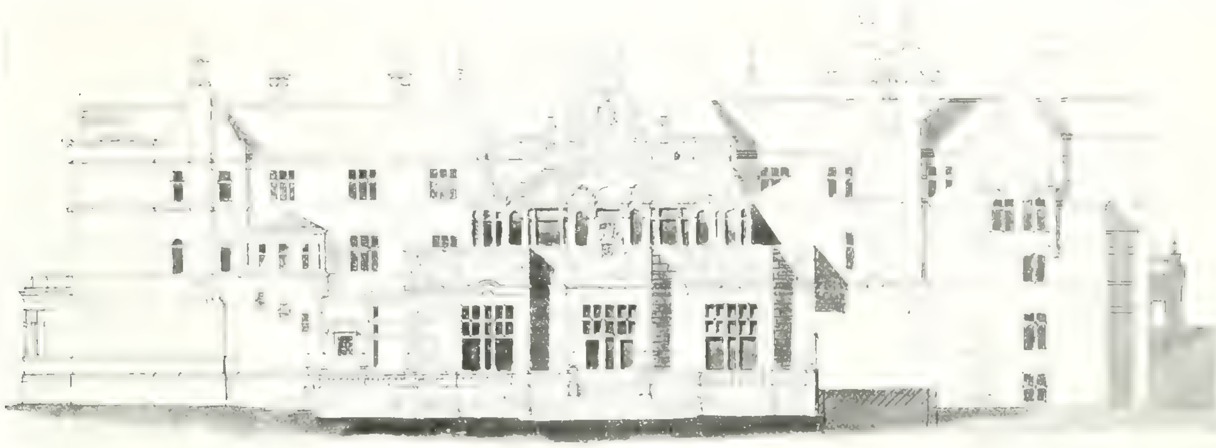


First Floor Plan, Competitive Design of Architect George W. King, for new Ontario Government House, Toronto.



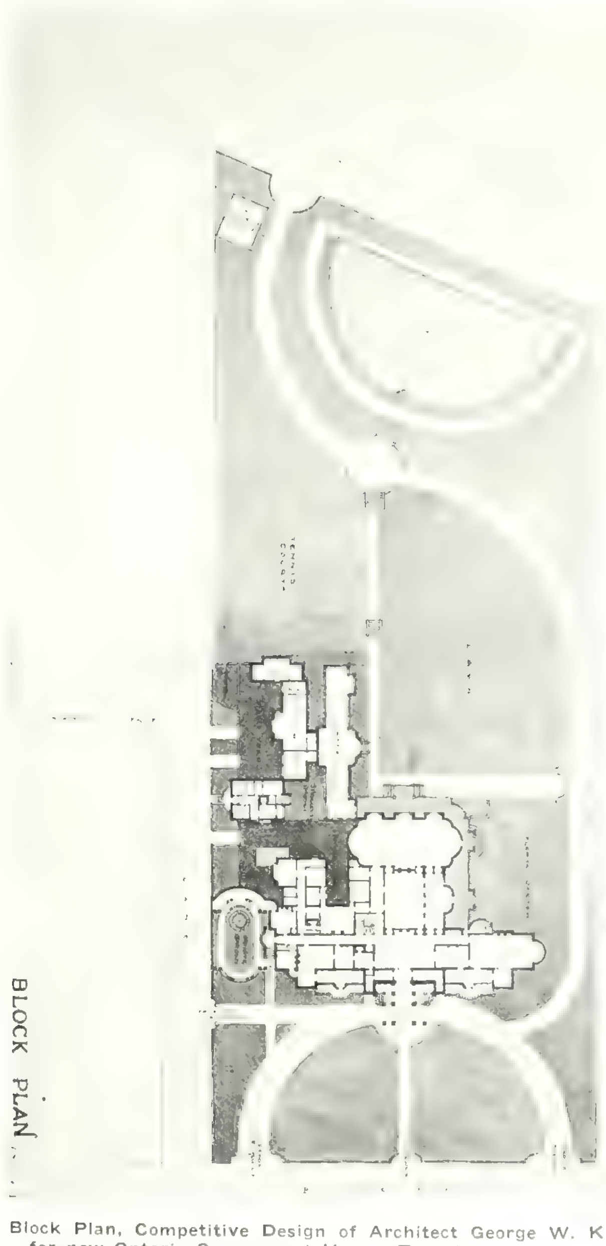
Second Floor Plan, Competitive Design of Architect George W. King, for new Ontario Government House, Toronto.

Another feature to which attention is called is the position of the billiard room. This is so placed that the entrance is off a landing of the grand stair-case, and by the main hall-way. The rear windows facing the north would be screened by leaded cathedral glass.



North Elevation, Competitive Design of Architect George W. King, for new Ontario Government House, Toronto.

and is isolated entirely from the bedrooms by both the well lighting the serving pantry and china closet,



Block Plan, Competitive Design of Architect George W. King, for new Ontario Government House, Toronto.

In addition to the full bedroom accommodation an extra room has been provided on the second floor. This could be utilized as a small ball room or children's room. Two of the sun-rooms provided are for the private use of occupants of the rooms which they adjoin.

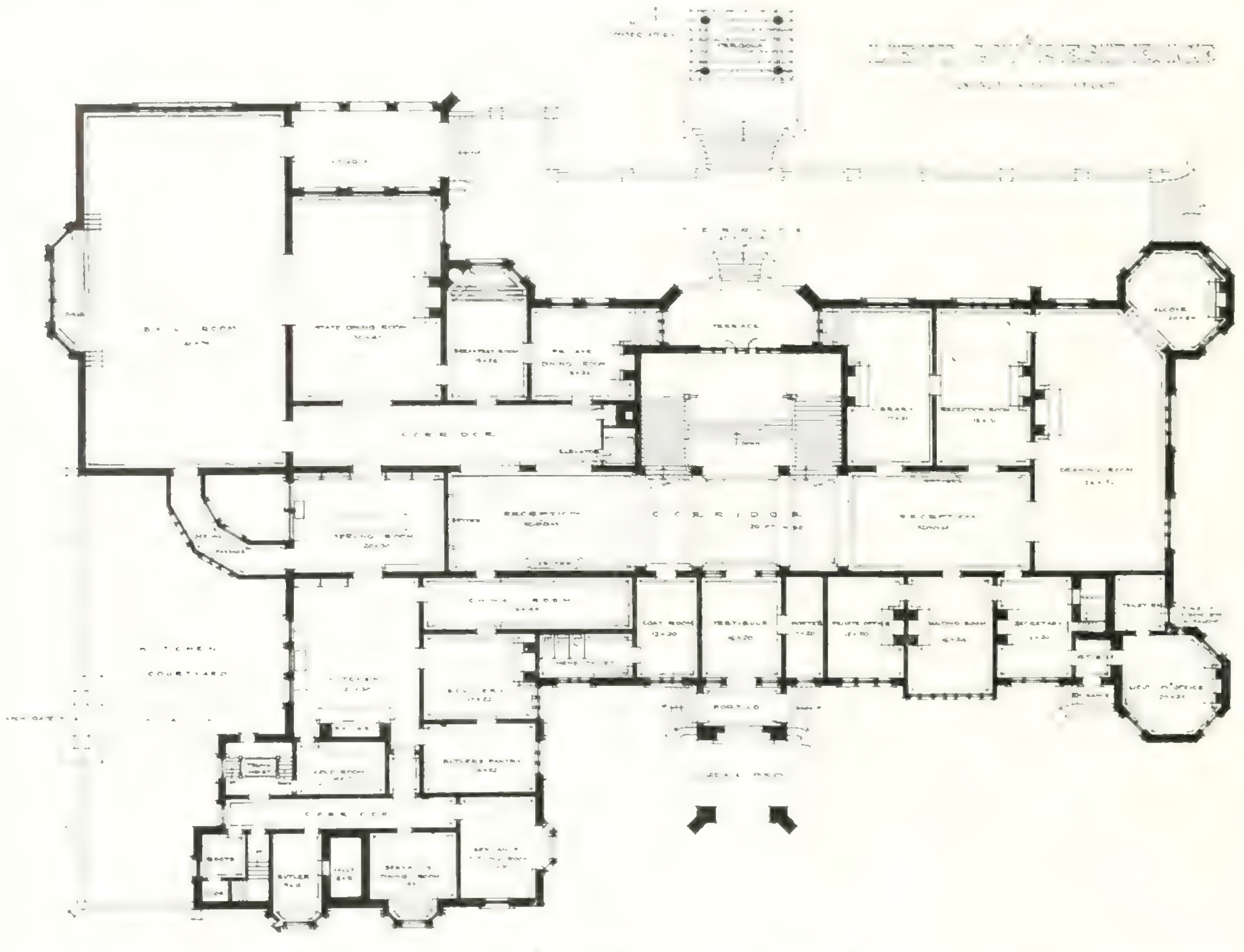
The servants' bedroom quarters are on two floors. These are arranged for direct communication, and are well lighted and easy of supervision.

The steward's house is advantageously placed on the grounds, and permits of ready supervision over the service department and the stables and garage which are self contained. The gardener's cottage which is similar in plans to that of the steward's house is situated to serve as a lodge at the rear entrance gate.

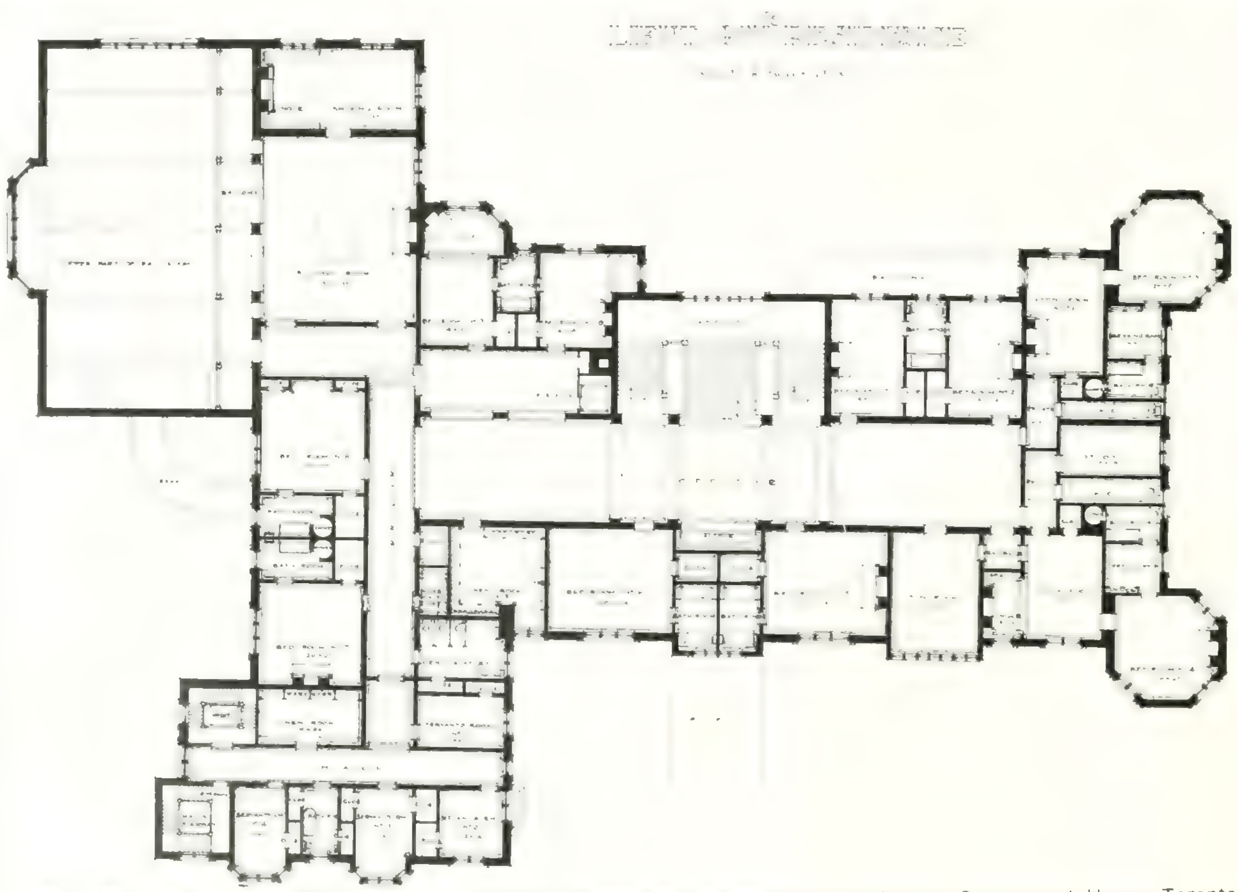
The stables have been placed off the lane, but should it be desired these can be located on that portion of the property across the ravine road, the same plan being adopted as is indicated by dotted lines in block plan. If this change should be effected the space now occupied would be added to the lawn, the conservatory forming an "L," obscuring the same from view of the steward's house. The outlay of the grounds has only been suggested, as its development would require the service of a landscape architect.

Architect Geo. W. Gouinlock's Design

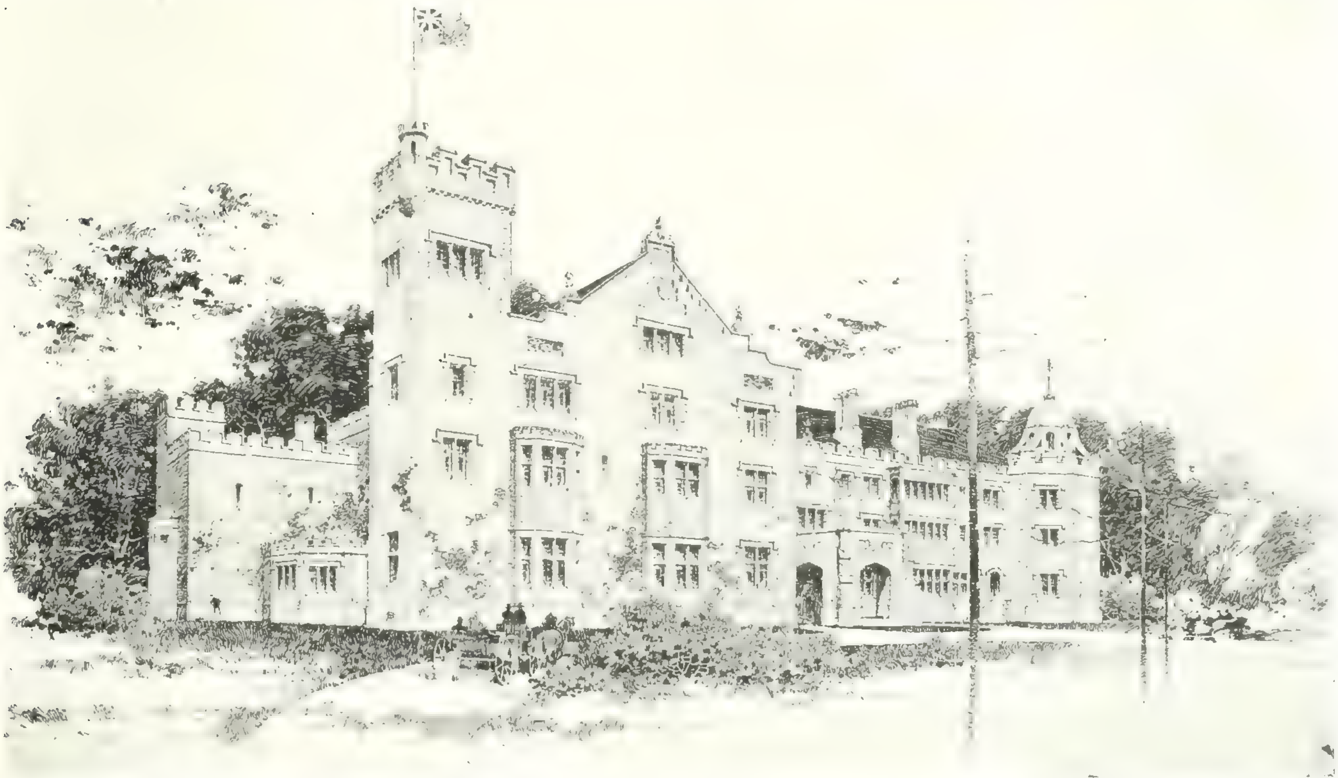
The design submitted provides for a baronial mansion in the Tudor style, with the exterior wall of light gray stone. The main entrance and Lieut.-Governor's offices are arranged to face Bloor Street (south) and the principal living rooms are so situated as to obtain the full advantage of the picturesque outlook along the ravine, at the north and north-east points. Attention is drawn to the arrangement of the ball room and banqueting hall, which are placed on the north west side; and also to the kitchen and service department situated in a westerly position, to which direct access can be obtained from Bismark Avenue. In addition to a private entrance



Ground Floor Plan, Competitive Design of Architect George W. Gouinlock for new Ontario Government House, Toronto.



First Floor Plan, Competitive Design of Architect George W. Gouinlock for new Ontario Government House, Toronto.



Perspective View From South-West Point. Competitive Design (Awarded Second Prize) of Architect George W. Gouinlock, for new Ontario Government House, Toronto.

from Bloor Street, the Lieut.-Governor's offices connect with the corridors of the main hall. Briefly, the general arrangement and communicating features of the plan seem eminently suitable for the private and semi-public needs of a residence of this character. The second floor is taken up entirely with bedrooms having adjoining baths. These include two private suites, one of the Lieut.-Governor and one for State guests.

It is intended that the garage and stables should be located down the hill on the Rosedale Ravine Road with the approach from these buildings by the way of Park Road and Bismark Avenue. The residence and subsidiary buildings, it is estimated, can be built at a cost of $250,000.

Architect John M. Lyle's Design

In this design an endeavor has been made to make the buildings comprising the group, simple in plan, domestic in character and at the same time dignified and semi-public in appearance. Taking into account the fact that the buildings are intended to serve as the official home of Ontario's highest dignitary and in accordance with the accepted custom be opened to the public on state occasions, it seems important that these three considerations should essentially form the key note of the general scheme.

The style selected is the Georgian, which is both decidedly appropriate for a building of this purpose, and particularly well adapted to local climatic conditions. This style has all the simplicity and domestic charm that is associated with the homes of England, and is capable of being invested with great dignity by the judicious use of columns and cornice treatment. The provision of the programme restricting the cost of the building, together with the laying out of the grounds, roads, walks, etc., to a sum not to exceed $225,000, has been thoughtfully considered, as have also the specified requirements regarding accommodations in both the Government House proper and subsidiary buildings; and while it would be possible to carry out the entire work mentioned at the amount stipulated, the type of construction would necessarily have to be of the plainest and simplest character. In this connection, the opinion is ventured that in such a large and important residence as this, which houses a large number of people, the construction should be fireproof in character, and that an additional appropriation sufficient to cover the increased cost necessitated in this respect, would greatly be to the advantage of the investing party.

Subjoined is a brief outline of what is considered some of the more noteworthy features of the plan and general scheme.

1. Arrangement of Service: Special service, connecting between ball room, breakfast parlor and State dining room. Convenience of service wing to lane.

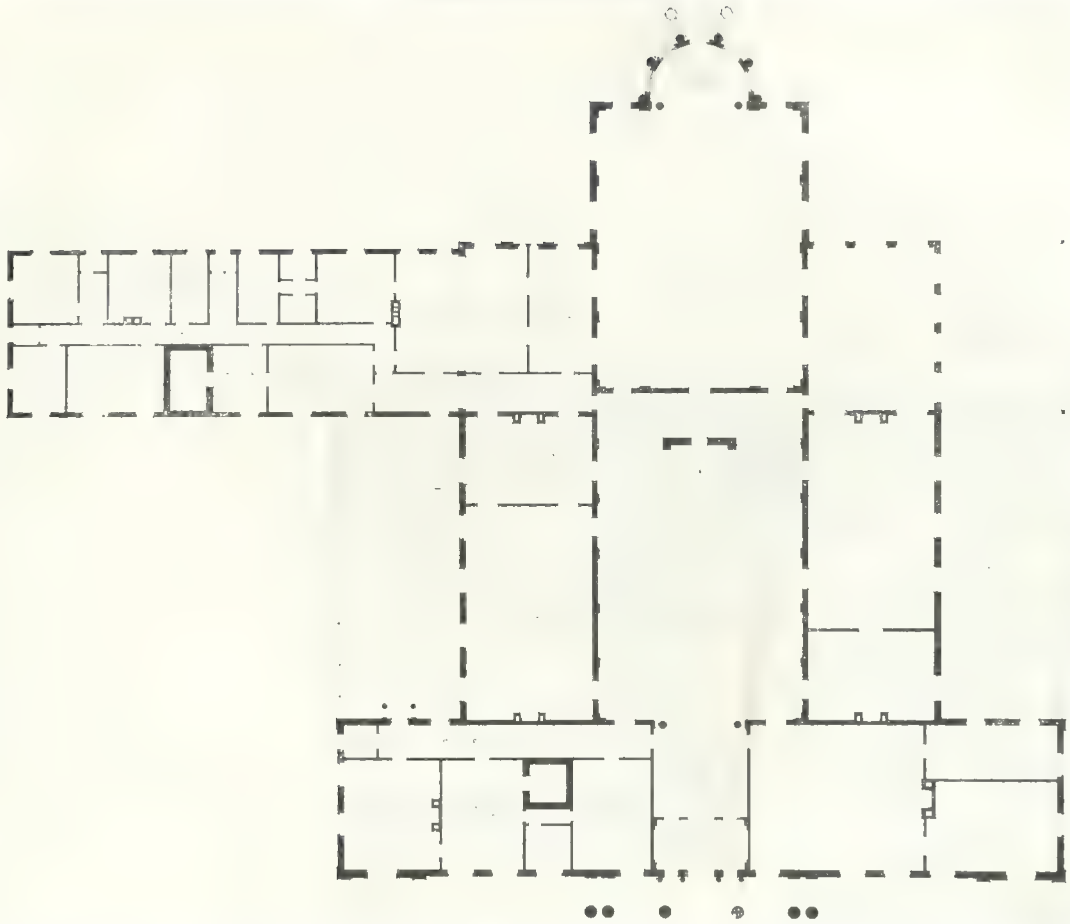
2. The lighting of the main hall and first floor halls.

3rd. Second bedroom storey not treated as attic storey, so giving a bed room floor equally as good as the floor below.

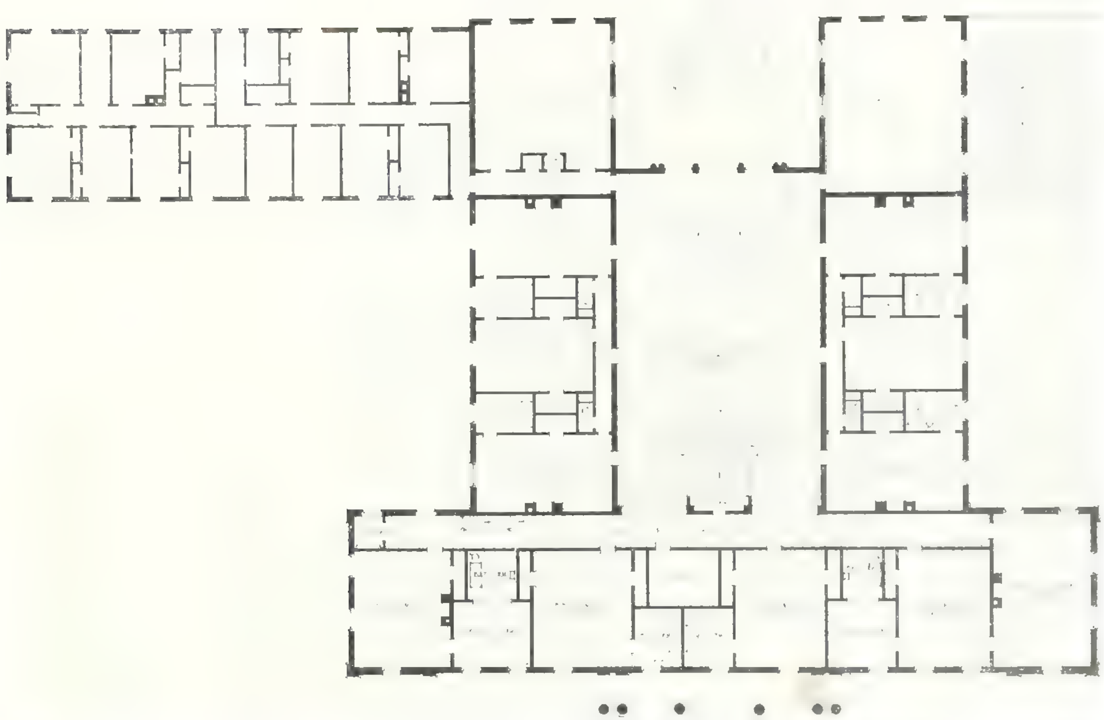
4th. Stable and Garage placed in ravine lot, so avoiding objectionable odors in the immediate neighborhood of the main building. (Connected by 'phone).

5th. Kitchen yard to be walled in with corresponding rose garden on opposite side, so giving attractive lawn and terracing on the garden side.

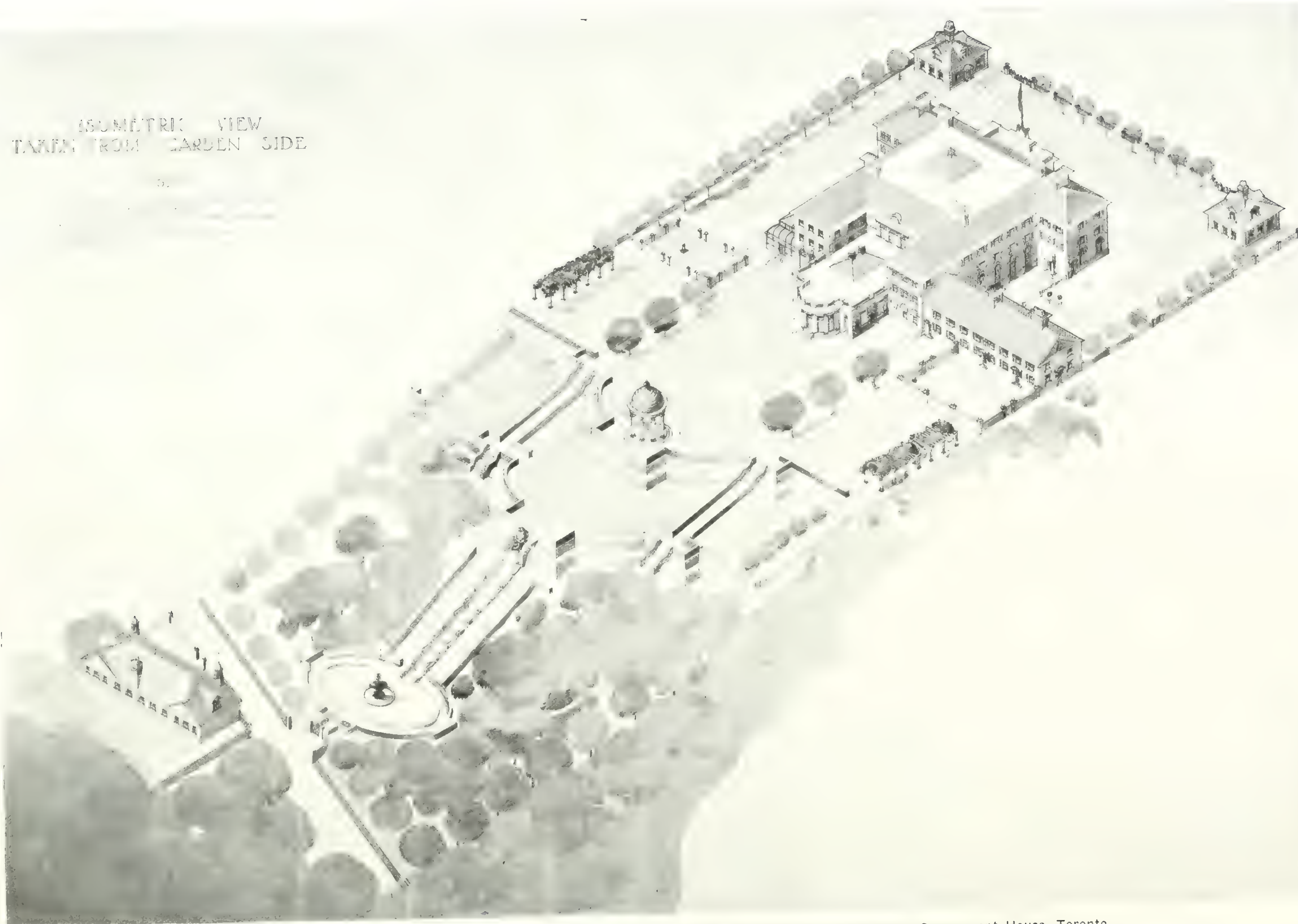
1.—Perspective View from Bloor Street. 2.—Garden Elevation. 3.—Front Elevation. 4.—Section on Centre Line—Competitive Design of Architect John M. Lyle for new Ontario Government House, Toronto.



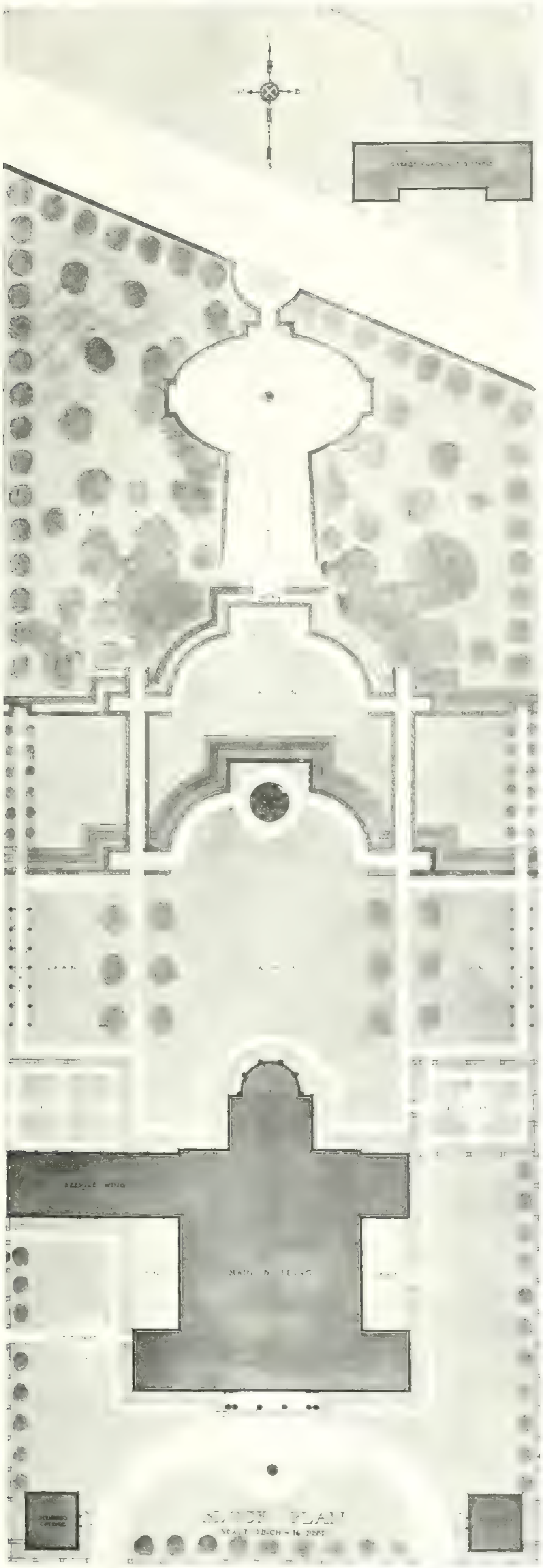
Ground Floor Plan, Competitive Design of Architect John M. Lyle for new Ontario Government House, Toronto.



First Floor Plan, Competitive Design of Architect John M. Lyle, for new Ontario Government House, Toronto.



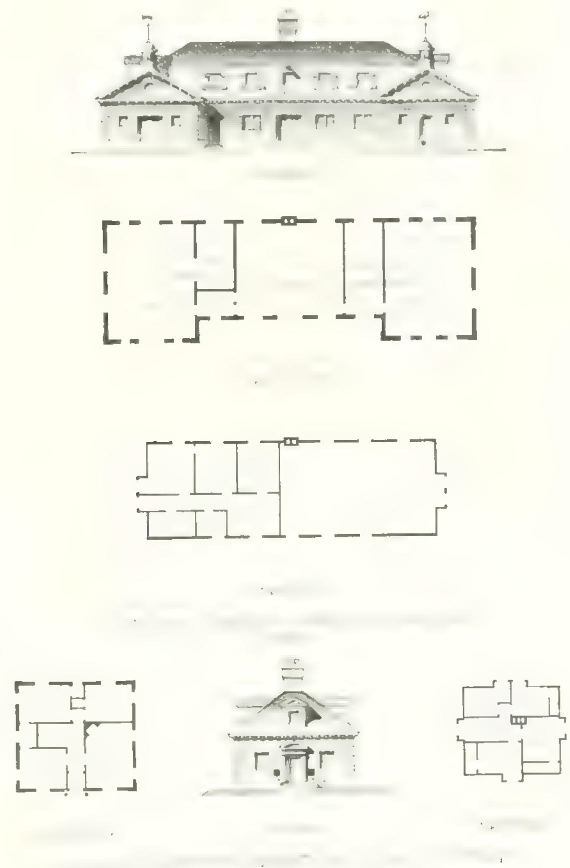
Isometric View from Garden Side Competitive Design of Architect John M. Lyle, for new Ontario Government House, Toronto.



Block Plan, Competitive Design of Architect John M. Lyle, for new Ontario Government House, Toronto.

6th. Trunk entrance allowing trunks to be placed directly in elevator.

As regards heating, it is suggested that a hot water system be used, and that a fan system be installed to ventilate the principal rooms.



Plans and Elevations of Gardener's and Steward's Cottages—Competitive Design of Architect John M. Lyle, Toronto.

Upon examination of the accompanying drawings, it will be observed that special consideration has been given to the garden side of the scheme. As the site lends itself particularly to a formal arrangement with a chateau d'eau effect, the development at this point logically coincides with the natural advantages offered; hence the treatment of the terraces

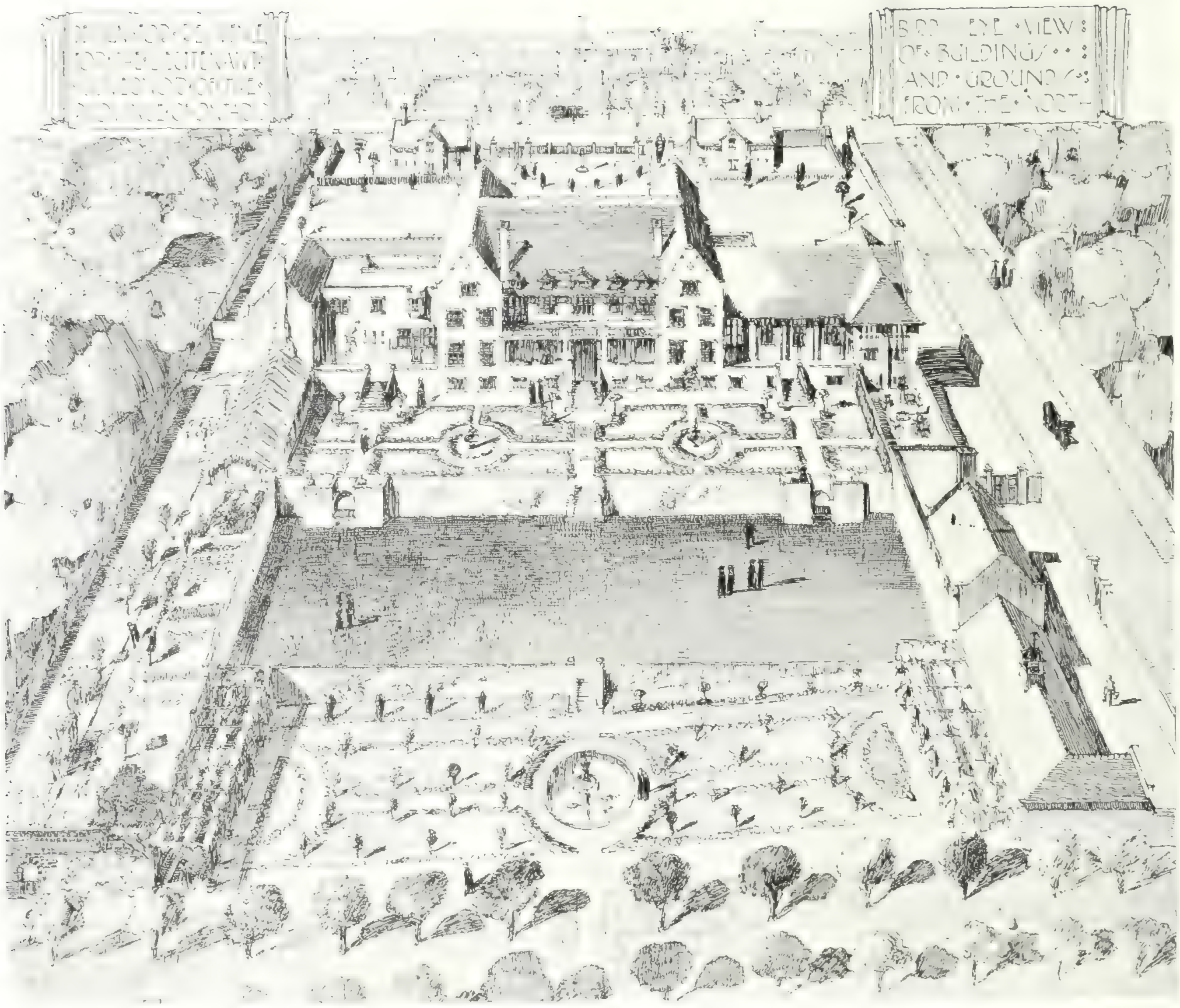
Perspective Diagram, Competitive Design of Architect John M. Lyle, for new Ontario Government House, Toronto.

and garden side of the building were regarded as even more important than the front elevation.

Messrs. Bevan & Moore's Design

This design, illustrated by the accompanying drawings and perspective views, is based on the requirements issued to the competing architects.

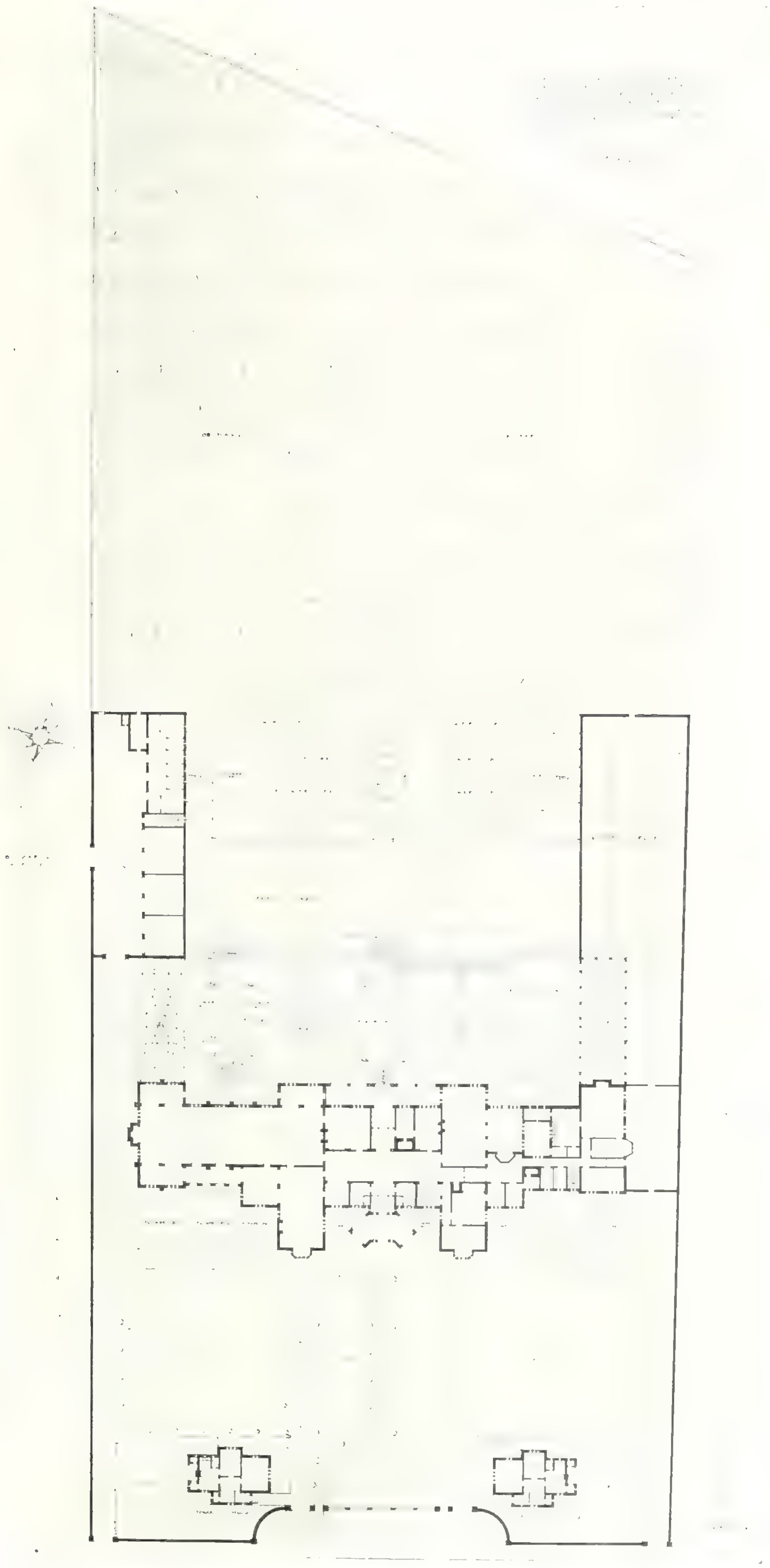
From a careful study of the site and levels, it was felt that the residence should not be placed too far



Isometric View from the North. Competitive Design of Messrs. Bevan and Moore, for new Government House, Toronto.

Perspective View from Bloor Street. Competitive Design of Messrs. Bevan and Moore, for new Ontario Government House, Toronto.

back from Bloor Street East, but should be so situated that while allowing sufficient setting to ensure dignity and privacy, yet that access should be gained to the stables, not only from the front entrance, but also from Bismark Avenue and lane. Upon reference to the site plans, it will be seen how this has been accomplished. At the entrance from Bloor, the steward's and gardener's cottages have been placed, acting as lodges to the entrance gates. The residence would be centrally situated, flanked on the west and east by the ball room, and kitchen and servants' wings respectively.

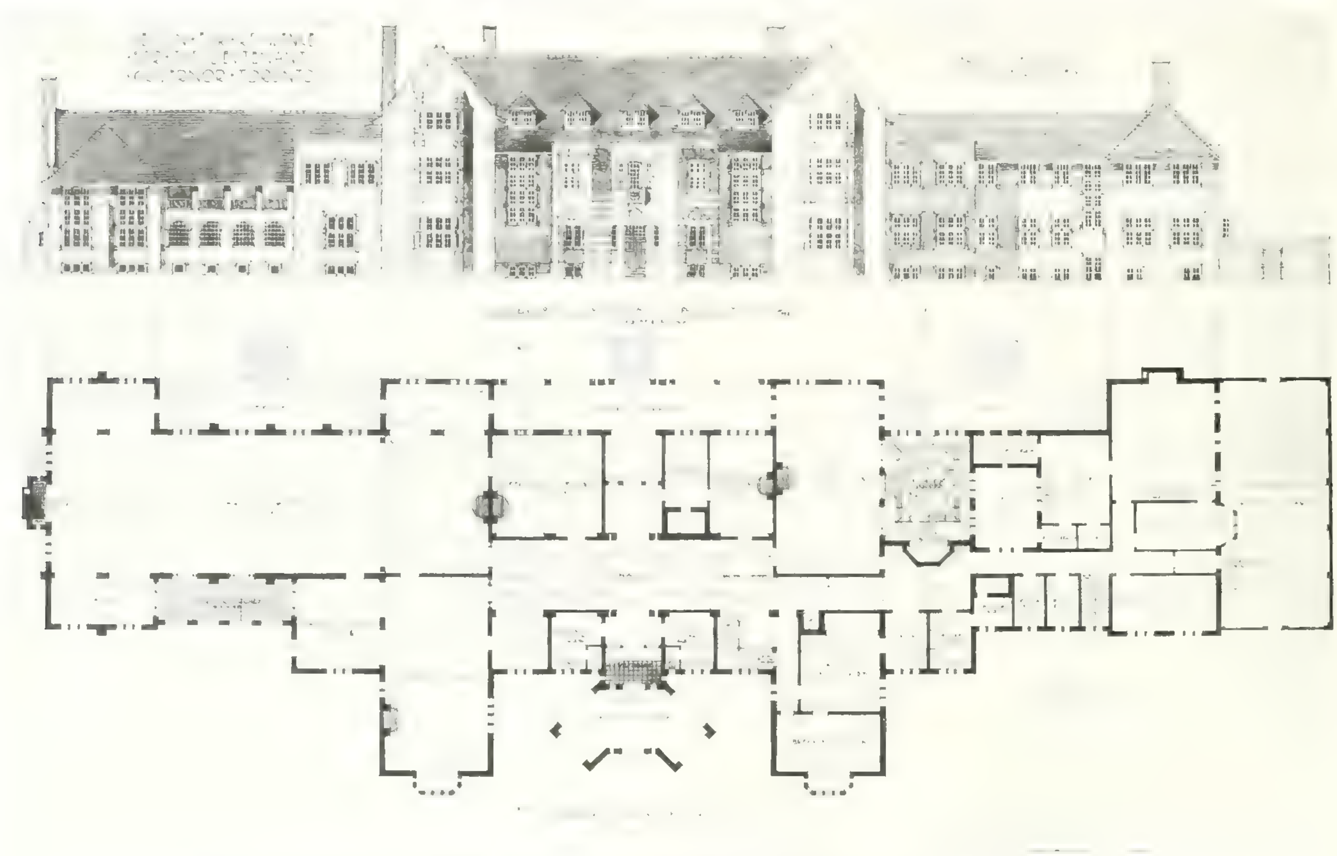


Block Plan, Messrs. Bevan and Moore's Design, for new Ontario Government House, Toronto.

To the north of the residence a spacious formal terrace garden is proposed, flanked in similar manner by the rose garden and greenhouse, while a flight of steps would lead at a lower level to the tennis lawn or bowling green, which would be enclosed on the west side by the coach house and garage, and on the east by the kitchen garden wall. This lawn in turn would open onto a flower garden, having a lily pond and pergolas, and flanked by the stables and kitchen garden, and thence to the orchard, thus leading gradually from the formal to the less formal setting. The formal disposition and the broad and simple treatment of the scheme should impart a fine and dignified effect to the whole, while the terraces, flights of steps and flowers should make an attractive and picturesque setting for the residence.

The endeavor has been to take full advantage of the site by careful study of not only that part upon which the residence would stand, but of the whole site, its aspects, character, contour, etc.

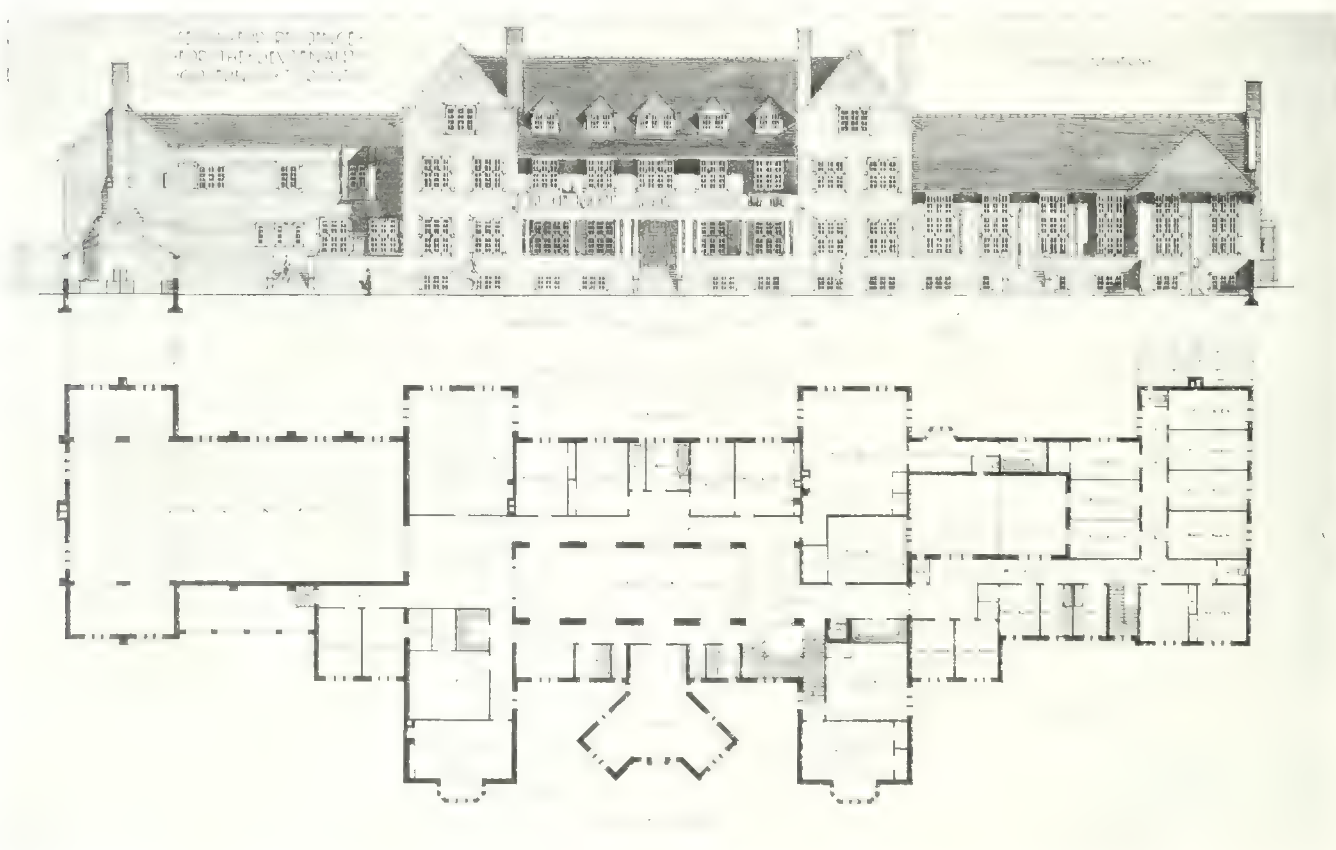
"To leave a house exposed upon the site, unscreened and unterraced, is not to treat the site of the house fairly," has been said by a late eminent architect and authority on such matters. The charm of



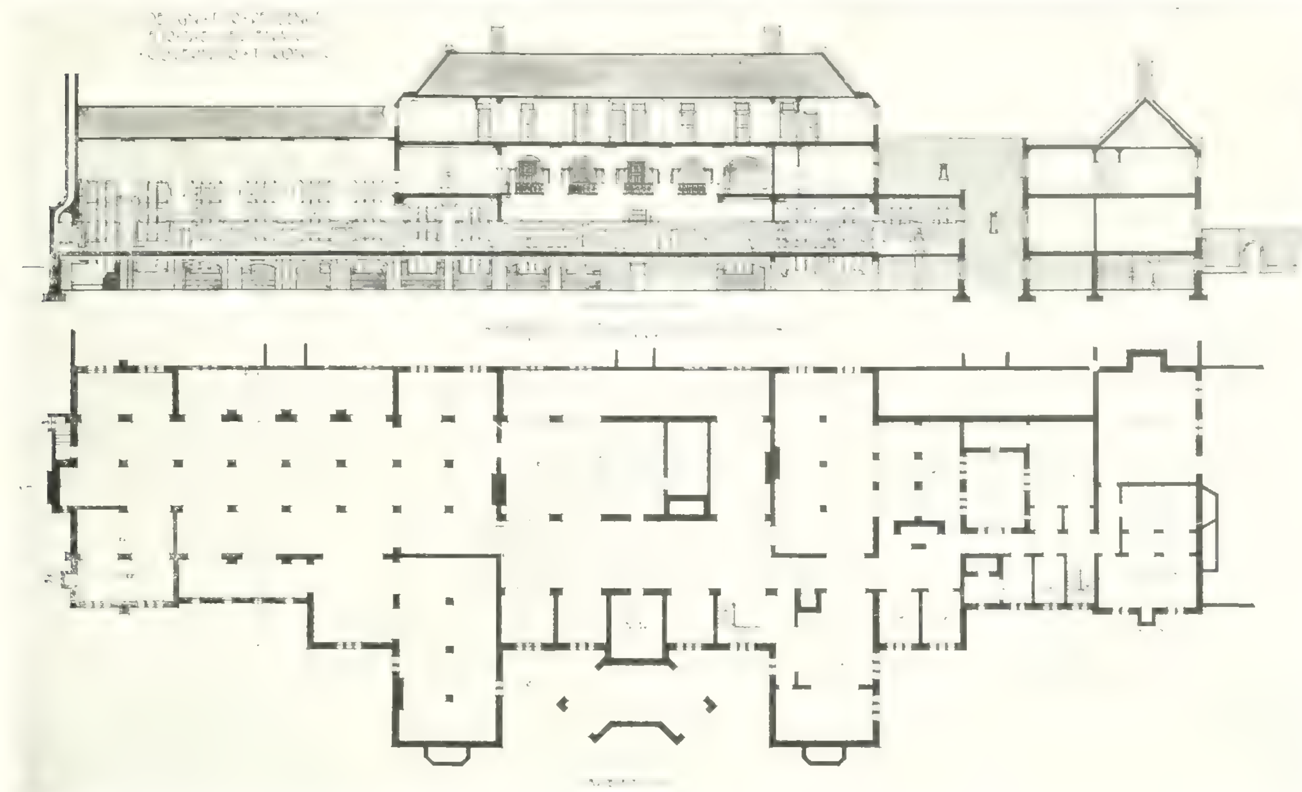
Competitive Design of Messrs. Bevan and Moore for new Ontario Government House, Toronto.

the old manor and stately house of England, where the art of domestic architecture had reached its highest perfection, is to be found in the architectural setting of terraces, steps, etc. Again, in Italy, no residence of importance was complete without its formal garden and terraces, and in a residence of such importance as that under consideration, and on a sloping site, there could be no question that some such treatment was not only desirable, but really essential.

The bird's eye perspective gives some idea of the proposed scheme, but in the absence of color much is undoubtedly lost of the effect which would ultimately be secured. The treatment of the sloping



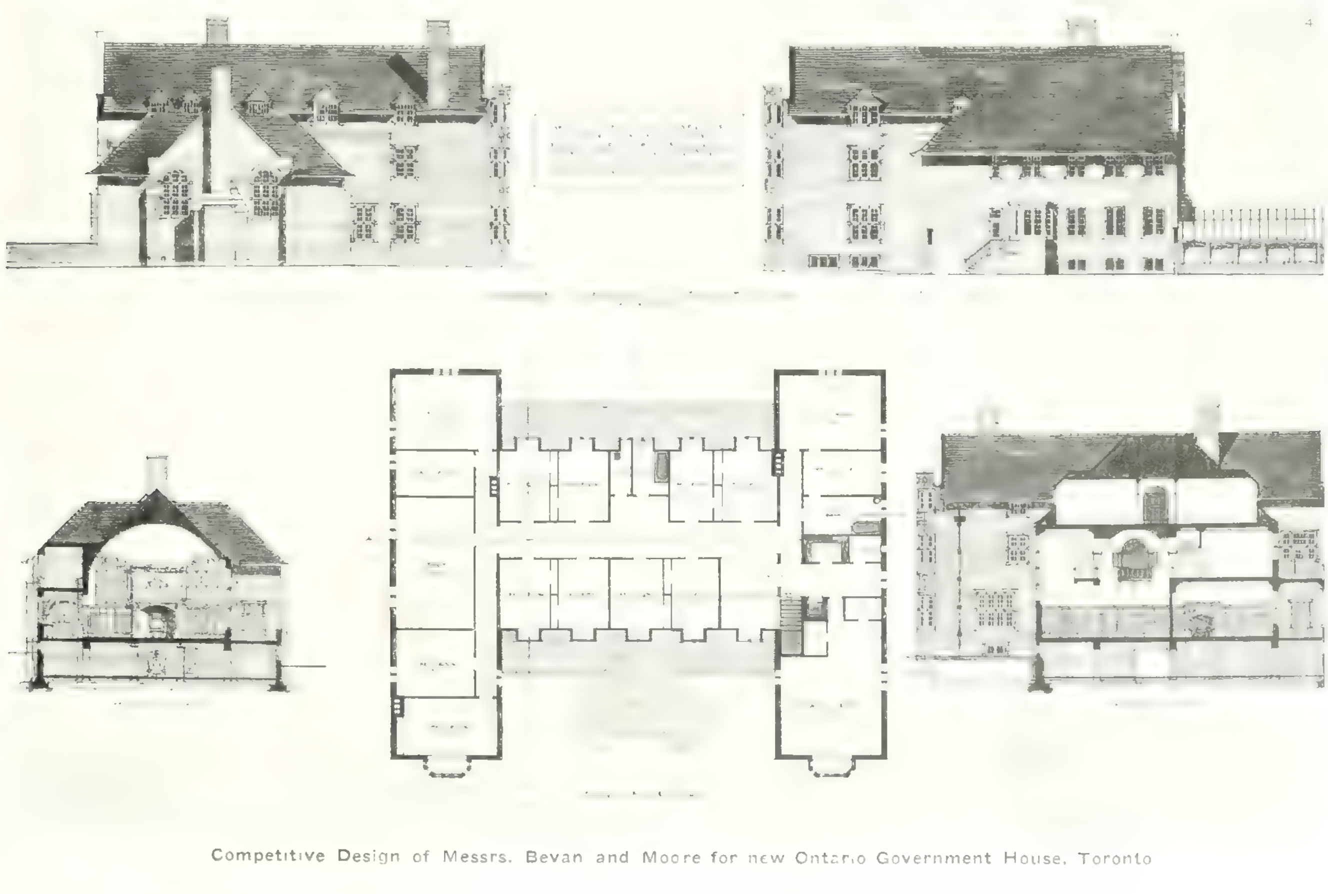
Competitive Design of Messrs. Bevan and Moore for new Ontario Government House, Toronto.



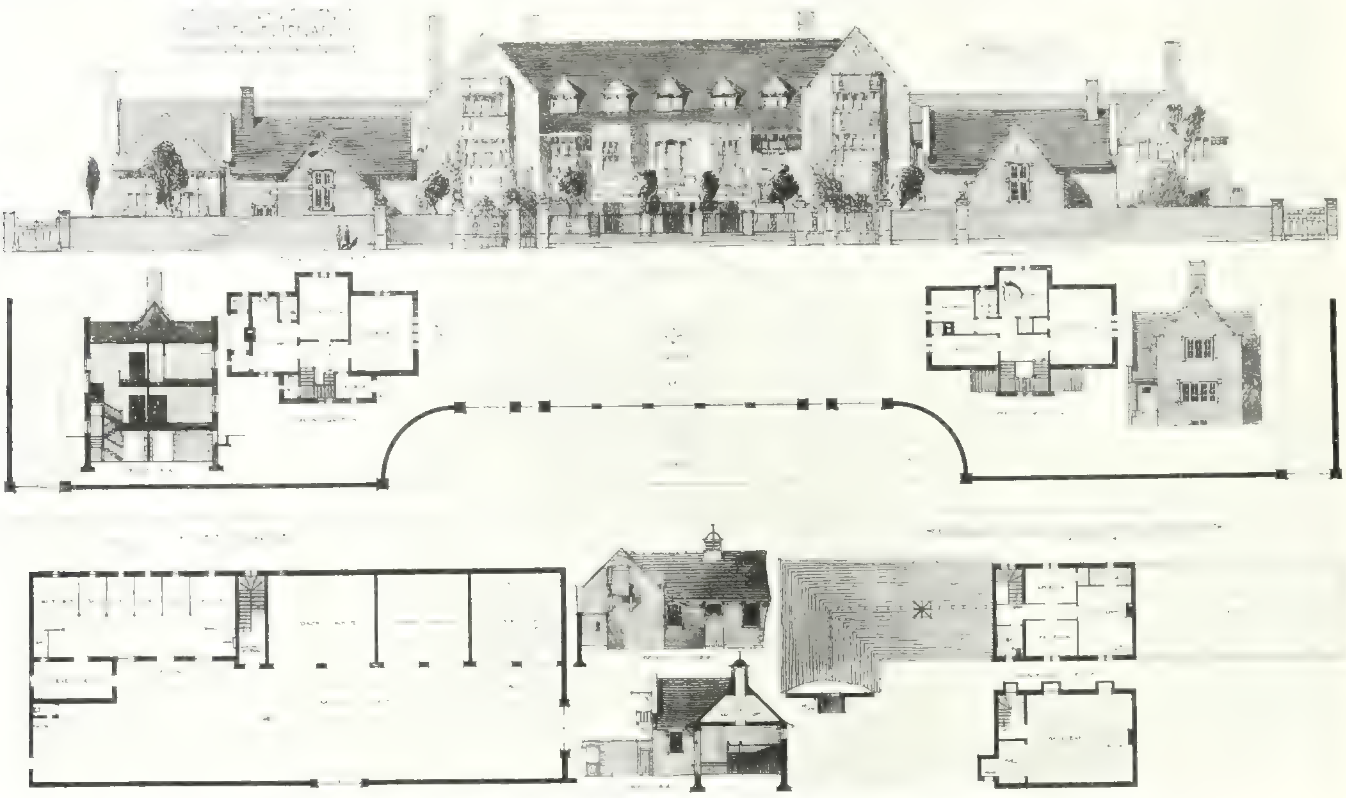
Competitive Design of Messrs. Bevan and Moore for new Ontario Government House, Toronto.

hillside by a system of terracing and gravel walks and steps of easy gradient suggested itself in the preliminary studies, but was abandoned in favor of the planted arrangement, owing to the increased cost. If deemed advisable, and by an additional expenditude, this idea could still be carried out either as a part of the present scheme or as a development of the future, when the ravine itself has received proper attention.

The plans fairly explain themselves, but one or two points might be worth mentioning. The entrance to the residence is under a porte-cochere over which is placed the library, and immediately on either side of the entrance vestibule would be found separate lavatories and cloak rooms for ladies and gentlemen. The hall, which is immediately entered from the vestibule in the centre of the south side would be a spacious and lofty apartment, and with its panelled



Competitive Design of Messrs. Bevan and Moore for new Ontario Government House, Toronto



Competitive Design of Messrs. Bevan and Moore for new Ontario Government House, Toronto.

walls, arches and balconies and coved and plastered ceiling, and lighted by two large and lofty windows, should prove a striking feature immediately on entering the residence.

The reception room is in front on the other side of the hall, and adjoins the ball room. The ball room would also form an important feature in this scheme, with its lofty windows, enriched semi-circular ceiling, and stone ingle fire-place at the end; moreover, the recesses at the ends of the room would tend to enhance the effect and give an idea of spaciousness. Access could be gained to the terraces and garden on the north from this room, while to the south the drawing room could be entered directly or through a conservatory. A small peep could be obtained into the ball room from the lounge on the first floor, and it is here the orchestra could be played, should occasion require.

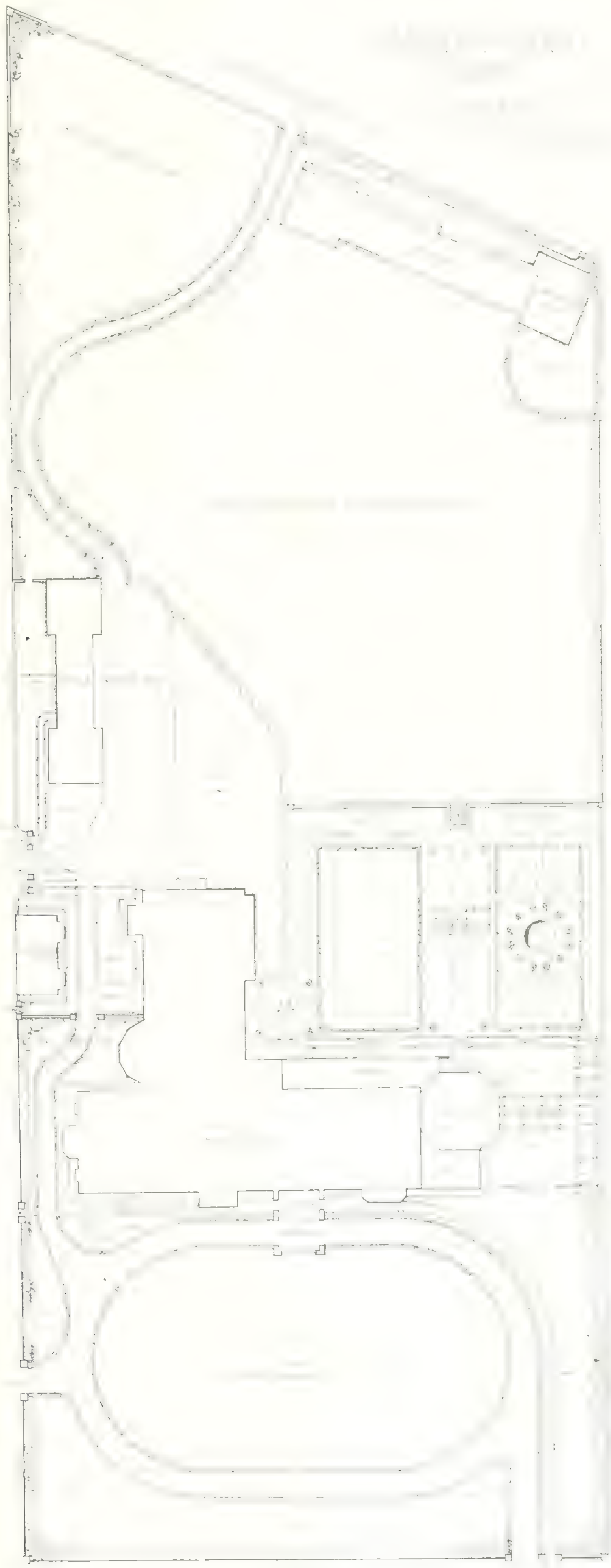
The drawing room is so situated that it would get the morning sun. At the other end of the hall is placed the state dining room, opening into a winter garden or palm room, also on to the terrace. The winter garden, with its colored marble floors, walls and fountain, should prove an attractive and welcome addition to the residence. The servery is so placed that it would serve both the state and private dining rooms and has butlers' rooms, etc., arranged in connection therewith.

The Lieut.-Governor's room and Secretary's office are also entered from the hall on the north side and the breakfast and private dining room on the south. The former room would get the morning sun. A covered verandah is provided to the north. The kitchen and servants' rooms, their bedrooms on the floor above and separate tradesmen's entrances have all been kept together in the east.

On the first floor is placed the library and billiard room. From the latter access would be gained to a balcony over the covered verandah below. The sun room is placed to the south over the conservatory at the side of the ball room and the various bedrooms planned as shown. The second floor is devoted to bedrooms, sewing and store rooms.

If it were considered desirable to place the servants on this floor, and give the whole of the first floor to bedrooms, it could easily be arranged by a slight modification of the plans. In fact, there are many possibilities in the planning of internal arrangements in such a scheme, and it is reasonable to presume that personal contact and consultation with the promoters in the final study, would lead to an ideal arrangement.

The stables and garage are detached from the residence and kept sufficiently far away to avoid any unpleasant odor, but not so far as to be at an inconvenient distance, and would, as planned, greatly help in the general composition and lay out of the scheme. The arrangement of stables, coach house and garage, opening onto a common yard, and yet



Block Plan, Competitive Design of Messrs. Chadwick and Beckett, for new Ontario Government House, Toronto.

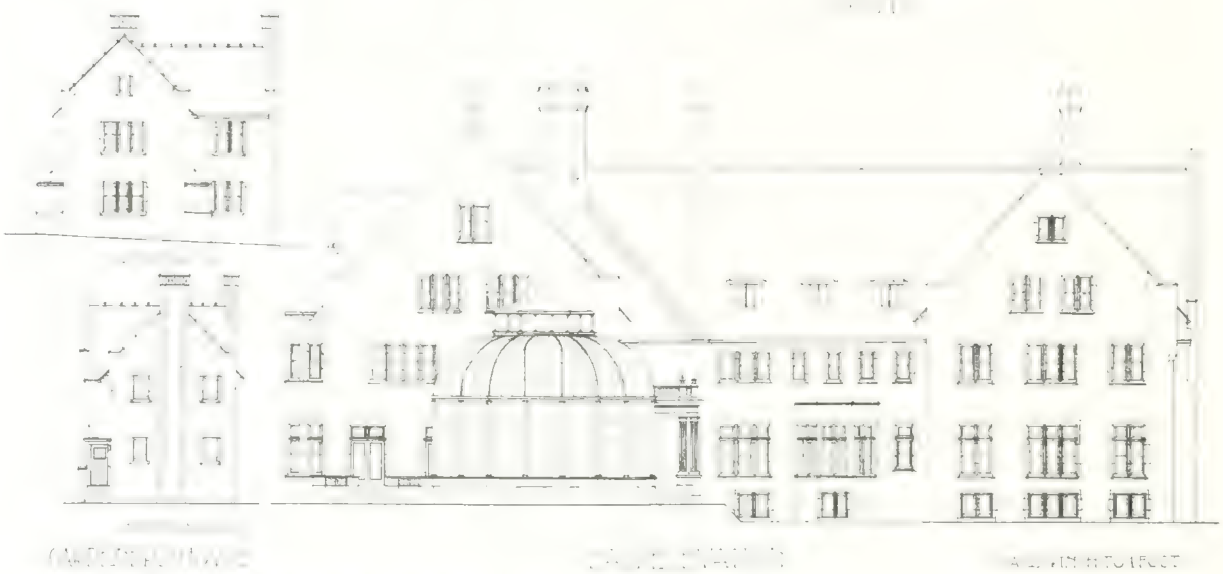
quite separate for their respective purposes, should prove commendable from every standpoint.

Suitable cottages for the steward and gardener are provided at the entrance, each with its garden, but screened from the lawns of the residence by hedges.

The type of architecture adopted is a simple treatment of the Elizabethan period, when domestic work reached its perfection, and would rely on its good outline, handling of materials, and colors for its effects, rather than on the elaboration of unwarranted and expensive detail. While considering the question of style, it was felt that in order to meet the requirements as to cost, and at the same time give results commensurate with the architectural possibilities of the site, the adoption of simple and dignified lines in the architecture of the buildings was absolutely essential; consequently there has been a conscientious endeavor to solve the problem in a logical and straightforward manner, keeping within the limit of expenditure. The type selected, it is found, lends itself more readily to present needs in a house of this character, than severe classic or renaissance, which is not so pliable.

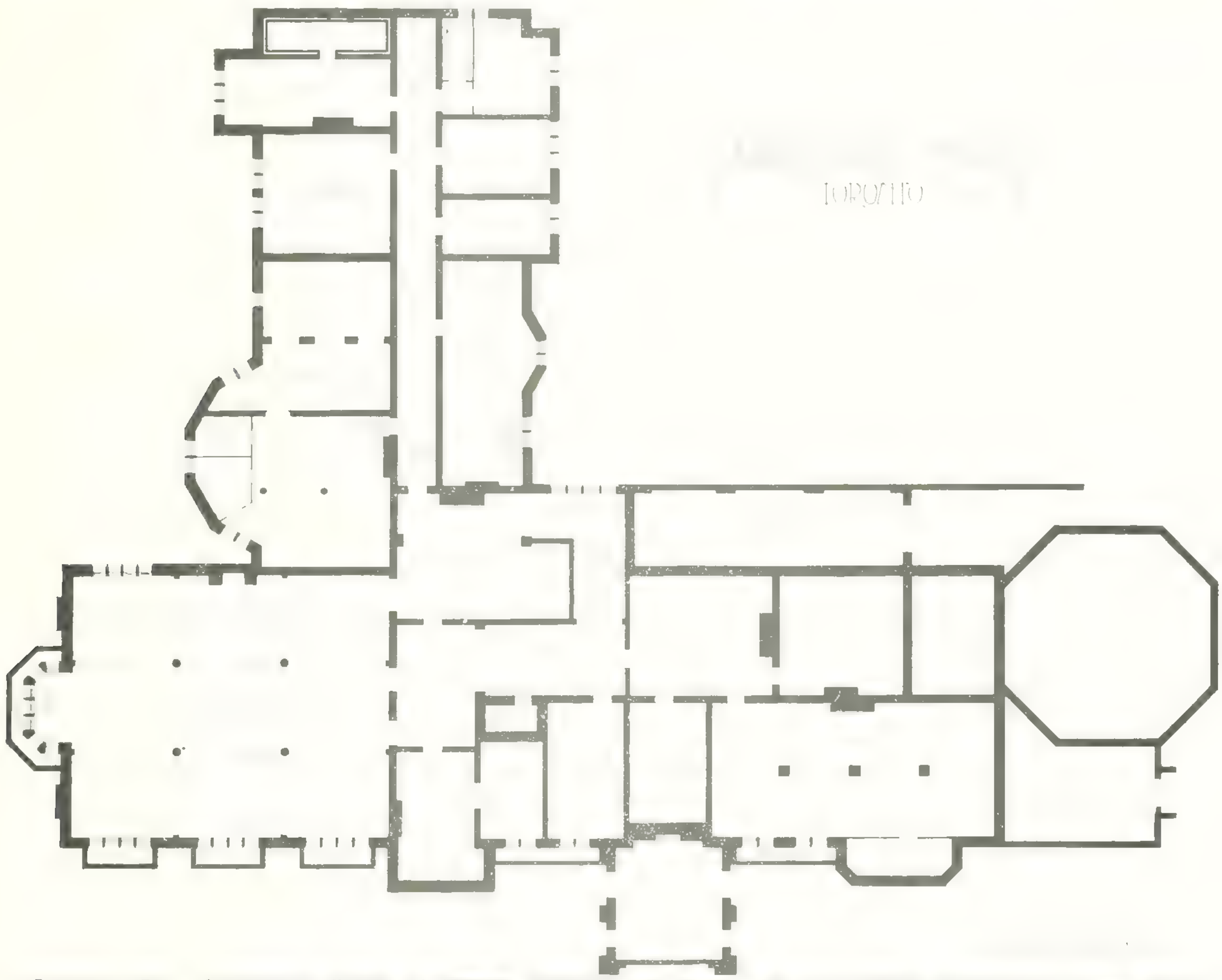
It is proposed to erect buildings of (1) gray stone, the wall faces to be broken ashlar and the trimmings of cut stone, or (2) No. 1 pressed brick laid up in Flemish or English bond, with a struck white or raked gray mortar joint. Cut stone trimmings would be combined for use in sills, jambs, mullions, heads, moulded work, etc. The roofs would be covered with gray green slate. The interior finish would be in hardwood; that in the servants' wing of Georgia or white pine; ceilings and walls plastered, oak dadoes in ground floor rooms, with the exception of reception room, which would be finished in Circassian walnut; plaster ceiling of ball room constructed on metal ribs and furring; ground floor fireplaces of cut stone with the exception of of reception room, drawing room and state bedroom, which will be of marble, other fireplaces of brick and tile. The floors of basement would be in cement,

South Elevation, Competitive Design of Messrs. Chadwick and Beckett, for new Ontario Government House, Toronto.

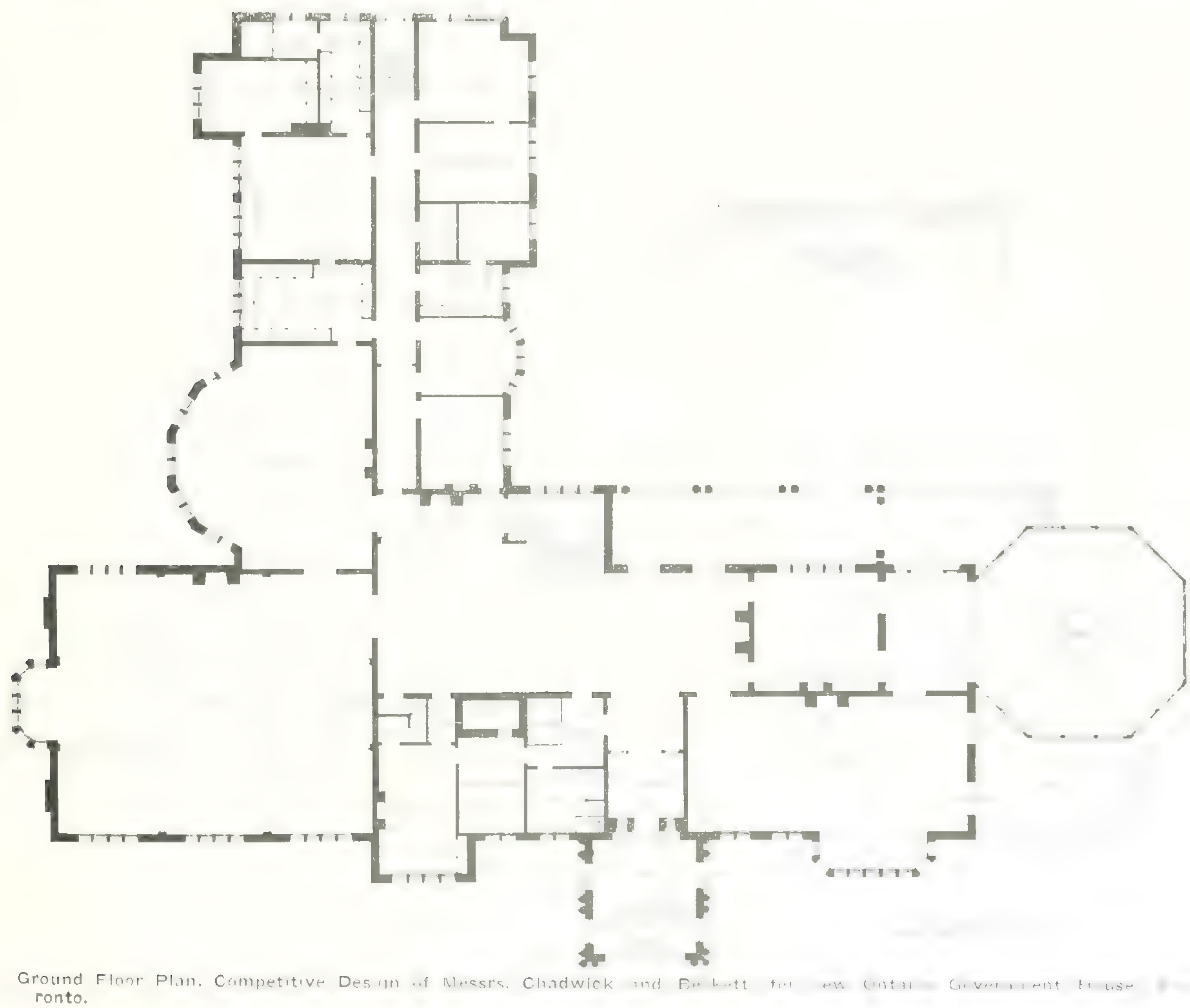


East Elevation, Competitive Design of Messrs. Chadwick and Beckett, for new Ontario Government House, Toronto.

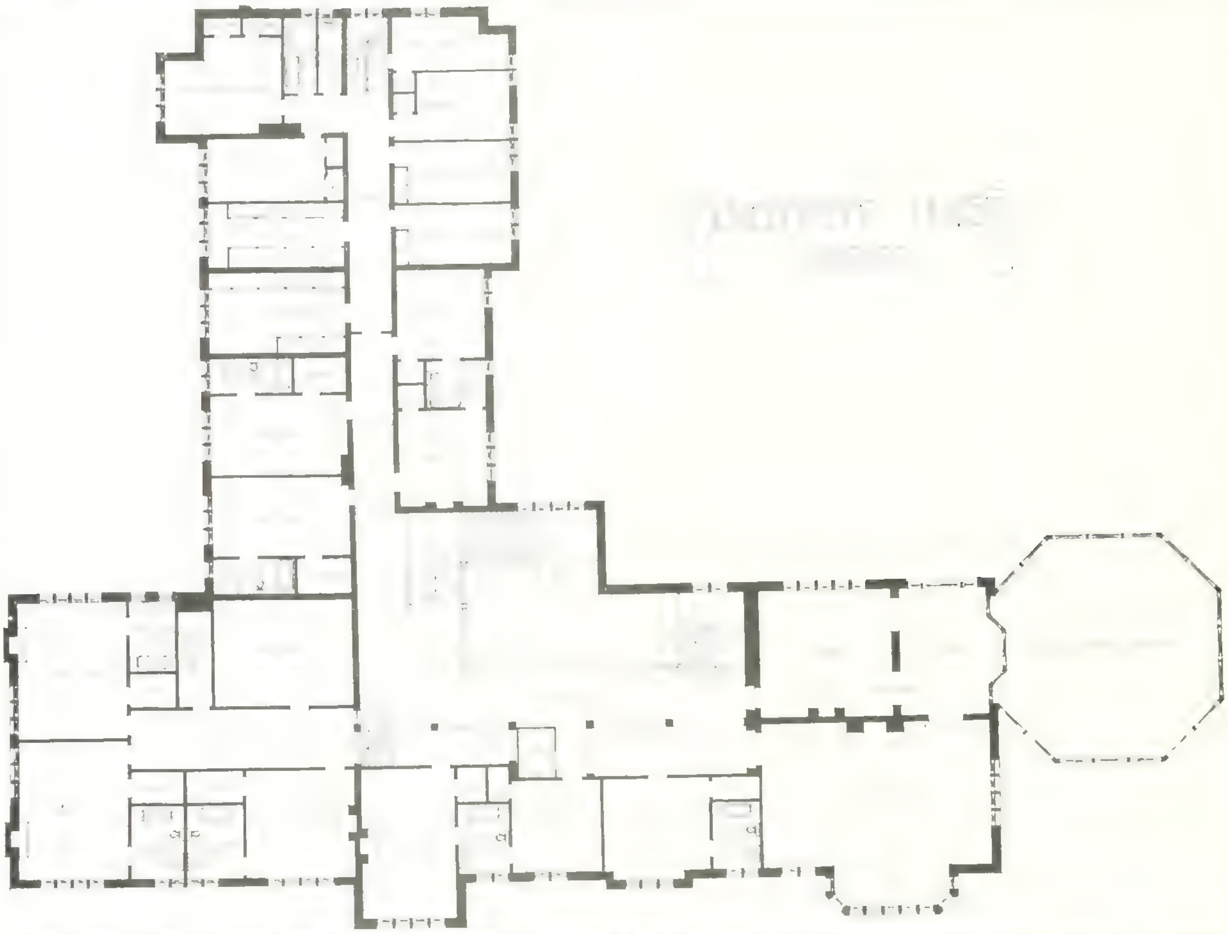
North Elevation, Competitive Design of Messrs. Chadwick and Beckett, for new Ontario Government House, Toronto.



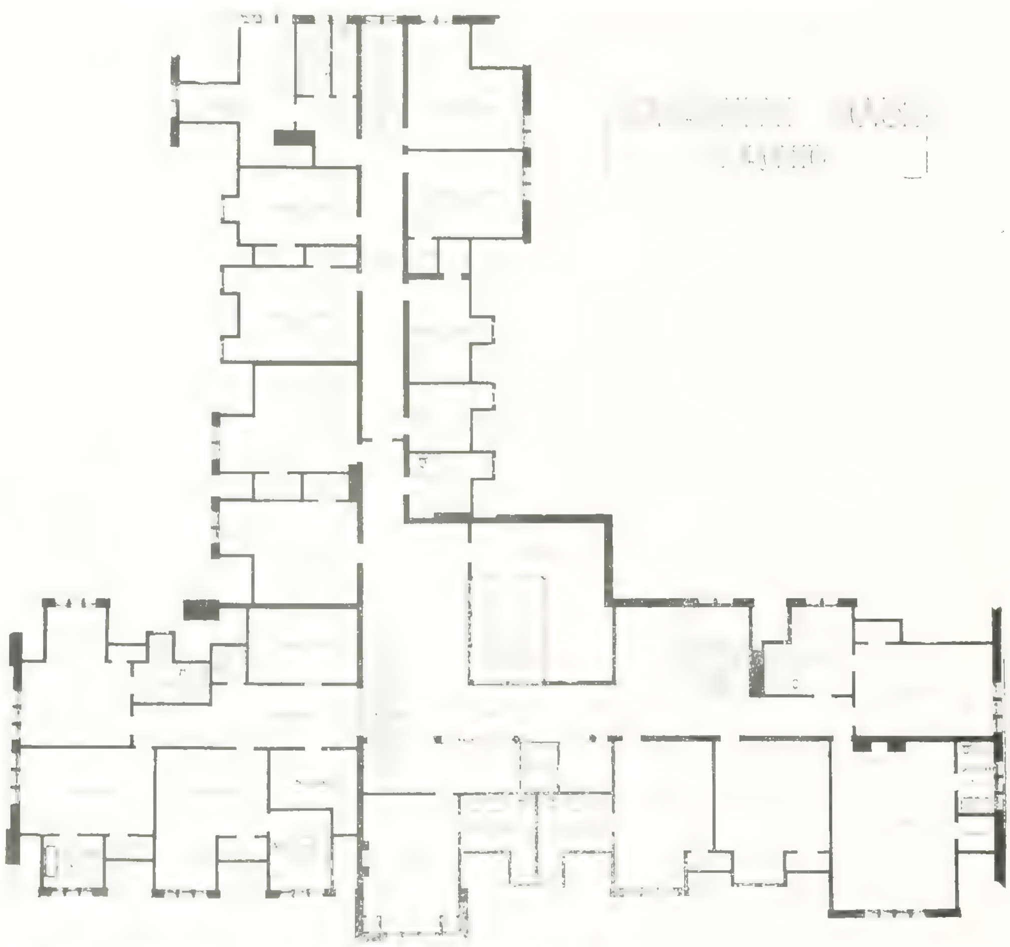
Basement Plan, Competitive Design of Messrs. Chadwick and Beckett for new Ontario Government House, Toronto.



Ground Floor Plan, Competitive Design of Messrs. Chadwick and Beckett for new Ontario Government House, Toronto.



First Floor Plan, Competitive Design of Messrs. Chadwick and Beckett, for new Ontario Government House, Toronto.



Second Floor Plan, Competitive Design of Messrs. Chadwick and Beckett, for new Ontario Government House, Toronto.

those in the servants' quarters of rift sawn Georgia pine or birch, and the remaining floors of highly finished oak in narrow widths, with the ball-room floor waxed and polished. This latter floor would be constructed with wooden joints on steel girders attached to springs. The hall floors could be of marble.

As regards windows, these are to be filled with wooden casements and weather stripping, or metal frames and sash with double hung sash in exposed locations.

Large stone flags are to be used for the exposed terrace walks and Welsh Quarry tile for the verandah floors and terraces, the other walks being carried out in gravel and concrete.

It is proposed to heat the buildings by the hot water system, the radiators to be supplied from a series of cast iron sectional boilers located in the basement and cross connected so that one or more boilers can be utilized to do part or whole of the work as the conditions require. A certain amount of ventilation would, of course, be included in this scheme, consisting of direct and indirect radiation in the different rooms where necessary, the ventilation being accomplished by fresh air being drawn through grilles in the walls and passed under and up through the radiator and controlled by dampers. It is considered advisable that the air be exhausted from the kitchen, smoking rooms, etc., by means of a small propeller fan operated by electric power. The installation of an elaborate and complicated heating and ventilation system is not contemplated; the adoption of the hot water system, being based upon simplicity of operation, effective results and minimum of cost of installation and maintenance.

The interior of the residence is designed to lend itself admirable to decorative treatment, and the opportunities offered for color schemes and lighting effects are many and varied. The ball room, with its broad expanse of floor, panelled walls, lofty mullioned windows and arched semi-circular ceiling, together with its broad plaster surfaces divided and given scale by panelled and enriched ribs and modelled ornaments picked out in color, and the whole lighted by hanging electroliers, is well calculated to produce an atmosphere, gay and inviting, yet stately and dignified, and possessing that architectural charm and flavor which was characteristic of the Elizabethan period and made the work undeniably national in character.

The halls, state dining room, galleries, bedrooms, etc., also give exceptional opportunity for artistic treatment.

In the halls and state dining room heraldic ornaments and mottoes would be introduced, and the walls of the dining room could be treated in tapestry, which, with the enriched ceiling, stone fireplace and stained woodwork, would be quite in keeping with the character of the room. Opening off the state dining room, the palm room or winter garden would be treated in colored marbles and ornamental plaster ceiling pierced by ceiling lights glazed in a heavy metal frame. In the recesses at the south end of this room, would be a small fountain, which with the potted plants and flowers, should make a pleasing feature.

The bedroom treatment would be quiet and domestic in character with refined cornices and ceilings finished in paint of water color, and the walls papered or hung. The lighting fixtures and hardware throughout the principal portions of the house would be specially designed to harmonize with the architectural scheme; and every item or detail of the entire work would be studied and considered so as to insure a perfect consonance throughout.

West Elevation, Competitive Design of Messrs. Chadwick and Beckett, for new Ontario Government House, Toronto.

Chadwick & Beckett's Design

The buildings are designed in the Tudor style of architecture, and are arranged on the property as shown in the accompanying "block and garden plan." The exterior is necessarily very simple, in order to keep within the amount specified in the conditions. With the object of minimizing any noise or vibration occasioned by the trolley lines and traffic in the neighborhood, the Lieutenant-Governor's residence is located well back from Bloor Street. This also assists in effecting a plan which gives the principal drawing rooms, living rooms, etc., the greatest amount of sun light, and the best views possible along the ravine.

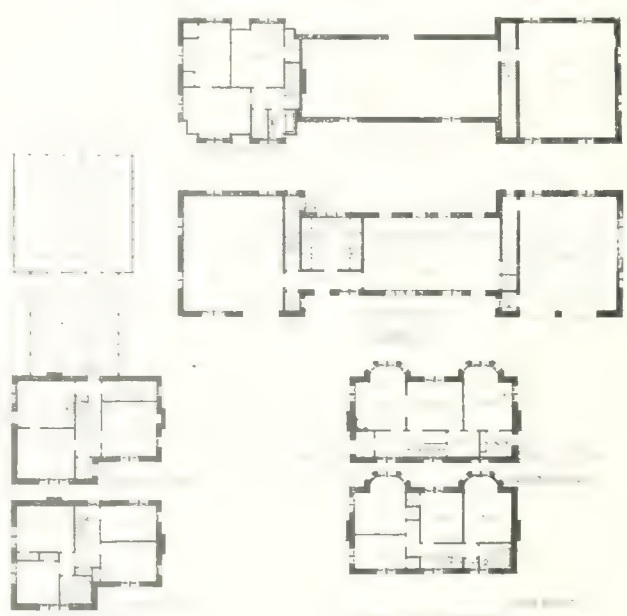
Subsidiary Buildings, Competitive Design of Messrs. Chadwick and Beckett for new Ontario Government House, Toronto.

The drives are laid out with an entrance from Bloor Street and an exit into the lane to the west, in order that conveyances can be lined up without interfering with the traffic on Bloor Street. The service entrance is through a double gate from the end of Bismarck Avenue, and a winding carriage path is arranged from the Ravine drive up to the stable yards. Immediately in the rear of Bismarck Avenue are the stables, with the steward's house to the south of the entrance from that street. The gardener's cottage and green-house are placed at the north-east corner of the property along the Ravine drive; enough practically level land being available for two lines of green-houses, if such should be required.

In front of the house the present trees and shrubbery are to be retained as far as possible, with flower borders along the house and fences, while in the rear such of the fruit trees are to be preserved as will not interfere with the laying out of a formal garden (placed in the north-east angle between the two wings of the house) and the stable and kitchen yards. The formal garden is to be graded up and the north side enclosed by a stone retaining wall, finished on top with a ballustrading, and with steps to the lower level of the slope, which is to be sodded and planted with trees and shrubs to suit the ground, terraces being arranged if necessary. The kitchen garden to be arranged in terraces or on a slope, and located north-west of the drive to the Rosedale Ravine.

It is proposed to enclose the property along Bloor Street and up the lane on the west to a point in rear of the State dining room by a low iron fence with stone posts; the east side of the property to have a high stone wall as far north as the rear line of the formal garden, and from there to the Ravine drive a simple iron fence screened by shrubbery. The stable yard and steward's garden are to be enclosed with high stone walls, from the house to the lane to the west, and along that lane to the rear of the stables. From there on a wire fence and shrubbery similar to the east side will extend, with a stone retaining wall in the north-west corner. A low stone wall, with posts, is to be carried along the Rosedale Ravine drive, and the kitchen and stable yards and gardener's yard are to be screened from the rest of the property with hemlock hedges.

The buildings are preferably to be constructed of hammer-dressed grey rubble stone, with cut stone or terra cotta trimmings, but the designs are adaptable



Floor Plan of Subsidiary Buildings, Competitive Design of Messrs. Chadwick and Beckett.

for construction in cut stone, with stone or terra cotta trimmings. If constructed of brick with cut stone or terra cotta trimmings more exterior ornamentation should be introduced. The roofs are to be of red slates, the cornice and exposed rafters of oak or Southern pine, stained brown, and the gutters and down pipes of copper.

The principal rooms contain the floor area mention-

CONSTRUCTION

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

Vol. 4 Toronto, May, 1911 No. 6

CURRENT TOPICS

THE ARGENTINE GOVERNMENT has issued a decree approving of a plan for constructing dams in the Province of Jujuy, at a cost of $9,000,000.

A NOVA SCOTIA LUMBER FIRM, with mills at Caledonia, has completed a survey and made preliminary arrangements for the construction of a railroad from that point to the sea at Port Midway, a little over 28 miles. The road, in addition to hauling lumber, will be used for general freight and passenger purposes. The country to be served is rich in lumber and somewhat settled, but at present the several mills operating in the interior are compelled to haul their output 28 miles by ox teams.

THE IMMENSE CLOCK shortly to be installed in the sixteen story office building now in course of erection for the Royal Liver Friendly Society at Liverpool, England, will outrival in size any of the famous tower timepieces of which the world can now boast. It will have three dials on one turret and one on another 300 feet away. The hands will have an average length of 14 feet and will be driven at each separate face of the clock by individual motors.

CEMENT AND SLATE DUST, to quote a builder in the United States, makes a concrete of an exceptionally fine, hard and serviceable quality. The proportions are: One part of the former to nine of the latter, with a moderate quantity of water. Only a high grade Portland cement should be used.

ACCORDING TO THE ESTIMATE of the Department of Mines, Ottawa, Canada produces in year 1910 structural materials valued at $105,040,958. Some of the items mentioned are: Portland cement, 4,753,957 barrels, valued at $6,414,315; clay brick, valued at $1,669,390; sand-lime brick, $18,492; lime, 5,721,285 bushels, valued at $1,131,407; sand and gravel exported, 624,824 tons, valued at $407,974; slate to the value $18,492, and gypsum to the extent of 513,313 tons, valued at $93,838.

* * *

WHAT IS CREDITED as being one of the most unique and artistic fireproof curtains yet devised, is being built in New York at the present time for the National Theatre in the City of Mexico. It consists of a great bronze frame set in with mosaic panels of favrille glass in iridescent hues. The mosaic work is embedded in a concrete composition which furnishes a firm resting place for the myriad pieces of glass depicting the romance of Princess Iztaccihuatl and her lover Popo, a popular Mexican legend. The curtain was designed by Adamo Boari. It is fifty feet square and weighs twenty-seven tons.

* * *

SIMULTANEOUSLY to the announcement of the awarding of the contract for the new Quebec Bridge comes word from New York that plans are in preparation for a similar structure of great magnitude to be built across Hell Gate, the turbulent straits that connect Long Island Sound and the Harlem with the East River. Preliminary work, it is said, has already been started. The structure will be erected and operated by the New York, New Haven and Hartford and Pennsylvania roads. It is to be two miles long, including its approaches, and will be one of the highest railway bridges in the world.

RAILWAY EXTENSION WORK involving the expenditure of $17,000,000, is about to be started in the West along the right of way of the Grand Trunk Pacific. The scheme of improvements includes the following projects: Calgary branch, 143 miles; Battleford branch, 59 miles; Melville, Regina branch, 68; Alberta Coal branch, 72; Biggar to Calgary, 50 miles. Other undertakings are the laying of 265 miles of main line track and further grading to the extent of 200 miles on branch lines. All of the above work, according to the contract terms, is to be completed this year. Arrangements, it is also understood, are also being made for the erection of 140 station buildings and 100 hotels.

AN APPLICATION is now before the Governor-in-Council, Ottawa, asking that the Minister of the Interior be authorized to consummate the sale of a tract of land to the Alberta Brick and Terra Cotta Company. The land adjoins the plant which the company established about three or four years back, and consist of a clay that is of suitable quality for the manufacture of brick and similar products. The company agrees to turn out 50,000 bricks per day.

* * *

WHAT IS CONSIDERED in many respects as the finest example of a academic work in South America, has just been completed in the new build- which will house the Faculty of Law and Mathematics at Montevideo, Uruguay. The structure has been some four years building, and was erected at a cost of approximately two and one-quarter million dollars. It occupies a site of over 17,400 square yards, with imposing frontages on two main thoroughfares. As the accommodation provided is greatly in excess of present requirements, part of the building will be temporarily utilized to lodge the National Museum and Library until these have a building of their own, which is intended to be the case in a few years.

* * *

THE DEVELOPMENT of another of Canada's natural resources is likely to be the outcome of the accepted offer of Mr. J. K. Cornwall, M.P.P. for the Peace River district, to pave, free of cost, a portion of one of the streets in the business sction of Edmonton in ordr to demonstrate in a practical way the value of the crude asphalt deposits so plentiful around Ft. McMurray and the north country. Numerous places, it is said, are to be found throughout an area 1,400 miles long and 300 miles wide, where tar springs bubbling into fine sand produce asphaltum of a rare and valuable quality; and it is with the object of pointing out the necessity of building for the purpose of opening up this territory that Mr. Cornwall's venture is designed.

A VERY CURIOUS architectural member in Greek architecture, says *The State Trade Gazette*, was the acroterion which was set on the gables, sometimes one and sometimes three. These were not late ornamental additions, but they seem to have been essential and important features from an early age. Primitive builders seem to have made much of the point of the gable by crossing the rafters, or by setting there some animal's head. The developed form is usually much in the shape of a lyre with two horn-like branches, one on either hand, turning into scrolls and palmettes. It seems possible that they may be derived from horns of consecration. Roofs were either covered with tiles, that is, large pantiles with covered rolls, or by marble copies of the same, wrought and adjusted with amazing precision. They either dripped along the eaves, or they were turned up at the bottom into a sort of low parapet, lated the cymation, having at intervals jutting spouts like toy cannon, or lions' heads with open mouths.

REPRESENTATIVES of the Associated Portland Cement Company of London, England, in the persons of H. K. Bamber, managing director, and H. D. Anderson, a stockholder, have been touring Canada with the object of investigating the opportunities this country offers for investment. It is said that the company is contemplating the establishment of a number of plants in the Dominion, and that the territory about Vancouver has already been looked over for a suitable site. The plans under consideration, it is understood, involve the expenditure of a sum that reaches up into the millions.

* * *

PROSPECTIVE BUILDING WORK in the Western Provinces this year include an unusually large number of important structures. One is a 14-storey office building to be erected at Winnipeg for an English syndicate. Lyall and Mitchell have the contract and as soon as the plans are approved the work will proceed. Another is the $2,000,000 Bay Company, while a third is the large modern store to be built at the same place for the Hudson hotel which the G.T.R. will construct in Edmonton at a cost of $1,000,000. Other projects include the Saskatchewan University and several smaller colleges. There is also some talk to the effect that the T. Eaton Company has in contemplation the erection of a large department store in Calgary, but as to whether or not this latter undertaking will materialize is still somewhat conjectural.

AN INTERESTING APPLICATION of electricity was recently carried out in connection with the wrecking of a wooden bridge which was to be replaced with a steel structure erected on the old piers and abutments. The county authorities purchased the bridge from its original owner, who agreed to remove it in thirty days. Several wreckers declared that it would be impossible to pull the structure down in the time without damage to the piers, which would probably have been injured if dynamite had been used, whilst if the bridge had been burned, probably the masonry would have been injured by the heat. At the expiration of the thirty days, an extension of one week was secured. About this time an electrician proposed to burn the structure apart by means of wires heated by electricity. Each span was composed of nine chords of three timbers, and the plan was to cut each of these twenty-seven sills simultaneously, so that the span would drop into the river between the piers. Fifty-four of these loops were employed to wreck each span, and the work was done a single span at a time. Sufficient current was used to heat the wires to a cherry red. One hour and forty minutes elapsed from the time the current was turned on until the span fell, the timbers falling into the water well inside the piers. The whole occupation occupied a few hours; the current was first turned on at 5 a.m., and at 2 p.m. the last span fell into the river.

Connecticut State Library and Supreme Court Building, Hartford, Conn. Donn Barber, Architect.

Detail of Entrance, Connecticut State Library and Supreme Court Building, Hartford, Conn. Donn Barber, Architect.

Section of Library, Connecticut State Library and Supreme Court Building, Hartford, Conn. Donn Barber, Architect.

Supreme Court Chamber, Connecticut State Library and Supreme Court Building, Hartford, Conn. Donn Barber, Architect.

View of Rotunda, Connecticut State Library and Supreme Court Building, Hartford, Conn. Looking into the Memorial Hall on the Left and the Supreme Court Chamber at the end of Corridor. Donn Barber, Architect.

Memorial Hall, Connecticut State Library and Supreme Court Building, Hartford, Conn. Donn Barber, Architect.

CONNECTICUT STATE LIBRARY AND SUPREME COURT BLDG.

An imposing public structure which presents an interesting study in unembellished mass and simple line adjustment

WHILE INTERESTING as a recent example exhibiting the *beaux art* influence so common to the present day American architectural trend in public building design, it is not so much this as it is the exquisite adjustment of exterior lines that makes the Conneticut State Library and Supreme Court Building, illustrated in this issue, a structure so pre-eminently noteworthy. Few buildings are there to be found in the United States to-day so decidedly devoid of exterior surface embellishment, that still attain such a high degree of architectural excellence. In the design, indeed, there is an approach to simplicity that verges on the austere, and yet avoids that severe ablatitiousness which usually characterizes the latter quality. Such ornament as is used is kept in low relief, refined in detail, and placed only where essential, so that the building depends principally upon its unadorned mass, harmony of scale, and general balance for the admirable effect that has been produced. The beauty of poise, symmetry and pleasing dignity of the resultant composition, reflects in no small way the artistic competency of Mr. Donn Barber, (New York) from whose design the building was erected. In less skilled hands it is doubtful if an attempt at a treatment so direct would have been productive of so satisfying a result.

Regarding its more individual features and the minor details of plan, a criticism appearing in an architectural contemporary has this to say: The coupled columns which form pylons at each side of the triple entrance, appear to have no vital function but when the statuary, evidently intended to surmount them, is in place, this objection will be removed. The cornice treatment on the portions of the building other than around the entrance is of an extraordinarily interesting character, and one which seemingly is peculiar to the French school alone. It is by no means uncommon to use the architrave and cornice combined, but the frieze and the cornice without the architrave, or with the architrave reduced to a simple molding, is one which without seeing the executed work would seem impossible to properly treat, but in place is most convincing.

Perhaps the most thoroughly satisfactory part of the entire building is the delicate beauty of the columns round the main entrance, in proportion somewhat more slender than the usual Doric type with the flutes decorated toward the top. They are about as happy in proportion and as exquisite in detail as it is possible to conceive, while the architrave, frieze and cornice, which they support are of just proportion to them. The decoration of the frieze, by the way, over the coupled columns is unusually interesting, thoroughly in character with the building, and of a detail which is novel and gives the same gray as the frieze around the remainder of the building. The three functions housed in the structure are suggested by the triple entrance doorway, and appropriately enough the frieze is inscribed over the door adjacent to each of these portions with its proper title. The monumental entrance steps, built in three levels, are agreeably diversified, with pedestals for statuary and assist in raising the building so as to create the subtle impression of dignity, essential in public work. The plan is simple, ample in space and arranged to afford excellent circulation. It seems unfortunate that the library should be broken with stacks introduced into the reading room itself, but this was almost certainly due to the requirements external to the architect's original conception of the plan. After all, the impression of utility (not utilitarianism) made by this intrusion into the general space is by no means as bad as might be expected since one feels instinctively that this is a working and not a showroom.

The supreme court is housed in a room appropriate to the dignity of its function, convenient, spacious, airy, calculated to inspire the attendant upon that court with something of that awe which is too often absent in chambers of tribunal. The rich sevreity of coloring and form of this room can hardly be bettered, while the ceiling is treated in a manner indicative of careful study and worthy of as careful study from those interested.

The Memorial Hall is not quite so successful, the problem of high and bare wall spaces, lighted from above, is inevitably a difficult one, and it is somewhat open to question as to whether the semi-vault treatment used here is the best which can be obtained. There is no doubt but that an increase in the number of pictures filling and enriching the lower surfaces will notably help out the room, and it is probably this which the author had in mind in designing it. Taking the building as a whole, it seems one of the finest public buildings in the United States, not alone because of its exterior, but because of the thought, care and skill which have been lavished upon even insignificant details. Mr. Baker, the designer, stands well at the head of his profession in the United States, and has a number of important competitions, including the one for the new Department of Justice Building to be erected at Washington, to his credit. In the building under consideration, he has not only produced a structure that is worthy of the highest commendation, but one that should be gratifying and a lasting source of pride to the State which has made its existence possible.

AMONG CONCERNS recently incorporated is the Standard Quarries, Limited, with head offices in Montreal. The company is organized for the purpose of producing stone, lime and the like, and carrying on a general business in building material line. It is capitalized at $325,000.

MODEL HOMES FOR WORKINGMEN

Ottawa Association inaugurates movement to brimg erection of laboring-class houses under architectural influence and direction

THE MODEL HOMES Association of Ottawa has been recently formed under distinguished patronage, for the purpose of taking practical steps towards the improvement of the working class houses in that city. It is felt that up to the present time no distinctive type of house, suitable for the Canadian workman, has been evolved; and that the existing examples are either shacks or miniature editions of the more expensive houses, designed without either consideration of fitness or with a view to economy of management. This is due, in the opinion of the Association, to the fact that the providing of proper housing facilities for the laboring class in this country has not heretofore come under architectural influence and direction.

In other countries some of the most eminent architects have been devoting their talent and their time to the solution of the cheap house problem, and it is felt that in Canada also, where this is such a live issue, architects and sanitarians can be relied on, in the interest of the public and the country, to rise to the occasion and give the question some thought and study.

The architects of Canada are therefore invited to send non-competitive designs to Mr. Albert J. Hazelgrove, Hon. Secretary of the Association, 126 Sparks street, Ottawa.

It is proposed in this connection to distribute $540 in prizes in a competition open to draughtsmen and students, and while the prizes are not large, the Association feels that the problem should appeal to the public spirit of the younger members of the profession. It might be pointed out that the plans in one class will in many cases evolve directly from plans in another class, hence the work to a great extent will be simplified. When a good selection of designs has been obtained, it is the intention of the Association to supply blue prints of the same for a nominal sum to cover cost of reproduction, to people about to build this class of house. The Association also proposes to use its influence in every possible way to see that houses are built according to the plans, and it is hoped that a marked improvement will speedily take place in this class of property.

It is not proposed to confine the circulation of the designs to Ottawa alone. On the contrary, it is intended that the movement will be widespread in scope, and residents in other localities will be equally as welcome to the use of the plans as those in the Capital city.

The Association is neither commercial nor philanthropic. It simply aims at the improvement of the small houses in our Canadian cities, and is deserving of the co-operation of both the architect and layman. Once started, the movement should spread rapidly and become national in character, and in this manner effect a sociological and economic betterment that will be of immeasurable benefit to the country at large. The Patrons of the Association and those identified with the furtherance of the movement are:

Patrons

[illegible] Honorable Earl Grey, G.C.M.[illegible], G.C.V.O.
[illegible] Minister of Labor.
[illegible] M.P., Leader of the Opposition.
Hon. Clifford Sifton, M.P., Ex-Minister of the Interior; Chairman, [illegible] of Conservation.

Committee

[illegible], Senator.
Dr. P. H. Bryce, Chief Medical Inspector, Immigration Branch, Department of Interior.
Gerald H. Brown, Assistant Deputy Minister of Labor.
Noulan Cauchon, Consulting Engineer.
[illegible], [illegible] Superintendent, Grand Trunk Railway.
[illegible], Secretary-Treasurer, Trades and Labor [illegible].
Theodore St. Germain, President, Greater Ottawa Development [illegible].
[illegible] Engineer.
Albert J. Hazelgrove, Architect (Honorary Secretary).
J. E. Macpherson (Honorary Treasurer), Manager, Bell Telephone Company, Ottawa.
T. D. McFarlane, President, Ottawa Builders' Exchange.
Colborne P. Meredith (Chairman), Architect, Commissioner, [illegible] Commission.
E. Norman Smith, President, Ottawa Free Press, Limited.
[illegible] Architect.

Outline of Competition

The Committee of the Association, in inaugurating this competition, desires to briefly outline the objects and aims of the movement, in order that competitors may better understand [illegible].

The Model Homes Association, Ottawa, has been formed for the purpose of taking some practical steps towards the improvement, both in economic planning and in external beauty, of the cheaper houses in this city. It is felt that if the movement meets with success it will be rapidly taken up in other cities with good results.

A great many small houses are springing up in and around Ottawa, many being built by working men in their spare time, others by working men on a speculative basis. It is the aim of the Association, by education, and by the scheme of designs, outlined below, to raise these dwellings above the class of shacks, and to demonstrate to their owners that simplicity does not necessarily imply crudeness, that form and line can be successfully obtained in the smallest mass by a proper disposition of material, and that a carefully planned and economical house can be built which is much more suited to their needs than the present series of box-like rooms.

This class of work, owing to lack of means on the part of the builders, has heretofore not come under architectural influence.

The Committee, in inviting designs, feels that the public spirit of the profession, draughtsmen and sanitarians throughout Canada should respond, not for the sake of any financial gain to be obtained thereby, but in an honest endeavor to do something for the public benefit.

The architects are asked to submit schemes, on a non-competitive basis, while the large number of prizes offered to the draughtsmen and students should offer some inducement to compete, especially as the problem, though fascinating, is not a large one.

When a selection has been made it is the intention of the Committee to supply blue prints of any particular design to the prospective house builder at a nominal sum to cover the [illegible].

The subject is one which should be of universal interest, and it is not the intention of the Committee to restrict the circulation of the designs to Ottawa, as persons resident in other places will be quite at liberty to avail themselves of the scheme. The Model Homes Association is not a philanthropic association, but it aims purely and simply at helping the small home-builder to help himself.

The designs will be adjudicated upon by a sub-committee [illegible]:

Colborne P. Meredith, Architect.
L. Fennings Taylor, Architect.
Noulan Cauchon, Consulting Engineer.
Dr. H. P. Bryce.

Conditions

Classification of Designs.

Designs are required for houses suitable for the needs of a [illegible]:

1 Single houses with pitch roof.

Class 1—[illegible]	[illegible]
Class 2—To cost	1,200 00
Class [illegible]	[illegible]
Class [illegible]	[illegible]
Class [illegible]	[illegible]
Class 6—[illegible]	[illegible]

[illegible] 2,500.00

[illegible]

[illegible] 1,400.00 [illegible]
[illegible] 2,000.00 [illegible]
[illegible] 3,000.00 [illegible]

[illegible]

[illegible] 000.00
[illegible] 1,200.00
[illegible] 1,400.00
[illegible] 1,600.00
[illegible] 1,800.00

[illegible]

Class 16—To cost ....$1,500.00 the pair
Class 17—To cost .... 2,000.00 per pair
[illegible] 2,500.00 [illegible]

Prizes.

[illegible]

To design placed first $15.00
[illegible] 10.00
[illegible] 5.00

The Committee reserve the right to withold prizes in any class should the entries be deemed of insufficient merit.

Competitors may enter designs in any or all classes, and their designs should be clearly numbered to indicate in which class they are entered.

Size of Lot and Accommodation.

The customary sizes of lots in Ottawa are 66 feet frontage by 99 feet deep, and 50 feet frontage by 100 feet deep. The majority of such houses are built on half lots, 33 feet by 99 feet, or 25 feet by 100 feet, the latter being the more common [illegible]

The character of the accommodation and the disposal on the lot is left to the discretion of the competitor, as it is hoped that by this competition some original schemes will be evolved for the solution of the problem. All designs, however, should include bathroom and inside w.c., and wherever practicable, an [illegible]

Basement.

Wherever the design lends itself to such treatment, the [illegible] piers, should the builder wish to proceed without a basement at the outset, with a view to constructing it later. (This is a condition likely to be frequently met with.)

Clearness Essential.

[illegible] ings is not required; competitors should bear in mind the fact that the probable builders will not be well versed in the reading of plans, hence simplicity is essential, especially in regard to figuring.

Flat-Roofed Houses.

Special attention is directed to the competitions for flat-roofed houses. These are at present the especial abomination in this class of property, but the Association, while not wishing to perpetuate this type among the builders, recognizes that the flat roof is the result of economic conditions which have to be met. It is therefore hoped that some satisfactory schemes will be forthcoming to solve this problem.

Drawings.

[illegible]

Floor-plans of each floor, four elevations, roof plan, outline section, a small sketch to give the builder a clear idea of the general appearance of the house.

Scale

[illegible] inches, if possible.

Specifications.

Competitors are required to submit with their designs brief typewritten specifications of materials and construction.

Figuring.

Drawings shall be clearly figured.

Materials.

The choice of materials is left to the competitor. This class of building is at present chiefly brick veneered, clapboarded or shingled. A schedule of current prices on building material is appended. Competitors should bear in mind that important [illegible] ber and stock material.

Delivery of Designs, Etc.

Designs shall not be signed, nor have any mark of identification thereon, but shall be accompanied by a sealed envelope containing the competitors' name and address. On receipt by the Association, the designs and envelopes will be similarly numbered, and the envelope will not be opened until the designs have been adjudicated upon.

This condition does not apply to architects submitting non-competitive designs. All drawings subsequently used will have the designer's name and address printed thereon.

All designs submitted must be received on or before Saturday, May 20th, 1911, addressed to Mr. A. J. Hazelgrove, Honorary Secretary, Model Homes Association, 126 Sparks Street, Ottawa.

[illegible]

Schedule of Rates for Materials

	Per M. B.M.
[illegible]	$13.00
[illegible]	15.00
[illegible]	17.00
[illegible]	19.00
[illegible]	18.00
2 in. x [illegible] in. x 12 in.-16 ft. Spruce	19.00
[illegible]	18.00
[illegible]	19.00
[illegible]	19.00
2 in. x 10 in. Spruce	22.00
Over 16 ft. lengths special price.	
[illegible]	24.00
1 in. Pine Flooring and Clapboards	26.00
1 in. Spruce V-joint and Beaded	25.00
[illegible]	28.00
Shingles, $5.50 per square, laid, including paper.	
Stock Door, 2 ft. 6 in. x 6 ft. 6 in., each	2.25
Stock D.H. Window, complete, each	4.00
[illegible]	2.25
1 in. No. 3 T. and G. Spruce	19.00
1 in. x 6 in. or 1 in. x 12 in. T. and G. Pine, M.C.	20.00
[illegible]	12.00
1 in. x 2 in. Furring, per length	.04
[illegible]	40.00
[illegible]	25.00
Ordinary earth excavation, per cubic yard	.50
Brickword at $18.00 per thousand.	
Concrete at $7.00 per cubic yard.	
Masonry at $10.00 per toise of 72 cubic ft.	

	Per Sq. Yd.
[illegible]	.32
[illegible]	.20
[illegible]	.40
Cement Plastering on wire lath	.75

COMPETITIVE DESIGNS FOR ONTARIO GOV'T HOUSE Continued from Page 70

ed in the conditions of the competition and a trifle more in some cases.

As there is so much more space in the basement of the main residence than can possibly be required for ordinary purposes, a large supper room and serving room have been arranged, which can be used for large entertainments, thus making the State dining room available as an adjunct to the ball room. In addition to the rooms called for in the conditions, the plan provides for a laundry with clothes dryer; a servants' lavatory, rooms for machinery (one of which would contain a dustless cleaning system), a ventilating system, etc.

On the ground floor an inner lobby has been arranged between the vestibule and the hall, with access therefrom to the elevator, so that in case of entertainments guests can be taken up to the dressing rooms without crossing the hall. The Governor's and Secretary's offices also communicate with this lobby, together with cloak room and lavatory. The reception room, drawing room and conservatory are placed in intercommunicating order at the east end, and the ball room and State dining room (with connecting doorway) are situated at the west of hall, so that the two may be used in conjunction for large entertainments. At the east side of the north wing are the private dining room and breakfast room, so placed as to gain the benefit of the morning sun, and in close proximity are the kitchen, pantries, sculleries, etc., and servants' quarters, all arranged so that the work of the house can be carried on with a minimum number of servants.

The billiard room, library and sun room are arranged east of the gallery on the first floor, and the State bedrooms are placed directly over the ball room. Ten bedrooms and eight bathrooms are provided on this floor, besides the servants' quarters, with six bedrooms, bathroom, and two linen rooms, which are situated in the rear.

The second floor contains ten bedrooms and eight bathrooms, and in the rear portion four servants' rooms, servants' box room, sewing room, and bathroom. A large ceiling light has been arranged over the main hall, with a sky light above in the roof.

"Fallingbrook," the Suburban Residence and Estate of Sir Donald Mann, Kingston Road, Toronto. Warren and Wetmore, Architects.

Gate-Keeper's Lodge, Estate of Sir Donald Mann, Kingston Road, Toronto. Warren and Wetmore, Architects.

Garden Front, Residence of Sir Donald Mann, Kingston Road, Toronto. Warren and Wetmore, Architects.

Main Hallway, Residence of Sir Donald Mann, Kingston Road, Toronto. Warren and Wetmore, Architects.

Living Room, Residence of Sir Donald Mann, Kingston Road, Toronto. Warren and Wetmore, Architects.

Reception Room, Residence of Sir Donald Mann, Kingston Road, Toronto. Warren and Wetmore, Architects.

Dining Room, Residence of Sir Donald Mann, Kingston Road, Toronto. Warren and Wetmore, Architects.

Library, Residence of Sir Donald Mann, Kingston Road, Toronto. Warren and Wetmore, Architects.

Gathering of Notables at the Ceremony Attending the Laying of the Corner Stone of the new Toronto General Hospital. His Excellency Earl Grey, Who Has Just Accepted the Silver Trowel Preparatory to Lowering the Stone in Place, is Seen at the Centre of Picture. The Buildings Comprising the Group Cover a Ten-acre Site, and are Being Erected from Designs by Architects Darling and Pearson, at a Cost of $2,000,000. When Completed Toronto Will Not Only Have an Institution that is Ideal in Its Equipment for Hospital Work, but One Which in Connection with the Toronto University will Afford Opportunities for Medical Research Such as Will be Unsurpassed by Any Similar Establishment on This Continent.

THE NEW GENERAL HOSPITAL TORONTO

Impressive ceremony attending laying of corner stone by His Excellency Earl Grey. Speakers emphasize importance of project and the vast good it is destined to accomplish

IF THERE HAS BEEN anything lacking heretofore to impress upon the public the great importance attached to the erection of the new Toronto General Hospital, the ceremony attending the laying of the corner stone, which took place on April 11, served to completely fill the void. The statement of His Excellency Earl Grey, who officiated, that he would always consider the privilege of placing the stone the greatest of the many honors accorded him during his Governor-Generalship in Canada, is in itself sufficient to indicate the vastness of the project and the great part it is destined to play both in humanitarian work and in the advancement of medical science. It was an event to which the governors of the hospital, as well as everyone concerned with the care of the sick and afflicted in Toronto and the Province, looked forward with great interest and eager anticipation, as it not only signalized the result of years of tireless effort, but marked a new epoch of development in hospital work in the Dominion. Aside from His Excellency, who was accompanied by Lady Evelyn Grey, those on the platform erected for the occason included His Honor Lieutenant-Governor Gibson, Sir James Whitney, Mayor Geary, Chief Justice Sir Charles Moss, President Falconer of the Toronto University, Hon. Robert Jaffray, Hon. W. J. Hanna, Hon. Dr. Reaume, Hon. J. S. Duff, distinguished members of the clergy and medical profession, and a large representation of men and women prominent in the business and social life of the city and Province.

In introducing the speakers, Mr. J. W. Flavelle, who as chairman of the Board of Governors, presided at the ceremony, stated that he wished to express on behalf of the trustees their appreciation of the kindness shown by the co-operating bodies which had made the enterprise a success, the Mayors of Toronto, the Chancellor and Governors of the University, the Legislature and the people of the Province, by whose authority the Governors of the University were enabled to give important financial aid to the hospital, and the people of Toronto, who by their votes and by subscriptions had given every possible assistance to the hospital. Mr. Flavelle also paid a tribute to the surgeons and physicians who year after year rendered their services with no remuneration whatever. The site of the new hospital, he said, comprised ten acres, and the building under construction would cost $1,400,000. Contracts would shortly be let for three other structures, thus bringing the total cost for buildings alone up to $2,000,000.

Following Mr. Flavelle's remarks, Dr. Falconer, President of the Toronto University, emphasized the momentous nature of the occasion. It was due to the liberality of the citizens of Toronto that they were enabled to be present to take part in the ceremony. He pointed out the tremendous rate at which medical science had advanced during the last century. Speaking of the structure, he told the gathering that nothing had been undone in order that the plans and the equipment should be of the very best. The present was an age of philanthropy and also an age of science. He voiced his appreciation at the union between the University and the hospital, and stated that as far as the University was concerned the new institution would have its deepest care and best knowledge.

Other speakers were Sir James Whitney, who in a short speech wished the promoters godspeed in their work; and His Honor Lieutenant-Governor Gibson and Meary Geary, who dwelt upon the great benefits that such a modern institution would bestow on both the citizens of Toronto and the community at large. Prior to lowering the stone into place, His Lordship Bishop Sweeny, who was present in his episcopal robes, invoked a blessing, and the Rev. Dr. Carman, head of the Methodist Church in Canada, read the 23rd Psalm. At the conclusion of the ceremony, Earl Grey expressed his gratitude for being invited to officiate at so important an event, and he hoped that the Government, the City of Toronto and the University would continue in their effort to further so worthy a work.

As an undertaking made possibly by the people of the city and Province, and the munificence of private individuals, Toronto will indeed have an institution of which it can be justly proud. Aside from being ideal in its equipment for hospital purposes, it will offer opportunities for medical research work in connection with the Toronto University which cannot be surpassed on this continent. Probably no scheme of buildings so comprehensive in scope, designed for a like purpose, has ever before been undertaken at any one time on this side of the Atlantic. The magnitude of the project is best evidenced by the fact that the brick and masonry contract is the largest single undertaking of its kind under way in Canada at the present time. The bricks, which are being furnished by the Don Valley Brick Works, are of a special grade, and the manufacturers were obliged to install specially designed machinery in order to promptly fill the demand and to produce a material that both in texture and quality would be particularly adapted to the architectural scheme of the buildings, as worked out by the designers, Messrs. Darling and Pearson. Work on the buildings is progressing rapidly and their completion, which is to be effected within two years' time, will be a tribute to Canadian enterprise, and denote to a high degree the philanthropic tendency and broad spirit of those who have made its existence possible.

ABBREVIATION OF FACTS.

THE FOLLOWING LETTER has been received from Mr. Peter Gillespie, Lecturer of Applied Mechanics at the Toronto University, and President of the Canadian Cement and Concrete Association, with the request that it be published:

April 1, 1911.

The Editor, Construction, Toronto:

Dear Sir,—I desire to call your attention to a pamphlet being distributed in Canada by the Hercules Waterproof Cement Co., of Buffalo and New York, which gives a summary of tests made by me last summer on some of their Hercules Strengthening and Waterproofing Compound. In the first place, I am incorrectly described therein as "Dr. Peter Gillespie, Dean, Department of Civil Engineering in the University of Toronto." In the second place, in justice to the public and myself, I wish to state that certain parts of my report have been omitted, and that, in consequence, the impression obtained by the reader of the summary of tests in the pamphlet is quite different from what the public would receive from reading the report I submitted to the company. I have notified the Hercules Company that I object to the summary of the report as set out in the pamphlet, and I have requested them to discontinue its publication. The Ontario Lime Association, the agents of the Hercules Compounds in Canada, inform me that they are in no sense responsible for the contents of the pamphlet.

Very truly yours,

PETER GILLESPIE,
Lecturer in Applied Mechanics,
University of Toronto.

AN IMPORTANT CONTRACT for material was recently awarded to E. F. Dartnell, the well known building supply dealer, 157 St. James Street, Montreal. It calls for about 160,000 white porcelain faced brick to be used in the exterior of the Dominion Express Building, now being erected in that city, after plans by Messrs. E. and W. S. Maxwell. This is one of the largest orders for enamel or porcelain brick ever placed in Canada. Satisfactory progress in the construction of the building is being made by P. Lyall and Sons, who have the general contract.

* * *

THE MISSISQUOI MARBLE Company, Phillipsburg, Que., has increased its capital stock from $500,000 to $1,000,000. It is understood that the company will make a number of enlargements at its property in order to meet the growing demand for its product, which is richly veined and regarded by architects and builders generally as one of the highest grade marble quarries.

THE HEATING AND VENTILATING OF SCHOOL BUILDINGS

Factors in class-room hygiene and the importance of their neutral adjustment to sane and natural needs.

THE IMPORTANCE of the heating and ventilating problem in its relation to class-room hygiene, and the part which these factors play in assisting or retarding the physical and mental development of the scholar, forms the basis of an instructive article by Curtis Tobey, architect, in a recent issue of the "Building and Industrial News." The arguments set forth are reasoned from premises which assume that the question of lighting has been properly considered, and are advanced with the object of clearly indicating the necessity of the neutral adjustment of these elements to sane and natural needs.

For the healthy and natural development of the mind of the child and scholar, says the writer, it is absolutely necessary that its body is healthy and natural. Under this condition, he forgets that sickness and nerve fatigue exist. He is not acquainted with his stomach, for it never bothers him. He is entirely unconscious of his environments and source and element of provision. All is neutral to the senses but the one desire of the moment, and that is intense and its satisfaction keen and enjoyable. It is this neutrality of the senses to these physical environments and provisions, this absolute forgetfulness of insensibility, that permits the undivided and eager attention of the scholar in his studies, and it is therefore absolutely necessary that this neutrality be secured and maintained in the class-room if best and lasting results are expected from his training. Let us see what our modern class-room offers or provides to meet the needs and requirements in the matter of atmospheric temperature and purification.

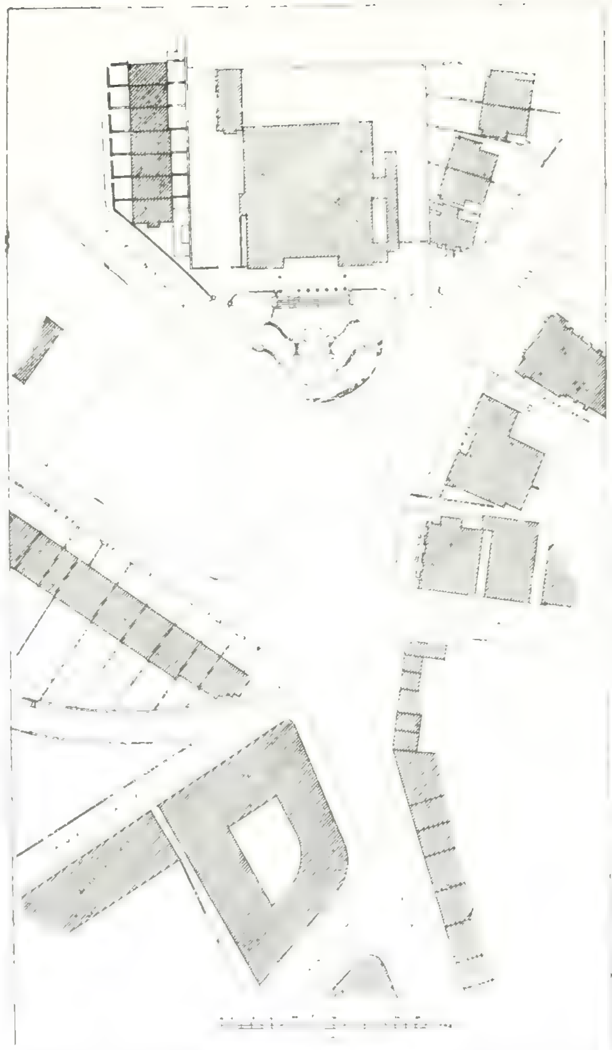
In a room 26 feet by 36 feet, a large class-room, there are usually two entrance doors with pivoted transom sash over one or both. At the rear and at the left of the scholars as they are seated are placed the window openings. The lower two-thirds of each opening is fitted with double-hung sash balanced with weights to enable each sash to be raised or lowered at will. The upper one-third of each opening is provided with a bottom-hinged transom sash controlled by adjustable transom lift. Each sash is glazed with ordinary 21 or 26 ounce glass representing a thickness of about one-eighth of an inch of separation between the temperature of the outside atmosphere and that of the class-room. The front and right-hand walls are blank partitions forming part of the interior construction of the building. This gives us, then, two outside walls with about half their area of only one-eighth of an inch in thickness, and two inside walls plastered on both sides and usually containing sound deadening material between the studs. The ceiling is plastered which, together with the lath, should give a thickness of about three-quarters of an inch, but, as it is customary with plasterers to "skin" the ceilign, this thickness is very often not over one-half an inch The floors are doubled with deadening effect between the rough and finished floor.

To maintain a uniform temperature and a uniform ventilation within a space so unevenly inclosed and so poorly insulated from the effects of the elements, is a practical impossibility. To correct this condition, steam, hot water or hot air radiators are placed on or near the floor and below and in the centre of each set of windows. Fresh air inlets are placed below or in back of these radiators and, like the radiators, are controlled by hand at the will of the teacher, or, as is very customary, by one of the scholars assigned to that duty. Ventilators are placed in the ceiling or in the walls near the ceiling for the purpose of venting or carrying off the impure air through galvanized iron vent pipes that connect with a large exhaust stack extending above the roof of the building. This stack is in most cases equipped mechanically to cause a forced draft calculated to exhaust the air of each class-room within a given time. The draft or suction in this stack is sometimes left to the natural tendency of the air to ascend, due either to its gravity or both to gravity and induced suction at the top through louver terminal. This latter method is never uniform and is not to be recommended, except where made necessary by the lack of sufficient funds. To facilitate the intake of fresh air and the outlet of impure air as occasion demands, windows and transoms are opened and adjusted to best secure results.

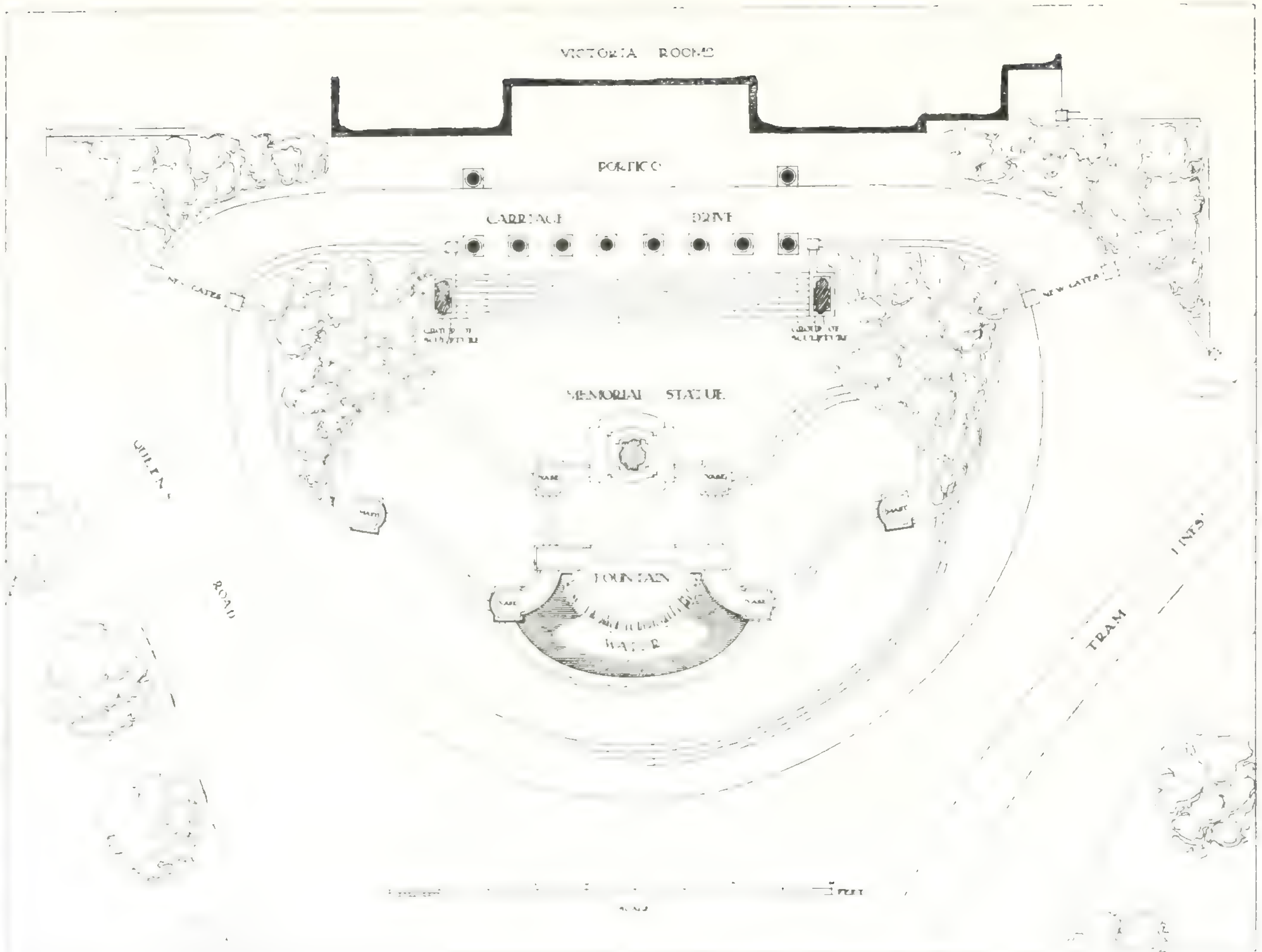
This description is necessarily composite, but it applies very accurately to the newest and best of our public school buildings. The older buildings contain many recognized faults and practically few merits. They are, unfortunately, so fundamentally crude, as compared with modern design and equipment, that many of them must be relegated to and considered in the class of temporary housings.

Before we start to criticize or to make suggestions for the improvement or alteration of the present class-room and its modern methods for securing and maintaining uniform and evenly distributed temperature and ventilation or rejuvenation of its air, we must first understand and determine the nature of air itself both in the relation of fresh or pure air to the noxious or impure air that is the result of contact with the body or that which has been exhaled from the lungs, and in its action as a fluid body within definite confines. Primarily, air is composed of oxygen and nitrogen; oxygen representing, in ordinary terms, Life and Animation, while nitrogen, which comprises in volume nearly four-fifths, representing Substance. The cleansing action of air upon the blood and tissues of the body at each respiration is similar to the cleansing action of water upon soiled linen at each washing. The dirty or foul air expelled from the lungs is laden with used up or oxidized energy in the form of carbonic acid gas.

Design for King Edward VII. Memorial and Fore-ground Scheme of Victoria Rooms, Bristol, England. Messrs. Lanchester and Rickards, FF.R.I.B.A., Architects.



Plan of Site.



Plan of Memorial.

Practically every City and Town of any Importance in the British Isles are Taking Steps at the Present Time to Perpetuate in a Substantial Way the Memory of King Edward VII., and already a Number of Elaborate Schemes have been Projected and Worked Out. Notable among these is the Proposed Memorial to be built in Front of the Victoria Rooms at Bristol, after a Design by Messrs. Lanchester and Rickards, which is illustrated herewith. The Site Chosen is an Ideal One, being at the Summit of a Hill which Rises from the Heart of the Town. The Monument, which Will have a Building of Dignified Design for its Background, will Form the Terminal Feature of Queen's Road and Overlook College Green and the Statue of Queen Victoria at the Foot of Park Street, which Forms a Continuation Further Down. The Victoria Rooms are Private Property and the Existing Driveway and Terrace Walls are to be Preserved Intact, with the Exception of the Broad Flight of Steps in Front of the Portico, which is to be Slightly Altered. In Front of this, however, the Whole Site is to be Remodelled in Accordance with the Accompanying Scheme, the Existing Triangular Enclosure being Thrown Open Within the Lines of the Curved Balustrades Terminated by the Venetian Masts, which are Designed to Contrast with the Sweeping Lines of the Design. The Decorative Fountain, which is an Integral Part of the Scheme, is Placed on a Slightly Lower Level to the Front of the Memorial Statue, and is Intended to Obviate the Effect of Isolation that Might Otherwise Obtain.

This exhaled air with its load of carbonic acid gas is much heavier than pure or fresh air, just as dirty water, with its load of earthly matters held in suspension, is heavier than clean water. Thus, assuming that the air contained in a room is still and of even temperature throughout, the foul or heavy air would drop or gravitate to the floor while the fresh and lighter air would remain toward the ceiling. The air body in the average class-room, however, is not still, nor is it of even temperature, and, although the tendency of the foul laden air is always downward, the air currents keep it in constant motion and in constant assimilation or mixture with the fresh air. Instead, then, of the scholar breathing and working in fresh air, the same that is injected into the class-room through the fresh air inlets, he is breathing, again and again, air that contains more or less of the impurities not only of his own body but of every other body in the room. It is obviously impractical to provide each scholar individually with an independent and separate supply of fresh air direct from the outside. Such a contrivance is possible, of course, but its application and use would involve so many other problems that its application is necessary only in classes under medical treatment. For the normally healthy child and scholar, a high percentage of purity is all that is required, but he is entitled to as high a percentage of pure air at each respiration during his study hours as is possible to secure for him, and this, too, with no more distraction or exertion than he would experience in the open.

In point of fact, no body of air is ever absolutely quiet, not even within its own particular mass. In the class-room, the currents of the air are accelerated by the great differences of temperature at various points. In winter time, it is warmest at the heating radiators and coldest at the windows and exposed walls; while in summer time, the reverse is the case, the windows radiating outside heat. In summertime, also, the circulation of air in the class-room is greatly increased by the opening of the windows and transoms. This latter, although perhaps productive of excellent ventilation, is nevertheless severe upon a weak constitution and particularly so if the scholar is within line of the draft. If the windows and transoms are not thrown open, both for better ventilation and for purposes of cooling the room, then the ventilating system must perform its function. It is unfortunate but true that there is scarcely a modern school house in which its heating and ventilating system performs its functions in entire satisfaction of demands, nor what is even more rare, a school house or a class-room whose atmospheric temperature remains the same in summer as in winter, not only as the thermometer registers at the heaters or ventilators, but as it registers at every corner and section of the class-room.

Summer heat, with its dry, sultry and dust-laden air, is no more conducive to active brain development than is the shivering cold of winter. The climate or temperature of the class-room must be equal and uniform, and maintained at a degree of physical comfort to each scholar so nearly perfect that the existence of temperature environment is forgotten. The same is as true of the ventillation. The supply and exhaust of air should be so equalized and so carefully adjusted to meet the requirements, not only of the room, but of each scholar in the room that it calls for no consideration or attention. With a class-room made first practically noiseless with its thick, shellaced linoleum floor covering; the window sash fitted with the thick prism glass accurately adjusted to disperse soft, clear and shadowless light; the climate or temperature evenly distributed and perpetually maintained; and the air continuously but unobstrusively admitted and exhausted without draft or noticeable circulation the attention of the scholar to his work must be the best, his attack upon difficult and intricate problems must be with keen interest and pleasure, and he must, under such favorable physical environments, produce the best results possible.

It is a simple matter to review any situation, see and understand its good and its bad points and to criticize results. Neither is it altogether difficult to offer valid suggestions for the betterment of conditions as they exist, but it is decidedly difficult, and sometimes hazardous, to attempt to prescribe a "cure-all" remedy, more particularly, if in the application of the remedy, all precedent is to be upset. Progress, however, is the fruit of rational experiment and the results sought are sufficiently important and necessary, as in the case of the surrounding elements of the class-room, that it may not be deemed a breach of conservatism to offer suggestions and to propose a system of heating, cooling and ventilating which, in its installation and operation, would be directly opposed to the systems now in vogue.

In the case of indirect light, the direct rays are so diverted and refracted that the room has the effect of light without a source. This is exactly what is required. The strength, quality and direction of the light thus obtained for the class-room was secured by a careful study of natural out-of-door conditions. Nature supplies correct examples and "modus operandi" of all principles. The source of light and heat is above and not below, as in the case of ordinary floor radiation within a building. Now, if the natural source of heat and cold is above, the ceiling and not the floor should be the source of heat and cold for the class-room. It should, also, be the source of pure air, and the floor, and not the ceiling, the point at which the heavy and foul air is exhausted.

In the basement of office and other buildings where, for mechanical reasons, radiators have necessarily been placed on the ceilings, it has been discovered that the temperature of the rooms is much more even and the heat more uniformly distributed throughout the entire space than is the case where the radiator is located on the floor. Another instance of the application of "top" heat is found in the mechanical incubator and brooder for the hatching and care of chicks. This instance is, of course, not exactly parallel to the needs of a class-room, but it serves to illustrate the theory of "top" heat and air, inasmuch as the method has been tried out and adopted as the best and most natural, as well as the most successful in point of results.

The matter of equipping a class-room for "top" or, as in the case of light, "indirect" heating and cooling, and for the supply of fresh air, once its theory is understood by the mechanic, there is no difficulty in its application. At each of the four corners of the ceiling and about four feet each way from the walls, hang a radiator of sufficient capacity equal to one-fourth of the total radiation required. Directly above each radiator provide the fresh air inlet. An inch or two below the radiator, hang a permanent metallic distributing pan, so that as the fresh air strikes into the radiator it will be deflected horizontally and distributed over the ceiling. At each corner of the room, and if possible, at other points in the base board, provide exhaust openings for the heavy and foul air. Both the supply of fresh air and exhaust should be operated and regulated mechanically by means of pressure and suction appliances. The radiators should be controlled by a thermostat placed in a screened recess of the wall about three feet from the floor and set to operate the control at normal temperature.

Under such an arrangement, with the system designed to meet full requirements, and with all windows and doors closed, the heated fresh air that is distributed evenly over the entire upper portion of the room would gradually descend upon the scholars uniformly and in its original purity, take up its burden of body impurities as thrown off at each respiration and finally fall to the floor to be sucked into the exhaust vents and out through the stack to the roof. The inequalities of building insulation against the external or outside elements would have but slight effect upon the uniformity of internal temperature or at least a far less effect than it has upon the internal temperature of the class-room under present methods of heating and ventilating.

During the summer months, when the heating of the building is not required, the fresh air supply should first pass through a cooling process before it is supplied to the class-rooms and is distributed horizontally over the ceiling. Uniform temperature is maintained in warm weather by this means as regulated by the thermostat the same as it is regulated in cold weather, and also without the necessity of opening doors and windows or causing injurious drafts.

The additional expense of installation and maintenance of this system of "top" or indirect heating, cooling and ventilating is but slightly in excess of the ordinary systems, the additional expense centreing upon the power plant and cost of operation. The advantages gained, however, are so great from the student's standpoint that this extra expense is but trifling and should not be considered as in the least obstructive.

COLOR EXPERIMENTS IN CONCRETE

Results of investigation covering a series of important tests made in body and surface coloring to determine the value of different pigments.

TIMELY TO THE PROGRESS that is being made in the use of concrete, are the results of a series of color experiments recently conducted by Prof. Charles E. Pellew for a New York architect engaged in the erection of a number of cottages of this material in the neighborhood of that city.

The general problem of coloring concrete, the investigator says, naturally separates itself into two main divisions, body coloring and surface coloring. In the first the pigment is incorporated in the body of the concrete before mixing, and forms blocks of even color all through. In surface coloring, on the other hand, the coloring material is applied to the surface of the block, after the concrete has set, and thus forms only a thin film or coating on the outside.

These methods of applying the color each have their special disadvantages, due to the nature of the material. The free lime in the concrete has, when moist, a strong and generally injurious chemical action upon most of the ordinary pigments, and comparatively few coloring matters are able to resist it, especially when mixed right in with it. It has at the same time a strong action upon many kinds of organic matter, such as linseed oil, used in paint. Then, too, the compact but friable surface of concrete makes it difficult to force a stain or paint into the pores far enough to prevent it from being easily brushed or rubbed off.

For our particular problem, as it happened, the question of expense was of vital importance; and this limited us still further in our range of possible pigments. In the matter of first cost it is evident that some form of surface coloring would be cheapest. But, unless great pains are taken to have a thoroughly hard, permanent surface for the pigments to adhere to, and to obviate as far as possible the use of linseed oil, the body coloring is probably the most satisfactory.

It is proposed to sketch, briefly, the various materials that can be used for body coloring. Our experiments hitherto have been directed towards the following colors: Brown, red, yellow, buff, black, and green, and we shall take them up in that order:

Brown. Some experiments with a vegetable brown made from partially carbonized organic matter gave results which were unsatisfactory, as the colors were hard and uninteresting. We then made a series of experiments with two mineral dye-stuffs, long known and used for staining and coloring textiles, but not, we believe, used hitherto for coloring cement or concrete. These were the orange-brown iron-rust color and the manganese brown.

(*a*) *Iron-rust.* This color is the same as that known to our ancestors for dyeing homespuns, and is still used for coloring fishing boat sails on the Mediterranean. It is based on the formation in the concrete of a reddish brown deposit of ferric hydroxide by the action of the lime of the cement on a soluble salt of iron, like ferric chloride or ferric sulphate. First we tried ferric chloride as the coloring agent, but we found later that strong solutions of ferric sulphate could be obtained from the chemical manufacturers at a low price, far less than any other soluble ferric salt.

Unfortunately, it takes a very large amount, twenty-five to thirty per cent. (of the weight of concrete) to get at all a decided color with this compound, and this is a serious drawback for our purposes.

(*b*) *Manganese Brown.* This color is based on the formation in the concrete of brown manganese hydroxide by the reduction of the salt potassium permanganate. The latter possesses a strong rich purple color, which in the presence of oxidizable material, such as organic matter, turns to a full seal brown.

In staining concrete the organic matter must be supplied in the form of glucose or sugar, which in quite small quantities will change the deep purple color of the permanganate into a rich seal brown. To get a full, deep color in our experiment we were obliged to use some twenty-four and a half per cent. (by weight of the cement) of permanganate and about half per cent. of glucose. The price of permanganate is about eight cents a pound, and the glucose can be obtained in the form of a thick, concentrated syrup at a little less than three cents a pound.

Red. The only red colors practically available for body coloring are the various forms of red oxide or iron, some of them natural, finely ground hematites from Europe or this country, and others artificial, usually a residue from the distillation of copperas for fuming sulphuric acid.

These colors differ greatly in shade, price, and coloring power, and it is impossible to cover more than a few of the innumerable varieties of red oxide that can be obtained for this purpose. In general, the cheaper colors are either native oxides of rather unsatisfactory shades and low coloring power, or else are more expensive and powerful pigments mixed with a neutral adulterant, like gypsum. As a pigment adds nothing to, and, indeed, distinctly detracts from, the strength of the concrete, it is evidently best to get the desired shades by a small amount of a strong, though high-priced, color than by using a cheap and weak color in proportionately larger quantities.

After experimenting with twenty or more different colors from various manufacturers the best results were obtained from a red color at 2½d. a pound, from seven and a half to ten per cent. (of the weight of cement) being needed to give a full shade. The addition of small amounts of permanganate brown, as described above, modifies the bright red color and gives a more pleasing shade, like red terra cotta.

Yellow. For this color the only available pigment is some form of yellow ochre, which can be obtained both strong and cheap. The best results that we have had came from the use of a strong, bright color, which, when used to the extent of eight per cent. of the cement, gave a bright tan color. This yellow can be used for shading the red, but it is not so effective for this as the manganese brown.

Buff. The same yellow ochre, when mixed with small amounts of the permanganate brown, will give various shades of yellowish brown or buff color. Pleasant shades are obtained by using five per cent. of yellow ochre and two and a half per cent. of permanganate.

Black. In case black shades are desired, they can be obtained without difficulty by using some of the carbon or lampblack. For a bluish shade of black we experimented with some success with a black iron oxide, imported for the use of gas works. Full shades would need some eight or ten per cent. of the pigment.

Green. The high price of chrominum oxide, the only green mineral pigment which will stand the action of lime, prevents its use for body coloring. In the absence of a strong blue which will stand the action of lime, it is not possible to obtain a good green by modifying the color produced by yellow ochre. Ultra-marine blue is, indeed, fast to lime; but possesses a very low coloring power when mixed with other pigments, while the strong blue, Prussian blue, which is commonly used as a constituent of green paints, is very easily attacked by the cement.

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CONTENTS

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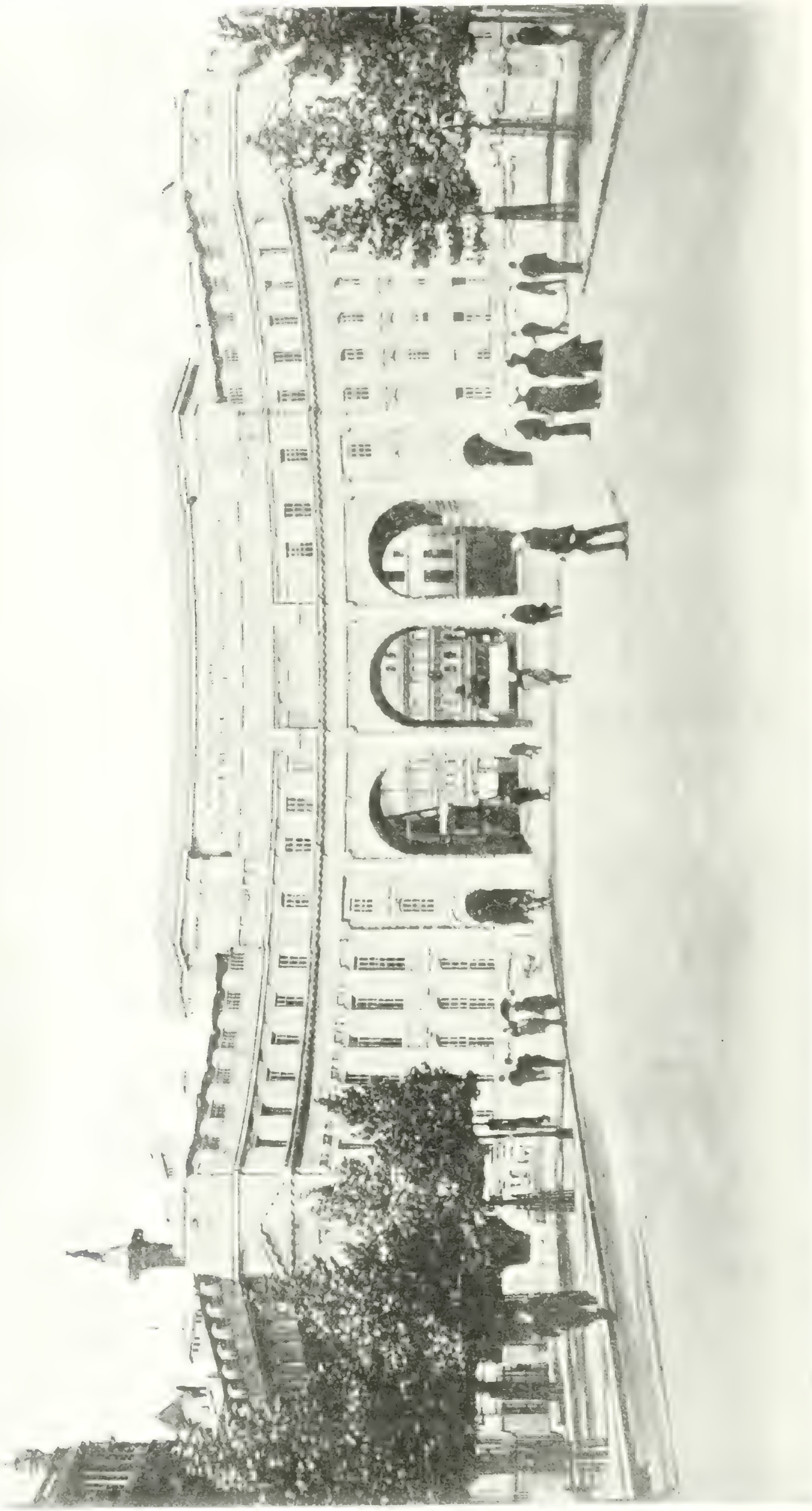


Queen Victoria Memorial Archway. The Mall, London, to be Used for the First Time When the Royal Procession Passes Through it on Coronation Day.

Building Statistics for April—Month notes a number of substantial improvements over corresponding period—Toronto's big total a feature.

ALTHOUGH MORE DECREASES occurred than has been noted in any previous month during the past year, the total investment for building work undertaken in thirty cities reporting to CONSTRUCTION for April, amounted to $13,792,239, as against $11,846,496 in the corresponding period of last year. Such losses as were sustained in the less fortunate localities were more than offset by the substantial totals piled up in the more successful centres. Considering the high state of development in the period immediately preceding, and the fact that labor disturbances and a somewhat late spring interfered with contemplated work in several sections, the headway made in general was all that could be expected.

Toronto's magnificent total of $3,272,818, which was by far the outstanding feature of the month, in particular is most attractive. Not only is this amount far in excess of the corresponding figures, but is over $1,500,000 greater than is noted in any other city in the list.

Ontario in all reports six losses and seven gains, the former approximating one-half the decreases included in the accompanying table. Fort William, where a marked advance was made in the previous month, suffered a decline of 19 per cent. Peterboro' fell behind 35 per cent. Ottawa and Port Arthur were both in the rear 35 per cent., and Brantford and Stratford experienced set-backs of 23 and 63 per cent. in order named. Apart from these places, however, the Province witnessed some very substantial improvements. Besides Toronto's marvellous showing, Hamilton issued permits aggregating in value $624,150, as against $382,175 for the same month in the previous year. London also, as indicated in her amount of $132,334, representing a gain of 26 per cent., experienced a busy time of it, and as much can be said for Preston, where the volume of work amounted to $110,300. Other substantial gains noted are, Berlin, 38 per cent.; St. Thomas, 31 per cent., and Windsor, 354 per cent.

In this connection it might be said that there are numerous secondary towns and cities throughout the Province that are prospering to an unusual degree, but in many cases as no permits are required and hence no system of record kept, the totals for these places are unavailable.

As regards the West, operations were exceedingly brisk in many centers. Winnipeg, however, by a loss of 17 per cent., again sustains a decrease, and Vancouver, whose tremendous activities have so far this season attracted widespread attention, meets its first reversal in a loss of 18 per cent. Brandon, on the other hand, extended its stride and registered a gain of 58 per cent.; while most places in Saskatchewan, judging from the returns to hand, forged ahead in a striking manner. Saskatoon's investment amounted to $808,040, as compared with $292,956 in April of last year; Regina registered a total of $562,490, representing an increase of 83 per cent.; and Prince Albert has an amount of $162,355, netting a gain of 825 per cent., the highest percentage increase noted for the month. An advance of 59 per cent. is also announced from Moose Jaw, where permits amounted to $244,524, which is $170,424 in excess of the amount registered in the previous month.

In Alberta, Calgary surpasses the high total of the previous month by a slight margin, the exact figures being $1,127,256, which is a gain of 86 per cent. over the corresponding period. Edmonton, also with an increase of 42 per cent., moved well ahead, permits being issued for new work amounting to $359,027; although Lethbridge, in the same Province, is 6 per cent. behind her former figures. This decrease, however, is due to the miner's strike, which is responsible for a number of projects being laid over for the present time. In British Columbia, aside from Vancouver's decrease previously mentioned, a slight falling off is noted at Nelson, which is 10 per cent. behind. Victoria, on the other hand, is to the front with a gain of 45 per cent., the value of permits issued amounting to $280,110.

Of the Eastern cities reporting, St. John is the only one on the "upside," the investments there aggregating $78,900, which represents an advance of 51 per cent. Halifax and Sydney were both behind with respective decreases of 62 and 63 per cent., although in these two places developments have been somewhat retarded by weather conditions. Montreal also suffered a slight loss, having failed to equal her former amount by 3 per cent., while Quebec City sends in an amount of $13,000 without comparative figures. Montreal's total was $1,711,971, the second largest amount registered for the month.

While the prosperity of the month was perhaps less evenly distributed than in the period immediately preceding, the general expenditure nevertheless showed a marked improvement.

Conditions throughout the country give every promise of a busy summer. Montreal has sufficient work ahead to more than offset her present deficit; Vancouver reports that the pace so far established will be fully kept up, while as for Winnipeg it is safe to predict that on the whole the volume of work this year will be equally as great as that of 1910.

	Permits for April 1911.	Permits for April 1910.	Increase Per Ct	Decrease Per Ct.
Berlin, Ont.	$ 121,733	$ 87,881	38.52	
Brandon, Man.	63,100	39,720	58.86	
Brantford, Ont.	61.565	79,830		22.88
Calgary, Alta.	1,127,256	603,930	86.65	
Edmonton, Alta.	359,027	252,196	42.36	
Fort William, Ont.	211,135	261,625		19.30
Halifax, N S.	11,100	29,650		62.57
Hamilton, Ont.	624,150	382,175	63.31	
Lethbridge, Alta.	94,125	100,425		6.28
London, Ont.	132,334	104,883	26.17	
Montreal, Que.	1,711,971	1,775,880		3.60
Moose Jaw, Sask.	244,525	153,250	59.56	
Nelson, B.C.	46,980	52,715		10.88
Ottawa, Ont.	221,075	340,675		35.11
Peterboro, Ont.	82,345	121,201		32.06
Port Arthur, Ont.	69,300	107,750		35.68
Preston, Ont.	110,300			
Prince Albert, Sask.	162,355	17,550	825.09	
Quebec, Que.	13,000			
Regina, Sask.	562,490	307,205	83.09	
Saskatoon, Sask.	808,040	292,956	175.82	
Stratford, Ont.	18,868	52,168		63.84
Sydney, N.S.	39,465	88,025		55.17
St. John, N.B.	78,900	52,000	51,73	
St. Thomas, Ont.	70,650	28,050	151.87	
Toronto, Ont.	3,272,818	2,522,058	29.77	
Vancouver, B.C.	1,186,320	1,460,508		18.78
Victoria, B.C.	280,110	192,440	45.55	
Windsor, Ont.	85,750	18,850	354.90	
Winnipeg, Man.	1,922,150	2,320,900		17.18
	$13,792,937	$11,846,496	15.39	

¶ *Proposed Revision of Toronto Building By-law—Mayor and Board of Control memorialized to make changes in existing code.*

THE BUSINESS and professional interests connected with building construction in Toronto want a revision of the existing building code, which has been in operation for something more than twenty years. As to what success their efforts will meet with, is difficult to presage. It may be said, however, on behalf of the efforts of the organizations and their representatives, who memorialized the Mayor and Board of Control, that the work has been most thorough in every detail. The compilation of a building code is by no means a small task and the men who have given up their time to this work deserve great credit from the citizens of Toronto. The present building code of the city of Toronto is antiquated, incomplete, very slack and loose in some instances, and unreasonably exacting in some others. The present code was never compiled for the city of Toronto by a competent commission of scientific men. The building inspector, Mr. MacCallum, was obliged to compile the code from parts, excerpts and regulations draughted from codes in use in other cities. For instance, a very large part of Toronto's code has been adapted from the New York building code, which is conceded to have been out of date ten years ago.

We are not altogether just sure as to the position Mr. MacCallum will take in reporting on the suggestions made in this memorial, but assume that he will undoubtedy follow the usual course of civic officials when their department is under the fire of severe criticism. He will undoubtedly undertake to discredit the views of these men by trying to show that they have an ax to grind. This would be most unreasonable. The men's names that appear on these several committees stand high in their respective occupations and professions. Mr. MacCallum, either from education or training, should not assume that he would be justified in criticizing or making light of the combined opinions of representative engineers and architects who are responsible for the designing and erection of some of our larger buildings in Canada. Of course, there is always one element that has to be taken into consideration, one that seems most unfortunate, and that is the lack of knowledge with regard to matters pertaining to building construction, architectural and engineering, on the part of the average municipal politician. It very often results in important matters of this nature being set aside, upon the recommendation of their supposedly competent official who has charge of the building department. The memorial takes the form of a general review of the weaknesses and incompleteness of the existing building code and of the disadvantages incurred thereby. A second part deals with a detailed criticism of the present building by-law which points out many gross inconsistencies that would be hard for any conscientious architect or engineer to defend. Considerable space is devoted to that portion of the code regulating reinforced concrete construction. The former part of the memorial is of interest, in that it outlines just what the architectural and engineering professions think of the present building code and their reasons for holding such views. It says in part:

Your Worship and Gentlemen,—For some time past there has been a growing dissatisfaction among architects, engineers, contractors and business men with the Building By-Law of this city, and there is now a general conviction on the part of those best qualified to judge, that, however well the present by-law may have conformed to the conditions existing at the time of its enactment, it is no longer suitable. Indeed, it must be admitted that the present ordinance is prejudicial to the best interests of the city, constituting in many respects an obstacle to permanent and high-class fireproof construction.

From time to time objections have been made to the City Architect's Department by those having to do with building construction, and in at least one instance representations have been made directly to the Mayor and the Board of Control. Thus far little or no improvement has been effected by these criticisms, due in part, no doubt, to the diverse opinions often expressed by different persons with respect to the same portion of the by-law. The City Architect has therefore quite properly taken the stand that until architects, engineers, contractors and builders could come to some agreement among themselves as to the manner in which they wished the by-law modified, he could take no action in the matter.

With the belief that those financially and professionally interested in building construction could reach such a desirable understanding, a meeting was held on October 18th, 1910, on the invitation of the Engineers' Club of Toronto, at which representatives of the following business and technical organizations were present: The Toronto branch of the Canadian Manufacturers' Association, the Ontario Association of Architects, the Toronto Society of Architects, the Engineers' Club of Toronto, the Toronto branch of the Canadian Society of Civil Engineers, the Canadian Cement and Concrete Association, the Builders' Exchange of Toronto.

The attitude taken throughout has not been one of antagonism to the City Architect, but the aim has been to assist rather than to embarrass a department which by reason of the duties it has to perform must always be subjected to much adverse criticism. Consequently every effort has been made to render the labors of this committee constructive in character, and, where it has been necessary to criticize the by-law, at the same time rceommendations have been made for its improvement.

The objectionable features of the by-law upon which the committee bases its request for revision may be stated briefly as follows: 1. The exacting and unreasonable demands of many of its provisions; 2. Undue laxity in certain other provisions; 3. Incompleteness; 4. Faulty editing.

Exacting and unreasonable demands are met with in many sections of the written by-law. In the interests of brevity only the most important of these will be indicated here, the remainder being cited and discussed in Part II. It should be noted in passing that the objectionable requirements enumerated below are those of the written code only, and that the faulty interpretation of the by-law constitutes an additional grievance. The features to which most objection is raised on the ground of undue severity are as follows:

(a) Ten inches of fireproofing (nine inches of brick work and one inch of Portland cement grout) *all around* external iron and steel columns, and the compulsory use of fireproofing for iron and steel columns in timber construction buildings.

(b) The requirement of curtain walls fourteen inches or more in thickness for all materials, parapet walls fourteen inches thick, and the fixing of the thickness of basement bearing walls, however lightly loaded, at not less than fourteen inches.

(c) Ridiculously low allowable bearing pressures on brick work, necessitating 50 per cent. excess material in piers, pilasters or walls in which the compressive resistance of the brick work is the determining factor of the design.

(d) Unduly exacting rules respecting the number of piles in certain pile foundations.

(e) An allowable bending stress on encased grillage beams much less than is commonly adopted; excessive thickness of the encasing concrete, and the requirement of unnecessary asphalt and plaster coatings.

(f) Impossible assumptions as to the amount of live load on columns, involving in the case of tall office buildings a load in some instances as much as 50 per cent. greater than the maximum probable load.

(g) Lower allowable stresses and severer assumptions of design for plate girders than are customary in good practice; low permissible stresses on shop rivets; the requirement of excessive material for steel columns in the lower storeys of buildings.

(h) Exceptionally low allowable stresses on timber columns.

(i) Specification of impossible floor loads in a number of classes of buildings.

(j) The provision that the *horizontal* wind pressure on sloping roofs shall be considered as acting with the full specified intensity of 30 pounds per square foot on the sloping area of the roof.

(k) Excessively low allowable stresses on plain and reinforced concrete; untenable assumptions respecting the design of reinforced concrete structures; the impossible requirement that the deflection of a slab loaded beyond the elastic limit shall be proportional to the load.

This committee wishes it to be clearly understood that the primary object of its labors was not to cheapen building construction in Toronto, but to secure the enactment of a reasonable, safe and workable by-law. Consequently, wherever certain provisions were, in the opinion of the committee, such as to permit questionable construction, more stringent requirements have been recommended. The more important instances of undue laxity in the written by-law are as follows:

(a) The allowing of the use of inferior grades of Portland cement.

(b) The limitation of the use of fireproof shutters, wired glass or outside sprinklers, to warehouses and factories over two storeys in height.

(c) The permission of non-fireproof public schools up to 55 feet in height.

(d) The allowing of woodwork within four feet of cupolas of foundries, and the requirement of only four inches of brick work on a 3-16 inch sheet of metal under boilers or furaces resting on wooden floors.

(e) Insufficient strength in steel columns in the upper storeys of buildings.

(f) Higher allowable stresses on wind bracing than are usually permitted.

(g) Insufficient protection against corrosion of steel towers supporting water tanks.

(h) The omission of special stair protection in factories, warehouses and retail stores equipped with automatic sprinkler systems.

(i) The fixing of the required strength of concrete blocks at too low a limit.

(j) Inadequate provision for the fire protection of lumber and wood yards in congested districts; insufficient restrictions respecting the storage of hay, straw, ashes and highly corrosive acids.

(k) The permission of wood framing construction for buildings of any size in Fire Limit D (south of the Esplanade).

A critical examination of the present by-law discloses the fact that little or no reference is made to a number of new materials and forms of construction which are now taking an important place in building operations. It is true that some of these are used by special permission of the City Architect, but for the sake of convenience and definiteness the conditions under which their employment is permitted should be inserted in the written code at the earliest possible opportunity. Again, important considerations materially affecting the design are in many instances not mentioned. While under ordinary conditions this would not prove a serious matter, so frequently has the City Architect's Department placed interpretations on the present by-law entirely at variance with generally accepted engineering theory and practice, that it is considered desirable to have all important assumptions of design clearly stated in the code. In this way the inconvenience and loss of time consequent upon learning the unusual methods of calculation adopted by the City Architect's Department would be avoided.

The following are some of the important matters which receive no consideration in the by-law:

(a) Provision for the use of reinforced concrete footings, piles, lintels, pads, retaining walls and chimneys.

(b) The use of cement stucco veneer, as well as brick veneer for frame buildings.

(c) The use of metal lath and cement plaster for the enclosing walls of light and elevator shafts.

(d) The use of hollow concrete walls.

(e) Specification of the requirements of terra cotta or hollow tile, with respect to strength and absorption and permission for its use as an independent material in residences and similar buildings.

(f) The use of radial firebrick chimneys.

(g) Provisions for light forms of construction commercially practicable for greenhouses.

(h) The number of stairs required for given floor areas.

(i) Necessary dimensions of fire escapes.

(j) The relative transverse and longitudinal bending moments on concrete floor slabs; the distribution of loading along beams carrying slabs reinforced in both directions.

(k) Requirements concerning bridges between buildings.

Some of the subjects which are imperfectly or indefinitely treated in the code are as follows:

(a) The classification of buildings.

(b) The reduction of live loads on columns and footings.

(c) Proportioning of column footings to obviate unequal settlement.

(d) Wind pressure on sloping roofs.

(e) Workmanship in reinforced concrete construction.

The above is a fair resume of the chief objections set forth in the memorial presented by the general committee, consisting of architects, engineers, contractors and business men.

Paragraphs follow dealing with the "high cost of building especially in fireproof construction" that is necessitated by what is termed "overly exacting regulations." Another paragraph, an attempt is made to show that through the high cost of building, in addition to unreasonable requirements of the by-law, industries are forced to locate outside of Toronto. Some space is also given under the caption of "limitations or restriction of building projects." It is further claimed that the present building code encourages non-fireproof construction. Another paragraph which may be said is not of exceptional interest to the general public deals with the inconvenience to which architects, engineers and contractors are subjected owing to a faulty arrangement of the by-law and unreasonable regulations. Considerable space has been given to reinforced concrete and the paragraphs devoted to this particular type of construction complains of overly exacting regulations. It may be said in this connection that while a safe and sane code governing work of this character should obtain, it is also of paramount importance that restrictions should not be imposed that would incur an unnecessary expense on the part of the owner. On the other hand, every precaution should be taken, and regulations should not be approved of, or adopted, that would permit of the indiscriminate use of this new type of construction by inexperienced or unscrupulous contractors or engineers.

Mr. MacCullum has been Building Inspector in the city of Toronto for many years, and during his tenureship he has always demonstrated an attitude of caution and careful interest in the type of building construction permitted in the city of Toronto. We might say furthermore that in Toronto, despite some of the inconsistencies in its building code it is generally conceded that this city has a better class of buildings than the average city of its size on the continent. It is to be hoped that Building Inspector MacCallum will give the recommendations in this Memorial full consideration and that he may take advantage of this opportunity to secure a commission of experts to revise the by-law.

CORRECTION.—On page 105 of the March issue, in connection with the advertisement of the Cement Product Company, the name of the architect of the [illegible] Brewing Company, 47 Simcoe street, Toronto, is erroneously given as Victor Moore. The design for this building should have been credited to Mr. A. L. M[illegible], 28 S[illegible]hill avenue, Toronto. CONSTRUCTION regrets the occurrence of this mistake, which was due solely to a typographical error.

Basilica of St. Mary the Greater, Rome. A Hall in the Liberian Palace Granted by Constantine to the Christians.

CHURCH ARCHITECTURE

By EDEN SMITH, R.S.A. F.R.A.I.C.

The development of the aesthetic in ecclesiastical buildings—an essential which is too generally overlooked in the work of modern designers.

THE ANNOUNCEMENT that Mr. Ralph Adams Cram, of Boston, would give a lecture on Cathedrals, caused many who knew him and his work to look forward to the event with a great amount of pleasure. Probably many of us imagined that though the Gothic revival of the last century in England might have thoroughly thrashed out the ideas involved in ritualistic church building, yet a mind trained in an environment quite free from the traditions and conventions which pervade all ecclesiastical life in England would give us, perhaps not some new thought about these things, but possibly some new view points that would enable us to get fresh vistas through the old church aisles.

We were disappointed that we obtained no new vistas. We were told that a cathedral was an expensive building. I forget just how much one should cost, but cathedrals were something to which we ought to contribute liberally. This was not quite new to us, we have many men in Toronto who could most eloquently impart such information as that.

We were also told, of course, quite modestly, of the very great success Messrs. Cram, Goodhue and Ferguson had made of church building, how they had built parish churches which looked like cathedrals, and of cathedrals they had built which quite rightly might never be mistaken for parish churches, and how that huge collections of buildings they were now erecting for a War School at West Point, New York State, was dominated so appropriately by a medieval chapel with a tower which has a family resemblance to that of Gloucester Cathedral in England.

We were shown some excellent slides of the most familiar of the great cathedrals, such as Notre Dame, Paris; Exeter, York and Canterbury in England; with some other churches and cathedrals by Cram, Goodhue and Ferguson, all of which drew from the audience enthusiastic expressions of intelligent approval, as did also an interior view of St. Paul's, London, before Mr. Cram had time to explain that, he exhibited that as an example of what to avoid in church building.

As we sat in darkness looking at the lantern slides one could not help thinking how strange it was that we, the descendants of those who had endeavored to preserve the traditions of the old church, some of us members of families who could trace an unbroken allegiance to it through the last three centuries of disruption, should find it necessary to send to a foreign country for some one to teach us veneration for what we had always considered the most important institution of our own land, especially to send to a country which, more than any other, was peopled by the very men who did their utmost not to destroy alone that institution sacred to us, but even the buildings that housed it.

What environment better than our own could there be in such a State that might produce teachers better qualified to instruct us about such things?

It was the hope of having some fresh thought on the underlying motives of medieval church building that attracted us to the lecture. The hope of hearing something different to the usual archaeological arranging into periods and styles of the great church buildings, which is the gist of most disquisitions on Ecclesiastical Architecture.

As long as our study of church building of the ancients produces no other result in us than the ability to distinguish the peculiarities of the buildings erected by them during a certain period of years, and a taste for imitating in our new buildings such of the minor effects of the old as we can by any means engraft on our entirely different architectural compositions, so long we may consider architecture a dead art and our building something analogous to writing Latin odes in imitation of Horace, or medieval verse in the manner and with the archaisms of Chaucer.

To study architecture we must remember that it is not a matter of esthetic perception alone, or a matter of science alone, but a combination of both going side by side, the one quite as important as the other and one depending upon the other. It is a matter of science and sentiment appealing to our reasoning and emotional faculties. Its scientific side includes most of the mechanical or useful arts, and through its emotional quality it is included among the fine arts, and it is probably more capable of exciting emotion than any other art, except, perhaps that of music.

In this peculiar study, Church Architecture, probably sentiment is more important than science. Naturally, we may rely more on modern than upon ancient science, but as modern sentiment fails to produce the beauty we appreciate, it is natural that we should desire to understand the sentiment which created it in the old work.

The scientific side of Architecture, the solving of engineering or constructional problems, peculiarities of plan and design caused by differences of custom or ritual, or of considerations of comfort and convenience, are things which affect our rational perception, things which any reasoning being may see and discuss. These engineering feats of the ancients do not as a rule excite in us such an affection as would cause us to put aside the comforts of modern inventions for the sake of perpetuating them, except perhaps as monuments of the work of our ancestors, or as records of traditions we reverence. We might wish to retain them but not to imitate them. This part of architecture appeals to almost every one, but it is only half of the message of architectural design. That which excites emotion is the part which we perceive by means of something in us that is almost that intuition, which the Greek philosophers considered an ecstacy, possessed only by a few favored persons.

There were two supreme periods in the history of architecture, or of art, in which were produced masterpieces which we acknowledge have not since been excelled or equaled. The first was marked by the production of the Grecian Doric temple, and the second by the creation of the medieval cathedral.

All previous architectural art culminated in this temple of the Greeks, their later ones were but an elaboration of the idea developed in it.

The Romans developed no new aesthetic architectural idea, they simply applied to the new kind of construction they introduced, a decorative surface of Greek detail evolved by the Greeks in designing buildings on quite a different architectural principle. Architecture as a fine art is beautiful construction. It is not a raiment applied to cover any kind of construction. That is really decoration and corresponds in human beings to the tailoring or millinery we hide under, as compared with the nude figures exhibited in Grecian sculpture. It is a fine art, because by means of it the artist can express something to the beholder. It appeals to intellect and reason through the emotions as do painting, poetry and music.

To do this it must have something analogous to a language. Not a language like our language of words, in which certain noises, we make with our mouths or perhaps noses we agree shall stand as signs for things, but a language like the language of music, in which certain forms of harmony, tone, melody, etc., produce certain impressions. All those conventional arrangements of tone, form and color which persistance of usage through the ages has made for each of the arts its language. This language in the case of architecture became established through man's selecting and retaining, even though utility did not always dictate their use, such forms as produced satisfactory impressions upon his senses, whether his reason approved of their use or not. Forms which were sometimes repeated by him because they excited in him feelings nature had suggested or reminded him of themes announced by nature, not because they were his imitations of natural forms.

We know an artist does not set out to imitate nature in the way popular opinion suspects, an opinion which I think is largely responsible for popular art; his business is to rekindle emotions similar to those nature has excited in him, to produce impressions.

It is customary to trace the growth of the Christian Church building from the Roman Basilica and on through the Romanesque churches of France to the English and French Cathedrals of the middle ages. This gives satisfactory results as far as plan and construction go. Of course, plan is a most important part of any building, and there is no doubt that the plan of the Roman Basilica affected not only the plan of the Christian Church, but to some extent its ritual. And it is evident that considerations of construction affected the development of the plan. But all these things belong mainly to the scientific side of architecture. We do not seem to care to trace the development of its other side.

All our modern fine art and poetry come from Greece. Is it not likely that all that poetical side of architecture should come from Greece as well? The Romans, unlike the Greeks, did not take as serious a view of the fine arts as they did of literature. Cicero, in ordering some Grecian statuary to be obtained for his new villa, much in the manner of a modern millionaire, seems to be more interested in getting it well packed, so that it might arrive without damage than he was of obtaining work of any particular merit. Plutarch speaks of the absurd magnificence of the palaces and Imperial Buildings of Domitian. This seems so modern.

It seems strange to make any connection between a Greek temple and a Gothic Cathedral, but that is because we will only look for the scientific development of these buildings and not for the sentimental.

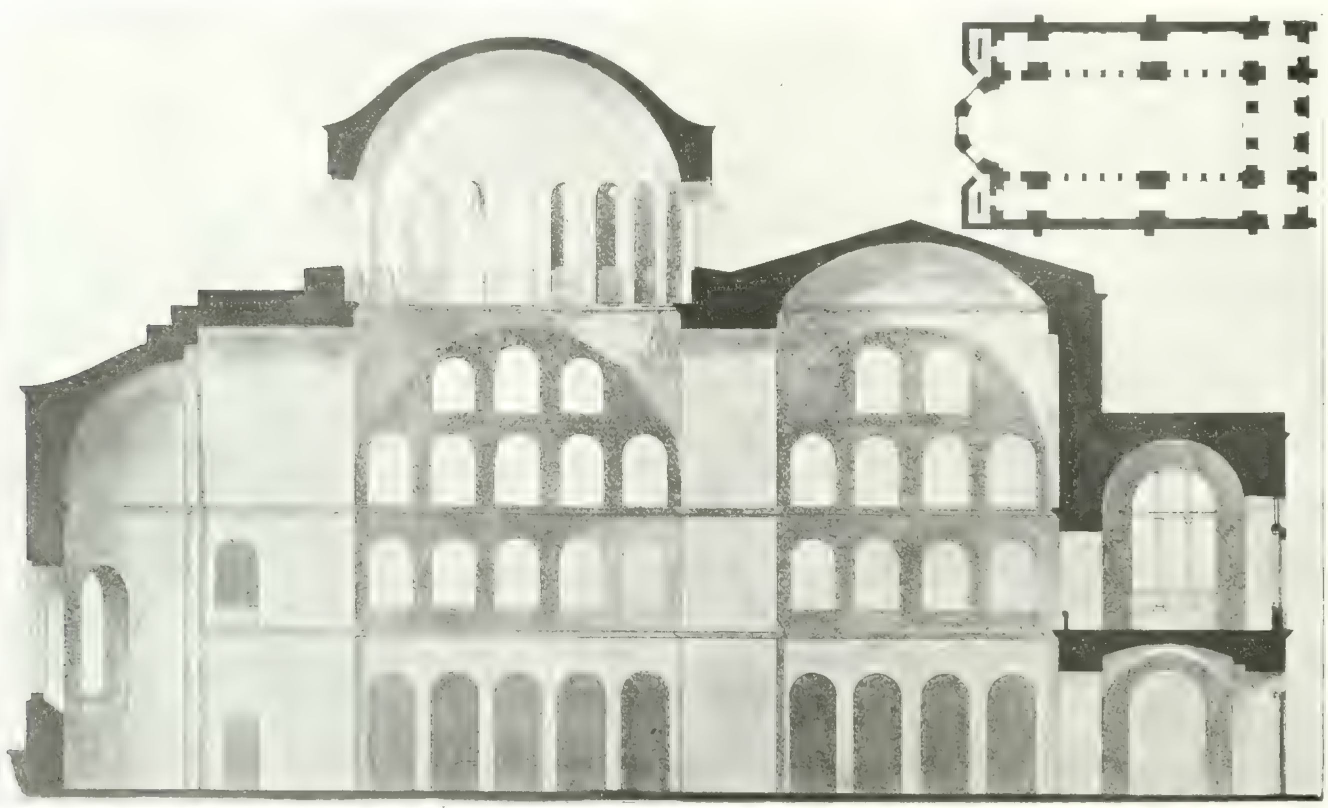
Basilica of St. Paul, Rome. Built by Theodosius, A.D. 380, and Re-erected 1811.

The aesthetic connection is quite complete, but did not come by way of Rome. That is why when we travel backwards the Roman Basilica seems to be a kind of jumping off place, leading nowhere. We do not bother to look for anything more, because we, like the ancient Romans, rather affect to scorn the emotional. This Roman characteristic the really emotional Anglo-Saxon has adopted is well expressed in Addison's Cato as:

"Rank pride and haughtiness of Soul,
I think the Romans call it stoicism."

The pseudo classic age that the revival of learning

Interior View of St. Peter's, Rome.



Longitudinal Section, St. Irene, Constantinople.

the Renaissance brought was for a long time merely an imitation Roman one. For a long time Roman poetry and art was more popular than Greek. And architecture does not yet seem to have passed this stage.

The difference between a Gothic Cathedral and a Grecian temple exists mainly in its scientific side, the aesthetic principles expressed are the same in each.

The Grecian Temple is the most perfect example of beam construction, a construction of columns and beams designed to resist only vertical forces.

The Gothic Cathedral is the most perfect example of arch and column construction, designed to resist forces from all directions.

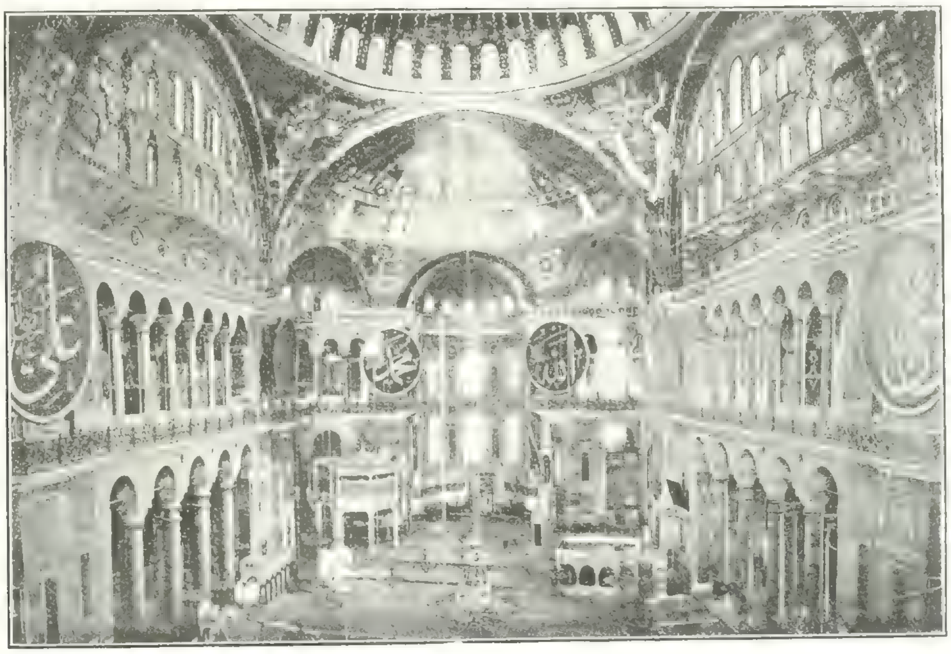
The Roman Basilica as St. Maria Maggiore is still an example of column and beam construction like a Greek Temple. But the Romans became familiar with the use of the arch and found a means of setting their columns farther apart than a lintel would allow, as shown in the Basilica of St. Paul, they discovered a new scientific principal in building, but they did not discover how to use it aesthetically. They still tried to make it look like beam and column construction. Till in the ultimate idea of Roman Church architecture developed from the Basilica, which we see expressed centuries after in St. Peter's at Rome, the poor column becomes a mere hanger on, and the arch, which is really an extension of the column, is not of so much importance as the frieze and cornice, which are really purely ornamental and do no more constructional work than if they were painted on.

The Greeks attached so much importance to expressing the constructional principals of their buildings that the columns, the principal constructional feature, obtained a beautiful identity, so almost super-human that one could not help but feel some such reverence and awe when amongst them as when among the giant tree trunks of a primeval forest.

It is strange that this appeal of the column in its likeness to the forest trees could be almost taken as a motive in design to mark the difference between the Gothic and the Latin building and connect the Gothic with the Greek. And it is strange to see the attraction the column has for men seeking to establish a religious environment.

We remember that the original Basilica was the *Stoa Basileios* or Royal Porch, at Athens, among whose columns religious discussions were heard. The name Basilica came from this to Rome to be used for the open piazza enclosing a central open court in which the merchants used to congregate to discuss business. In time this central court was roofed in and side walls were built to the colonade, making the court a large oblong room with side aisles, about like St. Maria Maggiore at Rome. This, with the addition of a semi-circular apse at one end, or sometimes at both ends, became the civic hall of the Romans. The floor of the apse was raised above the floor of the main hall or nave, and on concentric seats around it sat the judge and his assessors, the altar on which he took his oath to impartially administer justice being placed at the centre of the semi-circle. A screen was placed between the apse and the nave to prevent the noisy litigants, who crowded the nave, from interfering with the judge and assessors. There was very little religious sentiment about such buildings as these. They were used by the early Christians when they were permitted to hold public meetings, because they were convenient, and because in the beginning they were too poor to build for themselves, and when they were able to build, Roman art had so declined that they no one with genius enough to design buildings better than in imitation of these old halls of justice and commerce.

In the Basilica of Maxentius or Constantine at Rome, in the beginning of the fourth century, was built a church that was a complete departure from the Basilica plan. The great nave 260 ft. long



Interior of St. Sophia, Constantinople.

Interior of Westminster Cathedral, London. The Late Mr. J. F. Bentley, Architect.

was separated from the side aisle by three large arches of over 70 ft. span each. The arches of the roofs of the nave and of the nave walls were collected on two high piers. In this building was announced the new principal of construction to be perfected in the medieval buildings about 800 years later, but no new aesthetic discovery was made to keep pace with this construction. The arches were supported by high piers of masonry, just pieces of wall left between the voids made by the arches. The column of the Greeks was retained, but practically only as an ornament stuck on with a portion of entablature to the face of the great piers.

After this the seat of the Empire was moved to Byzantium, and through the centuries of the barbarian occupation the buildings erected in Rome were made of fragments of older work, ignorantly put together, and architectural development in Italy ceases.

So far Christianity had but made use of pagan art and particularly of the Roman School of pagan art. The art of a people not seriously enough interested in such things to demand that it should be an embodiment of their ideas, but contented to let their own scientific building be covered with a veneer of an entirely foreign form.

When Byzantium of the Greeks became the centre of the Empire, the controlling thought became Greek; the thought of a people who preferred to take religion and art seriously.

Even if they took one of these things more seriously than the other, we should still expect to find in their religious buildings the best of their art, or else in their art the best of their religious feeling.

With the Romans the best of their art was magnificent self-indulgence. The Greeks could live in mean houses and build grand temples. They could be stoics and cultivate the aesthetic. The Romans, like ourselves, were imitation stoics for the sake of their morals.

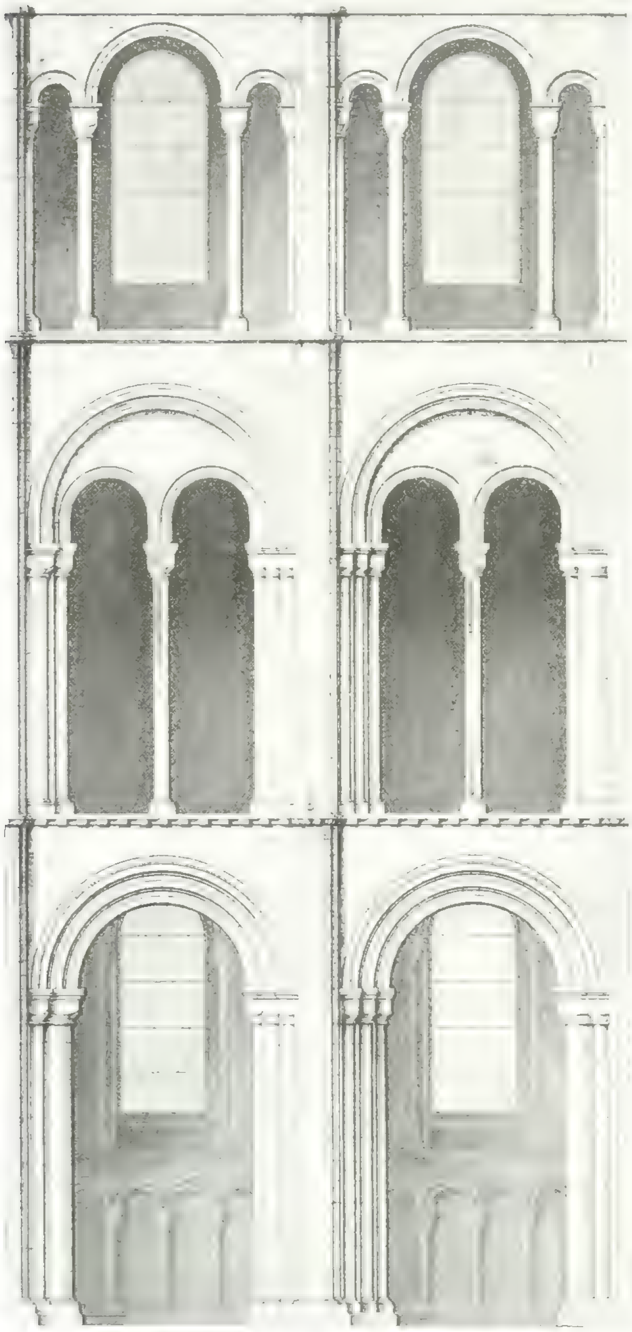
That the Greeks at Byzantium did take both their religion and their art seriously is well exhibited in one of the first churches Constantine built at Byzantium, St. Irene. Here we have but little advance on the arch and vault construction of the Basilica, Constantine built in Rome; but a great advance on the aesthetic or sentimental side in leaving out every bit of the Græco-Roman architectural decoration, preferring to frankly expose their bare construction till they could thoughtfully beautify it. This must have been done intentionally and not in ignorance, for they were the same Greeks the Romans had employed as artists, the same Greeks as were employed by Charlemagne centuries after, and they were surrounded on all sides by specimens of Greek and Roman masterpieces, which they preferred to ignore.

When in about 200 years after this Justitian built for the third time the Church of St. Sophia at Byzantium, or Constantinople, as it was now named, we see practically the same arched and vaulted construction elaborately ornamented, but the beam and column motive of Greece is entirely gone. The column itself comes back again, but this time it is frankly a column carrying the minor arches; the great piers, which do the major work, are left as piers.

This Church of St. Sophia at Constantinople marks the high tide of architectural development in the East, for soon after this time those disputes in the church as to the propriety of representing divine beings in decoration arrested the development of sculpture, but not so much the development of pictured representation in mosaics, and the Greek artists were practically driven from the country. The Iconoclasts seem to have done for Byzantine pretty much what the puritans did for English art. Their movement to suppress images failed, and instead of getting divine subjects presented to them intellectually as the Greeks would have eventually been able to do, they preferred to use for their worship pictures of the crudest type.

View of Choir, St. Georges De Boscherville.

Yet there are people who say that this arrested and afterwards stunted and orientalized buildings, represents the ideal of Christian church building. These buildings, with their heavy depressing domes, like caves, well symbolized, and possibly that is why they find such favor with the Semitic or Asiatic races, apathy and fatalism, places for sleep, refuge



Interior of Nave. Ely Cathedral.

or burial, well shown in the new Cathedral at Westminster.

In a discussion in England on style of church architecture one disputant calls the "Basilica Church the product of Christianity." All that Christianity ever used of this hall of commerce of the Romans was its plan; a big effort was made to change this in the Basilica of Maxentius at Rome, practically in the time of Constantine. What might have developed in Rome from this start in a new direction was arrested by the move of the Imperial seat by Byzantium. But in St. Irene at Byzantium the same idea is picked up again and carried a little farther. At St. Sophia we see the idea carried a little farther still, all this the work of Greek artists. There is very little resemblance now between this grouping of domes, and the oblong hall with a row of columns down each side and a flat ceiling over (see St. Maria Maggiore of St. Paul's Rome), which was what Ausonius called the "halls once so full of business, now full of prayer."

The Basilica plan was revived again, but far

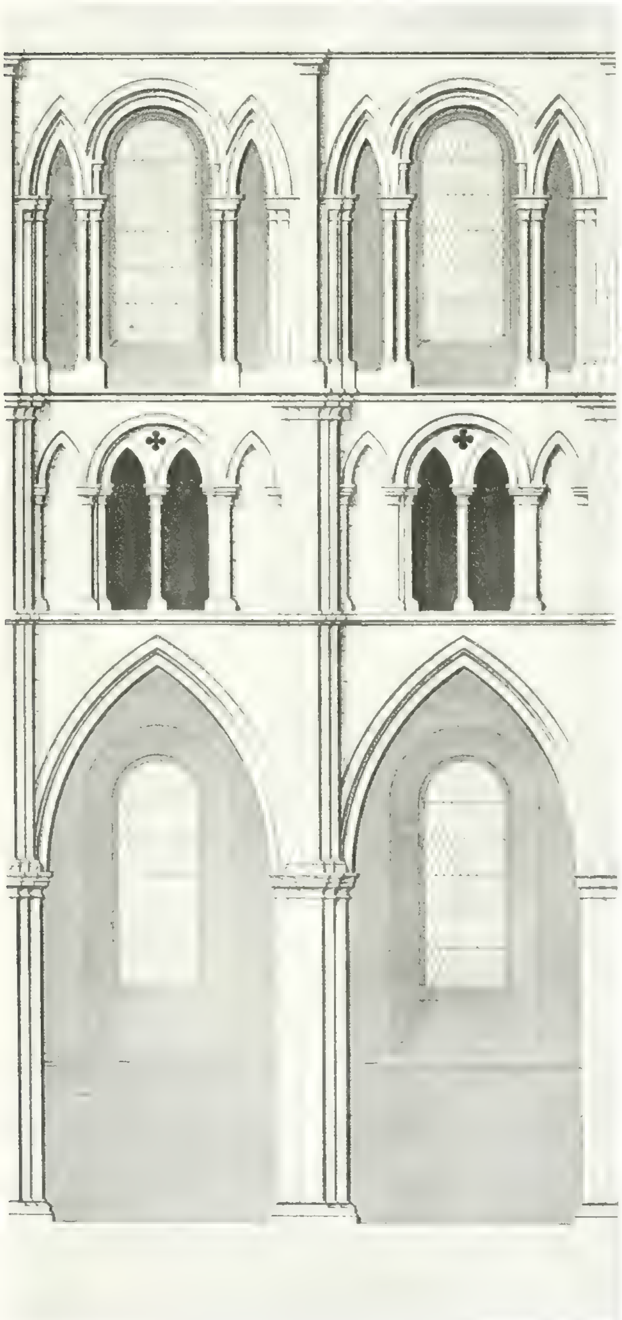
View of Nave. Westminster Abbey.

away from Byzantium. The Greek artists banished from there found a refuge in France, where Charlemagne was restoring order and establishing schools. In devising new church buildings they found all round them remains of the Roman occupation, among these remains, of course, Roman Basilicas; but they changed them so that the new ones really had no more connection with the old than any two buildings might have because they were oblong in plan.

The Roman Basilicas sometimes had a semi-circular apse at one end, sometimes at both ends, sometimes the apse or judges court was square. The Christian churches in France sometimes had three apses.

But there is something very much more vital by means of which we can trace the best architectural development through the ages. It is not the mere scientific arrangement of plan for convenience of construction or use. But it is the expression of sentiment, the appeal to the emotion, the endeavor to express intellectual or spiritual values.

Charlemagne, as he conquered and reduced to order Western Europe, built castles or fortresses to maintain order with, and churches to teach order; he had not the tyrant's distrust of scholars and men



Interior of Choir, Ripon Cathedral.

of intellect, and drew round him the most learned he knew. One of them, Alcuin, said once to the Emperor, "If your zeal were imitated perchance one might see in France arise a new Athens, more glorious than the ancient, the Athens of Christ." Is it likely these men who knew their Greek would try to revive any such thing as the Roman art that Plutarch derided?

This spirit came right from Greece, it failed to grow in Rome, and it failed to grow in Byzantium; the

Interior of Presbytery, Ely Cathedral.

work it did there stayed just as it was, when this spirit was driven out. Greece had succumbed to Asiatic influence, and had gone to sleep in its caves. But in the West the new life dawned like daylight after the darkness of barbarian night on almost a new race of men, men of great physical and mental virility, men of Northern Western Europe who contrasted sharply with those of the South East who were by now almost Asiatic. Such men were a rich, fertile ground to receive such seed as the religion of Christianity and the art and philosophy of the Greeks, cultivated in the schools founded by Charlemagne. Schools liberal and enlightened, for he gave instructions that no difference should be made between the sons of serfs and the sons of free men, but that they might sit on the same benches and study the same subjects. He it was who made a temperate decision between the bigotry and infatuation of the image breakers and the image makers of the East.

The fruit of this cultivation, the art and architecture it brought forth, was the freshest, most vigorous and daring the world had ever seen. Churches that to this day recall the glorious forest their builders must have known. Their minds had been trained before they received Christianity to seek in the forest or in the grove what superhuman beings they imagined might exist. Probably the purest emotion man ever felt was when the beauty of some natural scene impressed him with the sense of the presence of an invisible benign being or a God.

Abraham "planted a grove in Beer-Sheba and called there upon the name of the Lord." Yet this seeking of a holy place among the trees is an Aryan characteristic rather than a Semitic. It is so much a race instinct that we at the present time are still sensitive to it.

Washington Irving, writing of an American forest, says: "We were shadowed by lofty trees, with straight and smooth trunks like stately columns, and as the glancing rays of the sun shone through the transparent leaves, tinted with the many colored hues of Autumn, I was reminded of the effect of sunshine among the stained windows and clustering columns of a Gothic Cathedral, indeed there is a great grandeur and solemnity in some of our spacious forests of the West that awakens in me the same feeling that I have experienced in those vast and venerable piles." And in those vast and venerable piles we experience the same emotion as the forest excites. The power to excite emotion is the vital principal of art.

The conventionalities of art, all that system of form and color our ancestors evolved by selecting and retaining in their buildings or work from the forms originated by necessity, such as revived in their minds emotions they appreciated. These emotional appeals are the motive themes or plots of his work, and they are not a vast array of almost incomprehensible ideas, but like the great things of life that really matter, a few simple facts.

We need not go into every detail of every one of these old buildings to find the aesthetic motive of the great masters. Because the message is not written all over all of them in every detail, we need not think that there is no message, because the message is not evident in every copy of a masterpiece or in the work of every pupil of the masters. The message or appeal is often as minute and inconspicuous as is the faint fluttering called soul in that conglomeration called man.

Interior of Exeter Cathedral as It is Seen from the West.

The schools Charlemagne founded attained their perfection in the Abbey of Cluny in the twelfth century, from there went out the Gothic message, their best expression. Sincerity and such conscious or sub-conscious re-rendering of the emotions nature had taught them.

But many of the medieval buildings failed to carry the message. Some builders broke every traditional rule, some built on bad foundations, some did bad work, some built with insincerity. Some buildings are experiments, merely records of flights in untried directions.

Unlike our clergy of to-day the monks of Cluny taught their artizans their art. They did not go about looking for artists who could build good churches, they taught the artists what good churches

View of Ch[illegible]. Westminster Abbey, Looking East.

should be. How much they were in advance of their times may be gathered from the reproof St. Peter the Venerable of Cluny administered to St. Bernard of Clairvaux for his intolerance of the advanced ideas of the Clunisians. He said "new things may irritate a mind rooted in habit, it may find it difficult to approve of the strange, but the eye of the mind comprehends diversity of usage, but this intellectual sight is given to few." Abelard, with whom most of us now would sympathize, also fell foul of St. Bernard and sought refuge with St. Peter of Cluny.

The new things these French monks endeavored to teach their artists to express are what we must consider the best expression of arch architecture. We have seen the best expression of beam architecture at Athens. We know they dreamed of a new Athens, but they could comprehend a new usage and they would not have an intellectual sight if they could see nothing but the old clothing for the new usage.

If we take one motive in their buildings that even now rekindles in us, an emotion they must have felt conscientiously or sub-consciously, and in their buildings sought and preserved, the motive of the forest or sacred grove, the upward soaring impression left on the mind by the Gothic Cathedral caused by making the details of the work lighter by sub-dividing the forces and providing for each one separately, as from column to groin rib like from tree trunk to branches.

We should consider their expression of the dignity of work in exalting to the most honorable position, with beauty of form and perfect expression of functions, the working members of their buildings, the column and arch, how under their direction the co-

Interior of Nave, Lichfield Cathedral.

lumn again became a venerable thing like the column of the Greeks, but recognizing that it, unlike the Greek column, instead of one had many functions to perform, which they expressed in their columns as do the muscles in the human body.

We should naturally expect from such spiritual enthusiasts symbolic expression of the great virtues in their work, such as of truth or faithfulness as opposed to deceit. Of the sacrifice of the sensually beautiful to obtain the intellectually beautiful of valuing human work above the value of gold and precious stones, a lesson not yet learned in the East.

As well as such criteria as these we may see how they solved such purely aesthetic problems as that of satisfying the eye as to the disposition of the lines of strength and the lines of force or weight and their proper massing, separation or resolution.

In studying the manners and thought of the ancients we are apt to forget how little the impulses of the men of two or three thousand years ago differ from ours of to-day. We forget that as in most matters then as now, the majority as a rule has the wrong idea of what is progress, and that what was popular or fashionable really presents the habits of the feeble minded as truly then as now. Fortunately there is nothing so ephemeral as fashion, what remains is the not always popular opinion of the few. Popular opinion in Athens did not approve of Socrates.

most perfectly in the great churches built nearest to the influence of Cluny, but this is not invariably the case, owing to the frequency of changes at different periods. The Cathedral of Amicus possibly best represents most completely the perfection of their ideas in France.

If we take an example from France, such as St. Georges de Boscherville, and compare it with one built in England at the same time in Ely Cathedral Nave. With this starting point we can follow the development of the ideas, of the architectural philosophers of the school Charlemagne, founded in our own church building in England from the 11th to the 15th century.

This detail of a couple of the bays of the Nave of Ely Cathedral, which with corresponding bays of

Nave of Lincoln Cathedral as It Appears Looking West.

Often the enthusiastic followers of a teacher from lack of perception reverse his doctrine. The message as soon as announced seems to be hidden from the many, but like the protoplasm, its insignificance in bulk, as compared with the inanimate matter around it, may mislead one as to its power. We must not expect that the idea of the great teachers penetrated the brain of every medieval monk engaged in building that multitude of churches which in England and France sprang up in the 10th and 11th centuries.

In the arts of ages more remote than the middle ages, the artists succeeding have had time to remove the failures of the pioneers, but in medieval art, the changes were so abrupt and the time relatively so near our own, that we see nearly all the old work in the making, with its unfinished experiments. One would expect naturally to see their ideas carried out

Ripon Ely presbytery, Litchfield, Ely Choir and Winchester, I have taken from Sharpes' parallels, as they are probably the most intelligible analysis of English Medieval Church Building I know of. The Nave of Ely sufficiently shows us the connection between the work of England and France on comparing it with St. George de Boscherville. From then on the English work becomes, with few exceptions, quite different, though the philosophy may and should be the same, the detail of its decoration changes more and more.

The cluster of shafts is not yet a column, it still retains some of its Byzantine character of a pier, although the column was much more distinct in Gloucester, Durham, Tewkesbury; it was really a column supporting a wall like the column of the Basilica, as in the Basilica of St. Paul, Rome.

In these shafts of Ely we see the first attempts to magnify the function of the column and make it the one great feature of the church, as in the Grecian Temple, the trunk of the tree. For although this nave of Ely was not vaulted, there is now no doubt but that it was intended to be, as St. Georges de Boscherville, but if no other consideration caused it, the builder probably found the walls too weak for the weight of a stone vault.

Although this glorification of the column persisted in English Churches, to its best period, as in the Nave of Exeter, in England, more than in France, its connection as a roof support grows more indistinct. Its best expression is probably in the Nave of Westminster, a Church practically French in its plan and proportions, but most English in its detail.

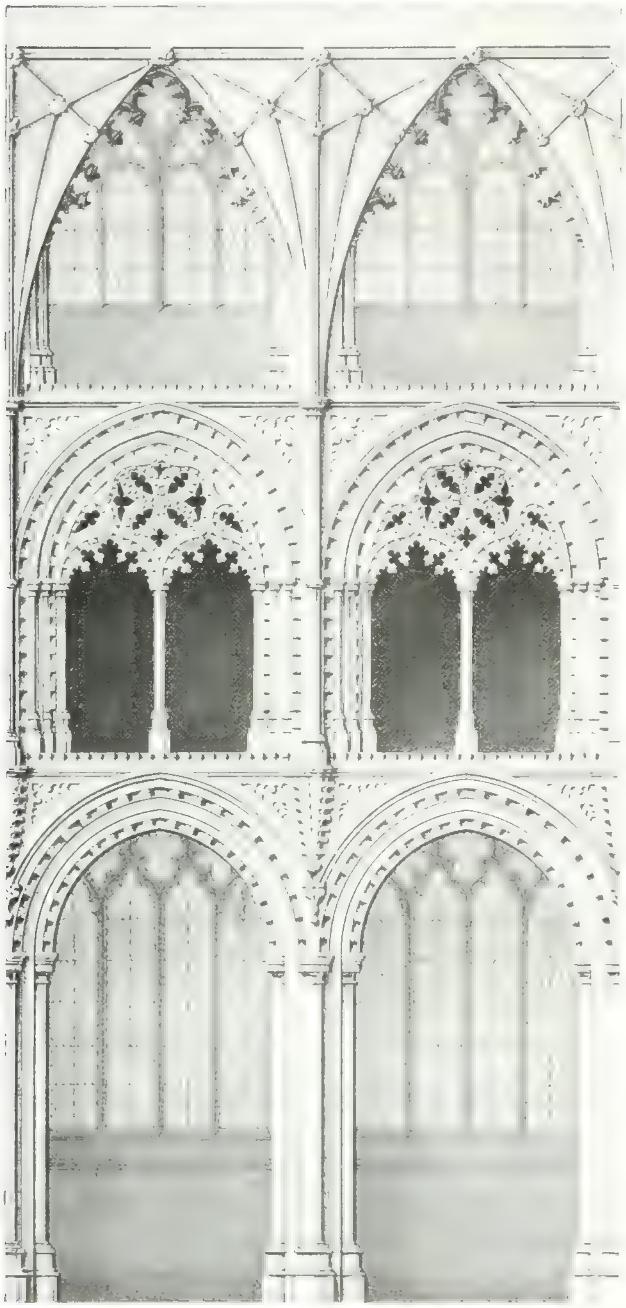
A little later, as in the Choir of Ripon, we have an example of the total misunderstanding of the column, although all resemblance of a pier is gone and it is a column proper, but instead of carrying its lines of strength up till they melt in the ceiling, like the resolution of a musical chord or as a tree's branches dissolve in the sky, its three abrupt columns are interrupted with heavy caps and bases at each stage as completely as superimposed orders in a renaissance building. This Choir of Ripon was evidently intended for vaulting, but it remains another example of an experiment which failed. If we compare it with the next stage, Ely Presbytery, we can see how in Ripon, although the pointed arch had just come into use, how little the lines of weights and strength were understood, and how well they were in the presbytery at Ely, almost an example of the perfection of English Gothic. Although the weak point of the non-continuation of the shaft lines to the roof is exhibited here, it is not so obvious in perspective as may be seen in distance of the Nave of Exeter, the vertical lines of the columns practically carry through the triforium to blend with the groin ribs.

In this period of Ely Presbytery, English work reached its perfection, and although it may have continued long enough to have included such churches of the next period as shown in the example taken from Westminster Abbey, Lincoln and Litchfield Cathedral, yet the elaboration of tracery and repetition of geometrical motives began a mechanical kind of over decoration which marks among other things its decline.

The Nave and triforium of Litchfield probably marked the greatest advance of this geometrical period laid out by the Cistercians, who in England were most insistant upon good building, but in this example the clerestory window seem to be another example of an experiment which failed, not so much because of their unusual form, but because of the change to an altogether different scale of detail.

The Cistercian Abbey of Rievaulx, England.

If we look at the Choir of Ely Cathedral for our forest tree, we see creeping in again the Romanesque pier, a piece of walling with shafts attached to its four faces. For the last three centuries we had been turning these piers into columns. Now, for some reason, we turn our faces back again to piers. For the last three centuries we have been getting rid



Interior of Choir, Ely Cathedral.

of wall, see Lincoln, Westminster and Exeter, to obtain the tree-like effect of columns and arches.

I say back, because this is the first evidence of a series of changes which lead from a building in which the column and arch is as completely expressed as the whole structure of the building, as was the column and beam of the Greeks—to a kind of building in which, although columns and arches may be the constructive element, columns and beams are the misfitting aesthetic element. A series of changes culminating in the revival in the Renaissance, as exemplified in St. Peter's at Rome, of those Roman ideals of building developed from the Basilica which the Greeks at Byzantium put aside as being unfit to philosophically express the new arched construction they had adopted.

In this 14th century work at Ely Choir, although not very much more elaborately decorated, than the bay of the presbytery, hardly two centuries older, the accents come in the wrong place, and the columns, arches and roof lose their connected simplicity and broad dignity.

About a century later, as in Winchester, the dignity of the column and arch is nearly gone, the arch has almost turned to a beam, it did so practically a little later, and the lines of weight crossed transversely what should have been the lines of strength. The horizontal lines above the arch became more important, the mouldings heavier and heavier, till the Roman cornice and frieze comes back. The shafts turn to paneled piers and the columns to a flattened pilaster, pretending to carry a lintel and cornice which have no constructional function.

Even before the 15th century work went so far as

Interior of Nave, Winchester Cathedral.

this, there seemed to be a desire to get rid of the column as the constructional motive to lose the effect of strength and breadth made by the massing and distribution and strength of lines, and to call attention to wall only by paneling it all over with paneling so much like the window tracery of that period that when one considers the painted and gilded wall and stained windows the effect inside must have been as if it was all wall, but some of it transparent. (Continued on Page 69.)

CONSTRUCTION

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

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Vol. 4 Toronto, June, 1911 No. 7

CURRENT TOPICS

PROJECTED IMPROVEMENTS at Victoria this year include the asphalting of over fifty streets. Some 600,000 square yards of pavement, equivalent to 36 miles in all, will be laid.

* * *

THE LARGEST CRANE in the world, has just been tested at the Imperial Japanese Navy Dockyards, Yokosuka. It is of the cantilever type, and is capable of handling a working load of 200 tons at a radius of 95 feet. The crane was built by Messrs. Cowans, Sheldon and Company, an English concern, who at the present time are erecting one with a working capacity of 200 tons at a 105 feet radius for the Japanese Navy at Kure.

* * *

ELEVEN MILLION FEET of lumber constitute an order for a single item of material, recently placed with a mill at Revelstoke by an Edmonton building corporation engaged in the erection of residential structures. Judging from the extent of this one purchase by an individual concern, and the fact that lumber is only one of the large number of materials required for work of the character, Edmonton offers a field to which supply firms can well direct their attention. In a rough way, it is estimated that it will require 400 cars to transport the shipment in question.

THE WORK OF PIERCING the Lotschberg Tunnel on the new Alpine route which is being constructed from Switzerland to Italy, was accomplished March 31. This new route, which will be completed in about two years, is of special importance to both countries in that it will result in the re-adjustment of transit traffic owing to the great contraction in distances it will effect.

* * *

A POWER SCHEME contemplating a series of gigantic chutes over the Coteau and Cedar Rapids at a point twenty-five miles above Montreal, is reported as being projected by the Canadian Light and Power Company of that City. A half million horsepower will be developed for generating electrical energy. The undertaking, it is estimated, will necessitate an outlay of between $15,000,000 and $20,000,000.

* * *

PLANS FOR NEW TERMINAL facilities at Montreal have been filed by the Grand Trunk management with the Board of Railway Commissioners at Ottawa. The proposed scheme of improvement calls for an outlay of at least $10,000,000. Of this sum two and a half million will be used for the erection of a new passenger station, and the balance will be expended on track elevations, interlocking towers, freight houses, power plant, and outlying depots. The work is to go ahead as soon as the plans have been approved.

* * *

MOST OF THE OLD MACHINERY and rails acquired by the Unites States Government when it purchased the Panama Canal, is now being converted into structural steel by a mill located in Eastern Pennsylvania. This scrap, which also includes car wheels and axles, was disposed of by auction to the highest bidder, M. Samuels & Sons, of Brooklyn, who pays for it on delivery at a price of $11 a ton. There is something like 220,000 tons in all, on which the Government will realize about $2,000,000.

* * *

BRICK AND STONE are so invariably the accepted material for exterior construction of ecclesiastical buildings on this continent, that the adoption of white marble for the outside wall scheme of a Gothic cathedral at present being erected in Buffalo, comes as somewhat of an innovation. The edifice in question is being built from designs by Aristides Leonori, the church architect of Rome. It is to be 100 feet in height, exclusive of its two towers which will rise 150 feet above the roof of the structure. In length, the cathedral will be 250 feet, with the width of the nave and transept 100 and 150 feet respectively. The marble walls of the exterior will be tooled, while the interior walls and pillars will be polished. Seven marble altars are to be installed, and these, together with the other furnishings, are to be in character with the architectural scheme. The estimated cost of the structure is $500,000, exclusive of the furnishings.

AN ARCHITECTURAL PARTNERSHIP at Windsor, Ont., has been entered into by James C. Pennington and C. Howard Crane, a well-known architect, formerly of Detroit. Mr. Pennington, who is a graduate of the Architectural School of the University of Pennslyvania, and who also has had considerable experience in the Detroit field, is a native of Windsor. The new firm will be known as Crane and Pennington, with offices in the Bouk Building.

* * *

REFERENCE IS MADE in negotiations now being carried on by the city government of Amsterdam, to the fact that the imposing palace occupied by the royal family, was originally the municipal building or town hall. This is not generally known. The city is now desirous of resuming possession of the property as a structure for local governmental purposes, and has made a proposition to build a palace for the royal family in one of the new residential sections. The present palace was converted to domestic uses in 1808, when it was given by the people to King Louis Bonaparte, as a residence. In that it is agreed on all sides that improved quarters must be found for the municipal offices and archives, the probability is the property will revert to the city and a new palace be erected.

* * *

TESTS CONDUCTED at the Prussian Royal Testing Laboratory of Gross-Lichterfelde under the direction of Professor Martens, says the "Builder," show conclusively that structural iron is not prejudicially affected by innumerable repetitions of stress during long periods of actual service. In the report for last year it is stated that tensile tests of specimens taken from old wrought-iron railway and highway bridges showed ultimate strength and elongation almost exactly equal to those for specimens which had been under different stress, while comparative tests on annealed test bars showed only a slight decrease of strength. Professor Martens considers that the results justify the conclusion that the mechanical properties of the iron were not appreciably impaired by service during about fifty years.

* * *

GETTING A STRUCTURE OUT by the roots, as a contemporary aptly puts it, forms a unique spectacle now being witnessed at Baltimore, (U.S.A.), where wreckers are at work demolishing The Baltimore News Building, a nine storey reinforced concrete structure which was erected at the corner of Calvert and Fayette streets, shortly after the great fire in 1904. The work is being done with the aid of pneumatic drills, chisels and sledge hammers, and while the task of cutting and breaking away the concrete from the reinforcing rods of the framework is a difficult and tedious one, very excellent progress is reported as being made. The corner, which is a valuable one, will serve as a site for a 16 storey office building to be built as soon as the present structure is removed. It is estimated that the cost of razing the present building will be $35,000, less the salvage of steel which has been purchased by a local wrecking concern.

THE NEW GRAVING DOCK at Belfast, Ireland, which was recently completed, after seven years of uninterrupted labor, is excavated entirely on ground reclaimed from the sea by the staff of the Harbor Commissioners. One of its most striking features is a travelling caisson gate of rectangular form. This is operated by means of a couple of endless chains, which haul the gate into its track across the entrance and withdraw it again into the recess made for it. Hydraulic machinery supplies the power for hauling the caisson, which can be opened or closed in from four to five minutes. The dock was built at a cost of $1,750,000 and its principal dimensions are as follows:— length of floor, 850 feet; length with caisson, 887 feet; width of floor, 100 feet; width of coping, 129 feet; thickness of concrete floor, 17½ feet; depth at ordinary high-water spring tides, 33 feet; height of keel blocks above floor, 4¼ feet. When a vessel is set she will rest on 334 sets of heavy keel blocks. Like the machinery which operates the gate, that used in the pumping station, which contains three engines with a total horsepower of 3,000, is also of a special type. The whole dock can be cleared of its water, 23,000,000 gallons, in one hundred minutes. A special contrivance is provided to permit of its operation by manual labor in case the hydraulic machine fails.

* * *

AN INTERESTING FEATURE of German life is the fact that, in spite of the tremendous progress of the country, mediæval customs are still in evidence here and there, side by side with all the adaptations to the necessities of modern life. Especially is this true as regards locksmithing, which to-day is as important a trade as plumbing or blacksmithing. The first lock and key was introduced into Prussia in the fourteenth century, and caused a considerable sensation at the palace of the Elector of Brandenburg. He found that by this device he could do away with the guard at his private doors and thus materially reduce his household expenses. Since that day the "schlosser," or locksmith, has been a most essential factor in German life. The present German house key could be used as a weapon of attack and defence, besides serving its original purpose. It weighs on an average, about one-eighth of a pound; and, as each person entitled to carry a house and corridor key has nearly a quarter of a pound of soft iron in his pocket, it is conservatively estimated that the amount of iron in circulation in Germany in the pockets of the men and the handbags of the women amounts to 2,695 tons, besides an additional 2,560 tons for the keys to the interior of German homes. Thus, something over 5,000 tons of iron are put into keys of a size to be found nowhere in America. However large the house or numerous the apartments, the outer door is locked promptly at 10 o'clock; and, as the German spends many of his evenings out, every person carries at least one of these massive keys to affect an entrance. Bells at the outer doors are uncommon except at the homes of doctors.

SEVENTEENTH CENTURY BUILDING METHODS IN ENGLAND

Some interesting facts gathered from an old text dealing with quantity estimates, cost of material and labor, and certain regulations regarding the erection of structures.

SOME INTERESTING LIGHT is shed on the methods of building construction employed in England during the 16th century, in "Mortimer's Husbandry," an old book published in 1712. The text deals with quantity estimates, cost of materials and labor, and certain regulations regarding the erection of structures, and is valuable as affording a comparison in this respect with work undertaken in the present day.

According to this authority, the cost of constructing a barn that had a single stud, or one heighth of studs to the roof, was 2 shillings (50c) per square foot. For a double stud and girth it was 2 shillings 6 pence per foot. In measuring the structure the dimensions of one side and one end were taken. If, for instance, a barn was to be 60 ft. long and 20 ft. wide, making 80 ft., the cost of hewing the timber, sawing it out, framing it, and setting it together, was 2 shillings 6 pence (62½c.) per foot; 10 pounds ($50) if the carpenter furnished the timber.

The House of 1712.

Referring to the construction of houses of that period, the volume states, "Upon a good foundation, two bricks or 18 inches thick for the heading course is sufficient for the ground work of a common structure, and six or seven courses above grade to the water table, where the thickness of wall is cropped off the thickness of a brick, or 2½ ins. on each side. For houses of three to five stories, the walls of such from foundation to water table should be three courses of heading brick, or 28 inches in thickness, and at every story a water table and off-set on inside for joist to rest on; the joist to extend in wall one-quarter part for the better bond. For partition wall 1½ brick thick, and upper stories one brick or 9 inches thick."

To dig foundations one brick wide and one foot deep, the price was one penny per foot. Where it was 2½ ft., it was 2 pence per foot, and so on.

Brick Work.

Bricklayers' work was measured by the pole square of 16½ ft. square, taking out the door and window openings. A bricklayer received 2 shillings 6 pence per day, and a laborer 20 pence; while the price of brick was 14 shillings per M, lime 4½ pence per bushel, and roofing tile 2 shillings 6 pence per 100. The average price for bricklayers, who furnished everything, was 5 pounds a pole square of 272¼ square ft., that is, for house work. For the construction of walls, alone, where the bricklayer furnished the materials, the cost was 4 pounds 10 shillings. For laborers only, it was 1 pound 2 shillings per pole square for 272¼ square ft. 1½ brick thick. "If a wall is more or less than 1½ brick thick, it must be reduced to a brick and a half by multiplying the length and height by the number of half bricks the wall is in thickness, and divide the product by 3 and that by 272¼ inches."

In size, the bricks were 9 ins by 4½ ins. by 2½ ins. and 4,500 were required for a pole square, together with 25 bushels of lime.

Brick Making.

Regarding the manufacture of brick, 7 tons of coal (2,000 lbs. to the ton) were allowed in burning a clamp of 16,000, or 10 bushels of coal per thousand of brick, while the workman received 6 shillings per thousand for making them; "a square yard of clay being required for 7 to 8 thousand bricks."

Roofing tile was measured by a square of 10 by 10 ft., and 3 shillings 6 pence was allowed per square for the labor. To provide all but the tile, the price was 12 shillings; while to furnish everything, it was one pound 6 shillings per square. Roofing tile was laid in mortar or cement on lath, and 3 bushels of lime were required per square. The cement was laid on the first course of tile near the middle, and the next course bedded in it and joined on the underside; 100 lath and 500 nails being required per square. The nails were hand made and courted.

Thatching roofs with straw was done at a price ranging from 2 shillings 6 pence, to 3 shillings per square of 10 by 10 ft., and with reeds at 4 shillings per square; 1,000 reeds costing about 15 shillings, covered 3 squares of the roof. Two good loads of straw were sufficient to cover 5 squares. The thatch was tied on with ropes or writhes.

Carpenter Work.

All sawing of lumber was done by hand in the saw piles. The price was 2 shillings 8 pence to 3 shillings per 100 square feet, measured at the middle length of the log.

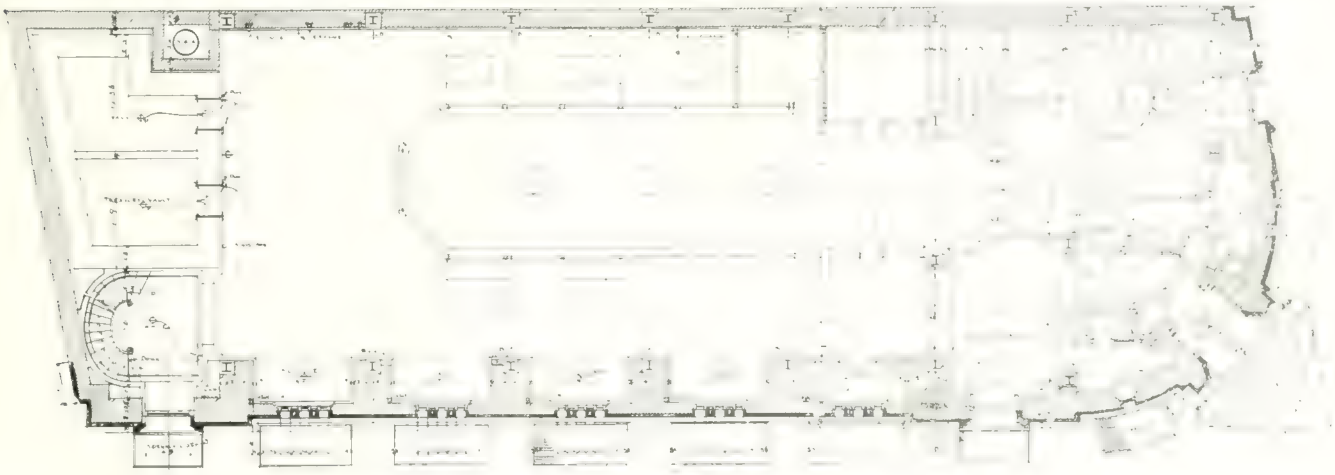
Heart lath of oak were 1 shilling 10 pence per 100. Sap lath of oak were 1 shilling 8 pence per 100, and fir lath were 12 pence per 100. The carpenter work was done by the square of 10 by 10 feet or 100 square feet. At London, the book states, "they will build a house four stories high for 40 pounds ($200) per square, if built of oak, and 30 pounds if built of fir. This includes mason work, etc."

ARTESIAN WATER SUPPLY.

SIX HUNDRED WELLS are being drilled in the vicinity of Altbunzlau, Bohemia, which is near the junction of the Rivers Elbe and Iser, to obtain an abundant supply of pure drinking water for Prague and its suburbs. The water from these wells will be collected into four large basins, from which it will be conducted to Prague through mains 3 feet 6 inches in diameter, the total length of the mains being 15 miles from the reservoirs to the city limits. The capacity of the wells is placed at 18,491,900 gallons daily.

Recently Completed Building of the Bank of Nova Scotia, Portage Avenue and Garry Street, Winnipeg. Darling & Pearson, Architects.

Main Entrance, New Premises, Bank of Nova Scotia, Winnipeg. Showing Detail of Terra Cotta Work Darling & Pearson, Architects.

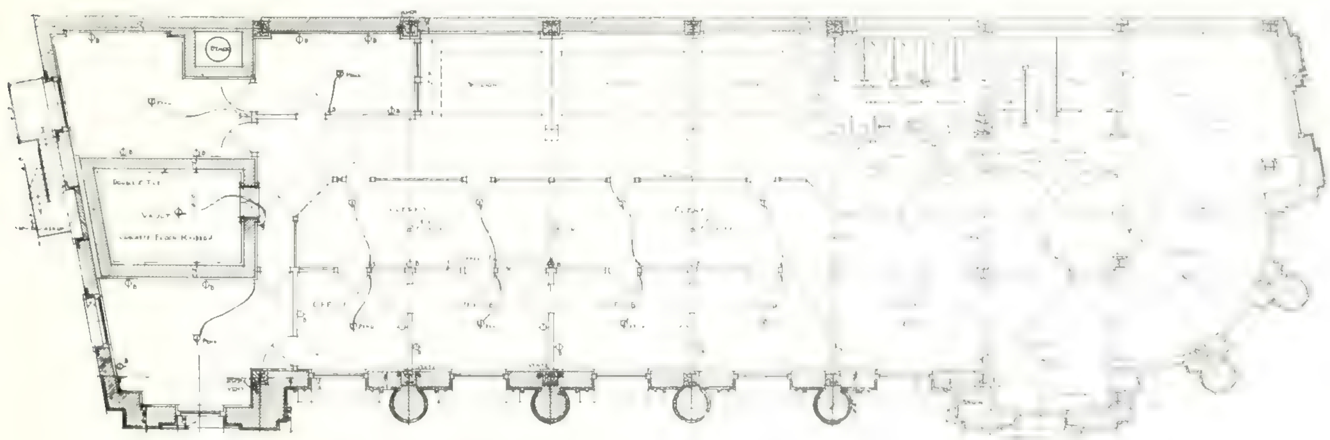


Ground Floor Plan, New Premises, Bank of Nova Scotia, Winnipeg. Darling & Pearson, Architects.

MODERN WINNIPEG PREMISES OF THE BANK OF NOVA SCOTIA

Brief description of architectural features of important structure occupying frontages of 140 and 44 feet at the corner of Portage Ave. and Garry St

THE NEW BUILDING of the Bank of Nova Scotia, illustrated herewith, is one of the more noteworthy commercial structures recently erected in Winnipeg. It is of steel and hollow tile construction, fireproof in character, and enclosed in walls of semi-glazed terra cotta. The design, which is an adaptation of free Renaissance, is admirably suited to give due prominence to an important structure occupying frontages of 130 and 44 ft. at a point where the confluence of traffic is heavy. Viewed from the corner the building, with its massive colonnade, and terra cotta dome accentuating the curvilinear intersection of walls, presents an appearance which well typifies the combined quality of dignity and stability such as a structure designed primarily for banking purposes should essentially possess. As indicated by the accompanying drawings, the plans meet in a most successful way the modern day requirements of a joint bank and office building. The entrance with its chaste detail and four stone steps of easy gradient, leads into the rotunda, through which the banking room is reached. Here the wall scheme is executed principally in Caen stone, the ceiling elaborately panelled in plaster, and the floor laid in grey Missisquoi marble with a border of light Tennessee and verde antique. Opposite the doorway is the elevator enclosed in a grille work of iron, while more towards the centre of the rotunda is a circular staircase of marble leading down to the safety deposit vault in the basement. In the banking room the general scheme is treated to be consistently in character with the exterior of the building. This interior occupies an area of 73 by 34 ft. clear space, and is 29 ft. high. Caen stone is employed in the doorway and walls up to a height of 11 ft., and above this the space is divided into a series of panels finished in plaster. The woodwork is of mahogany, and the counters, which are surmounted by grilles of solid bronze, are executed in a combination of light and dark grey Missisquoi marble with an inlay of verde antique. Missisquoi marble is also used for the floor scheme and the three cheque desks placed at regular intervals in the public space. An interesting feature of the plan is a series of alcoves in the wall forming the Garry Street elevation. These provide additional space for the banking staff, and assist materially to make the working arrangement most complete. The vault equipment, as might be assumed, is of the approved modern type. This applies both to the vaults in the banking room and the safety deposit vaults in the basement. The upper floors are occupied by offices, the arrangement

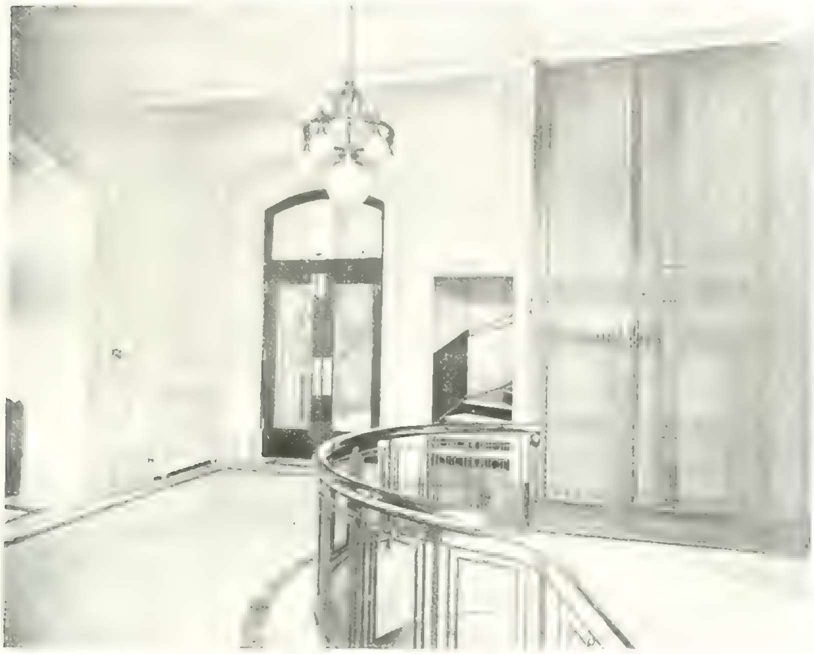


First Floor Plan, New Premises, Bank of Nova Scotia, Winnipeg. Darling & Pearson, Architects.

Banking Room, New Premises, Bank of Nova Scotia, Winnipeg. Showing Detail of Counter Work and Wall Treatment. Darling & Pearson, Architects.

Banking Room, Looking Towards the Entrance, New Premises, Bank of Nova Scotia, Winnipeg. Darling & Pearson, Architects.

of the suites being indicated in the accompanying plan. Messrs. Darling and Pearson were the designing and supervising architects, and Thos. Kelly and Son, Winnipeg, the general contractors. The terra cotta used was furnished by Eadie-Douglas, Ltd., Montreal, and this firm also supplied the marble work with the exception of the counters. Other contractors were:— Bronze counter work,



Approach to Banking Room through Rotunda, New Premises, Bank of Nova Scotia, Winnipeg. Darling & Pearson, Architects.

Canada Foundry Company; elevator grilles, Western Iron Works; elevators, Otis-Fensom Elevator Company; vaults, Goldie & McCullough.

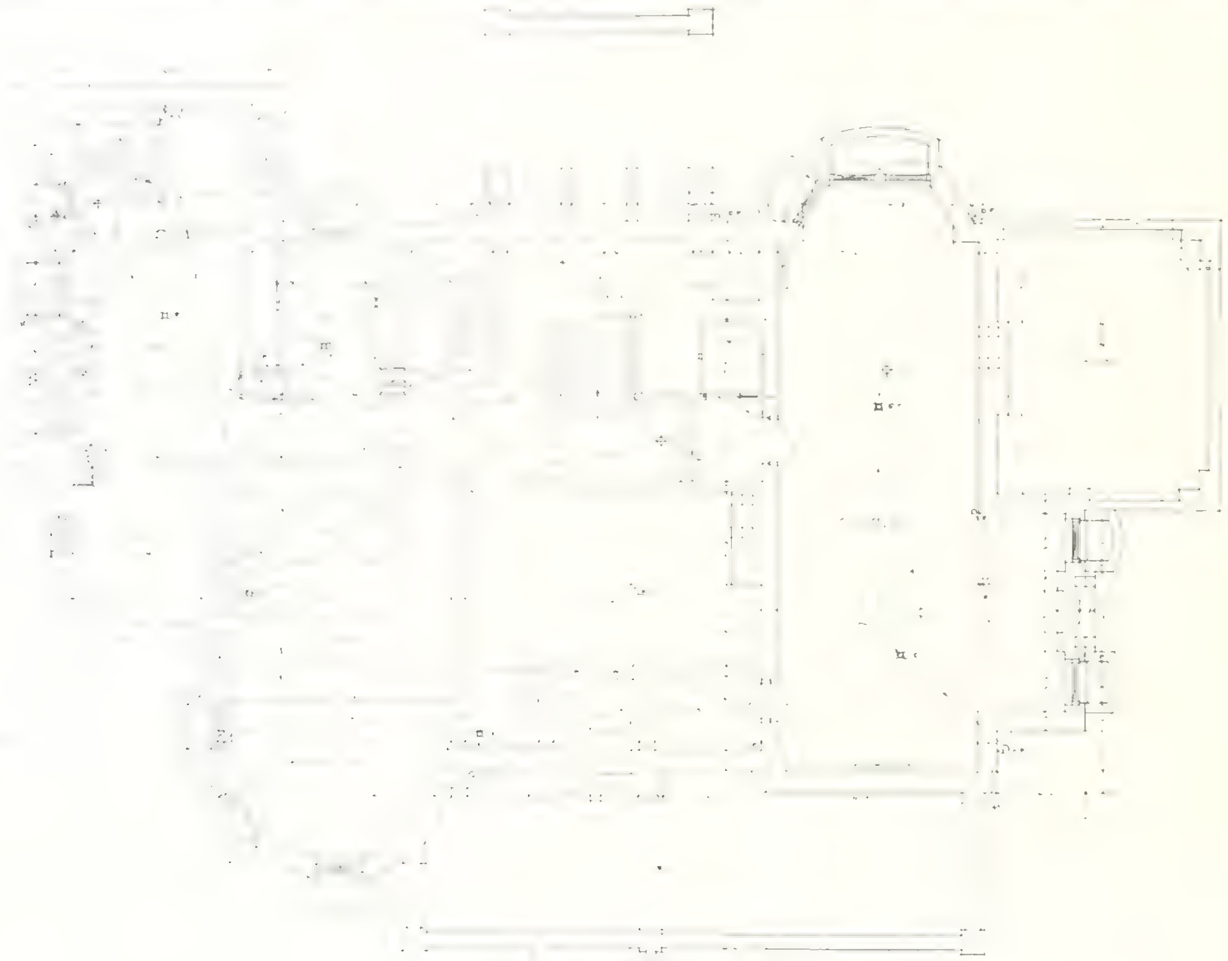
CHURCH ARCHITECTURE—Continued from Page 62

This secularization of architecture, which commenced before the end of the 13th century after the last Crusade, as the influence of the monastery declined and the new learning and the new development of commerce and art in Italy occupied the minds of the people instead of religion and fighting, developed in England our most characteristic building, our domestic and collegiate buildings of the Tudors, from the time of Henry Seventh to that of James 1st, England's greatest time, the Elizabethan days. But they were purely buildings for domestic comfort and convenience, and properly that was their chief expression. There was nothing of religion or philosophy in them, nothing that could suggest the temple. They all seem to reduce the great to the little, and to suggest content and material satisfaction rather than spiritual aspirations, that is what makes them look so comfortable. And it is so evidently what the people were after that the churches built after the Renaissance—were comfortable, partitioned off with cushioned seats for those who patronized them. Man had become of so much more importance as a spectator than the insignificant worshipper, who knelt on the stone floor behind some great column. Yet, it is of the worshipper we wish to hear. We are not so much interested at the present time in the Church of any particular sect as in the expression of worship in building.

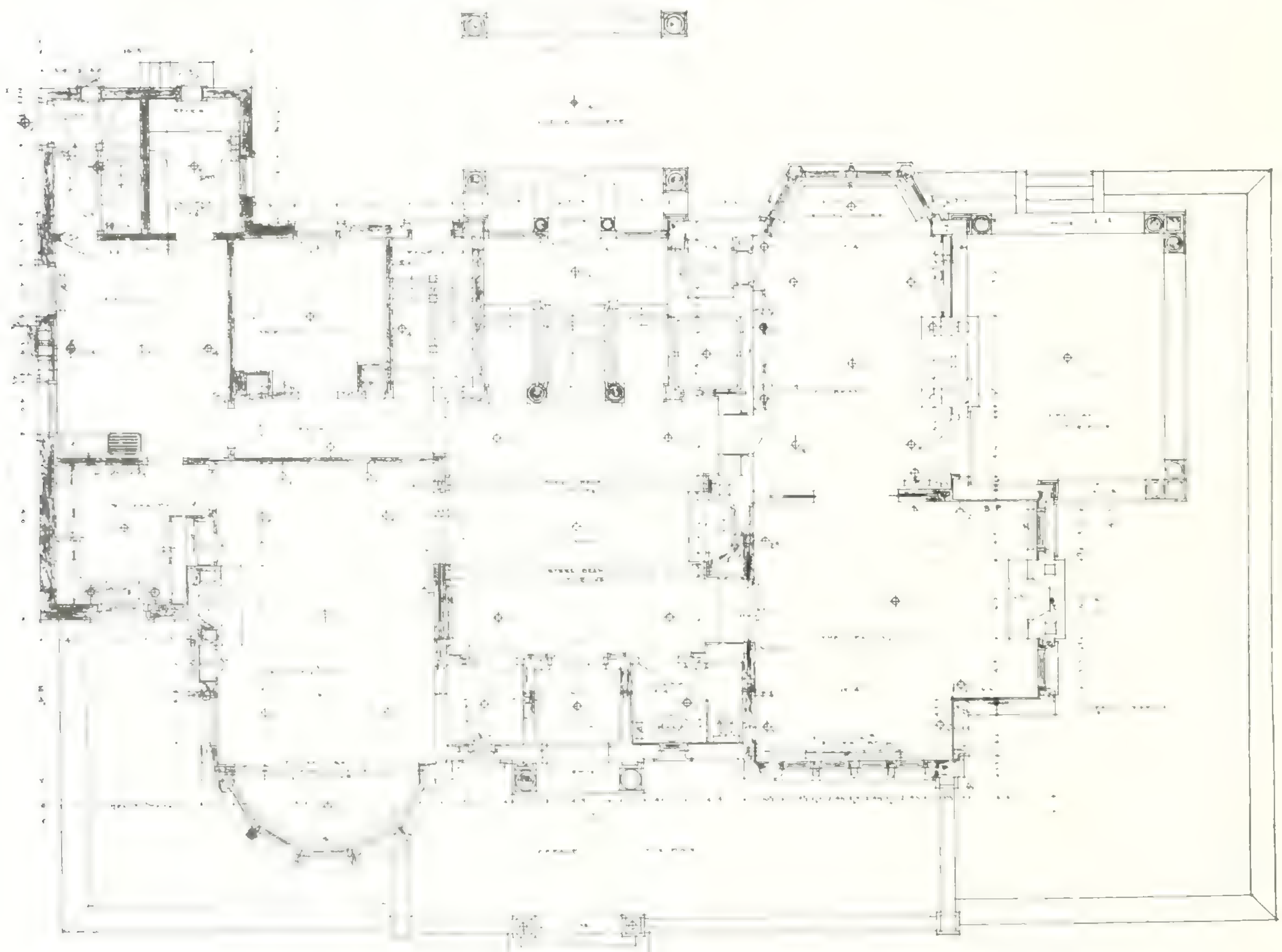
REINFORCING RODS OF RE-ROLLED STEEL

A PREJUDICE which has long been entertained says the "Iron Trade Review," is that against reinforcing bars, which are rolled from old material. These bars, commonly rolled from old rails, have a high carbon content. A finding of interest to makers and users of such bars is that of the committee which was appointed in Cleveland recently to examine into and report on the collapse of the Henke building in that city on November 22, 1910. The main cause for the collapse of this building, a four-story and basement reinforced concrete structure, was given as the condition of the concrete, which had not been given sufficient time to set before being subjected to the weight of the building. Although not included in the official report, members of the committee, when interviewed, stated that the reinforcing bars used in the building, while bent and greatly distorted as a result of the collapse, showed only a minimum amount of breakage. The bars which were used in this building were high carbon re-rolled from old rails. These high carbon, re-rolled bars are hot-twisted, and not cold-twisted, as is usually the case. Numerous tests made by inspection bureaus show that re-rolled high carbon bars of average size develop a tensile strength of from 80,000 to 95,000 lb. and an elastic limit of 50,000 to 65,000 lb. per sq. in., combined with a ductility which will permit bending through 180 degrees to the arc of a circle of which the diameter is equal to three times the diameter of the specimen tested. These figures exceed those generally required by engineers for concrete reinforcing purposes.

SEVENTY-NINE BUILDINGS in Victoria, B.C., were recently condemned at one sitting of the City Council. From this sweeping action it would seem as though the city authorities at that place are determined to rid their municipality of all dangerous and unsanitary structures, and thereby set up an example which many other municipalities can follow with profit. Dilapidated and disease-breeding buildings are always a serious menace to any community, and while the danger of their presence is usually understood, yet little, as a rule, is ever done in the way of an organized effort to bring about their summary removal. Too often condemnatory proceedings are never carried into effect, but it is to be hoped that this will not prove so in the case of Victoria.



Basement Plan, Residence of C. S. Boone, Crescent Road, Toronto. Chadwick & Beckett, Architects.



Ground Floor Plan, Residence of C. S. Boone, Crescent Road, Toronto. Chadwick & Beckett, Architects.

Residence of C. S. Boone, 142 Crescent Road, Toronto—Built of Dark Red Stock Brick with Indiana Limestone Trimming, and Noteworthy as an Adaptation of the Tudor Style to Modern Domestic Design. Chadwick and Beckett, Architects.

AN ATTRACTIVE TORONTO HOME IN TUDOR DESIGN

Interestingly considered Rosedale Home, which is reminiscent of some of the more notable work of the domestic architecture of this particular period.

NEW RESIDENTIAL WORK possessed of any degree of architectural merit, while always of more or less general interest, is doubly noteworthy as a rule if the scheme employed embodies in its treatment features which reflect the spirit and homelike charm characteristic of certain recognized types of domestic buildings developed in England. In this connection it might be said that the character of domestic work to-day divides itself into two general classes, one the ultra-modern in which novelty of effect is extensively and often successfully introduced, and the other that which incorporates in its architectural treatment essentials of design adopted from the work of some particular period.

Of the latter class a very excellent example is the residence of C. S. Boone, Crescent Road, Toronto, which was recently erected from designs by Messrs. Chadwick and Beckett. The exterior, which is executed in red stock brick with Indiana limestone trimmings, is in the Tudor style, and in certain respects is reminiscent of some of the more interesting individual features which this period produced. Especially is this true of the entrance scheme with its upper balustrade, which is reproduced in motif from Blickering Hall, built at Norfolk in 1620, and also as regards the balustrade enclosing the terrace along the front, which is modelled after a similar feature at Bramshill House, built in 1603. The terrace is paved with red quarry tiles, and the lamps surmounting the balustrade at either side of the doorway are of special designs in bronze.

Entrance to the interior is through an open loggia, having cut stone walls and a tiled floor. The main hall with its spacious dimensions taking up the entire central portion of the ground floor, is finished in

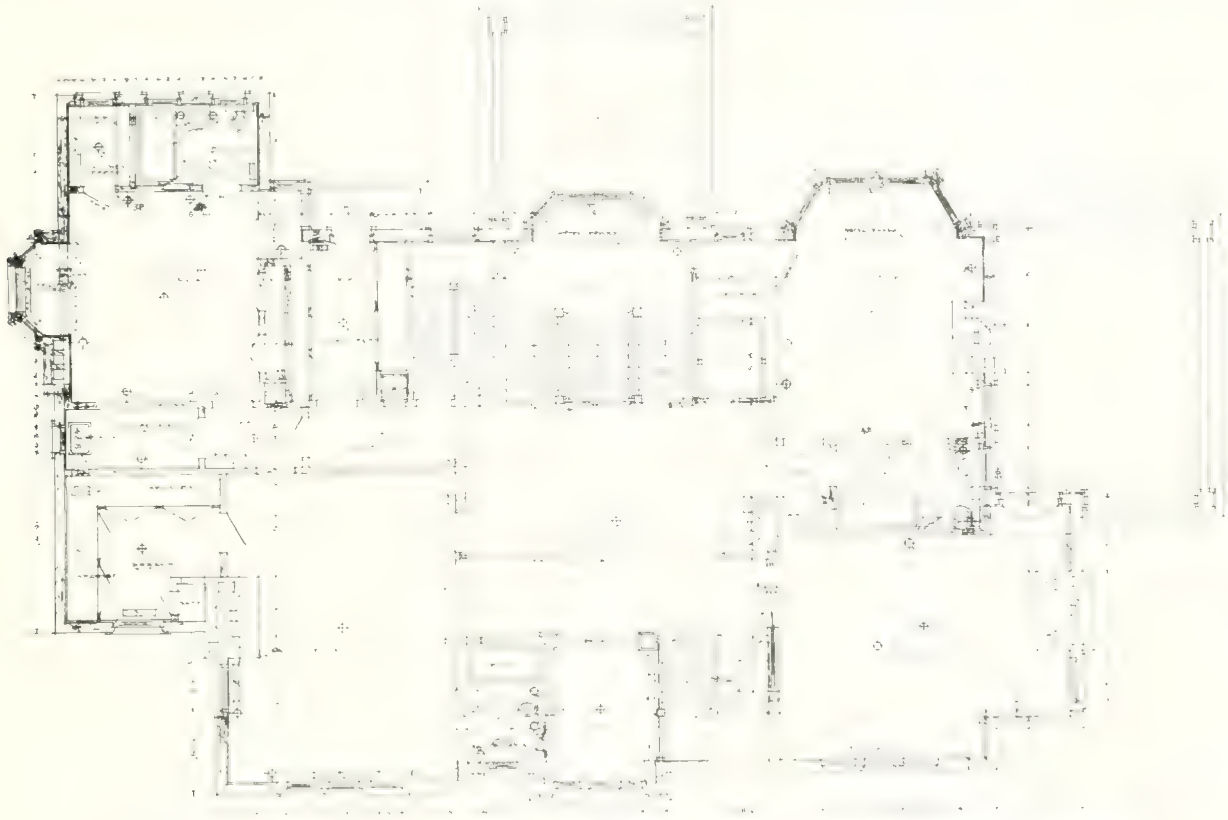
View from the South-East, Residence of C. S. Boone, 142 Crescent Road, Toronto. Chadwick & Beckett, Architects.

Reception Hall, Residence of C. S. Boone, Crescent Road, Toronto—The Panelling and Woodwork is in Mahogany, and the Fireplace is Faced with Pompeiian Brick. An Interesting Decorative Feature is the Inset Panel of Florentine Bronze Above the Mantel Shelf. Chadwick & Beckett, Architects.

mahogany with beamed ceiling and panelled walls, an interesting feature of the scheme being a Pompeiian brick fireplace with an inset panel of Florentine bronze above the mantel shelf. At the rear is the staircase and an automatic electric elevator serving all floors. Behind the staircase, which branches both ways from the first floor landing, is a lower hall, situated down two steps from the main floor, which opens on to a *porte cochere* at the rear.

Throughout the entire house the architectural scheme is beautifully in harmony, the general arrangements of the rooms being explained in the accompanying plans. The drawing room, which is placed in a south-east position, is finished in white enamel with an enriched plaster ceiling and cornice of Renaissance design. The fireplace of this interior has a molded base of Pavonazzo marble, and the motif for the carving of the mantel is taken from a fireplace in Hampton Court. In the library, which adjoins, the scheme of woodwork is carried out in exquisitely matched Circassian walnut, the veneer for the entire room, including the wainscotting, doors, mantel and beamed ceiling, being taken from a single log. Near the fireplace is a double door of glass opening to a spacious verandah paved with red quarry tile; while immediately off the rear of the room, at the left of the bay window, is a concealed silver closet forming an interesting part of the plan.

The dining-room, situated on the opposite side of the hall, and which has a large bay window at the front, is panelled in San Domingo mahogany finished in light natural tone. Here, also, the veneer for the entire woodwork is taken from a single log, while the panelling and fireplace is reproduced in motif from Knole House, Seven Oaks, England, built in 1602. A noble feature, indeed, is the combined mantel and china closet, which is twelve feet wide and reaches to a cornice of the old English grape-



First Floor Plan, Residence of C. S. Boone, Crescent Road, Toronto. Chadwick & Beckett, Architects.

Detail of Entrance and Upper Balustrade, Residence of C. S. Boone, Crescent Road, Toronto, which is Reproduced in Motif from Blickering Hall, Norfolk, built in [illegible]20. Chadwick & Beckett, Architects.

Drawing Room, Residence of C. S. Boone, Crescent Road, Toronto—Finished in White Enamel with a Renaissance Enrichment for Plaster Ceiling and Cornice. The Motif for the Carving on Mantel, which has a Molded Base of Pavonazzo Marble, was Taken from a Fireplace in Hampton Court. Chadwick & Beckett, Architects.

Library, Residence of C. S. Boone, Crescent Road, Toronto—Carried Out in Circassian Walnut with a Hand Decorated Frieze. Chadwick & Beckett, Architects.

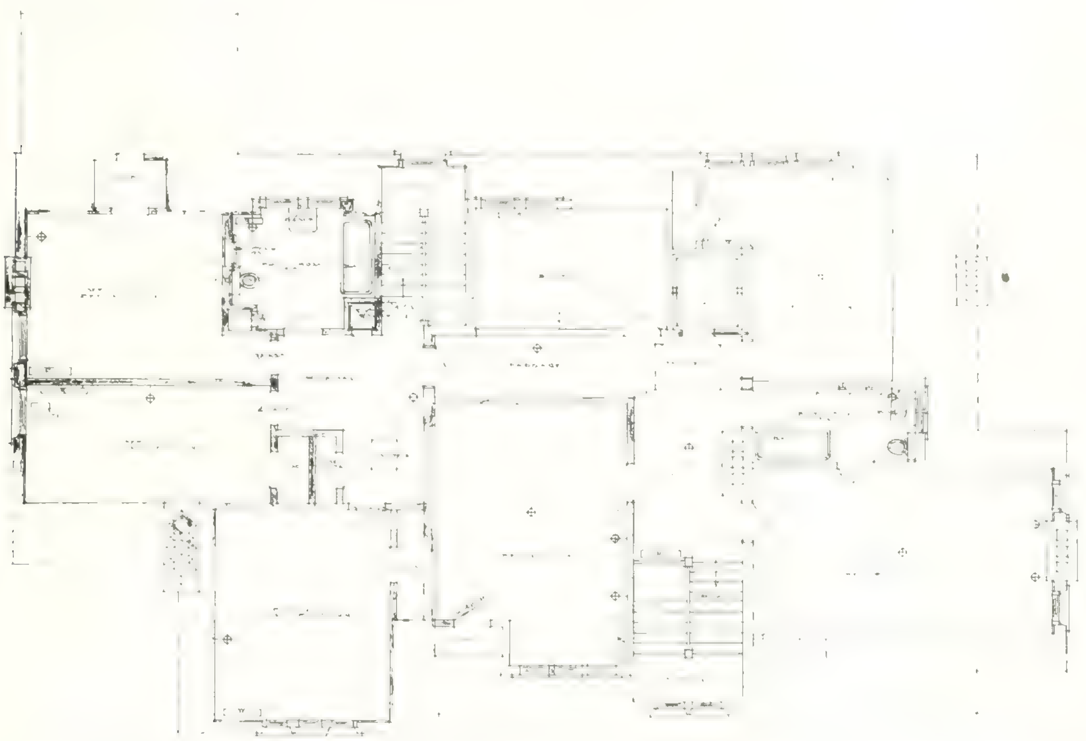
Dining Room, Residence of C. S. Boone, Crescent Road, Toronto—Panelled in San Domingo Mahogany, Finished in a Light Natural Tone. Chadwick & Beckett, Architects.

View Showing General Wall Scheme of Dining Room, Residence of C. S. Boone, Crescent Road, Toronto. The Motif for the Panelling and Fireplace is Similar to that of Knole House, Seven Oaks, England, Built in 1602. Chadwick and Beckett, Architects.

Sitting Room, Residence of C. S. Boone, Crescent Road, Toronto—Finished in Dark Stained Georgia Pine with Strapped Wainscotting and Built-in Ingle Seats. Chadwick & Beckett, Architects.

Owner's Room, Residence of C. S. Boone, Crescent Road, Toronto, which Denotes in Decorative Character the Wall Treatment and Furnishing in the Bed Rooms Throughout. Chadwick & Beckett, Architects.

vine pattern, forming the base of a moulded and enriched ceiling of Elizabethan geometrical design. Connecting the dining-room with the kitchen is a standing and three box stalls, harness room and coachman's suite comprising living-room, dining-room, kitchen, three bedrooms and bathroom.



Second Floor Plan, Residence of C. S. Boone, Crescent Road, Toronto. Chadwick & Beckett, Architects.

large butler's pantry equipped with built-in work tables, cup-boards and shelves. The kitchen walls are tiled and the service section, which includes a large pantry and storage and spacious servants' hall, is compactly arranged. In addition to the passenger lift, the house contains a dumb waiter, linen chute and dust chute, as well as two sets of vacuum cleaners running from basement to attic, the vacuum plant being installed in the motor room in the basement.

The billiard room occupies the whole of the east side of the basement and is equipped with a large fireplace with built-in seats on either side.

On the first floor, the central feature is the hall, which is twenty-two feet square with a bay situated over front entrance. This is finished in mahog-

The sitting-room is finished in dark stained Georgian pine with strapped wainscotting and built-in seats on either side of the fireplace. In addition to these interiors, this floor contains three large bedrooms with adjoining baths. These are finished in white enamel with delicate wall hangings, an excellent idea of the general appointments being obtained in the accompanying view. The second floor contains three guest rooms, guests' bathrooms, three maids' rooms, servants' bathroom and box room.

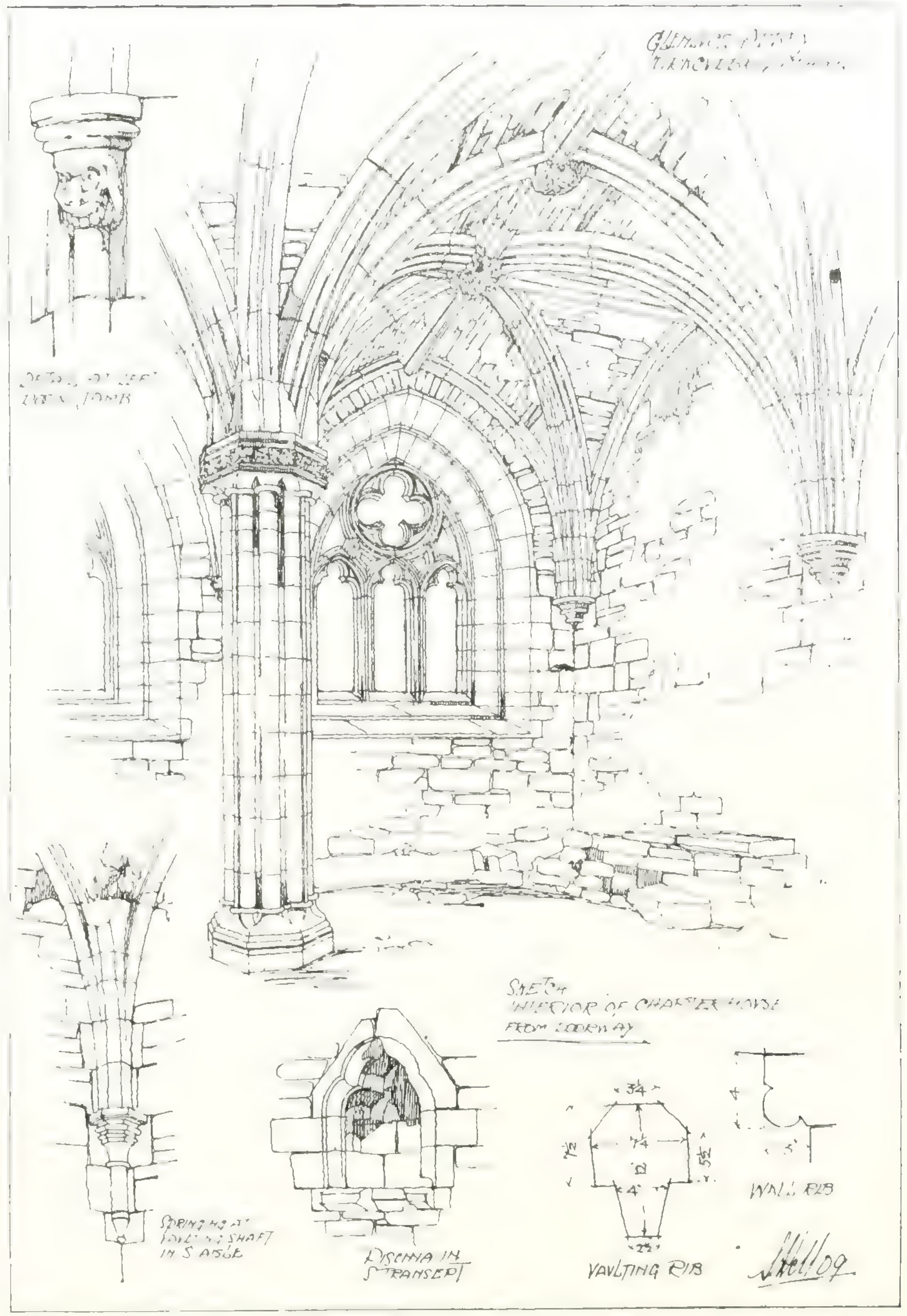
The house and stables are equipped with a system of eleven intercommunicating telephones, and a complete burglar circuit of one light in each room and hall.

The stable which is shown at the end of driveway in general view contains a carriage room 30 x 38 feet for eight carriages and two motors, besides two

FIREPROOF CONFUSION

COMMENTING ON THE HAVOC recently wrought to the State Capitol Building at Albany, N. Y., a contemporary states that the event adds one more to the considerable list of disastrous fires in "fireproof" buildings. After such events the public is puzzled to understand how so much damage can be done by fire if the building was actually fireproof, and so the opinion has grown, among many, that fireproof construction is a fraud, that there is no such thing, and that one building of stone is about as likely to be consumed as another. The lesson, on that point, is, not to upset the protection offered by fireproof construction, by filling the building with inflammable fittings and contents left exposed. It was the contents of this capitol which burned. Books and pamphlets were piled high on the wooden shelves in the State library. They fed the flames quickly. Other inflammable fittings and papers added to the force of the flames. Even fireproof construction was menaced by the terrific heat. So, altogether, it will cost $4,000,000 to renovate. It should be clear by this time that fireproof construction loses much of its effectiveness as a safeguard to property when a building so constructed is filled with inflammable material left exposed. The fireproof capitol at Albany was like a stove, filled with fuel. The stove would not catch fire; the contents would. Too hot a fire will warp and crack any stove. The simile here is probably far-fetched, but it emphasizes, nevertheless, the point in question.

Detail of Tomb, Southwest Corner of Chancel, Lincluden College, Kirkcudbrightshire.



Interior Detail, Chapter House, Glenluce Abbey, Kirkcudbrightshire.

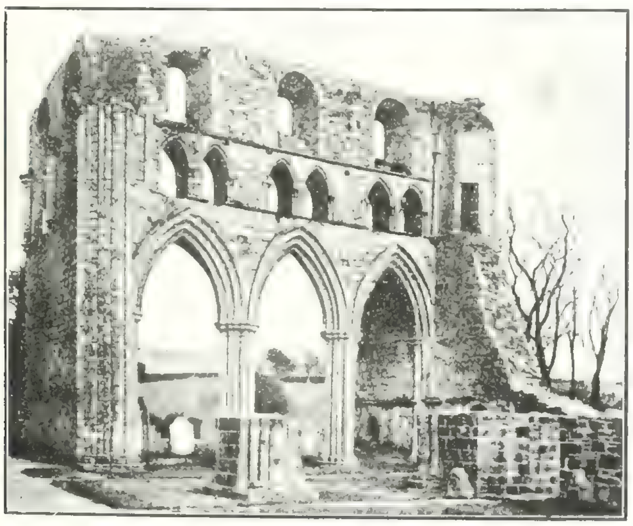
THE CISTERCIAN ABBEYS OF SOUTHWEST SCOTLAND

Interesting old edifices which time has reduced to a fragmentary state Description of their architectural plan by Sydney H. Miller.

FEW ON THIS CONTINENT, not excepting many who claim a fair degree of familiarity concerning the architectural history of the British Isles, are acquainted in even a remote way with the Abbeys of the Cistercian Order in the southwest portion of Scotland. These old buildings, whose erection antedates the present by a number of centuries, are gradually disappearing; and it is only by such papers as that read by Mr. Sydney H. Miller, a short time back, before the Edinburgh Architectural Society, and which is reproduced herewith from the "Builder," of London, that knowledge of their architectural character and plan is brought to attention. The author in question takes up his subject briefly, yet with considerable detail, giving such historical facts as are available; and his description of several of the buildings as follows will be found to be of more than ordinary interest.

Glenluce Abbey.

The Abbey of Glenluce is situated about one and a half miles west of the village of Glenluce, in the valley of the Luce. Historically very little is known, and few of the names of what must have been a long list of abbots are to be found. It was founded in 1190 by Roland, Lord of Galloway, and was

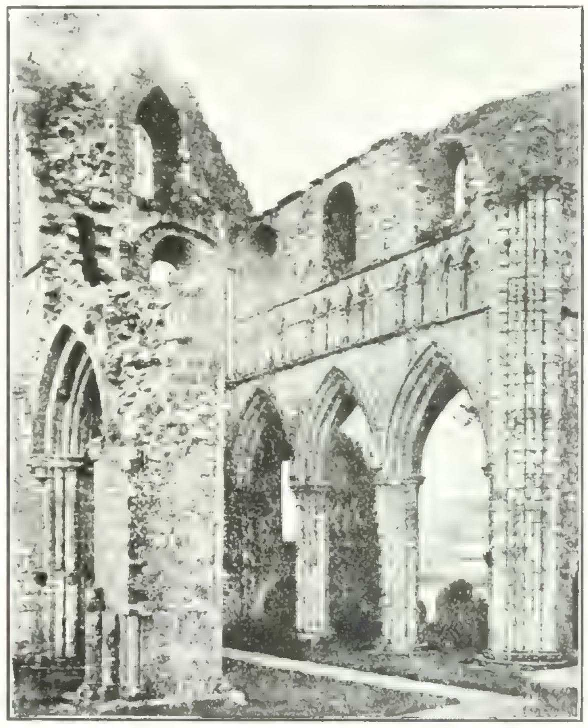


Remaining Portion of South Transept, Dundrennan Abbey.

colonized by the Cistercian monks, being the seventh in order of foundation in Scotland. It may be stated here that there were altogether in Scotland twenty-eight establishments of the Cistercian Order —*i.e.*, eleven abbeys, three priories, and fourteen nunneries. (The abbeys were Balmerino, Culross, Cupar, Deer, Dundrennan, Glenluce, Kinloss, Newbattle, Melrose, Sweetheart, and Sandal. The priories Friars Carse, Hassingdean, and Mauchline.) It might also be interesting to mention that this Roland's grandfather, Fergus, was a great patron of learning and religion, and founded several monasteries in Scotland. It was his granddaughter, Devorgilla, who founded Balliol College, in Oxford, and the Abbey of Sweetheart, the last of our old religious houses.

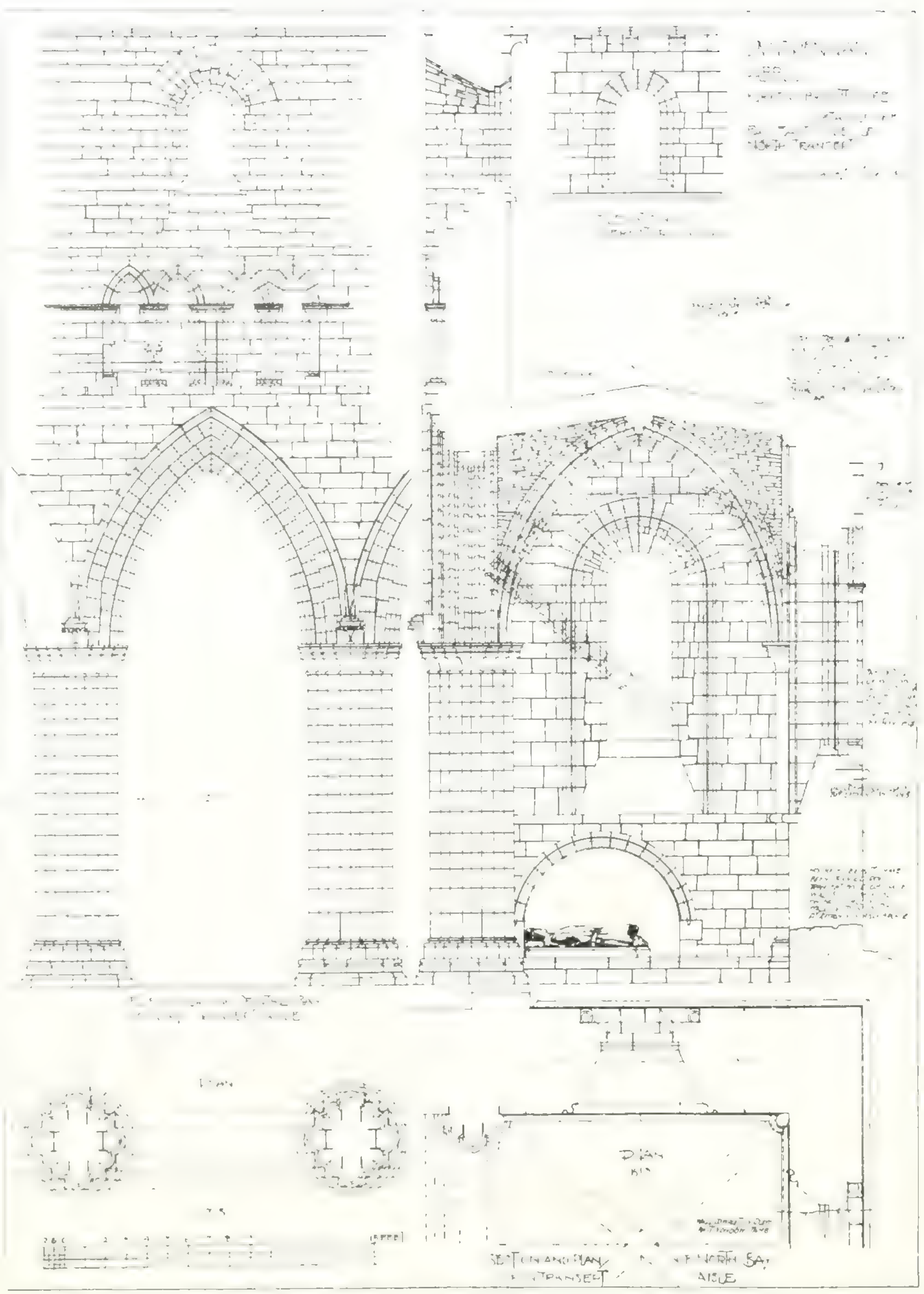
There is some doubt whether Glenluce was colonized from Melrose or Dundrennan, but most authorities seem inclined to the latter belief. The buildings must at one time have been extensive and magnificent, but what remains now with the exception of the chapter-house is very dilapidated indeed.

The plan corresponds very closely to those of Dundrennan and Sweetheart. The south transept and part of the choir are the best preserved portions of the actual church building. Symson, writing in 1684, says: "The steeple and part of the walls of the church, together with the chapter-house, the

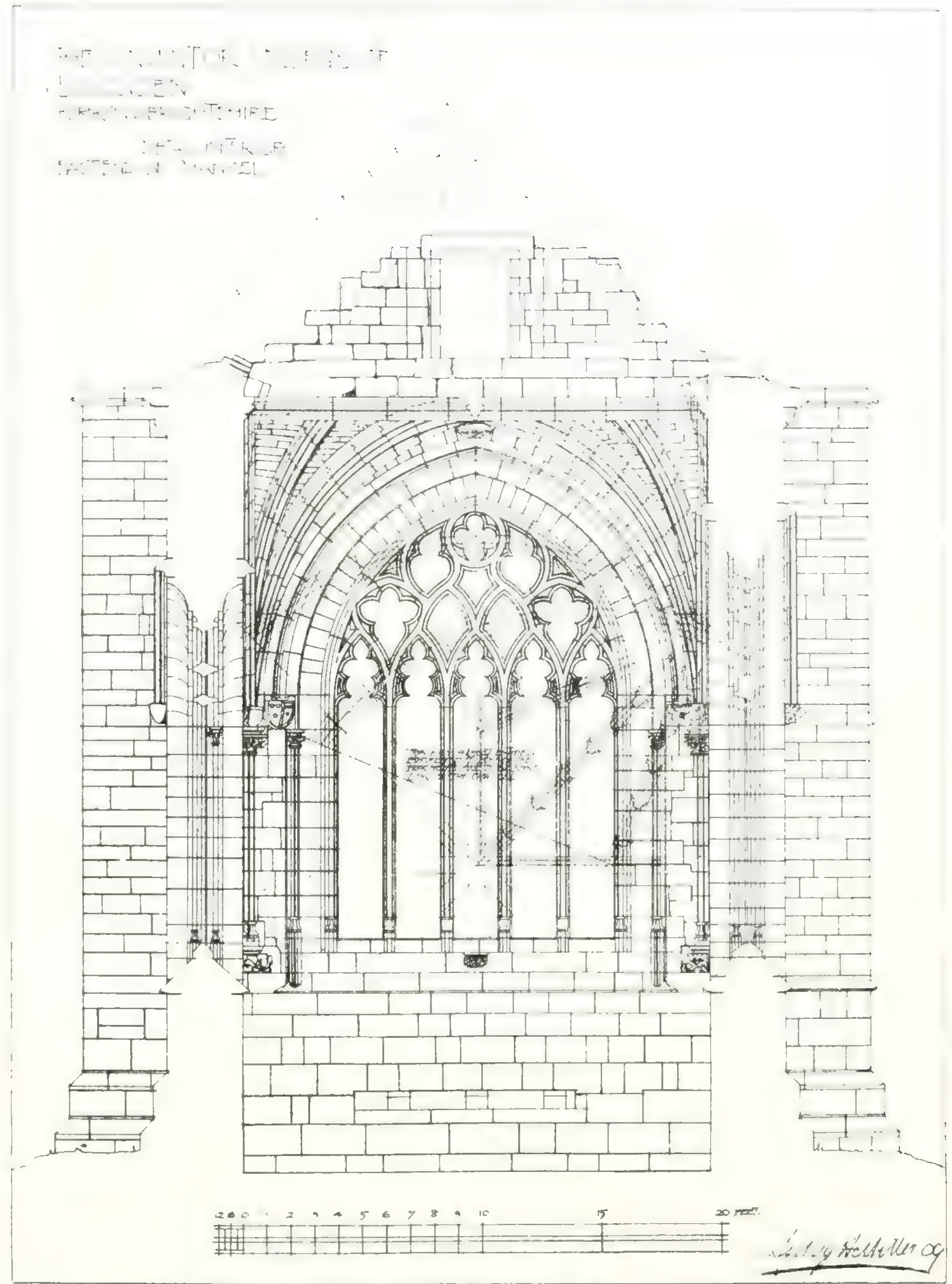


Dundrennan Abbey: North Transept from South Nave Aisle.

walls of the cloister, the gatehouse, and the walls of the precincts, are for the most part yet standing." The nave has entirely disappeared, except for the south wall and the mounds, which are hardly definable, and portions of the west end and door are still visible. In the south transept there are still to be found the bases of the arcade piers and their responds, which are E. E. in character. There seems to have been no triforium, but portions of jambs and sills still exist to indicate the aisle windows and clearstory. The aisle has been screened and divided into chapels, and has been vaulted, the ribs being simple splayed stones 7 ins. across. There were two piscinas in the aisle, though one had been replaced very recently— in fact, all over were indications of the restoration which took place in 1884. The cloister square is still bounded on the north-west and south by the original wall, in which are still remaining portions of the doors to the con-



Detail of East Bay, North Transept, Dundrennan Abbey, Kirkcudbrightshire.

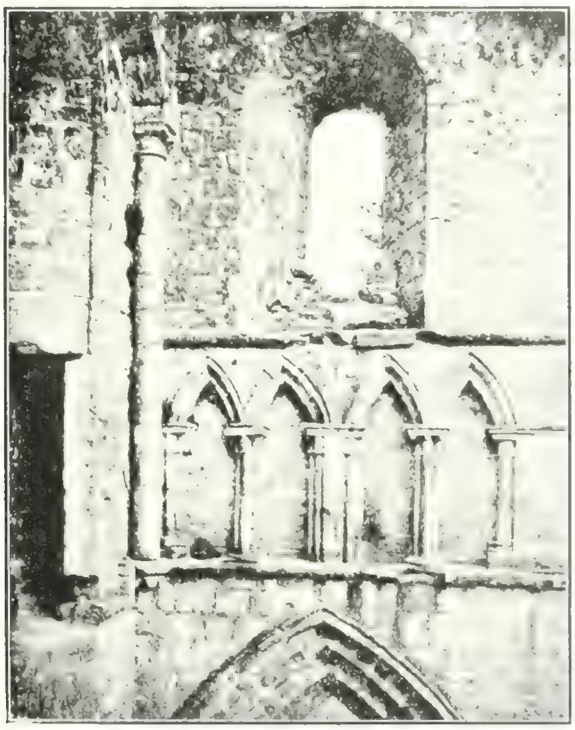


Interior Detail, East End of Chancel, Conventor College of Lincluden, Kirkcudbrightshire.

ventual buildings. The portions of the church still remaining are in all probability those of the original structure, finished before 1240, and indicate E. E. of the best period. The chapter-house must be as late as the end of the XVth century. It is 24 ft. square and has a central column. The vaulting is quadripartite, the ribs springing from the column in the centre, and at the walls and angles from carved and moulded corbels. At their intersections are bosses of bold and good design. The apartment is lighted with traceried windows, which seem to have undergone restoration. Above the chapter-house would be the scriptorium, the tiled floor and fireplace of which were exposed in 1884. South-east of the cloisters at some distance are mounds, which may indicate the position of some of the conventual buildings.

Dundrennan Abbey.

This Abbey, one of the most beautiful specimens of monastic antiquity to be found in Scotland, is sit-

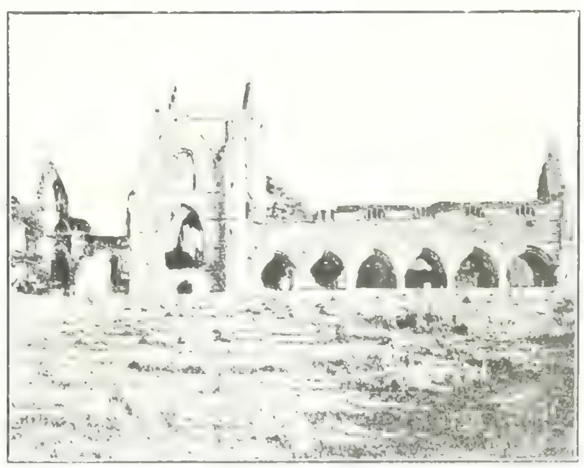


Clearstory and Triforium Arcade, Dundrennan Abbey.

uated on a level plateau, about seven miles from the town of Kircudbright, and is believed to have been the institution from which the abbey just described was colonized. The building is greatly dilapidated, but what remains, with a closer investigation of the more fragmentary parts, gives one a very complete idea of the splendor and stateliness of the whole original structure. Very little of its history is preserved beyond the names of some of its abbots, and even the name of its founder is somewhat obscure. It was founded in 1142. Some authorities say David I., in whose reign it was built, was its founder. Some ascribe it to Fergus, Lord of Galloway. The abbey was colonized by monks sent from the Cistercian abbey of Rievaulx, in Yorks. The ill-fated Queen Mary took shelter in the monastery after her flight from Langside and before she sailed for England to throw herself on the mercy of Queen Elizabeth. In 1605, the abbey was suppressed, and the monks emigrated to France. Tradition has it that the abbey was burned, but it is more probable that time and neglect brought about its ultimate ruin. Part of the abbey was used as a parish church till 1742, after which it was allowed to fall into decay, and for about one hundred years served as a very convenient quarry for the building of the neighboring village. It was partly repaired by Lord Selkirk in1838, and in 1841 passed into the hands of the Government, and is now well protected and cared for. The arrangement of the buildings followed in

Entrance to Chapter House, Dundrennan Abbey.

almost all respects the normal Cistercian plan, and resembles very much the plan of Kirkstall in Yorks, which is also of Cistercian foundation. It comprised a church and a cloister garth, with the conventual buildings on its east, south, and north walls. Of the latter buildings very little remains but the entrance front to the chapter-house, which is fairly well preserved. On the west are a series of vaulted chambers and on the south there are only a few indications

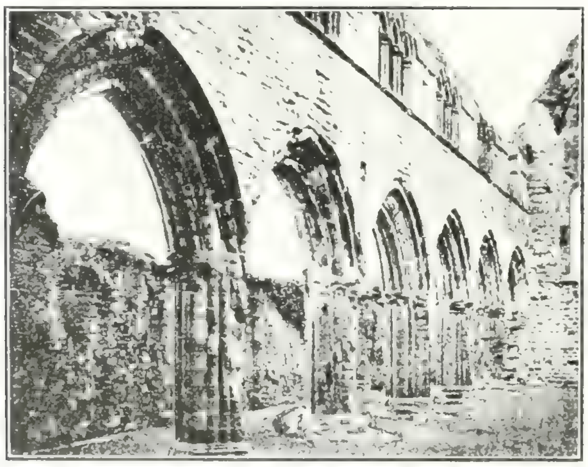


Sweetheart Abbey—View from North.

remaining of the domestic premises and a doorway. The church, however, is almost complete as regards arrangement of plan, and the north transept, part of the south transept, and the walls of the choir exist in their original form as high as the wall-head. The choir, of which the east wall is gone, is 26 ft.

wide and without aisles. It has a clearstory of three round-headed windows in each side, and between them triple vaulting shafts carried on corbels. There are here the remains of a triple sedilia and a piscina. The nave, about 130 ft. in length, had north and south aisles. The piers are all gone except the south-westmost one, and the responds on the west wall, the bases of which are still preserved. They are of an early first pointed section. The west door remains complete, though it appears partially restored. The details are transitional in style, the shafts being detached, abaci round, and the small nail-head ornament is used. The transepts are the best preserved portions of the structure. They have three bays and eastern aisles, and the details are, as in the nave, transitional. The aisle windows are of high proportion with semicircular heads, and have very simple mouldings. In both transepts there is a blind triforium and a clearstory. The clearstory windows have deep splays, and are semi-circular headed. The central tower has entirely disappeared, and only the north-east and south-east piers remain. Of the arcading of the cloister (measuring 103 ft. square) there remain only several of the corbels which supported the vaulting on the north wall, and all of these are of different detail and richly moulded. A number of fragments belonging to it, principally trefoil arches, are found lying in the nave.

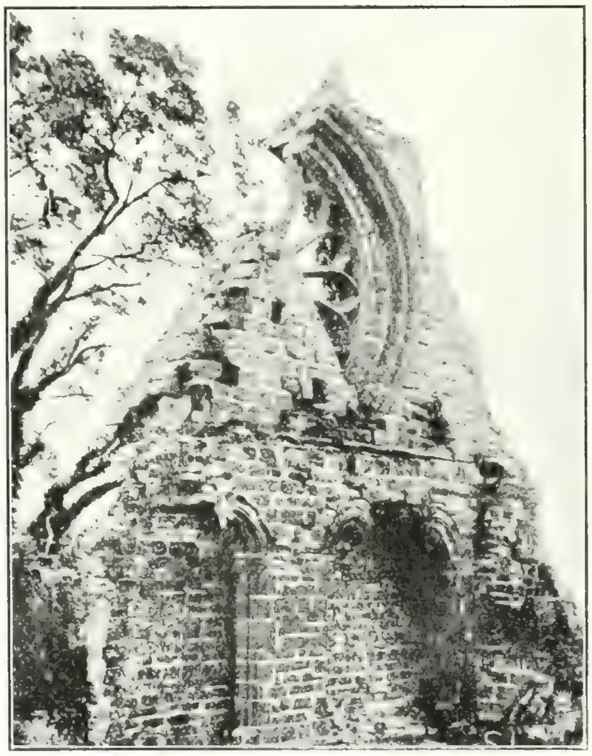
Sweetheart Abbey, from South-East Viewpoint.



Nave Arcade, Sweetheart Abbey.

The entrance to the chapter-house forms one of the most beautiful portions of the abbey. It has a centre doorway, with a two-light window at either side. The caps and bases to the shafts are E.E., while the nail-head is much in evidence. The carving on the windows is composed of incised crosses and conventional forms of lilies and Scots thistles. Of the six piers which originally carried the vaulting of this apartment only the lower portions with the bases remain well preserved. Portions of the windows to the library or scriptorium are still remaining over the chapter-house.

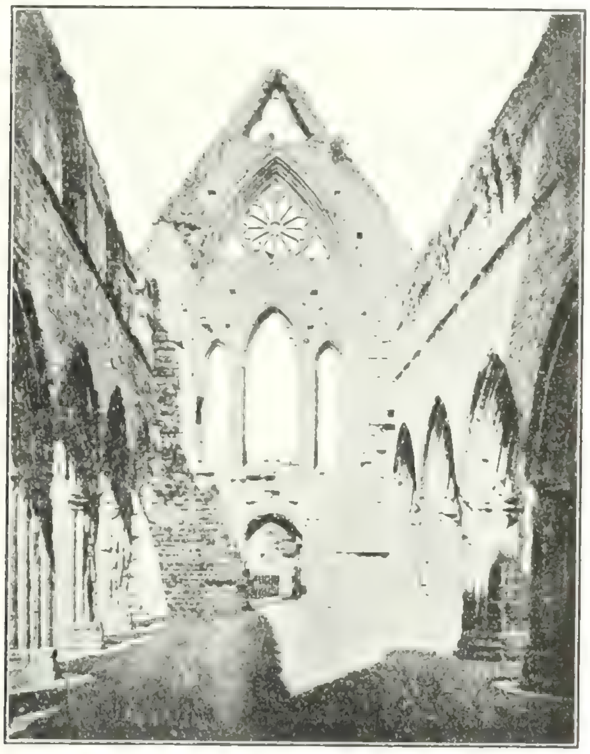
The remaining foundations and walls along the south side are hardly complete enough to allow one to assign them to any particular portion of the monastic building. A doorway of fine proportion and good detail exists in this wall towards the west end. Generally, the main structure seems to be of the Transition period. The features of the choir and north transept, *i.e.*, the doors, windows, buttresses, etc., seem almost Norman in style, while the main arcade and triforium of the transepts are more advanced.



Sweetheart Abbey: Rose Window in South Transept.

Sweetheart Abbey.

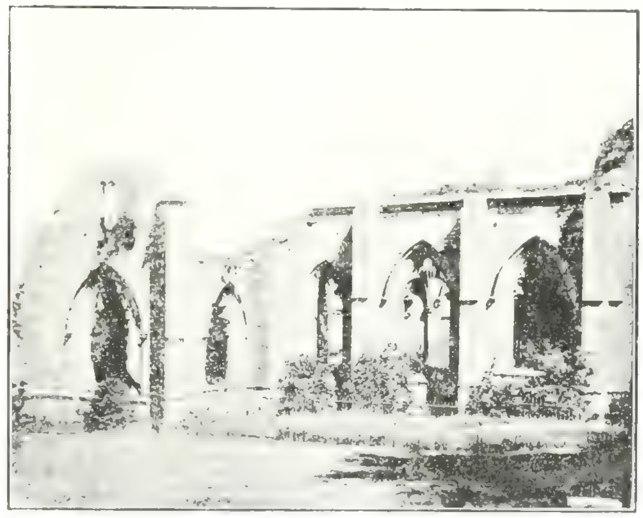
Sweetheart Abbey derives its name from the fact that the founder, Devorgilla, daughter of Alan, Lord of Galloway, caused the heart of her husband, John Baliol, who died in 1296, to be preserved in an ivory casket, to be buried with her upon her breast when she died. Even the abbots shared in this mellifluent title, and bore the name of Dominies Dulcis. The date of the foundation of the abbey is 1275. The names of many of the abbots are preserved, but none seem to have been specially distinguished, except perhaps Gilbert Brown, a man of exceptional ability, energy and tact, the last abbot of all who held his ground against the efforts of the Reformers, but who finally was exiled and went to Paris, where he died at Scotch College in 1612. The abbey fell into poverty during the War of Independence, and in 1331 we read that the charter of the Church of Crossmichael was granted to the abbey "on account of the well-known poverty of the said abbey," and again that in 1381 the charter of the Church of St. Colmanell "was granted to the Abbey of Sweetheart and their successors for ever on account of their pressing necessity and known poverty and smallness of income, and the demolition of that monastery by lightning, and its being situated on the borners of Scotland and England, where great depredations were frequently perpetrated." It is known that the abbey was extensively repaired about the end of the XIVth century by Douglas the Grim," Lord of Galloway, and this, together with the fact that the vigor and influence of Abbot Brown, allowed him to attempt certain improvements, might to some degree explain the style of several features, which unmistakeably belong to the end of the XVth century, a period much later than the rest of the structure of which the character corresponds to the work of the XIIIth century. During the last century the buildings suffered great dilapidation at the hands of those in the neighborhood, who used the stone, which was a soft and easily-worked material, to build their cottages. The abbey is built of red sandstone brought from a quarry on the opposite side of the Nith, below Dumfries. Granite, the natural stone of the neighborhood, is used greatly in the body of the walls.



Interior of Sweetheart Abbey—Showing West End of Nave.

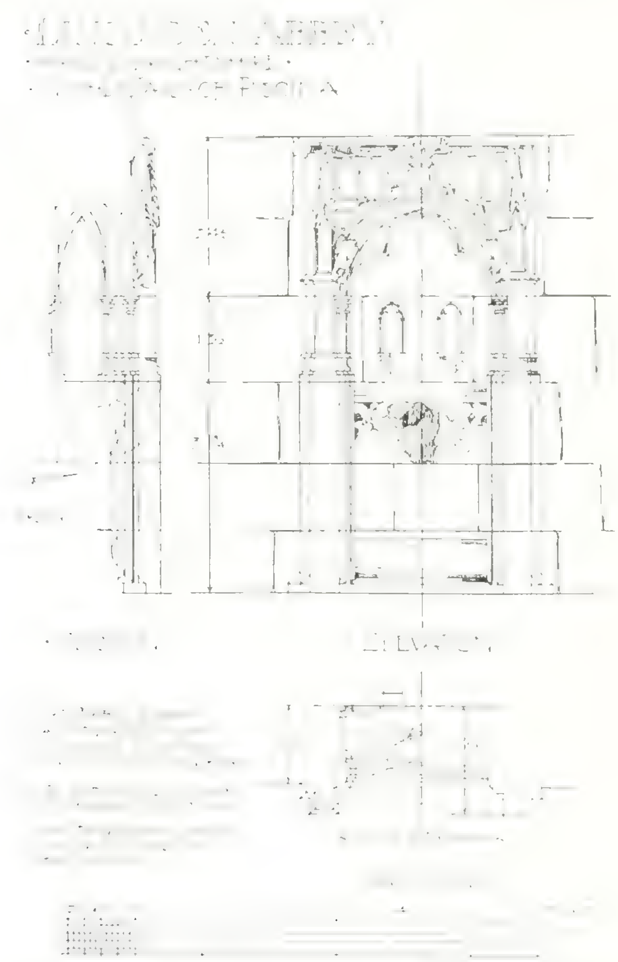
Door in Chancel to Sacristy, Lincluden Abbey.

Few of our ancient churches are so complete as regards all the divisions of the plan, and it adheres faithfully as regards arrangement and style, both in its secular buildings and the place of worship, to the rules of the Cistercian Order. Of the buildings still preserved, little remains but the church itself and a few of the foundations of some of the more immediate conventual buildings. The former is almost complete as far as its principal features are concerned, and comprises a choir, nave, north and south transept, with their aisles or side chapels, and a central tower over the crossing. The building, however, is entirely roofless, but in its now ruinous condition this fortunately rather adds to its appearance, giving it an air of loftiness and unusual charm. The choir, which is without aisles, measures roughly 28 ft. by 49 ft. It is lit by a large five-light traceried window at the east end, at the north by two three-light windows, and at the south by a two-light and a three-light window. They are all of similar detail. These windows are all in good preservation. It is a peculiarity of this building that nearly all its arches are depressed, the centres being below the springings, and this is especially apparent in the windows of the choir and in the nave arcade. The north and south transepts have each eastern aisles of two bays. In the latter exists the only remaining and complete piece of vaulting, and in both aisles are the remains of wall piscinas. In the north wall of the north transept is a doorway, a large window, of which the tracery is all broken away, and above it a window of somewhat unusual and not altogether happy form. At the north-west angle of this transept is a turret stair which led to the clearstory, and by it to the central tower. In the south transept is to be seen the door which was reached by a flight of steps and led into the scriptorium over the sacristy and chapter-house. In both transepts was a clearstory similar to that in nave and choir, but little remains of it. In the top of the south transept gable is a curious and what, I believe, must have been an ingenious and beautiful piece of design. It is a cir-



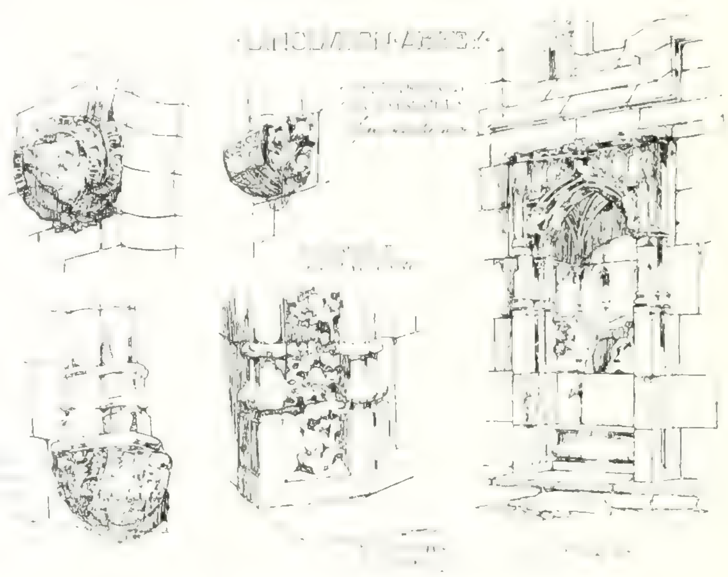
Lincluden Abbey—View from the South.

cular or rose window, encroached upon by the gable of the adjoining scriptorium, the apex of which reaches a little beyond the centre of the rose, and which receives the shafts—a curious though happy compromise between beauty and utility. The nave, 114 ft. long, is divided from its aisles by arcades of six bays each. The details of the arch mould, caps, and bases are of simple, bold form and very effective. The responds are still existing on the south wall as high as the caps. There are no vaulting shafts in the nave, and the roof must have been of wood construction. The west door is small and rather plain, and indications are seen of a parvise or porch entrance. The window above it is something of a puzzle. It seems at one time to have been filled with tracery, but this seems to have been broken out and the void filled with solid masonry, carried on two solid buttresses like mullions. The clearstory is undoubtedly the finest feature of the whole building. It consists of a series of triple-arched openings, one in each bay, and on the outer thickness of the wall are triple lancet lights of which the sills are at a considerably higher level than the string inside. In the four eastern bays on both sides



Detail of Piscina, Lincluden Abbey, Kirkcudbrightshire.

of the church the outside windows of this clearstory are in the form of a semicircle divided by mullions into five lancets. In these same bays the inside caps (unlike those of the two western bays, which are simply moulded) are finely carved, some of first pointed character, and some copied from natural foliage. The central tower over the crossing still stands on its four piers. The tower itself is plain,

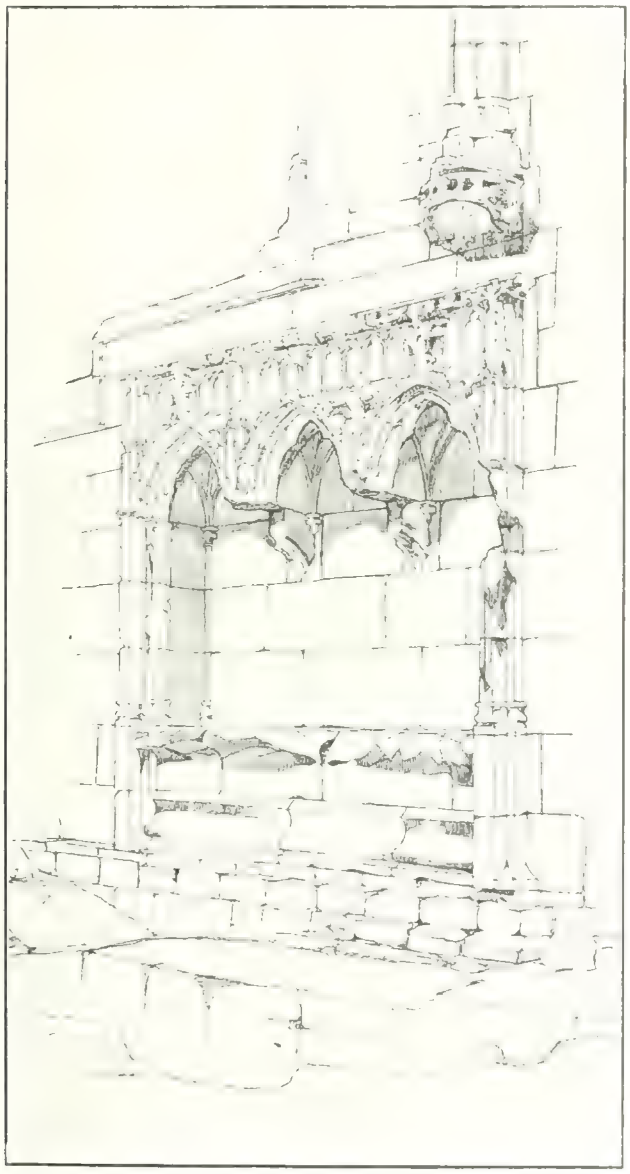


Detail in Chancel, Lincluden Abbey, Kirkcudbrightshire

and rises to a height of 72 ft. 4 in., measuring to the underside of the parapet corbel table, which is carved with a series of grotesque heads and animal forms. Above the parapet rise the crow stepped gables of what was a saddle-back roof. The water tables and raggles of the high-pitched roofs of the choir, transepts, and nave are all evident on the faces of the tower. The abbey precincts, about thirty acres in area, are enclosed on the north, south, and east sides by a great cyclopean wall about 4 ft. to 5 ft. thick, and built of huge granite boulders. Its height in parts is almost 12 ft. The south side was defended by a broad deep ditch filled with water.

Lincluden Abbey.

The Abbey of Lincluden is smaller and more get-at-able in many ways than those previously mentioned. It is dedicated to St. Mary, and is situated in a most picturesque spot on the river Cluden, just at its junction with the Nith, which stream flows through one of the most beautiful pieces of Scottish country to the Solway. The abbey was formerly a Benedictine nunnery, and was founded by Uchtred, son of Fergus. Very little of the earlier history is preserved, and only one of the abbesses, Lady Alianora, in 1294, is known. At that time it was quite a small establishment, having a household of twenty-five sisters. Of the buildings belonging to this period no portion, with the exception of a few traces of the nave of the church and some moulded stones, now exist. As a nunnery it was suppressed before 1400 in order to form a collegiate church for a provost and twelve canons to make provisions for those dependent on the family of the founder, Archibald the Grim, Earl of Douglas, and Chief Butler in Scotland, who is buried in the sacristy. Archibald was succeeded by his son, the renowned Douglas of Shakespeare's King Henry IV. He was slain in a battle against the French in 1424, and his widow, Margaret, daughter of King Robert III., who died in 1449, was buried in the splendid tomb still standing in the chancel. The new foundation consisted of a church with the necessary conventual and domestic apartments, and it is the remains of this latter edifice which are left to us. It escaped the hatchet of the church purifiers long after many of the other abbeys in Scotland. We read that twenty-five years after the lords of the Council were ordering the abbeys to be "kest doon" that Lord Maxwell openly withstood them, and ordered Mass to be sung on three successive days at Christ-



Lincluden Abbey, Kirkcudbrightshire—Sketch of Sedilia

mastide and other holy days. The last Mass was celebrated in 1585. After this it was occupied as a mansion house far into the XVIIth century. In the present arrangement of buildings the church seems to occupy the same site as the early Norman church, which consisted of a nave and a choir of the same width, the former having a north aisle. These later particulars were ascertained during excavations in 1896, and are given in McGibbon & Ross's "Ecclesiastical Architecture of Scotland." The church, as its exists now, one of the earliest of the Revival period, embraces a chancel with sacristy, a south transept, or a transeptal chapel, and a nave, of which only a portion of the south aisle wall remains; the two vaulted chambers to the north of the sacristy also belong to this period. The church itself is small, but holds its place amongst remaining Scots Gothic relics as one of the finest for boldness, richness, and purity of design. Considering it from without, the first feature that strikes one is the range of projecting buttresses, broken only by small drip mouldings, and having no reduction by intakes. They rise from a strong double base, running round the whole building to the top of the wall, which is finished by a rich foliated and deeply-cut cornice. Between the buttresses are well-proportioned windows which were originally mullioned and filled with elaborate tracery of the flamboyant style. The deep cavetto arch is surrounded by a bold hood mould. One feature of Scottish architecture which became universally characteristic of the later phase in its development is especially remarkable at Lincluden, where it was introduced for the first time. The roof was designed as a double one, the lower roof over the choir being groined and vaulted in the usual manner; above this there was a pointed barrel vault with strengthening ribs at intervals 12¼ in. by 7½ in. wide, on which rested a roof composed of dressed overlapping stones. this formed an upper room, lit doubtless by the square-headed window seen in the top of the east gable, and reached by the turret or wheel stair adjoining the chancel. It is evident from corbels still remaining at the level of the wall-head that there was a timber floor immediately above the vaulting. The chancel is the most interesting part left, and here are seen several features of beautiful design, although most of them are terribly mutilated. The magnificent tomb of Princess Margaret is perhaps to be noticed first. It is about 9 ft. square. Above a rich panelled base, which formed the sarcophagus, is a curved arch, which originally was elaborately cusped and crocketed. Above the arch is a florid carved cornice, the spaces being relieved with panels similar to the base. At the back of the recess is an incised Latin inscription. The whole work has a wealth of heraldry worked into it; in fact, all over the chancel are found heraldic forms—on the bosses. label terminals, corbels, and other enrichments. The doorway to the sacristy is richly decorated with carving. In the arched head, as is also seen in the tomb, is the Douglas heart with the three winecups surrounding it, the cups indicating his office of Chief Butler. On the south side are the three sedilia and the piscina. They are of similar design and well proportioned, and must have been admirable pieces of workmanship. Corbels below the east window seem to indicate the altar, or perhaps a reredos. The work of the nave is of the same date. The vaulting shafts are carried on corbels carved with figures of angels, and the caps also are of the same strong design, but very little of this portion remains. The eastern range of buildings, the provost's lodging, contains five apartments and extends about 88 ft. northwards measuring from the north side of the nave. These buildings are, however, in a very ruinous condition, except for the ground floor apartments. Most of these have still the complete barrel vault, and in some of the walls are presses or ambrices. Over these apartments between the sacristy and the tower would be the dormitory. There is nothing left to indicate the buildings on the north and south sides of what must have been the cloister garth.

SCULPTURE AND ITS RELATION TO ARCHITECTURE

The interdependence of the two branches of art affecting carved ornament and building design. Interesting discussion on subject by W. S. Frith.

THE DISCUSSION of the relation of sculpture and carved ornament to architecture is necessarily directed mainly to that interesting series of instances, where the art of form finds its fulles expression through the harmonious co-operation of both its branches; for though sculpture and architecture may each have their own definite sphere, and are in that sense independent of the other, it is when acting together in harmony that each is recognized as attaining to its highest achievements.

The Egyptian, the Assyrian, the Greek, the Roman, the Gothic, the Rennaisance periods are all distinguished by the presence of an adequate sculpture, in sympathy with the æsthetic theme of the architecture much in the same way as a song and its accompaniment. These periods illustrate that architecture and sculpture being phases of one art, their excellence is largely interchangeable and that when working in entire sympathy and understanding, the art of form is effectively presented, because it is then presented in its entirety.

It is suggested that all art is one, and therefore the architect, sculptor, and painter should be united in one person. There are so few instances, however, of this being done with success, that these instances constitute exceptions rather than rules, and judging by the amount a sculptor has positively to learn, and the difference of standpoint his phase of art demands, there is little probability of the artist in either branch really possessing more than a smattering of knowledge in the allied arts.

The early use of sculpture would appear not to differ essentially from the present, viz., assisting to realize an object, or event, a person or an abstract idea; and it still appeals as having qualities which give it predominance as a nucleus around which the associations and memories of a person or event may congregate. Ruskin states that to make things in real volume is a primary human instinct, and cites the case of a child making a cat and kittens in dough in support of this theory.

The subjects of the Egyptian sculpture were historical records of the Kings and their achievements, the representations of their various Deities; and there are some very interesting and realistic portraits of priests and other people of importance. most of these minor works are in wood but their treatment is similar in character to the granite work, and perhaps for this reason suggests their being thought out in granite.

The Assyrian works are much the same in subject, the records and doings of the Kings, their Deities, and their sports. Those depicting lion hunting are of exceptional vigor in treatment, and expression, as might be expected of a sport loving people.

Of the Greek, the sculpture was mainly devoted to the service of religion, and as the worship of beauty formed a not inconsiderable part, we find this reflected in the humanizing of their Deities, and the effort to represent these of the highest physical development, beauty, and dignity; an effort which eventually developed that magnificent school of sculpture which is still the wonder and admiration of the world. Although Rome continued much the same theology: the impulse of the people being different, the real seems to have had more charm than the ideal; and we find a development of portraiture, and a careful rendering of detail: the things which are, matter rather than the things which might be. We get an actual Hadrian in his statue, and it is a fine statue. We find also a development of the minor forms of sculpture, foliated ornament especially gained in importance.

Greek carved ornament was much more restrained and seems designed rather for effects of light, and of conveying through its texture, the effect of lace-like enrichment on a solid structure: while the Roman is distinguished by vigor and boldness of design, the capitals of the Pantheon which is typical of Roman ornament has remained the dominant type in use for palatial buildings to the present day. Generally, Roman sculpture conveys the impression of being used rather for its decorative value as an adjunct to luxury rather than, as in the Greek, for the love of art and delight found in seeking for its higher development.

The break up of the Roman Empire coinciding with the change of faith, and that faith one in which the ancient sculpture was considered idolatrous; together with vast social disturbances, brought about the disappearance of the architecture and sculpture identified with ancient Rome. After an interval came the rise of the Byzantine order in which sculpture served to record the persons and the incidents of the Faith, although this was affected in a way rather symbolical than personal, while in architecture its principal use was to assist to produce pattern, texture and rhythm, of the general composition. The statues from Chartres Cathedral are a good instance of this, as also is the Portal of Rheims which though of later date carries on the same traditions, and as an example of design must be considered a masterpiece.

This system of using sculpture affords considerable opportunity for the introduction of a variety of scales in the figures, a device not exclusive Gothic but of which considerable use is made in all its varieties. The harmonious contrast of broad surface with broken surface, of lines with fret; and curved, with straight line, while preserving the general structural idea, is one which provided the artists with material for some centuries.

The many examples the various cathedrals afford, are well worthy of long and continued study, and it is the conviction of all who have been interested in the Gothic phase of the art, that it is not only what has been done, that is of interest; but they feel that there is here a mine of knowledge and suggestion capable of immense future development.

The Percy Tomb is a fine example of English work under this general influence; the way in which the whole weaves together, the arrangement whereby the structural idea carries through, and is borne out by the foliated and moulded enrichment and the way in which the composition is varied and completed by the figures, together with the grand treatment of the foliated enrichment is worthy of all praise.

The revival of classic learning in Italy, and the revival of classic art which followed it, cut short the independent development of Gothic, but not without there being effort to blend the two; as in the art of Northern France, and in that called the style of Francis I., the Jube de Limoges must be taken as a sufficient example.

With reference to the art of Italy, I think it may be said that Italian artists never took kindly to the Gothic idea of the human figure represented merely as a symbol as it were a letter in the alphabet) ; but in even their early work felt and represented the strivings of the individualistic spirit within; although, the work of Nicola Pisano and his school approximated to the texture scheme of the Gothic sculptures, there is yet a feeling for form and movement which differs from these and in the work of Ghiberti, Donatello, Verrocchio, Lucca della Robbia, Rossillino, and many more, and above all Michael Angelo the details become lost in the grand effort to realize to the fullest the conception of the mighty spirit moving in the divinely formed body; the work arriving at a stage when it is its emotional aspect, rather than its architectural that enforces attention.

As our subject is, however, Sculpture in relation to Architecture, it may be well to consider the question of general principles; for in reviewing these various works, we seem to need a guide to consecutive thought, other than that supplied by the purely historical aspect.

Yet, in approaching this, the question at once arises as to who shall define art, for the spirit or art is an intangible as any dream—may be it is a dream—of which may be said in the words of Shelly:—

> "On an unimagined shore,
> Under the grey beak of some promontory,
> She met me in such exceeding glory
> That I saw her not."
> (*Epipsychidion.*)

Though the spirit of art is indefinable and may be considered as a vision apprehended not by any means by the eye alone, the efforts to realize this vision, which result in works of art, are found to conform to certain general rules: with reference to which in reading a musical book lately, I found a definition of the qualities a work in that form of art should possess, which seem to me to the point. It commenced by saying Form, Expression, Feeling and variety were essential. Form, the shape presented to the mind; expression, the prominence given to some sounds and the subordination of others; feeling, the character of the effect produced; and variety, to prevent the work becoming mechanical and so lifeless. It further states a melody should display amidst all its features, and phases, an all-pervading unity and relationship among its several parts. The text then preceeds in criticism of a certain arrangement, as wanting in design in its form, regularity in its expression, stability, or clearness in its feeling, and method in its variety.

These directions seem so admirably adapted to the art of the sculptor and carver, that they might well have been written expressly for him, except that being written about musical composition they make no mention of the artists' hand.

Lord Bacon, in one of his essays remarks: "There is no beauty but hath some quality of strangeness in it." I think it may also be said that we do not recognize beauty in that which is altogether strange, and it is the just proportion of strangeness harmonized with that which is familiar, which constitutes the charm. How is this charm of the familiar and the new to be obtained? By a search through the realms of nature by developing a helpful imagination, and by acquiring the power to imitate, together with the power to invent, and to express or rather to reveal your discoveries with a skilful hand. Imitation alone is not sufficient, it must be balanced and controlled; in the Gothic period the direct imitation of leaves as in early decorated, soon cease to satisfy, and developed into the more rhythmical perpendicular.

In the Rennaisance period, the most satisfactory arrangement or ornament was found to be (where direct imitation was used at all) in obtaining the necessary architectural quality by a considerable dominance of conventional form, and this occurs even in the extremely free treatment of Grinling Gibbons.

The principles applying to the figure are not identical with those of ornament, but in the Greek work I think the contention that the earlier and less realistic work is the best fitted for architectural purposes can well be maintained. In the Gothic period the unity of the whole could not have been preserved except the sculptors' convention permitted the lights and shadows to be of the right size and shape and to occur in the right place, three things of which imitation can take no heed.

On this question of harmonistic treatment which really embraces the question of distance effect also, M. Camille Mauclair writes in his work on Rodin: "This theory to which Rodin approved of my giving the name of 'deliberate amplification of surfaces' is simply the critical principle of Greek sculpture, which has been entirely misunderstood by the Academic School. That school which is supposed to honor the Greeks, is really false to their spirit, and their teaching. Moreover, this principle which belongs to all primitice statuary that was made for the open air is to be found among the Egyptian and the Assyrian. It calls in question the Academic Tradition, whereby exactitude is confounded with truth." This deliberate arrangement of surfaces is well borne out by a number of examples including the Wellington Memorial, probably the finest monument in existence, all of which show a care devoted to the arrangement, design, and treatment of light and shade bearing surfaces, practically coinciding with the Rodin view.

In examples of Michael Angelo's work, it will also be found that the dominant feature is the light bearing surface finely defined by the broad groupings, and design of the shadows; and indeed, this may be accepted as one of the most important elements in the means of expression of the art.

This may be considered as rather appertaining to the craftsmanship; of course, craftsmanship is after all only the servant, something more is required in a work of art, something on which the human mind can work; for in all real art it is essential that underlying the mere representation of the working of the directing mind and the touch of the executing hand should be evident. In certain work the skill of the hand is alone sufficient to justify the work; in the Roman stucco, for instance, how great a charm is imparted by the hand traces left upon them.

In the work of Rodin, how much does it owe to the same cause; and in the work of Michael Angelo, how do those parts so called unfinished yield traces of his consumately skilful hand moving as directed by his mighty brain—it brings the thing home to us and seems to place us in immediate touch with the artist working at those grand conceptions, which for four hundred years have filled so large a space in the history and development of art; and to use a hackneyed phrase which expresses nevertheless a profound truth, supplies the "touch of nature that makes the whole world kin."

TENSILE STRENGTH OF CEMENT MORTAR BONDS

THE STRENGTH of the bond between layers of mortar deposited after different time intervals has been investigated by tensile tests by Prof. B. Kirsch, of Vienna, and because the method has proved satisfactory it was described by him in a paper presented to the Copenhagen Congress of the International Association for Testing Materials. The specimens resemble roughly in shape the ordinary tensile test specimen, the joint being at the smallest section, which has an area of 100 x 200 mm. The moulds were of wood, lined with zinc to prevent absorption of water by the wood, and when the first half of the specimen was molded the other half of the mold was closed with a removable filler block. This was removed when the first half had set, the contact surface roughened a little and the second half molded against it. The clamps were a modification of those used in tensile tests in the United States.

Two mixtures of Portland cement were experimented with, a 1 :2 and 1 :4 mortar. The intervals of rest between pouring the two layers in contact were 0, ½, 2, 6, and 14 hours, corresponding to uninterrupted work, work interrupted by short intervals, as by the dinner hour, and by half and finally a full day or night. The charge was pressed into the mould with a pestle, but not rammed. The 1 :2 mixtures were taken from the moulds after two or three days, the 1 :4 mixtures after eight days. After completion the specimens were allowed to harden for three months in a damp cellar.

The Portland cement used showed a textile strength in neat tests of 269 lb. per square inch after one week, and 346 lb. after four weeks. It was of constant volume, took initial set in 4½ hours and hard set in 15 hours. A quartz sand was used.

The adhesion values found are given in the following table in pounds per square inch:—

Intervals in hours. .	0	½	2	6	14
1 :2 mortar	54	17½	20½	15	14½
1 :4 mortar	56½	17	16	22½	17

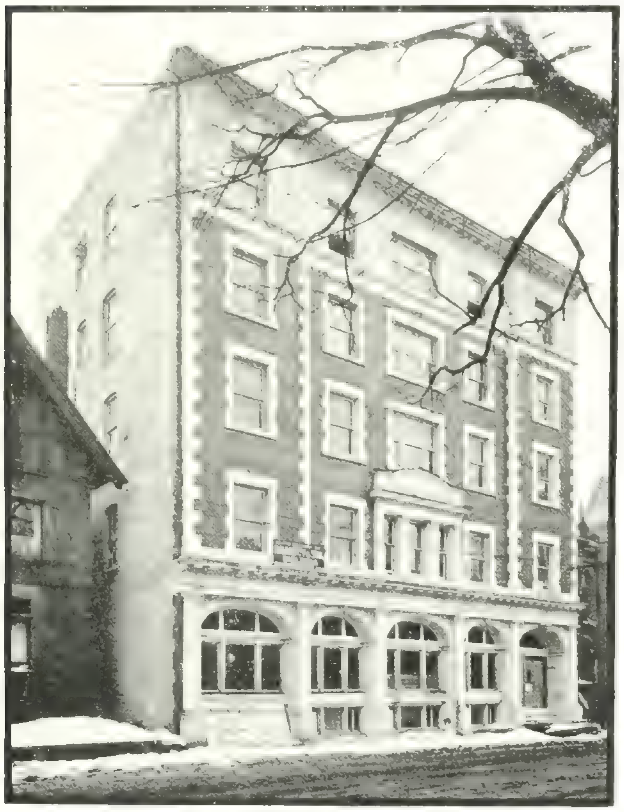
From these and further tests, Prof. Kirsch concludes that an interval of half an hour is sufficient to reduce the adhesion strength to about one-third of the concrete strength, and that with longer intervals the adhesion diminishes still further but more slowly than during the first half hour. Tests with slag cement show that its adhesion diminishes much more rapidly than that of Portland cement.

JUDGING FROM AN ACCOUNT of the formal opening of the first Chinese sand-lime brick plant which occurred the early part of March at Mut Li Sha, a village situated on an estuary of the West River, about midway between Canton and Fatshan, the event was attended by considerable ceremony. The guests on the first day were Chinese officials, on the second day Chinese merchants and gentry, and the third day foreign merchants and officials from Hongkong and Canton. The invitations were issued by His Excellency, Cheung Pat Sze, a wealthy Chinese merchant, whose fortune was made in the Straits Settlements and who controls a large share of the stock and is a prominent factor in the business world of Canton. The foreign guests were taken from Shameen by flower boats to the factory, there shown over the plant, and entertained at luncheon by his excellency, and returned by boat to Canton. A sum of $200,000 has so far been expended on the plant. It is owned by the Yue Yick Sand-Lime Brick Company, and has a working staff of one British engineer and 100 native hands. The scheme of buildings includes, besides the plant, residences for the entire staff. The factory is equipped with crushers, mixers, four ordinary pressing machines, one rotating presser for fancy bricks, and four drying ovens.

CANADIAN FORESTERS' BLDG. TORONTO

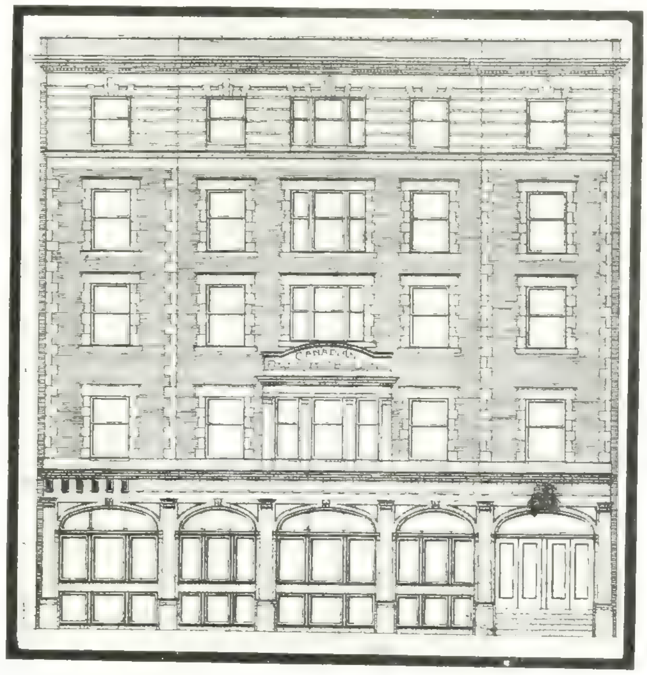
A successfully designed lodge and office structure recently erected to meet the requirements of prominent fraternal organization

AS A RESULT of the consistent expansion that has taken place in representative fraternal circles, and the attending need for better and more improved accommodations for lodge work and the transaction of business, considerable activity is being witnessed in the erection of buildings designed especially for this purpose at the present time. The new buildings that have so far been erected are vastly superior in design to the older buildings of this type, and are better considered in every way from the standpoint of accommodation and arrangement.



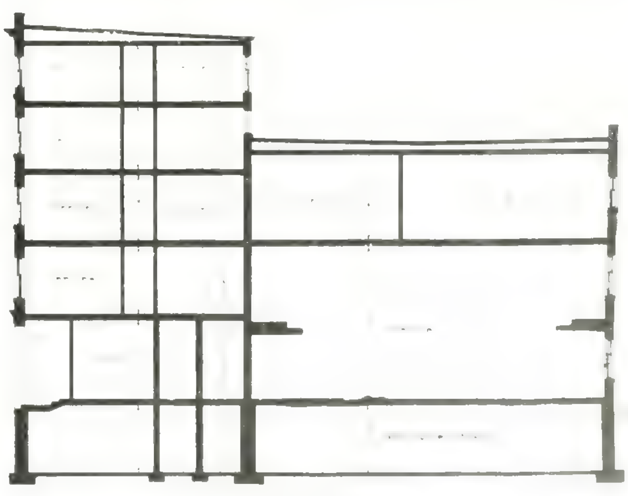
Recently Completed Lodge and Office Building of the Canadian Foresters, College Street, Toronto. W. R. Gregg, Architect.

One of the more notable structures of this character recently dedicated is the new Canadian Foresters Building, Toronto, designed by Architect W. R. Gregg. This building has a frontage on the north side of College street of 65 feet 6 inches, and a depth of 100 feet to the lane, and is divided by a firewall into a five story office building in front and a two story building containing an assembly hall, with lodge rooms above, in the rear. The first story of the facade, which is designed in the Doric order, is executed in light gray manufactured stone; and this stone is also used as a trimming on the russet iron clay brick background of the wall scheme above, the whole forming a pleasing combination of outline and color. The assembly room, as shown by the accompanying plan, is entered directly from the street through a wide hall, and is provided with two emergency exits to the rear on the north. This room is 52 x 55 feet, with a large stage or platform 26 x 10 feet, and together with the gallery will comfortably seat 700 people. The gallery is approached by a wide iron staircase, and has additional exit facilities leading to the lower floor between the northern emergency exits. It is supported from above in such a way that the centre floor of the assembly room is free from columns.

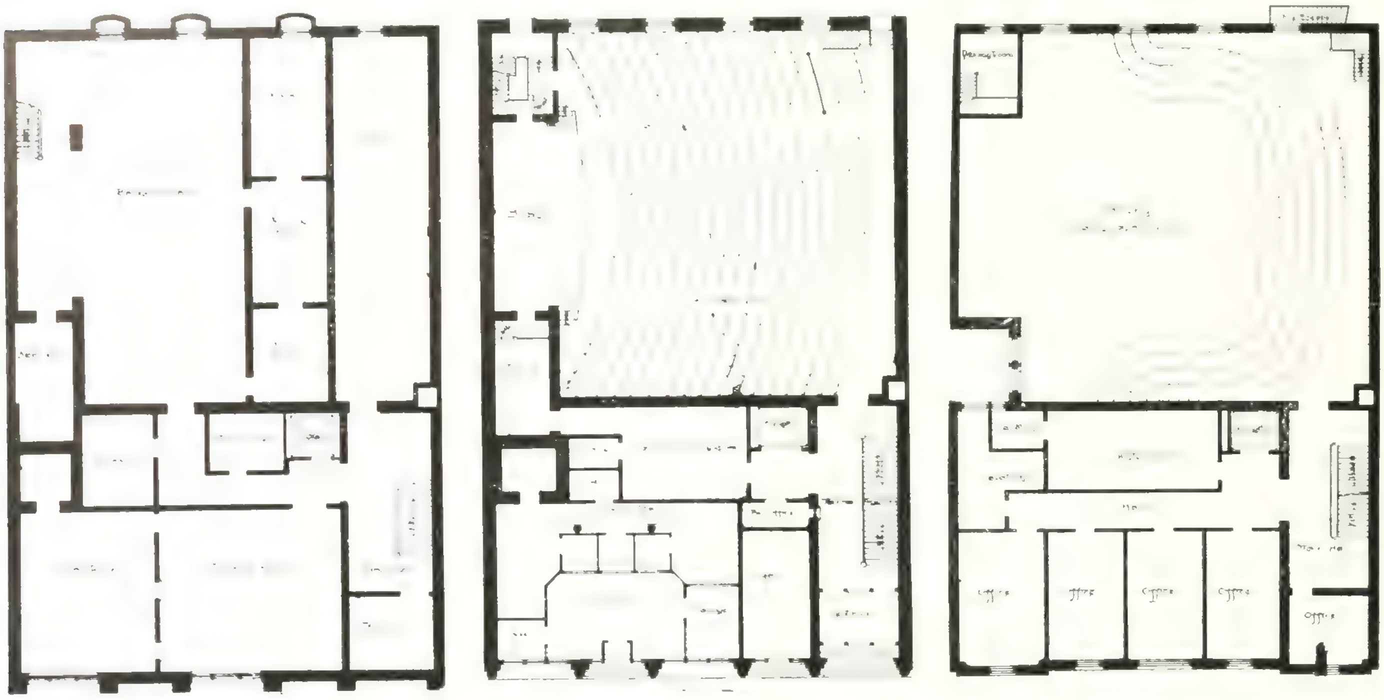


Front Elevation, Canadian Foresters' Building, College Street, Toronto. W. R. Gregg, Architect.

The entrance hall, which is fireproof, has a tiled floor, while a striking feature of the architectural scheme is a handsome dado of marble from the newly opened quarries at Bancroft, Ontario. The elevator, which runs from the basement to the upper floor of the building, is placed in a central position convenient to the gallery, lodge rooms and offices. Immediately adjoining this on the ground floor are the ladies' dressing rooms, which are of large size and



Longitudinal Section, Canadian Foresters' Building, College Street, Toronto. W. R. Gregg, Architect.



Basement Plan. Ground Floor. Second Floor..

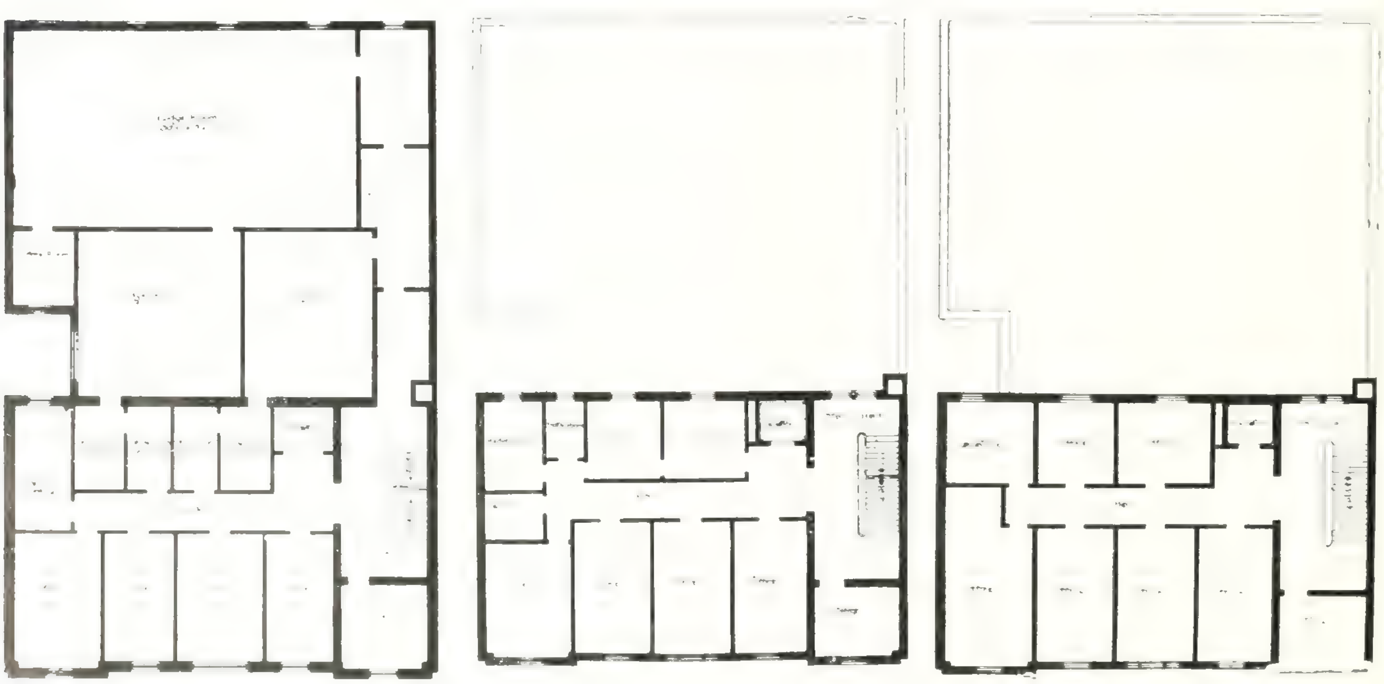
Scheme of Interior Arrangement, Canadian Foresters' Building, College Street, Toronto. W. R. Gregg, Architect.

adequately equipped with toilet accommodations and wardrobe facilities. The basement, as seen in the accompanying plan, contains a smoking room and coat room for men, as well as a large banquet room below the assembly hall, which is approached by two stairways and provided with a completely equipped kitchen and serving rooms. The arrangement for society functions leave little to be desired, the plan being compact and the appointments complete in every respcct.

The building is heated by steam and ventilated by a system of indirect heating and electric fans. The lighting is by both electricity and gas.

In addition to the assembly hall with its subsidiary rooms, the ground floor contains a large modern office suite having a separate entrance from the street. This suite is divided into a public and a working space, with the manager's office and ladies' room on either side of the entrance.

The three lodge rooms above the assembly hall are divided by sound-proof partitions and each room is approached through two or three more ante-rooms. The largest of the lodge rooms is 30 x 52 feet, and is 14 feet in height; the lodge furnishings throughout being of fumed oak, upholstered in leather, and the floors carpeted. H. N. Dancy & Son were the general contractors, while the manufactured stone used for the exterior decorations was furnished by the Canadian Art Stone Company.



Third Floor. Fourth Floor. Fifth Floor.

Scheme of Interior Arrangement, Canadian Foresters' Building, College Street, Toronto. W. R. Gregg, Architect.

THE HOUSE OF VANISHING ROOMS

ECONOMY IN SPACE and cost, together with convenient equipment and perfect arrangement, are without question the considerations of greatest importance to the architect of the apartment and small city dwelling designed for a small lot. The latest example of the extremes to which architects and builders in their endeavors to produce cheap dwellings that possess all the conveniences and comfort afforded by a more expensive type of structure, was recently illustrated in "Country Life in America." The "freak" house, as it is termed, has been erected at Evanston, a suburb of Chicago. It is built of stucco and costs about $1,500. It measures 25 ft. by 26 ft. in plan, and contains, by an ingenious arrangement, five rooms and a bath. The ground floor has a living room 19½ ft. by 12 ft.; bedroom, 13 ft. by 10½ ft.; bathroom, 8½ ft. by 5½ ft.; kitchen, 3 ft. by 9 ft.; closet, just outside the bathroom, 5 ft. by 3 ft.; and guest room, 7½ ft. x 5½ ft. Even the most careful figuring will not succeed in compressing all those measurements within the space of 25 ft. by 26 ft. That is because of certain arrangements which led it to be called "The House of Vanishing Rooms."

Exactly in the middle of the ground floor is a base-burner stove, which, upon a supply of four tons of coal, warms the entire house all winter. Over the main floor is a large attic, now used for storage; but two rooms can be finished off there if the downstairs supply proves inadequate. There is a curious closet between the bathroom and the sitting-room. One-half is a clothes closet, the other a stairway leading to the attic. When shut up these stairs are a tier of boxes serving as clothes hamper, hat boxes, and so on. Pull the lower ones forward and they form a first-rate flight of steps. Under this closet a door leads to a fair-sized compartment built below the floor—there is no cellar—and giving additional storage room. The roomy bookcase, if approached from the rear—that is, via the clothes closet—is a linen chest. There is an automatic gas heater in the attic which supplies hot water to kitchen and bathroom.

The visitor staying to dinner wonders where the dining-room is, and whether he is expected to eat in the kitchen. His youthful hostess has disappeared some time since, and he hears sounds in the kitchen that tell him that a meal is in process of preparation. The kitchen is attractive enough for anyone to mistake it for a dining-room, but when the critical moment arrives the host presses a button in the hospitable mantel-piece of the living room, the burlapped wall beneath the mantel slowly rises and disappears, and the dining table, in all its splendor of china and glass and snowy napery, appears through the opening, and when well on the living-room side the partition silently resumes its wonted place again; then chairs are drawn up, and you sit down to enjoy the repast. At the end of the meal the table is gently pushed back into the other room, the way it came, awaiting the pleasure and leisure of the mistress of the house to clear up.

Perhaps the greatest marvel is when the guest room appears out of an empty wall. A large, roomy couch is rolled over to the windows, and the panel behind it adjoining the bookcase, by the touch of a button, again swings out into the room. It may be swung out at right angles to make a larger room, but is usually left at a three-quarter angle, turning in slightly, and there you behold the guest chamber. It is a pretty room, with its fresh muslin curtains at the window, snowy counterpane on the bed, low, comfortable chair, and high, built-in dresser, which is in weathered oak to match the rest of the furnishings. When this panel is closed, the space is only large enough to hold the bed, chair, and dresser (which is built into the panel), but when opened out it gives a guest room of very fair dimensions, and a screen placed across the 3 ft. opening made by the folding out of the wall allows plenty of privacy. In the morning the wall is pushed back into place and the living-room resumes its normal size again.

INADEQUATE SPECIFICATIONS

THE FOLLOWING SENTENCE is copied from a set of specifications covering many different classes of work, the job for which they were used having a large amount of concrete construction:

"Concrete shall be mixed in the manner prescribed by the engineer, and of such proportions as the engineer may direct."

It is needless to say that nothing could be more indefinite than this clause, yet even by following it injustices can be inflicted. It would seem that when specifications are so indefinite, that it would be better not to have any specifications to govern the work. But few would agree with this statement owing to the fact that although some classes of work might be poorly covered, yet others may be described in great detail. In considering this clause we must first look into its origin.

No doubt such a clause was inserted in the specifications when concrete was but little used, and the amount of that class of work was always insignificant. In those days there were few, if any, mechanical mixers on the market, so that nearly all concrete was mixed by hand. Thus the contractor was to consult the engineer as to the method of mixing, that is, was sand and cement to be first mixed then water added, or was the concrete to be mixed dry, and then made wet, and how much water was to be used.

But with the introduction of many makes of mixers such questions were forgotten and the interpretation of the clause changed. The question to be decided was whether or not the concrete was to be mixed by hand or by machine, and if by the latter, what style of machine would be permitted. Here is where an injustice can be done the contractor. Under the specifications the engineer could prevent a mixer being used, compelling the contractor to mix all the concrete by hand, or if a mixer is allowed, the engineer could refuse to have on the job certain makes and styles of machines. These are not suppositions, but the editors of this journal have known of actual cases of these kinds, and contractors have been compelled to use methods and machines that made his work much more expensive. This shows the necessary cutting out of specifications where the clauses have outlived their usefulness.

The second part of the provision quoted relates to the proportion of the materials to be incorporated in the concrete. Nothing affects the cost of concrete more than when the ingredients vary, and it is an easy matter to set forth the various proportions to be used. Even if the kind of structure to be built is not known, it is still possible to make the specifications definite. When it is not done, the contractor is very apt to suffer. If he bids on a 1:3:5 mixture, it may be changed to a $1:2\frac{1}{2}:5$ or even 1:2:4, and the cost will be increased. On the other hand the owner may be made to pay an excessive amount for the work, owing to this element of doubt.

A method in this connection, that is to be commended, is the dividing of the concrete work into classes, as Class A, Class B, and so on. Thus the specifications can be definite as to each class, although on some work there may not be used concrete of certain classes, while if there is work to be done the specifications are explicit and the contractor has named a price for the work.

Some specifications go a step farther by providing for the different classes of concrete and obtaining a price on each class with forms and without forms. This is done to obtain more economical construction, and should be welcomed by contractors.

From these remarks, it is evident that there should be no need of writing specifications as indefinite as those from which we have quoted.—The Contractor.

REPAIRING CONCRETE FLOORS

THERE IS A POPULAR and widespread fallacy to the effect that a concrete floor once chipped or cracked is practically at the end of its usefulness. This is undoubtedly due to the results of unskilled workmen attempting to repair a damaged floor. Unless proper care is taken and the workman engaged on the job has sufficient knowledge of concrete, a repair job is most unsatisfactory.

In this connection, says "Concrete," the practice of a Boston firm is worth noting. In certain of the concrete buildings erected by this firm floors have been chipped in particular places because of some phase of the industry which gave rise to dropping heavy materials in one place, as, for example, the winding rolls in a paper mill. When a floor has become chipped out in some such manner as this, the proper method of repairing is to chip out with mallet and chisel a recess usually square, of sufficient depth to reach to the bottom of the deepest break in the concrete surface. The rough surface resulting from this process is then treated with acid to bring out the solid aggregate, or else a stiff brush is used to remove all the loose dust, and the recess washed out by sluicing out with a hose. When all the dust particles have been removed the recess is grouted with cement and before this has set the granolithic finish is applied and leveled up with the rest of the floor. Repairs made in this manner are just as permanent as the remainder of the floor, as the bond between the new and the old concrete will be perfect if all the loose material has been carefully removed.

NEW BRICK PLANT

EXCELLENT PROGRESS is reported as being made on the buildings comprising the plant which the Sandstone Brick and Sewer Pipe Company, a new concern, with head offices in Calgary, is establishing at Sandstone, a point twenty miles south. The new plant, in fact, will be in operation by July 1. It is the intention of the company to erect temporary kilns this year, and on this account the output will be limited to 500,000 brick per week. Next year, however, when continuous or permanent kilns will be built, the output will be between 900,000 and 1,000,000 brick per week. For this season the energies of the company will be directed towards getting out brick only, but next year sewer pipe, terra cotta, hollow ware, etc., will be manufactured Mr. F. Prendergast, formerly connected with the Alberta Portland Cement Company, and the Blairmore Brick Works, has been appointed manager of the plant. The company is capitalized at $75,000, all of which is paid up.

REMOVES TO NEW QUARTERS

A CARD IS TO HAND announcing the removal of the show rooms and offices of E. F. Dartnell, the well known building material dealer, of Montreal, from 157 St. James Street, to 8 Beaver Hall Square. The new quarters are much more commodious and better arranged for display purposes than the premises just vacated. The extensive line which Mr. Dartnell carries includes among other products, high-grade face bricks, tapestry brick, enamelled and glass brick, terra cotta fireproofing, glass tile, hollow brick, floor quarries and roofing tiles. One of the important orders for supplies received so far this season, calls for 160,000 white porcelain to be used in the exterior of the Dominion Express Building now being erected in that city from plans by Messrs. E. & W. S. Maxwell. Montreal patrons can avail themselves of quick service by 'phoning "Uptown 2975."

CONSTRUCTION

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CONTENTS

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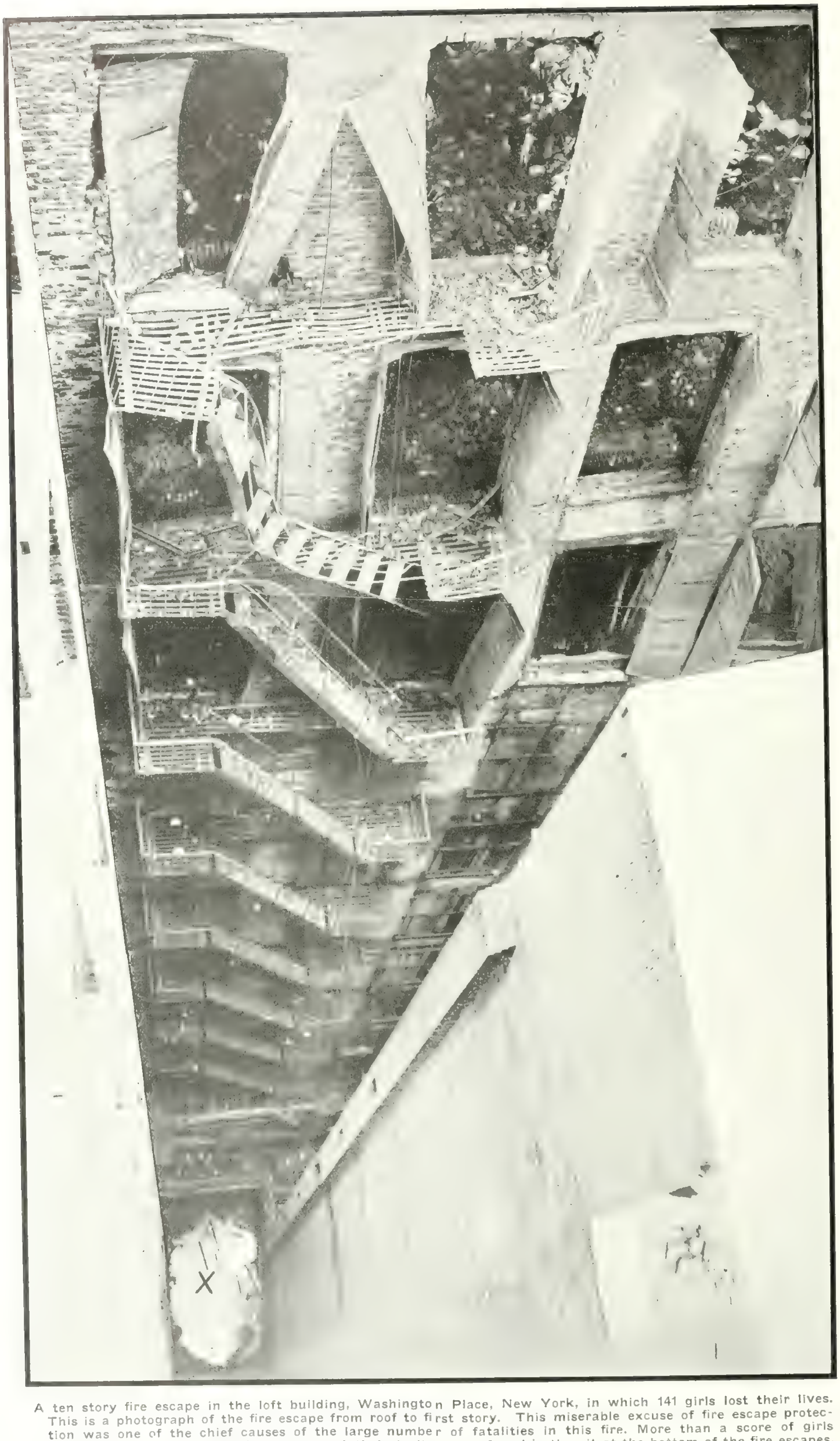


A ten story fire escape in the loft building, Washington Place, New York, in which 141 girls lost their lives. This is a photograph of the fire escape from roof to first story. This miserable excuse of fire escape protection was one of the chief causes of the large number of fatalities in this fire. More than a score of girls fell from these supposed life savers, and their bodies were found in the pit at the bottom of the fire escapes, marked X. These so-called fire escapes are quite equal and in many cases superior in efficiency to what is to be found on our average loft or factory building in either Toronto or Montreal, or in fact anywhere throughout either Ontario or Quebec where large factories are to be found. The City Architect of Toronto, or the Building Inspector of Montreal have to their credit many of such fire escape bungles as the one shown above. The fact that no serious catastrophe has occurred is not a result of the efficiency of the inspection of these departments, but because of good fortune. The fact that this was a ten story building does not change matters a bit, a drop from the fourth or fifth floor would be equally as fatal.

Horrible catastrophes resultant from official neglect, incompetence or corruption, seldom last long enough in the public mind to effect a reformation or a correction —New York loft building fire, like others, soon forgotten—Canadian cities have many lessons to learn from this appalling affair—Our fire-escapes mere delusions.

NOT LONG AGO a fire occurred in the three top floors of a ten story building of fireproof construction in New York City, in which 141 lives were lost. At the time, the press of the whole continent was ablaze with startling, black-faced head lines about the awfulness and shamefulness of this catastrophe. Editors plied their pens with vigor, pointing out the necessity for better fire protection and more adequate life saving fire appliances. Reporters were busy writing feature stories about the conditions in factories in their own particular city. They interviewed public officials, who gave assurance that buildings under their jurisdistion were properly inspected, and that they were reasonably well equipped in case of fire or panic. They also promised, when pressed by public opinion, to formulate news laws and to bring about the stricter enforcement of laws already in existence. New York City was going to fasten the responsibility. The owners of the buildings were to be prosecuted. Union officials were busy demanding laws for the better protection of employes in sweat shops. The legislature of New York was going to pass a law requiring fire drills in factories, and the Governor of the State of New York promised an investigation.

This illustration of the upper three stories occupied by the Triangular Waist Co., taken after the fire, shows how the building proper still remains intact. It is absolute proof that the contents of a fireproof building, filled with inflammable goods, requires life saving and fire fighting apparatus just as much as a non-fireproof building, as far as the protection of life is concerned. If this building had been equipped with a sprinkler system, history would not have had to record such a shameful holocoust.

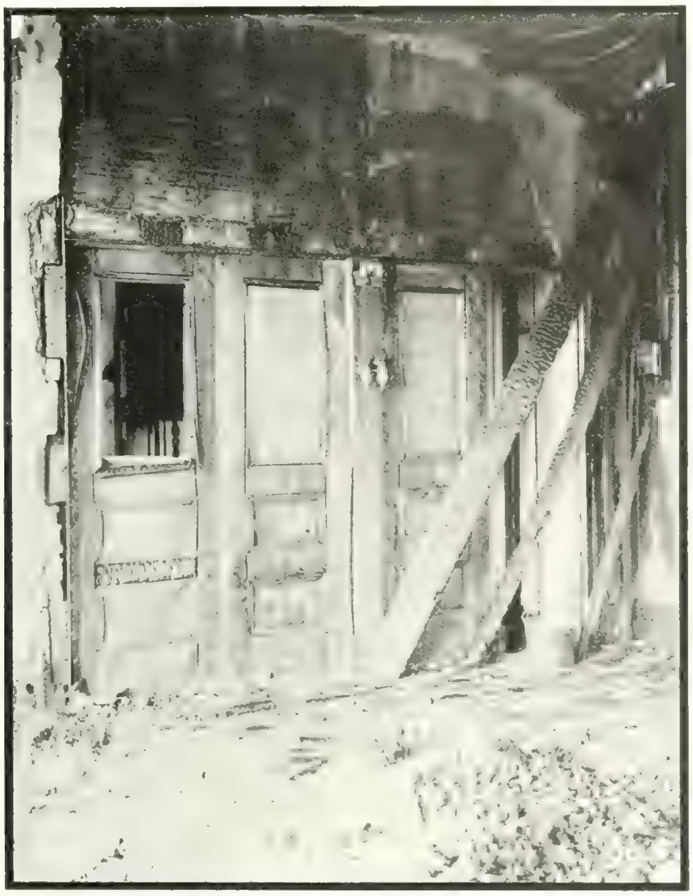
This view was taken shortly after the fire started. From outward appearances it would seem impossible that a fire could occur in such a structure, that would in a few minutes stamp out the lives of nearly 150.

This sounded good while it lasted, but how soon it was all forgotten. The city of Toronto, which, without question, has the most damnable type of inferior and inadequate flimsy fire escapes on its sweat shops, loft buildings and factories of any city we know of, was even shaken, and it seems that a gentleman, Mr. J. Laidlaw, went to the Fire and Light Committee with a scheme, a plan he had devised for safe-guarding lives in factories and large buildings in the event of an outbreak of fire. He claimed that it is possible to construct stairways and elevator shafts in factories and skyscrapers so that each floor can be shut off from fire for a sufficient time to give any one in the building time to escape. Fire Chief Thompson endorsed the plan. Ald. Hilton, Chief Thompson and the City Architect were appointed a committee to act with Mr. Laidlaw, dealing with fire protection in factories, but we have heard no more, and from our knowledge of the accomplishments and efforts of such committees, which have been appointed previously on like occasions, we think that a report may get as far as the dump, to which the City Council usually relegates such legislation as might interfere with pirvate interest, about the commencement of 1915.

After the Boyertown disaster, City Architect McCallum of Toronto, together with the factory inspector of the Province of Ontario, were going to mend the regulations governing the construction and equipment of theatres and five cent amusement places, and promised, further, to more rigidly enforce the laws already on the statute books. The Boyertown disaster is now a distant memory, and a visit to any of the five-cent theatres on Yonge Street, in the City of Toronto, is sufficient to give a fair idea of the thoroughness of the building inspection in the City of Toronto. Not only are they without reasonably adequate fire protection, but they are fire traps, boxes with a hole in each end, unventilated pest houses; the odor, due to the lack of ventilation is sickening, and the contaminated air that patrons, mostly youthful, are obliged to take into their lungs, is almost as dangerous and disastrous as the obvious lack of fire protection.

Ninth floor of Loft Building, Washington Place, New York, where a large number of the victims were trapped. Many bodies were found under sewing machines and their postures showed that they were endeavoring to shield themselves from the heat. This illustration forcibly demonstrates the efficiency of modern fireproofing. The twisted pipes and remains of sewing machines show conclusively that a tremendous heat was developed. It further proves that because a building is fireproof, fire fighting and fire protective devices cannot be eliminated. These three stories in which 141 lives were lost remain intact as far as the construction is concerned—the contents fed the flames.

After the Collinwood disaster, just outside of Cleveland, the people of Canada were again aroused over the necessity for fire proof construction in school buildings, together with proper life saving fire apparatus. Again did our press publish thousands of columns dealing with the awfulness of this brutally pathetic disaster. They were full of suggestions, recommendations and demands for new regulations governing the construction and equipment of school buildings. Public officials with whom the responsibility rested for the design and construction and equipment for school buildings, were stirred as never before. They promised an investigation. They promised new regulations. They promised better school buildings and more complete and adequate equipment, but what has been the result. Montreal had to wait for a disaster to occur in one of her own school buildings, in which were sacrificed the innocent lives of little ones of tender years, upon the altar of official neglect and incompetency. Winnipeg, and, in fact, all the western cities, took heed of the horrible lesson, and to the shame of the older Provinces of the Dominion, it may be said that they are erecting a class of school buildings with regard to design, construction and equipment, that is far superior to what is being foisted upon the public in the eastern cities by officials with their settled, antiquated ideas, who have grown feeble and weak-kneed in office. If the infirmities of most of these officials were

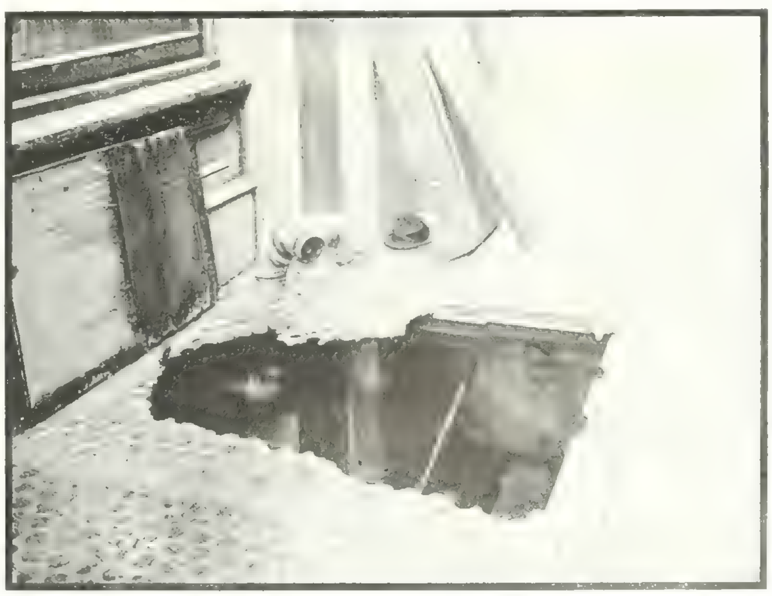


The doors leading to the elevator which, owing to the flames that swept around the enclosure, had to be stopped after a few loads had been taken down. On the right of these doors was the iron door, which opened inward at the head of the stairway, and it is claimed that in order to prevent theft, this door was closed, no girls being allowed out without being searched. A fire alarm was given and the girls massed in front of these doors in such numbers that they could not be opened and they were forced back into the flames. This surely indicates that factories, sweat shops and such places should be very closely inspected to avoid in human practice that may be a menace to the safety of their sweated employees.

to be measured by the power and intelligence they wield in their office, they should have been pensioned long ago. The City of Toronto, which boasts much of being the educational centre of Canada, also talked much of reforms and improvements, and to quiet public clamor, the School Board promised much of which she has gotten but little. Some additional fireproofing has been done in recently erected schools, and some iron stairs have been put in some of the older fire traps, but from the standpoint of fire equipment and protection against loss of life from either fire or panic, public schools in the City of Toronto, yes, even the Collegiate Institutes, are the worst that we know of, or can find in any city nearly the size on the North American continent. And so might we continue pointing out how soon public officials forget their responsibilities, their promises, when the public mind is at peace. It seems that in every community some horrible, shocking catastrophe must take place before the public wrath is stirred to that point where civic officials will really perform their plain, sworn duty. The public press could do great service in bringing about reforms that would obviate many of these evils if they were not saturated with politics.

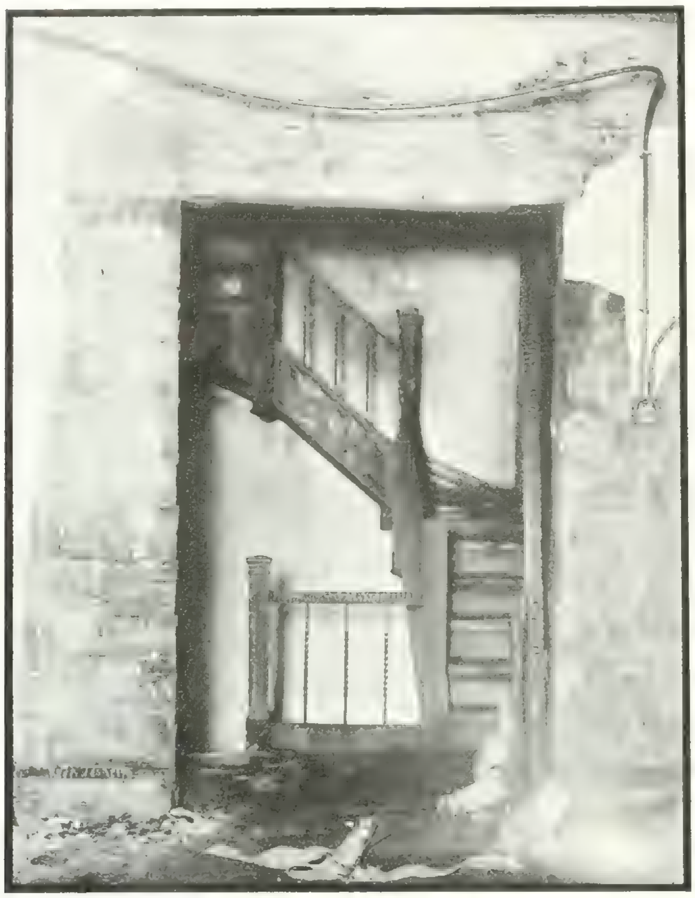
And so after the 141 poor, innocent, sweated employes of this hell perched in the air, have been laid in their allotted number feet of earth, we have passed on to other things, and seem to be oblivious of the necessity of correcting the conditions that that brought about such an extraordinary sacrifice. In the meantime there has been a successful revolution in Mexico. A few air men have been killed and wounded. We have had a murder mystery or two to excite our minds. There has been an international polo match, and the Coronation is approaching. It is truly wonderful how soon we forget.

The enormous loss of life in the Triangle Shirt Waist factory in Washington Place, New York, was the result of conditions that are generally prevalent in buildings of like character in our Canadian cities. The fact that this building was ten stories high does not change matters one iota, as a drop of three or four stories is equally as fatal as a drop from a greater height, with the exception of the fact that the firemen's nets could be brought into service in the former case, while they proved absolutely useless in the latter. A panic may occur in a five story building just as easily as it would in a ten story. Lack of proper inspection, and inhuman conditions imposed upon employes by the employer will bring the same net result in buildings of ordinary height as it would in one of ten stories. Lack of proper protection around elevator shafts, stairways and other means of egress from a building where a large number of individuals are employed would effect the same dire results in case of fire panic in a building half the height of the one in Washington Place. The fact that we have not many skyscrapers in Canada, at the top which hundreds of people are employed, does not minimize our ever present danger in this respect. The direct



Owing to the lack of proper fire equipment, many of the poor unfortunates jumped from the windows to escape the flames. The New York fire department spread the stoutest life nets they had but the velocity of the bodies was too great and they fell through. The above illustration gives some idea of the velocity of the bodies when they reached the sidewalk. The hole in the pavement was caused by the bodies of fallen victims.

causes of the appalling loss of life in this particular fire has been widely discussed. There was no available fire apparatus on the premises, and while the building was equipped with iron doors, it is claimed the employers were in the habit of keeping them locked, so as to prevent the employes from descending the stairs until they were searched at the end of each day. Against these the frightened victims were packed to the height of a man's shoulder in their effort to gain egress from the building. The fire escapes were nothing more or less than flimsy ladders, and of a type to be found on our loft and factory buildings in Canada. This fire escape system, if it might be termed such was but of little use, located as it was in a court, and the girls that attempted to make use of this supposed life-saving contrivance were either dashed to pieces in falling from the escapes or were drowned in the pit in the court, which was filled with water from the standpipes. Yet most of the conditions that were the cause of the loss of so many lives in so short a period of time, are those to be found prevalent in most of the factory buildings in Toronto and Montreal.



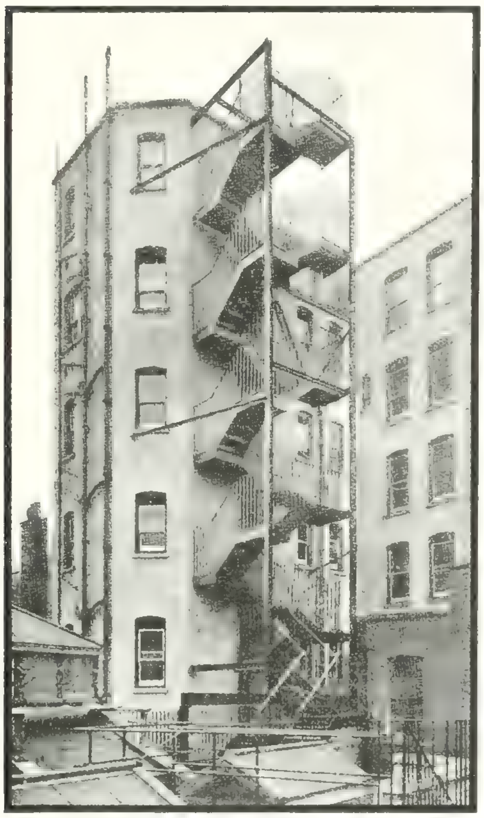
View showing interior stairway, New York catastrophe, where the charred wooden handrails and steps give evidence of how the flames leaped through the doorway and up the stairway, thus cutting off this means of egress from the building.

The building was fireproof, and, as will be seen in one of the accompanying illustrations, the terra cotta fireproofing of the building remained intact, despite the enormous heat to which it was subjected. This demonstrates conclusively that even fireproof buildings, where a large number of individuals are employed, must have fire protection equipment. If this building had been equipped with a sprinkler system not a life would have been lost. If manufacturers find it profitable to equip their buildings with fire sprinkler apparatus to reduce insurance on inflammable merchandise, then should the public surely demand that the manufacturer equip his plant with a sprinkler system for the protection of the lives of his employes. As evidence of the fact that greater value is placed upon merchandise than life, we would point out that warehouses are invariably better equipped with fire protection appliance than are our factories. The type of fire escape required or permitted on factories and loft buildings in both Toronto and Montreal, are the worst type of delusive excuses. They are practically nothing more than flimsy ladders of high risers and narrow treads, erected at an angle which renders it almost impossible for the average individual, in the normal state of mind, to descend them with any degree of a feeling of safety.

Fire Chief Croker, of New York City, repeatedly warned both the civic officials and the public of the danger of the conditions of the loft buildings in New York City. In an interview given to one of the New York dailies, during January of this year, he made the following statement:—"All fireproof office buildings, and so-called loft buildings used for manufacturing purposes should be equipped with fire escapes and closed in wire mesh to prevent panic-stricken people from falling when they try to use them, and provided with good iron stairs and broad treads and easy risers, with rails instead of ladders." The law, he pointed out, was strict with regard to the theatres, requiring asbestos curtains and exists and all safety devices, besides having a fireman on duty on the stage to guard the prosperous who go to them to find amuse-

Possibly after a few more such catastrophes, people on this continent will become a trifle more serious in insisting upon proper fire protection and proper public inspection, by honest, efficient and public spirited officials. The above is a fire escape on a three story college in England, erected according to the requirements of the London County Council.

ment. "All this," said Mr. Croker, "is as it should be, but the poor devils were forced to work in factories all day and often through the night; the laborers in the loft buildings; the toilers in the sweat shops are much less elaborately guarded, and the risks they take are necessary." He pointed out that the large percentage of deaths from fire throughout the country happened in such places, and that nearly every one of them could have easily been prevented. It is just such conditions as Fire Chief Croker pointed out that was the cause of the Washington Place catastrophe. As a result of his observations at the New York fire, Mr. Croker, who was in the thick of the fight, makes the following recommendations relative to the fire protection that should be provided in every factory and loft building: fire escape landings in the form of balconies at each floor level on the outside of the building, wide enough to accommodate two persons; adequate outside stairways leading right down to the ground; stairways to be enclosed in fireproof partitions; fireproof exit doors; all doors to open outward; no exit doors should be locked or blocked; no fire escape window should have sills above the floor, but each window in reality a door open to the level of the floor, like a French window, to swing outward and back to the wall; each floor should be protected with standpipes, automatic fire alarms, automatic sprinklers, and other approved safety devices. He also suggests a law for the compulsory fire drill in all factories, lodging houses and institutes. There is possibly no man on the American continent who is in a better position to judge just as to the extent of the danger to life from fire in factories and loft buildings than ex-Fire Chief Edward F. Croker, of New York, and these recommendations coming from a man with such broad and thorough experience in fire fighting, should have considerable weight with municipal authorities.



The above illustration is another type of fire escape in England built in accordance with the requirements of the London County Council. As may be seen, this type of fire escape may be continued to any height, and would be well adapted for high buildings on this continent.

The press of Europe was merciless in its criticism of the causes that led up to this New York calamity, and in Germany advantage was taken of this opportunity to condemn the skyscraper type of building as largely responsible for such catastrophes. Newspapers were filled with communications and editorials decrying tall buildings and warning Berlin municipal authorities to continue their opposition to the introduction of what is termed in Germany "cloud-scrapers." In fire equipment, as in many other branches of building construction, we have still much to learn from the more set and conservative methods and regulations employed and adopted in the countries of the Old World. Like the United States, our growth in Canada has been and will be exceedingly rapid, and unless we face our responsibilities squarely, and "hold our heads" (so to speak), we shall pay dearly for our slip-shod methods, resultant from rapid development. Herr Reichel, Chief of the Berlin Fire Department, in discussing the Washington Place horror, points out that a disaster of such magnitude is practically excluded in Germany, because of the relentlessly rigid building and inspection laws, which are not only enacted, but enforced in that country.

It will be noted that in these fire escapes erected in England, that they are really external iron staircases, having iron guard-rails; gangways to roof; balconies and foot bridges. The above is a fire escape on a private residence.

German cities clothe their fire departments with the authority and responsibility of seeing that buildings are genuinely fireproof. According to Herr Reichell, ladders and elevators are useless when fires break out in tall buildings, and that only trustworthy, precautionary arrangements in such structures are balconies at every floor, with substantial steps leading to the street.

We illustrate herewith some fire escapes built in accordance with the regulations of the London County Council. It will be seen that these fire escapes are practically outside iron stairs, with balconies at every floor. It is only fire escapes of this type that are of any practical value in case of either fire or panic. Newark, N.J., not long ago had a factory fire where 26 lives were lost. The result is that the authorities there have enacted a set of regulations that requires a very much more superior type of factory structure.

A factory recently erected under these regulations by the Wolfe Muslin Underwear Company, which has nine floors, is provided with four elevators, four separate stairways, six exits to stairways on each floor, two exits to fire escapes on each floor, and four entrances to elevators on each floor. There is no reason why any manufacturer who finds it necessary to employ a number of individuals at a height of three stories or more should not be enforced to provide it with such adequate means as shall make it reasonably safe.

These things have occurred in other cities, and we here, so far away, do not feel the real horror and sting of such calamities, but why not take heed and profit by these terrible lessons that others had to be taught, or, must we wait until some such catastrophe occurs in our own midst; until we can see with our own eyes the ong rows of charred remains being viewed by thousands of weeping and wailing mothers, brothers, sisters, fathers and friends, trying to identify one of their kin. Must we wait until we have to be impressed by a public funeral of forty or fifty unidentified bodies to be thrown together in one common pit marked by a stone common to all. It seems beyond all reasonable conception that it takes such horrible lessons to awaken the public and its servants to the full realization of their stern responsibilities.

¶ *Building Returns for May—Month experiences brisk forward movement—Thirty-two centres invest $18,747,894 as against $11,324,898 in previous year.*

IF BUILDING RETURNS for May can be taken as an indication, activity in the building line throughout the country is veritably rampant. At no previous time, considering the large list of cities reporting, have the gains been greater in number, or the individual increases of more striking magnitude. Comparative figures submitted to CONSTRUCTION show an average gain for thirty-two centres of 65 per cent., the permits totalling $18,747,894, as against $11,324,898 in the same period of last year. But seven decreases in all are noted, and only five of these can really be considered as being on the reverse side. Montreal, for instance, where the permits amounted to $1,703,120, the loss was less than 1 per cent., while in the case of Stratford, the comparative totals represent so little as to indicate practically nothing one way or the other. Saskatoon, with a decrease of 43 per cent., suffered the greatest loss from an investment standpoint. Fort William is next in this respect with a decline of 55 per cent. Ottawa, with a falling off of 17 per cent., is third, and Port Arthur and Peterboro' follow with decreases of 67 and 46 per cent. in order named. Saskatoon, as it was, registered a total of $489,000, while Ottawa's amount was in excess of the half million mark.

Calgary's heavy investment, amounting to $3,616,-812, shows a remarkable state of development, as does also Toronto's total of $2,643,755 and Vancouver's amount of $2,488,050. In fact all sections with the seven exceptions previously noted, experienced a most marked advance. Winnipeg, where new work amounting to $2,229,480 was undertaken, reversed the less favorable condition of the previous month. Brandon, in the same Province, with an investment of over half a million, is 166 per cent. ahead. In Saskatchewan, Regina, with a total of $1,036,190, jumped forward 160 per cent.; Prince Albert advanced 740 per cent., and Moose Jaw annexed a gain of 44 per cent. Other Western gains are Edmonton, 118 per cent.; Medicine Hat, 89 per cent., and Victoria, 11 per cent. North Vancouver, while not submitting comparative figures, indicates by her amount of $52,068 a very wholesome condition.

A notable feature of the month was the marked reversal of conditions in the Eastern Maritime district. Halifax, Sydney and St. John, which were behind the two previous months, are all on the "upside," the former noting an advance of 207 per cent. and the latter two places gains of 378 and 30 per cent. in order named.

In Quebec, aside from Montreal's total and the figures of Westmount, which gives a gain of 23 per cent., statistics are unavailable, although it is definitely known that Quebec City and a number of the smaller municipalities undertook a substantial amount of work. This also is true of other unheard-from centres in the various other Provinces, many of which are establishing new records with each succeeding month.

As to the immediate outlook, it might be said that at no time in the past has there been so much important work in prospect. June, July and August should record tremendously large totals, although labor troubles which threaten at the present time might interfere to some extent with operations in one or two important centres.

	Permits for May, 1911.	Permits for May, 1910.	Increase, per cent.	Decrease, per cent.
Berlin, Ont. ...	$55,200	......	......	......
Brandon, Man.	621,428	$232,990	166.71	......
Brantford, Ont. ...	60,823	25 805	136.09	......
Calgary, Alta	3,616,812	525,066	588.83	......
Edmonton, Alta. ...	504,425	231,055	118.31	......
Fort William, Ont..	116,375	259,230	......	55.11
Guelph, Ont.	244,770	18,600	1215.97	......
Halifax, N.S.	111,450	36,200	207.87	......
Hamilton, Ont.	539,005	202,625	166.01	......
Kingston, Ont.	20,470	19,535	4.78	......
London, Ont.	195,470	87,165	124.25	.....
Medicine Hat, Alta.	77,775	40,949	89.93	......
Montreal, Que. ..	1,703,140	1,709,200	......	.36
Moose Jaw, Sask.	298,950	207,000	44.4-	......
Nelson, B.C.	16,945	......	......	......
Ottawa, Ont.	538,445	651,150	....	17.31
Peterboro'. Ont.	67,108	124,845	......	46.25
Port Arthur, Ont.	42,550	131,975	...	67.76
Prince Albert, Sask.	93,350	11,100	740 99	...
Regina, Sask.	1,036,190	397,040	160.98	......
Saskatoon, Sask.	489,000	859,350	......	43 10
Stratford, Ont	2,100	4,500	.....	53 34
St. John, N.B.	40,600	31,000	30 97	....
St Thomas, Ont. ..	34,315	33,550	2.28	......
Sydney, N.S.	124,120	25,928	378.71	..
Toronto, Ont.	2,643,755	1,870,350	41.35	....
Vancouver, B.C ...	2,488,050	941,570	164.24	.
N. Vancouver, B.C..	52,068	......	......	......
Victoria, B.C.	287,335	257,290	11.6,	....
Windsor, Ont.	69,790	21,580	223.40	......
Winnipeg, Man.	2,229,480	2,104,450	5.94	.....
Westmount, Que. ..	326,500	263,800	23.76	......
	$18,747,894	$11,324,898	65.54	......

PROPOSED FEDERAL AND MUNICIPAL SCHEME FOR TORONTO

A few reasons advanced by John M. Lyle, Consulting Architect of the Civic Improvement Commission, why the projected improvement should be adopted.

TORONTO as at present planned, has neither a civic centre or proper arteries for travel. She is like a large overgrown boy, and like the boy she is just commencing to feel her growing pains. Many of us who are familiar with the great continental cities are praying that the city fathers will take a leaf out of their books, and re-plan the city before it is too late. The Civic Improvement Committee is now attempting to devise ways and means to bring about this result. The Plan Committee, a sub-committee of the General Committee, is actively engaged in not only drawing up a scheme for the improvement of certain sections of the city proper, but is also at work on the general plan of comprising the territory within a radius of eight miles from the City Hall. The Committee, with the approval of the Board of Control, deemed it wise that certain studies of the older portions of the city should be made public from time to time. The above mentioned scheme is the first of these to be placed before the public.

It must be self evident to anyone who cares to take the time to study the map of lower central Toronto, that the present layout is very bad. The streets are narrow, and many of them are what may be termed blind streets—not in the real sense streets at all. There is not a through street of any length from Spadina Avenue to Yonge Street. The whole intervening territory is honeycombed with blind arteries. It is true, that there is sometimes an outlet for traffic along a more or less direct line, but such is not always the case. The result of this planning has been to force the travel along three principal streets —Yonge Street, Queen Street and King Street.

Yonge Street by reason of its great length, and also because of the fact that it forms the artery of traffic connecting with the numerous towns directly to the north of Toronto, has become the principal business thoroughfare; and in that it is a very narrow street, the congestion of late has become most acute. If present conditions are not remedied, in twenty-five years' time the situation will become intolerable. In order to relieve this congestion it has been suggested that additional through streets should be developed. Diagonal boulevards should be cut through in a northeasterly direction and also in a northwesterly direction, and Terauley Street should be widened and cut through to link up with Davenport Road, so as to give a direct line of travel to West Toronto.

Perhaps the average citizen does not fully realize the great injury to business, the great loss of time and economic waste, that is occasioned by a congested district. If there was any possible way for computing the lost time due to congestion in street traffic the figures would surely be startling.

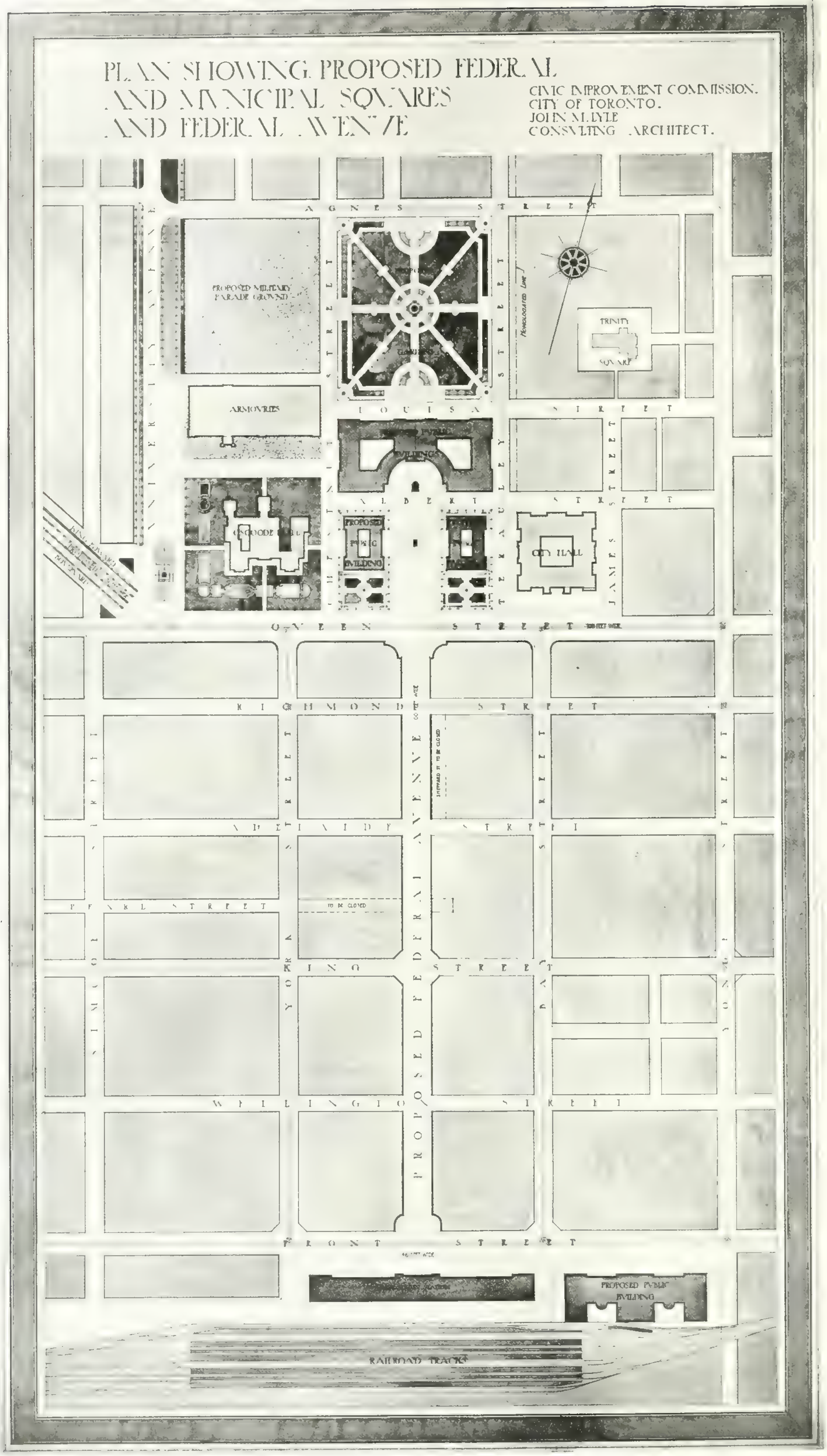
Directly interested in the relieving of congested pedestrian traffic is the shop keeper. With inadequate sidewalk accommodation, there will be no room for the prospective purchaser to stand and admire the tempting goods displayed. Everyone will be carried along with the rush the throng. Perhaps this is one reason, even to-day, why Toronto shop keepers, with but very few exceptions, dress their windows so badly. As it is, the country store idea prevails in the case of niney-nine per cent. The practice of putting as much and as many kinds of articles as can be crowded into a limited space evidently being the popular conception of an attractive display.

On examining the present plan of lower Toronto, we find that instead of having numerous wide arteries in the lower section where the great bulk of the business is transacted, we have comparatively few arteries, and many long blocks. For instance, the block between Yonge and Bay Streets is a long one and the block between Bay and York Streets a longer one still. With increasing office buildings of importance, an enormously heavy increase in foot traffic is bound to come. It would therefore seem very necessary that new business streets should be opened up in this section. A fine new business street cut through from Front to Queen Streets, having the new Union Station at one end and the proposed Federal and Municipal Squares at the other, is one of the suggestions embodied in the Civic Improvement Committee plan—to give Toronto a civic centre and to relieve the aforementioned congestion. The interior of the blocks affected by the cutting of the proposed avenue constitute one or subsidiary buildings of little or no value. The new frontages given by the avenue as planned would be immensely valuable: and the city having the right to buy 200 feet in addition to the expropriated line, could then re-sell to advantage. The loss of present frontage in cutting through this avenue would be 1295 feet; while new frontage would be 3970 feet, thus netting a gain of 2675 feet.

The buildings affected by the proposed changes are, with but very few exceptions, of the poorest possible character: especially is this true of the properties north of King Street. If action is not taken at an early date, the land affected will increase in value to such an extent, that the cost will be almost prohibitive. It is estimated that by the re-sale of lands taken in excess of the expropriated line, and the increased assessment due to the greatly enhanced value of the lands on the proposed new avenue, the city would be enabled to finance this portion of the scheme with practically no cost to the tax payers. If the properties in St. Johns Ward were expropriated, they ought to carry themselves until the city and Governments are ready to erect their new buildings.

Reasons for Immediate Action.

Plans are now being prepared for the new Union Station. It is also probable that the Dominion Government will erect buildings such as the new Customs House, Post Office, Receiver General's Offices


PLAN SHOWING PROPOSED FEDERAL
AND MUNICIPAL SQUARES
AND FEDERAL AVENUE
CIVIC IMPROVEMENT COMMISSION.
CITY OF TORONTO.
JOHN M. LYLE
CONSULTING ARCHITECT.
AGNES STREET
PROPOSED MILITARY PARADE GROUND
TRINITY SQUARE
ARMOURIES
LOUISA STREET
ALBERT STREET
OSGOODE HALL
PROPOSED PUBLIC BUILDING
CITY HALL
JAMES STREET
QUEEN STREET
RICHMOND STREET
ADELAIDE STREET
PEARL STREET
KING STREET
WELLINGTON STREET
FRONT STREET
YORK STREET
SIMCOE STREET
PROPOSED FEDERAL AVENUE
PROPOSED PUBLIC BUILDING
RAILROAD TRACKS

and numerous other buildings in the near future. The City Hall is crowded to the attic and more accommodation for the different departments will have to be provided. The Provincial Government should certainly aid in the beautification of the Capital City. There are many offices of the local government scattered throughout the city. These could possibly be grouped in a building or buildings conveniently situated between the Parliament Buildings, the City Hall and the business district; for example, the Temiskaming and Northern Ontario Railway Commission, the Hydro-Electric Power Commission, the Department of Education.

There are many departments of the Civic Administration which will need accommodation in the near future, and which could not be better placed than between Osgoode Hall and the City Hall; for instance, The Registry Office, the Law Courts. Both of these will have to find accommodation outside the City Hall.

The military authorities are also sadly in need of a parade ground. If the land immediately north of the Armories were procured for city purposes, it could be used for a playground in the day time.

In conclusion, it may be said that this scheme is not only aesthetic in character but practical to a high degree. If carried out as planned, it will give a splendid setting for our public buildings; give open spaces and plaza for public demonstrations; eliminate slum conditions now existing in St. Johns Ward; relieve the downtown congestion; give a fine new business street to the city—in short, a head, a heart, and a pulse to Toronto.

Description of Proposed Scheme.

According to the projected scheme, it is proposed to lay out a civic centre between the blocks bounded by Queen Street on the south, Agnes Street on the north, University Avenue on the west, and Terauley Street on the east; the City Hall, Osgoode Hall and the Armories to form part of this scheme. An avenue 100 feet wide is to be cut through from Queen Street to Front Street, thus affording direct access from the new Union Station to Queen Street and thence to University Avenue, and Terauley Streets. Directly at the head of this new avenue would be grouped the proposed public buildings both governmental and civic. Two of these buildings are shown flanking a fine plaza 200 feet wide, at the head of which a more important building is shown on the main axis of the proposed new avenue. The idea of this arrangement being that space for great public demonstations would be afforded, and that the buildings facing this plaza could be seen to advantage. The incoming traveller's first impression of Toronto would be materially enhanced by the splendid vista opening up before him. It is proposed that this Federal Avenue should be preserved for vehicular and pedestrian traffic only, and that no street car lines should be allowed.

The buildings shown grouped about the plaza have been placed on a line with Osgoode Hall. Queen Street is shown widened to a width of 108 feet; Terauley Street is shown widened to a width of 86 feet. Directly behind the Armories, it is proposed to form a military parade ground on the ground on the land bounded by University Avenue, Agnes Street, Chestnut Street and Louisa Street, and on a line eastward with this parade ground is shown an open square or garden. The former could be used as a playground when not in use by the militia; the latter as a breathing spot for the worker, and as a setting to the public buildings directly in front.

The commencement of the proposed King Edward Boulevard is shown at the intersection of Queen, Simcoe Streets and University Avenue. This Boulevard is to be 132 feet wide and is to have four street car tracks, two for local and two for rapid transit service. The new Union Station is shown set back 66 feet from the present line of Front Street, giving a width of 146 feet in front of the station. The proposed public building shown to the east of the station is set back on the same line, and on its eastern and western sides is set back 40 feet.

In the property affected by these proposed changes there are only two buildings of importance—namely, the Manning Building on Queen Street, and the Queen's Hotel on Front Street. Ninety per cent. of the buildings affected are of a very ordinary character, and in the Ward District, and immediately below the Ward ninety-nine per cent. are of the cheapest possible description.

The time would seem to be opportune to make this great improvement, which would give to Toronto a civic centre worthy of its position as one of the leading cities in Canada.

THE UNATTRACTIVENESS of most suburban development lies, first in the fact that the land is hopelessly sub-divided into uniform and monotonous units admitting of little or no variety, excepting by the expenditure of money which the investment does not justify; hence the attempt to attain variety by stunts and detail, much of which is tawdry. Secondly, the designing of these houses, which has been mostly in the hands of speculators and promoters, has not usually been entrusted to architects of skill, and has not been developed with the idea of elevating and developing public taste, but rather of catering to passing fancies. Assuming four lots, each fifty feet wide, if, instead of building, as usual, four houses with a narrow frontage and extending back into the lot—all in a row, with a small garden in front, a contracted space separating them, and ugly yards in the back—it were planned to place the two end houses with narrow fronts, and extending back, and the two middle houses set back and designed with broad fronts, thus forming a court, a composition would immediately be possible, and a better distribution of light, air and grounds—whether for ornamental or merely back-yard purposes—would immediately result without any interference of property lines or of light easements.—John M. Carrere in Country Life in America.

Victoria College Library, Toronto. View from the North Sproatt and Rolph, Architects.

Victoria College Library, Toronto. View from the West. Sproatt and Rolph, Architects.

THE NEW VICTORIA COLLEGE LIBRARY BUILDING, TORONTO

An imposing stone structure, in which line, mass and detail are effectively combined. To control architectural scheme of future buildings.

IF ONE IS TO JUDGE the final results of the architectural scheme which is now being worked out for Victoria College, Toronto, from the new Library Building recently completed, the Board of Regents has indeed a magnificent system of structures in contemplation. Not only is this building unrivalled in architectural character by any structure in the present University group, but as an example of Collegiate Gothic it is possibly unsurpassed by anything that has yet been carried out either in this country or the United States.

Viewed from either the north or west boundary of the open site on which it stands, the building presents a scheme in which admirable proportions, harmony of detail and texture of material, all combined to give a sum total effect that is strikingly impressive. The exterior is carried out in Georgetown gray, Credit Valley ashlar with Indiana limestone trimmings, the tracery of the windows being exquisitely executed, and the buttresses of the large hall of proportions that are beautiful in scale with the general design. An interesting feature of the decorative work is a series of small individual carved figures terminating the extrados molding of all arch openings. Two of these figures are to be seen in the accompanying view of the north entrance bay, as can also the detail of the heavy oak doors leading into the interior. The entrance bays, which form the dominating feature of the scheme, are similar in motif; the west bay or principal entrance, facing North Drive, having a large statue of Queen Victoria set in a niche dividing the machicolated paraet above the upper window. This statue, which is a most masterly piece of sculpturing, is carved out of Bath Stone, and was designed and executed by the Brommsgrove Guild of Worcestershire, England.

On entering the building, the scheme which unfolds itself is so strikingly simple in its general lines as to cause one to marvel at the degree of architectural excellence that it is possible to attain by mere proportions and carefully appointed detail. Few interiors can be found so decidedly unadorned and yet so decidedly admirable in treatment. It is perhaps the quiet and restful atmosphere and dignity of feeling of the place, so essential in a building of this character, that impresses one the most. The rooms are arranged on either side of a long corridor which forms an open space or rotunda at the north end. Opening from this space to the west is the large hall or men's reading room, a vast interior overlooked by the delivery desk in the rotunda, which is also arranged to control the women's reading room, cataloguing room, stack room and north entrance and staircase. The walls are finished in stucco, and all woodwork, with

Rotunda, Victoria College Library, Toronto. Looking Towards North Stairway and Entrance. The Delivery Desk to the Right is in Fumed Quartered Oak with Linen Fold Panels. Sproatt and Rolph, Architects.

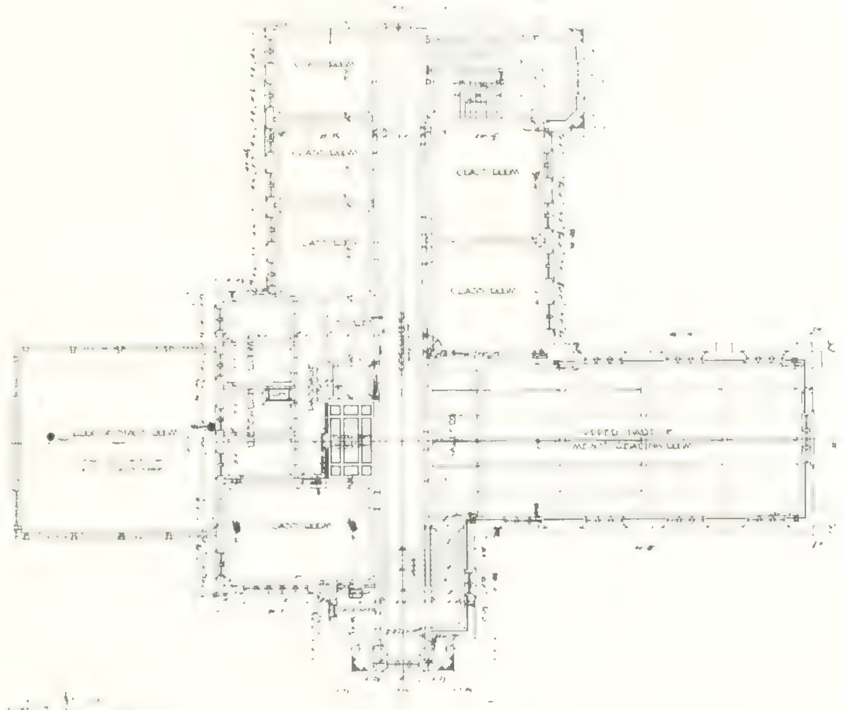
Detail of North Entrance and Doorway, Victoria College Library, Toronto. Sproatt and Rolph, Architects.

Detail of West Entrance Bay, South Wing, Victoria College Library, Toronto. Sproatt and Rolph, Architects.

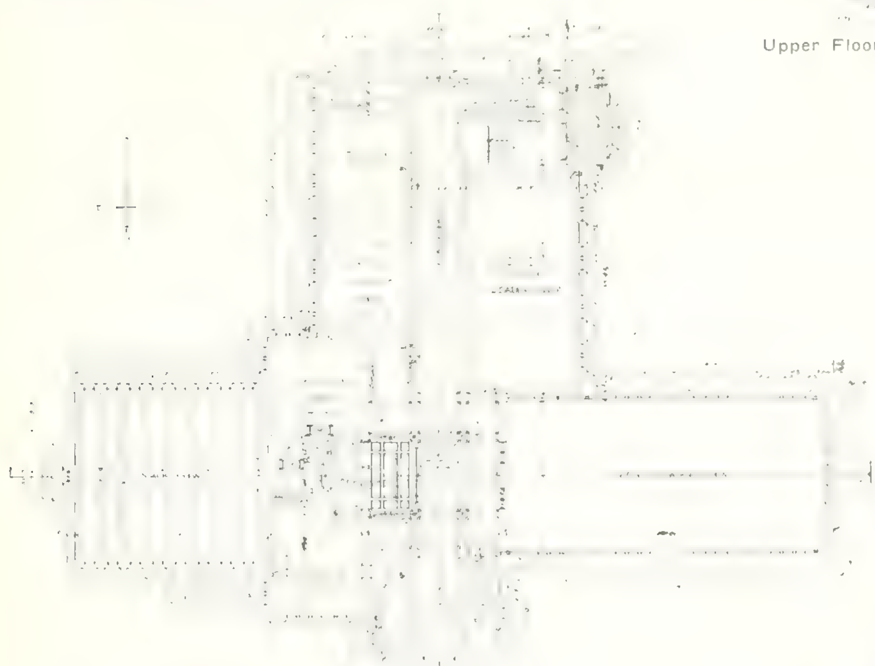
the exception of the ceiling in the large hall, is of brown fumed quarter cut oak; the base of the walls being of marble throughout the ground floor, where the trim is of stone.

In the men's reading room, which is 28 x 80 feet, the character of the scheme depends entirely upon the general proportions, window tracery and ceiling and trusses· the latter being carried out in Georgia Pine with a brown solignum finish. Extending across the east wall over the doorway is a balcony which is entered from the upper corridor. This balcony, as well as the pilasters and columns of the main corridor, and the door frames throughout, is of Indiana limestone.

The stair-cases are situated adjoining both entrances. These are constructed of sawn Missisquoi marble of a grayish white texture, the individual steps being of one solid piece 7 in. x 13 in.



Upper Floor Plan, Victoria College Library, Toronto.



Ground Floor Plan, Victoria College Library, Toronto.

In every particular, the building has been most thoughtfully considered, the doors being treated to be in spirit with the general feeling, while the table and chairs, which are in oak stained to correspond with the woodwork, were all made from designs furnished by the architects. An interesting bit of wood-carving is seen in the counter or delivery desk, which is of fumed quarter oak with linen fold panels.

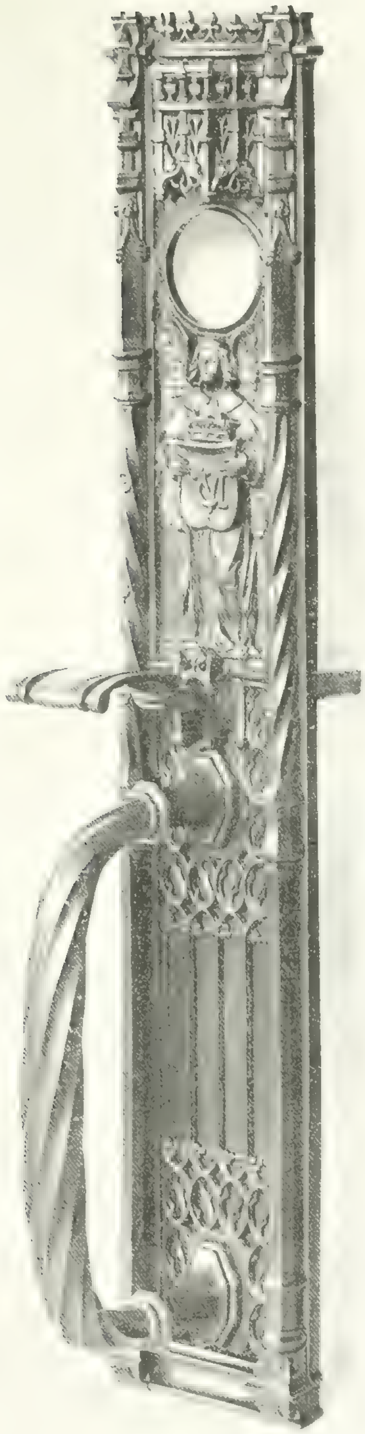
The librarian's room, which has an interesting stone fireplace in Gothic design, is placed north of the delivery desk· while at the south end of the corridor, on the same side, is a good sized magazine room and the faculty room. The latter interiors, like the main reading rooms, have wooden ceilings.

On the upper floor there are two large seminary rooms and a number of small rooms, each furnished with one chair and table for research work, where students can have their books sent up from the stack room and study without interference. The stack room, which has a capacity of 64,000 volumes, is finished with the Snead System of shelves, and has

Basement Floor Plan, Victoria College Library, Toronto.

View Towards West Window. Men's Reading Room. Victoria College Library, Toronto, Showing the Roof Scheme and Wall Treatment. Sproatt and Rolph, Architects.

Men's Reading Room. Victoria College Library. Looking Towards the Rotunda and Delivery Desk. The Balcony, with its Supporting Columns, is Executed Entirely in Natural Stone. Sproatt and Rolph, Architects.



Detail of Door Plate, Victoria College Library, Toronto. Designed and Executed in Bronze Gun Metal by the Brommsgrove Guild, Worcester, England. This Type of Door Plate is to be Adopted for the Exterior Doors Throughout.

lighted from both above and below by electricity. The windows of this room are equipped with Hope frame and sash made of steel and filled in with steel and glass doors and veilings, the stacks being English glazing.

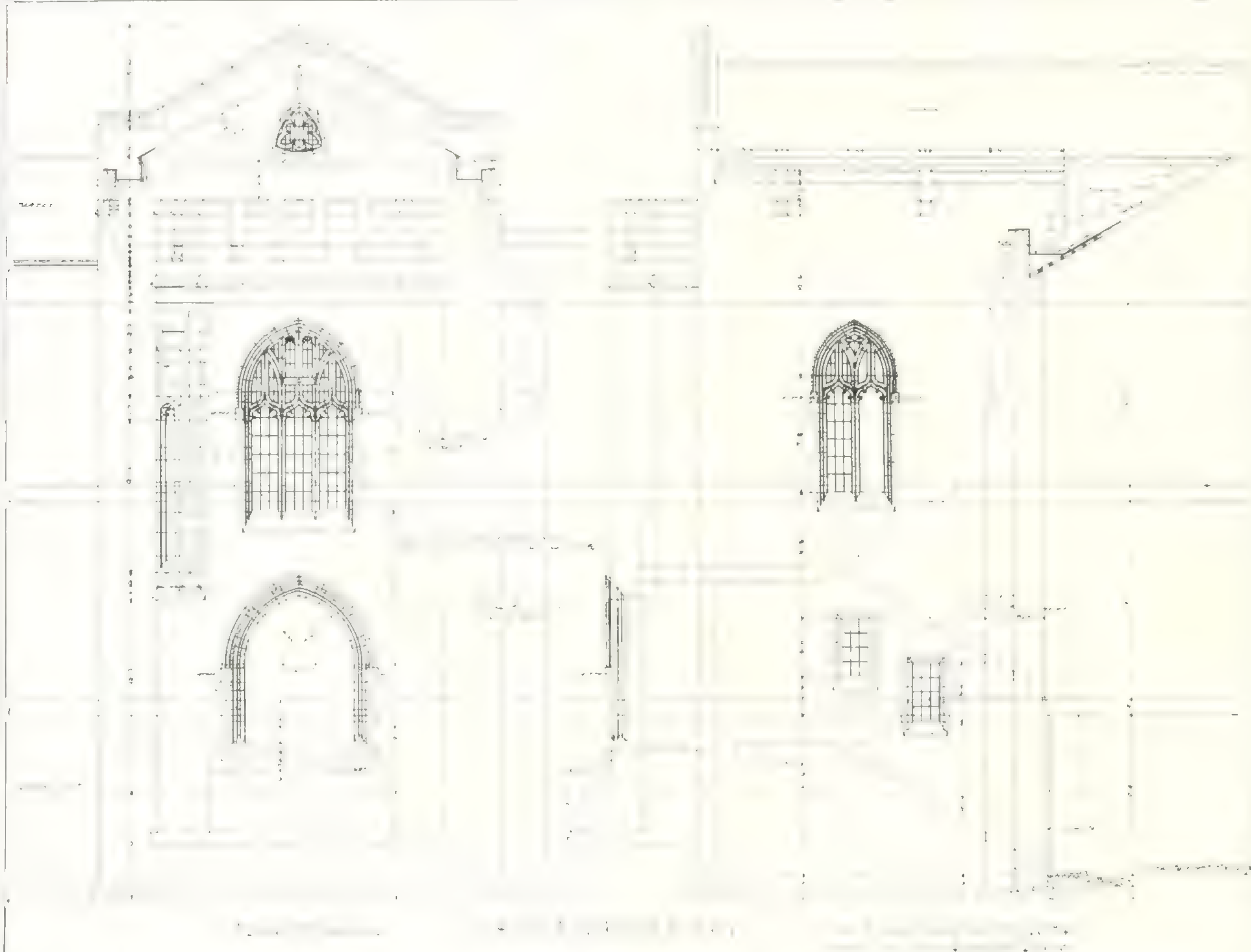
In every other case, the windows throughout, both inside and out, are of stone, there being no woodwork used in any of the openings.

The men's and women's cloak rooms and lavatories are in the basement, which is approached by the main stairs at the north and south end. This part of the building also contains a book bureau and receiving room, as well as caretaker's quarters, attendant's room, boiler pit, a large storage and similar offices.

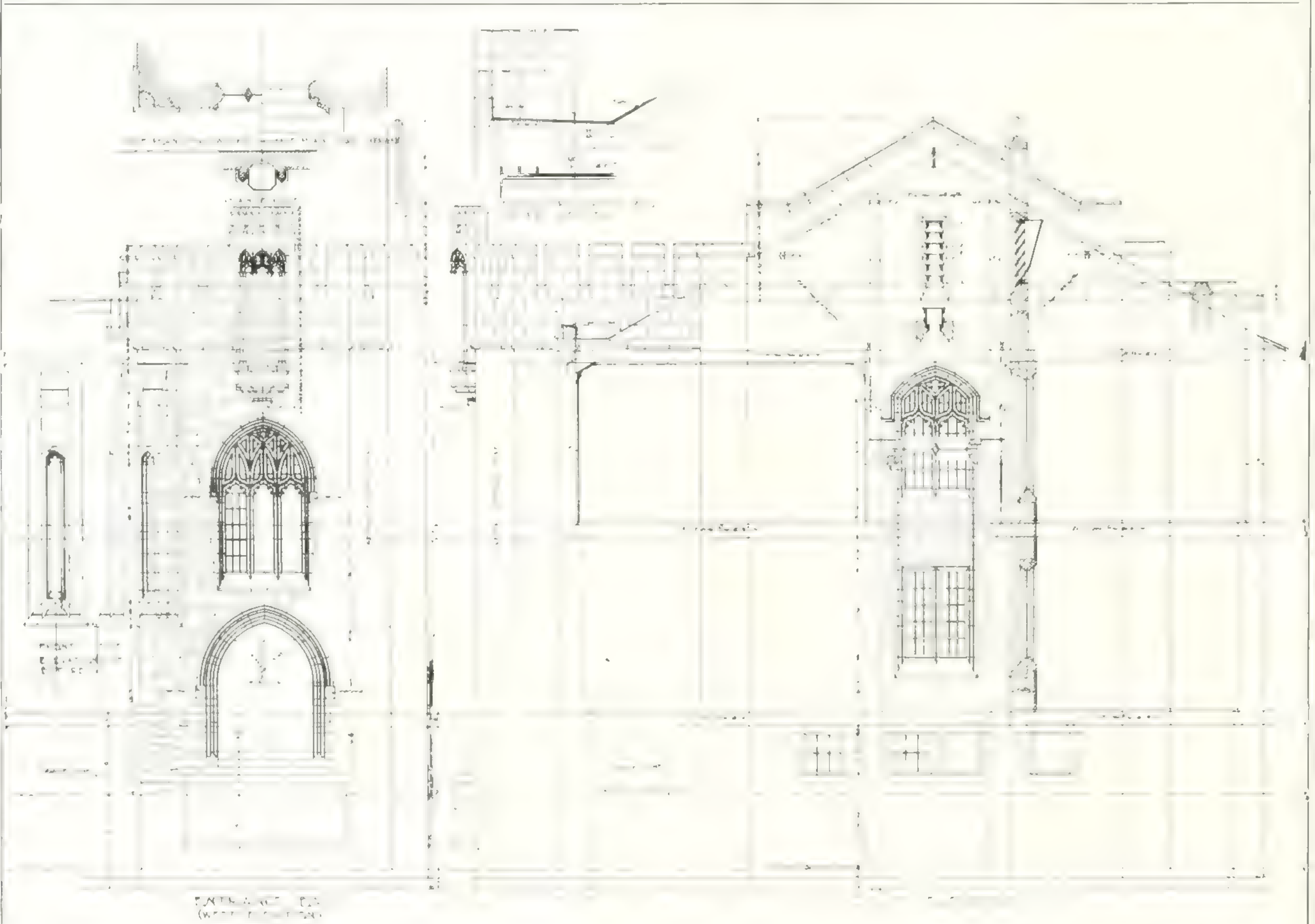
In planning the structure, the architects have given careful thought to both present requirements and future needs. The stack room can be extended indefinitely along Charles Street, and additional accommodations for the students can be provided by extending the building southward on North Drive. Such additions can be carried out as a natural development of the plan and without sacrifice in any way to the features of the architectural scheme adopted.

Taken in its entirety, the building, either in architectural character or construction, leaves but little room for improvement. The reading rooms are situ-

Statue Over West Entrance, Victoria College L[illegible], T[illegible]. Sproatt and Ralph, Architects.

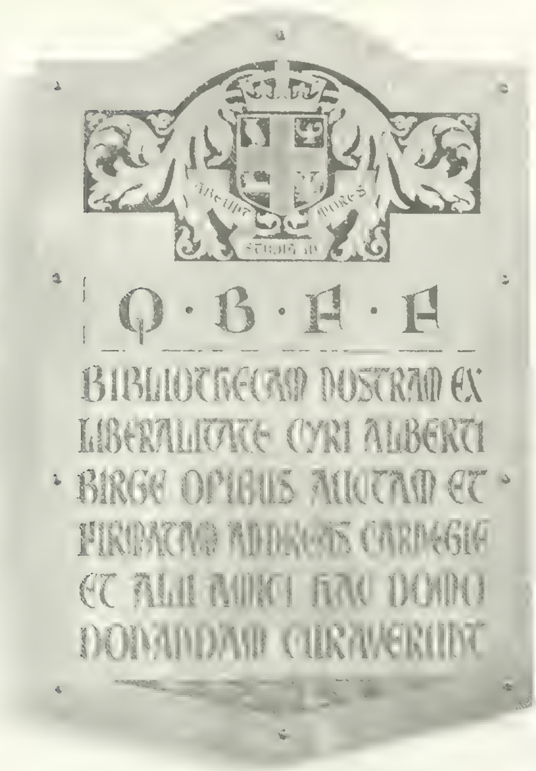


Detail of Elevations and Section, North Entrance Bay, Victoria College Library, Toronto. Sproatt and Rolph, Architects.



Detail of West Entrance Bay and South Elevation, Victoria College Library, Toronto. Sproatt and Rolph, Architects.

ated so as to assure perfect quiet and freedom from disturbance from students changing books and from messengers or casual visitors; the stairs, located near the entrances, being placed to minimize as far as possible the traffic along the corridor between the delivery desk and main reading rooms. But few details as regards the architectural scheme still remain to be carried out, one of which is the lighting fixtures which are being made from special designs, while another is the permanent door plates and



Brass Wall Plate in Rotunda, Victoria College Library, Toronto. Sproatt and Rolph, Architects.

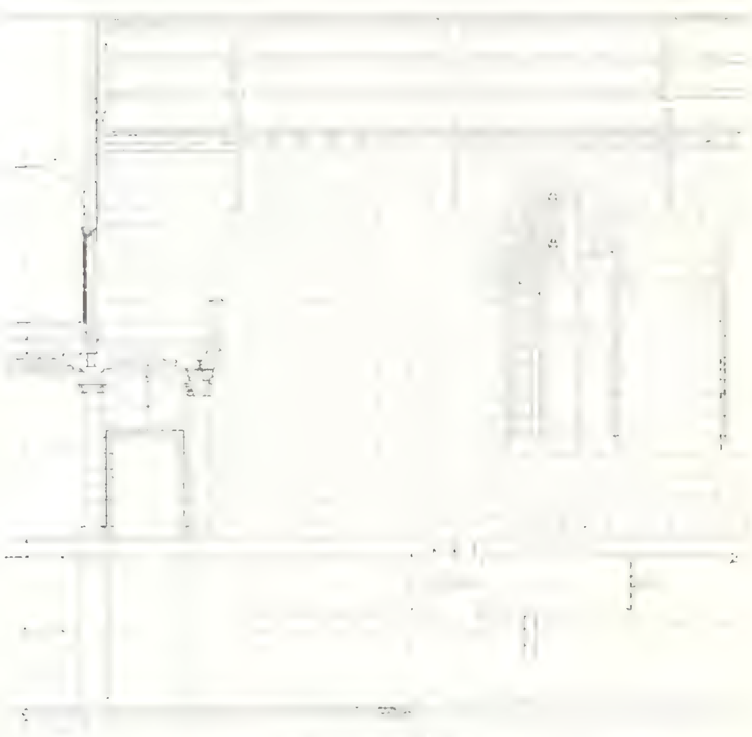
latches to be adopted for all exterior entrances. These door plates, a photographic detail of which is shown in an accompanying view, are a most beautiful example of the metal workers' art. They are made of bronze gun metal, and were designed and executed by the Bromsgrove Guild of Worcestershire, England.

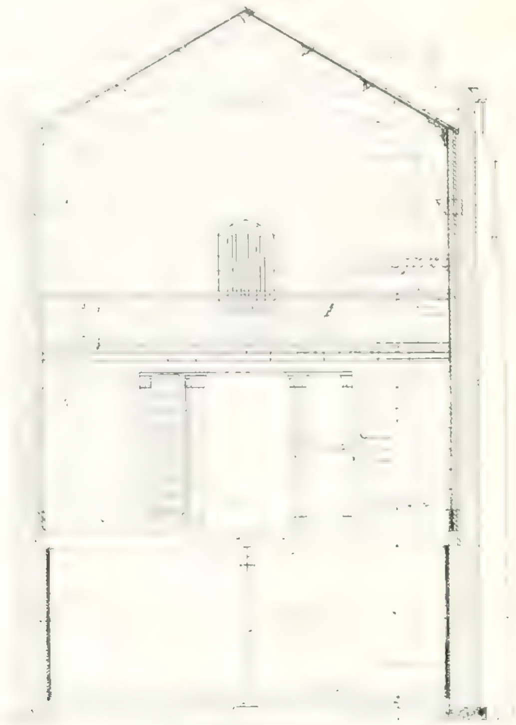
As regards the construction of the building, possibly its best recommendation in this respect is the statement of the underwriters, to the effect that it is one of the most satisfactory buildings of its kind that has yet been brought to their attention.

The architects of the building were Messrs. Sproatt & Rolph Toronto, and the contracting firms identified with its erection were as follows: Masonry, Page & Co.; carpentry, J. C. Scott; marble work and plaster, Hoidge Marble Co.; slate roofing, A. B. Ormsby, Ltd.; plumbing, heating and electric wiring, W. J. McGuire, Ltd.; painting, the Faircloth Art Glass and Decorating Co., Ltd.; hardware, steel windows and glazing, Aikenhead Hardware Co.; stack room equipment, Snead Co., New York.

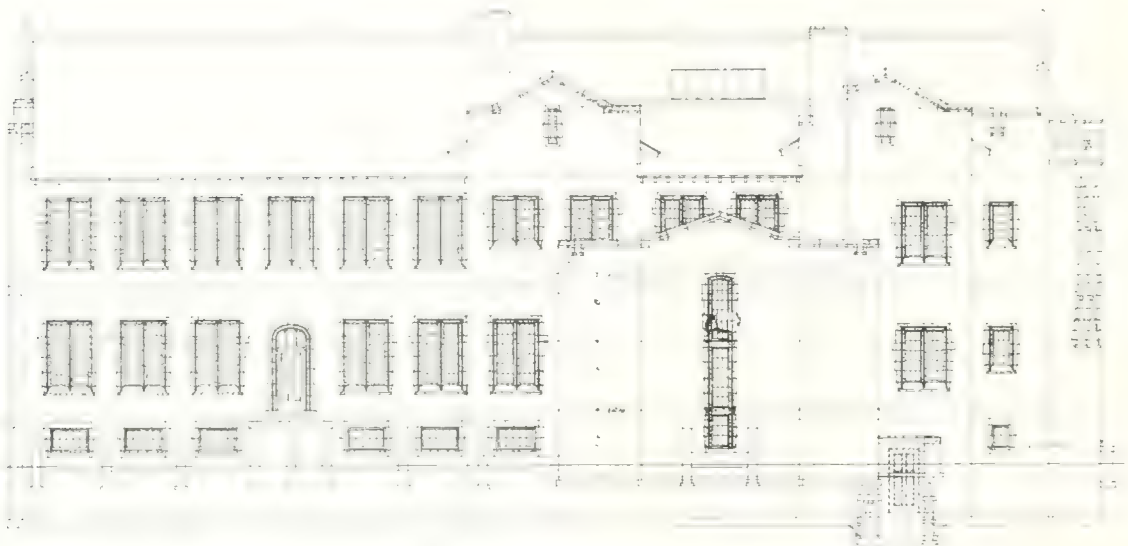
Typical Interior Door with Cut Stone Frame, Victoria College Library, Toronto. Sproatt and Rolph, Architects.

Detail of Stone Fireplace, Librarian's Office, Victoria College Library, Toronto. Sproatt and Rolph, Architects.

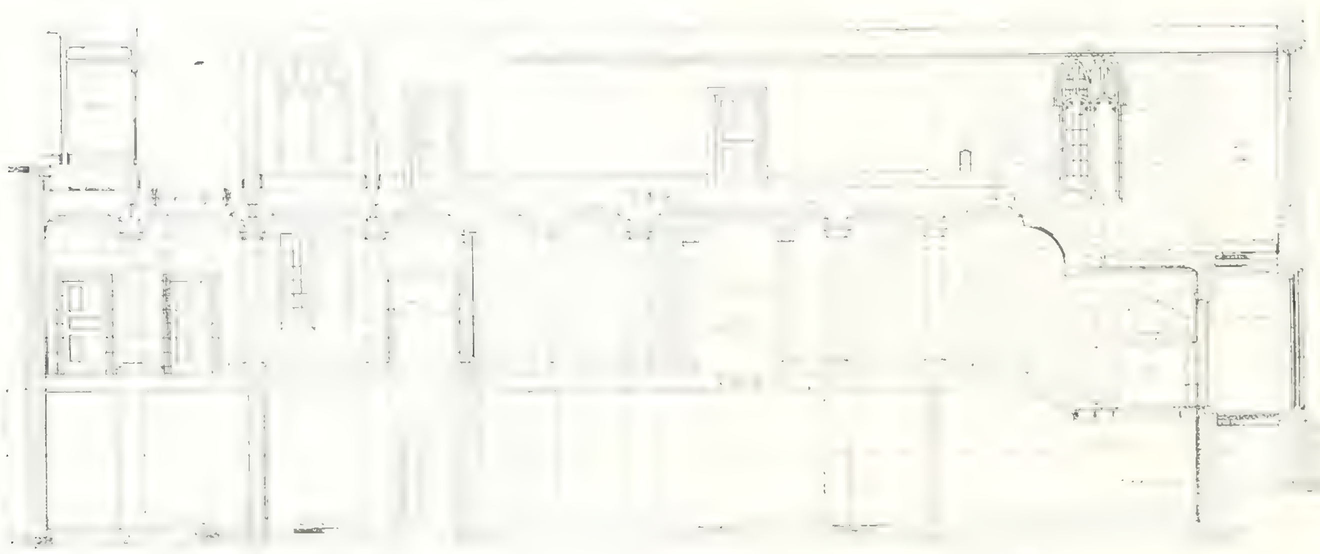




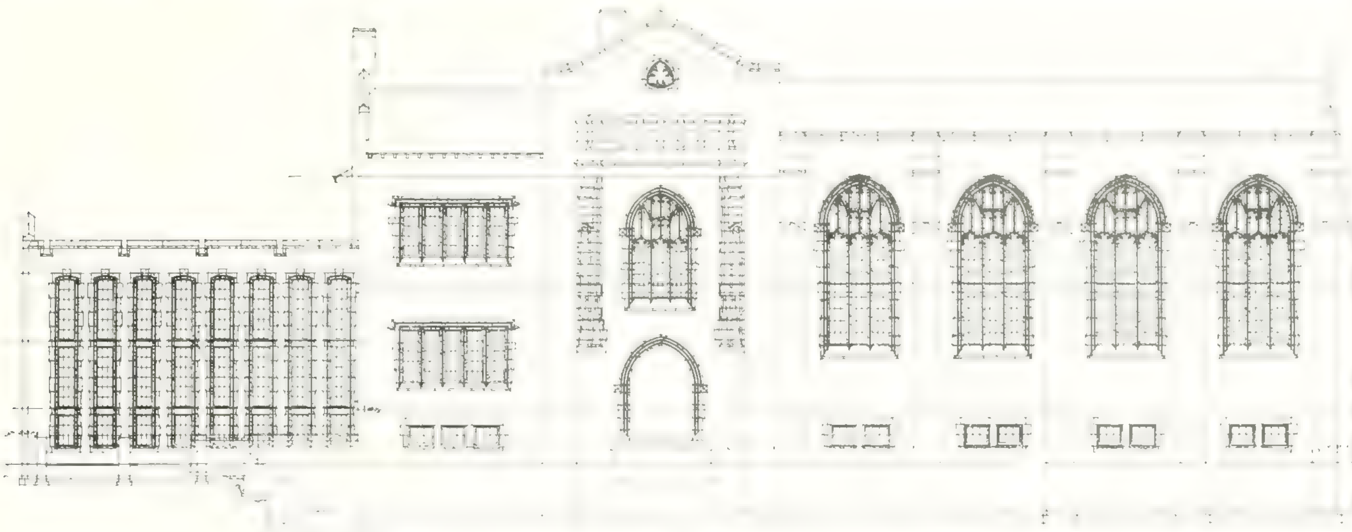
Detail of Sections, Victoria College Library, Toronto. Sproatt and Rolph, Architects.



East Elevation, Victoria College Library, Toronto. Sproatt and Rolph, Architects.

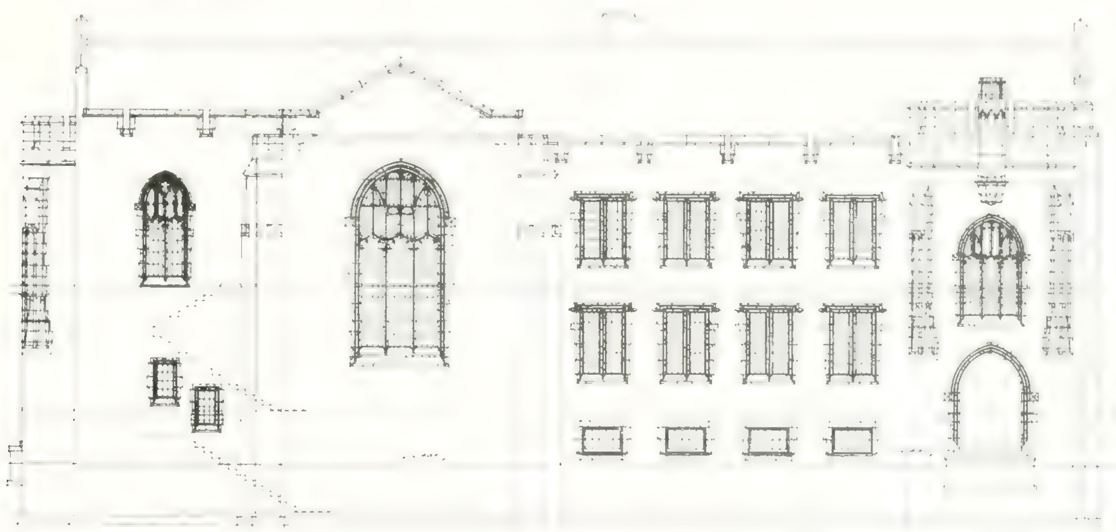


Detail of Sections, Victoria College Library, Toronto. Sproatt and Rolph, Architects.

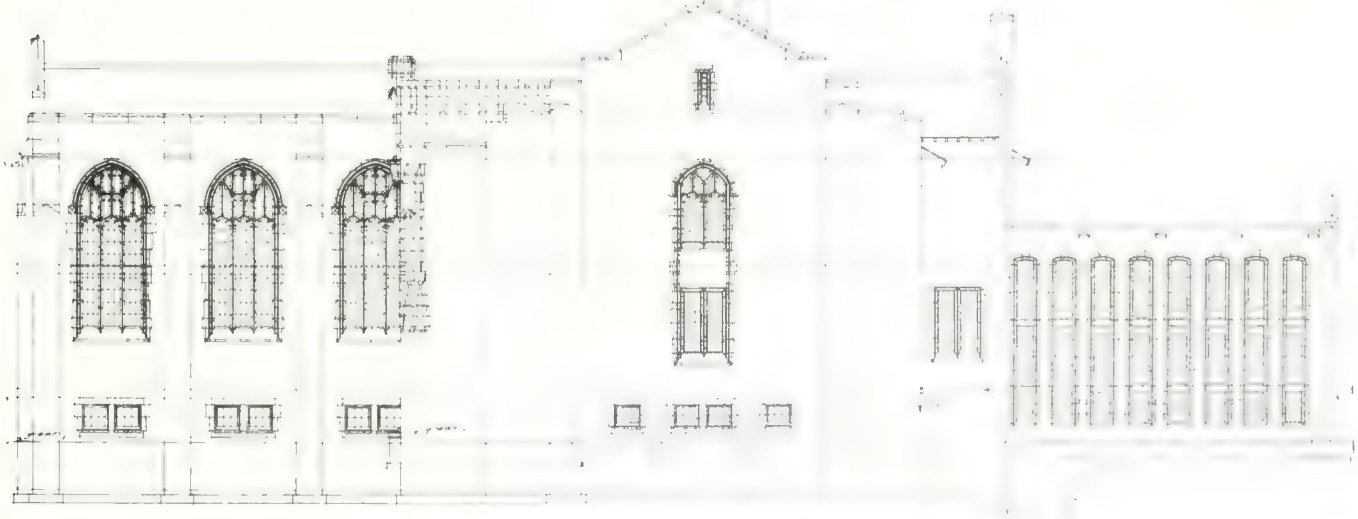


North Elevation, Victoria College Library, Toronto. Sproatt and Rolph, Architects.

SUPPLEMENTARY ESTIMATES recently brought down in the Dominion Parliament, contain a grant of $35,000 for a survey of the proposed tunnel under the Strait of Northumberland to connect Prince Edward Island with New Brunswick. The distance between Cape Traverse on this island and Cape Tormentine in New Brunswick, the nearest approach on the mainland, is about 7 miles and the maximum depth of the strait between these two points is 90 feet. An improvement such as is contemplated would infinitely better conditions in Prince Edward Island, in that it would establish an all-rail route to the mainland, and thereby do away with the isolation which more or less obtains at the present time owing to uncertain and irregular means of communication, during certain periods of the winter months. The cost of the tunnel is estimated at $15,000,000.



West Elevation, Victoria College Library, Toronto. Sproatt and Rolph, Architects.



South Elevation, Victoria College Library, Toronto. Sproatt and Rolph, Architects.

THE CONSTRUCTION AND EQUIPMENT OF THE MODERN GARAGE

Economy is found in the selection of materials and labor saving features such as are the best and most approved.

THE ONE THING to be considered above all others in building a garage is practicability. It must be practical in plan, practical in its construction, and practical in the character of its equipment. No matter, says a recent writer, how beautiful it may look—no matter how it may be finished or how many pretty windows it may have if the car to be housed within scrapes the top in passing in or out, or is jammed in the sides, the garage fails to successfully serve its purpose. Any garage, big or little, is built to protect. If it fulfills its mission it must protect from the weather, from thieves and robbers, and as much as possible from fire. Within the last few years a number of marked improvements have been made in buildings of this type. Features are now being introduced which make for every facility and convenience in the handling, overhauling and storage of cars without necessitating any great additional expense on the part of the owner.

An important labor-saving device in the modern garage is the turn-table. Where the floor space is limited, and where there is no chance to back or turn around, this device is practically a necessity. It is also very useful when the machine is being washed or repaired, as any part desired can be turned towards the light. A common form of turn-table consists of a circular platform slightly dished towards the centre and braced on the under side by heavy ribs. It is supported at the centre by heavy ball-bearing and near the edge by a circular ridge on the lower side of the platform. This ridge rests on several small wheels placed with their axles in standards resting on the bottom of the pit. These wheels prevent the platform from tipping when the cars run on to the turn-table and also act as roller bearings when the platform is turning. A less expensive type of turn-table is one built without a pit. In this case the platform comprising it is placed directly on the floor and does not require any bolts or screws. This type of table is compact and complete in itself, and will not tilt and it can be installed at a very little expense as the only thing needed when installed in the finished garage is the concrete approaches, which can be made at a small cost. If the space in the garage is so limited that it is necessary to turn the steering gear three or four times whenever the car is backed out, the price of one of these tables would be saved in the wear and tear on the tires and the steering gear that otherwise would result.

Where a turn-table is omitted, it will be found advantageous to adopt a sloping concrete floor. This type of floor, which is becoming decidedly popular in many small garages, is so graded that a slight push will dislodge the car and send it out of the door. In case of fire this would prove to be a big advantage to the owner, for fires generally break out so quickly that there is no time to crank up, and cars must be gotten out without loss of time. The car is kept from sliding while it rests either by setting the brakes or by placing a small wooden wedge under the wheels. In the modern garage, the lack of space generally requires an arrangement that will permit of all the space being utilized and not wasted. It is wise for anyone contemplating building to be sure that he has enough space for future enlargement. Very often more space is desired, and unless provision is made for extension in the original plan it cannot be obtained without considerable expense. The matter of equipment is also something that must be thoroughly considered. One of the most important features to demand attention in this respect is a storage tank for gasoline. This in the interests of safety should be buried outside of the building and the gasoline pumped through a connecting feed pipe into the automobile as required. In this manner a large quantity can always be kept on hand without unduly endangering the property. It is also necessary to have convenient facilities for cleaning the car. A commendable device which is being adopted quite extensively is a swivel washing apparatus. This swivel hangs from the ceiling and the hose is fastened to it so that one can walk around the car and reach all points with ease. Both in the construction and equipment of buildings of this type economy is found in selecting such materials and features as are the best and most approved, and automobile owners are awakening to the fact that unless the garage is fireproof the investment at the best is an uncertain one.

AN UNUSUALLY LARGE NUMBER of big buildings are at the present time projected in the West. Included among them is a $1,000,000 G.T.R. hotel at Winnipeg, to be known as the "Selkirk," plans for which have recently been approved; and a ten story office building necessitating a like expenditure is to be built by the Confederation Life on Main Street in the same city. The Bank of Quebec has also acquired an important piece of property in Winnipeg on the south side of Portage Ave., immediately opposite the Queen's Hotel, and will erect a modern office building of many stories as soon as the present lease expires. Calgary and Edmonton also have in contemplation a number of important buildings, while a quarter million dollar addition is shortly to be built to the Empress Hotel, at Victoria, by the C.P.R.

CONSIDERABLE INTEREST is being taken by aerial navigators, according to a report from France, in a new substance known as Liege metal, which gives promise of being adopted extensively in the construction of both "heavier than air" and "lighter than air" crafts. It is said to be 40 per cent. lighter than aluminum and has a density of 1.762. Its surface is grayish-white, reflecting rays analogous to those of poorly worked aluminum.

CONSTRUCTION

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

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

Vol. 4 Toronto, July, 1911 No. 8

CURRENT TOPICS

A NUMBER OF NEEDED CHANGES in the building by-law of Owen Sound are at present being considered. Two special meetings dealing with the proposed revision has already been held by the city council, and it is expected that a much improved code will shortly be adopted.

* * *

A CONTRACT HAS BEEN LET for the Culwulla Chambers, a 13 storey structure to be erected at Sydney, Australia. The exterior construction is to be red open-kiln bricks with polished trachyte piers and freestone dressings. When completed it will be the tallest office building within the Commonwealth.

* * *

VISITORS TO THE ORIENT for many years have been impressed with the beautiful tonal qualities of the large bells of native make, used in the monastries and temples throughout China and Japan. In no country perhaps can one listen to the detonation of bells more exquisitely soft and smooth. This is due to the superior quality of materials used in their manufacture, and also to the absence of iron clappers. The bells are never swung, being always suspended in a fixed frame, and the sound is produced by striking them on the outer edge with a wooden mallet. This brings forth tones that are a marvel of softness and delightfully melodious.

PROPOSED AMENDMENTS to the building by-law of Calgary, shortly to be submitted to the council for ratification, provide for the extension of the business area or fire limits of the city in order to insure a better standard of construction in general. The proposed changes, if adopted, will make it necessary for owners building over six stories, to erect their buildings of fireproof construction, and to fireproof five and six story buildings on the first and second floor, according to each respective height. In all other buildings, mill or slow burning construction will be required, while all tenements or apartments or with three stories will have to be of fireproof construction.

* * *

SCHEDULED IN THE LIST of improvements to be carried out in the Eastern maritime district is a project calling for the extension of the Halifax dry dock to a length of 650 feet. At present the dock, which is 600 feet long, is the largest in the Dominion, and with one or two exceptions the largest private dock on this side of the Atlantic. When the extension is made, it will rank next to the docks at the Brooklyn Navy Yards, which now take priority as to size. Plans for the enlargement were recently filed at Ottawa. It is estimated that the proposed work will cost $250,000. Other extensions that will make the total length of the dock 800 feet, it is said, will eventually follow.

* * *

FINISHING TOUCHES are now being given to the Portland Bridge, a 1,400 feet concrete structure crossing the Delaware River and forming an important part of the extensive cut-off of the Delaware, Lackawana & Western Railway between New Jersey and Pennsylvania. The erection of the bridge, which costs over $700,000, and has been twenty-eight months in course of construction, has been closely watched by engineering interests, both in the United States and abroad. It has five spans of 150 feet, and a number of lesser ones averaging 120 feet. The deck of the structure is 36 feet wide and the rails are 70 feet above the low water mark. A trifle over 70,000 barrels of cement and 82 tons of crushed stone were required in carrying the work out.

* * *

GOVERNMENT MADE BRICKS, according to a statement recently given out by the Australian Minister of Home Affairs, will in all probability be used in the new capital buildings to be built at Canberra. The vastness of the projected capital scheme, coupled with the discovery within the new federal area of promising deposits of raw materials for this purpose, has led the Government to the conclusion that the establishment of a brick-making plant on the property would be both highly advantageous and profitable. Sample lots of the clay, which is said to be practically unlimited in quantity, have been sent to both Melbourne and Sydney for tests, and if the results prove satisfactory as expected, the Government will undertake to install a modernly equipped plant.

CONTRIBUTING TO THE FEATURES of interest to engineers visiting England during the ceremonies attending the formal accession of King George will be a modern 1,300 horse power locomotive of the leviathan type, which has just been turned out at the London & Northwestern Crewe Works. The steaming up of the locomotive, which has been christened "Coronation," marks the completion of the five thousandth engine constructed by its makers. It is to be used for the train on which the King and Queen are to travel by the West Coast route on their visit to Wales.

* * *

THE TYPE OF BUILDINGS adopted in China varies in different localities, and depends principally on the character of materials available in the immediate vicinity. A somewhat interesting form of construction, according to U.S. Consul General Samuel S. Knabenshue, is found in and about Tientsin, where the majority of native houses are built of clay and kao-liang. The latter is a plant much like American broom corn, growing to a height of 10 to 12 feet. In erecting a house a rude frame work is set up for the side and end walls, and filled in with kao-liang stalks placed lattice fashion. This is then plastered thickly, outside and inside, with clay, which is smoothed down. The roof is built in exactly the same way. At the end of the rainy season, if there has been any damage to roof or walls, repairs are made, and the hot sun of the late summer bakes the clay to a considerable hardness. The Chinese house is invariably of one story. The houses of the better class of Chinese are built of brick with tile roofs. These tiles are set in clay and such a roof is immensely heavy. In the foreign settlements, of course, the buildings are on European or American models.

* * *

ANNOUNCEMENT HAS BEEN MADE in the House of Commons, Ottawa, of the Government's determination to construct the Halifax & Eastern Railway and to link up other sections of the Province with the Intercolonial Railroad. The estimates submitted call for an appropriation of $1,000,000 towards the construction of a railway from a point on the Intercolonial Railway at or near New Glasgow, in the county of Pictou, to the town Guysboro, and from the said line of railway at Crossroads County Harbor, to the deep water of said harbor. One million dollars is also asked toward the construction of a railway from a point on the Intercolonial Railway at or near Dartmouth, in the county of Halifax, by way of Musquodobit Harbor and the valley of the Musquodobit, to Dean Settlement, in Halifax County. Toward the construction of a railway from a point on the Intercolonial Railway at or near Alba, in the county of Inverness, to the town of Baddeck, Victoria County, $200,000 is asked for. These are reported to be only the preliminary appropriations to provide for the immediate commencement of operations and to cover the cost of construction during the current year.

AS THE RESULT of experiments recently made with different classes of bricks, says the "Slate Trade Gazette," it was found that with mixtures of magnetite and marble with kaolin, the refractoriness of the magnetite brick decreases as the amount of clay increases, and the same applies to the addition of lime. With mixtures of alumina and silica, additions of kaolin bring down the melting point of pure alumina considerably below the normal value of about 2,000 degs. Cent., and if quarts be added with 9.1 per cent. alumina, the melting point is reduced to about 1,566 degs. Cent., after which a very small amount of alumina raises the melting point rapidly to 2,760 degs. Cent.—the melting point of pure silica. In the case of silica brick with a certain amount of clay introduced as a binder, it was found that as the amount of clay in increased, the refractoriness rapidly falls off after the added amount reaches six per cent. This points to the desirability of making bricks either very high in silica or entirely of clay. Other investigations indicated the effect of the potash, soda, lime, magnesia, and iron on the melting point of clay. Slight additions of the fluxes named reduced the melting point, the reduction being proportionate to the quantities added.

* * *

THERE HAS BEEN ERECTED at Govan, Scotland, on the River Clyde, for the Fairfield shipyards, one of the largest, if not the largest, cranes in existence. The official trials of this mammoth appliance have been satisfactory, and it stands in bold relief, a landmark on the River Clyde, where a number of the most powerful cranes in the world had previously been erected. The jibhead of the crane is of the hammer-head type, built on the cantilever principle, and stands 160 feet above high-water level, or to rail level 169 feet. The jib, with a total length of 270 feet, extends 169½ feet outward from the centre and can be utilized within every point of a circle 336 feet in diameter. The motors for operating the gear vary from 60 to 90 horsepower, and are situated in the machinery house at the rear end of the crane, the test load of which is 250 tons. The crane, on slow gear, can elevate 200 tons extended 75 feet along the jib, and on quick gear it can manipulate a load of 100 tons at 133 feet. The maximum load of 200 tons can be lifted from 30 feet below wharf level to 140 feet above, a total of 170 feet. The three controlling brakes are worked by magnetic, mechanical, and hydraulic action. The stability of the structure of the crane depends on four huge steel cylinders, one under each corner of the tower. These great tubes, 15 feet in diameter at their base, are filled with concrete and sunk 74 feet below ground. The heavy materials necessary in the construction of warships can be handled advantageously by this colossal machine. It is expected that it will be utilized first in the completion of a New Zealand cruiser soon to be launched.

THE NEW BONAR PRESBYTERIAN CHURCH, TORONTO

A modern ecclesiastical edifice in Gothic design—built at a moderate outlay to meet the requirement of a congregation of one thousand worshippers.

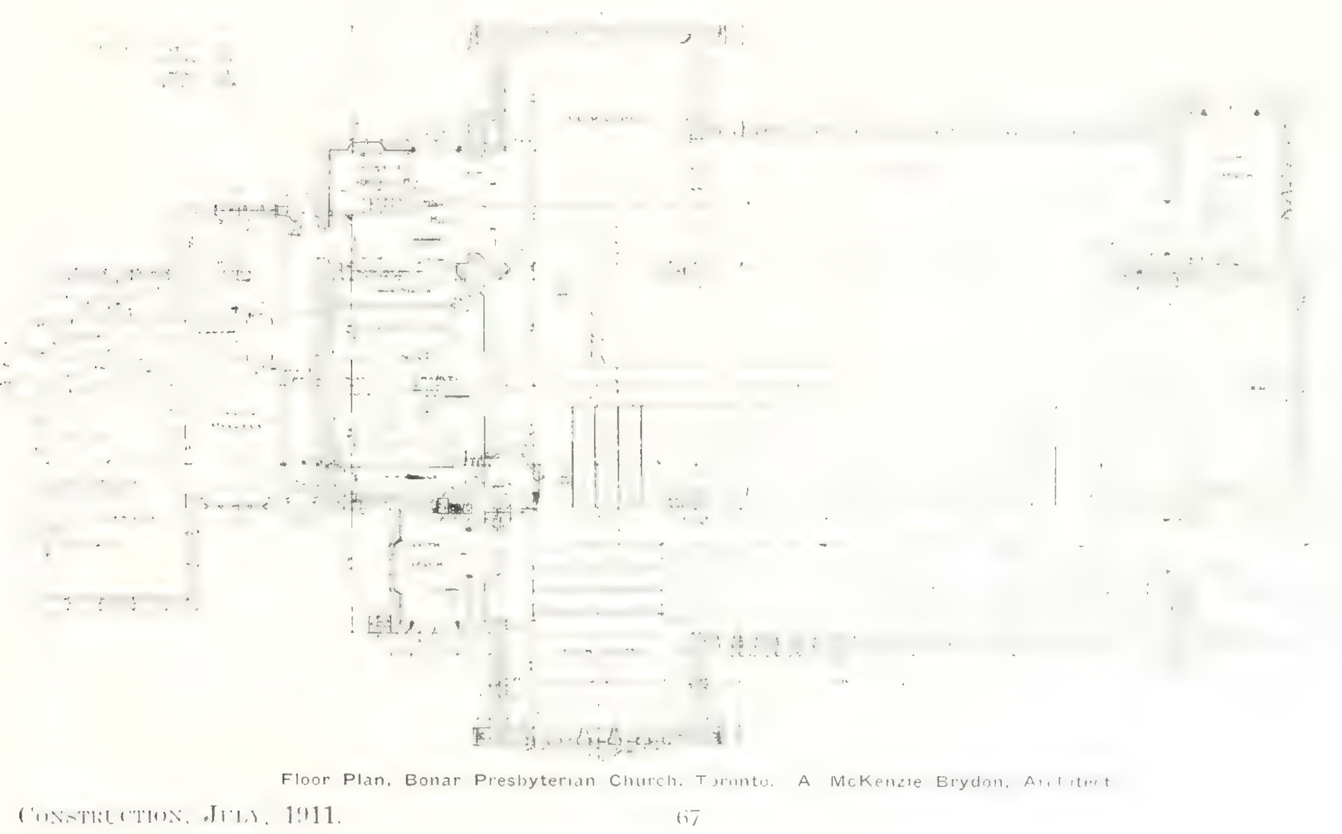
AS A GOTHIC STRUCTURE erected at a moderate outlay to meet the requirements of a congregation of one thousand people, the Bonar Presbyterian Church, Toronto, which is illustrated herewith, stands out in recent ecclesiastical work as an example of exceptional architectural merit.

The site of the building is on St. Clarens Ave., and while like most city churches, it suffers the disadvantage of being enclosed by houses on both sides, an open view from the corner of Lansdowne Ave. and College St, reveals the splendid proportions of the structure and enables one to obtain a comprehensive idea of the extreme simplicity of the general scheme.

In working out the general design and plan, the architect has endeavored to produce a structure that would in the first place, be ecclesiastical in spirit both within and without; secondly, that would leave no doubt as to the structural truthfulness of its component parts; thirdly, that would attain the maximum of efficiency as regards acoustics, and fourthly, that would admit of a seating arrangement that would bring the pulpit and chancel within view of the greatest possible number of worshippers. Following such principles as were deemed best adapted to obtain the desired results, the building has been laid out with a nave and wide aisles, and the pulpit has been placed at the southwest chancel respond, but much closer to the aisle than is customary; so close in fact that the pulpit encloses the respond of the south transept arch. By bringing the pulpit forward in this manner it was possible to arrange the seating on one level, and thereby do away with the sloping floor which detracts from, rather than add to, the dignity of the average interior of this character.

Within the chancel the choir stalls are located in the orthadox position, while in the centre is the communion table with benches for the minister and elders on all three sides, the minister's seat having the reredos directly at the rear. The organ chamber, which is open on both sides, is to the north, forming the transept on that side; the consol being placed behind the reredos, in such a position that the organist is able to see, and can be seen by, the choir and minister, while being completely hidden from the congregation.

As the acoustics of a building such as this is of prime importance, it was deemed essential to introduce only resonant materials in the interior construction, and for this reason as well as from an aesthetic consideration, plaster work has been en-



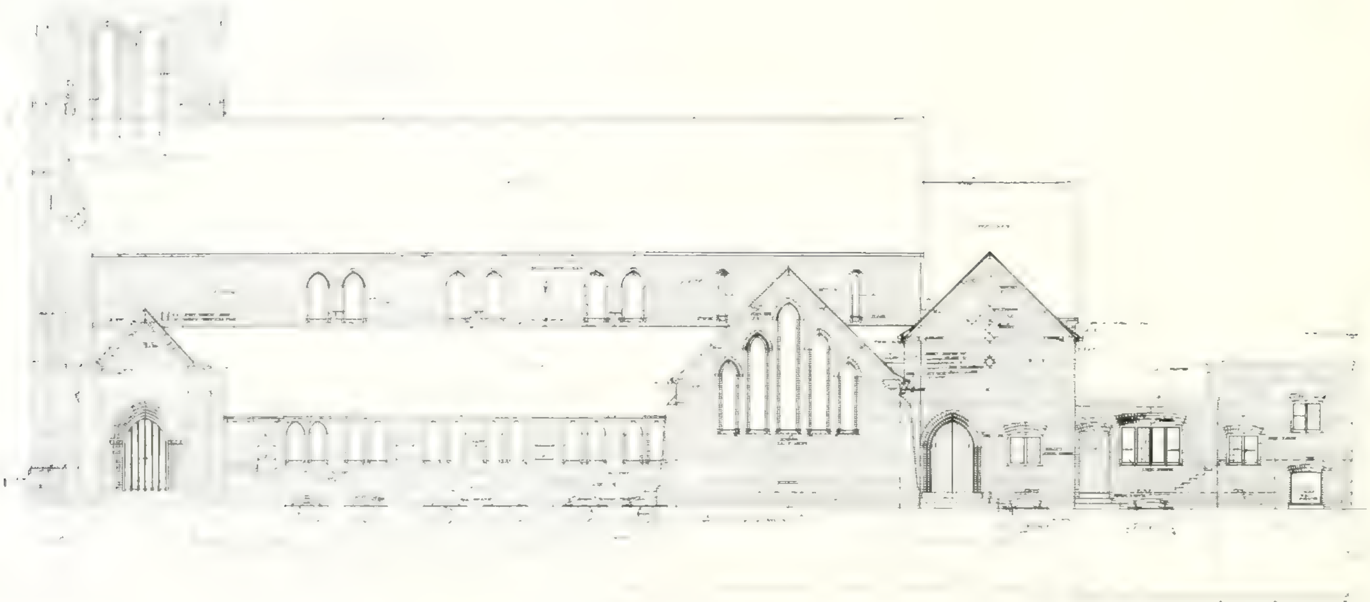
Floor Plan, Bonar Presbyterian Church, Toronto. A. McKenzie Brydon, Architect

Bonar Presbyterian Church, St Clarens Avenue, Toronto. From a North-East Viewpoint. A. McKenzie Brydon, Architect.

Bonar Presbyterian Church, St. Clarens Avenue, Toronto. View from the South-West. A. McKenzie Brydon, Architect.

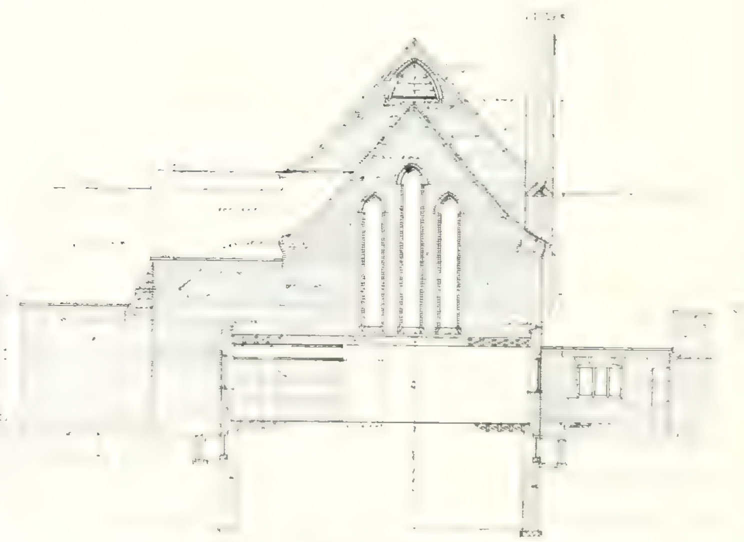
View Looking South-East from North Transept, Bonar Presbyterian Church, Toronto.—Showing the Wall and Ceiling Scheme and Seating Arrangement. A. McKenzie Brydon, Architect.

View along Nave towards Chancel, Bonar Presbyterian Church, Toronto. A. McKenzie Brydon, Architect.

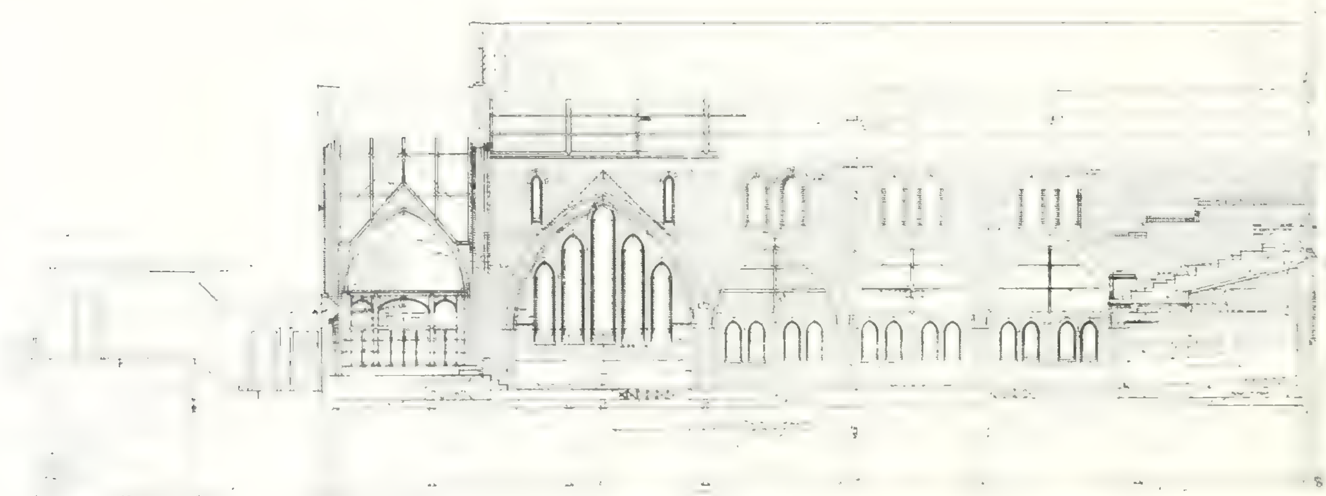


North Elevation.

East Elevation.

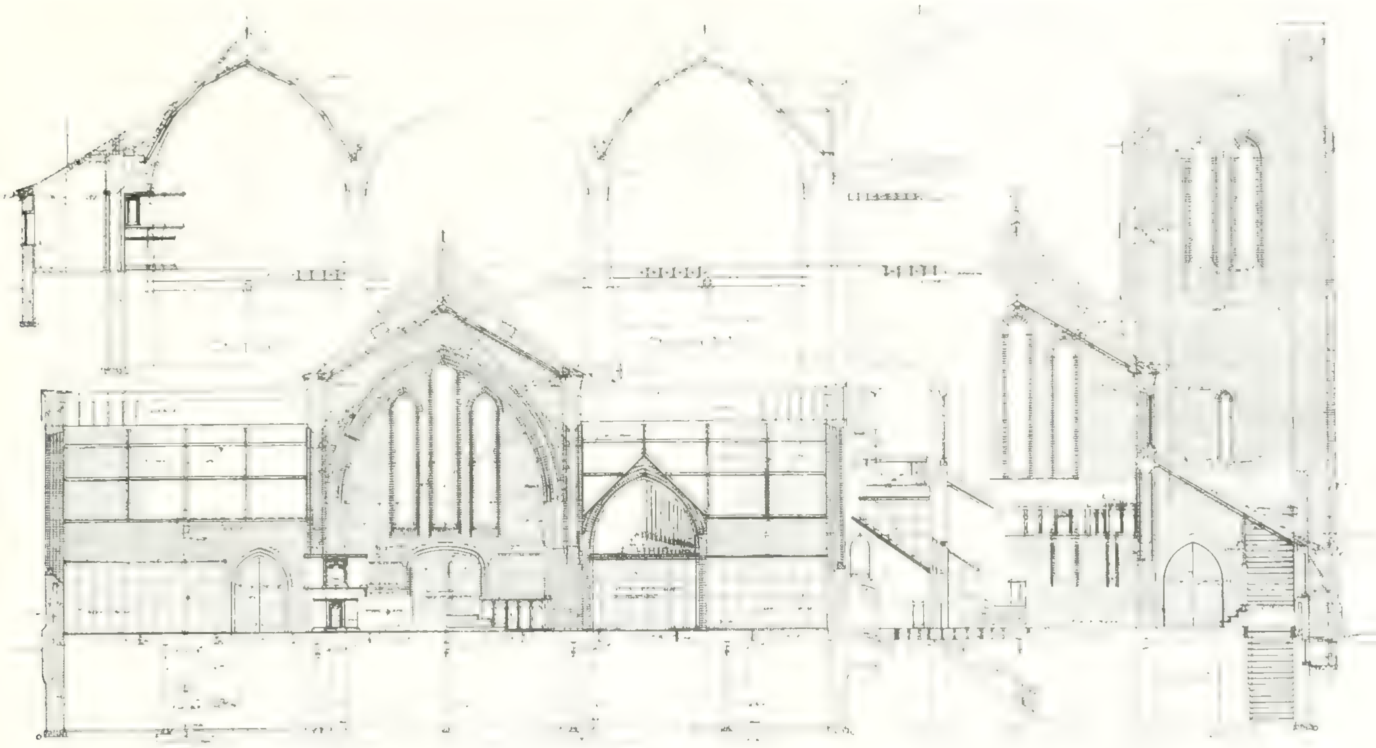


West Elevation.



Longitudinal Section.

Bonar Presbyterian Church, St. Clarens Avenue, Toronto. A. McKenzie Brydon, Architect.



Transverse Section and Detail of Tower, Bonar Presbyterian Church, St. Clarens Avenue, Toronto. A. McKenzie Brydon, Architect.

tirely omitted. The walls are built with a half brick cavity, the inner and outer sections being bounded together by 3/8″ round iron rods. In addition to the ready respond to sound which this type of wall gives, the acoustics are improved by the deep reveals of the doors and windows, as well as by the large nave piers which are designed to materially assist the sound-carrying properties. Dark brick is employed for the outer walls as well as for the nave piers and arch wings, while a lighter brick has been selected for the inner wall facings. The brick is laid in common gray lime mortar, at four courses to the foot, the exterior joints being weather cut, and those in the inside raked out to emphasipe the texture.

Rather an interesting feature are the window openings, which are built wholly without frames, the glass being bedded right into the brick, thereby effecting a saving in labor and material and preventing the possibility of deterioration. Metal sash has been adopted only for the basement and the ventilating hoppers, and with the exception of the memorial windows depicting the life of Christ, which are executed in green white glass on a white ground. The glazing throughout is of sheet rectangles with a half-inch lead.

Maple flooring is employed throughout the building, including the gallery at the east end, and the woodwork and seating is of chestnut, 3/8″ sheeting being used for the ceiling. Aside from the doors, there is no wood employed in the exterior nor is there any painting on any part of the structure, excepting that used on the eavetroughs and leaders, all the wood-

(Concluded on page 76.)

South Elevation, Bonar Presbyterian Church, St. Clarens Avenue, Toronto. A. McKenzie Brydon, Architect.

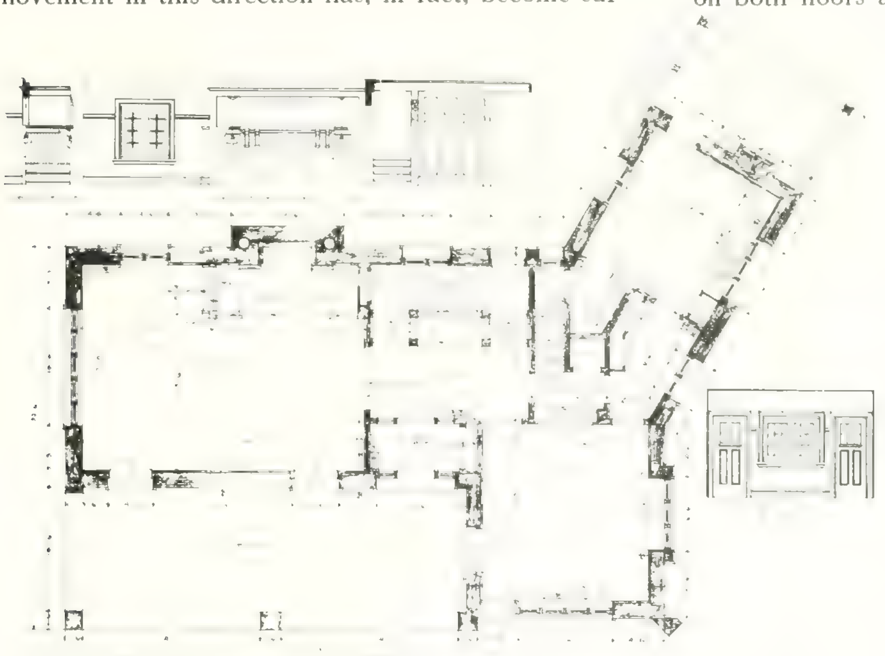
Residence of A W. Briggs, Port Credit, Ont. Built of Stone Taken from the Shore of Lake Ontario, which the House Overlooks, and Finished Above with Red Cedar Shingles. Chadwick and Beckett, Architects.

Living Room, Residence of A. W. Briggs, Port Credit, Ont., Showing the Inglenook with its Brick Fireplace and Brown Stained Georgia Pine Panelling and Seats. Chadwick and Beckett, Architects.

SUBURBAN RESIDENCE AT PORT CREDIT, ONT.

Recently erected Lake Shore Home of A. W. Briggs, which shows an interesting use of local stone in exterior wall construction.

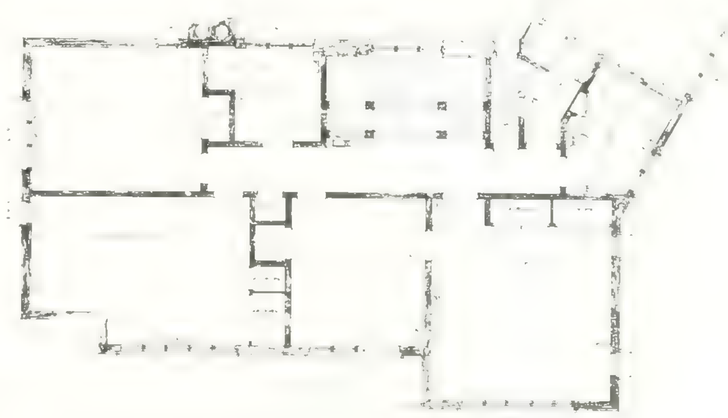
BOTH THE AUTOMOBILE and the better accommodations afforded by steam and electric lines within the last few years, have induced a large number of owners to acquire residential sites and build their homes at a considerable distance from the more congested centres. The movement in this direction has, in fact, become sufficiently pronounced of late to make the suburban or country home a factor of no little promise in our domestic life. Even now it is necessary to turn to the outlying districts in order to view some of the more noteworthy examples of recent domestic work, and judging from the creditable type of houses which are now being erected in general, it is quite evident that the development of our architecture in this respect is rapidly attaining a standard that compares most favorably with the work of other countries. Owners not only find the country with its trees and foliage and natural vistas more ideal, more healthful and more liveable in every way, but in many cases, either through foresight or good fortune, sites are acquired having an abundance of good stone suitable for the construction of the building itself.



Ground Floor Plan and Detail of Wall Scheme, Residence of A. W. Briggs, Port Credit, Ont. Chadwick and Beckett, Architects.

Such an advantage favored Mr. A. W. Briggs in the selection of a site for his suburban home, illustrated herewith, and the architects, Messrs. Chadwick & Beckett fully availed themselves of the opportunity thus offered in designing the structure. The house, which is located a short distance east of Port Credit, Ont., stands on spacious grounds, and is approached from the Lake Shore Road through a heavily wooded tract. To the southeast, about 75 feet away, lies Lake Ontario on which the property abuts, and from the shore of which the stone employed in the lower walls of the house was taken. By utilizing the material obtainable from this source, and adopting red cedar shingles for the upper walls and roof, the architects have not only produced a structure that fits in harmoniously with the natural features of its surroundings, but one which, owing to the admirable treatment of the design in general, is extremely pleasing in the simplicity of its domestic character.

In the arrangement of the interior, which is explained in the accompanying plans, all the principal rooms on both floors are located to get the benefit of the Lake view towards the south. The living room, which faces in this direction, opens through casement doors on to a large deep verandah, having rustic stone piers which support the roof etxension forming the shelter overhead. This room occupies the entire west portion of the lower floor, and has a built-in ingle nook panelled in Georgia Pine, with bracketed shelves and fixed seats on either side of a brick fireplace. Aside from this interior, the ground floor has a large central hall and dining room, the latter being connected with the pantry and kitchen wing which is taken off at a slight angle to the north. At the rear of the hall is an open staircase connecting the lower floor with the upper story and basement, while adjoining this to the right is a small entry giving convenient access to the interior from the Lake Shore Road. Entrance can also be obtained from the north through the service wing which terminates with a deep covered verandah.



First Floor Plan, Residence of A. W. Briggs, Port Cred.t, Ont. Chadwick and Beckett, Architects.

The upper hall, in keeping with the woodwork throughout, is finished in brown-stained Georgia Pine and panelled in burlap. This hall with its

Dining Room, Residence of A. W. Briggs, Port Credit, Ont. Note the Simplicity and Individuality of the General Scheme with its Interesting Door, Wall Cupboard, and High Placed Window. Chadwick and Beckett, Architects.

Upper Hallway, Residence of A. W. Briggs, Port Credit, Ont. Finished in Brown Stained Georgia Pine with Burlap Panels. Chadwick and Beckett, Architects.

built-in recess forms an interesting feature, as does also the inset balcony breaking the south roof, which opens off the nursery. There are three bedrooms in all, together with a sewing room, maid's room and bathroom.

In the basement the space has been advantageously utilized, over one-half of the area being taken up by the children's playroom. Here a beamed ceiling and a large open fireplace add to the domestic character of the scheme; while the open stair arrangement connecting with the main hall, brings the playroom well within touch with the other portion of the house, and makes it eminently suitable for dancing or other forms of entertainment should the occasion demand.

Basement Plan, Residence of A. W. Briggs, Port Credit, Ont. Chadwick and Beckett, Architects.

The property is exceptionally well provided as regarded sanitary conveniences, having a system of septic tanks for the disposal of sewerage, and approved plumbing fixtures throughout. Since the exterior was photographed the owner has undertaken to develope a small formal garden to the west of the structure, and this when completed will further add to the many attractive features which already make the estate one of the most interesting in the vicinity in which it is located.

ARCHITECTURE IN RELATION TO THE INEXPENSIVE HOUSE

Simplicity and truthfulness of early Canadian work as compared with modern examples The Model Home Association and what it aims to accomplish By Albert J. Hazelgrove

THE ADVANCES which in recent years have been made in the aesthetic and sanitary construction of our larger Canadian houses have not been equally evident in the construction of the smaller homes, suitable for working people and the lesser paid population generally.

Man's first instinct for protection from the elements evolved a type of dwelling which in the early days of Canadian history more or less adequately fulfilled the requirements of the situation. The log house, the clap-boarded house and the plastered house of Quebec Province were tried and tested in the strenuous days when men literally hewed their way forward to the present stage of Canadian development.

Out of the moil of the early days have come down to us examples of the houses in which a future great nation was cradled and while much must be allowed for the hallowing influence of sentiment and antiquity it is impossible to deny that the smaller houses of to-day will not bear comparison with the simple quiet lines of the old work. Chief among the points of superiority of the latter must rank the harmonious selection of materials to meet the exigencies of the situation. The charm of some of the old French Canadian villages in this respect is paramount. Complication of form and material was entirely absent, hence the attainment of that unstudied, intangible kind of beauty which is evolved by unaffected simplicity. While it is not sought to prove that the early houses are suitable types of modern reproduction, the fact remains that much can be learned by following the broad principles on which they were evolved.

One of the most prominent faults of the modern type of small house is an all-pervading restlessness—an aggressive desire to force itself upon the notice of an innocent and long-suffering public.

Whatever publicity is lost by its demerits is regained by a rampant self-advertisement which compels people to take notice, much on the principle of the old adage which tells us that "empty vessels make the most noise." The unthinking section of the public is carried away by the show and vulgarity of such types, hence the extraordinary vagaries of taste which fell our way. The rich man builds his house sometimes well, often badly. The poorer man endeavors to imitate his richer brother, and he usually succeeds in developing a cheap imitation of the worst designs of the latter. It is a case of "skim milk masquerading as cream."

Canada is getting along in years now, nationally speaking, and Canadians have the advantages of observation of other people's mistakes, which other nations had not. When are we going to realize that beauty in architecture has its basis in structural growth, and that it is a perversion of all principles to put up a box and then seek to make it beautiful by applying alleged ornament, devoid of relation to the structure and with no considerations of texture or fitness? The box may be far more beautiful as a box, pure and simple.

In Europe much time and thought has been given of late years to the problem of inexpensvie and artistic houses, and a great measure of success has followed the efforts. In England numerous garden suburbs have been laid out on the outskirts of the large cities, and in these suburbs are to be found unpretentious houses grouped together with all the charm of the old work. These houses also possess all conveniences which modern invention can supply· and are the work of eminent architects, some of whom have specialized in this class of work.

With a view to bettering the conditions in our Canadian cities the Model Homes Association of Ottawa has been organized. This association is endeavoring to enlist the co-operation of architects and the public generally throughout the Dominion, in a campaign for better houses. The movement is as yet in its early stages, but it is universally realized that a great amount of good can be done on these lines with an organized effort.

The problem of the inexpensive house has been virtually neglected in this country from an architectural standpoint. Possibly architects have been too busy on works of great magnitude to bother about work so unremunerative and seemingly insignificant. Looking at the matter in a broad public spirit, however, the profession must realize that by reason of special artistic and technical qualifications it has a duty to the public at large, and if work of this character does not come under architectural inuuence in the ordinary course of business, it rests with the profession to exercise an advisory interests in the matter for the public good.

The conditions prevalent in Canada at the present time do not seem to call for a solution of the problem on the lines which have been adopted in other countries, and the Model Homes Association has wisely decided to start its work by getting at the man who is building his own small house.

A competition was recently organized among architectural draughtsmen throughout Canada, and although the response was somewhat disappointing, a number of good designs were received.

It is the intention of the association to develop further plans from time to time, and these, together with the best of the competition drawings· will be duplicated and prints will be available to the public at a nominal charge to cover cost of reproduction. By means of these drawings, the Association hopes to raise the standard of taste among those who are building such houses. It is hoped that in the future a marked improvement will take place as the results of the modest erorts originated by the Association. The movement is bound to grow when its objects become more widely known.

The many applications which have already been received for plans are indicative of the great interest which is being taken in the Association.

There is no reason why Canadian cities, which are so beautiful naturally, should continue to be defaced by the misguided efforts of minds untutored to the particular phase of art which finds its expression in the building of the house beautiful. It is due to the generations to come that the present inaction in this matter shall be succeeded by that of a great reaction which can only be obtained by systematic effort.

BONAR PRESBYTERIAN CHURCH Continued from Page 71

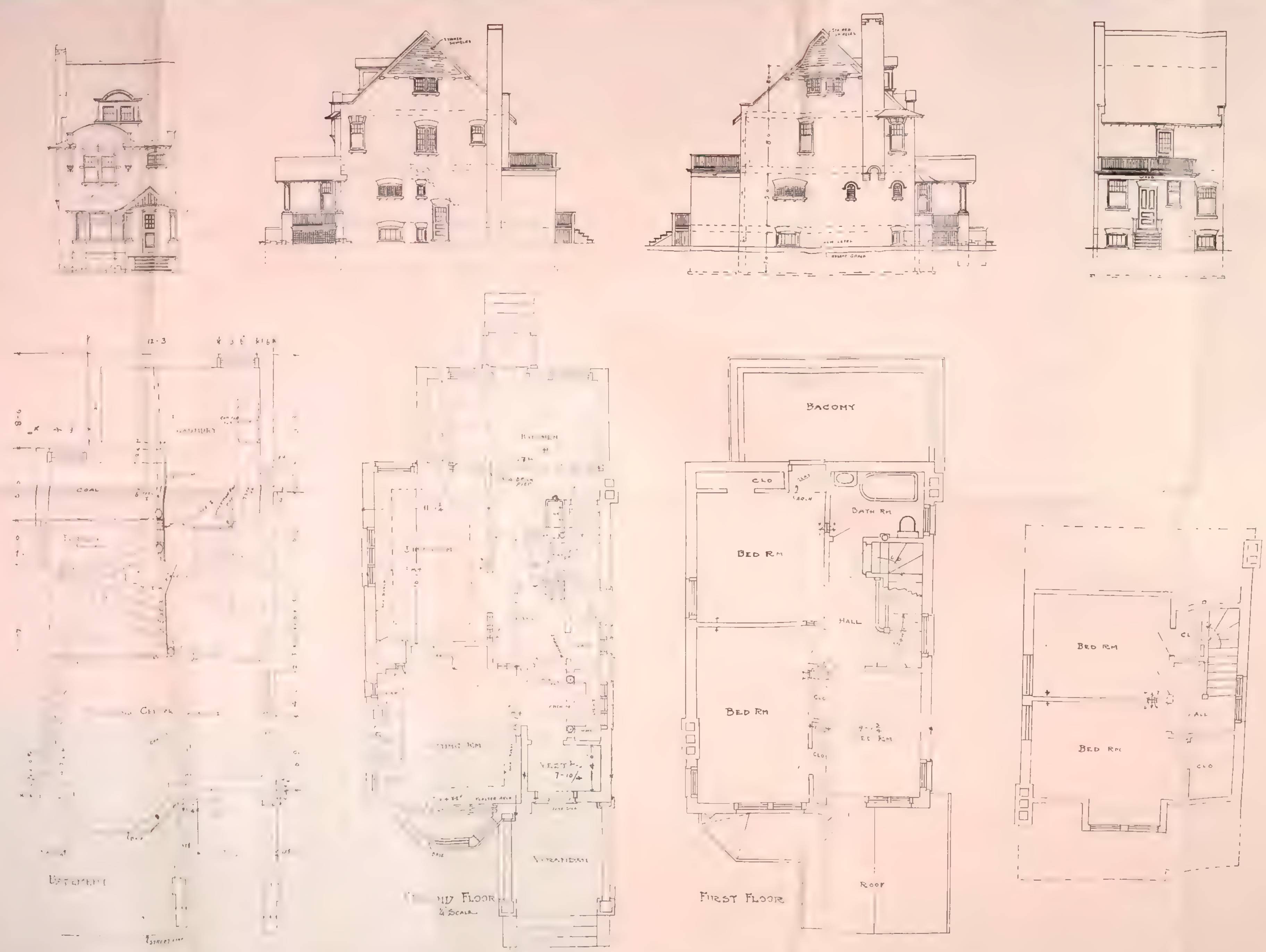
work throughout being treated with "Solignum." All the electric light wiring is in conduits, and the nave pendants, pulpit light and exterior lights, with the exception of two carried out in cast brass and copper, are executed in wrought iron.

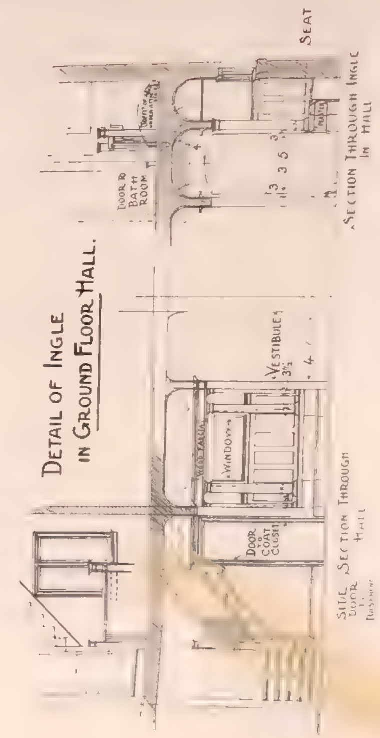
The rear apartments contain the minister's vestry panelled in chestnut, a ladies' parlor in the character of a large living room, a private coat room, board room and lavatories. The roofing of the building is of green slate, very rough in texture, and the heating is done by a system of furnaces.

Despite the limitations as to funds, which admitted of an expenditure of but $40,00 for both the church and organ, the architect has succeeded in producing an edifice that is not only Gothic in feeling and spirit, but one in which the acoustics, lighting and general arrangement has been thoughtfully considered.

The building was designed by Architect A. McKenzie Brydon, of Toronto, and the various branches of the work were executed by the following firms:—Masonry, Witchall & Sons; carpentry, Geo. Nicholson; plumbing, J. R. Jackson & Co.; plastering, Hoidge & Sons; painting, Joseph McCausland & Son; glazing, Robt. McCausland Ltd.; roofing, A. B. Ormsby, Ltd.; seating, Valley City Seating Co.; heating, Jas. Smart Mfg. Co., Ltd.; furniture, Lickley's Ltd.; organ, Casavant Frerer; font, Macintosh Marble Co.

VERY MATERIAL PROGRESS has been made within recent years in the process of welding metals. Especially is this true as regards Germany, where many systems for this purpose have been devised and adopted. Possibly the most marked advance is to be noted in the increasing use of the acetylene apparatus which is quite generally replacing the older hydrogen method, owing to the fact that it makes the process of welding not only cheaper, but more generally applicable. In the case of the more approved system, the acetylene gas is generated directly from calcium carbide by the apparatus itself. The cost of acetylene gas thus produced is about the same as the market price for hydrogen gas, but only about one-fifth as much acetylene gas is required for a given piece of welding. Furthermore the considerably higher temperature attained with acetylene gas makes possible the welding of metals of greater thickness. The temperature limit for hydrogen is 1,900 deg. C. (3,452 deg. F.) and of acetylene it is 3,500 deg. C. (6,332 deg. F.). The metal thicknesses that may be welded by the two systems are one-third and one and one-fifth inches, respectively. One authority estimates that welding apparatus is used in upward of 12,000 plants in Germany.





SUPPLEMENT TO

CONSTRUCTION

July, 1911. Vol. 4. No. 8.

RESIDENCE

OF

W. DINSMORE, TORONTO

EWART G. WILSON,
ARCHITECT

Plans and Detail ¼ inch scale
Elevations ⅛ inch scale

FOR DETAIL SPECIFICATIONS SEE PAGE 77.

An Attractively Designed Low Cost City Dwelling

Built on a narrow lot and planned to give maximum accommodation for a small family. Detail of construction explained by architects' specifications

THE PROBLEM of designing the average city house not only, as a rule, revolves itself around the limitations of a narrow lot, but in many cases imposes a further restriction in that the designer finds it necessary to erect a structure of certain given requirements, within an extremely modest and sometimes inadequate sum. To produce a house under these circumstances, and still to impart character and individuality to the scheme, is at the best a somewhat difficult task. Aside from the fact that the site generally offers little or nothing in the way of natural advantages to assist the general scheme, the narrowness of the lot allows the architect but meagre latitude in working out the design. Of necessity the building must be carried up in elevation, and to do this and still preserve dignity of line and proportion is wherein the hard part of the problem really lies. Not only is it necessary to take full advantage of all available floor space, but if the scheme within is to be made interesting in its character of treatment and appointment, the law of economy must be exactingly applied. As to what degree a house of this kind can be successfully produced and still be erected at a reasonably low cost is to be seen in the residence of W. Dinsmore, Geoffrey street, Toronto, which is illustrated herewith. This house at the time of its erection cost $3,100, although according to the architect, Mr. E. G. Wilson, Toronto, its construction at the present time would require a sum at least seven hundred dollars again as great. Not only is it a residence of pleasing architectural character, but one which from a standpoint of construction, plan and internal appointments, is exceptionally well considered in every respect. The lay-out of the house, as can be seen by the plans in the accompanying supplement, provides for a scheme that not only gives the greatest accommodation for the space available, but is particularly commendable in its general arrangement. A feature of the ground floor is the hall with its built-in seat, and the staircase which is placed further back than is usually the case. Considering the small amount set aside for the building, the structure represents an investment in which architectural ability and business acumen have been most successfully brought to bear. The thoroughness with which the construction of the building has been carried out in detail, is possibly best judged from following the specifications from which the house was built.

Residence of W. Dinsmore, Geoffrey Street, Toronto—An Interestingly Designed Small City House Built at a Moderate Cost. Ewart G. Wilson, Architect.

Mason Work.

Lay footings for all walls, of hard stock grey brick, two courses deep, with 4 in. offsets, well flush up in cement mortar. Lay damp proof course upon footings, of one ply ready roofing. Build foundation walls as shown 9 in. and 14 in. thick as shown, of hard stock grey brick, first four courses to be built in cement, remainder in lime mortar, thoroughly bond every six courses with headers. Build in all window and door frames where shown. Carry up chimney flues as shown, 9 in. by 9 in. and 9 in. by 14 in., and carefully point; build in clean-out soot doors and frames, also collars to each flue; carefuly bed all lintels, build piers in basement as shown in cement mortar. Parge outside face of basement walls with cement mortar, 3 to 1, 3/8 in. thick. Provide and set one footing stone roughly squared to 18 in. for steel column.

Walls of ground, first floor and part of attic gable to be built of hard stock red brick, free from rub marks and of an even color; lay with a dark colored lime mortar joint 3/8 in. thick; bond every fourth course with Flemish bond. Build in all window and door frames and turn relieving arches over all brick openings and lintels; carry up chimney flues and carefully point. Carry chimneys above roof as shown with hard select brick, top four courses to be laid and rendered in cement ½ in. thick.

Window sills on ground and first floor to be 5½ in. by 8 in. sawn sand stone. Heads to windows on front and south to be 4½ in. by 9 in. sawn sand stone; jambstones and sill blocks where shown to be of similar material.

Lay concrete floor throughout basement on foundation to be 4 in. thick of broken brick and cinders well pounded down; grade to floor gratings; concrete to be 2 in. thick of four parts broken stone and 2 parts sharp coarse sand to 1 of Portland cement. Finishing coat to be 1 in. thick of sharp sand and cement 2 to 1. Provide and fit floor gratings where shown.

Carpenter Work.

Ground and first floor joists to be 2 in. by 8 in., set at 12 and [illegible] centres. Main joists to be 2 in. by 8 in., set at 16 in. centres. [illegible] joists over kitchen to be 2 in. by 8 in. at 12 in. centres. All joists to have at least 4 in. [illegible]. Size and set all joists leve. Trim for chimneys, stairs, plumbing and heating pipes, joists supporting partitions to be doubled and trussed and set 4 in. apart for the free passage of hot air pipes. Cross bridge all joists in each span with 2 in. by 2 in., well nailed. Collar ties in attic to be 2 in. by 4 in. on every pair of rafters; support to roof rafters with 1 in. by 4 in. Anchor joists to brick walls with wrought iron ties, with ends turned down into brickwork, anchors to be placed every 8 ft. apart and extending over two spans of joists, where joists run parallel with wall, and on every sixth joist where ends run into wall.

Construct roof with 2 in. by 6 in. at 16 in. centres; well spike to 2 in. by 8 in. wall plate, and 1 in. by 10 in. ridge board. Valley rafters to 2 in. by 8 in. Cover main roof, also balcony, with 1 in. by 6 in. matched hemlock, closely lay and well nail. Cover main roof with 14 lb. asbestos and with B.C. cedar shingles laid 4½ in. to weather.

Gutter eaves to have 2 in. by 6 in. wrought exposed rafters, sheet upon same with 1⅛ in. by 2½ in. beaded pine sheeting, cut ⅞ in. by 5 in. in between each rafter at wall line ,and finish under with 3 in. bed-mould. Stud side gable from top of attic windows with 2 in. by 4 in. at 16 in. centres; fur out on inside to same thickness as brick wall, enclose with matched hemlock, cover with 14 lb. asbestos felt, and with stained shingles 4½ in. to weather; finish with crown mould and rail as shown, also cut blocks, form hood over west attic windows as shown. Construct dormer window on front as shown with 2 in. by 4 in. and 1 in. by 6 in. matched hemlock, deck joists 2 in. by 4 in. at 16 in. centres, cover sides with 1 ply 14 lb. asbestos felt, and with stained shingles 4½ in. to weather; finish on angles with 8 in. by 8 in. casing; cornice to have ⅞ in. fascia and soffit, with crown and bed-mould. Finish front gable on brickwork with 2 in. by 10 in. plank, bolted down to brickwork, with ½ in. by 18 in. bolts, finish on face with 3 in. by 6 in. crown mould.

Lay ⅞ in. by 3½ in. spruce flooring throughout. Lay ⅜ in. by 2½ in. quarter-cut oak flooring in ground floor hall, vestibule, and 18 in. border in sitting room including bay, also dining room. All flooring to be thoroughly kiln dried, free from large or black knots, to be closely laid and well nailed every 12 in.; all hardwood flooring to be thoroughly cleaned up. Construct partitions as shown, with 2 in. by 4 in. at 16 in. centres, double all angle and door studs, also heads, truss all openings over 3 ft., all plates to be single, partitions over partitions to run between joists and spiked to sides of same. Form for plaster arches at bays and recesses and where marked. Provide and fix 10 in. cove furring, at ceilings of vestibule, ground floor hall, dining room and sitting room. Provide ½ in. by 2 in. bond strips to be built into brick walls every 8 courses. Strap exterior walls with 2 in. by 2 in. at 16 in. centres.

Basement window frames to be 3 in. by 4 in. rebated, with moulded hanging stiles, sub sills to be fitted with iron tongues, sash to be 1¾ in. moulded and divided as shown; hang with 3 in. steel butts, fit with 4 in. barrel bolts two to each sash, also hook and eye to hold same open. Small windows in sitting room, high windows in dining room and ground floor hall to have solid frames, no sash, glass to be fitted in place with stops; attic, main stair landing, and small window in coat room to be similar, but fitted with sash, hang with steel butts, and fit with bronze sash adjusters and fasteners. Remainder of frames to be made for balance sash, frames to be made weather proof, with molded hanging stiles, fit with cast iron pulleys and sash to be 1¾ in. moulded, hang with stout sash cord and cast iron weights, fit with bronze sash lifts and locks.

Construct front bay frame as shown with 1¾ in. material, frame to be made for balance sash similar to other frames; roof to same to be constructed with 2 in. by 4 in. and ⅞ in. matched boards, eaves to be finished similar to main roof eaves. Fill in between deck joists over kitchen with 1 in. boards and mill shavings or sawdust.

Outer door frames to be 3 in. by 7 in. rebated and moulded, with moulded hanging stiles. Front and vestibule doors to be of veneered quarter-cut oak, lower panels moulded with raised panels, upper panels to be divided and made for bevelled plate glass; side and balcony doors to be of pine, upper panels made and divided for glass, lower panels moulded. Hang front and vestibule doors with plated steel butts, three to each door. Other doors to be hung with bronze butts and fitted with stout mortice locks and bronze hardware complete.

Interior door frames to be ⅞ in. by 5½ in. fitted with stops; all closet, stair and attic doors to be 1⅜ moulded and panelled; hang with 3½ in. steel butts, and fit with bronze face mortice locks, with bronze trim and white porcelain knobs. Remainder of doors to be 1¾ in. moulded and panelled, with solid bronze hardware.

Basement doors to be ⅞ in. sheeted and battened; hang with strap hinges, and fit with thumb latch complete. Basement stairs to have 1¾ strings, housed for ⅞ in. risers and 1⅜ in. treads; newels to be 4 in. square, with rounded top, rail 2 in. by 4 in. with rounded angles, no balusters. Main stairs from ground to first floor to have 1¾ in. and 1⅜ in. open strings with 1¼ in. treads, with moulded nosing, risers ⅞ in., newel at start to be 6 in. square, with tapered chamfered angles, and moulded and dentiled cap and moulded base; remainder of newels to be 4½ in. square, with moulded and dentiled cap and no base. Rail, 3 in. by 3½ in. moulded, balusters ⅞ in. by 1¾ in., three to a tread, fit in place with string and rail mouldings. Stairs to attic to have closed strings, treads 1⅜ in., risers ⅞ in., newel 4½ in. with moulded cap rail 3 in. by 3½ in. moulded balusters ⅞ in. by 1¾ in. set 2 in. apart. Newels, rails, treads and risers of main stair to be of Georgia pine, remainder of white pine for enamelling, newels and rails of attic stairs to be of birch, remainder of pine for staining.

Trim doors and windows with ⅞ in. by 4 in. moulded architraves with 1⅜ in. band mould; door openings from main hall to have moulded caps.

Stiles in dining room to be ⅞ in. by 3½ in. of Georgia pine 6 ft. 6 in. high, fastened 9 in. apart and connect with moulded plate rail. Sitting room, ground and first floor hall, vestibule and dining room to be finished in select Georgia pine, for staining. First floor hall doors to be of white pine for painting. Remainder of interior finish to be of white pine for painting.

Lathing and Plastering.

Lath the whole of the walls, ceilings and soffits of stairs of ground, first floor and attic with first quality lath, laid ¼ in. apart, breaking joints every six courses; nail solid in all angles and at door studs. Render outer walls with a heavy coat of lime mortar well flush between ends of joists. First coat of mortar to be composed of grey lime and clean sharp grey sand, 3 to 1, mixed with a full proportion of long clean cattle hair. Apply to lath, forming a good key, float and trowel to a true, even surface. Second coat to be composed of white lime putty, slacked at least seven days before using, and calcined plaster in full proportions, mixed with a small proportion of clean sharp sand, float and trowel to a smooth hard finish. There will be no plaster cornices, or centers, but ceilings of sitting room, ground floor hall and dining room to have coved ceilings. All arches to be plain, no beads.

Painting and Glazing.

The whole of the wrought wood work to be painted three good coats of white lead and linseed oil including galvanized iron work. The whole of the front verandah to be oiled and twice varnished. Newels and rails of main stairs to be filled, shellacked and wax varnished.

Dining room, vestibule, ground and first floor hall, and sitting room to be stained, shellacked and wax vvarnished, and balusters of main stairs and bath room to be enameled; remainder of interior finish to be painted three good coats of white lead and linseed oil; fill with best linseed oil putty colored to match work, and sand paper all work smooth. Floors of ground floor hall, including vestibule, and 18 in. borders in dining room, sitting room, to be filled and wax polished.

Glaze front and vestibule doors with 1¼ in. bevelled plate glass. Glaze lower lights of sitting room bay with 32 oz. glass. All small lights in upper sash to be of 16 oz. glass, remainder of sash to be glazed with 21 oz. glass; carefully bed, sprig and bevel all glass into sash and leave sound and complete. Small window in dining room, two small windows in sitting room and hall to be lead glazing.

AUSTRALIAN CAPITAL SCHEME COMPETITION

THE MINISTER for Home Affairs for the Commonwealth of Australia, Melbourne, has issued a memorandum in connection with the designs for the federal capital city, to be constructed in a federal district, which will be the permanent seat of government of the Commonwealth of Australia, where all Commonwealth legislation will be conducted and where the Governor-General will have his official residence.

A copy of invitation to the competitors, issued on April 30, 1911, embodies the conditions of competition, historical and introductory matters relating to the district of Yass-Canberra and its selection as the federal district, and the requirements for the consideration of designers, the allocation of appropriate areas embracing sites for the following buildings, viz.:

House of Parliament.
Residence of the Governor-General.
Residence of the Prime Minister.
Public offices, as follows:
The Department of the Prime Minister.
The Department of External Affairs.
The Attorney-General's Department.
The Department of Home Affairs.
The Department of the Treasury.
The Department of Trade and Customs.
The Department of Defence.
The Postmaster-General's Department.
Courts of justice.
Places of public worship.
Mint.
National art gallery and library.
Statehouse.
Printing office.
Government factories.
University.
Technical college.
City Hall.
General Post Office.
Museum.
Central railway station.
Railway marshaling yards.
Military barracks.
Criminal and police courts.
Jail.
Hospitals.
National theatre.
Central power station.
Gas works.
Markets.
Stadium.
Parks and gardens, etc.

(Continued on page 91.)

AMERICAN ARCHITECTURAL DEVELOPMENT

Full text of interesting address delivered before the Royal Society of Arts at London, (Eng.) by Frank M. Andrews of New York.

THE ART OF ARCHITECTURE in any country finds a twofold source from the architectural tradition and the moral and intellectual character, political organization, and mode of life of its people. To trace intelligently its development and artistic worth, these broad conditions must be accounted for.

Unlike the sister arts of painting, music, and sculpture, it cannot be detached from the masses, for it is not a creature of the museums or of the private collector, nor of the exclusive patronage of the favored intellectual few, isolated as a thing apart, to be sought out and found in order to be felt and understood.

Contrary to these, it is the serviceable and intimate art of man, insistently a part of his familiar daily routine, a creature of his needs and circumstances, arousing in even the most heedless a consciousness of its existence and its power of expression either of beauty or of ugliness. For this reason, architecture artlessly becomes an inevitable exponent of the characteristics of the people it serves, and the unerring index of their time and epoch.

The wisdom of the Greek philosopher was the intellectual flower of the human race, belonging to all mankind, but the architecture of Greece expressed the genius of the Greek alone, indicating the antecedents, environment, and soil which nourished and made possible the Greek philosopher. The Gothic cathedral, the feudal castle, the walled town, the monastery, and the vanished hovel of the common people told the story of mediæval times, of the great religious movement and the feudal system of the Dark Ages, with its cloistered learning, its strong arm of military and exclusive political might, and the subserviency of the masses. Again, the readjustment of these conditions, the resulting dissemination of learning, and the establishment of political and religious freedom, are faithfully reflected by the architectural development that kept pace with it throughout Europe.

In this brief allusion to a period momentous in its importance to the development and uplifting of the human race, I am touching upon matters entirely familiar to yourselves, yet which I wish to emphasize in order that you may appreciate that a discussion of American architecture must necessarily be approached with a similar regard for its political and civic development.

What I have to present to you deals with, perhaps, one hundred years of antecedent history, and with not to exceed four decades of a subsequent movement that possessed any degree of architectural significance to others than ourselves, and yet as unerringly as in Europe we have recorded, in the terms of our art, the forward movement of our people.

Our land, colonized from England, Spain, France, and Holland, drawing to it ever since a population from most of the peoples of the globe—a land stretching from ocean to ocean, having climatic conditions ranging from those of Norway to those of Northern Africa—with its mineral, agricultural and other natural resources sketched in with a broad and lavish hand, was in its inception and early history notable for its isolation. This isolaton was not only geographical, but is reflected in a political system that is intensely and jealously individualistic, the keystone of its fabric being personal freedom and independence. As a new star in the firmament of government, it was peculiarly jealous of its own orbit, and largely justified its being by its very indifference to all European influence, fearing that therein lay discord and entanglements dangerous to the common welfare. Clearly the fundamental concept of this new government was the abandonment of the established European order of things, with its habits, customs, traditions, and conclusions, in so far as human determination could effect it. Pomp and display, class distinction and the exaltation by rank or otherwise of an individual or group, which in Europe played so important a role in the development of its civilization, were not to find place in this new scheme of things, and, as a natural corollary to it, almost the entire vocabulary of architectural thought was automatically abandoned.

Therefore we find in early times but a tract of the interesting and inherent architectural beginnings such as were characteristic of Egypt, Greece, Rome, and the various European nations, nor do we find a place for a receptive disposition towards those architectural types which at that time prevailed throughout Europe, as its expression of the power and importance of government or of a class.

A timid concession to traditions, which could not be altogether denied, we find reasonably applied to the first structure of the national capital and in the Executive Mansion at Washington. That these structures should owe their existence and excellence to the interest of Washington and Jefferson, and to Hamilton, the locating of the capital itself gives to our most important architectural effort of the time a personal significance, corresponding to their influence in the affairs of our Government. Throughout the Colonial period we find in New England and in Virginia, with its sister States, a faithful adherence to the manners and customs of the Mother Country, its architecture consequently that of the coincident Georgian period of England, and the word for it in our architectural vernacular, "Colonial." With us an architecture of brick and wood, severe, simple, and with a certain refined stateliness, owing to its existence as a precedent to the influence of our then leaders of thought and action, and merely reflecting their point of view, it ultimately became only a mode or habit of construction without architectural force or vitality. Its earliest and best examples, preserved by a fortuitous circumstance throughout a century of neglect and indifference, became in the end a helpful educational influence pointing towards the true path of artistic excellence; a cudgel with which to belabor a heedless utilitarian public but too prone to an inartistic display of its swiftly-acquired wealth, and to awaken its artistic conscience.

Again we rediscovered the rare beauty, quiet strength, and world of suggestion in the old Spanish missions of California and the south-west. Glowing with artistic spirit, in their extreme isolation from the then civilized world, they seem a miracle of accomplishment. They are the product of minds who loved art, and remembered it as of the land of their birth; but, forced by environment and conditions to a fortunate simplicity, they preserved and created for the admiration of our future generations the essence of all that is good in the architecture of Spain. To-day this work is a powerful source of inspiration to the prosperous people of all that region of the United States where these good old mission fathers did their work of civilization, leaving behind them evidence of their love of the beautiful. These, then, were the slender links that united us with the ancient architectural forms, and while they were not inherent nor endowed with a spontaneous expression of ourselves, nor an indication of our future development, they, for the moment, served as a borrowed garment, fortunately a good one.

The story of our departure from these standards, and the subsequent period of artistic squalor and ignorance, which I may refer to as our architectural Dark Ages, was one, however, not of wilful ignorance nor purposeful neglect, but of a condition.

It is the story of these people isolated by a great ocean, and by the greater intellectual ocean of abandonment of European traditions and ties; with the great task of solving an experiment in Government on a huge scale; with a vast wilderness to subdue and render serviceable to man; with the problem of assimilation of an influx of foreign population possessed of alien thoughts and customs; of a country that, as a whole, may be likened to the pioneer settler whose log-cabin is reared quickly out of the immediate material at hand for convenience and shelter only, so that he may the sooner set about the task of clearing his land and gaining his livelihood. Should accumulated wealth later bestow upon him or succeeding generations its independence of labor, and the opportunity to cultivate the mind, he may then observe the stored wisdom of history, and bow to its influence and tradition.

Colonial Architecture.

Therefore in our country, in this condition to which I have likened it, we find the Colonial type of domestic architecture principally interpreted, not by architects nor under an artistic impulse, but by the builders of the period whose personal vagaries and idiosyncrasies more and more overwhelm the meagre examples of this authoritative style. Throughout the country, and for the greater part of the nineteenth century, these conditions prevailed, for we cannot take as essentially typical the attenuated architectural movement, if it may be so described, that was discernible in a few of our more important sea-board cities. Broadly speaking, the entire scheme of things involved no application of artistic code or principle, but was merely the product of the builder-craftsman. In the older portions of the country we find the more important structures reared of brick and stone with a generally prevalent application of our own peculiar system of wood-construction to domestic requirements. Throughout the Middle West, in Ohio, Michigan, Indiana, Illinois, Wisconsin, and all that region west of the Mississippi River, the saw-mill was king and the carpenter-builder its faithful apostle and exemplar. The strictly utilitarian held sway, and the rapidly-increasing population of this region had neither the time nor inclination to consider such matters as art nor the refinements of a wealthy and settled community, and thus there became impressed an habitual habit of thought which stood for years as an obstacle to artistic growth and development. Buildings were an object of pride, and aroused interest and appreciation only because they expressed in size, materials employed, and in numbers, the growth of a community or the prosperity of the individual. These structures, with here and there a reminiscent architectural detail, usually crude and illiterate, were devoid of architectural sense of meaning, as were the people themselves of a proper understanding of the codified systems of artistic thought.

In this connection it does not appear to me that it is logical nor permissible to trace the course of that spark of architectural knowledge which moved onward from the early Colonial days, revealing itself from time to time in isolated instances throughout this period, and claim that its description is the story of American architecture.

Personally, I prefer to deal with that which in its broader sense arises from the people, as with the seed that is sown with Nature's forces working invisibly and within, until, under favoring conditions, its growth and full flower appears. Despite their apparent indifference to artistic feeling and their devotion to material development, these people held within them the seed of art, and during this period its germination and hidden growth was sure, awaiting but the bursting of a materialistic envelope to blossom into a keen love for and appraisal of the value of beauty and art to mankind. Manifestly this must be true of them since there were no kings, nobles, nor courts to patronize the arts, nor leaders of thought who could arbitrarily establish an artistic movement. The accomplishment of this could only be through the gradual dissemination of knowledge of and love for the beautiful throughout a people concentrated on practical problems, until they, in a unity of thought and action, should respond to the resulting impulse, thereby making possible an architectural epoch in their history.

It must be borne in mind that we are dealing with the development of architecture within a democracy, describing a movement probably without a parallel in the history of the art. Republican Venice in its day of commercial supremacy had her traditions of Rome and Greece, an old order of things to build upon, and an unavoidably inherited environment not of its own creation; of an artistic bequest authoritative in its derivation, and certain of itself.

We are dealing with a nation in which no individual could so dominate as to become a mainspring of artistic action, a nation so wedded to the formula of democratic simplicity that he who would lead must become its consistent votary, a nation that expressed this habitual attitude architecturally by its wholesale neglect of the artistic excellence of its public buildings of this period.

Passing over the time of the Civil War, the reconstruction days, and the panic of 1873, we find architecture at its lowest ebb concurrently with the renewal of the energetic development of railroads and of other fundamental industries, a consequent rapid increase in accumulated wealth, and of the power of the individual as well as of communities to assert their importance by a material display. The individual respected no architectural authority, save that of his own taste, under the guiding influence of the carpenter-builder. The architect was a negligible quantity, a mere speck in the background; and, in fact, the name had small significance except only when applied to the builder. An architect was a dubious being at best, who insistently expounded impracticable and useless theories about art and other effete things of European origin that were quite inimical to the interests of the local dealers, building trades, and their political henchmen. These were the controlling influences, and this was the day of diluted East lake and whimsical variations of Victorian Gothic, of jig-saw ornament, and of cast-iron tortured into night-mare semblances that to this day can scarcely be traced to their remote ancestry even by an expert. Under the authority, and with this vernacular, the residential architecture of the time was created, and cities and states so announced their power and importance in their institutions of learning, their capitals, court-houses, and other public structures.

Thus we have before us the spectacle of democracy, with its growing newly-acquired wealth and leisure, embarking without rudder or compass to range aimlessly the broad unfamiliar stream of traditional art. Many souvenirs of this extraordinary excursion still remain with us, but, fortunately, the greater portion of the work of that day has vanished, to make way for better things. The climax of this era occurred in the Exhibition buildings in 1876 in Philadelphia, and the greater part of the succeeding decade was required to mark its fall.

The Modern American Style.

To-day it may be justly claimed that the fundamental elements of our peculiar American type of architectural expression are discernible. Its precise formulation may not yet be possible, but it is a vital and growing thing, plastic, perhaps restless and unsettled, yet reflecting our rapidly crystallizing characteristics as a people. As an art, it has unquestionably found itself, and its underlying purposes and tendencies are capable of analysis and discussion. In method it is bound to no exact tradition nor architectural style, but does acknowledge the underlying principles and authoritative precedents that energize them all. For the present it is transitional in character, and, as to detail, is essentially an architecture of adaptation, wedded, as I have said, to no particular style, but seizing for the purpose at hand any suitable architectural form that applies to our situation and environment, but controlled by a trained art intelligence.

Here we have the interesting example of an art movement rather typically American, wherein the love of the beautiful and the desire of its intelligent expression is not due to the stimulus of the patron towards the artist, but, on the contrary, has flowed from the artist to the patron, or, rather, from an entire group of artists to an awakening public. Democracy having solved its fundamental problems, now encourages intellectual and artistic growth with a lavish patronage, that in its aggregate volume and result will some day be viewed with deep interest by the world at large. Even from the standpoint of historical analogy, the forces are at work and the material exists out of which to fashion this result.

The entire material equipment of this country which served its purpose throughout a period of transition and development must be, and is being, recreated in permanent and enduring form, thereby affording an extraordinary volume of architectural opportunity. A practical people, accustomed to quickly grasping and solving broad problems by concerted action, they have realized that beauty and art is a vitally important thing, and that to be acquired as a national asset their guidance and direction must be assigned to that group of men whose training and experience entitle them to it, and whose active propaganda are but reflected by this conclusion.

The educational influence now at work within us is as wide as the nation itself, proceeding primarily from the group of men referred to, also from schools of art, which are to be found in every important city in the land, from the regularly-established schools of architecture in our various colleges and universities, from the active and alert efforts of the lay press, and the intelligent and interesting art-criticism and discussion of the popular magazines and the technical journals of the profession.

In this scheme of education Europe may be regarded as one great laboratory, in which the practical application of the theories and influences of this educational movement are tested and applied. The thousands of Americans who, year by year, cross the Atlantic and travel about Europe have, regardless of their immediate motive, both consciously and unconsciously, absorbed the spirit, the grandeur and nobility of its artistic achievements, and have at last perceived that, besides the material wealth of a country, there must be a spiritual and intellectual wealth which art alone can express, and without which no nation can be truly great nor the full fruition of a people's destiny be accomplished.

I believe these influences have resulted in a public sense of discrimination and a sound professional analysis of the art and artistic nfluence of Europe, and from this I reason that there will ultimately appear in America a characteristic American style that will be grounded upon the verities of architecture, sincerely expressing the organism, use, and purposes of our structures, yet not insisting upon the forced and unnatural adaptation of motifs and detail in archæological reproduction of other styles not suited to ourselves. The day has passed in my country when the ideas and so-called originality of the individual is to be tolerated as a worthy substitute for the time-honored forms and concrete conclusions which represent the cumulative authority of the many minds of the past striving for truth and beauty of expression.

That our growth and development will be to a large degree homogeneous is to be expected, because of the ease of intercommunication and consequent habit of travel between our various states and cities. While interesting variants may appear, due to the Colonial influence of which I have spoken, there will be none of those phenomena that have in the past arisen from restricted intercommunication, isolation of cities, division of languages, and customs which so strongly individualized and restricted the art and thought of European groups, and which so comprehensively effected the formation of its various styles of architecture. Speaking one language, and existing under one Government, with facile and established habit of intercommunication, we are not subject to, in any given locality, the possible provincial outlook nor the requirements of local materials or customs peculiar to that locality, as in Europe.

Influence of the Chicago Exhibition.

Undoubtedy the greatest, if not the primary, stimulus of the present artistic development of the United States is to be found in the Columbian Exposition of 1893 in Chicago. It was here that the profession for the first time found itself in possession of a theme monumental in its scope and dignity, and of that peculiar quality and complexity which put it beyond the capacity of the layman or of the builder to control: resulting, therefore, in its assignment to a profession now become powerful enough to assert its right to assume direction within its own domain. The initial moment in our art history that required the united action of a group of properly-trained men, it was the first time when they had to deal with a problem in which architecture was the dominant note; recognized as the visible and vitally-important expression of the dignity and scope of the enterprise. The interest of a great public was to be aroused, and a situation of charm and beauty was to be created as a functional part of the display itself, and for this purpose the business men in charge perceived that good architecture was indeed a practical necessity. For the first time the ability of architects accustomed only to separate individual effort was to be gathered together, synchronized and welded into unified action, where the individual tendency must be subordinated to the requirements of all while dealing with a grandiose plan, the grouping of buildings in harmony of mass and outline conforming to a central governing ideal.

For the first time on American soil there was to be produced in orderly triumph the majestic splendor of ancient Rome, of Italy, of the dreams of France, and these architects, recruited from the field of conventional daily routine, thus found in their grasp the opportunity to display to a great people the possibilities and meaning of the art of architecture. To-day it is a thing of the past, ephemeral in its material existence, but everlasting in its message and impression upon the nation. With difficulty can you, to whom the traditions of your own land and the storied riches of Europe are familiar things, realize the revelation contained in this work of art, and its stimulus to our people. Its direct influence is manifest in every important city of our land, by local agitation for civic beauty, by established and projected control, and direction of the art expression of individual enterprises, by the popular demand for the beautifying of streets, the monumental groupings of public buildings, and the constantly increasing intelligence of popular architectural criticism.

A hitherto unknown language to the masses, this enterprise aroused in them a spirit of inquiry and appreciation, that with one great sweep of thought elevated the profession of the artist and architect into a plane of equality with all of the utilitarian pursuits of a practical money-getting age.

In the buildings erected during the past twenty-five years we have run the gamut of practically all known architectural thought—have experimented with about everything this side of the Indian wigwam. This has been done, not because of any lack of inventiveness on our part, nor of imagination, nor, again, does it suggest any feeling of satisfaction with such a state of affairs. We realize that we are dealing with something much more important than passing fads in millinery, automobiles, or dress, and that eventually this indiscriminate borrowing of other people's architectural garments must be succeeded by a costume more fittingly our own.

The incredibly rapid growth of our cities, increase of population, the demand for a new equipment of buildings of every variety of use and purpose, the razing of existing buildings (products, perhaps, of a previous decade, but become obsolete and in the way of imperative necessities), constituted a movement of such overwhelming volume, to be accomplished in such a short space of time, as to crowd upon the shoulders of one generation of architects—who virtually at the same time were re-creating themselves—a variety and volume of new problems, complicated in their every practical aspect, and presenting an entirely new artistic field of attack, that perhaps would not have been an easy task for three generations of men well entrenched amidst familiar traditions.

Genesis of the Skyscrapers.

Again, the entire absence of suitable precedent or style, and the presenc of a prevailing and entirely new form of construction having no European prototype, obviously presented a free range for the exercise of individual fancy, resulting oftimes in incongruity and an inharmonious eccentricity and lack of restraint. Owing to the ever-increasing height and the form of our buildings—a subject of great importance to which I shall give a special attention—new problems in the scale and application of detail were presented, which resulted in many architectural catastrophes, but are now better understood.

Due to all these conditions the successful architect found himself burdened with an extraordinary and varied assortment of buildings difficult to deal with at one and the same time, with the demon of American rush-methods relentlessly pursuing him—regarded by all of our highly-organized and efficient building trades as a sort of human rubber-stamp that worked automatically—what otherwise could he do but throw up his hands in despair, with one backward look of envy towards the old monks who constructed a few feet of cathedral in a generation, turn archæologist, and plaster his steel skeleton with a tidy arrangement of architectural dope, calculated to soothe the owner, the public, and the contractor, making everybody perfectly happy, but the poor architect being left alone with his sadly disfigured ideals?

It is my personal belief that this has had much to do with the exploitation of certain historical styles by several of our notable architects; to the extent that their names have become synonymous with those styles, as, for example, Richardson with the French Romanesque.

It is an undertaking that requires no small amount of executive ability and a highly-organized office to successfully manage this condition, and whatever tends to standardize and unify its efficiency must perforce be found and used.

Richardson, with his masterly knowledge of the style, was quite justified in his adherence to the Romanesque. It was not too violent a departure from the prevailing mode, was easily managed by the building trades, and suitable to the then existing range of available building material. How clearly he perceived this is proven not only by his own work and that of his immediate successors, who were trained under him, but also by the complete collapse of the movement he established when it fell into the hands of the horde of imitators who neither saw nor appreciated the importance of this fact, and who, in attempting novelties of treatment without proper means at hand, helped it to an early death.

Our next important architectural revelation fared more fortunately by proving itself much more adaptable to our wants, and, dealing with an almost infinite variety of refined flexible forms easily applied, became the reigning fashion for an extended period, and is to-day reasserting itself in a salutary and refreshing way.

This revelation came through the work of White and of MacKim, who did not at first display a full mastery of the style, but temporized with a curiously interesting architecture of brick and a reserved application of Italian detail. They soon became the leadng exponents of the Italian Renaissance, and since their output of residential, commercial and other classes of work was enormous, its educational influence with us must be counted of prime importance, and by their own good taste, fine sense of proportion, and full appreciation of the refinements of the style, they elevated our standards to a plane that will not be abandoned. In their extensive use of the Georgian period they reminded us of our best tradition, showed us the value of simplicity, control of expression, and respect for architectural law and order. Office expediency is to be apparent in much of their work, particularly in their bold confiscation of entire architectural compositions, as, for example, in the Tower of Madison Square Garden.

With us the first important exponent of the modern French school of thought and design was Richard Hunt, and his work was of such volume, his clientele so important, as to place him as one of the factors that shaped our tendencies. His earlier work adhered closely to the contemporaneous French Renaissance, but later his frequent and facile application of the style of Francis I. to noteworthy structures produced a widespread interest in the style. His high place is accorded him, not only because of the importance and quality of his work, but also for his sturdy maintenance of the best traditions of the French school, which now have become so important to us.

These men were great artists whose inspiration given to the young men of their day, now become the active men of this day, and to the whole trend of architectural thought in the official, governmental, and private life of our country, cannot be overestimated.

American Architectural Association.

It is important that I refer to the aims, influence, and results of the system of architectural education prevailing in our colleges at home and of the foreign schools, notably that of the Beaux-Arts system of struction, and the theory of architectural training as formulated by it. Better than any other, it seems to us to concern itself with the broad principles of architecture, of the laws of composition, mass and proportion, the proper use of ornament, and emphasizes the comprehensive grasp of problems of a nature comparable to our own. Furthermore, it has evolved a technical method of expressing these things so intelligibly that it is peculiarly suitable to the student, first grounding him in principles and then developing in him the power to indivdualize his interpretation of them. It is this insistency upon principles, and freedom from exploitation of any particular style or fad and the resulting flexibility, which popularizes this school of training with us. The general result of this organized system of education is already apparent, and will, in our succeeding architectural generation ,mark the greatest forward step in the right direction that we have yet known. Already the sobering influence of logical thought based upon this training in principles is visibly impressing itself upon our buildings, to their infinite betterment, and revealing a firmness of touch and a sure handling of design.

There is forming a unanimity or trend of thought that is replacing the scattered individual assertiveness of style that was characteristic of former days, which presages a typical American mode that will continue and prevail as a foundation for consistent development. I believe that the English influence and traditions will be always more in evidence in our expression of domestic architecture, because our habits of living are modelled upon the English customs, with particular reference to country life. Our public buildings, and our disposition of the larger civic architectural problem, will undoubtedly exhibit more decidedly than ever the French influence and system.

In the field of commercial buildings, we have presented to us our own peculiar characteristic American problem, and out of it we are developing our one positive contribution to architectural form.

Unlike the Gothic architecture, with its organic union of construction and design, it partakes of one characteristic Gothic quality, namely, the emphasis of the vertical and subordination of the horizontal line in composition. But, again, it requires a superficial envelope, a simulacra inclosing and concealing the real structural elements beneath, and in this respect becomes analogous to the arcuated construction of the Romans with its outward application of Greek forms and orders.

That we should have indulged in architectural flounderings and fantasies with such a problem as this to deal with is not to be wondered at when all things are taken into consideration.

Tall Buildings.

Our most unruly problem, the tall building, is, from my way of thinking, the result of the logical working of the law of supply and demand. It is neither fantastic, avoidiable, nor useless, will not yield to adverse legislation, because public necessity formulates a public opinion that will not legislate.

It is amusing to read in the publcations of fifteen years ago the diatribes against it and prophecies of its early extinction which were provoked by the modest fifteen and twenty-storey structures of that time. The architect of the then tallest building in New York announced in print his belief that the end of tall buildings was in sight. Structures of twenty-five, thirty, forty, fifty, and even sixty storeys have been the answer. It furnishes a typical example of practical necessity and mode of existence creating a movement which ends in something distinctively characteristic of a people, and in this instance steel-construction and the tall building is affecting us as did the round arch and vault of the Romans. The business centres of such cities as New York and Chicago, as created to meet the conditions of 1860 to 1870, were soon outgrown, and the necessity for larger and better buildings became apparent. The established business centres could not be, or, at least, were not, moved, property values and the existing inter-relations in those centres being of too great moment at the time.

This generally prevalent condition produced different immediate results in different sections of the country, which long since have converged into an established common practice.

Skeleton Construction.

In Chicago, we find that the direct causes that led to the first example of true skeleton construction were—(*a*) the necessity for increased height; (*b*) which the character of the supporting soil rendered impossible on account of the weight of the then prevailing type of massive masonry walls and interior columns, and which could not be overcome unless (*c*) a system of construction be devised stronger and of less weight than other types, which was accomplished by the device designated by us as the "Skeleton Steel Construction."

The system as developed is a simple one in principle, consisting of supporting columns of steel or cast-iron, braced in all directions, and riveted or bolted to the horizontal girders and beams, which not only support the floor construction, but, more important still, also carry, story by story, the outer walls of the structure, which thus cease to have constructional value, becoming a thin screen of material that serves to enclose th building and to protect the steel fabric from exposure.

The outer walls being but screens, the masonry supporting nothing, their piers were in consequence easily reducible to a minimum surface width, and the area of glass could thus be largely increased, thereby giving a maximum lighting to the interior, a device rendered necessary by the generally increased height of our buildings fronting upon streets that could not be increased in width. The effect of this condition is manifest in the earlier treatment of the architectural design of these structures, and has become typical of them in the work of the present day.

The walls, being non-supporting, could be reduced to a minimum thickness, thus providing an important addition to the interior area of each floor, and materially increasing the earning power of the building —an imperative necessity because of the rapid rise in ground value in central business districts.

None of this development would have been possible, however, if it had not been for the American type of elevator, which was promptly developed in response to this new demand, and has kept pace with it ever since by evolving new principles of construction and operation necessary to cope with the constantly-increasing height of buildings and the enormous increase in service, both as to speed and volume of traffic.

These foregoing advantages, meeting our conditions and requirements, led to the general widespread adoption of this system, resulting in the development of remarkable contracting and building skill and organization, of which we have every right to be proud, and which has produced amazing results as to speed of construction, quality of work, and economy. With our high ground values and the necessarily great earning power of these structures, the saving of time in their erection became a matter of momentous importance, and this necessity led to the creation of the skill and organization referred to.

This type has come to stay because of its attributes of structural endurance, safety, economy in first cost and of upkeep, and its general suitability to our modern conditions.

While it has belonged to the domain of the architect, becoming the accepted type for our huge hotels, apartment houses, and commercial structures, and under his direction is fast becoming a thing of grace and beauty from a beginning of sprawling ugliness, nevertheless it must be said in all fairness that these structures could not have been devised without the skill and genius of our mechanical and structural engineering professions, the builders, and the skilled mechanics, whose trades have become specialized and developed by this demand, all united in effective co-operation with the architect.

The question is frequently propounded, "Are these structures beautiful, or can they be made so, and thus enter the realm of artistic thought?" In my opinion the answer is emphatically, "Yes." It is no conclusive argument to decry them because in certain communities people live and pursue their vocations in such a manner as to make this type of building unnecessary, or because, since they have thereby been enabled to restrict the height of all building to a lower level, producing a uniformity of general effect, they can then point to Paris as the grand example of this sort of thing, and claim her artistic virtue as their own. Beauty of this sort is the outgrowth of suitability to local conditions, plus the artistic thought that may be apparent in the means adopted, but it is, after all, only one kind of beauty. There is beyond question the beauty to be found in truthful picturesqueness when it is a natural outgrowth of conditions inherent to the people, and it can be made quite as respectful of architectural law, and the result of individual effort being made with regard to the effect of the whole, while working in this freedom of spirit, as though it were hemmed in by ironclad restrictions as to height, etc., that are characteristic of certain communities.

The development of the exterior treatment of the tall building architecturally has been exceedingly interesting, and in the time and space afforded to me in this discussion cannot be described in detail. The stereoptical views and the comment thereon which I have to present will illustrate the subject in a more effective manner.

Treatment of the Tall Building.

Briefly stated, our fundamental principle in design seems to have become established by treating the tall structure as a column with its base, shaft, and capital. In all of the best and most pleasing examples of the later work this element appears, and we find the lower storeys grouped in a single architectural composition supporting a long vertical and shaft-like series of storeys grouped into a simple treatment that carries the eye upward without interruption to the crowning feature of the entire design, which again is a series of storeys combined into the capitol, as it were, of the mass. The pleasing variety of thought in the handling of this scheme of treatment is one of the best features, and, generally speaking, is now characterized by a sober, refined self-control and a truly architctural spirit. In the classic feeling of the Italian Renaissance the municipal building of New York is unquestionably one of the best solutions of the problem on these lines that we have, while in the West street building and in the Woolworth building, both in New York, we have equally good examples of the application of Gothic feeling and detail. Considering its extraordinary height and unusual mass, the design of the Woolworth building is, in my judgment, an architectural achievement of the highest order. I have referred to thes buildings not only because of their architectural merit, but also for the reason that they represent the two broad schools of design which seem most suitable to the problem presented by the tall building, and are, I believe, typically representative of our lines of future development.

In pointing out the consummation of this century and a half of architectural growth in my country, I would have you enter the harbor of the city of New York on a transatlantic liner, and from that point of view for the first time observe the buildings of the lower end of Manhattan Island, with their towering and amazing skyline and mountain-like mass of architectural grouping, picturesquely artistic and truthfully expressive of the spirit of our lives and activities.

I believe that it will grip the imagination of any observer, whether he sees it for the first or the hundrdth time, and that he will experince from it that flow of thought and impression which is produced only in the presence of some great and inspiring thing. To me it illustrates the quality and the character of our people, their aspirations, and their peculiar genius in terms of architecture, as do our mountains and valleys, our lakes and rivers, the physical character of our land. Prosperity, wealth, and power we are surely possessed of, and we are as surely acquiring from the artistic wisdom and traditions of Europe that which is useful and good for us to have, and are applying it intelligently to our needs. As a people we are learning to respct and revere art, and to value its uplifting influence, and with these fundamentals to build upon, and with the artistic forces that are ever active amongst us, the future of American architecture will be worthy of high regard.

THE ROUND CORNERS OF NEW YORK CITY

How the improvement of business intersection, such as is under discussion in Toronto and other Canadian cities, has been accomplished in New York.

JUST NOW, when the question of widening certain intersections in the downtown business district of Toronto is under discussion, an article of timely interest by Franz K. Winkler, dealing with what has been accomplished in this respect in New York city, appears in our contemporary, the "Architectural Record." The author, who discusses in a broad way what is termed in the caption "Mitigating the Gridiron Street Plan," describes in part the round corners of the American metropolis as follows:

It is, no doubt, the interminable monotony inflicted by the rectangular plan which is, architecturally, its most depressing feature. "A whole city full" of "straight-sided and right-angled houses" must necessarily be a most depressing spectacle to those condemned to witness it and traverse it daily. Irregularity in the street plan enforces some ingenuity in the house builders, some picturesqueness in the houses. How much more interesting to walk about is, on that account, the irregularly laid-out Dutch settlement below Wall street than the "long, lovely streets" above Fourteenth, which were "regularly laid out" by the system of a hundred years ago. An

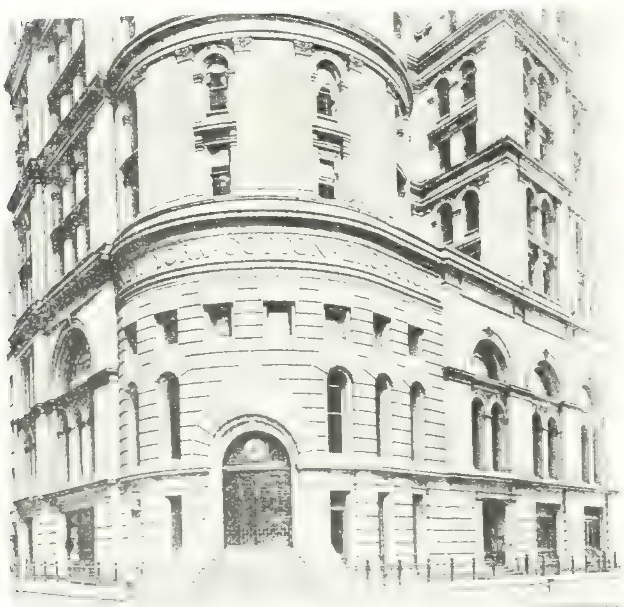


Fig. 1.—The Cotton Exchange, Hanover Square, New York City. Geo. B. Post, Architect.

acute or an obtuse angle cannot be as monotonous as the unvarying succession of corners where two walls meet at a right angle. The obtuse or the acute angle not only offers, but in some sort imposes, an architectural opportunity. Accordingly, it is in the downtown district, and up-town, along Broadway, where every street corner offers two obtuse and two acute angles to the builder that some variety is offered to the monotony that prevails elsewhere.

The site of the down-town Delmonico's almost compels an interesting building. It is one of the most commanding that the irregularly laid-out street plan of the lower island supplies. The opportunity impressed the designer of the elder building on the site, doubtless dating back to just after the great fire of 1835. When that was outgrown, its architectural features, the porch and the order at the narrow end on the rounding corner, were in effect judiciously reproduced in its successor. The successor is of

Fig. 2.—The Royal Insurance Building, Corner William Street and Maiden Lane, New York City. Howells and Stokes, Architects.

modest altitude among its neighbors now, though its eight stories made it a portentously tall building when it was erected in 1892, being an example of the transitional building in which, of the factors which have gone to the production of the modern skyscraper, only the elevator was already in operation. A sensitive passer can hardly look at it without deploring that "the system" prevents the multiplication of such opportunities as that which has here been so effectively employed.

The Cotton Exchange (Fig. 1), in the neighborhood of Delmonico's, is another transitional building between the old five-story office building and the new indeterminate skyscraper. One may remark, in passing, that that transitional building, of from seven to twelve stories, with real walls of masonry, seems to have invited or compelled more originality and individuality of treatment than its successor of the steel frame. In this case the rounding or other signalization of the corner was not compulsory, since the angle is nearly or quite a rectangle. But the rounding, it will be agreed, is very effective all the same, enables the designer to give dignity and importance to the principal entrance, and gives the passer something to look at for which he ought to feel grateful, and if of an appreciative constitution does feel so. And Gradgrind himself, to whom the unusual disposition has nothing to say, could hardly complain that the effect was too dearly bought by the sacrifice of room. There is no such sacrifice.

It is satisfactory to observe that the effectiveness of such features as these has not been lost upon the designers of the fully developed skyscrapers, and that, when they have the good luck to deal with a corner and not a mere inserted street front, they are increasingly showing their sense of their good fortune by endeavoring to make a feature of the corner, even when it is rectangular. One cannot always, nor perhaps generally, say that the corner is the "logical" entrance for a building fronting on two streets. But it is the logical entrance, at least, to the room at the corner, and, in a building erected primarily for the uses of an institution, and secondarily only for what

Fig. 3.—Broadway, South-east Corner of Twentieth Street, New York City. McKim, Mead and White, Architects.

rental may be derived from it, the corner is often the logical abode of the institution, and its separate entrance a logical and suggestive feature. On the other hand, there is, structurally, a want of logic, in a building which is designed upon the assumption, however false, that it is a building of masonry, in piercing with large openings the corner which should be, and which, if the assumption were true, would have to be, the solidest and most fortified piece of masonry in the entire building, as being the ultimate abutment of the walls on both sides. *De non apparentibus et non existentibus, eadem est ratio.* Of course, the passer knows that, as a matter of fact, by means of the steel frame, the masonry of the corner can be gouged out and weakened to any extent without compromising the stability of the structure. But all the same, the architect engages in a self-destructive process when he contradicts his false pretence that what the spectator sees is an actual structure competent to carry itself. He ought to bear this truth in mind when he undertakes to scoop out his corners, and to leave as much solid-seeming wall, and to fortify it as speciously as is compatible with his purpose of cutting an "important" hole in it. In this respect the entrance to the Royal Insurance building (Fig. 2) is particularly well contrived, and is, indeed, pretty nearly a model of treatment for a corner entrance to an institution which, like the "private family" that let lodgings in the old days before the apartment house, "has more room than it requires,"

Starting from the financial district northward, one comes upon one notable example of irregularity in the southern end of the Post Office. One cannot call it exemplary, for undoubtedly the city gave away its birthright for a mess of pottage when it yielded to the importunity of Mr. Mullett forty years ago and consented to move away the park fountain which had been playing for twenty-five years, or ever since the introduction of Croton water, in order to make room for the Government building. All the same, the most interesting point of design, some may say the only interesting point of design, in the granite pile is the manner in whch the ground is taken advantage of, and the triangle filled out, by the advancement of the southern front in narrowing echelons. Unfortunately, there is no proper distance from which it can be seen. It is good enough to stop a vista withal.

Nevertheless, the one anomaly which the layers out of 1807 allowed to stand is also the one up-town thoroughfare which offers opportunities for any picturesqueness of outline. Broadway does this all the way up from its westward turning at Grace Church. That church itself owes much to its situation just at the turn. From there up to the Harlem River every intersection of the thoroughfare with the "sieve" of the system offers at least two obtuse and two acute angles, of various degrees of obtuseness and acuteness, according to the curvature of Broadway. Every one of these corners is more or less a challenge to the ingenuity of the architect. The challenge has commonly been shirked, perhaps not by the fault of the architect, but in the interest of economy. There is no denying the postulate of the commissioners of

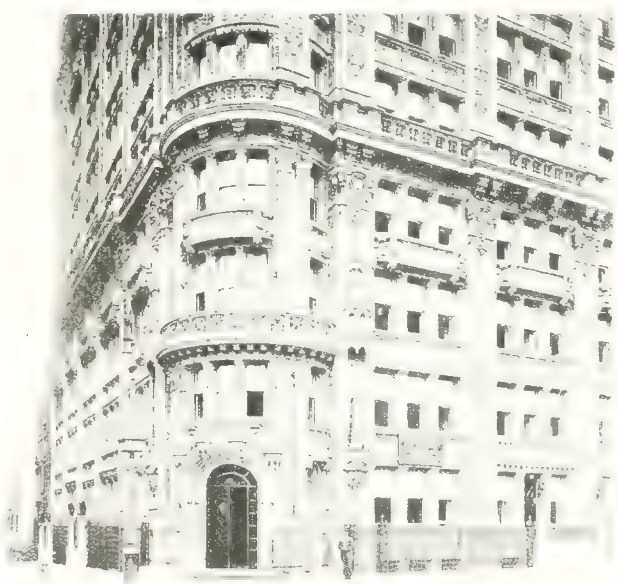


Fig. 4.—Seventh Avenue, South-east Corner of Fifty-eighth Street, New York City. Harde and Short, Architects.

are the cheapest to build," grossly as they exaggerated the importance of that consideration. Never-
1807 that "straight-sided and right-angled houses
theless, there are examples along Broadway where the challenge has been taken up and satisfactorily met. One of the most noteworthy of them is at the southeast corner of Twentieth street, where an acute

angle is rounded and furnished with an entrance which is a highly attractive feature (Fig. 3). In the stilting of the arches compelled by the arrangement and the curvature, we may see repeated the process of the architects of the French Romanesque, where, as in the circling of an apse, they had to deal with arches of different spans and the same height. Doubtless it was the awkwardness which this process entailed, in complicated cases, where the round arch was retained, which led, among other similar drawbacks, to the introduction of the pointed arch, which it is evident that the Gothic architects employed at first under compulsion and not from choice, seeing that they continued for so long to use round arches where they could and pointed arches only where they must. This New York example shows how effective may become the stilting of round arches of less than the normal span of the openings of the building in which narrowing compels the stilting. On the corresponding corner of Twenty-second street occurs another interesting feature, made, this time, by truncation and not by rounding. The truncation is sufficient to afford a face wide enough to admit an oriel window, which, though rather domestic than commercial in character, is yet an effective feature.

But, upon the whole, the architects of upper Broadway have by no means lived up to their privileges in "featuring" their corners. The instances we have cited are almost alone, though, to be sure, there is a rather picturesque turret in red brick at the northwestern, and, therefore, acute-angled corner of Eighteenth street and Broadway, by the late Edward H. Kendall, rather interesting, though much weakened by the absence of any visible means of support.

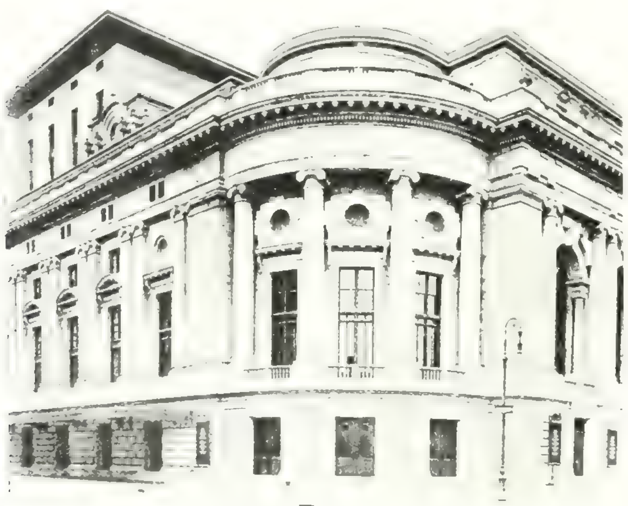


Fig. 5.—The New Theatre, Eighth avenue and Sixty-second Street, New York City. Carrere and Hastings, Architects.

But, desirable as the irregular angle is to draw attention and lend distinction to the building upon it, the square corner is also capable of some distinctive and individual treatment, although so few architects seem to appreciate that fact. Doubtless it is the common superstition that there is a "waste of room" in every building which stops short of the building line, which is not "built to the limit" in every dimension, that is responsible for this abstention.

Yet, in domestic architecture, in particular, a rounded bay at the corner not only offers an opportunity for a picturesque exterior feature, but very often, by the simultaneous command it gives of two streets, furnishes an interior attraction which any occupier would be delighted to acquire at the infinitesimal cost of the space it sacrifices. For the purpose of producing a grandiose architectural feature at a street corner, the New Theatre very impressively illustrates the advantage of rounding the corners, even when the street system has squared them (Fig. 5). Nothing in the treatment of that building is more admirable than the introduction and the design of the rounded and crowned pavilions at the corners which shelter and denote the entrances. There are other methods of circumventing the street system and mitigating its asperities. But they require some municipal co-operation. This of giving more importance and interest to the corners any architect can apply, in a case suitable to its application, with no other assistance than the connivance of his owner. All the same, one can by no means commend the performance of the architect who is responsible for the building at the south-western corner of Fifth avenue and Thirty-eighth street. He has compelled attention to his work; there is no doubt about that. But he has compelled it by compelling wonder how the thing stands up at all, why it does not kick out at both its unabutted ends and tumble into its own yawning void. Of course, that it what it would do if it were what it purports to be—a construction of masonry. And, of course, one understands that the real structure is not at all what one can hardly call the "ostensible" structure, but is a concealed framing of metal, which has nothing to do with the architectural case.

Fig. 6.—Fifth Avenue South-west Corner of Thirty-eighth Street, New York City.

PRESENT DAY ECCLESIASTICAL BUILDINGS

English architect deplores perversion of constructive principles in modern work. Says cheapness began when traditional architecture died out.

THE PERVERSION of constructive principles so manifest in much of the present day ecclesiastical work form the subject of an interesting article by W. D. Caroe, F.S.A., F.R.I.B.A., which appears in a recent issue of the "Church Builder." After a brief introduction, in which the "cheap" church is characterized as a product entirely of modern origin, the writer says: Our church building ancestors, who may be said to have invented and developed for us the type of building which so materially influences our designs and methods, never indulged in unsubstantial work erected chiefly because of its cheapness. They worked under a continuous tradition which had its best development in church building, and made them beautiful, substantial and solid. This statement is consistent with the fact that these great builders many times began a work which they had not the means to complete on the scale of magnificence contemplated at the outset. In such cases a simplification of detail took place; a vault perhaps was omitted and a wooden roof erected in its place. But still, the work finally accomplished was never "cheap." Again, there were instances where the building materials more usually desired were too costly to come by owing to difficulties or distances of transit, and they had in such cases to put up with such inferior materials as they could collect on the spot. A large part of their art consisted in the suitable use of such local material. We find notable examples where piers, arches, and every part possible are erected in the roughest rubble masonry plastered over. Dressed stone is used in the smallest possible quantity only where, as in window traceries, it could not be dispensed with. But in such cases the pillars, being comparatively weak in construction, were made stout and sturdy, and extra thickness was given to the walls. Here again we cannot accuse them of cheap building.

Cheapness not Economy.

Cheapness seems to have begun when traditional architecture died out. Some of the churches erected towards the latter end of the 18th century were essentially cheap, and cheapness was rife in the early part of the 19th. In latter days it has been held in check in England, only by such societies as the Incorporated Church Building Society, and to a lesser extent by the Ecclesiastical Commissioners.

Economy, the author contends, is not necessarily cheapness; this is the distinction to be made clear, for the two in fact are wholly opposed. Experience tells us that cheapness in building involves with unerring certainty dearness of upkeep. Cheap building is invariably bad building, and for the results of bad building there is no remedy save demolition and starting afresh, when at length funds and patience alike have been exhausted in the fruitless effort to heal running sores.

Now there are, nevertheless, those who promote the building of cheap churches, and influence ignorant committees unable to distinguish between cheapness and economy. As cheapness and vulgarity seem to run in harness, it is not surprising to find the art of self-advertisement, for which the press of today affords such ready facility, frequently resorted to in this association. Such advertisement generally takes the form of a promise of a church at so much a sitting (a wholly fallacious standard). In the outcome the promise is frequently unfulfilled, but if fulfilled, it is only by sacrificing essentials. But whether fulfilled or not, there is the same special puff in the ear of the local reporter, when one of these structures receives episcopal benediction.

The Stereotyped Design.

A study of churches of this type is worth making. It will be found that each and all of them come in each individual case from a brain which has not two ideas. Precisely the same set of plans and details and the same specifications are used again and again, no matter what or where the site or the locality. At the very outset this bespeaks economy of production in favor of the producer, but at the lack of it to the payer, because the cost of materials and their lasting qualities vary with the locality. The specification is, moreover, apt to be of the most meagre and inadequate type, with large provisional sums reserved, so that, in the event of a breakdown in price in any locality, some alternative material may be substituted, no matter how unsuitable.

As far as granting and approving authorities are concerned, the design manages to run the gauntlet of approval with the narrowest possible margin, but having done so is loudly belauded as having secured what is represented as cordial recognition. As a matter of fact stereotyped design is submitted again and again and the same faults are pointed out by granting authorities *ad nauseam* and with difficulty secure correction, though apt enough to appear again in the erected building. It is one of the curious facts connected with the revision of design that the worse the design the more stiff-necked is its author in consenting to amend it.

Again, the class of design we are considering is generally of that garish and showy type abounding in fussy architectural features, thoroughly poor in themselves, but devised to catch the eye of the uneducated in these matters, who predominate on many building committees. It tries, with small success it is true, to found itself upon the past, and is apt to provide capitals and bases and tracery and mouldings, all those features which remove the architecture of the past out of the sphere of cheapness. In trying to give these things cheaply they are given badly, while at the same time matters of more importance are sacrificed.

The Qualities of Economical Architecture.

All the time the money thus squandered might have been spent upon genuine, creditable and economical architecture, the qualities of which may be briefly set forth as follows:

(1) The use of suitable and, if available, local materials in a simple and direct manner, as best suits their nature. This requires much more art than is usually displayed in the class of buildings we are considering. Appropriate style, in fact, really depends upon it.

(2) The disposition of the materials so as to secure the greatest possible solidity and stability in relation to the amount of material used.

(3) The special adaptation of each design to the site upon which it has to be placed, and also to the needs of the climate and surroundings.

(4) The securing of architectural effect and interest by simple lines and good proportions rather than by elaboration of detail.

Reticence in design and harmony of parts go far to produce the element of solemnity and inspire that sense of reverence which ought to be present in every building devoted to the service of God.

THE THEORETICAL AND PRACTICAL SIDE OF VENTILATION

Both should be thoroughly considered if best results are to be obtained. Too much rule of thumb in present practice.—By Theodore Hough.

THE PROBLEM OF VENTILATION is largely an engineering problem, but, as in all such problems, the highest efficiency can be secured only by knowing accurately the conditions with which the engineer has to deal and the ends he must secure. Is the theory upon which we base our practice in accord with the advance of knowledge during the past two or more decades? This is always a good question to ask, and especially with regard to matters involving costly and often inconvenient building construction.

The old idea that the purpose of ventilation is to keep the air reasonably free from carbon dioxide and supplied with its normal content of oxygen, has long since been given up. Rarely does the carbon dioxide rise to more than 50 or 100 parts in 10,000, or the oxygen fall below 19 or 20 parts in 100, and we have no reason to think that this of itself, is responsible for the effects of poor ventilation. At the same time it is by no means proved that the quantity of oxygen available to the body or the effectiveness of the removal of carbon dioxide from the body are without influence, for it is the quantity and especially the tensions of these gases in the lungs and not the quantity in the air of the room which is the important thing. It is not impossible that there may be various reflex or psychic interferences with the normal working of the breathing mechanism which results in deficient or perhaps in the equally undesirable overventilation of the lungs. Fortunately, the introduction of Haldane's simple method of analysis of the alveolar air now renders this subject capable of comparatively easy investigation, and it is to be hoped that our knowledge about it may soon be materially extended.

The failure to make the composition of the atmosphere in oxygen or carbon dioxide responsible for the results of poor ventilation led to the theory that the cause of the trouble is the presence of minute traces of extremely poisonous material in the expired air, and it was furthermore assumed, with utterly inadequate proof, that these poisons came from the lungs. Hence the teaching that while the carbon dioxide of the expired air is not itself responsible for the bad effects, it may be used as a measure of the imponderable or undeterminable poisonous material. And so there have been thousands of analyses of air for this gas in the endeavor to measure thereby the efficiency of ventilation.

Expired air unquestionably contains material not present in normal air, and these materials often have a very offensive odor. But it is not true that they are contributed chiefly by the lungs. Decaying food particles in the mouth, catarrhal exudates, uncleanliness of person, and the like, are far more responsible for their presence. If this is so, it is perfectly clear that the carbon dioxide is not a measure of their amount. A room crowded with typical representatives of the great unwashed, who do not brush their teeth and have never occupied a dentist's chair, would certainly impart to any assembly room a flavor which could not be given by the same number of individuals of cleanly habits; and yet the carbon dioxide content of the two rooms would in all probability be identical.

Nor is this all. Even granting that these offensive substances are present, it is not proved that they are poisonous, or at least to what extent they are poisonous. The fundamental assumption of all such theories is that in the bad effects of poor ventilation we are dealing with some sort of intoxication, i.e., with the action of a poisonous material reabsorbed into the body with the inspired air. Good as this assumption may be to serve as a working hypothesis upon which to base accurate investigation, we may confidently challenge the production of any adequate proof that poisonous material in the inspired air is the sole or even the chief cause of trouble. In other words, even on the theory upon which it is based, this measurement of carbon dioxide is an example of "barking up the wrong tree," wasted effort which the exercise of a little common sense would have saved.

Nor is the teaching of physiology lacking in indications of other and certainly equally important sources of trouble. A crowded, badly ventilated room is always in an overheated room with an atmosphere surcharged with moisture. The heat comes from the oxidations going on in the bodies of its occupants, and every breath of expired air leaves these bodies not only with an increased percentage of carbon dioxide and possibly other material of organic nature, but saturated with aqueous vapor. In other words, the atmosphere of the room comes to repeat the conditions of a warm, muggy summer day. Indeed, it only requires an appeal to experience to see that there is a suspicious similarity in the effects of the two conditions upon the human organism. The importance of these atmospheric conditions is, moreover, enhanced when we remember that it is not the general air of the room, but that in immediate contact with the persons of its occupants which exerts the physiological effects in question. The writer cannot but feel that if more attention had been paid to the physical condition of the air within a few inches of the body and less to the general air in the room, the practice of ventilation would to-day be far more efficient, simply because it would have coped intelligently with at least two of the main evils.

The treatment of the practical problem of ventilation as a portion of the applied physiology of respiration takes far too narrow a view of the subject, and indeed this is recognized in much of our practice. In technological schools, courses usually combine the treatment of the subjects of heating and ventilation. But they do not generally look upon heating and ventilation as two separate things, instead of being, as they really are, two parts of the same problem. Of course, in such matters all depends upon our definition of terms and we may confine our conception of ventliation, if we will, to supplying of "fresh air" to an inhabited room. At the same time it is no uncommon occurrence to get wrong points of view because of the previous adoption of unfortunate definition. Ventilation as it is popularly understood, and we think it should be understood, is not simply the replacement of vitiated pure air; it is rather the maintenance of ideal atmospheric conditions in a room, the correction of all undesirable atmospheric conditions, such as the presence of offensive and possibly poisonous constituents, too high or too low temperature or humidity, contamination from leaky gas fixtures, the up-draught from damp cellars, and numerous others for which the practical engineer must be on the lookout, and which he must understand how to estimate with approximate accuracy. The practice of ventilation as an art is perhaps more a case of the applied physiology of temperature regulation and the circulation of the blood than of the physiology of respiration; it is far more a physiological than a toxicological problem; and, more than this, it requires practical knowledge of many factors of domestic and public sanitation.

The practical side of ventilation should also take account, to a far greater extent than it actually does, of the variable nature of the conditions with which it must cope. The maintenance of ideal atmospheric conditions in a climate whose mean temperature is 75 degrees is an entirely different proposition from what it is in one whose mean is 65 degrees; it is entirely different according to the relative humidity; and the problem differs, above all, with the variability in these conditions from day to day. Has there not been entirely too much rule of thumb in our practice? Every treatise on the subject gives tables of the number of cubic feet of air which should be supplied to hospital wards, to school rooms, to factories, and so on. Surely it must make all the difference in the world in what sort of a climate these buildings are located. Formulas are excellent things, but only when they are judiciously applied, and a good formula for one city may be a complete failure in another.

It may also be pointed out that it is almost certainly a mistake to seek for any single convenient test of the efficiency of ventilation. It is, of course, not impossible that some test may be found which would give an approximate measure of this efficiency; but there certainly is no such test known to-day, nor is it likely that it will ever be discovered. The determination of carbon dioxide, as above pointed out, has been lamentably overworked. The operation of this test by a chemist sent from the office of a ventilating expert may at first impress the layman who knows nothing of its significance with a pleasurable feeling that he is getting the worth of the money spent in installing a ventilating system; but too frequently the same layman is found a year or so later expressing his opinion of "these scientific fellows" in language more picturesque than quotable, but he is usually justified in doing so. Efficiency tests should certainly include temperature and humidity, and the results of all tests should be interpreted in the light of actual knowledge of the conditions to be dealt with. After all, the final test is the experience of the occupants of the room.

There is in this whole matter a large field for the very best kind of scientific study.

AUSTRALIAN CAPITAL SCHEME COMPETITION—Continued from Page 78

A description of the site selected is also given, and a model of the city site on a horizontal scale of 400 feet to 1 inch with a vertical scale of about 100 feet to 1 inch has been prepared, and a cast of the model will be sent to each of the centres of distribution for inspection. The invitation to competitors states that:

(1) The government of the Commonwealth of Australia invites designs for the laying out of its capital city, and undertakes to remunerate the authenticated author or authors of the designs that may be placed, respectively, first, second, and third in order of merit at the final adjudication upon the designs, in accordance with the "Conditions of competition" as follows: For the design placed first, premium £1,750; for the design placed second, premium £750; for the design placed third, premium £500.

(2) The conditions under which designs are invited and will be received by the Commonwealth follow under the heading "Conditions of competition."

(3) Information and particulars are also given, solely to assist intending competitors, under the respective headings: "Historical and introductory"; "Requirements"; and "Description." The statements contained therein do not form part of the contract between the Commonwealth and the competitor.

(4) Information for the guidance of intending competitors will be available, free of cost, at the following places: Australia, the Department of Home Affairs and the Public Works Department of each State; New Zealand, Public Works Department, Wellington; Canada, Public Works Department, [illegible]

... Department, Pretoria, and Public Works Department, Cape Town. London, Office of the High Commissioner of Australia; Paris, the British Embassy; Berlin, the British Embassy; Washington, the British Embassy; New York, the British Consulate General; Chicago, the British Consulate General.

(5) Applicants must establish their bona fides as intending competitors before being supplied with information.

(6) The information comprises the following: (*a*) Historical notes, conditions of competition requirements, general information, descriptive matter, and statistics relating to meteorology and climatology; (*b*) map of preliminary countour survey of site of Federal capital at Canberra; scale, 20 chains to 1 inch; (*c*) map of contour survey of site of Federal capital at Canberra (two copies); scale, 400 feet to 1 inch; contours, 5 feet vertical intervals; the trigonometrical meridian may practically be regarded as the local true meridian; (*d*) topographical map of Federal territory of about 900 square miles; scale, 6,000 feet to 1 inch (approximately); (*e*) map of the State of New South Wales; (*f*) map of the south eastern portion of the State of New South Wales; (*g*) geological map of the city site, scale 800 feet to 1 inch, and two reports by the Government geologist of New South Wales; (h) map showing rainfall and temperature statistics of the site for the Federal capital and surrounding district; (j) report by the Commonwealth meteorologist on the climate of the Yass-Canberra district; (k) reproductions of landscape sketches taken from points within the city site.

(7) Competitors will be bound only by the "Conditions of competition," a copy of which must accompany any design forwarded by any competitor.

A feature of this world-wide competition contemplates that immediately after the announcement by the Minister of the adjudication of the premiums, which will be made at Melbourne within two months of the date of receipt of designs, it is intended to publicly exhibit in Melbourne for a reasonamle period all designs admitted to competition. Should the competitors desire on their own behalf to arrange a second exhibition in London or elsewhere, the Minister will, if requested, supply as exhibits reproductions from the originals of the premiated designs only.

WATERPROOFING MATERIALS

AMONG THE MANY DIFFERENT brands of waterproofing materials now on the market, the H. W. Johns-Manville Company, are offering an exceptionally high grade line of fabrics, felts, cements and coatings, known as J-M Waterproofing Materials. These materials, which are the result of this firm's half-century of experience, careful study and unexcelled facilities, are especially made to meet every condition in waterproof building construction, and have been effectively used for waterproofing underground tunnels, walls of brick and concrete buildings, dams, reservoirs, swimming pools, etc., with much success. J-M Waterproofing Fabric is strong, loosely woven burlap impregnated with pure asphalt. The asphalt not only clings, but becomes locked into the fabric, and it is claimed that a few layers of this fabric makes a waterproof course of great strength, ductility and elasticity that remains intact and resists moisture even when cracks occur in the cement work.

J-M Waterproofing Asbestos Felt is made of pure asbestos fibre, thoroughly impregnated with pure asphalt. This fibre, being composed of only mineral substances, is said to contain nothing to decay or deteriorate, and is therefore best adapted for waterproofing all exposed and foundation construction work. In addition to being waterproof, it is also claimed to be positively acid, mould and rot proof. The asphalt is of a peculiar nature, and has wonderful cementitious characteristics. It is used cold and hot and does not run, shove or creep, and will not become brittle in high or low temperature. This combination produces a waterproofing fabric that is especially serviceable where continual dampness prevails.

One of the most perfect water and damp proof materials made by this concern is J-M Waterproof Coating. This is a combination of carefully selected materials of the highest grades, which, when applied, makes a film unimpenetratable by moisture. Aside from being inexpensive, it does away with furring and lathing and makes a positive bond between plaster and brick or stone walls. This coating protects plaster from strains due to dampness, also from discoloring by fire-proof tile walls. Damp cellars and walls coated with this coating are made clean, sweet and useful. This coating can also be used in place of so-called non-staining cements, for stain-proofing marble, granite and limestone.

This concern, which has branches in Toronto, Montreal, Winnipeg and Vancouver, has issued a little booklet explaining fully the merits of their waterproofing materials, which they will gladly mail to anyone on request.

CONSTRUCTION

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CONTENTS

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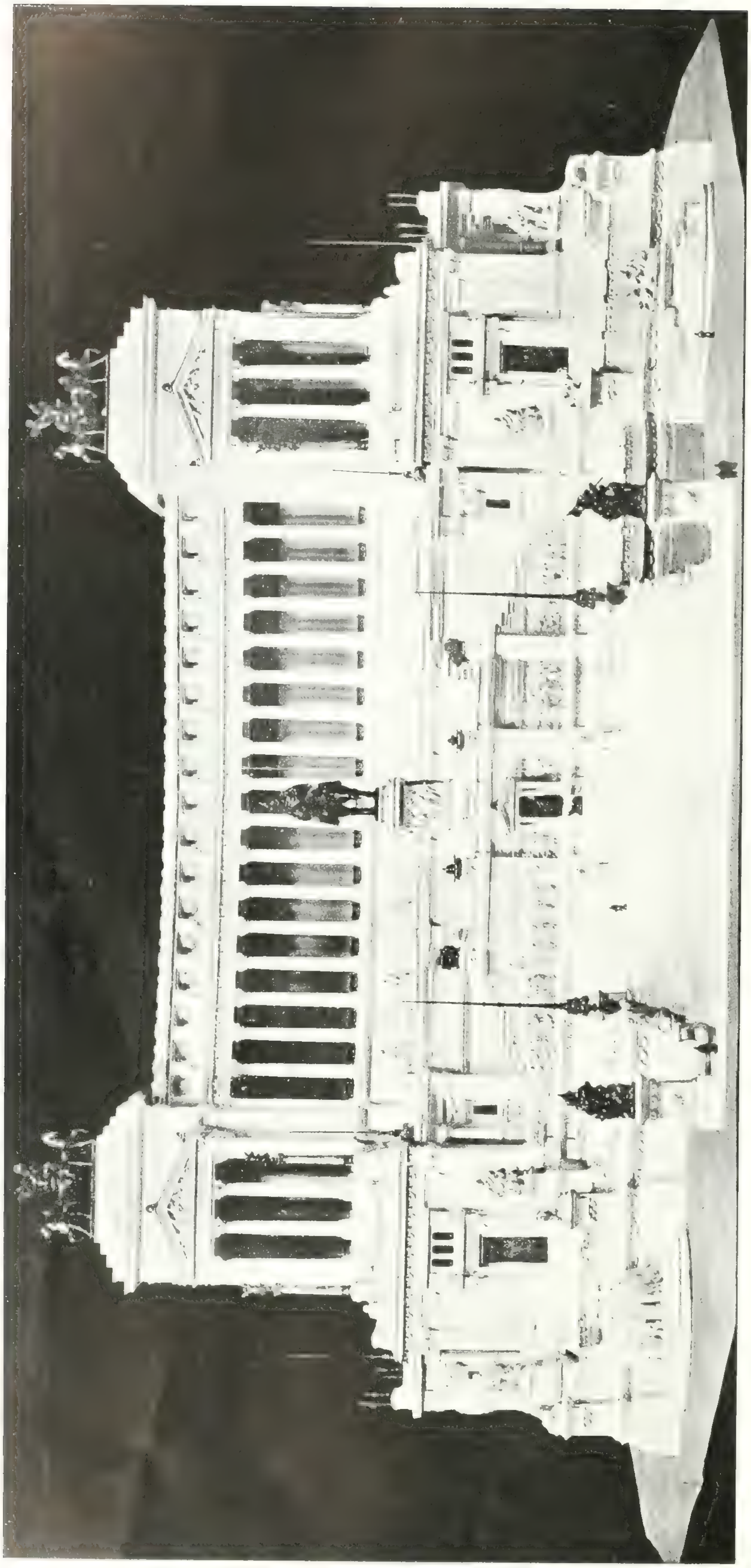
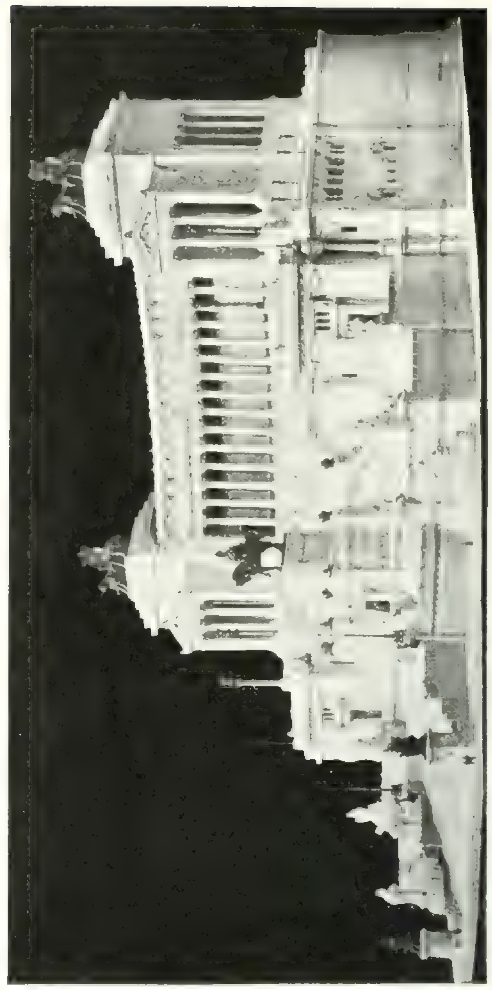
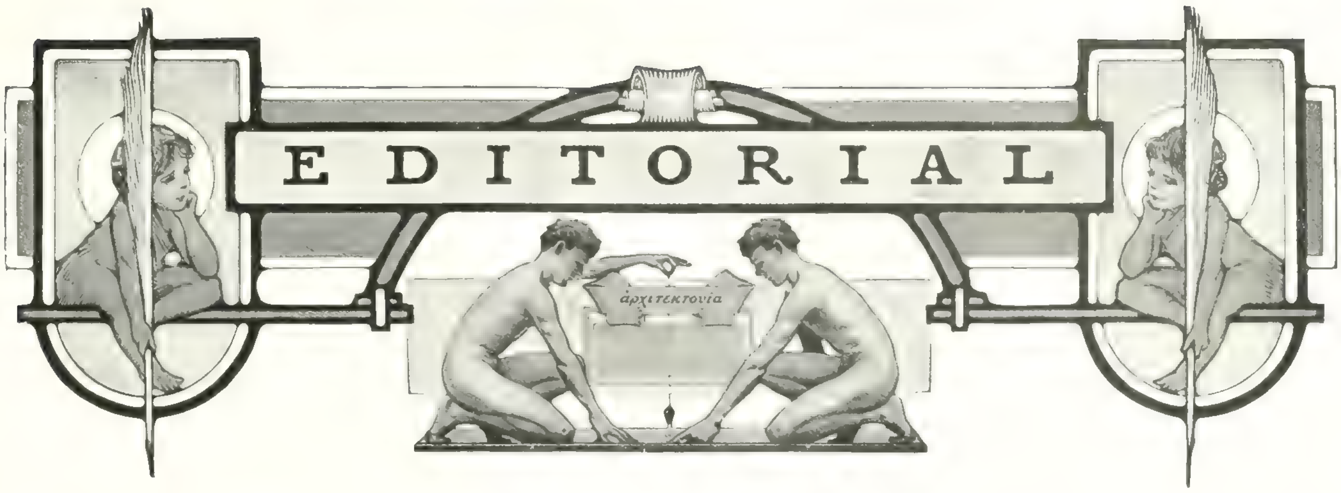




Front View, Victor Emmanuel Monument, Rome, together with View of Right Approach and General View from the Side.



Building Statistics for June show that country is still moving on apace—Thirty-one cities record average gain of 40 per cent. over same month of last year.

AN AVERAGE GAIN of 40 per cent., representing a total investment of $1,992,258 as against $10,364,478 in the corresponding period of last year, briefly summarizes the building situation as based on operations undertaken in the thirty-one cities reporting to "Construction" for the month of June. Taking into account the tremendously heavy investment of the preceding month, the showing made clearly indicates that as regards structural development, the country in general is moving on apace. Twenty-two gains in all were noted in the thirty-one cities referred to, the totals in a large number of instances denoting a decidedly marked increase.

Winnipeg's total of $2,790,250 is the largest amount registered; Toronto's expenditure of $2,384,400 shows the next heaviest investment; and Calgary comes third with an amount of $1,826,250. Calgary's advance, in view of the high state of activity experienced in the month of May, reflects a most remarkable expansion; her increase of 186 per cent. being proportionately greater than that noted in the case of Winnipeg or Toronto, where the gains registered were 15 per cent. and 3 per cent. in order named. The West in fact moved along with its characteristic stride; the only two places to suffer a loss being Brandon and Vancouver, their respective decreases being 69 and 22 per cent. Vancouver's set-back can be attributed to a great extent to labor troubles affecting several branches of the building trades. So far Vancouver has a two and a quarter million dollars increase over the same period of last year; and according to a report from Building Inspector Jarrett, his department feel confident of an increase correspondingly as great for the next six months.

Saskatchewan witnessed heavy operations throughout, the investments ranging from $103,000 to $779,725 in the four principal cities. Saskatoon noted an increase of 301 per cent.; Regina an advance of 180 per cent., and Prince Albert and Moose Jaw respective gains of 283 and 699 per cent. In Alberta a like degree of prosperity was found in evidence, for aside from Calgary's gain, other increases noted are: Edmonton, 53; Medicine Hat, 393, and Lethbridge 5 per cent. In British Columbia, Victoria is ahead by 10 per cent. At North Vancouver the value of permits amounted to $55,415, and at New Westminster new work was started entailing an expenditure of $68,000. Neither of the two latter places submit corresponding figures, but it seems safe to assume, considering their respective populations, that both are substantially ahead.

The bulk of the decreases were centered in Ontario, five of the seven losses occurring in this Province, viz.: Fort William, 13; Berlin, 17; Brantford, 9; Stratford, 62; St. Thomas, 24 per cent. In several instances, however, the declines are of no serious consequence. On the other hand, Hamilton has a total of $618,675, netting a gain of 104 per cent., and Ottawa issued permits valued at $404,975, which is 33 per cent. better than her corresponding figures. Windsor advanced 306 per cent.; Guelph

	Permits for June, 1911.	Permits for June, 1910.	Increase. Per cent.	Decrease. Per cent.
Berlin, Ont.	$32,910	$39,975		17 68
Brandon, Man	22,825	97,950		69 55
Brantford, Ont.	99,095	109,145		9 21
Calgary, Alta. ..	1,826,220	573,846	218 24	
Edmonton, Alta. ..	357,929	233,670	53 17	
Fort William, Ont.	220,390	256,225		13 99
Guelph, Ont.	61,050	16,300	274 54	
Halifax, N.S.	52,000	21,630	140 40	
Hamilton, Ont.	618,675	301,885	104 93	
Kingston, Ont.	58,125	11,545	403 46	
Lethbridge, Alta. .	94,960	90,005	5 50	
London, Ont	44,756	38,586	15 99	
Medicine Hat Alta.	83,575	16,925	393 79	
Montreal, Que. ..	1,780,860	1 585,284	12 34	
Moose Jaw, Sask	665,300	83,190	699 73	
New Westminster, B.C.	68 800			
Ottawa, Ont.	404,975	302,000	33 2.	
Port Arthur, Ont. .	183,450	65,375	180 61	
Prince Albert, Sask.	103,675	27,050	283 27	
Regina, Sask.	716,025	255,318	180 61	
Saskatoon, Sask. ..	779,725	194,400	301 09	
Stratford, Ont.	12,400	33,000		62 43
St John, N.B.	62,000	44,300	39 95	
St. Thomas, Ont. ..	23,350	31,050		24 30
Sydney, N.S..	98,247	69,789	40 77	
Toronto, Ont.	2,384,440	2,302,550	3 56	
Vancouver, B.C. ...	906,706	1,162,940		22 04
N. Vancouver, B.C.	55,415			
Victoria, B.C.	250,800	227,600	10 19	
Windsor, Ont.	126,330	31,075	306 53	
Winnipeg, Man.	2,790,250	2,413,700	15 60	
	$14,992,258	$10,636,278	44 65	

274, Kingston 104, and London and Port Arthur noted increases of 15 and 180 per cent. in order named.

Montreal has the fourth largest amount noted, the aggregate value of new work amounting to $1,780,-860, which is 12 per cent. better than the same month last year. In the Maritime district the situation also showed an improvement. Halifax annexed a gain of 140 per cent.; Sydney one of 40 per cent., and St. John advanced 39 per cent.

Reports to hand give every indication of a large volume of work ahead, and it is quite evident that the present wholesome condition will see no change for at least some little time to come.

Architectural Collaboration—Well-known architect criticizes present method of conducting competitions—Would have selected architects co-operate on important work.

MUCH HAS BEEN SAID with regard to architectural competitions, and we have had several which were unsatisfactory in Canada, together with one or two, that might be approved of by the profession. In connection with this particular difficulty in the architectural profession, F. W. Fitzpatrick, of Washington, has to say the following:

Worse than that, they are a veritable ill, and one that, like a cankerous growth, threatens to poison and perhaps destroy the entire body. Strange, too, how, just like so many other ills, we seek constantly to retouch it, gloss it over, perhaps minimize it and sometimes even make frantic efforts to better it, but never seem to even dream of boldly eradicating it!

Let me suggest something. No, nothing startlingly new or original, simply something quite old but forgotten, merely a resurrection of a cobweb antique, but one that in its time worked to a charm, and is to-day as fit as ever if we only have gumption enough to make it do duty instead of the frapped idea of "Competition."

Architectural competition never was, is not, and never will be an ideal way of selecting an architect. Not one owner in a hundred thousand has the qualifications necessary to a discriminating judgeship as to architectural merit; his selection is either a prejudiced personal one, or he is blandished by some trick of rendering, of glibness of tongue or vain promise of extraordinary or impossible achievement. If he selects a professional adviser it is rarely a great master, or a man of noted ability and keen sense of differentiation. The judge is seldom the peer—save in name—to many of the competitors and with all the prejudices, the whims, the narrowness of the individual to which is often added an impaired digestion. The successful comeptitor is usually not the one who even attempts to do his best for the owner, or who honestly endeavors to solve the problem, but rather the one who best knows the judge's whims, and is shrewd enough to cater or pander to them. If there is a board of award the case is but changed in detail—not in principle; you get a compromise between half a dozen or more personal prejudices, and that's all. At best a competition is a delusion and a snare, and too often it winds up in a mess or a scandal.

Once in a while, in a free-for-all competition, a great light, a new genius is discovered, but it happens so seldom that we hardly need to sit up nights watching for the new star. I have known something of that kind to happen but twice in the past thirty years, during which period I have been more or less actively intimate with competitions. Indeed there is scant opportunity for that sort of thing these days, as in most cases the big competitions, particularly those for public buildings, are "restricted." The eligible competitors are naturally the most successful practitioners and the big jobs seem to be, quite by accident, of course, portioned out with arithmetical precision and rotation.

Now then, instead of all this, that rarely conduces to the best results architecturally, why not call for "collaboration" instead of the farcical so-named "competition"? If the number of competitors can be limited, then certainly an owner may with equal justice select the local or other architect—in whose integrity and ability he may have confidence—to construct his building, to let contracts and all that sort of thing and then invite and pay one, two, four or more other architects to come in and collaborate with that one, pick his design to pieces, doctor it up, lambast it generally and then hammer it into shape. They'll evolve something worth while, too; and it's so much more sensible than the competition notion. Especially for Government work. In that the Government is adequately, if not admirably equipped with supervising architect and all the necessary machinery for superintendence, contract,giving and all details that are infinitely better administered generally than is the case with private work. And surely is the Government architect more intimate with departmental needs than any outsider can be and in better position therefore to plan the structure to fit its purposes. So instead of going through the motions of competition, why not try and get our legislative bodies to pass a bill authorizing the executive departments to invite and pay five or six architects to collaborate upon each new building, to discuss the design with the supervising architect, to work together to get up something useful and beautiful and that will be the result of their united energies, skill and experience?

We have at least one or had one glorious example of what could be accomplished by collaboration, an example that yielded such vastly superior results to any "competition" that had ever gone on before it that it is a marvel, indeed, that it did not take deeper root in our ways of doing things architectural. I mean the Chicago World's Fair. There a splendid corps of architects was kept together, harmonized, led, scolded by that prince of organizers and executives, Burnham, and their united work gave us a group of buildings that for beauty, unity and adaptability has never been surpassed or even equaled for modern times, nor in classic antiquity. Those buildings were a lovely dream, they lifted one above the sordid things of earth, idealized that exposition, were its chiefest charm and fascinated the bucholic plainsman as well as the most cultured traveller.

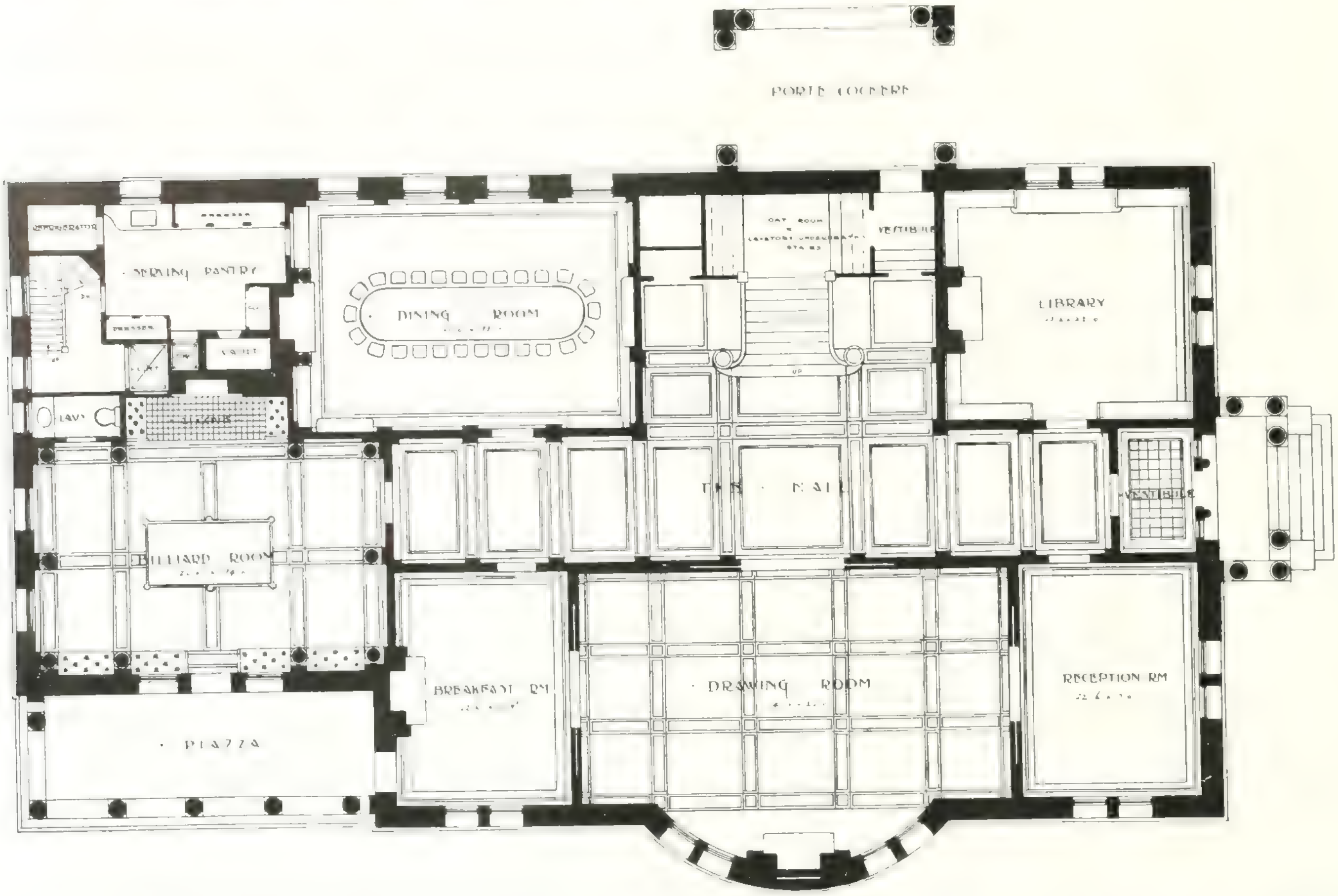
COLLABORATION, that's the word. Why not try it again?

¶ *Rebuilding of Towns in the Porcupine District—New buildings will undoubtedly be of a more substantial character than those destroyed by recent fire.*

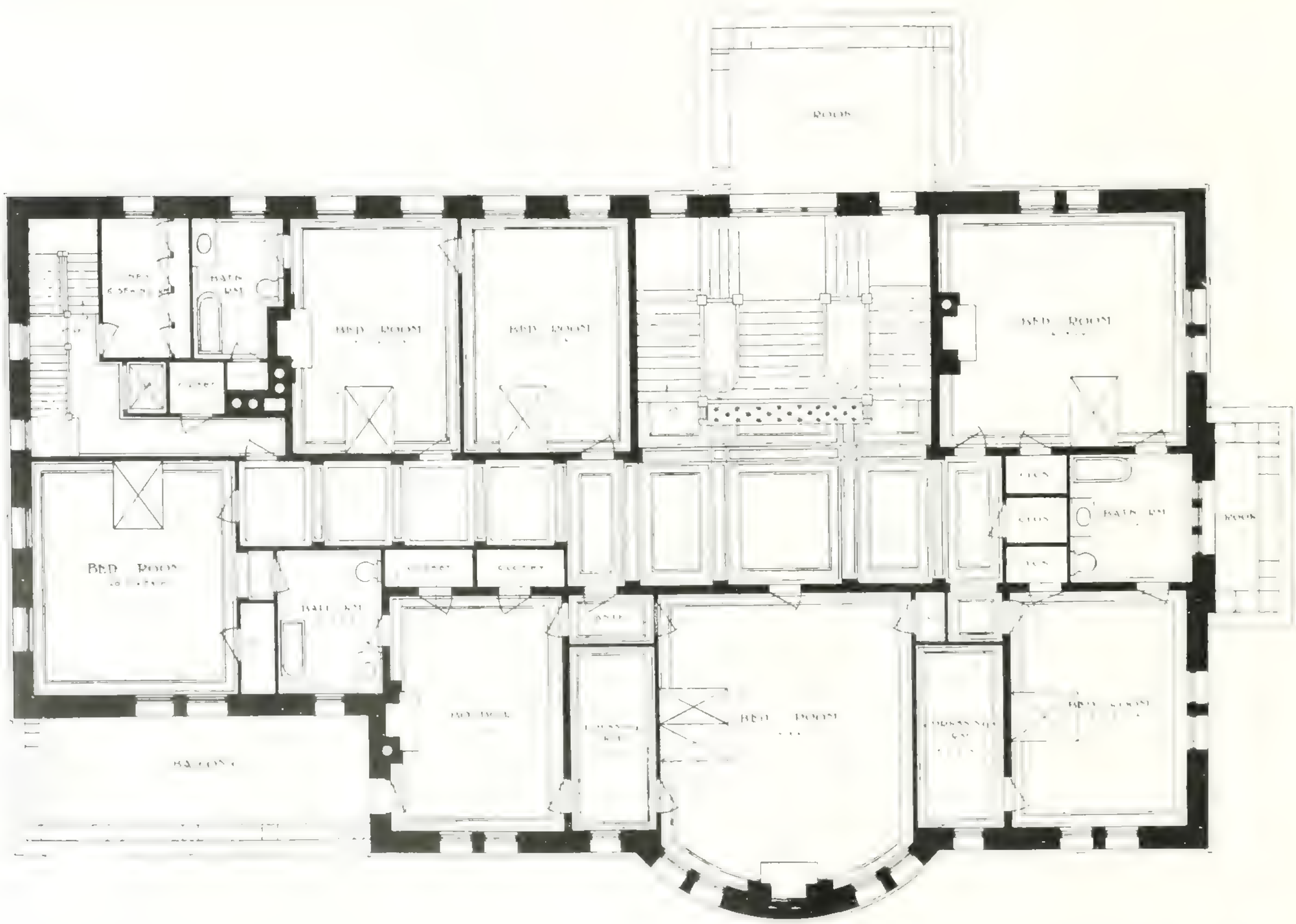
THE DISASTER which recently overwhelmed the Porcupine district is invariably the fate which overtakes all new mining camps, although as a rule the death list is less appalling. It is the sacrifice which the pioneer usually makes on the altar of progress. Hastily shapened and poorly constructed, the character of buildings to be found were such as would fall easy prey to a much lesser conflagration than that which visited the north country. Added to this is the fact that towns like Cochrane are not sufficiently advanced to have stringent building regulations, and such improvements as a reliable water service, and properly organized and efficiently equipped means to cope with a situation of even less serious proportions. Even many of the more important municipalities are inadequately provided for in this respect. Toronto, for instance, with its metropolitan manners, was confronted during the recent hot spell, when it found its water works overtaxed and its reserve supply in its reservoir being drained, with a state of affairs sufficiently alarming to bring under immediate consideration of the Board of Control the advisability of taking prompt steps to double the capacity of the new filtration plant, and to bring the water supply serviee up to a higher standard in general. For several days during this period, everything was as dry as tinder, and had a fire of any magnitude broken out dire consequence would have likely followed. So anything different from what happened in Northern Ontario could hardly have been expected. It seems like a misfortune of this kind is due before the authorities of the new towns are thoroughly awakened to their full responsibilities. Cochrane and the neighboring places are rebuilding, and it is likely that they will rebuild along more substantial lines. There will be a demand for better materials, more exacting building regulations, a more adequate water supply system, and better organized facilities for fighting fire. The old adage regarding "the ill wind" will undoubtedly hold good. It did in the case of Cobalt, Fernie and Campbellton. The rebuilding of these towns effected a vast improvement in every respect. Cobalt to-day boasts of a number of substantial buildings, including a five-story structure of reinforced concrete, and it is only to be expected that the towns in the Porcupine district will rise from their ashes in a much improved state. True, some buildings are again being hastily erected in order to meet pressing needs for immediate accommodations, and these some day will likely suffer the same fate. Most of the buildings, however, will unquestionably be built of better materials and be more substantially constructed, and what is more, will in a number of cases be more thoughtfully considered from an architectural standpoint. A prophecy has already gone forth to this effect.

THE AESTHETIC TREATMENT OF CONCRETE

SIMPLICITY OF INTENTION in constructional design may issue, says Professor Beresford Pite, F.R.I.B.A., in a native or spontaneous æsthetic quality. For example, an undesigned beauty reached without treatment is often attained by such a structure as the Forth Bridge or a ferro-concrete silo. Again, mediæval architecture grew up as a constructive method without æsthetic purpose, and yet achieved results of great beauty. Consequently, he asked, "Is not the opportunity given by the new process of reinforced concrete building one that could be utilized for the erection of the much-desired original and modern style of architecture? Are the new material and method together sufficient motive?" It had to be asked whether truthfulness of design to constructive purpose and elemental soundness of proportion were in themselves sufficient to provide that pleasantness to the eye which is desiderated. Four conclusions might be safely drawn: First, we have no instinctive guidance towards an unbiased originality for a concrete architecture; second, abstract principles like those invoked of proportion are of no assistance; third, superficial treatments, as by color, are insufficient for architectural expression, though valuable in assistance; fourth, the texture of concrete surfaces modifies and imparts special character to any forms employed for architectural purposes. Therefore, while modern considerations of utility develop æsthetic qualities, the scholarly and critical analysis and employment of traditional architectural forms suitably modified for execution in concrete is the proper method for the æsthetic treatment of concrete. A historical review of the development of some characteristics of Egyptian, Greek and Roman architecture furnishes proofs of the non-relation of æsthetic treatment to direct constructive facts. Idealized representations of ancient types form the basis of both Egyptian and Greek characteristics, while the Romans frankly separated the decorative from the practical purposes of architecture. In Gothic art, however, the constructive craftsman was the artist, and the development of decoration is integral with building craft. Modern novelty of constructive method does not remove a necessity for study of architectural development. The latter will aid adaptation and modifiation, and thus pave the way for development. At home we still are safely and timidly putting brick and stone fronts to concrete buildings. There is a great future before concrete building, and it deserves that close and patient architectural study which, deriving from the past, will give certainty to the future æsthetic treatment of the material.—"Journal of the Society of Architects," London.



Plan of Ground Floor, Montreal Residence Showing the Hall Scheme with its Open Staircase Arrangement, and the Relative Position of the Various Rooms. E. & W. S. Maxwell, Architects.



Plan of First Floor, Montreal Residence—Showing the General Placement of Bed Rooms, Dressing Rooms, Clothes Closets and Baths. E. & W. S. Maxwell, Architects.

View from Main Approach, Montreal Residence Designed by Messrs. E. & W. S. Maxwell.

A MONTREAL RESIDENCE IN RENAISSANCE DESIGN

By E. & W. S. MAXWELL

Interior luxurious in the character of its appointments. Treatment of various rooms carried out to bring the whole together in a scheme of exquisite color and decorative harmony.

THE LUXURIOUSLY appointed residence designed by Architects E. & W. S. Maxwell, which is illustrated in the accompanying views, cannot only be referred to as Montreals most noteworthy example of recent domestic work, but as an instance of residential architecture combining dignity of character and richness of detail, it can probably lay claim to being the finest and most costly building in that city of this particular type. It is a residence such as any designer or owner might look upon with the highest degree of complacency, so beautiful is it in treatment, and so thoroughly has every part been considered to bring the whole together in a scheme of exquisite color and decorative harmony. The exterior, which is designed in Renaissance style, is executed in grey cut stone with a judicious and subdued use of sculptured detail.

The above view shows the house from the main approach, while the interior arrangement is explained in the accompanying plans. The hall, which is Early French in treatment, is finished in dark oak, with panelled wainscotting, and walls of old Flemish tapestries in a red and green woollen weave. In this part of the house the art of the wood carver has been effectively brought into service to reproduce the architects' detail, an exceptionally splendid example of his handiwork being seen in the beautifully carved and perforated staircase. The window above the landing is filled in with antique Flemish fifteenth century glass; the rugs are of Persian make with red centres; while the furniture, which is antique in most cases, has been carefully selected to correspond with the general color and decorative effect.

To the right on entering is the reception room, a Louis XV. interior, finished with green silk wall panels, and lavishly decorated with carved ornament. Apart from the rich luxuriousness of the scheme of this room, an interesting feature to which attention might be called, is a supplementary lighting scheme, so arranged in the cornice as to be invisible.

The drawing room, which adjins the interir, is in character with the decorative period immediately preceding (Louis XIV.), although the scheme shows considerable modification in treatment. Here what might be also regarded as an invisible lighting arrangement has been worked out in conjunction with the beams forming the ceiling panel. The wall covering of this room is rose colored silk; the wood-

Entrance Hall, Montreal Residence—Designed in Early French Style with Elaborately Carved Staircase and Woodwork. The Entire Scheme is in Dark Oak, with Old Flemish Woolen Tapestries in Red and Green Above Wainscotting and Antique Furniture to Correspond. The Windows are of the Fifteenth Century Flemish Glass. E. & W. S. Maxwell, Architects.

Louis XVI. Drawing Room, Montreal Residence—Showing the Carved Decoration and Green Silk Walls. A Feature of the Room is a Supplementary Lighting Scheme so Arranged in the Cornice as to be Invisible. E. & W. S. Maxwell, Architects.

Drawing Room, Montreal Residence—A Louis XIV. Interior, Modified in Treatment. Here the Lighting Scheme is Arranged in the Beams, and is Almost Invisible. The Walls are in Rose Colored Silk, and the Mantel is in Marble. The Painting Above the Fireplace is by Sir Joshua Reynolds, Inset in a Frame Designed by the Architects, E. & W. S. Maxwell.

Library, Montreal Residence—Finished in Rosewood in French Renaissance Style. E. & W. S. Maxwell, Architects.

Detail of Door, Reception Room, Montreal Residence. E. & W. S. Maxwell, Architects.

Detail of Mantel in Library, Montreal Residence. E. & W. S. Maxwell, Architects.

Dining Room, Montreal Residence—Carried Out in Gothic Style with Blue Handwoven Tapestry Walls, Mahogany Panelling and Carved Stone Mantel. The Lighting Fixtures are in Old Steel, and the Furniture was Designed as an Integral Part of the Scheme. E. & W. S. Maxwell, Architects.

Hand-Carved Sideboard, Dining Room, Montreal Residence. E. & W. S. Maxwell, Architects.

Breakfast Room, Montreal Residence—Finished in Tiger Wood with Figured Frieze, and Glass Mosaic Faced Fireplace. E. & W. S. Maxwell, Architects.

Billiard Room, Montreal Residence—Here the Scheme is in Old English, or Pollared Oak, with a Leather Frieze and Decorative Stone Mantel.—the Detail of Ornamentation Being Rather Celtic in Origin. E. & W. S. Maxwell, Architects.

work is painted; and the painting above the marble fireplace, which is by Sir Joshua Reynolds, is inset in a frame designed by the architects.

In the library, which is finished in rosewood, a French Renaissance treatment has been adopted, the walls being covered with a wine red figure on a dull gilt ground. An interesting part of the scheme is the marble mantel, with a painting by Sir Joshua Reynolds above. A detail view of this mantel is shown in a separate illustration. In this room, and in the other interiors as well, the furnishing and decorating was carried out under the immediate direction of the architects.

Some very excellent furniture designed by the architects as an integral part of an unusually attractive Gothic scheme, is to be seen in the two views of the dining room: no two pieces of carving being alike. The room has windows of antique Flemish glass, and is most beautiful in the character of its appointments. The panelling is in mahogany, and the walls are of blue hand woven tapestry by Wm. Morris & Company; while in harmony with the richness of the general effect are the stone fireplace, and the electric fixtures which are fashioned in old steel.

The two remaining views show the treatment of the breakfast and billiard rooms. In the billiard room, which is placed at the end of the hall, the detail of ornamentation is rather Celtic in origin. Here the scheme is carried out in Old English, or pollared oak, with a leather frieze and decorated stone mantel. In the breakfast room the mantel is faced with glass mosaic, the panelling and plate rail being in tigerwood, with a figure frieze modelled by G. W. Hill, the sculptor, above. The furniture in this room was also designed by the architects.

CALCUTTA'S ELEVATED WATER TANK

THE TANK AND MAINS for the new overhead reservoir erected at Tullah (India) to supplement the water supply of the city of Calcutta, have been completed and the new system is now in operation. This tank, to which previous reference has been made in these columns, is the largest receptacle of its kind in the world, being 320 ft. square and 16 ft. deep. It is supported by a framework of steel, embedded $2\frac{1}{2}$ ft. in concrete, which is 90 ft. high, and covers an area of 2 1-3 acres. The total weight of the reservoir as it stands to-day, full of water, is about 72,000, the water alone weighing 43,000 tons and the tank bottom 800 tons. There are 32 miles of steel joists in the vertical columns and bracings, and in the foundations there are 20 miles of steel joists and tiebars.

The capacity of the tank is about 9,900,000 gallons of water, and the ordinary daily consumption of Calcutta is estimated at 30,000,000 gallons. The tank is designed to act as a balancer and to assist the pumps when they can not send sufficient water into the mains to meet the demand. In a tropical city like Calcutta there is naturally a tremendous fluctuation between the minimum and maximum of the daily demand, varying from the rate of $7\frac{1}{2}$ gallons per head of the population at night to 75 gallons per head during the day when the need of the city is the greatest, and the system employed heretofore of pumping direct into the mains has not been elastic enough to meet this demand. During the night, when the pumps are providing more water than is to act as reserve. Then, when there is a great required, the excess quantity will go into the tank demand during the day and the mains can not be kept full by the pumps the reserve supply from the tank comes into operation automatically. When the demand that the pumps can not meet relapses the full pressure from the pumps into the mains automatically cuts off the flow from the tank, and this flow comes into operation again immediately the pumps are not keeping the mains full.

One main, 6 ft. in diameter, conducts the water 30,000 feet from the tank to the extreme north end of Circular Road, and a second, 5 ft. in diameter, conducts it 18,000 ft. from that point via Circular Road and Dhurrumtollah to the corner of Wellington square and Wellington street. These mains are, of course, supplemented by a network of smaller mains making direct delivery throughout the various streets of the city. The total cost of the tank, new mains, and new installation, etc., has been about $1,550,000.

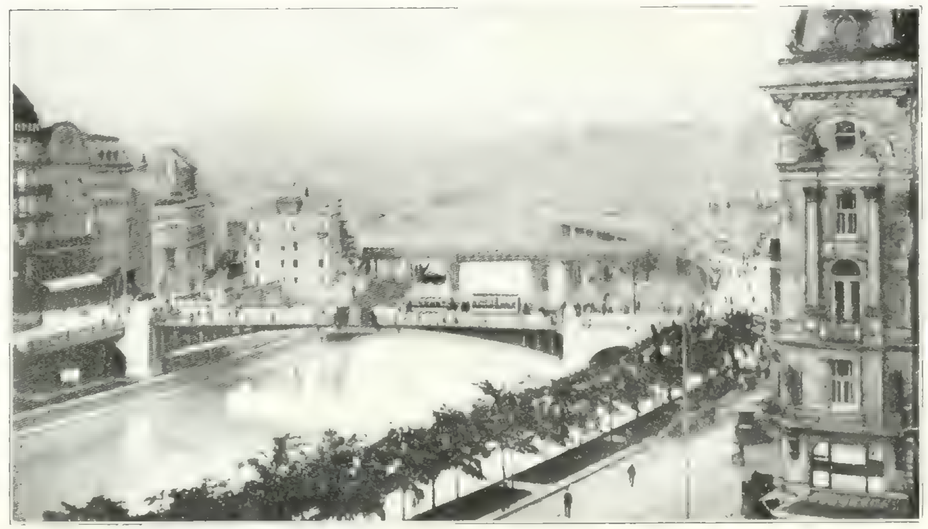
WE SHOULD HARDLY EXPECT to learn much of the arts of civilized life from the tribes of central Asia, yet it seems they make better brick than we turn out. The barbarians employ the same material that we do, and curiously enough, the thing that imparts superiority to their process of brickmaking is one of the powerful agents of Western civilization—steam. When the Asiatics have baked their bricks for three days, the opening of the oven is closed with felt which is kept wet, so that the bricks, intensely heated, are enveloped in steam. The process causes a remarkable change in the character of the bricks. From red they turn grey, and at the same time acquire a remarkable degree of toughness and hardness. Although porous, they give out a sound when struck, like that of clinkstone; and they are said to resist the efforts of weather much better than do the bricks of Western make. Necessity was the mother of invention in this case, for the climate in which these ingenious Mongols live is subject to great extremes of temperature, having a disastrous effect upon bricks made by the ordinary process.—Scientific American.

SOMETHING LESS than a century ago there was a tax on building brick in England, and in order to evade it the brick were made of larger and larger sizes. These were used for cellars and other concealed places. To stop this fraud an act was passed in the reign of George III. fixing the legal size of brick. Early in Queen Victoria's reign the tax was taken off, and brick may now be legally made of any size whatever, but any change from the standard size would bring about great inconvenience. All calculations for building are made on this standard, and the London building acts have practically fixed it at $9x4\frac{1}{2}x3$ inches for all time.

2.—THE MARIA THERESIA PLATZ, VIENNA.
Taken from the Royal Stables.

3.—THE OPERA RING, VIENNA.

4.—THE FRANZENS RING, VIENNA.



5.—THE FRANZ JOSEF QUAY, VIENNA.

1.—Plan of Vienna, Showing the Western Part of the Inner Town and Ringstrasse.

CITY PLANNING AS CARRIED OUT IN VIENNA

The Ringstrasse and relation of public buildings to the principal arteries of traffic. Points of merit claimed for plan adopted.

MUCH ATTENTION has been given to the city of Vienna by reason of the recent consideration of the question of town planning and the physical improvement of cities. Statement has been made that Vienna is the most perfectly planned city of Europe. Maps, models and photographs showing the arrangement of streets, the grouping of buildings and the general appearance of the three concentric girdles, the inmost of which, portions of the city have been shown at the various city planning conferences in support of this statement.

The most noticeable features of the city plan are known as the Ringstrasse, was formerly occupied by a wall surrounding the inner town. The accompanying diagram shows the western part of the inner town and Ringstrasse. This circular street, with the radial intersecting streets, forming main arteries of traffic, and the groupings of the public buildings about the Hofburg, or Royal Palace, are the points of merit which are claimed for Vienna's city plan.

The Ring is made up of a number of sections bearing distinct names, as follows: The Schotten-Ring, so called from the monastery of Scottish Benedictines situated in the old town near by; the Franzens-Ring, in front of the Royal Theatre; the Burg-Ring, in front of the Royal Palace; the Opera-Ring in front of the Royal Opera; the Kaertner-Ring; the Park Ring, in front of Stadt Park, and the Stuben-Ring. The remaining space completing the Ring is occupied by the Franz Joseph Quai, on the Danube canal.

The criticism has been made that the Ringstrasse offers an obstruction to transportation and to the development of the city. Just why the latter should be true is not apparent, unless it is a factor of the question of transportation. And with the number of transverse streets shown, it is evident that transportation may be readily taken care of. However that may be, the opportunity offered for the effective grouping of buildings, and the space allowed for inner town parks and gardens, should compensate for a slight check on transportation.

The grouping of public buildings is an admirable feature of the Vienna plan. All of the group situated with the Franz Joseph Quai as a background are made to centre upon the Hofburg and the two imperial museums, which, with the outer Burg Platz and the Maria Theresia Platz, form two inclosed squares. The squares form the central feature of the two symmetrical rings fronting on the Franzens-Ring and the Opera and the Kaertner-Rings. The original conception of this plan is due to the German architect, Gottfried Semper, and the building was carried out by Baron Hoolnauer. Photograph 2 shows the Maria Theresia Platz, as seen from the royal stables, with the Art Museum on the right. The formal garden is characteristic of those within the Ringstrasse.

In laying out the other main side of the Ring an attempt has been made to place an important building in the centre of each, on the side of the inner town. The placing of the Theatre and the Opera centrally on either side of the Hofburg is in accordance with this plan, and is an excellent piece of symmetrical grouping; but owing to their distance apart, this feature cannot be fully appreciated when viewed from the Ring. Photograph 3 shows a portion of the Opera-Ring. As will be noted from the plan (photograph 1), the wing along the Franzens-Ring has been more developed than the other; the Parliament building, the University and the Rathaus (city building) having been constructed on this first named portion, making it symmetrical upon the Theatre as a centre. Some idea of the effect of this grouping may be gained by reference to photograph 4, which shows a view looking towards the Hofburg from the Rathaus across the Franzens-Ring and Volks Garden. The intervening space between the Rathaus and Franzens-Ring is laid out in twin parks, with a central avenue between. The criticism has been made that the large forest trees in these parks tend to obscure the effect of the grouping of the buildings, as viewed from the ground level. This effect is not noticeable from the photograph shown. A great deal more intelligent treatment is evident in the wing dominated by the Theatre than in that of which the Opera forms the central feature. In the latter, the two important groups formed by the Academy of Graphic Arts with the Schiller Platz and the Technical School and the Karls-Kirche have been allowed to become widely separated by blocks of office buildings, so that their effect is entirely lost. The Technical School and Karls-Kirche, facing the Artists' House and the Music Society, form an independent group, the Vienna River, which flows between them, having been covered to form Karls Platz and a garden in front of the Technical School. The grouping of buildings on other portions of the Ring does not follow any consistent plan, such as characterized those previously mentioned, but it is hoped that in time a more orderly arrangement may be effected.

The base of the Ringstrasse is formed by the Franz Joseph Quai, a portion of which is shown in photograph 5. It is in the form of an irregular curve, following the line of the Danube Canal, and with the convex side towards the Hofburg, except near the Schotten-Ring, where a slight bend in a contrary direction forms a small park. The buildings along the Quai form a fairly level horizontal line, and the banks have been improved after the manner shown by concrete walls. The bridges are by no means remarkable, but are consistent and artistic.

There are, as may be noted, a number of small parks or town gardens within the Ring. These vary from the small patches in front of the Palace of Justice to the wooded park known as Stadt Park. They are in most cases laid out after the formal fashion noted in the photograph of the Maria Theresia Platz, but in some cases they are characterized by the picturesque "English manner," with well-grown, unrestricted trees and rich, thick foliage.

6.—The Long Drive Through the Prater, Vienna.

The Prater, not shown on the plan, is the true town park of Vienna. It is divided into three parts; the first, known as the Wurstel Prater, contains the milder amusement devices found at our state and county fairs; the second is dominated by the rotunda, erected for the exposition and preserved for exhibition purposes; and the third consists of natural woods and water. Extending through the Prater is a tree-lined drive three miles long, known as the Haupt-allee. Photograph 6 shows the Haupt-allee, or long drive through the Prater, with the walks and parking at either side. A number of other gardens and parks owned by the city or belonging to the royal grounds may be found throughout the city, but, excepting the Prater, they are of value only for their appearance, as they offer no such advantages as are demanded in American parks, namely, shade and plenty of green grass.

The streets are generous in width and well planned, though in some cases wretchedly paved. The accompanying cross-sections show a number of the principal streets. As will be noted, ample space is provided in each case for all classes of traffic. The Ringstrasse is symmetrically laid out, with roadways on either side of the central roadway and separated from it by a tree-lined promenade and riding track. The effective means of screenings the sunken railway along the Gurtelstrasse may be noted. The idea of avoiding the unsightly appearance generally noted in

7.—Ornamental Tramway Poles, Vienna.

street railway appurtenances is shown in photograph 7, flower baskets having been provided on the trolley standards and an artistic design for the base substituted for the straight, unsightly pole so common in America.

The Stadtbahn, or Metropolitan Railway, follows along the canal for five miles. The promenade, which forms a part of the gardens, is immediately over the railway and supported on columns in such a way that one side, towards the canal, is open to provide light and air.

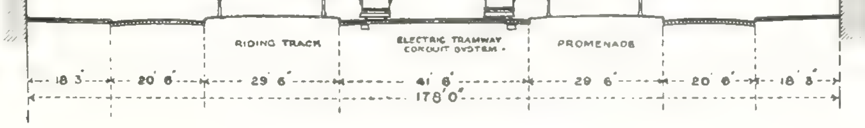
Taken in its entirety, the Vienna plan has much to recommend it to those interested in city planning, thought in some cases the carrying out of ideas has been unsuccessful.

[The above text, together with the illustrations used, is published by special arrangement with the "Municipal Engineering," Indianapolis, U.S.A.—Ed.]

IF A SCHEME now being promoted by certain New York interests comes to a head, the American metropolis will have within another year a $2,000,000 building designed exclusively for the display of automobiles, motor boats, æroplanes, and kindred products. The preliminary plans call for a structure that is remarkable in many ways. It provides for a building of eleven stories, having a starting and landing track for flying machines on the roof, as well as an artificial lake 60 by 125 feet for demonstrating motor boats. One of the structural novelties will be a moveable floor the same size as the centre court of the building, which may be raised or lowered, thus permitting any large exhibition to have one vast unbroken area on the ninth floor, with the tenth and eleventh floors serving the purpose of galleries. The site which the promoters have in view is close to the downtown business district. The ground floor of the building is to contain modern shop, and the seven floors immediately above are intended for individual showrooms. In the basement will be a magnificently appointed "rathskeller" capable of accommodating 6,000 persons.

A NEW CONCERN, known as the Edmonton Portland Cement Company, and having a capitalization of $15,000,000, has been incorporated. The company will erect a plant at a point 140 miles west of Edmonton, with a view to developing the large deposits of marle in that district. Work on the buildings is to be started at once, and it is expected the mills will be in operation within a year's time. The directors of the company are: Lieutenant-Governor G. H. V. Bulyea (chairman), J. H. Gariepy, Jas. A. McKinnon, Dr. W. D. Ferris, Ald. J. E. Lundy, S. H. Smith, A. Driscoll, J. H. Morris, W. S. Heffernan (secretary). The head office will be in Edmonton.

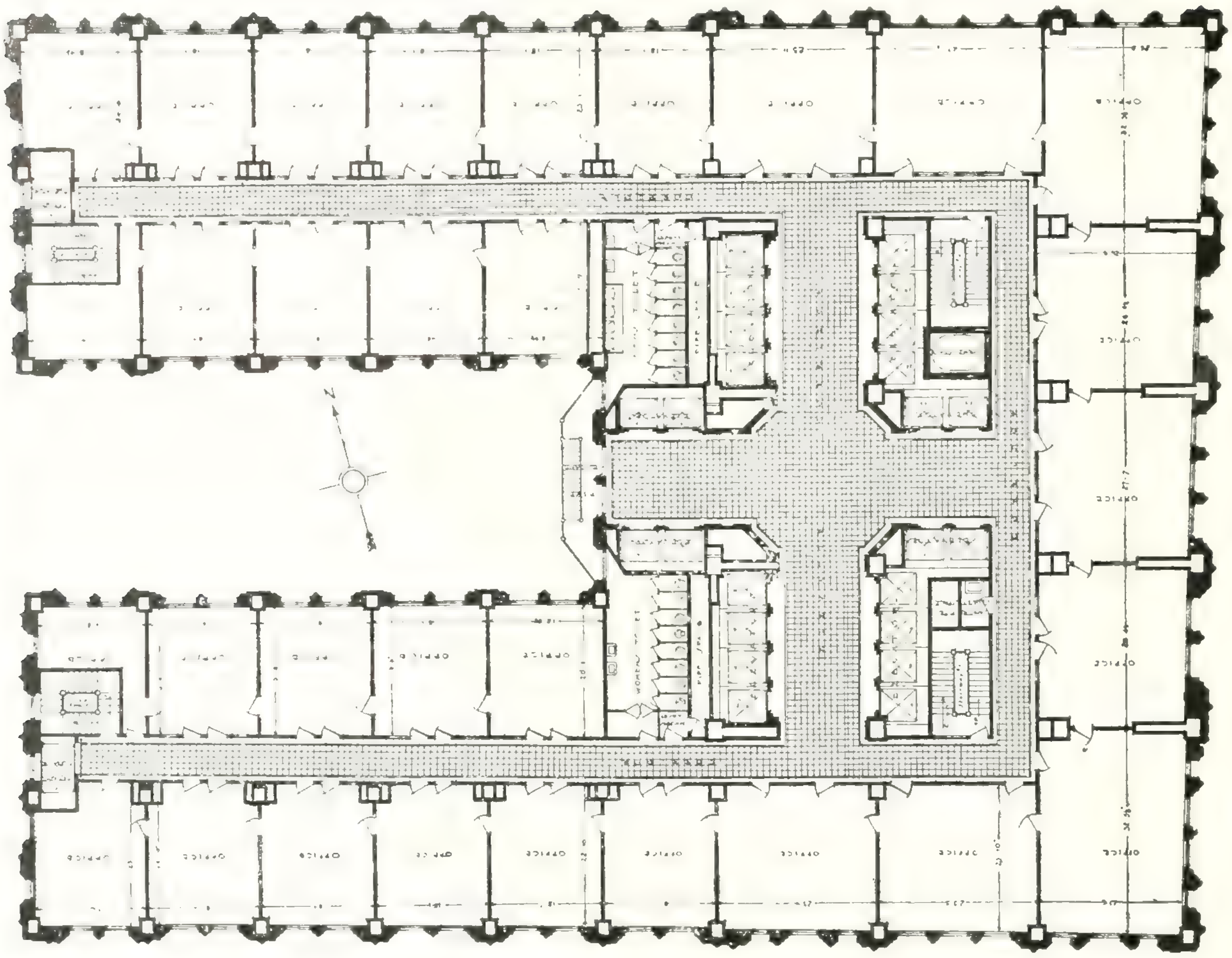
LARGE NEW SHOPS are to be established at North Bay by the Canadian Pacific Railway. Over $500,000 is given as the probable expenditure.



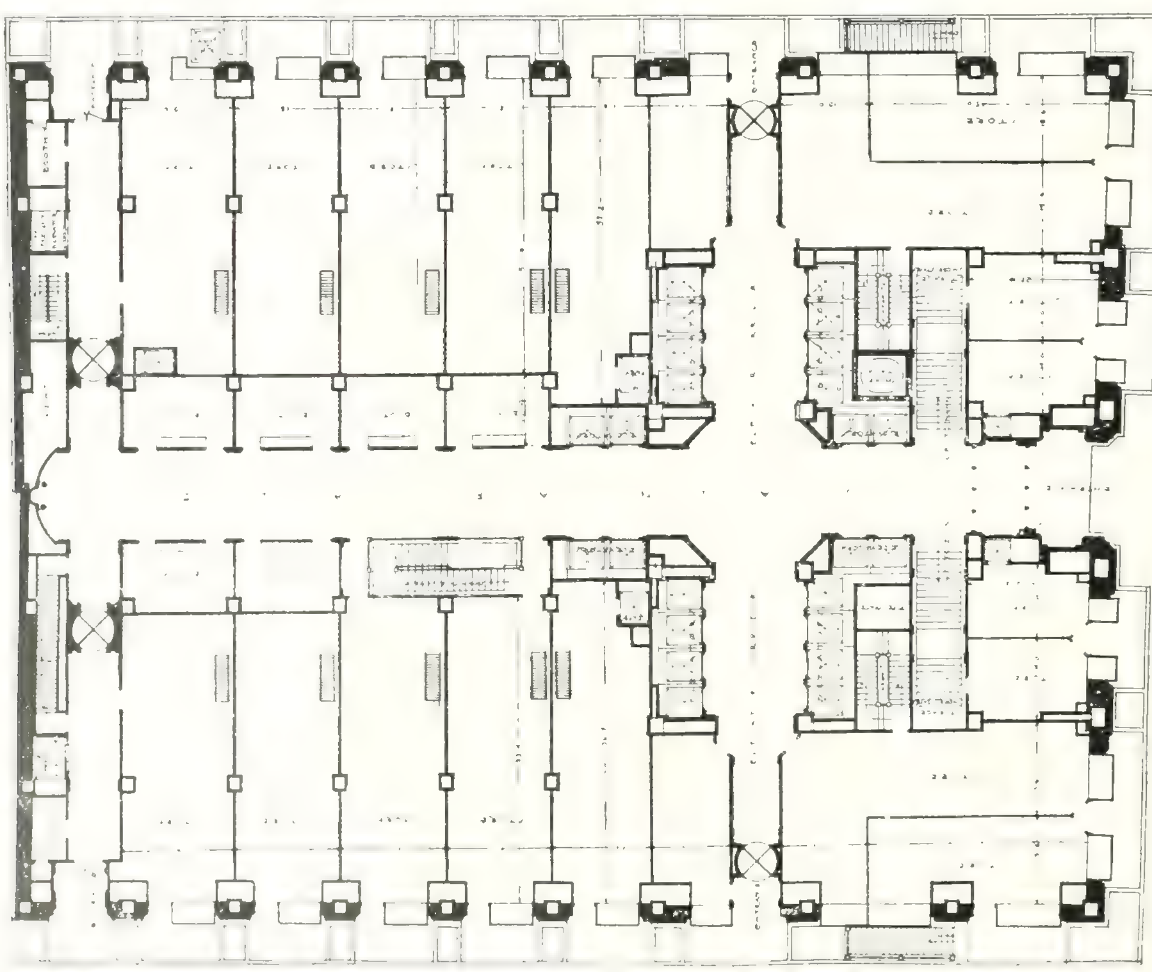
— SECTION. 1. —
THE RINGSTRASSE

— SECTION. 2. —
FRANZ JOSEFS QUAY

Diagrams, Showing the Width and Arrangement of the Ringstrasse and Franz Josef's Quay.



Typical Office Floor Plan, Woolworth Building, New York City. Cass Gilbert, Architect.



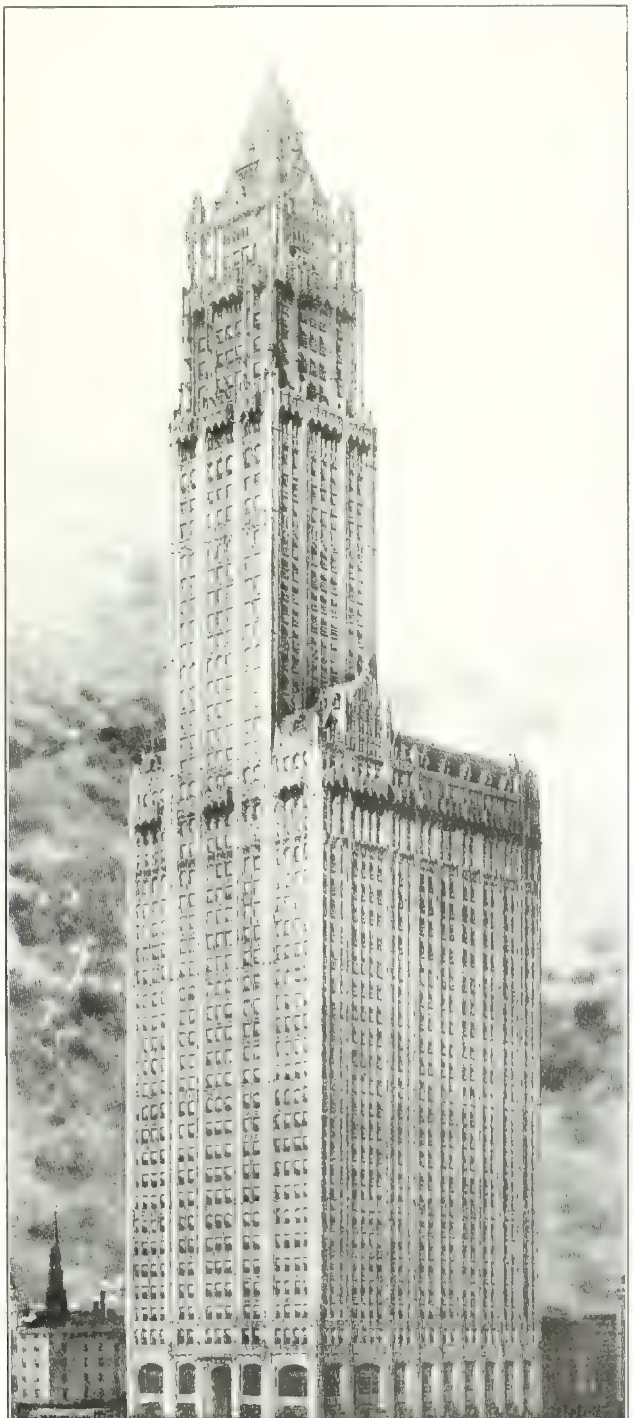
Ground Floor Plan, Woolworth Building, New York City. Cass Gilbert, Architect.

A MODERN OFFICE BUILDING OF FIFTY-FIVE STOREYS

The Woolworth Building New York's latest venture in skyscraper construction will tower 750 feet above level of sidewalk

A QUARTER of a century back, the twenty-storey building was regarded as a marvel of architectural skill and daring. To-day in the Singer Building and the Metropolitan Tower of New York, the forty-five and fifty-storey building is an actual accomplishment, and yet the fact that the great height attained in these structures is to be exceeded may well cause one to wonder where the limit in this direction really lies. New York's latest undertaking in skyscraper construction is the Woolworth Building, of which a perspective view and floor plans are shown herewith. This building, which is now in course of construction, will occupy the entire block west of Broadway between Park Place and Barclay street; the frontage on Broadway being 152 ft. 1⅜ in., and that on the other two streets 197 ft. 10 in. and 192 ft. 6 in., in order named. Not only will it be a notable structure from an engineering standpoint, but as regards plan and architectural treatment it will probably surpass any building of a lofty character that has so far been erected.

The principal feature of the building will be its great tower, 86 ft. by 84 ft. square, which will rise twenty-six storeys above the main structure, and bring the total elevation of the building up to a height of fifty-five storeys. This tower will terminate with a great electric lantern, placed 750 ft. above the level of the sidewalk. The main portion of the building will be twenty-nine storeys high, with two storeys in the gables at the north and south front, making it thirty-one storeys at its highest point.



Perspective: Woodworth Building, now Being Erected in New York City. It will be Fifty-Five Storeys High and the Tallest Office Building in the World. Cass Gilbert, Architect.

On the exterior, the construction will be of stone and terra cotta, to which Gothic detail has been adapted; although the architectural treatment of the building will of necessity, owing to the frequent and regularly recurring window openings, and the fixed location of the steel columns and girders, be somewhat different in character from the Gothic buildings such as are to be found in the Old World.

The ground floor, which is laid out for stores, will also have an arcade with openings on Broadway, Park Place and Barclay street. This arcade will contain a large number of attractive shops, modern in appointment and having fronts entirely of plate glass. On the Park Place side will be a banking floor or mezzanine storey, which will be occupied by one of the large banking institutions of New York. The upper portion of the building will be occupied entirely by offices with the exception of the twenty-eighth floor, which is laid out in modern club apartments.

Below the ground floor will be modern safety deposit facilities together with a restaurant, rathskeller, a barber shop and a number of storage rooms, several of which will connect directly with the stores above. All the machinery, coal compartment, refrigerating plant, power plant, electric generators, filtration plant and other mechanical equipment will be placed in the sub-basement. This part of the building will also accommodate the lower portion of a large swimming tank which is to be installed adoining the baths in connection with the barber shop.

The total cubical contents of the building, measured from the top of the caissons, exceed 13,200,000 cubic feet. The caissons extend down to bed rock, and are from 110 ft. to 130 ft. below the level of the sidewalk. These caissons are of enormous dimensions, some of them being as great as 19 ft. in diameter; the contract which was awarded last November calling for one of the largest undertakings of this kind ever executed. It was deemed imperative for so great a building as this that the foundation should be absolutely clear, and above any possible question as to efficiency, so a very considerable portion of the cost of the building is represented in the foundaton work alone.

Needless to say, the construction of the building will be fireproof throughout, and that every precaution has been taken to make it one of the best constructed and safest buildings on the continent. Four self-contained stairways are provided from the roof to the level of the street. Duplicate self-contained stairways are provided in the tower, in addition to which there is an outside fireproof staircase in the court accessible from the corridors of each wing. These self-contained stairs are entirely separated from the corridors and office spaces by fireproof walls and by wire glass doors. In this manner, the possibility of fire, or of smoke in event of the ignition of any inflammable material in any of the offices, spreading from one part of the building to the other is reduced to a minimum.

Provision has been made for thirty-four elevators, of which twenty-four are arranged near the Broadway entrance in four groups of six each. At the west end of the building there will be two large freight elevators available for passenger service. Provision has also been made for additional minor elevators for the bank, stores, observation gallery, etc. These elevators are likewise self-contained, being separated from the corridor by iron and wire glass doors. In short, every precaution has been taken to render the building absolutely fireproof and of the high class construction in every respect. In connection with the tower, provision has been made for a look-out gallery for visitors at the fifty-fourth floor level.

The building was designed and is being erected under the supervision of Mr. Cass Gilbert, architect, New York, and the consulting engineer is Mr. Gunvald Aus, also of that city.

CODE OF ETHICS OF TRANSVAAL ASSOCIATION

THE FOLLOWING IS THE CODE of ethics adopted by the Association of Transvaal Architects: (1) No member should have any financial interest in or combine any other business with that of architecture, such as building, contracting, house and estate agency, auctioneering, or mercantile pursuits. (2) No member should receive directly or indirectly any royalty, gratuity, or commission on any patented or protected article used on work that is being carried out for his clients without the authority of such clients. He should be at liberty, however, to issue certificates or recommendations for payment for such goods by his clients. (3) No member should participate in or be the medium of payments made on his clients' behalf to any builder, contractor, or business firm without the authority of his clients. He may, however, issue certificates or recommendations for payment for same by his clients. (4) No member should guarantee an estimate or contract by personal bond, nor be a party to a contract with a contractor, except as direct employer or under special circumstances with the concurrence of his client and the contractor. (5) No member should attempt to supplant or compete against another architect after definite steps have been taken towards his employment. (6) No member should advertise in any publication or in any other way than by a card or plate, giving name, address and profession. It is undesirable to do so on boards or hoardings on buildings in course of construction. (7) No member should criticise in public print the professional conduct or work of another architect, except over his own name. (8) No member should furnish designs in competition for private or public work, except under conditions previously approved by the council of this or other recognized institute. (9) No member should submit drawings in competition unless designed and prepared under his personal supervision, nor should any member attempt to secure work for which a competition remains undecided. (10) No member should deviate from the rules of practice and scale of charges authorized by a recognized institute without first consulting the president or council of such institute.

POLES USED IN CANADA 1910

THE FORESTRY BRANCH of the Department of the Interior has compiled statistics dealing wiwth the poles purchased in Canada during 1910. The total number of poles purchased was 782,841, or an increase of 118 per cent. over 1909. The total value of these poles at point of purchase was $1,043,874, and the average price of poles was $1.33 or less by 6 cents than the price per pole in 1909. Steam railroads, telephone and telegraph companies used 95 per cent. of these poles, the remaining 5 per cent. being used by electric roads, power and light companies. Ninety-seven per cent. of the total consumption were cedar poles, which for their cost give better service than any other wood. At present none of these poles are treated or preserved by any method, in which respect we are far behind the United States. The United States using in 1909, 3,738,740 poles at an average cost of $1.89 or at 50 cents more per pole than it cost in Canada, found that it paid them to use preservative methods. During the last three years the treatment of poles has advanced rapidly, so that in 1909, 15 per cent. of the total number were treated by the creosote or other methods. This is an increase of 67 per cent. over the number treated in 1908. At present the United States have 87 timber treating plants, while Canada has none. It is to be hoped that this great inequality will soon be done away with, and that pole users in Canada may take up this cheap and rational method of securing greater service from the poles used and thus lessening the

CONSTRUCTION

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Ivan S. Macdonald, Editor and Manager

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

Vol. 4 Toronto, August, 1911 No. 9

CURRENT TOPICS

MONTREAL'S FIRST BUILDING of all-marble construction will be the Mount Royal Hotel, a ten-storey structure which Peter Lyall & Sons, the contractors, will begin next season. The marble to be used is being cut at the Missisquoi quarries near Phillipsburg, Que., and over 65,000 cubic feet in all will be required.

* * *

EDMONTON AUTHORITIES are considering the erection of a new city hall. At a recent meeting held by a special committee of the Council, Mayor Armstrong strongly advised that competitive plans be invited at once. The rapid growth of the city has made the present municipal building inadequate, and even now new accommodations will be required before a new building will be available.

* * *

A FEATURE OF THE EXHIBITION to be held in San Diego, California, in 1915, will be a "Mission City" consisting of a series of buildings modelled after the architecture of the Spaniards who settled that State in the early days. The scheme is now being worked out by Mr. Bertram G. Goodhue, one of the most capable architects in this particular type of design, and when given materialistic form should prove an attraction of no little interest to the many visitors who will undoubtedly be in attendance.

A NEW STEEL ARCH BRIDGE to replace the present cantilever structure crossing the gorge from Niagara Falls, Ont., to the American side, is contemplated by the railroad interests in control of the structure. The present bridge is regarded as being insufficient in size to accommodate the increased heavy traffic.

* * *

AS A RESULT of a motor garage fire which recently brought about the destruction of over $100,000 worth of property, the commission now at work revising the building by-laws of Vancouver has decided to make provisions in the new regulations that will require all buildings of this type in the future to be of fireproof construction.

* * *

THE OLD HOTEL DIEU at Lyons, France, which was founded in the sixth century, is shortly to be replaced by a large general hospital to be established in connection with the medical department of the University at that place. The new institution, it is said, will be unequalled as regards arrangement and sanitary equipment by any hospital in the world. It will cover a site of about 40 acres, and contain accommodations for 1,300 patients.

* * *

ONE OF THE BROAD SLOPES of Mont Gringuez, France, is reported to have become detached from its foundations, and to have moved over a distance of nearly a quarter of a mile, carrying with it the soil, meadows and woods, and covering up in its passage roads and bridges that stood in the way. A chestnut grove has travelled 500 feet without suffering any apparent damage, but many small lakes have been formed by the damming of the waters.

* * *

IN THE NEW ART GALLERY which is now being erected on Sherbrooke street at Montreal, the Art Association of that city will shortly have study and exhibit features vastly superior to those afforded in the old quarters on Phillips Square. The galleries are said to be exceedingly well lighted and excellently arranged, with the wall construction such as to prevent damage to paintings and hangings from moisture or excessive heat or cold. The construction work is now approaching the final stage, and the building, it is expected, will be opened in the near future with an important exhibition.

* * *

MADISON SQUARE GARDEN, so familiarly known to Canadians visiting New York city, has been sold to a syndicate and will shortly be replaced by a twenty-five storey commercial structure. The building was first opened twenty-one years ago and has since that time been the home of almost every big convention, attraction and amusement that has come to contribute to the life and events on the Island of Manhattan. Sanford White, whose tragic death occurred within its walls a short time back, was the architect of the building, and up to the present time it has stood as a fitting monument to his ability as a designer.

THE FOURTH ANNUAL GENERAL Assembly of the Royal Architectural Institute of Canada will be held at Montreal, on 3rd and 4th October, 1911. A very interesting programme is being prepared which will include matters of interest to every architect in the Dominion. Every Canadian Architect is cordially invited and is welcome at all sessions and entertainments, whether a member of the Royal Institute or not. This is the best opportunity to visit the metropolis of Canada, and the Montreal architects have proposed a Royal welcome. The programme will be sent early in August to all architects and will contain all the particulars concerning the assembly.

* * *

FOREIGN CITIES are being invited, through the American diplomatic and consular service, to participate in the International Municipal Congress and Exposition at Chicago, September 18 to 30, this year. The exhibits of the exposition will be furnished by both municipalities and commercial concerns, the former demonstrating the ways and means of the operation of a city in such great departments as education, charities, streets, police and correction, fire, city planning, public health and recreation, drainage, taxation, budget making, public utilities, etc. The congress will assemble experts from this and other countries in municipal activities and in voluntary philanthropies with civic aims. It is expected that President Taft will address the congress.

* * *

AN EVENT OF IMPORTANCE to the building interests of the United States, is the National Building Material Exhibition to take place at Madison Square Garden, New York city, September 9th to 16th inclusive. The object of the exhibition is to promote a higher standard of construction by affording an opportunity for architects, material firms and the public to get closer in touch with one another, with a view to comparing the relative merits of the various products and appliances offered in connection with building work. An interestng feature of the show will be a series of demonstrations by ex-Fire Chief Croker, on methods of fire prevention. The fact that the project is warmly endorsed by prominent members of the architectural profession as well as by the larger manufacturing and building concerns, practically assures the affair being a huge success. A similar undertaking in connection with the Canadian National Exhibition, held annually in Toronto, as previously suggested in these columns, would be a sensible and timely step—and one that would do much to bring about an improved type of construction in general. If an early move was made in this direction, Canada would be but little behind her neighbor in this respect, as the forthcoming exhibition at New York will be, practically, the first of any great scope and importance held in the United States. It is nothing new, however, in Great Britain and European countries, and the character of the building and comparatively light fire losses, clearly shows it.

GLASS SUBJECTED TO the crushing test, says a contemporary, is harder than granite. It has a resistance of 1,800 tons per square ft., while that of granite is 750 tons, limestone 625 tons, brickwork 60 tons, and concrete 97 tons. In view of these figures it is surprising that glass has not before entered into serious competition with the other building materials. Glass bricks are being introduced for a number of purposes, and they are recommended for their strength and hardness of surface, which is a guarantee against chipping and cracking, and entirely sanitary under all conditions.

* * *

A NEW PROCESS of French origin, for the seasoning of wood by electricity, is described by a British technical journal as follows: A large tank is filled with a solution containing 10 per cent. of borax and 5 per cent. of resin, with just a trace of carbonate of soda. In the bottom of the tank is a lead plate which is electrically connected to the positive pole of the dynamo. The timber to be treated is stacked on this plate, and when the tank has been filled another plate is superimposed and connected to the negative pole of the dynamo. When the current is switched on it passes through the stack of wood between the two plates, and in its passage it is said to drive out the sap in the timber and deposit borax and resin in its place, completely filling up all the pores and interstices. When the process is completed the timber is removed and dried, after which it is ready for use. It is claimed that the timber submitted to this treatment, no matter how green it may be, becomes completely seasoned.

* * *

A CORRESPONDENT of the "Builder," London, gives an account, in a recent issue of that publication, of a new method of preserving stone from disintegration, invented by M. Jousset, a native of Tours, France. The process, which is the result of a long series of experiments and is still a secret one, is said to have nothing in common with the well-known silicate washes and sprays. It is claimed for the new treatment that, in its operation on stone deteriorated by time and moisture, it successfully reconstitutes it, by restoring the elements which the "nitromonad" or nitrifying microbe has removed; the process of petrification, investing the old stone with the hardness and resistance of granite or marble, endows it with a durability under exposure to weather at least equal to that of newly quarried stone. It also incorporates the outer portions treated with the sound core within in such a manner as to leave no room for fear that they will separate from it later. Experiments with the new process have been carried out at Tours on a portion of the stone work of the Cathedral known as Preau de St. Gatien or Cloitre de la Psalette, and member of the Archaeological Society of Touraine, who examined the results last January, found that the arch of the cloister with its mouldings and scroll work, thus treated, had resumed the appearance and constituency of new stone recently cut.

S. S. "Toronto," Richelieu and Ontario Navigation Company.—A. Angstrom, Naval Architect.

THE ARCHITECTURAL SIDE OF THE MODERN PASSENGER BOAT

Some interesting interior schemes that have been carried out in several of the more important steamships operated by Canadian lines.

NOT ONE IN TEN of the many thousands who annually travel the great lakes and upper St. Lawrence, possibly ever stops to consider the extent to which decorative architecture has entered into the interior scheme of the modern passenger and excursion craft. A still less number perhaps has any conception that the architect has anything to do with this class of work—especially the same architect who has something to do with the designing of buildings ashore. And yet, if the average person would exclude from his mind the fact that he is on the water, he might find it difficult, colloquially speaking, to "know whether he was on land or at sea," so decidedly, indeed, is the feeling of domesticity expressed in the scheme as to make the interior decorative character of the modern lake boat not unlike that of a well appointed modern hotel. The great change that has taken place in this respect is more apparent when one takes into consideration some of the early steamships still in service, whose interiors were arranged by the boat designer and finished by the carpenter and painter. By comparison, these older boats bear the same relation to the more recent crafts, that the early habitation does to the better considered residential structure of the present time. Fortunately in steamship construction as in residential work, a new order of things has come to obtain. The naval designer and the architect now work in association, the former as before dictating to a great extent the general arrangement of the boat, while the latter applies his artistic ability to make it more habitable and more inviting in general appearance.

Nothing more is required to demonstrate what is being accomplished in this direction than the several steamships comprising the fleet of the Richelieu and Ontario Navigation Company, operating between Toronto and eastern points. The steamer "Toronto" is a particularly noteworthy example to which attention might be called. Take for instance the illustration of the main entrance hall with its vast and roomy effect, and note how distinctly it contrasts with the utilitarian scheme that the older boats employed. This hall, with its interlocking rubber tiling, high mahogany panelling, and frieze of Canadian historical subjects, is a most pleasing introduction to the character of appointments which greet the eye of the traveller as he rises between the stately columns and graceful balustrades of the broad, easy ascending stairs. The frieze, to which additional reference may be made, is executed in a staff of caen stone. It is a beautiful specimen of the modeller's art, depicting important events and periods in Canadian history, viz.: "Portaging up the St. Lawrence in the Early Days," "Frontenac arriving at Fort Frontenac," "Trading outside Fort Rouille," and "Tecumseh in Council," the figures being in low relief.

From this part of the boat one passes to the main saloon, which, together with the gallery above, is carried out in a treatment characteristic of the period

Main Entrance Hall, S.S. "Toronto"—Finished in Mahogany with High Wall Panelling Having a Frieze of Canadian Historical Subjects Above.—Bond and Smith, Architects.

Corner in Main Entrance, S.S. "Toronto"—Showing Detail of Panelling and Wall Scheme.—Bond and Smith, Architects.

Gallery in Main Saloon, S.S. "Toronto"—Showing a Treatment in the Period of Francis I., with White Enamel Panelling and Effects.—Bond and Smith, Architects.

Dining Room, S.S. "Toronto"—A Louis XVI. adaptation in White Enamel with Tones of Amber in Panels. Bond and Smith, Architects.

Smoking Room, S.S. "Toronto"—Decorated in Oriental Styl e with Green Stained Chestnut Woodwork and Richly Stenciled Walls.—Bond and Smith, Architects.

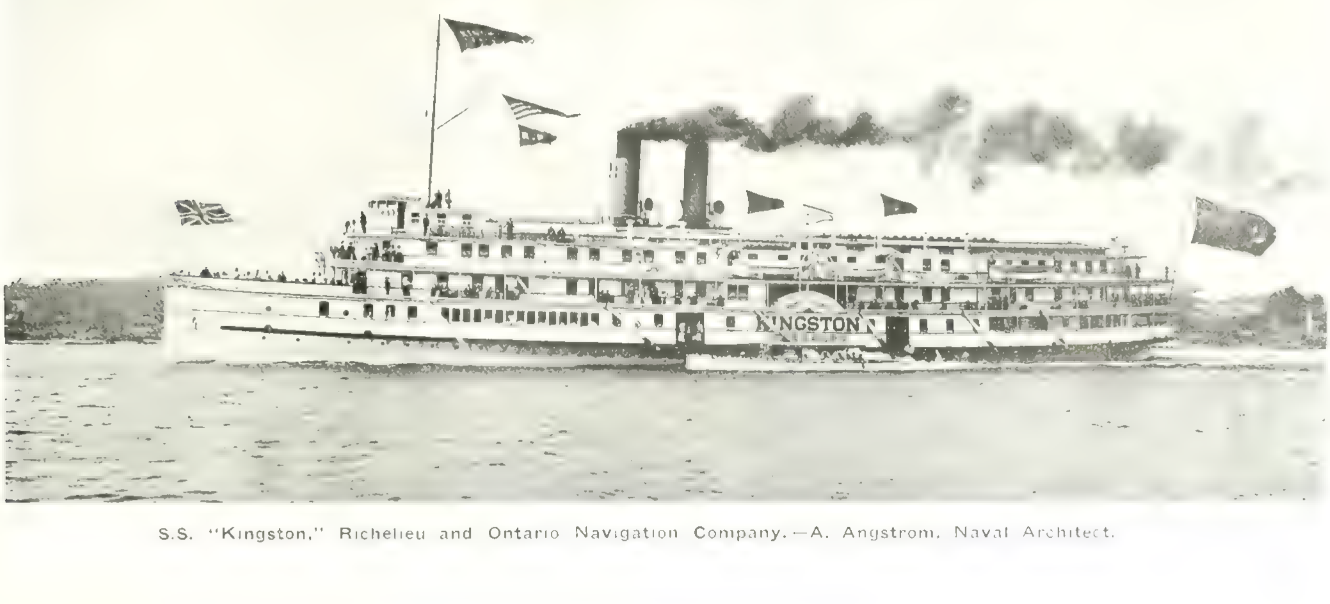
Writing Room, S.S. "Toronto"—Finished in Mahogany with Leaded Glass Window and Decorated Walls.—Bond and Smith, Architects.

S.S. "Montreal," Richelieu and Ontario Navigation Company.—A. Angstrom, Naval Architect.

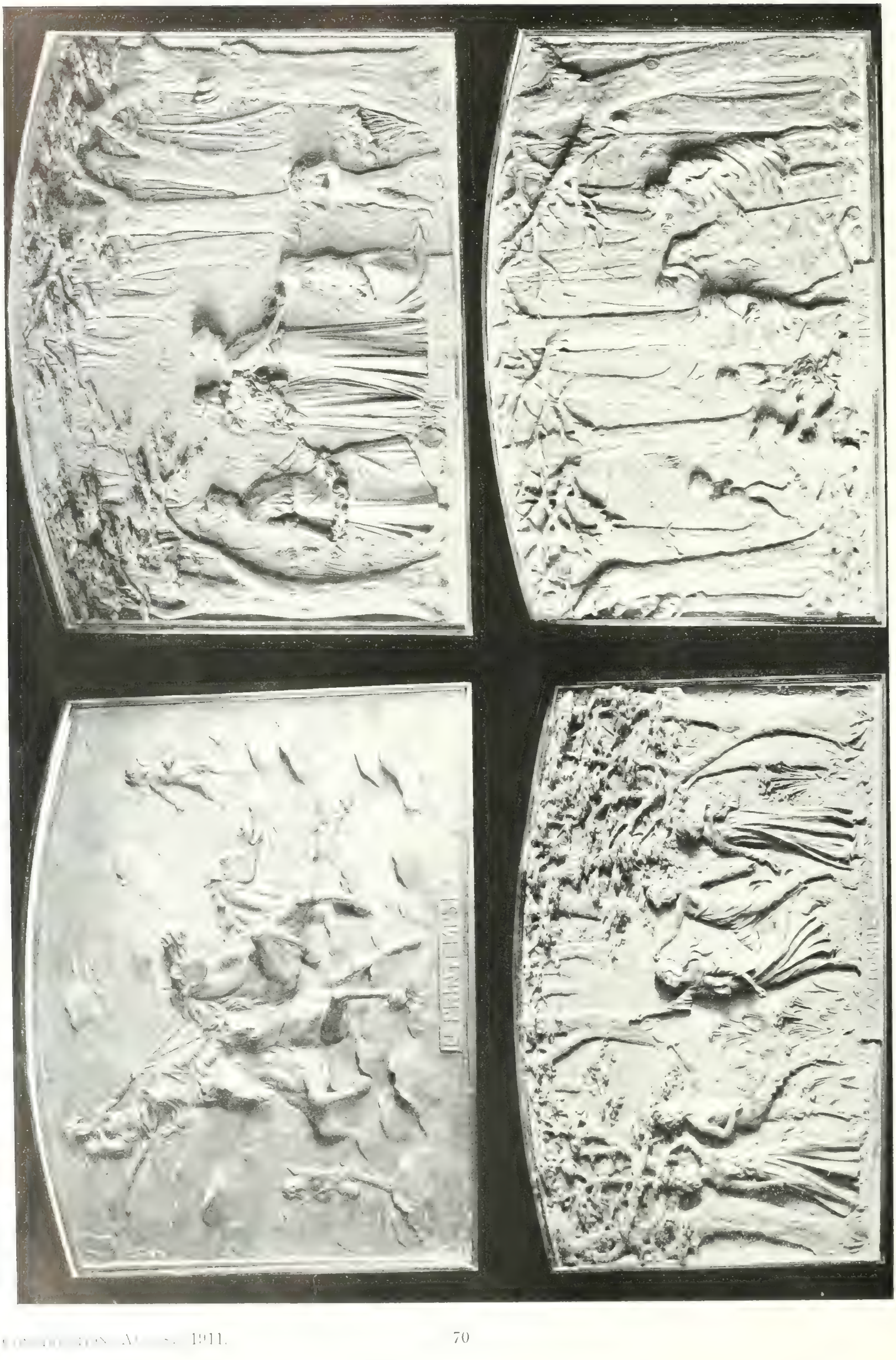
of Francis I., with white enamel panelling and effects. Both here and in the Louis XVI. dining room, which is finished in white enamel with richly embellished walls inset with amber-toned panels, the general atmosphere is one of luxury and refinement. The great care given to the detail of furnishings, can be better appreciated when it is known that the furniture, fixtures and carpet were made after the architect's designs.

Careful attention to detail is also in evidence in the smoking room, which is decorated in Oriental style with beamed ceiling, green stained chestnut woodwork and richly stencilled walls; and again in the writing room is finished in mahogany with leaded glass windows and decorated walls. In contemplating the accompanying photographic illustrations, it would be difficult without knowledge of the fact, to regard these two interiors as part of the scheme of a modern boat, so closely do they resemble rooms of similar character in the well appointed hotel or club.

It is not intended in the limited space available to go fully into the decorative character of the steamships immediately under observation, but to point out by illustration and minor reference several interesting schemes that have been carried out, and the marked departure from the purely utilitarian that has been effected through the architect's skill. And it must be said that the architect has not hesitated to enlist the services of his fellow worker in the allied arts when necessary to develop some especial feature essential to the success of his work. For instance, in the main entrance hall of the S.S. "Montreal," which is carried out in the Modern French style with mahogany woodwork, is a series of panels representing the "Four Seasons," modelled by J. S. Bank, the Toronto sculptor; while at the head of the staircase leading to the gallery of the main saloon is a



S.S. "Kingston," Richelieu and Ontario Navigation Company.—A. Angstrom, Naval Architect.

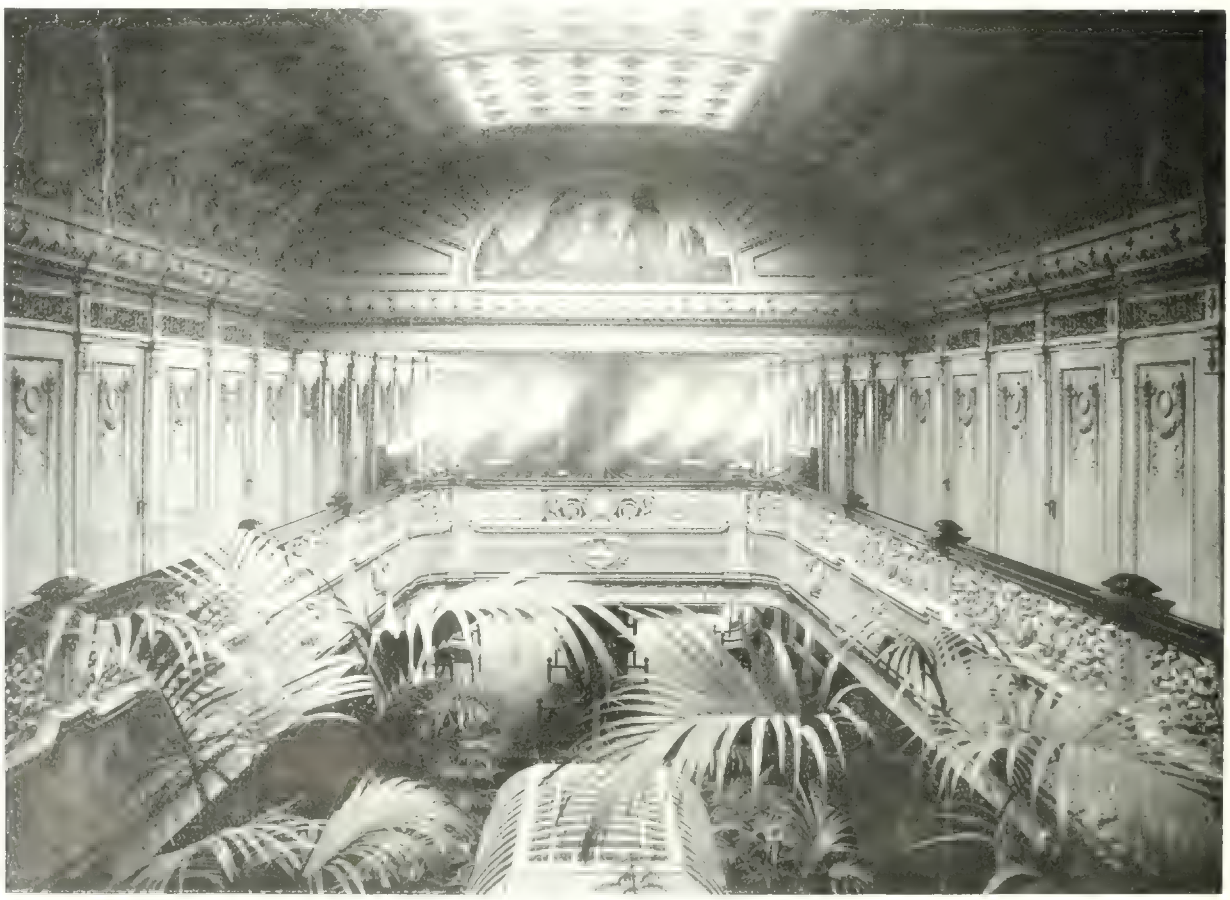


Wall Panelling, Representing the Four Seasons, Main Entrance Hall, S.S. "Montreal." Modelled by J. L. Banks.

Entrance Hall, S.S. "Montreal"—This View Shows Two of the Four Wall Panels Representing the Seasons. The Style of Treatment Here is Modern French and the Woodwork Mahogany.—Bond and Smith, Architects.

Gallery, S.S. "Montreal"—Decorated in Louis XV. Style. The Portrait of Cardinal Richelieu at the Head of the Staircase is by Sugar Cote.—Bond and Smith, Architects.

Main Entrance Hall, S.S. "Kingston"—In Decorative Character of the Jacobean Period, with Dark Oak Panelling and Heraldic Frieze in Staff.—Bond and Smith, Architects.



Midship Saloon, S.S. "Kingston"—Carried Out in Empire Style with Coffered Ceiling Having Lighting Scheme in Panels. The Mural Painting at the End is by F. C. Challener, R.C.A.—Bond and Smith, Architects.

S.S. "Rapids King," Richelieu and Ontario Navigation Company.—A. Angstrom, Naval Architect.

painting of Cardinal Richelieu by Sugar Cote, a well-known Canadian artist, which adds interest to the Louis XV. scheme. The dining room of this boat, which is not included in the illustrations, is in character with the entrance hall, being in Modern French style, decorated chiefly in tones of green.

In passing, a brief reference should be made to the two photographic views of the interior of the S.S. "Kingston," for no member of the Richelieu and Ontario fleet is more magnificent in its general appointments. The Jacobean entrance hall, panelled in dark oak with heraldic staff frieze and rich ceiling, is indeed a beautiful interior; but even here the scheme fails to equal the decorative character of the midship saloon, which is carried out in Empire style and lighted from above by a coffered ceiling having a mural painting by F. C. Challener, R.C.A., above the cornice at either end. Throughout the boat, the rooms are palatial in their appointments, the dining room being decorated in Georgian style with the color schemem in mahogany and white.

A treatment somewhat varied from any of the interiors of the above boats, is seen in the S.S. "Rapids King," also owned by this company, which is carried out entirely in Modern Mission style with the main entrance hall in oak stained a very dark brown, and rich wine color panels. An interesting feature of this steamer is the promenade deck, which is arranged as an enclosed observation room and finished with dark oak with a light colored beamed ceiling.

Another boat which shows an interesting treatment in the Modern Mission style is the S.S. "Cayuga," of the Niagara Navigation Company line. The scheme of rooms throughout have a most pleasing domestic character; the various interiors being carried out in different oaks and harmonious color combinations. The entrance is finished in green stained oak with panels of similar tone; the promenade deck in Flemish oak with panels of brown; and the smoking room is in dark oak with brown panels and white painted dome ceiling. In the dining room dark bog oak is employed, the panels having subdued tones of green; the generally quiet scheme of the room being given a bright relief by the red curtains at windows. A feature of this room is the built-in sideboard which can be seen quite distinctly in the accompanying view.

S.S. "Cayuga," Niagara Navigation Company.—A. Angstrom, Naval Architect.

Main Entrance Hall, S.S. "Rapids King"—Finished in Oak Stained a Deep Dark Brown, with Rich Wine Colored Panels. —Bond and Smith, Architects.

Promenade Deck, S.S. "Rapids King"—Arranged as an Enclosed Observation Room.—Bond and Smith, Architects.

Entrance Hall, S.S. "Cayuga"—Designed in Modern Mission Style with Vari-Toned Green Wall Panelling and Green Stained Oak Woodwork to Correspond.—Bond and Smith, Architects.

Smoking Room, S.S. "Cayuga"—Carried Out in Dark Oak with Brown Panels, and White Painted Woodwork — Dome Ceiling. Bond and Smith, Architects.

Promenade Deck, S.S. "Cayuga"—Here the Scheme is in Vari-Toned Brown Panelling, and Dark Oak Woodwork.—Bond and Smith, Architects.

Dining Room, S.S. "Cayuga"—Finished in Dark Bog Oak with Subdued Tones of Green in Panelling and Red Curtains. The Sideboard at the Back is a Noteworthy Feature.— Bond and Smith, Architects.

The A. E. Rea Company's Building, University Street, Montreal. Occupied by Goodwins Limited.—A. F. Dunlop, Architect.

THE A. E. REA COMPANY'S BUILDING, MONTREAL

By B. T. NARES

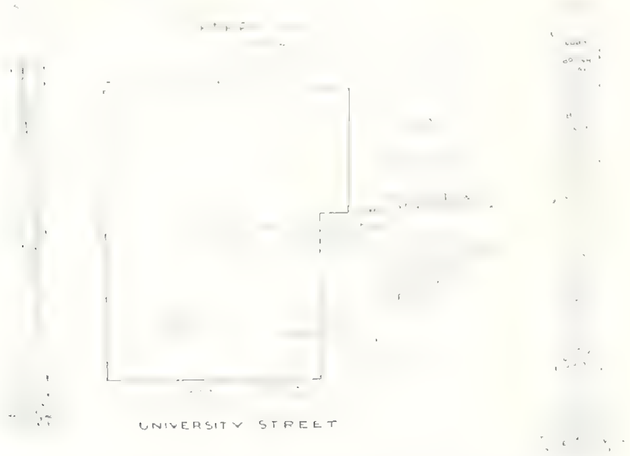
Built of reinforced concrete. Some details of its construction, together with description of contractor's plant equipment and method of carrying out work.

THE NEW STORE BUILDING of the A. E. Rea Company, Montreal, has a frontage on University Street of 155 feet, and extends through to Victoria Street—a distance of 210 feet. It is of re-inforced concrete construction throughout, with the exception of the foundations, which are of plain concrete, and consists of three storeys and a basement, with provision for an addition of five more storeys at a subsequent date. The exterior of the building is finished in terra cotta and marble, with copper spandrels, and the interior is plastered and finished with hardwood floors, marble bases and mahogany window frames and fittings.

The finished basement floor is at a depth of 18 feet below street level, the first floor is 20 feet high, with a mezzanine floor (for offices, telephones, etc.) 21 feet wide along the north side of the building. The second floor is 16 feet and the third floor 15 feet high from floor to floor. The fire escape stairs are enclosed by a curtain wall of re-inforced concrete, as a protection against fire, the doors also being fire doors of approved design.

The excavation for the cellar and foundations commenced on the 3rd of May, 1910, and was practically completed by July the 25th—a period of 64 working days and thirty-four nights, with an average over the total time of two hundred and sixty-seven cubic yards per ten hour day. At the end of this time there were only some 1,500 cubic yards left, part of which was used for the back filling around the retaining walls, and the rest was taken out by means of a small wheel truck and a sloping gang way. The main part of the excavation, consisting of 26,200 cubic yards, was done by the use of automatic excavators. A section of the ground to bed rock is appended, which shows the nature of the material removed. (See sketch No. 1.)

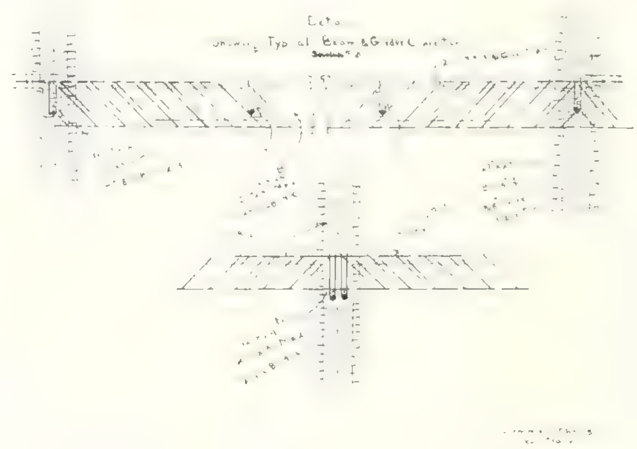
The building is founded on 96 piers with spread footings resting on hard pan, which was found at a depth of 30 ft. below the street level. Borings taken at three widely separated points over the site showed that an almost level layer of hard pan overlay the bed rock for an average depth of 20 feet The test holes were sunk 16 feet into the rock to make absolutely sure of its solidity. The appended section was obtained from the borings taken, and shows the distribution of the different strata. The bearing value of the hard pan was taken as 8 tons per square foot. The load to be supported by each pier was 400 tons—so that the necessary area is 50 square feet. The footings were made 7 ft. 6 in. square, giving a capacity of 450 tons per footing. The footings were made 3 ft. thick to take care of the bending and shear stresses transmitted to them. From the footings to the basement floor, piers 5 ft. square were put in, the compressive strength of plain concrete being taken as 400 lbs. per square inch. Dowels were left for the joint with the basement columns, there being enough steel to take care of any possible side thrust causing shear across the heads of the piers. The concrete in the foundations is of 1.3.6 mix.



Sketch 1.—Vertical Section Through Building Site. Sketch 2.—Vertical Section of Retaining Wall. Sketch 4.—Plan of Layout.

The excavation for the foundation piers was done by hand. Two inch tongued and grooved spruce sheet piling, 16 ft. long was first driven in a square around a yoke 7 ft. x 7 ft. outside measurement, by the use of a 4 in. Ingersoll-Rand Sheet Pile Driver, driven by steam from a boiler in the basement, and the interior was then shovelled out by hand. An accompanying progress view shows some of the caissons already sunk, and one (rear of view) just being started, as well as part of the sheet piling used as a temporary retaining wall, being put in place for driving. (See photograph No. 4.)

The retaining wall in the basement has a depth of 18 feet and a thickness of one foot (see sketch No. 2). It is designed as a vertical beam, fixed at the top by the ground floor slab and at the bottom by a horizontal beam running along the tops of the exterior piers. The pressure of the clay was assumed at one-third of water pressure—20 lbs. per square foot—so that 360 lbs. is the concentrated load to be supported by one foot of the wall. The resultant acts at a point about one-third the height of the wall, and the re-inforcing is designed to suit. The end reaction at the bottom is calculated at 240 lbs., but as the wall will have to hold back an indeterminable amount of water in wet weather, the beam at the base is designed to carry a distributable load of 360 lbs. per horizontal foot of wall. The vertical re-inforcing consists of one inch round rods spaced 4 in. centre to centre, and sufficient five-eighths and three-quarter inch round rods are used horizontally to act as spacers and to take care of any temperature stresses. The horizontal footing beam is incorporated in the wall and re-inforced with four one and three-eighths inch round rods. The wall is waterproofed with Trus-Con Waterproof Paste, furnished by the Trussed Concrete Steel Company. This paste was mixed with the water used in the mixer, in the proportion of one part of paste to 12 parts of water. The cost of the

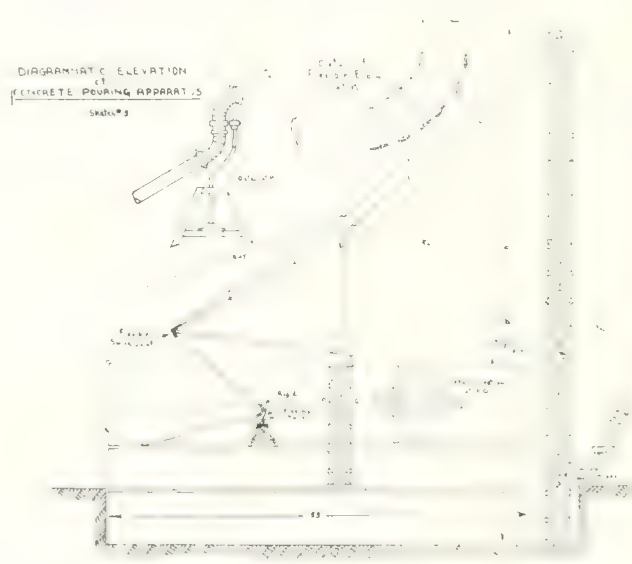


Sketch 3.—Showing Typical Beam and Girder Reinforcing and Connection.

waterproofing was very small, as it went on while the concrete was being mixed.

The shores which held back the earth were carried in to the second row of caissons, and the wall forms were built around them. They were taken out when the ground floor and wall had set, and the holes filled with a rich concrete.

The basement floor consists of a layer of cinders 12 ins. deep, a 5 in. slab of stone concrete reinforced with No. 6 Kahn Rib Metal, 4 ins. of cinders, in which sleepers are laid, to take rough spruce boarding, and on top of all a finish floor of birch.



Sketch 5.—Diagrammatic Elevation of Concrete Pouring Apparatus.

Drainage under this floor is provided for by a system of tile farm drains, increasing gradually from 4 in. to 8 in. in diameter, leading to a sump, from which the water will have to be constantly pumped. This is necessary because the new basement is below the street sewer level. The other floors are finished with 5 ins. of cinder fill and the rough and finished flooring; this form of construction having been adopted to make the building as sound proof and to conceal the electric conduits and sprinkler pipes.

Progress Photograph 1.—Showing Excavator Beginning Work on the Site.

All the columns in the building are square, with the exception of the ground floor columns, which are octagonal. They are reinforced with vertical steel rods, hooped with three-eighth in. spiral hooping, having a pitch of 2 ins. The concrete inside the hooping is figured to stand 750 lbs. per square

Progress Photograph 2.—Showing Excavator in Operation.

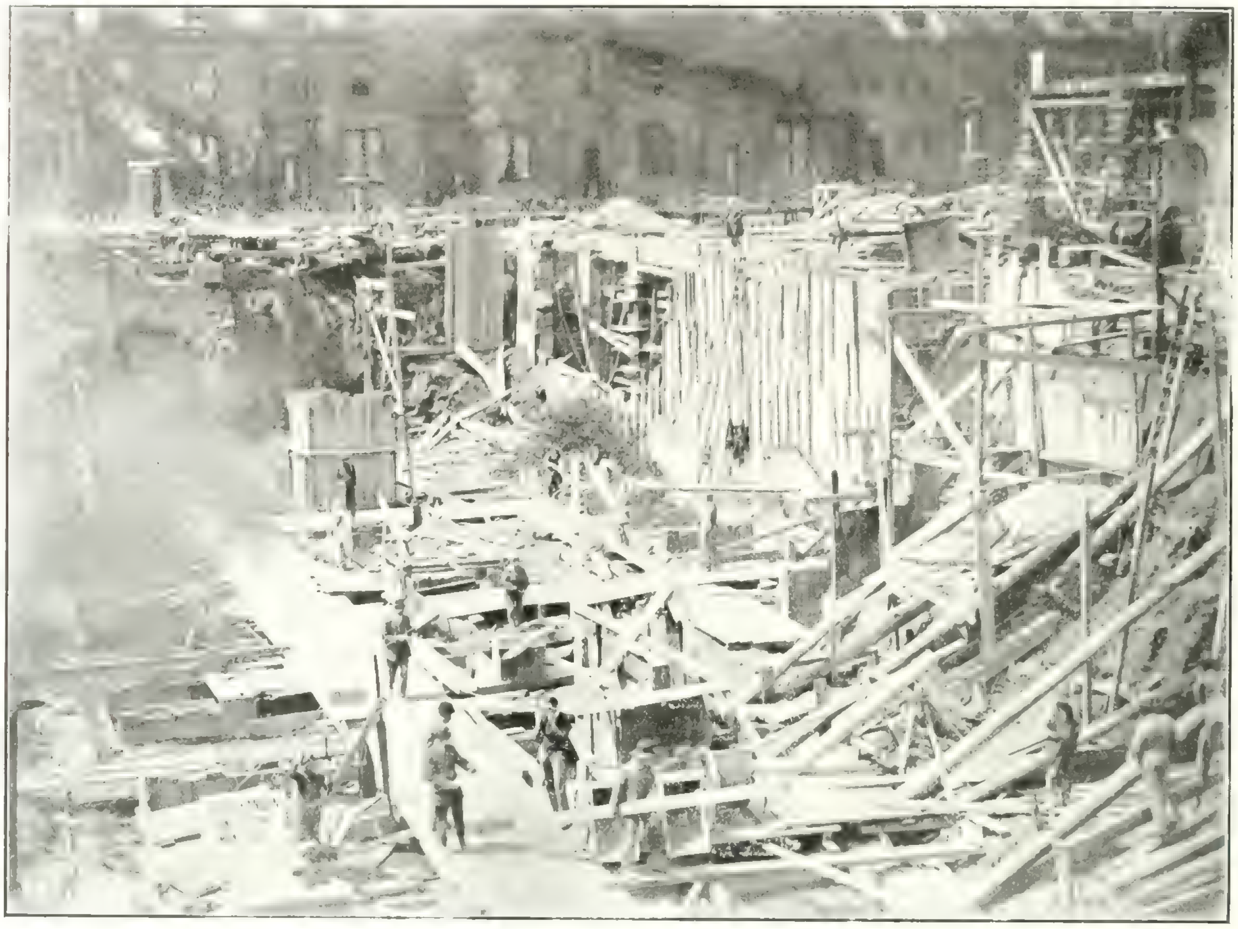
inch in compression, and there is a minimum thickness of 2 ins. of concrete covering the steel, as protection against fire, the strength of which is neglected. The ratio Fs to Fc is taken as 15. The capacity of the steel will therefore be 750 x 15 equals 11,250 lbs. per square inch. The basement columns were figured as follows:—Outside dimensions, 30 x 30 ins. Core diameter equals 26 ins., cross section area of concrete equals 531 square inches. Load taken by concrete equals 531 x 750 —400,000 lbs. Cross section area of one—$1\frac{1}{8}$ in. round rod equals 0.994 square inches. Cross section area of 15—$1\frac{1}{8}$ in. round rods equals 14.9 square inches. Load taken by steel equals 14.9 x 11,250 equals 199,000 lbs. Therefore total load taken by column equals 599,000. Total load on column equals 600,000 lbs. It might be noted here that the footings were designed to carry 400 tons, but the design was later changed.

All other columns were designed similarly, allowing for a 5 per cent. reduction in the live load from floor to floor. The exterior columns are reduced by

Progress Photograph 3.—Showing Main Tower Nearing Completion, with Stone Tower to Left Immediately Behind, and Sand Tower to Right. The Detail of Excavator Jib, Mast, Swivel Connection and Locking Lever is Seen at Extreme Left.

20 per cent. because, apart from the load imposed by the wall, they only carry half the floor load that the interior columns are subjected to. The live load on the ground floor was assumed as 105 lbs. per square foot, the dead load of concrete was taken to be 150 lbs. per cubic foot, and as the floors are 4 ins. thick, the dead load per square foot of floor will be 50 lbs. The weight of the cinder fill and wood flooring was assumed as 20 lbs. per square foot, so that the total load that the floors are designed to carry is 175 lbs. per square foot, with the 5 per cent. reduction in the live load already noted. The beams are figured to carry their own dead load, in addition to the floor load.

The floor slabs are figured as simple beams between the ends of the flanges of the T beams. They consist of a 4 in. slab of 1.2.4 mix, reinforced with $\frac{3}{8}$



Progress Photograph 4.—Showing the Start of Sheet Piling Retaining Wall at Rear Centre, with Excavators at Work to Left.

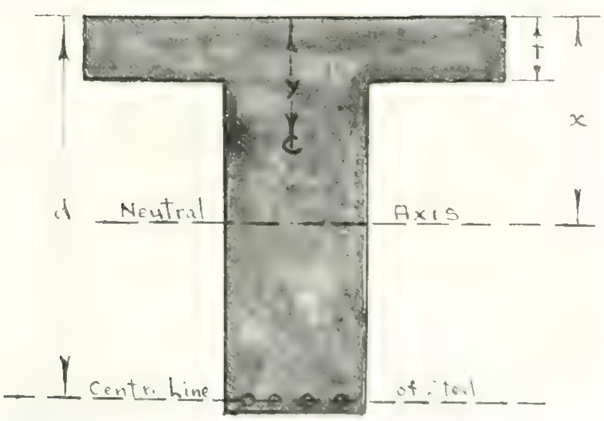
Progress Photograph 5.—Showing the Delivery Pipe and Flexible Elbow Used in Pouring the Concrete, and the Method of Breaking Off the Work.

in. round rods placed 6 ins. centre to centre, separated by $\frac{3}{8}$ in. distance rods spaced 2 in. centre to centre, and at right angles to the reinforcing.

All girders are figured as being continued, and the bending moment is taken as $\frac{wl^2}{12}$, except for those running to exterior columns, in which case the bending moment is assumed as $\frac{wl^2}{8}$, where w equals the total weight to be supported by the beam, and l equals the span of the beam in feet.

The method used in figuring was as follows:—

Let N equal $\frac{Es}{Ec}$ equal 15 where Es and Ec are the ratios of elasticity of steel and concrete resp ectively.



Let Fs equal extreme fibre stress of steel equal 16,000 lbs. per square inch.

Let Fc equal extreme fibre stress of concrete equal 600 lbs. per square inch.

Let X equal distance from top of flange to neutral axis.

Let d equal distance from top of flange to centre line of steel.

Let y equal distance from top of flange to centroid of compression.

Let t equal thickness of flange.

Let A equal cross-section area of steel.

Let M equal bending moment in beam.

$$\text{Then } X \text{ equals } \frac{N \times Fcd}{Fs \text{ plus } (N \times Fc)}$$

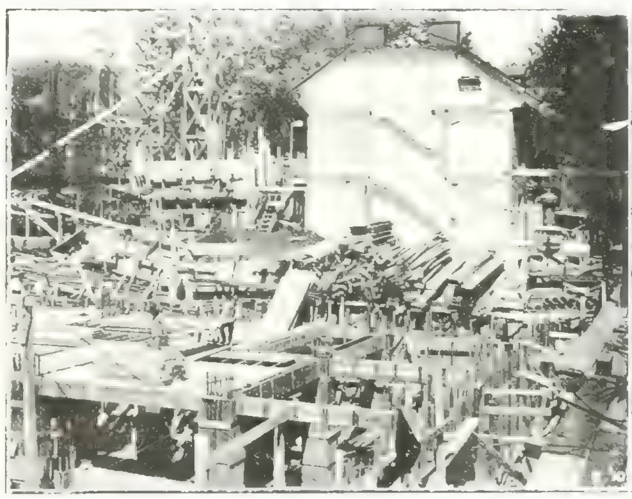
$$y \text{ equals } \frac{(3x-2t)}{(2x-t)} \times \frac{t}{3}$$

$$\text{and } A \text{ equals } \frac{M}{Fs\ (d-y)}$$

Sketch 3 shows typical beam and girder reinforcing and connections.

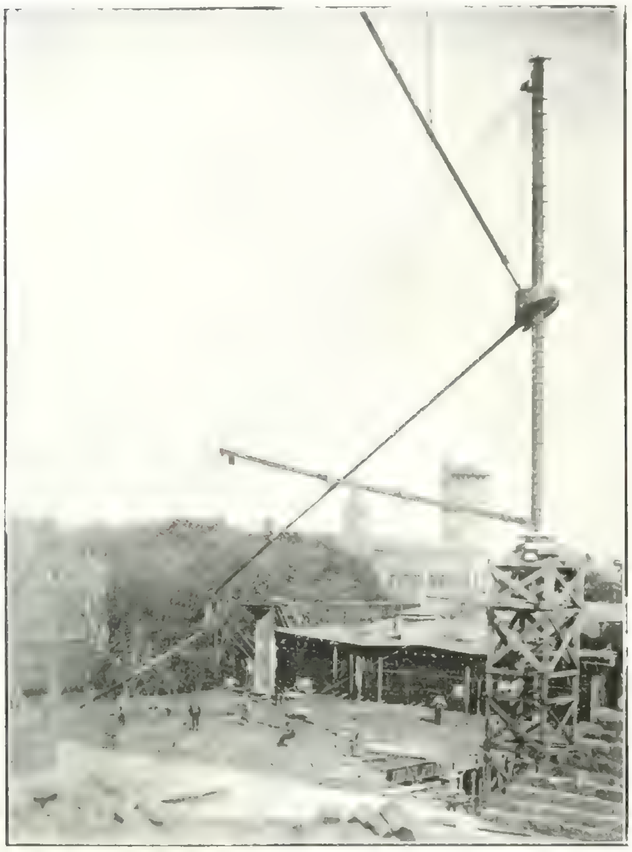
The sketch plan of the general layout of the job is appended (see sketch 4) with the diagrammatical elevation of the concrete pouring apparatus, and only a brief explanation is necessary.

The cement was stored in a vacant house beside the sand bin and was conveyed to the mixer in a small overhead truck, like those used in stables for handling feed, etc. It only required two laborers to keep the mixer supplied by the use of this apparatus, which carried eight bags at each trip and eliminated the labor of three men. The stone and sand carts drove in by the lane from Burnside Place and dumped over chutes in the driveway which led to hoist buckets in the bases of the towers "A" and "B" (see sketch 4 and photograph No. 4). From these buckets it was dumped, either into the storage bins or directly into the mixers; just the right amount for a batch being elevated at one time, and either of the mixers being fed at will by means of a hopper having a "flip-flap" door (see detail, sketch No. 4), which directed the streams of stone or sand from their pipe lines into hoppers above the two mixers. The sand, stone and cement for one batch were put into these hoppers together, and then the charge fed to the mixer. From the mixers the concrete was carried up through a twin tower (see sketch No. 3) to hoppers placed sufficiently high to give a slope of 30 degrees to the pipe line used in the pouring. These hoppers had a stop gate at their opening into the pipe line, controlled by a hand lever, so that the concrete could be admitted gradually—otherwise there was a possibility of the pipe choking. As the work increased in height and distance from the base of the tower the hoppers were raised. In order to pour the third floor the main towers were built 187 ft. above the basement



Progress Photograph 6.—Taken Thirty-Three Days After the Excavation Was Started.

floor. In the centre of the job a main distributing tower was built 50 ft. high above the already concreted ground floor, having a spread footing to distribute its weight, and on the top of this a guy derrick was placed with a vertical mast 50 ft. high, and a 60 foot boom, so pivoted that the whole could be revolved in a circle on top of the tower. Near the top of the vertical mast a circular hopper was placed. This hopper had a slanting bottom and a hole through its centre through which the mast passed. It revolved with the mast and delivered concrete, through a pipe opening at its lower side, in any direction (see photograph No. 7). From the top of the twin towers, which were braced back suitably, a cable was slung to the top of the distributing tower mast, and from this cable a line of pipe was hung by vertical slings. The pipe was rigidly connected to the lower of the two hoppers on the twin tower and fed into the circular hopper on the distributing tower. From the cable joining the end of the boom to the top of the mast a line of pipe was slung from the circular hopper to an elbow, which fitted snugly over the end of the boom, from



Progress Photograph 7.—Showing Distributing Tower at Work.

this elbow which had a swivel joint and a flexible elbow in it, so that the lower part of the pipe could be moved in any direction, the pipe continued to the pouring level, being supported half way by a small portable tripod tower about 12 ft. high, there being another swivel joint and flexible elbow at this point. This tripod was only necessary on the lower floor. In the pouring of the upper floor, in order to shorten the pipe line, it was not carried to the end of the boom; but was fastened, as shown in photograph No. 7. The central distributing tower was so built that only the four corner posts passed through the successive floors (see detail at P.Q. Sketch No. 5), and after it was taken down the holes in the concrete were easily filled. The pipe was of No. 10 black iron, 7 in. in diameter, in 16 ft. lengths. The lengths were made of slightly smaller diameter at one end, so that they would fit one into the other, being bolted together by means of angle iron hoops riveted on at the ends. The sections of each length were double riveted to give stiffness. The elbows were made of the same weight of black iron, the flexible ones being made up of short lengths of pipe slightly cone-shaped, fastened together, so that the small end of one length fitted loosely inside the large end of the next, and could move inside it to a limited extent, the whole being prevented from bending through too great an angle by having lengths of chain riveted on as a stop (see detail sketch No. 5). Photograph No. 5 shows the spreading of the concrete as it comes from the pipe and the method of breaking off the pouring at half span. A Chicago boom was placed on one side of the twin tower and used for hoisting re-inforcing steel through a stair way opening and a temporary elevator was erected in one of the elevator openings for bringing up forms and other material to the upper floors. The rest of the plant consisted of five boilers, supplying steam to the two mixers, two steam sheet pile hammers, a pulsometer and steam syphon for keeping the cellar dry, and the machinery for operating 7 hoist drums.

There are in all 8,000 cubic yards of concrete in the building, 2,000 cubic yards of which are plain concrete, used in the foundations, the rest being all reinforced. The pouring of the reinforced concrete started on the 28th June, and was finished on the 4th October.

The forms for the columns, beams and floors were made at the yard of the Montreal Lumber Co., from material supplied in the proper lengths. A great deal of wastage of lumber and cleaning up of rubbish was in this way avoided, and time and room were saved. Also a saving in cost was effected, as milling to size costs $3.00 per M., and by hand costs about $8.00 per M. Triangular beading was placed in all angles, and all corners were bevelled off, so that there would be no sharp angles in the concrete. One set of forms for the ground floor and one for the mezzanine were made, and these were cut down and used over again for the other floors. As this method of placing concrete is quite new

Progress Photograph 8.—This View, Taken Thirty-Three Days After the Eycavation was Started, Gives an Adequate Idea of the Headway Which Was Made in Carrying Out the Work.

and has never before been tried on a building of this size in Canada, it is very probable that with further experience the cost of plant can be cut down to almost half, and that of labor very considerably.

The cement used was supplied by the Canada Cement Co. from their Lakefield mills. Kahn bars were used for the beams.

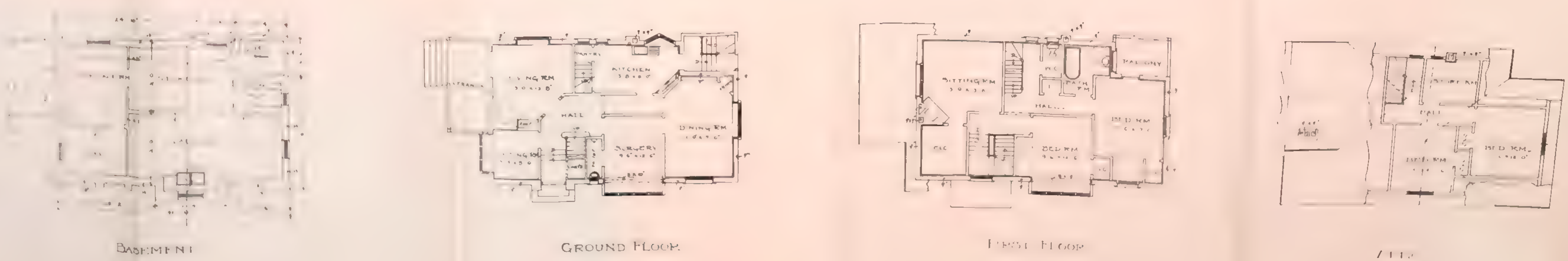
(Concluded on page 84.)

RESIDENCE of
Dr. C. S. McVicar, Toronto
J. H. Galloway, Architect

Supplement to CONSTRUCTION

August 1911. Vol. 4, No. 8.

Plans
Elevation
For Description see page 83



Residence of Dr. C. S. McVicar, Corner of Roncesvalles Avenue and Walter Street, Toronto—An Attractively Designed Moderate Size House, Built of Hard Dark Red Stock Brick, with Slate Roof and White Painted Woodwork. J. H. Galloway, Architect.

A MODERATE SIZE CORNER HOUSE OF BRICK CONSTRUCTION

Plan provides for doctor's suite in addition to compact household arrangement. Waiting Room and Surgery such as can be easily converted to domestic use.

LAST MONTH we published a half-tone view, together with floor plans and elevations of a low cost city dwelling built on a narrow lot between two adjoining structures. In this instance, we illustrate the residence of Dr. C. S. McVicars, a moderate priced house with two exposed elevations, situated at the northwest corner of Roncesvalles Avenue and Walter Street, Toronto. As in the case of the former house, it was necessary for the architect, in order to design a structure that would come within the amount set aside by the owner, to work out the scheme with simple materials, and along the lines of strict economy. The exterior, which is noteworthy in its treatments, shows an interesting roof arrangement and small well placed windows, although much of the success of the scheme depends upon the color combination and the character of materials used. The walls of the house, for instance, are built of hard dark reddish brown stock brick, taken from near the fire holes at the outer edge of the kiln, and burnt almost to a point of vitrification. They are much darker in color than the brick generally used, being almost a black, with a peculiar reddish tint, and of somewhat rough texture. In contrast to the pronounced depth of this tone is the white painted woodwork, and the grey of the cement stucco gables and stone trim. The roof is covered with a grey-green slate, and the clapboarding of the verandah is stained a reddish brown to correspond with the brick work of the walls.

The interior of the house, as explained by the plans in the accompanying supplement, is arranged to give the owner accommodations well suited for medical practice and domestic purposes. The patients enter through the side entry, which, together with the staircase, separates the waiting room from the surgery; both of these rooms being so placed as to interfere as little as possible with the remainder of the household. The dining room and kitchen, which are provided with built-in cupboard and workboard, are situated to give convenient service; while the stairs in the kitchen makes it unnecessary for anyone going from this part of the house to the upper floors to pass through the hall. The dining room is finished in oak, with panelled wainscotting, plate rail and cornice, and oak is used for the main stairs and the trim in the principle rooms, the floor being of hardwood. Should it be desired at any time to use the entire house for domestic purposes, the surgery could be converted into a library, and the waiting room made into a small reception room or den.

Living Room, looking toward the Hall and Side Entry—Residence of Dr. C. S. McVicar, Roncesvalles Avenue and Walter Street, Toronto. J. H. Galloway, Architect.

On the second floor are two bedrooms, a bath room and a good size sitting room with an open fireplace, and ample wardrobe and closet facilities have also been provided. This floor is finished in pine painted white, as is also the attic, which contains two additional bedrooms and a large storage room.

In the basement, which has a cement floor, is a furnace room, cold storage, laundry, and the usual offices.

The building is heated by a hot water system, and has both gas and electric lighting. It was erected at a complete cost of $5,600, the general construction following the usual specification for buildings of this price, the frame work being of selected hemlock, and the foundation of brick. The house was designed by Architect J. H. Galloway, and built by E. P. Atkinson, both of Toronto.

REA BUILDING—Continued from page 82.

The following is an average from tests made by the Milton Hersey Co. Laboratory on nine samples of the cement used:—

Soundness—Satisfactory.

Final set—6 hours 36 minutes.

Initial set—4 hours.

Fineness test—Sieve No. 100, 33 per cent.

Fineness test—Sieve No. 200, 19.1 p.c.

Tensile Tests.

Neat Cement—Water equals 23 per cent. One cement—3 Std.—qts. sd.—water equals 10 per cent.

	24 hours.	7 days	28 days	7 days	28 days
Min. equals	344	742	710	266	326
Max. equals	495	844	846	315	419
Aver. equals	432	779	790	293	379

So far as inspected the sample passed the specifications of the Canadian Society of Civil Engineers.

Specimens of the steel used were tested at the McGill University Laboratory and the following is an average of six tests on specimens ranging in size from 3/8 inch to 1 3/8 inch in diameter:

Average yield point equals 34,140 lbs. per sq. in.

Average ultimate strength equals 56,570 lbs. per sq. in.

Average actual maximum load equals 57,100 lbs. per sq. in.

Average p.c. of elongation in 8 in. equals 33 p.c.

Average p.c. of reduction of area equals 61 p.c.

In order to expedite the construction of the building, as much of the work as possible was carried along simultaneously. The excavation was started at one side while demolition was still going on on the other side of the site, and as soon as there was enough room the caisson work was started and kept up behind the excavation. Almost half of the ground floor had been poured before the excavation was finished on the far side. At this same time the steel and forms for the mezzanine and first floors were being erected, and so on throughout the whole construction. Mr. A. F. Dunlop was the architect of the buildings, and Byers & Anglin, the general contractors.

Dining Room, Residence of Dr. C. S. McVicar, Roncesvalles Avenue and Walter Street, Toronto. J. H. Galloway, Architect.

THE DEVELOPMENT OF THE GOTHIC VAULT

By C. R. HOWLAND

The early and transitional stages in the evolution of important constructional features leading up to the final perfection of the present Gothic system.

HISTORICALLY the vault is the most important structural feature of Gothic cathedral architecture, for it was through the efforts made to solve the problems of its erection that the fundamental law of the system, the functional grouping of supports, was developed.

When the builders of the thirteenth century grasped the value of the vault in spanning wide spaces, and attempted to employ it in the naves of their churches, they came face to face with this mechanical and artistic difficulty—they could not rely upon inert mass for the equilibrium of such large piles as they were contemplating; they must seek a less clumsy means of sustaining the tremendous vault-thrusts.

They did not need to look for new constructive principles. Two quite efficient—balanced thrust and concentration of strains upon isolated points of support—they had inherited from the building methods of older times; for not only did all the constructive members of the Gothic church exist in the earlier Romanesque, but even the Romans had known the use of arches and vaults exerting side thrusts that were met by external abutments, and neutralized by downward pressure upon the walls operated on, and had been familiar also with the mode of sustaining vaults by a framework.

The task that lay before the mediæval architect of the Gothic school was, therefore, merely to re-apply old principles in a novel way, to solve through them a new and difficult problem—the successful elevation of immense vault formations.

In Roman and Romanesque days the structural elements enumerated had been used in a purely rudimentary manner, especially the systems of external and internal supports. The buttresses, for instance, were not in Roman edifices confessedly functional members, devised to meet with economy and efficacy a lateral pressure; on the contrary an effort was made to disguise them, either by planning buildings in such a way that some of the enclosing or dividing walls should stay the vaults, or else by employing vast walls which would secure stability by their inert mass. Occasionally engaged columns were placed on the outside of walls at points where stress would naturally be met, but they were employed merely for a decorative purpose.

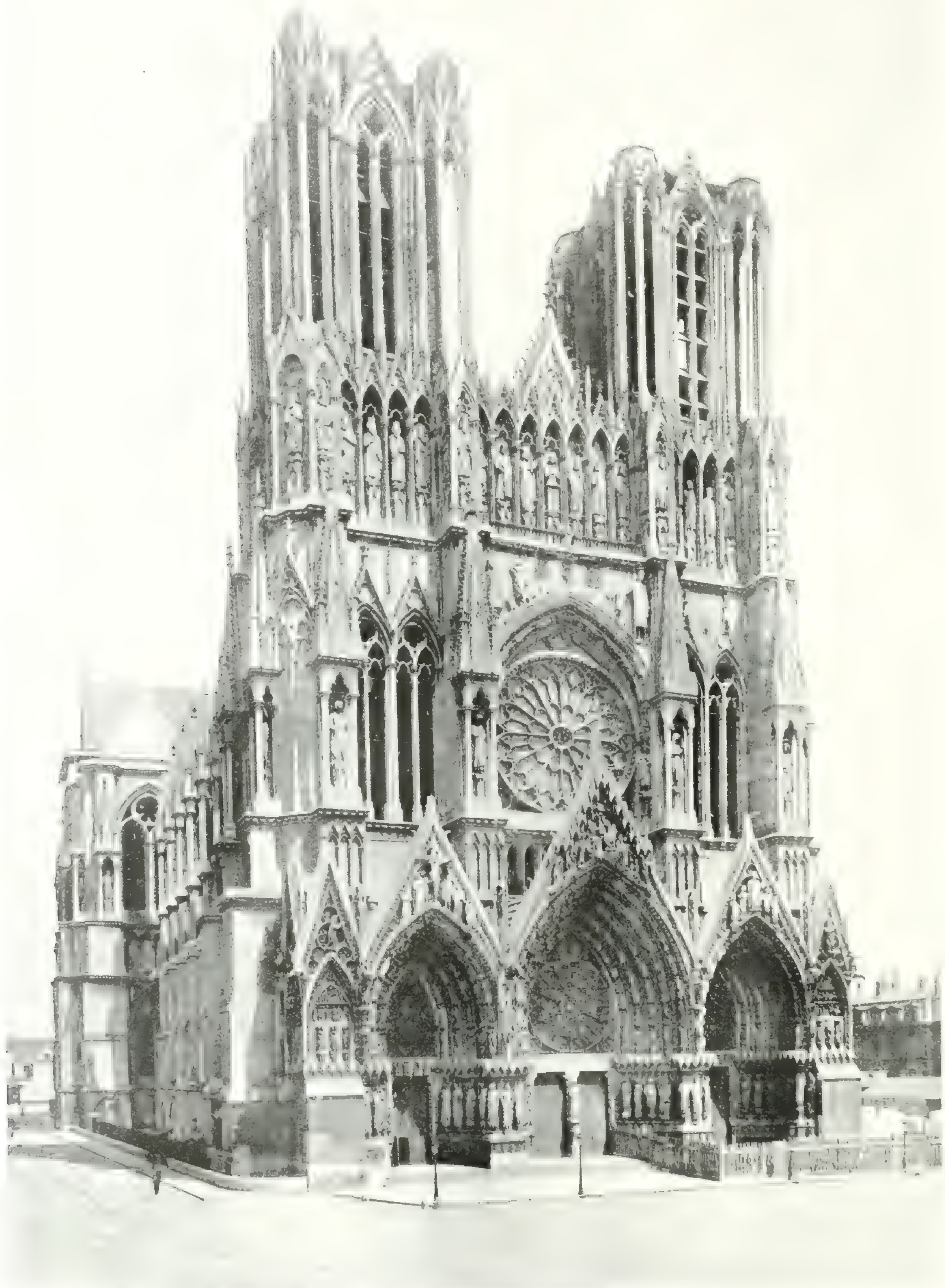
There was an advance in the system as the Romanesque builders improved the art of construction. The engaged columns were replaced by pilaster strips, which were used partly for ornament and partly to stiffen the walls, less massive than similar Roman formations had been. These pilasters had not sufficient projection to bear much vault pressure, but they were capable of enforcing the aisle walls against vaults of little span. They were of considerable importance historically, for they marked the place where in erections of this kind the walls required additional strength; and later they developed into true buttresses, when Romanesque builders found, in beginning to vault the nave, that the pilaster buttresses, which had been adequate to stay the walls of the vaulted aisles, were not equal to the thrusts of vaults of greater span. The expedients adopted to increase the resistance of the clear-story buttress developed the principles that were to recreate by a gradual evolution the Romanesque style into the Gothic. Nor was the elementary character of the internal supports less marked than that of the exterior system in Roman and Romanesque buildings. The framework supporting the vaults was buried in the thickness of the masonry, instead of made to project from, or even to appear upon, the vault's surface.

The beginning of Gothic dates from the earliest functional grouping of supports in the twelfth-century churches of San Michele of Pavia and San Ambrogio of Milan. The growth of the rudiments embodied in these Lombard structures is not, however, to be traced through Italian monuments of architecture. We must go north of the Alps to study the transitional stages to the final perfection of the Gothic form.

This is the natural sequence: The Italians, for their part, had a style, which, inherited from their ancestors, had gradually become modified to meet their needs. The people north and west of the Alps, on the other hand, had up to this time blindly imported building forms which were not well suited to their climate and their race. Unbound by classic traditions, and dissatisfied with the existing architecture, the latter were ready to seize upon and to grapple with an artistic problem, through the solution of which a suitable system might be built up. Therefore, when the rudiments embodied in the Lombard churches were transmitted to the north they were accepted and developed logically in accordance with climatic and local conditions, and in a manner expressive of the distinctive genius of the people.

The earliest Gothic movement was confined to the Ile-de-France, a region now largely included in the departments of the Seine and the Oise. Later it had rather wider boundaries, which embraced the royal domain of the Capetian Dynasty and portions of the adjacent provinces of Champagne, Burgundy, Orleans, and Berry. Throughout this section the

Romanesque we must consider buildings that antedate what is generally regarded as the transition period, monuments of the twelfth century, which are essentially Romanesque, containing only elements of the Gothic, showing merely the beginning of a move-



Rheims, West Front.

movement was general and spontaneous, although some localities were more apt than others at grasping the value of the principles imported from Italy. To study adequately the evolution of Gothic from

ment toward an independent structure that will have in every part an artistic as well as a mechanical value.

The more important problems involved in the development of the style can be best realized by following a brief outline of the primary growth of the system of external supports. An early form of the flying buttress appears in the twelfth-century Abbaye-aux-Hommes at Caen. Here an attempt was made to enforce the vaults, the groin-arches of which are curves of low sweep exerting strong lateral thrusts, by springing a demi-vault from the top of the aisle walls to abut it against the nave walls under the aisle roof. This concealed flying buttress was illogical, and essentially inefficient, for only a fraction of its strength met the thrusts of the vaults, the rest being wasted upon the walls between the piers where no props were required. The level of abutment was, moreover, lower than the point of greatest thrust. The strength of this constructure, therefore, resides necessarily as much in the inert mass of its wall as in its system of abutments.

The next step is seen in the development of the flying buttress at the Abbaye-aux-Dames at Caen, and in Durham Cathedral. Here the demi-vaults were sprung from the aisle walls opposite the piers, and abutted at the piers only at the points where the thrusts of the vaults were gathered. These arches were not quite effectual; their point of abutment was too low, and much of the strain of the vault-thrust consequently fell upon the walls. Therefore, inasmuch as they are neither well adjusted nor externally apparent, these abutting arches, although true flying buttresses, are not the logical members of Gothic architecture.

In order to appreciate that the evolution of the other components of the Gothic building involved similar difficulties, we have only to reflect upon the absolute interdependence of the parts of the Gothic edifice. The shape and performance of each of these constructive elements are vitally affected by the nature of others with which they are related. The configuration of the vault determines the character of its supports; upon the shape and disposition of the buttresses depend largely the equilbrium of the structure and its artistic effectiveness; the piers share the labor of the buttresses, and supply to the rib members functional support; the rib system, as it appears in its perfected form, constructed quite independent of the vault, serves as a strong centering, and prevents any rupture occurring in one part of the vault from spreading to other cells; and at the same time, built as it is with each of its ribs resting upon an individual stay, it carries out the principle of functional grouping of supports which the buttresses and piers observe.

The first definite stage in the development of true Gothic begins with the introduction, as a constructive device in vaulting, of the pointed arch, which had up to this time been used only as an ornamental feature in windows and doors; for, lessening materially the difficulties with which architects had to contend, this innovation marked the beginning of a sure and rapid advance. In the first place, because it exerted a less-powerful thrust than the round-arched vault, its external stays could be considerably reduced.

Through the experiments that resulted, the flying buttress was brought more directly to bear upon the points of greatest pressure. To meet these points, which were higher than those upon which the abutting arches of the Abbaye-aux-Hommes and Durham Cathedral had operated, it was necessary to spring flying buttresses over the aisle roofs, and make them marked external features. Examples of this form we find in Saint-Remy at Rheims, Saint-Leu-d'Esserent, and Saint-Germain-des-Pres at Paris. This important improvement of external supports the pointed arch supplemented by melioration of the vault form itself. Through its use it became possible, with a given span, to erect the crown of the vault to any level. Thus groined arches could be erected over the oblong compartments of the naves without either doming or stilting, a thing which had been impossible with the round-arched vault, with its compartments separated merely by transverse ribs.

The early Gothic method is seen in its inception in the ground-storey vaults of the eleventh-century Tbbey Church of Morienval, near Crepy-en-Valois; and is found in its complete character in the later Abbey Church of Saint-Denis, which dates from 1137 to 1141. In spite of the fact that the system employed in the apsidal aisles of the church at Morienval was awkwardly and incompletely carried out, two important principles were introduced—the use of the pointed arch and the curving of the diagonal vault ribs. The pointed arches were poorly conceived and adjusted, and show plainly that they were introduced as a result of experimental efforts to vault successfully a curved oblong space; and that they were not used because their form was admired for its artistic value. As for the vault ribs, one is missing, and the other—a heavy, round-arched one—is not well applied.

The advance upon Morienval made in the church of Saint-Denis is so great that it would seem as if there must have been intermediate progressive steps, although we are not able to trace them. In the well-developed apse and choir aisles which at Saint-Denis replace the rudimentary apsidal aisles of Morienval the vaults are adequately executed, and are sustained by a full rib system of which the transverse and longitudinal members are pointed, and the diagonals, round-arched, strengthen the groins by their vigorous projection. By the intersection of the ribs far above the crowns of the enclosing arches the vault cells are much domed. Thus the rib system is not only independent, but it performs as well a new office, in that it determines the forms and constitutes the strength of the vaults, a function which, so far as it is possible to discover, it had never fulfilled up to this time.

These vaults of Morienval and Saint-Denis are, it must be remembered, ground-storey vaults of small dimensions. The efficacy of the constructive members adopted can be better estimated by the degree of success of their application in the vaults and vaulting systems built on a larger scale.

Although chronological sequence cannot be accu ately determined, it would seem that the cathedrals of Senlis and Noyon were erected very soon after the Abbey Church of Saint-Denis. The original choir vaults of Senlis must have been the very earliest of any considerable scale that were constructed upon the Gothic principles above noticed. The configuration of this vault is of special significance. The shape and arrangement of the supporting piers indicate that the original vaults, which have since been replaced, were sexpartite, a form regarded by many authorities as th eearliest used.

Just what the initial progress of sexpartite vaulting was in France proper it is not possible to ascertain, sinec hardly any vaults built upon this model prior to those of the Cathedral of Paris, which was completed about 1180, remain on the Ile-de-France. Much may be learned, however, concerning the early development of this form from the sexpartite

Senlis. Looking East.

vaults of the Norman churches at Caen. Those of the Abbaye-aux-Hommes, which date from the beginning of the twelfth century, are certainly among the first, if they are not, indeed, the very first, sexpartite vaults built. They are not truly Gothic; their rib system, lacking longitudinal or wall ribs, is not complete, nor is it independent, for its ribs, instead of disposing the form of the vaults, are themselves determined by their forms; moreover, the transverse ribs are round-arched and the diagonals elliptical, and they violate the Gothic law by exerting the maximum instead of the minimum thrust. Without doubt, nevertheless, they furnish the pattern upon which the Gothic sexpartite vault was later built up. The laternal vault cells, on account of the positions and the curves of the intermediate and diagonal ribs, take on a new character, which is, in a rudimentary manner, Gothic, for twisted surfaces are necessary to cover the triangular spaces enclosed by these ribs and the clearstory wall. Still, because of the peculiar upright elliptical form of the longitudinal arches, these superficies are not especially pronounced, and give an awkwardness of effect not characteristic of the similar twisted surface of the Gothic system. This feature is very important, since it was upon this concentration of thrusts at the highest possible point that the compactness of the pier, which is so essential to the Gothic system, depends. Probably the adoption of this particular kind of vault at the Abbaye-aux-Hommes was due to the unusual arrangement of the piers, which have alternately a single engaged shaft and a shaft coupled with a broad pilaster—a method derived from the Lombard churches, which exhibited a reciprocal disposition of piers.

Whether or not the principle of the sexpartite vault and its appropriate system was really discovered and rudely embodied merely by accident in the Abbaye-aux-Hommes at Caen, it certainly became frunitful at once on the Ile-de-France, where it was consistently worked out to its perfection. In the cathedral at Senlis, where the piers alone indicate by their shape what must have been the rib skeleton regulating the construction of the vault, the full artistic and scientific value of the constructive law had been educed.

From the present remains it is not possible to decide what the external means of abutments of the high vault swas at Senlis; and as there are no evidences that any flying buttresses, sprung over the aisle walls, existed at this period, it seems probable that the heavy piers, reinforced by the triforium vaults, sustained the thrusts. The main piers, made up of square members and engaged vaulting-shafts, were excellent, both in their functional grouping and in their expression; but, being very massive, they took up too much room. In the erection of these component parts, a new skill in masonry is shown in the selection and in the handling of material, a factor very important in the growth of the Gothic system. Indeed, in every particular this cathedral illustrates strikingly the logical course by which the style attained its final effectiveness; for while the interior, though heavy in its proportions, is frankly Gothic, the exterior is peculiarly Romanesque. In this manner the French Gothic grows, from within outward, developing organically by a gradual perfecting of its essential framework, and leaving outer details as a last consideration.

At the contemporaneous Cathedral of Noyon, the choir, although larger in its scale, and built in a manner somewhat lighter and freer, resembles in many particulars that of Senlis. The vaults, which have been preserved to the present day, are quadripartite in oblong compartments. Therefore the vaulting-shafts and piers succeed one another in a uniform series, instead of varying alternately. The vaults are but slightly domed, since only their transverse ribs are pointed, and the round-arched longitudinal ones are stilted so much that their crowns are brought up to almost the same level as the crowns of the diagonal members. The transverse and diagonal ribs are respectively supported by three vaulting-shafts, which rest on the capitals of the ground-storey piers. The ground-storey piers of the choir proper are plain round columns with a single engaged shaft. The single columns of the sanctuary are more slender than those of the choir, and are monolithic with a slight entasis; their capitals are pure Gothic in their functional adaptation to the peculiar structural conditions. The means of external support cannot be determined with accuracy, inasmuch as the buttress system has been reconstructed; it is probable, however, that true Gothic flying buttresses were sprung over the aisle walls to abut against the high clearstory.

The Gothic principles, already far advanced in this choir at Noyon, are more completely carried out in the nave of the same church, where the lighter proportions of shafts and piers and the greater magnitude of openings, evince a better understanding of the freedom afforde dby the ne wconstructive method. Further evidence that a distinct stage of advance had been effected may be found in the choir of Saint-Germain-des-Pres, Paris, the nave of Saint Stephen's at Beauvais, the churches of Saint-Leu-d'Esserent and Saint-Martin at Laon, and other similar edifices, which were undoubtedly of about this same period.

In the greater cathedrals o fthe latter part of the twelfth century and of the beginning of the thirteenth—the cathedrals of Paris, Laon, Chartres, Bourges, Rheims, and others—we may study the surprisingly rapid development of the Gothic style to its highest perfection. Of these edifices, the Cathedral of Paris is the first in which a systematic application of the Gothic principles is distinctly shown; and the efficiency of the system could not be better illustrated than in the nave, the vaulted stone roof of which has stood intact for seven hundred years. Its vaults are sexpartite in form. The cells are entirely governed by the sustaining ribs, of which the longitudinal are pointed and the diagonals semicircular. The latter intersect at a point higher than the level of the crowns of the transverse ribs, the intersections of which are, in turn, higher than the crowns of the longitudinal members; in consequence the vaults are distinctly domed, assuming a form almost universal at that time. The lateral vault-cells are naturally oblique to the axis of the nave, and their surfaces are very irregular on account of it. This peculiarity Moore, in his "Gothic Architecture," explains as follows:

"More or less obliquity and irregularity of surface is a constant and necessary characteristic of true Gothic vaults, even of those which are quadripartite. Gothic vaults are never simple intersecting pointed vaults. The new constructive principles do not permit of such forms. Gothic vault-forms do not permit of description in geometric terms. They vary acording to the spans, the altitudes, the curves, the points of springing of the arches that compose the rib system, and it is by the forms and relation of these arches only that such vaults can be described. In the vaults of Paris the filling-in consists of successive courses of arched masonry reaching from rib to rib over each triangular space of the plan. The beds of these successive courses are not parallel one with another, but incline variously according as the mason found necessary or convenient in developing the twisted concave surfaces required by the varying spans and positions of the ribs. In early vaults like those of Paris the courses usually have considerable rise near their springing, from the longitudinal rib toward the diagonal; and they become more level as they approach the crown of the vault, where they are more nearly parallel. But perfectly parallel they hardly ever can be where each course is properly a surface which is concaved in all directions. The masonry of these vaults, especially in the choir, is perfectly faced, and closely jointed."

We see the progress of the style continued at Paris —the slender vaulting shafts rest upon the immense capitals of the cylindrical columns which constitute the ground-storey piers, and by the attenuation of these supports the inner space of the edifice is considerably increased. The equilibrium of the building is maintained entirely by the opposing action of thrust and counter-thrust. Originally there were double flying buttresses; the piers which divided the double aisles rose above the roof to meet each the head of a flying buttress, that sprang from the outer buttress to span the outer aisle, and to support another flying buttress, which in turn sprang over the outer walls to abut against the great piers. In fact there is but one defect in logic in this building: an incongruity between the sexpartite vaults and the form and magnitude of their sustaining piers; this, moreover, seems to have resulted from changes made in the building after the construction had reached the springing of the vaults.

The difference between the Cathedral of Paris and contemporary erections of a similar character was merely in unessentials, which varied according to local taste and individual architectural genius. In no two are the structural parts arranged exactly alike, but in all of them is shown a clear apprehension of the new style.

The system made further progress as the thirteenth centry advanced. One of the first improvements effected was in the construction of the ground-storey pier. The plain round columns, which at Paris and Laon had replaced the huge and inconvenient but entirely adequate piers of Senlis and of Noyon, had been found unsatisfactory, since they failed to afford independent supports for the various members of the superstructure. This defect was remedied in a pier built for the nave at Paris, a pier which was essentially Gothic in its construction, since it provided continuous support from the pavement for all the vaulting members. From this time forward the continuity of the members, from the pavement upwards, was invariably observed in Gothic buildings; this does not mean that each vaulting member had an individual support from the pavement, but that each group of the superstructure rested upon an independent ground-storey shaft. Furthermore, after the beginning of the thirteenth century, sexpartite vaults, which had up to this time been the popular form, yielded their place to the quadipartite vault. Much improvement was, however, effected in this form. The long longitudinal round arch was replaced by the pointed arch, which had been employed in the sexpartite vaults of Paris, and in similar buildings of the same period; and the excessive doming of these early vaults was done away with, by bringing the crown of all the arches more nearly to the same level. The rib system of these later edifices is, in the number and function of its members, closely correspondent to that of the finished earlier system— it is quite complete in its constructive members and in its independent pier supports; but ridge ribs and surface ribs are not yet introduced. In a word every member of a Gothic building is now logically conceived and adjusted, but excellence in treatment of detail is not invariable in dealing with minor structural exigencies.

We have yet to see the fullest distinctive perfection of the Gothic system fully realized in the Cathedral of Amiens, begun in 1220, which is, in its scale, the finest in France. Here there is a grand summing-up of all the Gothic principles, efficiently and artistically applied.

Of just what are the characteristic features of a fully developed Gothic cathedral structure we can gain a clear idea from Moore's excellent summary:

"1. The plan consists of a nave, the eastern portion of which forms the choir, with side aisles (sometimes single, sometimes double), and a transept, usually also with aisles. The nave and the aisles terminate at the east almost invariably in either a semicircle or a polygon, around which the aisles are continued. At the west the termination is square, the aisles of this end terminating in towers. The nave is separated from the aisles, and the aisles when double are separted from each other by rows of piers which support the superstructure. The whole is enclosed on the ground-storey by a thin wall, beyond which, opposite the piers, are the far-projecting and massive buttresses.

(Concluded on p. 92.)

THE VENTILATING AND HEATING OF SCHOOL BUILDINGS

Excerpt from annual report of Dr. H. B. Mapleton, M.A., Medical Health Officer to the Newton Abbot Rural and Urban Council, England

AMONG THE MANY conditions affecting school life, which have of late years received attention, the question of ventilation is, from the sanitary point of view, of the first importance. Medical inspection of the children is now an established routine procedure, and the logical consequence—treatment of abnormal conditions—is on the threshold; these constitute curative measures, which are generally placed first in public estimation. But in many cases disease will be avoided, and in others the treatment of it greatly facilitated, if the preventive side of the question—the environment of the children—is also thoroughly attended to. Five hours, or nearly half the day, are spent in the schoolroom, and, therefore, the condition of the air breathed should have at least as careful consideration as food, clothing, or any other necessity of life. Now, in practically all schools except those of the most modern construction, the arrangements for ventilation are suitable for warm weather only—that is to say, that a tolerable condition can only be obtained by the free opening of windows—and if the external temperature is low, this means that either warmth or air purity must be sacrificed, a Hobson's choice of evils, in which the former, being more immediately appreciated, has usually the first attention. The danger is most insidious, because the air in a room, if fairly pure to start with, becomes deteriorated so gradually that nothing is noticed by the occupants till an extreme condition is reached.

The effects of such a daily dose are indeterminate, and it would be hardly possible to define them exactly in any given case, or even group, of children, but, speaking generally, several may be mentioned: —(1) The vitality of the growing child, which depends to a large extent on a freely oxygenated and pure blood supply to the tissues, is adversely influenced. (2) This loss of vital power produces in its turn susceptibility to the invasion of any infective germs—such as those of phthisis, diphtheria scarlatina, etc., which may be present, and with all the care possible such cannot be altogether excluded when children are collected together in the schoolroom. (3) The infection itself is more concentrated and a larger dose received. (4) The central nervous system, equally needing pure blood for its proper operation and development, suffers; the children are less receptive in regard to their lessons, and public money is thus wasted. (5) Education should comprise sanitary instruction, and to teach children that the closed window is necessary, or even desirable, contravenes one of the first principles of health.

In this country, where winters are for the most part mild, the problem is perhaps easier and less costly in solution than a more rigorous climate would entail, but even here, if anything like ideal conditions are to be obtained, certain structural alterations in most of the older schools, and not a few of comparatively modern ones, would seem necessary. Ventilation is, as a rule, obtained by casements below and swing sashes above, combined with a few Tobins' tubes or Sheringham valve inlets—mostly of such limited area as to be of very little use; in many of the former the air before entering passes through long pipes, which contain the dust of years, and are inaccessible for cleansing purposes. Ceiling outlets, on the other hand, are, if of any size, of real value, and these in most cases have been provided. It is, however, difficult to discriminate between inlets and outlets, and, as far as my experience goes, they act at different times in both capacities, according to external air movements. The casements and swing sashes when opened, especially if cross ventilation—the most important object—is attempted, are liable to create draughts, which in anything but calm and warm weather become unpleasantly noticeable; and even under favorable conditions a good deal depends on the susceptibility of the individual teacher. The position of the school also constitutes another factor; a building on apparently a most healthy and desirable site is, ipso facto, more exposed to air movements, and thus an external benefit becomes an internal disadvantage, because it encourages at certain times the closed window.

Heating is inseparably connected with ventilation: in all but the most modern schools this is effected by stoves—either open or closed—and these, however effective in a comparatively small living room, cease to be so in any large building. The area near the fires may be—and often is—over warm, while more distant parts are not warm enough. Children feel a low temperature more than the teacher, inasmuch as the former—some of whom are, perhaps, insufficiently clothed—are sitting still most of the time, while the latter is continually on the move; moreover, children, especially the younger ones, endure in silence.

It may be said that stoves and open fires assist ventilation by drawing away vitiated air; this, however, only operates to a height of 4 feet or 5 feet, and, moreover, tends to create draughts, which affect the lower extremities of those exposed to them. With a view to ascertain local conditions in these matters, I made during the latter part of the year some tests of the air and temperature in the Newton schools, under various climatic influences. Each school was visited, and a test of the air made in every class-room; the external and internal temperature was taken, and the floor space, cubic area, and ventilation accommodation per head at the time of visit worked out. The apparatus used for the air test had of necessity to be simple, and one giving a quick result, both because of the number of tests involved, and also to avoid disturbing the lesson. Lunge and Zeckendorff's was the method employed. In this process a measured quantity of standard solution of carbonate of soda tinted pink with phenolphthalien, is put in a bottle, and the air to be tested pumped through by means of a syringe of known capacity. When the soda is neutralized by the carbonic acid, the color is discharged, and the amount of air necessary to effect this calculated. The change is soon apparent if the air is impure, and, on the other hand, under anything like normal conditions, the color is difficult to discharge. Thus the actual percentage of carbonic acid is determined; the results are very fairly reliable, and any errors arising from slight deterioration of the solution are favorable to the schools. A test was made on each occasion in the open air as a control. It is generally estimated that the normal atmosphere contains .4 parts per 1,000 of carbonic acid, but that the "permissible" amount may range up to .6 without harm; indeed, a slight increase, where many persons are congregated indoors, is unavoidable. On the other hand, anything approaching .8, where the excess is due to respiration, is perceptible to the senses of anyone entering from fresh air, and begins to be actively deleterious.

It is not that this small quantity is in itself poisonous, but where it results from respiration, waste organic matters from the lungs and bodies are also present. These constitute the real danger, and they are most readily estimated by the carbonic acid, to which they bear a constant proportion.

It will be seen that the conditions varied widely in the different schools, and even in the different class-rooms. Floor space, for instance, ranged from 6.5 to 21.5 sq. ft. per head, while it was under 10 in nine class-rooms; cubic area in the former case was only 93, and in the latter 300, but it was under 100 in two rooms only. Available area of ventilation, including all inlets and outlets (so-called) and open window space, reached 170 square inches per head in one class-room, while in another the figure was only 19; three show 22—very little more. It is generally estimated that each person should have 48 inches (24 inlet and 24 outlet), but in seventeen rooms this was not attained at the time of my visit.

The results of the carbonic acid test, without being wholly unfavorable, were sufficient to show that attention is needed in the matter, especially when it is considered that they were made under climatic conditions which could have made no severe demands on effective ventilation and heating systems. The estimated quantity of carbonic acid was below the permissible amount of .6 in eleven rooms, while .8 per 1,000 was reached in nine more, excluding two in which the gas had been alight for a considerable time previously, which discounts the figures to some etxent in their case; the remainder were between the two. Owing to the delicacy of the standard solution, it is probable that the figures are all slightly under-estimated, but they represented the apparent freshness (or otherwise) of the air as perceptible on entering, most accurately; all rooms in which .8 was approached were distinctly stuffy and unpleasant. I found that the chief factor of influence was the presence or absence of cross window ventilation, rather than cubic space or floor area per head, though, of course—other things being equal—these had their due effect.

THE DEVELOPMENT OF THE GOTHIC VAULT—Continued from page 85.

"2. The vaults, whose plan and construction determine the number and arrangement of the piers and buttresses, are furnishe dwith a complete set of ribs, namely, transverse ribs, diagonal ribs, and longitudinal ribs. These ribs are independent arches, of which the transverse and longitudinal ones are pointed, while the diagonals are usually round; and upon them the vault masonry usually rests—the one never being incorporated with the other.

"3. The ribs spring from slender shafts, compactly grouped, and often detached, though having their bases and capitals incorporated with the great piers which rise from the pavement, through successive storeys, to the nave cornice. Each one of these piers is a compound member consisting of a central body, with which are incorporated all the vaulting shafts, besides the columns which carry the pier arches to the ground storey, and those above which carry the arches of the triforium, and finally the buttresses of the clearstory. Upon the piers are concentrated all the side pressures of the vaults, but these side pressures are so neutralized by the buttressing that the piers require only to be massive enough to bear the weight of the vaults.

"4. The clearstory buttresses which receive the thrusts of the nave vaults are reinforced by flying buttresses springing over the aisle roofs and rising from the vast outer buttresses, which are incorporated with the respond piers of the aisles.

"5. The walls, required for the enclosure only, are reduced to the minimum of thickness, and are confined to the ground-storey and to the spandrels of the arcades. The apertures fill the whole space laterally between the piers."

Such a logical composition as this which Moore has described is that culmination of Gothic art—the Cathedral of Amiens.

A CORRESPONDENT reminds us of two notable figures in English history that ought to have been connected with the roofing industry, viz., Wat Tyler, Will Rufus (Wat Tyler will roof us). He adds the name of a more recent historical character, Slatin Bey (slate-in bay).—Exchange.

CHANGE OF ADDRESS

THE MONTREAL ADDRESS of the Standard Ideal Company, Limited, is now 44 Beaver Hall Hill. New offices have also been opened in Winnipeg at 76-82 Lombard street. In connection with both places are modern show rooms, in which the company displays its "Alexandra Ware," which is being extensively adopted throughout the Dominion by architects and owners desiring the best type of plumbing fixtures.

CONSTRUCTION

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CONTENTS

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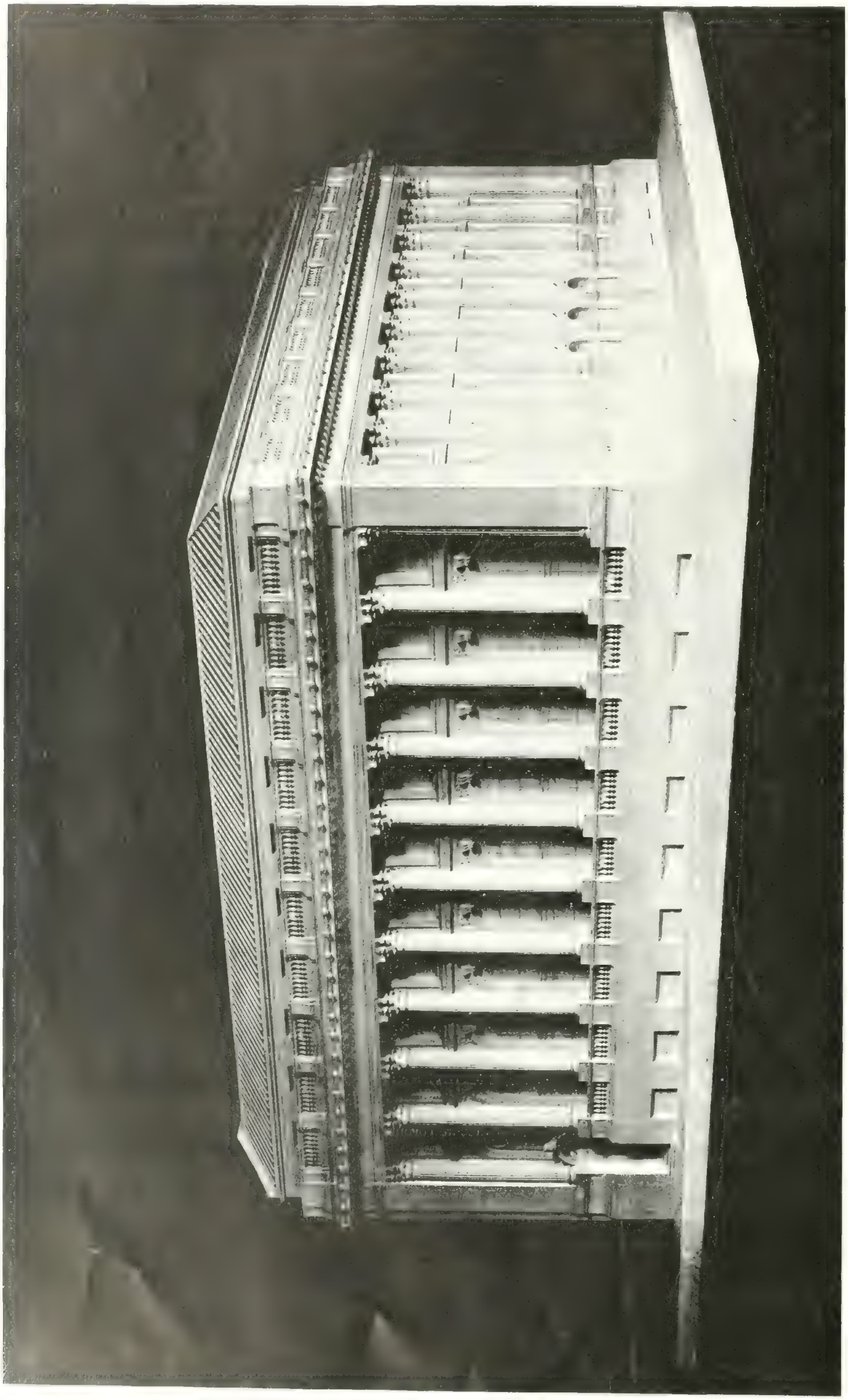


Plastic Model of the Bank of Toronto's New Head Office Building, in Course of Construction at King and Bay Sts., Toronto. Carrere & Hastings and Eustace G. Bird, Associate Architects.

Building statistics for July—Returns from thirty-three cities show substantial progress, with an average gain for the month of 23 per cent.

WITH A TOTAL INVESTMENT well in advance of that noted in the corresponding period, July adds another substantial increase to the heavy list of gains that have already characterized operations in the building line so far this year. From returns to hand, in fact, there is every sign that the country in general is still forging ahead at its much accustomed gait, with no indication of a halt of any consequence occurring for some little time to come. The value of new work undertaken in the thirty-three cities reporting to "Construction," amounted to $12,952,067 as against $10,266,276 for the same month last year, the average gain as based on the comparative figures amounting to 23 per cent. Aside from the decrease noted in the case of Montreal, all the principal cities exceeded their former figures, while in many of the secondary centres a marked degree of progress was strikingly in evidence.

As in the previous month, Winnipeg, with an investment of $2,787,100, has the largest amount registered, although Toronto, with a total of $2,786,529, is but a slight margin behind, the increase noted being 161 and 42 per cent in order named. Vancouver comes next in this respect, her expenditure of $1,108,378, representing a gain of 73 per cent., clearly indicating that this city has fully recovered from the labor troubles which for a short period embarrassed its progress. The West, in fact, with the exception of the loss of 33 per cent. recorded in the case of Lethbridge, experienced a cycle of unbroken gains. From the standpoint of increase per cent., Brandon (gain 562 per cent.) is well in the lead, her growth for the month being proportionately greater than of any other city in the list. Saskatoon and Regina, where respective increases of 397 and 97 per cent. were registered, the investment for the month was over $600,000. Moose Jaw and Prince Albert in the same Province, are also well ahead, the advance noted being 281 per cent. and 97 per cent. in order named. In Alberta, operations were likewise undertaken on quite an extensive scale. Calgary made an investment of $817,980, representing a gain of 57 per cent.; Edmonton issued permits amounting to $404,909, while Medicine Hat noted an increase of 250 per cent. At Edmonton, according to a report to hand, work has been seriously held up for the past three months owing to a shortage of cement. However, this material is now being received in larger quantities, and a number of large buildings at present under consideration, are shortly to be projected.

In British Columbia, in addition to Vancouver's gain previously mentioned, Victoria is ahead by 50 per cent., while the totals at New Westminster, ($134,112) and North Vancouver ($196,415), both of which fail to submit comparative figures, show a very satisfactory state of activity and development.

Ontario experienced a steady advance in general, although four of the losses noted occurred in this Province. Peterborough and Port Arthur have respective decreases of 20 and 81 per cent., while Stratford and St. Thomas are behind to the extent of 37 and 9 per cent. in order named. On the other

	Permits for July, 1911	Permits for July, 1910	Increase Per Cent	Decrease Per Cent
Berlin, Ont.	$ 23,955	$ 19,800	20.98	
Brandon, Man.	132,230	19,960	562.47	
Brantford, Ont.	76,287	61,825	23.39	
Calgary, Alta.	817,980	520,098	57.27	
Edmonton, Alta.	474,909	460,066	3.22	
Fort William, Ont...	225,175	156,200	44.15	
Guelph, Ont.	28,695	7,250	295.79	
Halifax, N.S.	43,350	65,150		33.47
Hamilton, Ont.	285,500	268,500	6.33	
Kingston, Ont.	36,151	35,818	.93	
Lethbridge, Alta. ...	56,120	84,520		33.61
London, Ont.	93,726	37,700	148.61	
Medicine Hat, Alta.	85,275	24,300	250.92	
Montreal, Que.	1,657,761	3,385,360		51.04
Moose Jaw, Sask....	309,850	81,200	281.58	
New Westminster...	134,112			
Ottawa, Ont.	262,575	202,500	29.66	
Peterboro, Ont.	24,340	30,725		20.78
Port Arthur, Ont. ..	31,500	174,475		81.95
Prince Albert, Sask.	79,225	40,100	97.56	
Regina, Sask.	602,115	305,030	97.39	
Saskatoon, Sask. ...	629,125	147,275	327.18	
Stratford, Ont.	10,032	16,000		37.30
St. John, N.B.	28,300	77,100		63.30
St. Thomas, Ont..	19,500	21,500		9.31
Sydney, N.S.	126,860	45,169	180.85	
Toronto, Ont.	2,786,520	1,953,285	42.66	
Vancouver, B.C.	1,108,378	639,530	73.31	
N. Vancouver, B.C...	196,415			
Victoria, B.C.	335,375	222,290	50.87	
Windsor, Ont.	43,640	37,950	14.99	
Winnipeg, Man.	2,787,100	1,065,600	161.55	
	$12,952,076	$10,206,276	23.66	[illegible]

hand, Ottawa has a total of $262,575, netting a gain of 29 per cent. Hamilton issued permits valued at $285,500, which is 6 per cent. better than July of last year. London advanced 148 per cent.; Guelph 295 per cent., and Fort William 44 per cent. Other gains are Berlin 20 per cent., Brantford 23 per cent., and Windsor 14 and Kingston 1 per cent.

The aggregate value of new work undertaken at Montreal, which has the fourth largest total noted, amounted to $1,057,761; and while the comparative figures show a loss of 51 per cent., it must be taken into consideration that the month of July in 1910 was one of the greatest building months that Montreal ever experienced. Judging from the amount of work in prospect, this city will witness fall operations that will measure up in every way to the marked activity of the period immediately preceding.

Of the three Maritime cities reporting, Sydney, where the investment was $126,860, is the only place to show an increase, Halifax and St. John sustaining losses of 33 and 69 per cent. in respective order.

"On to Ottawa"—Ontario Association of Architects to hold this year's convention at the "Capital City"—A hearty welcome and interesting programme awaits visitors.

FOR THE FIRST TIME in several years the Ontario Association of Architects will hold their annual convention at Ottawa, instead of Toronto, the time decided on being Sept. 13-15 inclusive. Announcements notifying those who are identified with the Association have already gone forth, and the members are asked to arrange their business and personal matters with a view to being on hand at the appointed time. The choice of Ottawa as a place of meeting could hardly be improved upon, especially so as the convention is to be held at a season of the year when the city is to be seen at its best. Ottawa has undergone a number of important changes within the past few years, and those who take advantage of the trip will find much in the way of new buildings and civic improvements that should prove both interesting and instructive. That a royal welcome awaits the visitors is quite evident from the preparations that are being made by the Ottawa members. The programme which has been arranged by the local chapter, provides for a number of delightful entertainments, including several sight-seeing jaunts in and about the Capital, and a prospective fishing trip up the Ottawa River. Nothing, in fact, is being left undone that can in any way contribute to the success of the occasion and make it one of the most notable gatherings in the history of the Association.

AGENDA.

Wednesday, September 13th.

[illegible]—Business Meeting in the Lecture Hall of the Carnegie Library, Metcalfe St. Adjournment till time to be agreed upon.

1.30 p.m.—Lunch at the Laurential Club.

[illegible]—At City Hall, Complimentary Drive at the courtesy of the Corporation of the City of Ottawa.

8.00 p.m.—Central Canada Exhibition, Complimentary tickets to grounds and Grand Stand at the courtesy of the Central Canada Exhibition Association.

Thursday, September 14th.

9.30 a.m.—Business Meeting in the Lecture Hall of the Carnegie Library, Metcalfe St.

10.00 a.m.—Paper by Prof. Corelli, of Toronto University.

11.30 a.m.—Auto ride up the Gatineau to Farm Point. Lunch at Summer Cecil. The Autos for this trip to be supplied by several private citizens.

8.00 p.m.—Dinner at the Golf Club. Arrangements will be made for private car to Golf Club.

Friday, September 15th.

The programme for this day has not been definitely decided upon, but, providing it is agreeable to the majority of members, arrangements will be made for a trip up or down the Ottawa; the business meeting to be held on board the boat. The trip up the Ottawa is deemed to be the most preferable, in that arrangements could be made for about four or five hours' fishing.

(Subject to change.)

This year, as in the past, the Association has a large volume of business to transact. A number of important subjects dealing with the welfare of the profession will come before the convention for consideration, and all members who can possibly attend should be on hand to participate in the daily sessions. As the convention is to be held during the week of the Ottawa Fair, reduced rates may be had on all railroads. It is the intention to arrange for a special car service leaving Toronto on the 10 p.m. train of the C.P.R. on the night of Sept. 12th, so that all who intend making the trip via Toronto can avail themselves of this arrangement. The active part the Association has taken in elevating the profession in Ontario, and its growing usefulness in promoting a better standard of architecture, should make the slogan: "On to Ottawa," resound in every part of the Province and bring forth an attendance that will give the meeting the full co-operation and support of the individual members, and thus enable the Association to more quickly realize the high ideals it is endeavoring to attain. Members who anticipate making the trip via Toronto, should notify either President A. F. Wickson or Secretary Herbert E. Moore, of their intention, so arrangements can be made to include them in the party which will leave Toronto at the above stated time.

More anent architectural competition—Architect F. W. Fitzpatrick makes a few more pertinent remarks regarding unfair condition under which architects compete.

IN A RECENT ISSUE of "The Architect and Engineer," Consulting Architect F. W. Fitzpatrick has the following to say about "Competitions":

Happening to glance over that "Competition" article of mine in your April issue, it just occurred to me that perhaps an illustration or two added might emphasize the point I tried to make, that an architect is indeed silly to enter into such contests unless he has a "cinch," and then he becomes somewhat akin to a "crook" or at least a party, "an accessory before the fact," to a full-fledged fraud upon his brethren who haven't the "cinch."

You see, conditions are such that in some way or another I know the details, the wigglings of most competitions some time or another, before, during or after. I would not go into one direct for a farm. If the practising brethren insist upon going in, in spite of what has been preached to them and what they must know of their own experience and probably in spite of my specific warning and advice to keep out, why, I can't very well hold them back by force, and if in going in they want to pay me real money to help them get up something particularly nice it certainly is hardly up to me to decline, though I feel, if I don't really know, that it is a forlorn hope. For the man with the cinch doesn't need to produce superlative results—he'll get it whatever sort of a design he may have. But all that is neither here nor there. We were considering concrete illustrations of the beauties of competition.

During the past month I have had a finger in eight, not little, insignificant affairs, but good, big, full-grown, important chaps.

No. 1, an architectural advisor affair. All designs rejected and the "advisor" employed to go ahead with the work—based upon the best features submitted by the competitors!

No. 2. No advisor. Sixteen designs submitted, three liked very much and invited to re-compete, and a foregone conclusion that one of the three, a relative of the President, will get the job, but the other two will receive moderate prizes.

No. 3. No advisor. Twenty-six designs. Award to a manifestly inferior design because its author was known to the board and had been a crony of the chairman for twenty-five years. To remonstrations it was answered that they cared more to have an "architect" they knew than they did for any pretty plans. Each competitor must have spent nearly $1,000 in the work.

No. 4. Rather close of kin to No. 3. Indeed, they are all cousins german. Award made to one who had done a lot of private work for the board. Design much criticized, and justly. Board calmly asked what the kick was about. Hadn't the others the privilege of sending in designs? The law said they should, but the law didn't forbid the award being made to any one they wanted and they had agreed to give the job to Mr. So-and-so long ago.

No. 5, rather amusing. Eleven designs received at the appointed time. Most of the competitors there anxious for a decision. Informed that no decision could be given for two weeks. Architect No. 12—a dear friend—called in in the evening, shown all the drawings and told to get busy and have a design in before two weeks. Of course the job will go to him.

No. 6. A very important building, some really clever designs and beautiful drawings. One chap, though, sends in a very ordinary, hackneyed plan and hastily drawn but accompanied by twenty or more plates of New York skyscrapers from the architectural journals and the statement that he'd be glad to build that building according to any one of those plates! The gall of the creature, and those "designs" were gravely examined and commented upon and compared to the specially made ones, too! The affair is not settled yet, but I have the assurance of the board that it will go to Mr. X, he being the oldest and best established local architect. But what about the designs, the relative merits and so on? Oh, well, Mr. X will be instructed to incorporate in his design any especially meritorious features in those other drawings and he certainly, having had so much experience, can get up something quite satisfactory even though his first sketch may not be very fine. They have the utmost confidence in him!

No. 7. A rather ancient story. Plans received, commented upon and returned with thanks. Decided not to build this year, just wanted to see what could be done with the lot and if the work goes ahead next year the same competitors will again be given a chance, thank you!

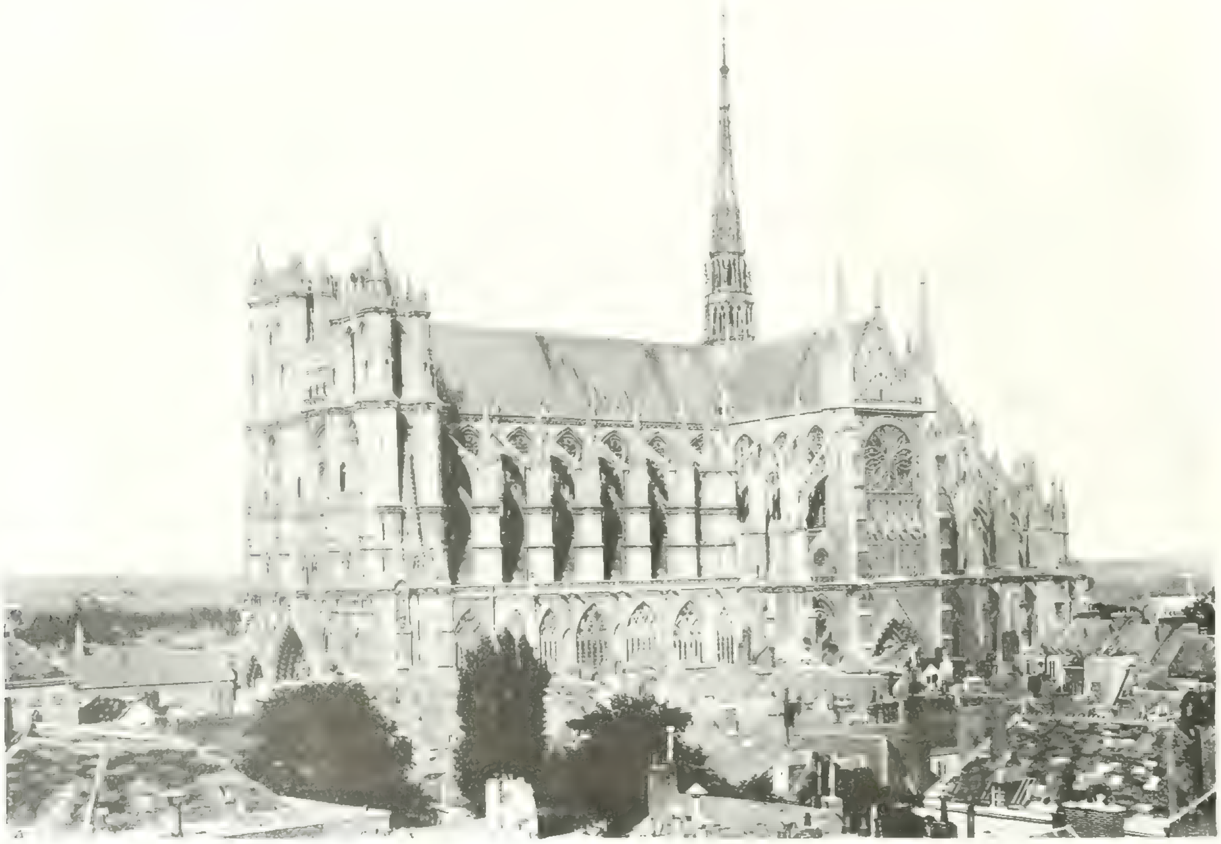
No. 8. A school. Competition invited. No notice given as to especial and unusual intentions of award, each competitor expected to get a show at a $200,000 job at the regular commission. When it was all over the three best designs "in the estimation of the board" were kept and their authors offered $500 each for them. The board had decided to have its regular superintendent make the plans and use a combination exterior from those three designs!

And how much nearer really just, unprejudiced, unjockeyed are the competitions managed according to the rules laid down by the A.I.A.? And even if the thing is un-jockeyed and left to professional advisers it's a lottery, a game of chance, the special whim the strongest adviser, essentially a jury trial, and who with a perfectly good case wants to leave it to the tender mercies of the impressionable jury? An instance: a big competition some time ago, three judges, big guns but not wonderful designers, agreed upon an award. Forty-two of forty-eight other architects, just as capable as the judges, entirely disagreed with the latter and thirty-six of them placed the third man first. Still, a good deal like using wood in construction though realizing it is dangerous, combustible, foolish and extravagant, the competition idea has become a habit, ingrowing, silly, almost criminal. We all realize that *collaboration* is infinitely more sensible, more honest, less costly and better in every way, but it'll take the dear profession another twenty years of hard knocks to get out of that fool habit. Its will be done.

WORD HAS BEEN RECEIVED that Herbert P. Rugh, Union Bank Building, Winnipeg, has consolidated his business with Ross & MacFarlane, of Montreal, in respect to their western business, under the firm name of Ross & MacFarlane, architects, of Montreal and Winnipeg, retaining Mr. Rugh's present offices. Mr. Rugh will be manager of the Western office and have charge of all Western work, including, besides his own, the Selkirk Hotel in Winnipeg for the Grand Trunk Railway, and large hotels in Edmonton and Prince Rupert.

CORRECTION.—In the article on the construction of the A. E. Rea's Company Building, Montreal, appearing in our previous issue, the eighth line, page 81, should have read "W = *the uniformly distributed load* [illegible] *of the beam*" instead of "*the bending moment* [illegible] *where W = the total weight supported*." Also, the name of the author should have been given as B. L. Nares instead of B. T. Nares.

Salisbury Cathedral from Northeast Viewpoint. Built 1220-1266. Tower and Spire Added in the 14th Century.



Southwest View of Cathedral, Amiens, Exterior Built 1220-1257.

THE MASONS' ART OF THE MIDDLE AGES

By PHILIP J. TURNER, F.R.I.B.A.

Paper read before the Quebec Association of Architects. Revised and condensed by the author and published by special arrangement.

THE TITLE of my paper deals more particularly with the so-called Gothic (or "Romance") Architecture of the years 1150-1550. The subject being a large one, this article is confined to the study principally of the technical or constructional side of the Art of the Workman-in-stone, and it is not an attempt to give an essay or the history, of the rise and fall of Gothic architecture.

When one attempts to analyze or dissect the methods of construction adopted and the reason for such forms one cannot fail to be impressed with the skill shown by these masters of their trades, and to find that the masons' art of the Middle Age is an intensely interesting one.

Though there are examples of great constructional skill and points of interest in the many civil, military, and domestic buildings that still remain, it was in the large churches and cathedrals that masons found their greatest opportunities of showing what could be accomplished in the handling of stone; in fact, it was the cathedral, the largest, the most comprehensive and the most popular form of the Christian Church that brought out the full development of the masons' art of this period we are considering. The architecture of the Middle Ages not only reached its highest perfection in the cathedrals, but it was in the strictest sense an architecture of churches primarily. Viollet-le-Duc has given a profound and exhaustive illustration of French Architecture of this period. He has shown that architecture consists primarily in a peculiarly structural system, a system which was a gradual evolution out of the arched Roman through the Romanesque, and that its distinctive characteristic is that the whole scheme of building is determined by, and its whole strength is made to reside in, a fully organized and frankly confessed framework rather than in walls. This framework, made up of piers, arches, and buttresses, is freed from every unnecessary encumbrances of walls, and is rendered as light in all its parts as is compatible with strength, the stability of the structure depending *not* upon inert massiveness (except in the outermost abutments) but upon a logical adjustment of active parts where opposing forces neutralize each other and produce a perfect equilibrium. It is a system of balanced thrusts in contradistinction to the ancient system of inert stability. Gothic architecture is such a system carried out in a finely artistic spirit. The earliest development of ribbed vaulting, together with a functional grouping of supports, may be taken as the tangible beginning of the Gothic system.

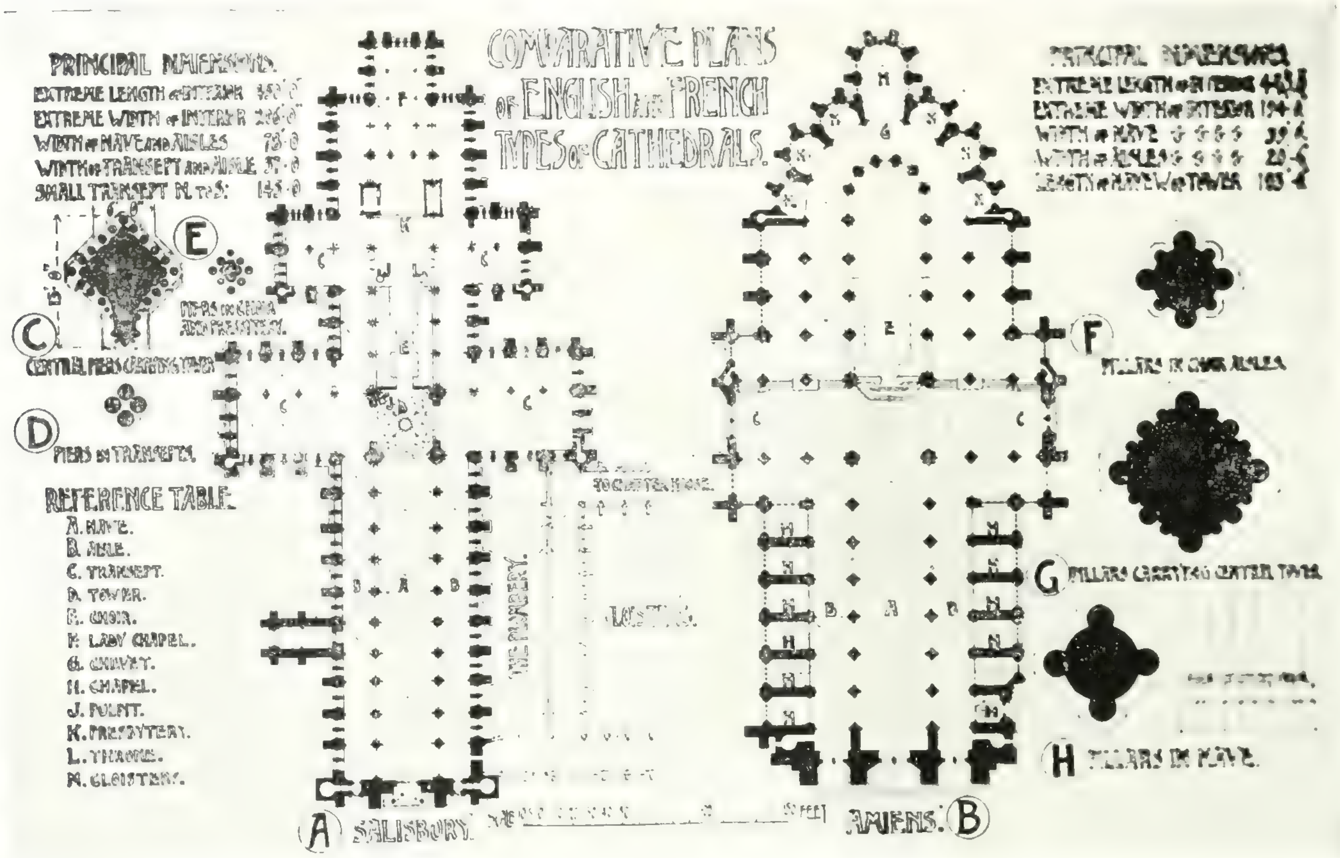
Brass Memorial Tablet to Hugo Libernius, a Master-Mason of the 13th Century, Buried at Reims. He is Represented in His Academical Dress and Cap of Office, Holding a Model of His Building and Measuring Rule. A Pair of Compasses, Set Square and Other Symbols of His Profession are also Represented. (From Lethaby's "Mediaeval Art.")

Nearly every constructive member of a Gothic building exists in a rudimentary form in a vaulted Romanesque structure, but the ultimate possibilities of an organic framework are not worked out in Romanesque art.

The whole keystone of Medieval Art is found in the use of *arch construction* which comprises the vault and its supports and it is this latter that is especially admired when considering the skill shown by these masons of bygone days.

It is one thing to put up a vault, and another to induce it to stay up, and so are found closely connected with the vault, the development of the whole machinery of buttresses, pinnacles and flying buttresses. In the Romanesque and Norman work, low buildings with thick walls and piers and small windows, is the order of the day, but in a few years the masons develop their architecture to the other extreme and sistent development, stone is balanced on stone, vault springs from vault, interlacing tracing sustains brilliantly dyed glass, towers stand firm as cliffs, spires are flung into the air like fountains. In these buildings all may be explained as devised for ritual use and for the instruction of the people; all as material and structural necessity, all as traditional development, all as free beauty and romance in stone. From whichever point of view we may approach them, the great cathedrals satisfy us, and their seeming perfections are but parts of a larger perfection.

"Nothing is marked, nothing is clever, nothing is



Comparative Plans of Amiens and Salisbury Cathedrals—These Are Examples of Typical French and English Cathedrals Erected at the Same Time and are Interesting as Showing Very Distinct Differences. Though Practically of the Same Length, One notices that Breadth and Height Were Always the Aims of the French Builders; While the English, Modest in These Respects, Relied More on Length in Proportion. The Latter Could, in Consequence, Afford to Give Their Main Transepts Considerable Projection and to Add Eastern Transepts. The Ideals Striven For on One Side of the Channel Were Not Those Striven For on the Other. If Asked Which is Right and Which is Wrong, There is Only One Answer. Each Building is a Law Unto Itself, and Unto Itself Alone. There is a Reason for Every Difference. In the Typical English Cathedral it is Found that the Height Both of the Nave and Aisles is About 2½ Times Their Span. Amiens, 46 Ft. Wide, Would, if Built on English Proportions, Have Been 114 Ft. as It is, but It is 140 Ft., or Three Times Height of Span. Height Enough Could Have Been Obtained Without Raising the Building to Such Great Height. Partly From Ambitions of Masoncraft, Partly from Exalted Ideas of Design, the Boundaries of the Material were Far Outpassed. The Result Was a Series of Buildings Surpassing All the Other Work of Man, in Which the Builders Reached Forward to and Attained Not Only the Beautiful but Sublime. Nowhere Does One Feel So Much the Greatness and the Insignificance of Man. Man, Who Built These Towering Vaults, is Crushed and Overwhelmed by His Own Work. (From Fletcher's "Gothic Architecture"). See illustrations on page 48 and 51.

lightness in every detail takes the place in the latter buildings. It is a wonderful transition, and one wonders how it all comes about. "The growth of these great cathedrals," says Mr. Lethaby in "Mediæval Art," seems to have been built on such a scale, that they might almost gather the entire adult population of the city within their walls. As to these marvellous buildings, the half of their glories and wonders cannot be told. They are more than buildings, more than art, something intangible was built into them with their stones and burnt into their glass.

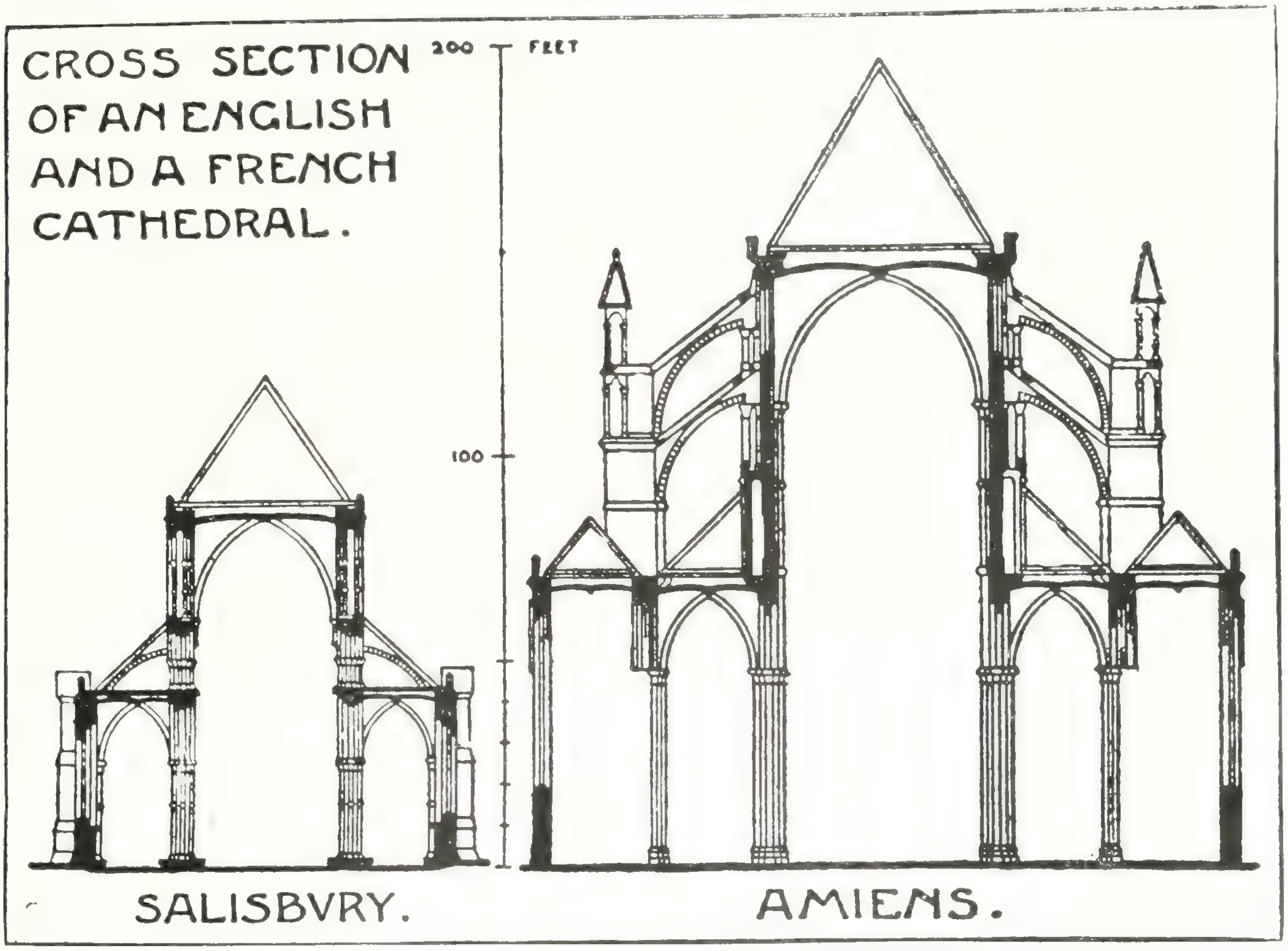
"The work of a man, a man may understand; but these are the work of ages, of nations. All is a con- individual, nor thrust forward as artistic; they are serene, masterly, non-personal like works of nature, indeed they are such, natural manifestations of the minds of men working under the impulse of a noble idea."

In such a church the arcades of the interior which maintain the vault, circle round the altar and abut against the western towers. By means of vigorous ribs of stone which spring from the pillars and spread over the internal area, a light web is suspended, so that the great space is covered by a tent of stone, one of the most wonderful of man's inventions. The push of these ribs, collected at certain points, is met by exterior abutting arches, called "flying buttresses," which, acting as props, carry the weight to the ground, and thus counterpoise the thrusts of the interior. The interspaces between the several points from which the vaults spring are practically relieved from work, and here the windows were put. As generation after generation, the masons worked away in perfecting their scheme of construction, every part of the fabric was gathered up into a tense stone skeleton. This resulted in, or was itself occasioned by, another idea which aimed in turning the whole inactive wall space into windows, so that the cathedral became a vast lantern of tracery; then, by picturing the spaces by means of transparent jewels of glass, the interior was lighted by angels and saints innumerable. In these porches and screens were placed hundreds of statues, all parts of a connected scheme, an encyclopædia of nature, history and theology.

As Romanesque architecture was for the most part monastic and feudal, and the builders were attached to the soil, in Gothic on the other hand we find an architecture of towns, guilds and masters who were free to pass from place to place.

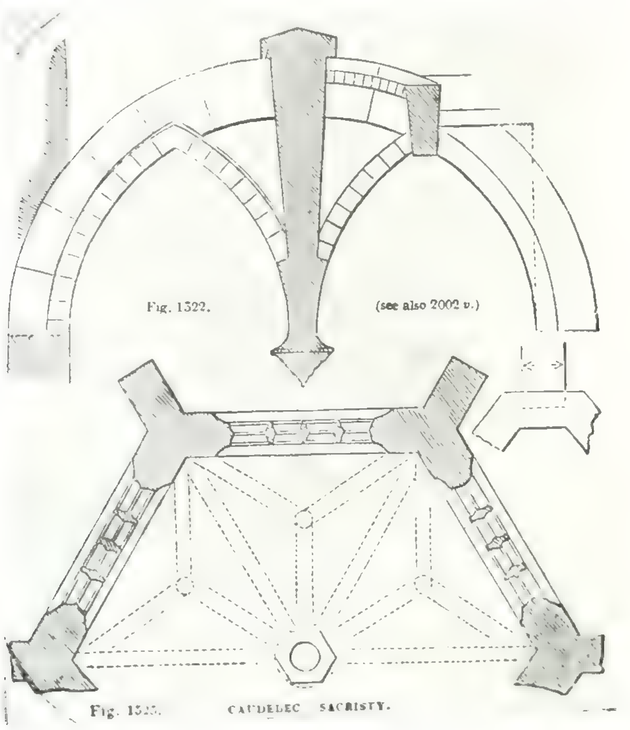
In looking at these buildings one naturally desires to know something of the designers and the workmen, how they lived, and the way they carried out their work, but our information is somewhat scant. To understand an old cathedral we must begin with the union in one person of the artist and the artisan. The picturesque variety springing from the creative capacity of the individual mason, and the individual stone cutter, ran all through the building. The architect himself was simply a master-mason, i.e., he was himself a mason by profession. He was not isolated in an office, he was at once architect and builder. As long as the architect was the master mason, he was not bound by his own plan. He carried his plan in his head and on the scaffolds of his building he changed it at will and freely oftentimes as he went along.

The monasteries had early taken every means to qualify large bodies of men to practice the arts; they had organized and maintained schools where art and science were taught; where architecture, sculpture and painting were cultivated under guidance of traditions, which regulated the leading forms of production, while yet they left some scope for the free play of new ideas. A large percentage of the revenues of sees were devoted to the work of building the great cathedrals. The Canons helped with their share, the nobles and rich burgesses gave large sums, and the people contributed what they could, sometimes their chattels, sometimes their money, or else their time and strength to transport the materials required. It is said, for instance, that the columns for the Church of St. Denis were dragged to the site from the quarries of Pontoise (some 14 miles distant) by the faithful themselves harnessed to the carts. We stand aghast at the great outburst of the building art in these times, especially when one thinks of the small size of the population in those days. Henry III., especially, must have been a



Cross Section of a Typical English and French Cathedral Built at the Same Period, 1220 A.D. (From Simpson's "Gothic Architecture.")

veritable building maniac, only happy when he was engaged in building operations. Sufficient evidence makes it clear that interest in building and other forms of art was universal in the Middle Ages. In many places we find amateur carvings done by



Caudebec Sacristy near Rouen—A Daring Piece of Construction. The Keystone is Suspended by Locking Between the Voussoirs of a Strong Semicircular Arch. The Length of the Pendant Stone is 17 Feet 6 Inches, and the Thickness at the Top Where Locked is 30 Inches. The Voussoirs are 3 Feet Deep, the Small Pointed Arches or Ribs that Form the Groining of the Hexagonal Vault Spring from the Side Walls and the Ornamental Knob of the Pendentive and are Perfectly Independent. The Abutments of the Semicircular Arch, which Has a Radius of 12 Ft., are Formed by Solid Walls Continued for Some Length in the Direction of Its Diameter. The Sides of the Building are 12 Ft., and the Height from the Pavement to the Springing of the Ribs is 18 Ft.

prisoners of rank as at the Tower and Guildford Castle, and these show the same characteristics as other examples of contemporary art.

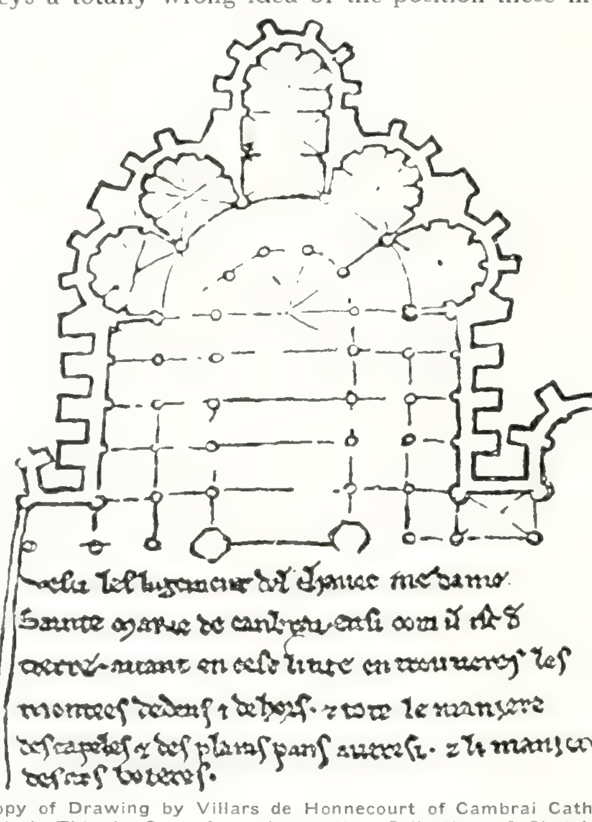
Architects.

Up to the middle of the twelfth century the monks themselves had been the architects; they had designed, superintended the erecting of, and in most cases found the money for the churches. The monasteries were at that time the centre of intellectual artistic life. In the schools attached to the larger ones were trained priests and laymen alike. The men thus trained either worked on the church and buildings of the monastery, or, if found worthy were sent by the monks to superintend building operations for them in other countries, sometimes in far distant lands.

Gradually the teaching of apprentices in finely technical matters passed from the monks to the lay master-masons, as it was natural that when the bishops, chapters and people took the building of cathedrals into their own hands, they should prefer laymen as their head workers. Many of these had received in the monastic schools the best education the times could provide, and were as well read as the majority of clerics and nobles. Some of these master-masons were attached to cathedrals, some to towns, while others took service with high nobles or with the king. That they were skilled craftsmen is undoubted, capable of executing themselves all work required; they had served their apprenticeship, and that in the Middle Ages meant that they had mastered the technicalities of their trade.

But it does not follow that when they reached the proud position of master-mason they continued to work with their hands as they had done when younger. They had higher work to do; they dictated the plan and general ordinance—the first essentials without which no building can be carried out satisfactorily—drawing them on parchment or paper sufficiently well to make their meaning clear to the workmen under them.

The modern architectural draughtsman may smile at the execution of some of these drawings, but they served their purpose. That so few of them have been preserved is owing to the fact that they were regarded merely as a means to an end, as all architectural drawings should be, and when the end was accomplished, their utility ceased. The full size details were drawn on the spot, probably on boards, either entirely by the master himself or merely corrected by him. Whether the man who did work of this description should be termed architects, or masons, or masters of the work, is an academical question which hardly requires discussion, except that the term "mason" is confusing, inasmuch as it conveys a totally wrong idea of the position these men



Copy of Drawing by Villars de Honnecourt of Cambrai Cathedral—This is One of an Interesting Collection of Sketches made on Parchment in the 13th Century. The Note on the Illustration makes Mention that the Sketch of the Chevet of Cambrai Cathedral was Made as it was Being erected at the Time of Villars' Visit to the Building. (From Lethaby's "Mediaeval Art")

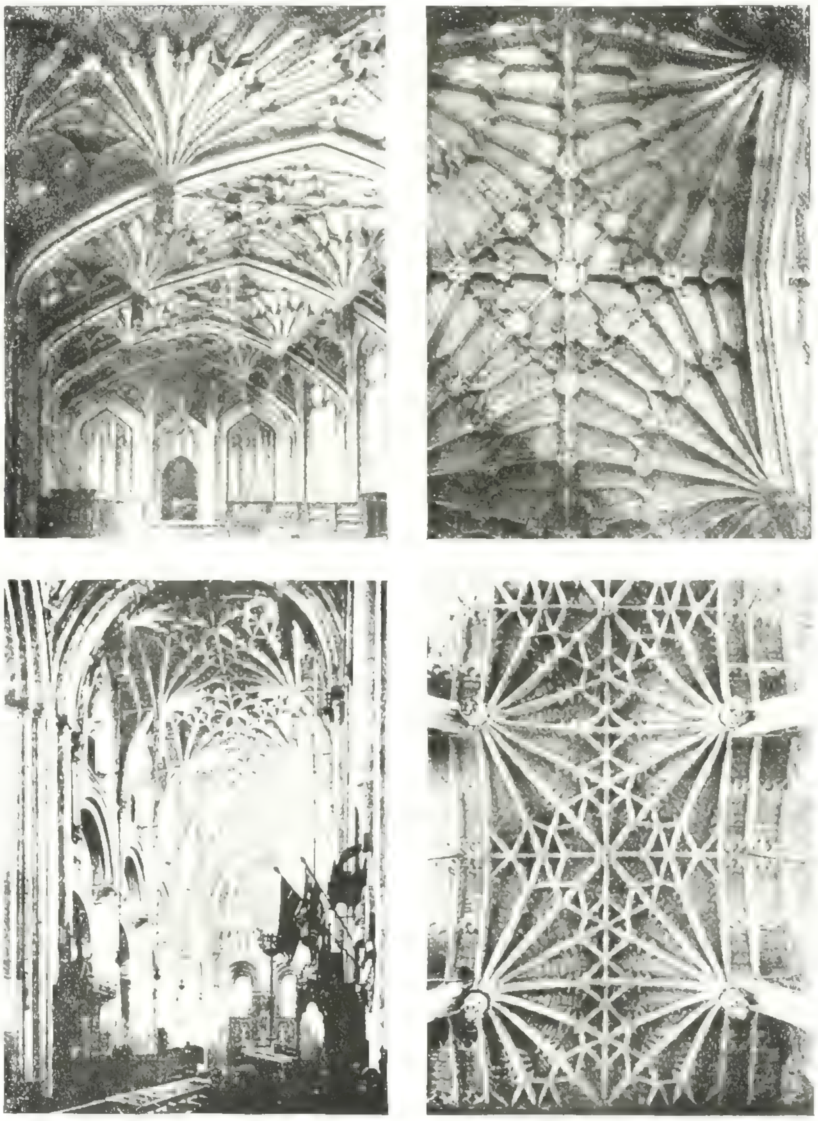
occupied. The laymen who in the thirteenth century took the place of the monks of the previous centuries were men of substance, held in high repute by their patrons and town folk, and artists in the true sense of the word.

The post of master-mason to a town or to a cathedral was a high and responsible one, descending in some cases from father to son. The spirit of the age was such that there was no fear of the workers in different crafts being out of harmony. The mason had confidence that the painter would not want to apply his color and gilding on the wrong mouldings, and that the glass stainer would not try and ignore the design of the window. By the beginning of the thirteenth century there was absolute sympathy between all branches; and to this sympathy is largely owing the beauty and completeness of the medieval cathedral.

To the infusion of secular blood in the twelfth century is due in a great measure the enormous strides made in France in architectural composition and design between 1150 and 1220.

The monk designer was by no means a recluse, living a life of seclusion within the cloister walls; but his training had saturated him with traditional methods, which he found it difficult to discard. The lay designer, on the other, although he might have served his time in the same school, was outside monastic life, and mixed freely with all sorts and conditions of men. The result was inevitable, gradually old ideas gave place to new, the traditional methods of ornamentation, methods based on old classic or Byzantine designs, were supplanted by fresh ones. Tradition was treated reverently—as it must be if good art is to result, but nature and not tradition became the governing factor for ornament and figure sculpture. Owing to this the differences between the carvings executed at the beginning of the twelfth century and those of fifty years later, are even greater than the structural changes which took place during the same period.

Gothic architecture has been called "the perfection of vault construction in stone," a system of mechanism maintained by thrust and counterthrust. In the Middle Ages it was the constructional features themselves to which an attractive form was given, although many, if not most, of the architectural features were founded primarily on structural necessity, yet others were the expression of artistic invention and of æsthetic requirements. In seeking to diminish the size of the piers and the thickness of the walls, it was necessary for the architects of this period to find a mode of construction more homogeneous and more capable of resistance, and to avoid the expense of labor which the carrying of any material of large size involved. The walls, therefore, became of secondary importance, their places being occupied by stained glass windows, and the support of the structure was effected entirely by means of buttresses or short walls placed so as to best resist the thrust of the vaulting

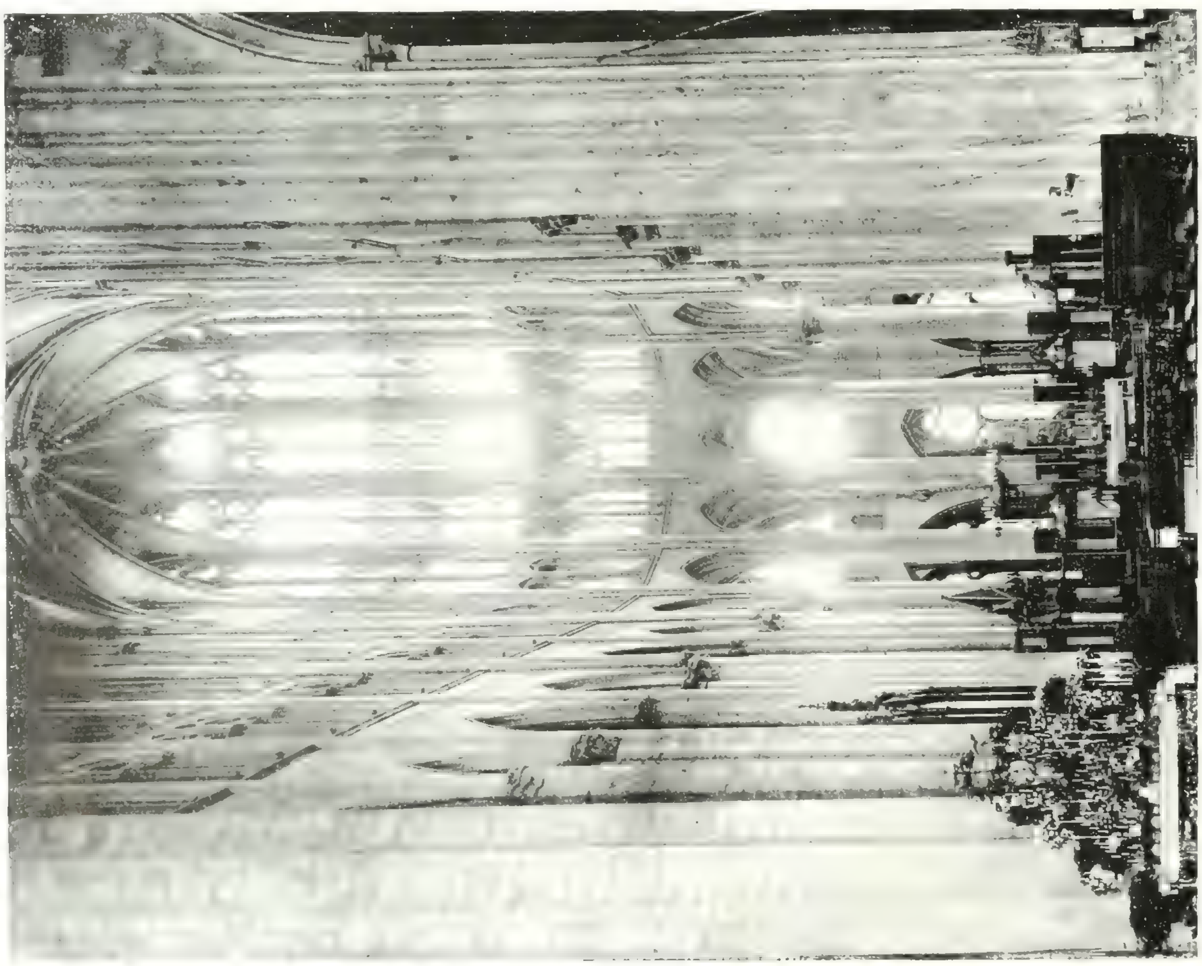


Upper Two Views—Vaulting at Oxford Divinity School, A.D. 1445-1480. Lower Two Views—Vaulting at Oxford Cathedral Choir, A.D. 1478-1503. These are Good Examples of Lierne Rib Vaulting. It Will Be Noted that the Pendants of Each Transverse Arch are But Two of the Voussoirs of the Arch, Greatly Elongated. (From Bond's "Gothic Architecture.")

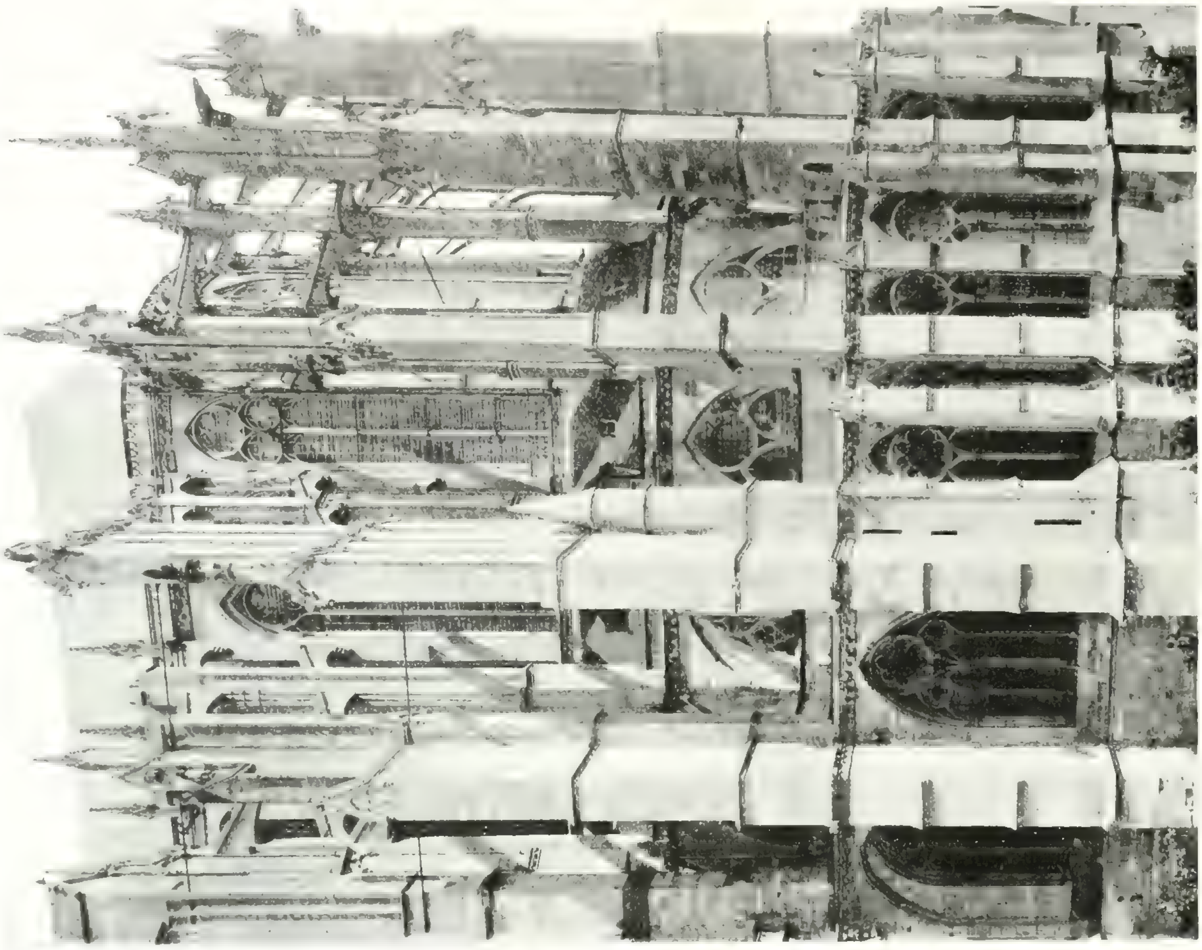
Buttresses.

As said before, the function of buttresses was to strengthen the walls and counteract the thrusts of the arches. It was immaterial whether they were placed inside or outside the buildings. The builders of England and Northern France were quick to perceive the artistic advantage of the former. (1) Outside buttresses give scale; (2) They form strong vertical lines and thus help to convey the impression of height; (3) They give the mason his opportunity. No part of a church throughout the Middle Ages received more care and thought than these strengthening props.

In the flying buttresses there is given to the building an appearance of vigor and active force, which nothing else can effect, but when employed extravagantly they create a feeling of unrest. There was no hard-and-fast rule to determine the relative position of the flying buttresses to the vault. The builders judged from experience, from failures and from successes. In the majority of examples the top of the intrados of the arch of the flying buttress, where it butts against the nave or choir wall, is approxi-



Interior of Choir, Beauvais Cathedral (1237-1347).



Exterior of Choir, Beauvais Cathedral (1337-1347).

mately on a line with the top of the *tas-de-charge.* Upper buttresses were frequently used merely as stiffeners to the walls.

Tas-de-Charge.

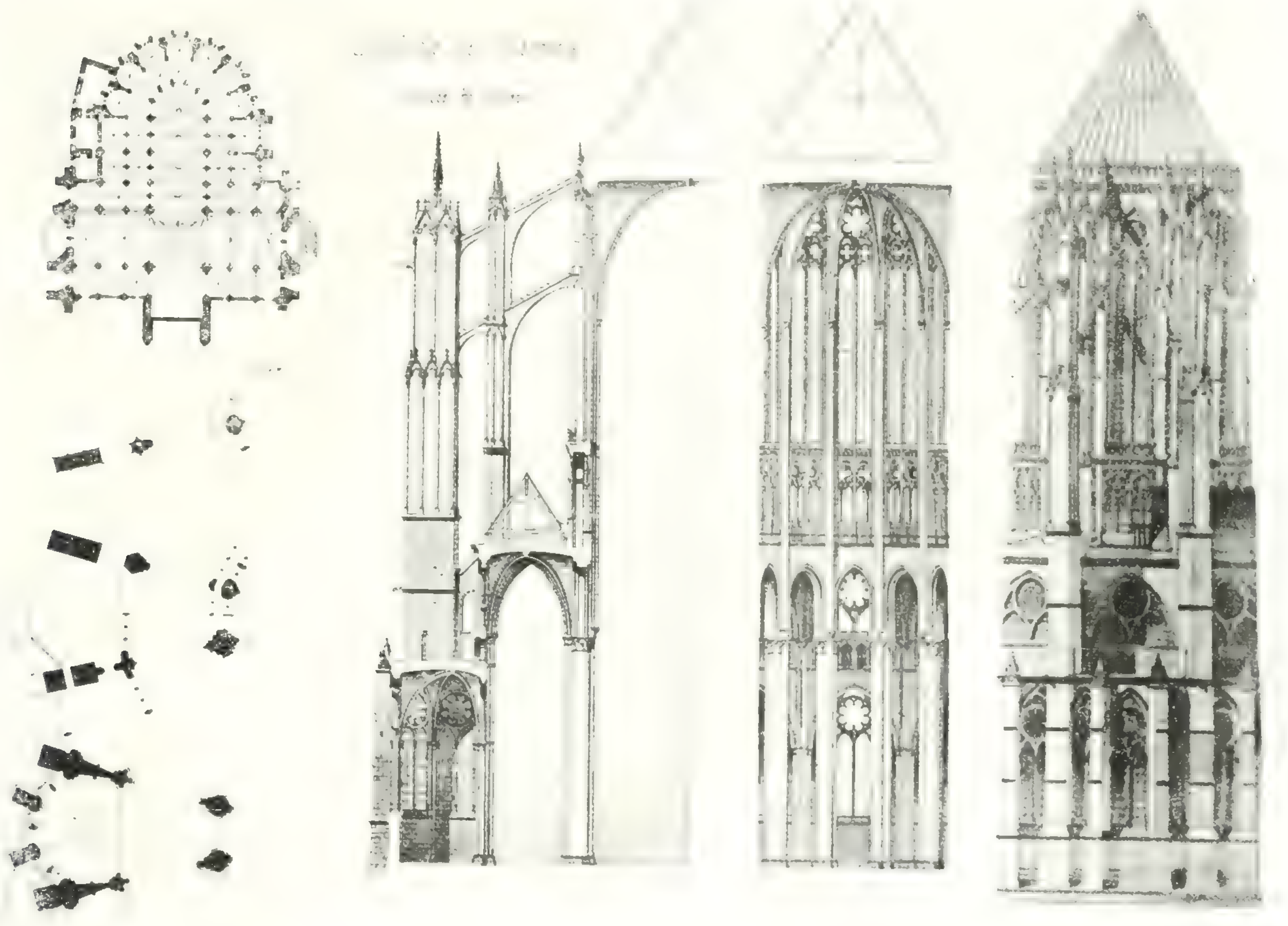
A common method of construction in the vaults of the Middle Ages is that of building an arch in *tas-de-charge.* In this the lower part of its curve is merely corbelled out, and consists below of courses of horizontal blocks, each upper course projecting further forward than the course below it. It may extend upwards as much as one-third of the height of the vault. The advantages in using this construction was that the weight from above was brought down on to horizontal blocks which could not slip—the span of the real arches with radiating joints is much reduced—and there is also an economy in centering.

Summary.

The principle of thrust and counterpoise may be brieuy summed up as follows:—(1) The *tas-de-charge* unites all thrusts and consolidates them at given points. (2) The *tas-de-charge* itself offers resistance to thrusts and also decreases the amount of thrust inasmuch as the space and height of the live portion are lessened. (3) A high wall above the point of pressure tends to divert lateral thrust into vertical. (4) Pinnacles act in the same way. (5) Flying buttresses transmit thrusts to abutments. (6) Abutments weighted by pinnacles can be smaller than when unweighted.

The generative principle of Gothic architecture was economy of stone. Labor was cheap, stone was dear, every care was taken to lessen the cube of stone. Any amount of labor might be expended on ornament, as little as possible on ashlar. The masons had grown up on this tradition. The constructional members are totally independent of the filling in and all windows, etc., might be removed.

Such light construction as may be seen in some of the cathedrals may be deemed perhaps somewhat non-architectural, the masonry being made almost as pliable and ductile in design as if it were metal. Though such work has stood for years, the eye desiderates something more, solidity as well as stability, and this in its later phases, the Gothic preponderance of voids fails to give. The unsubstantiality of skeleton construction was, however, largely counteracted by opacity of glass. A church with white glass seems but a collection of stone scaffolding; with stained glass, even if it be one great lantern, like King's College Chapel, Cambridge, an apparent solidity is produced that reassures. Nothing in the whole history of architecture is so unsatisfactory as an Amiens in white glass, nothing so delightful as that same church filled with stained glass, provided that the glass be good.



Beauvais Cathedral, the Mightiest and Most Daring Piece of Masonry in the World. The Chevet Was Begun in 1247 and Finished in 1271. The Dimensions of This Building are Enormous. The Crown of the Vault is 150 Ft. Above the Pavement, and the Exterior Ridge Rises to 210 Ft. The Width of Central Span is 45 Ft. and Span of Bays Vary From 29 Ft. 6 In. to 25 Ft. 9 In. Between Centres. This Building Has Been Called the Last Work of Gothic Art, and It Is Interesting to Follow Out How the Whole Seems Balanced and Kept in Position by the Series of Vaults, Arches, and Flying Buttresses. (See page 54.)

In architectural design the advance was perpetually in the direction of increasing loftiness. The spirit, as such, it associated itself naturally with the mechanical contrivance which could most effectively adopt itself to the concentration of a living purpose.

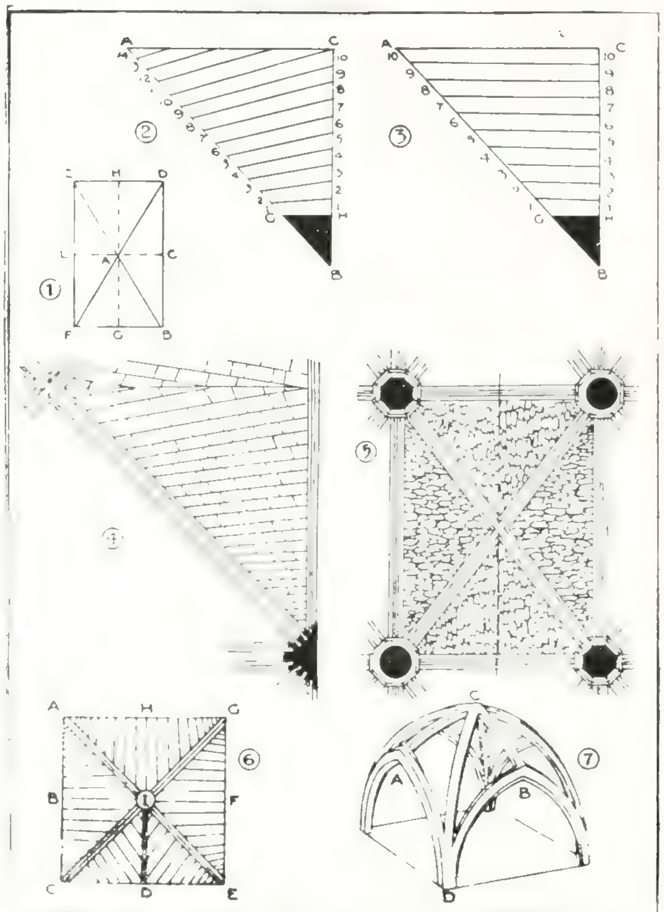
Fan Vaulting in Henry VII.'s Chapel—The Most Intricate Piece of Work Ever Carried Out in Masonry and a Perfect Example of Technical Skill. The Elaborate Construction is Shown Cleverly in the Illustration. The Main Arches Have Voussoirs 3 Ft. 6 Ins. Deep, and the Pendants Which Form Part of the Arch are About 16 Ft. Deep and 5 Ft. Wide. The Small Side Arch Serves by its Connection With the Wall, to Weight and Stiffen the Arch Where it Would be Most Required, that is, Towards the Springing.

French art achieved this purpose most resolutely in vertical expression; nothing has ever been built that can compare with the vaults and buttresses of Amiens, or Beauvais, or with the spires of Senlis or Coutances.

The geometrical ease of bringing, by use of the pointed arch spans of different widths to an even height was more taken advantage of than thought out in the designs of the mediæval artist. In paper architecture as we build nowadays, ease of construction may depend on exactness of setting out. If we go into the clerestory passage and look along an unrestored bay of twelfth or thirteenth century vaulting, the contortion of its curvatures are such as would seem quite indecorous to a modern mason, for the rib radius is varied in every stone and just as haphazard seem the angles of the rib springings. To the observer on the ground these irregularities though noticeable, have no distressing effect of contortion; on the contrary, they give that play of surface which has the emotional value of artistic texture. Was the Gothic artist conscious of these irregularities as defects? Very likely, but he had other matters of greater moment in his ambition, and mere geometrical accuracy was a small thing in comparison.

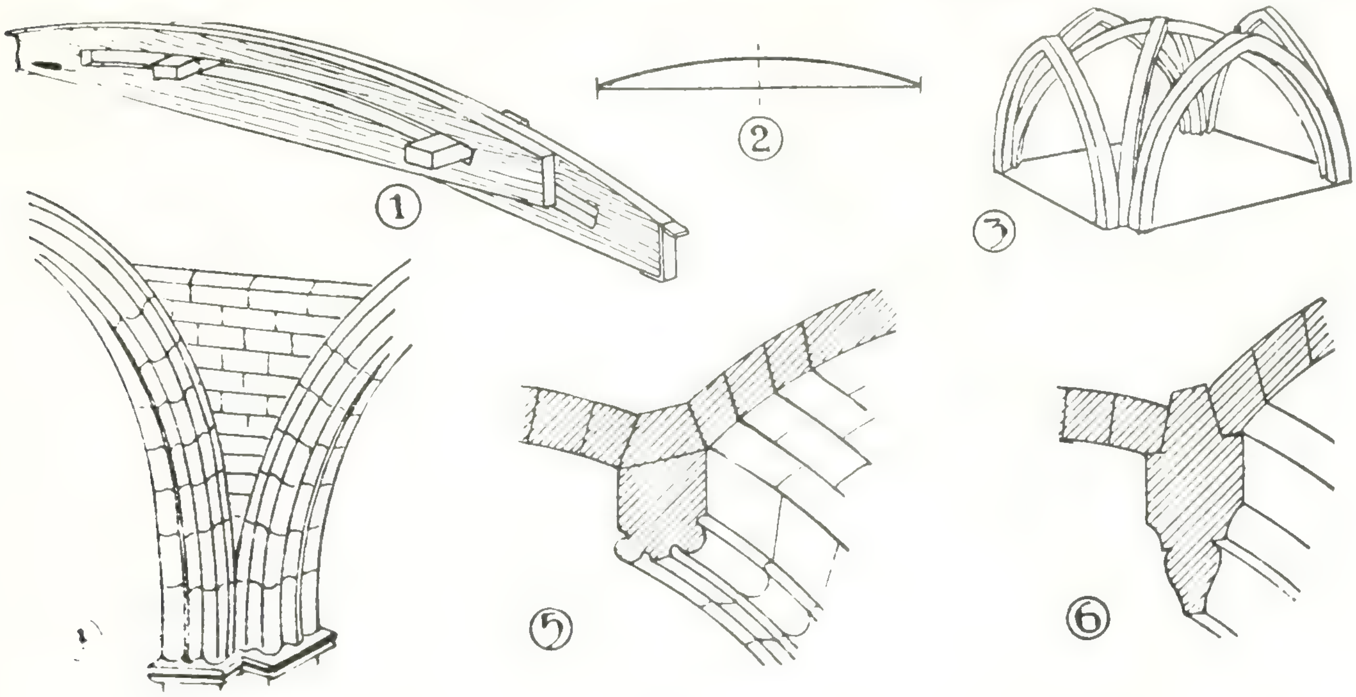
All through the development of their architecture the mediæval mason considered how he could economise centering, for this was an important matter. Scaffolding poles no doubt were cheap and plentiful, but in the Middle Ages it was an absolute necessity to build with the aid of as few planks as possible. That is why the arches were always built up in orders. (See illustration.)

We see the mason's ingenuity of saving centering in the construction of his vaults, as only centering would be required for the ribs of the vault. When these were set, each cell or web could be filled in one at a time. Even though a light plank construction would be required for this, a still further ingenious device was invented called the "cerce" (see illustration) to economise woodwork which consists of two planks fastened together, so arranged that one would slide on the other, forming a sort of extens-



Details of Vault Construction (From Bond's "Gothic Architecture")—2 and 3 Show Respectively the English and French Methods of Stone Filling Between the Vault Ribs. 4—A Vault at St. Saviour's, Southwark. Note the Irregular Stone Jointing at the Ridge, Which Originated the Use of Ridge Ribs in English Work.

ible plank or templet. Two men working together could easily manage such a centre. The objection, however, to this theory is that although possible when the course of infilling does not exceed say, 10 feet, the top courses of many of the great French



Vaulting.

Details of Masonry (From Bond's "Gothic Architecture")—1—The Cerce. 2—Springing of Ribs in Romanesque Work. 5—A Romanesque Vault Rib. 6—A Gothic Vault Rib.

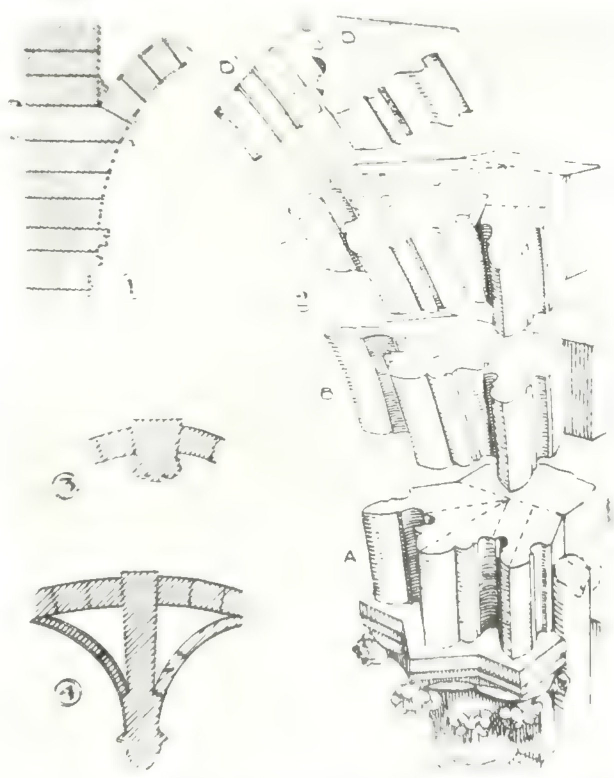
vaults are double that width and this would entail a centre too heavy to be managed by hand. These upper centres, though, were very likely laid on single boards propped up temporarily from a light scaffolding below. Quick-setting mortar would be used, and workmen after setting a course in one compartment could pass on to a course in another, giving the first time to set.

Thus we see the filling in between the ribs is always arched and of a light construction and necessarily of ashlar. The web varies in thickness from 4 inches to 8 inches. In some of the early vaults a kind of concrete is laid on the extrados.

A great advantage of rib vaulting was that in a severy of several cells, each cell was independent of its neighbor. In the groined vault if fracture occurred in any part of it, the safety of the whole vault was imperrilled.

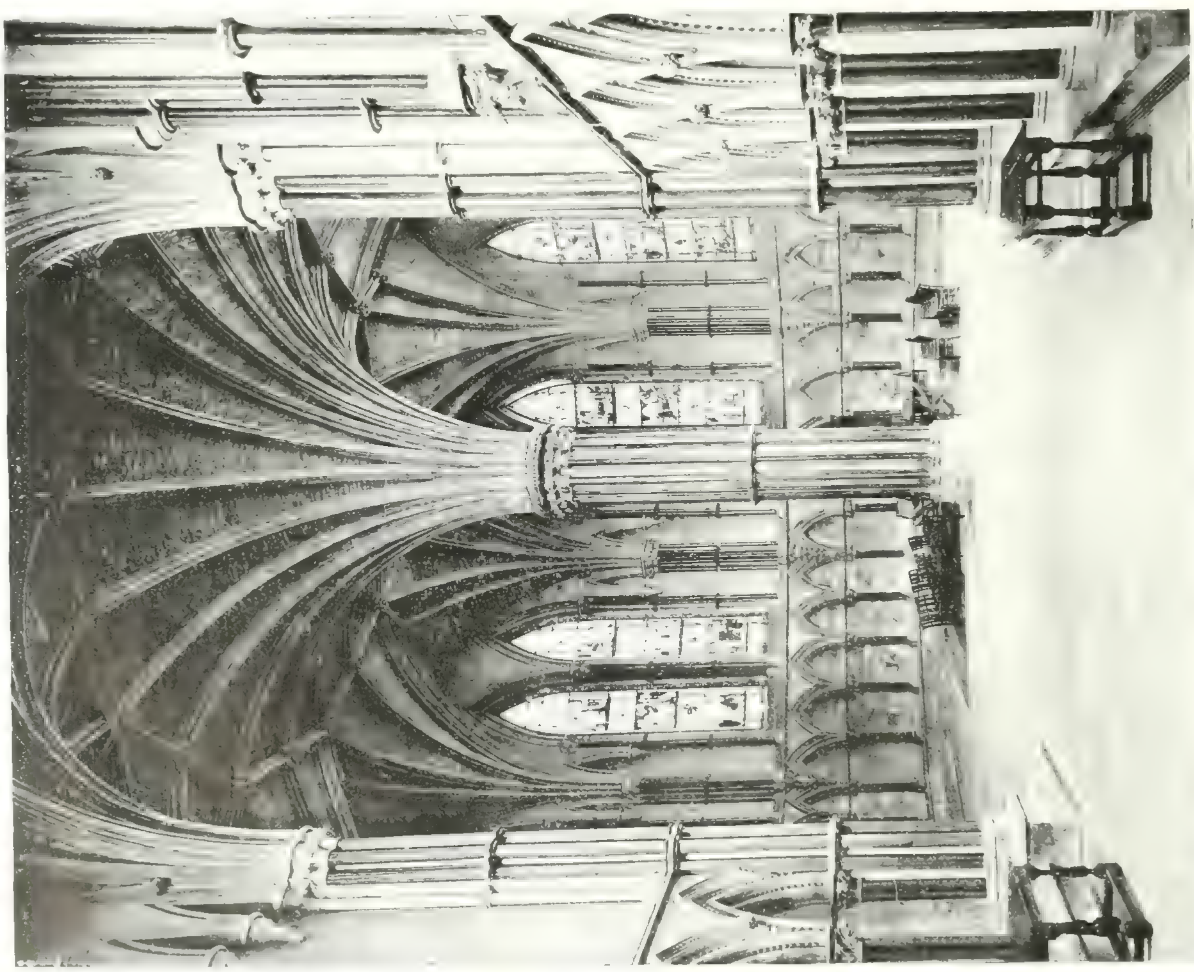
Another advantage was that there was a very considerable amount of elasticity in the shell of such a vault. If owing to pressure and strains, the diagonal ribs of the vault were thrust apart a little, the arched courses would sink; if the diagonal were fixed nearer together they would rise, and all this without ncessarily causing the vaults to fall, owing to the fact that the end stones of the vaults were not bonded to the ribs or arches on which they rested, the arches being usually rebated to receive the filling in, the cells of the vault had a good deal of "play."

The increase of the number and variety of ribs and the consequent form of the vault, is a fascinating study. The French architects do not show such variety as the English in their vaulting. The first named generally kept to the quadriparte or sexpartite form, but the English soon added a number of intermediate ribs across the webs which were probably added to avoid long courses and to facilitate the building of the webs, and also to support the ridge ribs.

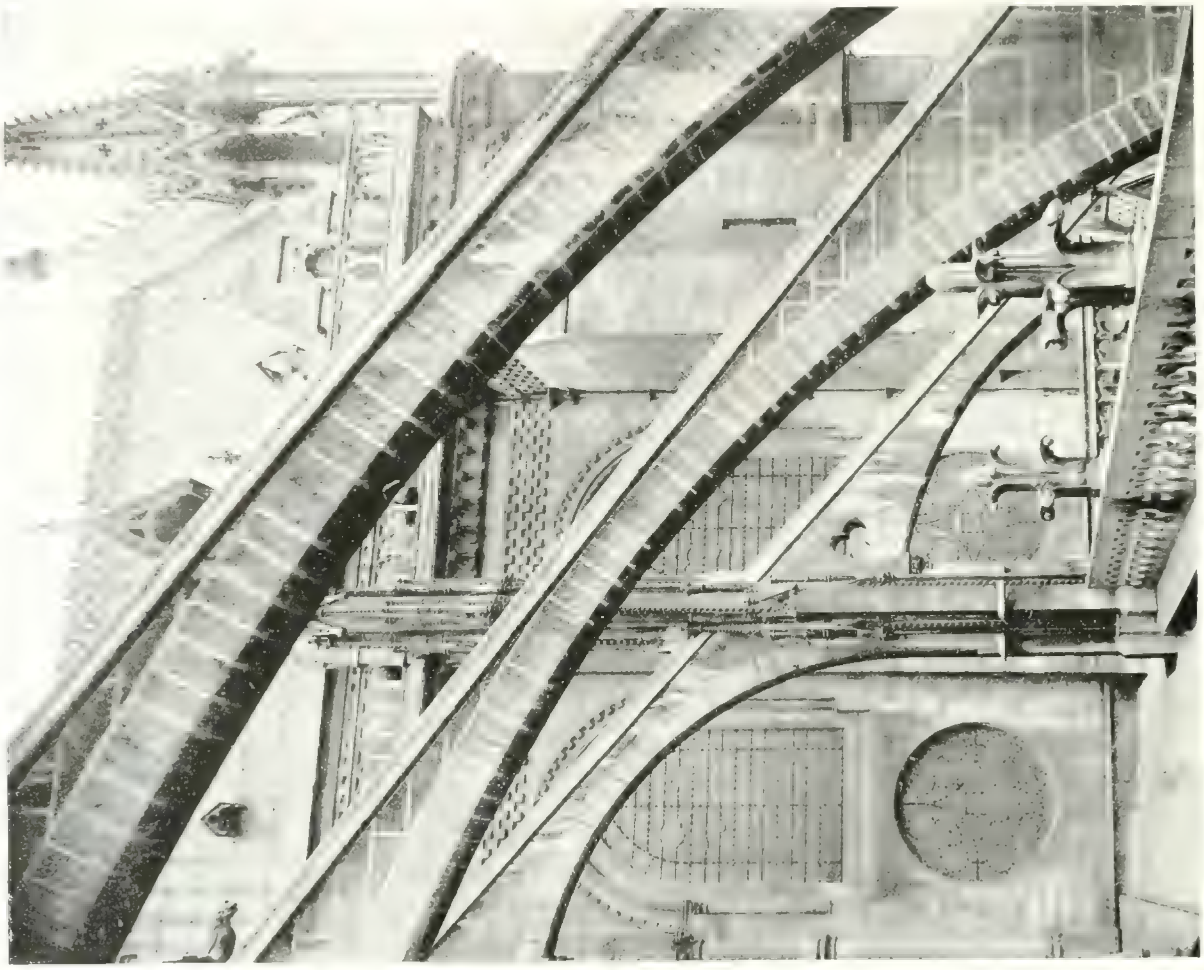


1 and 2—The Tas-de-Charge Method of Construction. 3—Keystone. 4—Pendant.

It was for the latter reason more than any other that the French masons never used these intermediate ribs (or tiercions) as ridge ribs with them were almost unknown and this is easily to be accounted for from the fact that the French had quite a different method of laying the filling-in of the stones to form the webs, than did the English. This is best shown by the diagram. (P. 56). In French work each stone is cut to fit. In English same sized stones are used throughout, which is cheaper and more expeditious but a ragged joint at the ridge is the result. The Englishmen's method



Lincoln Cathedral Chapter House—A Good Example of 13th Century Vaulting to an Octagonal



Flying Buttresses at Notre Dame, Paris—A Daring Piece of Arch Construction.

Detail of Vaulting in Retro-Choir, Peterborough Cathedral. A notable example of the Mason's Art. Executed in the XV. Century.

quired the adoption of the ridge rib with a number of saw-like teeth cut in its side to receive the ends of the top courses of the web.

The original idea of a vault as consisting of a framework and a filling-in between of small stones, was before long lost in a web of liernes which covered the whole surface of the vault. The next development, in perfectly natural and logical sequence, threw it over altogether, and resulted in an ashlar stone vault in which rib and panel are worked on one and the same stone. One result of the change was that the vault once more became of one substance.

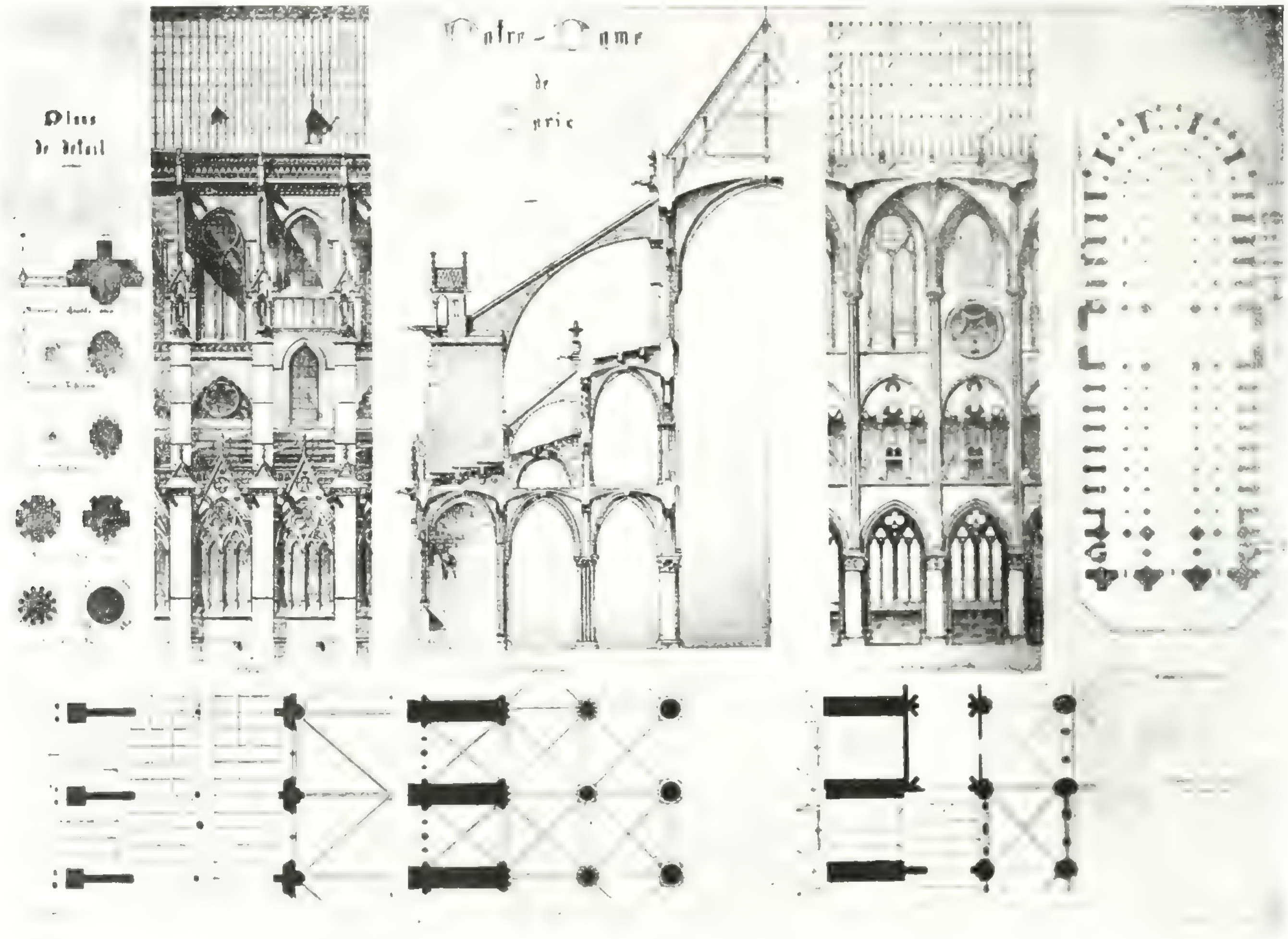
It had not the homogeneity of the Roman concrete vault, but it exercised far less thrust than the strongly ribbed vaults of the thirteenth and fourteenth centuries. It also consequently required less abutment and thus was born the fan-vault, the masterpiece of English masonry, the wonder of foreign lands. It is an essentially English design, and an appropriate ending to the centuries of vault development. In a moment, as it were, the history of the vault had been revolutionized.

The builders delighted with their new form indulged in many charming fancies, including the carrying down of the ribs so as to form pendants. The whole of the stone work in these vaults is put together with as an unerring science and precision as the parts of a stone engine or an astronomical instrument.

* * *

THE REPORT of the science standing committee on the "Rusting of Steel Inside a Concrete Covering," which was presented at a recent meeting of the British Concrete Institute, stated that a circular was issued in 1909 by the Concrete Institute asking for observations on the question whether rusting of steel takes place when covered by concrete, and was sent to 1,000 engineers and others engaged in concrete construction. Only 111 replies were received. Forty-seven contained results of definite observations, in which 26 cases of rusting had come under notice, and in 43 cases no rusting had been found.

As a result of these investigations the committee has arrived at the following conclusions: Reinforced concrete is as durable as plain concrete in any situation, provided that certain precautions are taken in construction. The cement, sand, stone, etc., must be of good quality and must be carefully and thoroughly mixed and scientifically proportioned, so as to be practically waterproof and airproof. The mixture must be fairly wet and must be well punned into position to minimize voids. The aggregate known to have a chemical action on steel should be used. The aggregate should all pass through a $^3/_4$ in. mesh. The concrete covering should never be less than $^1/_2$ in., and with round or square bars the covering should not be less than the diameter of the bar. In structures exposed to the action of water or damp air the thickness of covering should be increased at least 50 per cent. or the size of the aggregate should be reduced so as to ensure a dense skin. Structures exposed to very severe conditions should have the concrete covered with some impervious coating.



Notre Dame de Paris—Illustrating the Bold Use of Flying Buttresses. (See also Page 58.)

CONSTRUCTION

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

Ivan S. Macdonald, Editor and Manager

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Vol. 4 Toronto, September, 1911 No. 10

CURRENT TOPICS

RECENT ADVICES STATE that the rebuilding of the Campanile at Venice is now practically completed, and that the Sansovino logietta has been restored with great fidelity from the fragments into which it was shattered by the fall of the tower.

OLD WOOD CAN BE IMITATED by subjecting new material of this character to the action of moisture and ammonia. This is claimed to be the best method adopted. It is the process employed in the manufacture of antique furniture.

IT IS ESTIMATED that railway improvements in Western Canada this season will involve an expenditure of $45,000,000 and the continuous employment of 30,000 men and 10,000 teams, and that the accomplishment will be the construction of 2,800 miles of new track.

IN REFERRING TO THE DELAY occasioned in the construction of many business blocks at Vancouver through the carpenters' and stonecutters' strike, a Vancouver paper says that in a number of cases owners have instructed their architects to substitute terra cotta for stone work originally intended. It is also stated that in anticipation of a growing demand for this material a company is being formed to manufacture terra cotta, so as to get it cheaper than the imported article.

A NEW DEEP WATER DOCK which will take five years to construct, is to be built on the Thames by the authorities of the Port of London, (Eng.). The carrying out of the project will entail an expenditure estimated at $10,750,000. Work is to be started early in 1912.

A PRESS DESPATCH states that the largest storage warehouse docks on inland waters will shortly be constructed at Port Arthur, Ontario, by the Canadian Storage Corporation, Limited. The docks will be 800 ft. long, and the warehouses and concrete buildings will be seven storeys high, and be built in two units, costing $400,000 each. The first warehouse is to be started at once.

ARTICLES OF INCORPORATION have been granted to the Kennedy Construction Company, a new Quebec concern, which will have its headquarters in Montreal. Those interested are: Messrs. James Kennedy, of La Tuque; Chas. D. French, of Foster; St. George Harvey, of West Shefford, contractors, and G. A. Campbell, advocate, of Montreal. The capitalization of the company is $250,000. It will carry on business as general building and railway contractors.

STRANGE AS ANY CONNECTION between the two may seem, plaster construction has done much to increase the importation of needles into China within the past few years. This somewhat novel condition is explained by the fact that the average Chinaman fancies a nice plaster decoration on the ridge of his roof, and, in order to keep it free from crows which have heretofore made it their regular lighting place, a sort of *chevaux-de-frise* has been adopted by placing needles in the plaster while wet, with the points outward. This has proven such a successful device that needles for this purpose are being employed in large quantities. According to the Acting British Consul at Chungking, no less than 334,700,000 needles were imported by the Chinese in 1910—an increase of 31,963,000 over any previous year.

THE GOVERNMENT OF URUGUAY has instituted a competition, open to native and foreign sculptors alike, for designs for a monument to Gen. Artigas, victor of the battle of Las Piedras and hero of the Uruguayan War of Independence in 1811. This memorial statue is to be placed in the Independence Square of Montevideo, and 100,000 pesos ($103,400) has been appropriated to be paid to the successful contestant who shall supply the statue upon award of the Uruguayan Centenary Commission. All models must be submitted before December 31, 1911. Designs have also been requested for a monument commemorative of the dawn of Uruguayan independence, and 20,000 pesos ($20,680) will be paid to the successful sculptor. This second monument, which is to be allegorical in its nature, will be erected at the city of Mercedes, in western Uruguay.

OPERATIONS HAVE BEEN STARTED at the new plant established by the Sandstone Brick and Sewer Pipe Company at Sandstone, Alberta, the production at the present time being 40,000 bricks per day. The output is to be doubled within the next few weeks, when a second kiln which is being installed is completed. Already a number of large orders have been secured by the new concern and it is likely that the capacity of the plant will have to be increased to a considerable extent before very long. Mr. F. Prendergast, formerly with the Blairmore Brick Company, is in charge of the plant. The company's head office is in Calgary.

* * *

THE NEW PROVISION in the Montreal building by-law which demands the employment of fireproof materials in the construction of all important buildings, went into actual operation shortly after it was passed, when Building Inspector Chausse refused a permit for a large auditorium that did not comply with the regulations in this respect. It is the intention of the Building Department to vigorously enforce the new enactment, which provides in part as follows: All theatres, orphanages, boarding schools, schools having more than one storey above the basement, schools with dormitories, hotels, asylums, houses of refuge, hospitals, departmental stores, apartment houses, containing more than seven lodgings, apartment houses having more than three storeys above the basement, and all buildings over sixty feet high and having more than four storeys above the basement, hereafter erected or altered, shall be built or altered with fireproof materials, as provided in sec. 97 of said by-law No. 260.

* * *

THE ENGINEERS' SOCIETY of Western Pennsylvania have been conducting a series of experiments on different classes of brick. It was found that with mixtures of magnetite and marble with kaolin the refractoriness of the magnetite brick decreases as the amount of clay increases, and the same applies to the addition of lime. With mixtures of alumina and silica, additions of kaolin bring down the melting point of pure alumina considerably below the normal value of about 2,000 deg. C., and if quartz be addedd with 9.1 per cent. alumina the melting point is reduced to about 1,566 deg. C., after which a very small amount of alumina raises the melting point rapidly to 1,790 C.—the melting point of pure silica. In the case of a silica brick with a certain amount of clay introduced as a binder, it was found that as the amount of clay is increased the refractoriness rapidly falls off after the added amount reaches 6 per cent. This points to the desirability of making brick either very high in silica or entirely of clay. Other investigations indicated the effect of potash, soda, lime, magnesia and iron on the melting point of clay. Slight additions of the fluxes named reduced the melting point, the reduction being proportionate to the quantities added.

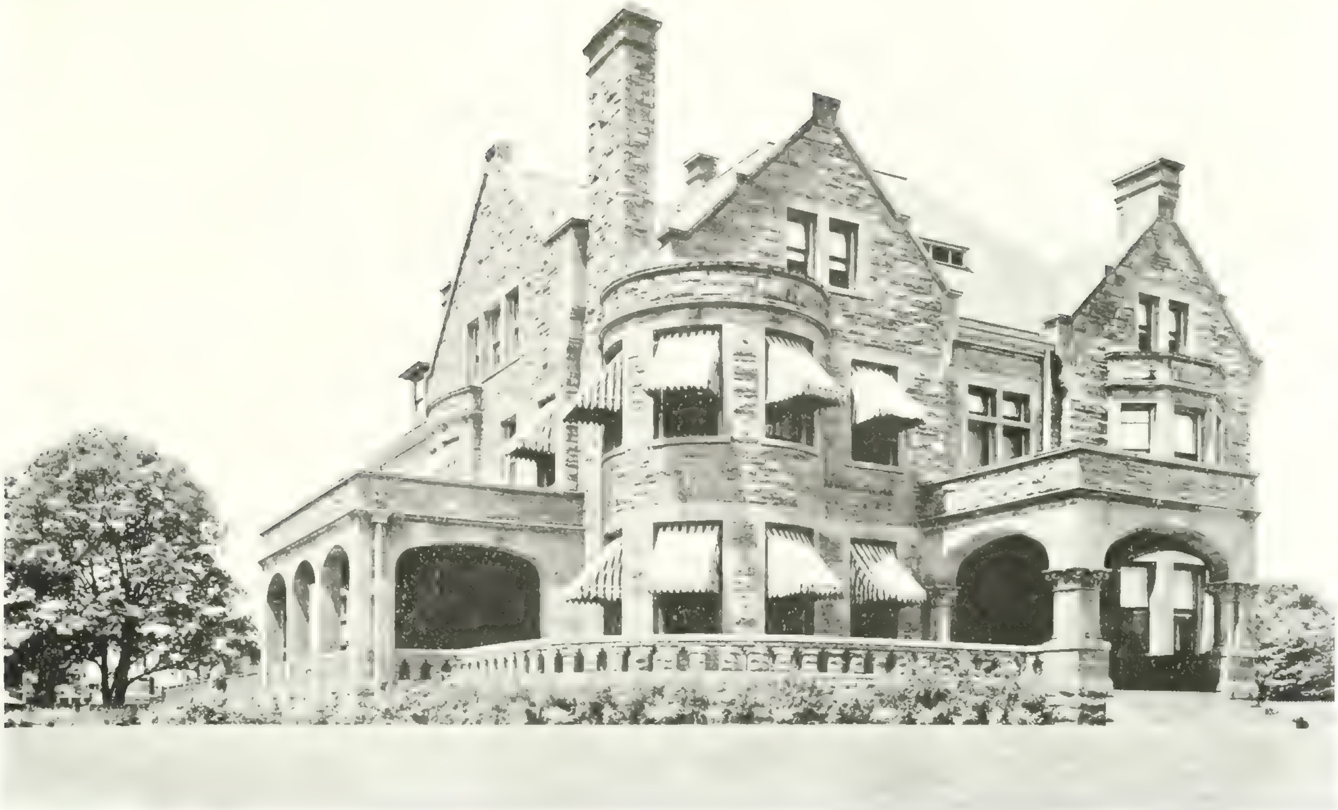
ACCORDING TO THE LONDON TIMES, a large number of architects have already applied to the Australian High Commissioner's office for sets of the maps and other information as to the Yass-Canberra district, with the intention of sending in designs for the laying out of the future Commonwealth capital. Prizes of $8,700, $3,500 and $2,-500 are offered for the best designs, which have to reach Melbourne by January 31, 1912. The documents now available are to be supplemented by a model or relief map on the scale of 400 feet to the inch; and one of these maps will also be exhibited at each of the other centres, where designers are invited to apply: Ottawa, for Canada; Wellington for New Zealand; Pretoria and Cape Town, for South Africa; the British Embassies in Paris, Berlin, and Washington; and the consulates in New York and Chicago.

* * *

EXCAVATIONS on the pyramids of King Sahure, dating back to the year 2600 B.C., brought to light some metal pipes used for water mains, surrounded by a thick coat of mortar. The analysis of this mortar of 4500 years of age showed the following results: Insoluble matter 9.95 per cent.; Soluble silicon dioxide 0.31; Iron oxide 0.70; Aluminum oxide, 0.47; Sulphur trioxide 21.18; Carbon dioxide 18.20; Water 10.89. This makes the mortar about 45.54 per cent. gypsum and 41.36 per cent. carbonate of lime with 13.10 per cent. insoluble matter. This agrees with other mortars discovered in Egypt which settles the question as to the composition of the mortars. Some said that the ancients used lime mortars with sand aggregate, others contended that they used only gypsum or plaster mortar containing more or less carbonate of lime.—Tonindustrie Zeitung.

* * *

GLASS IS OF VERY ANCIENT origin, having probably been discovered by the ancient Egyptians about the year 6000 B.C. But it is to the Chinese we owe the discovery of the beautiful stained glass of the early times, says the London Pottery Gazette. The first glass staining was done by this race about 2000 B.C., according to some authorities, and not until after the Christian era, according to others. At any rate, however, the art was original with the Chinese. The Egyptians made sham jewels of glass at least 5,000 or 6,000 years B.C. In some of the most ancient tombs, scarabs of glass have been found imitating rubies, emeralds, sapphires and other precious stones, and glass beads found broadcast in three parts of the globe were quite possibly passed off by Phœnician traders upon the confiding barbarian as jewels of great price. Of the use of glass in windows there is not very ancient mention. The climate of Greece or Egypt, and the way of life there, gave little occasion for it. But at Herculaneum and Pompeii there have been found fair-sized slabs of window glass, not of very perfect manufacture, and probably at no time very translucent.



Residence of Edward Gurney, Esq., Situated on Walmer Road, Toronto, George W. Gouinlock, Architect.

RESIDENCE OF EDWARD GURNEY, Esq., WALMER ROAD TORONTO

A luxuriously appointed modern stone house in modified Romanesque design. Description of interior scheme and features of plan.

AMONG THE MANY noteworthy homes that have been built in Toronto within the past few years, is the large stone residence of Edward Gurney, Esq., on Walmer Road. The style of architecture adopted is Romanesque, modified to conform with the conditions and climate of Canada, and refined to a simple solidity that is not lacking in grace. The materials employed in the exterior construction are Credit Valley sandstone with grey Indiana limestone trimmings and a green slate roof.

While luxuriously appointed and dignified in its general treatment, the interior is devoid of that feeling of formality which too often characterizes and detracts from that essentially domestic character so important and necessary to the success of a residential building. Instead, the scheme is one in which the decorative detail and the furnishing have been so considered as to make either the room *ensuite*, or the individual interiors taken separately, decidedly home like and inviting in appearance.

The main hall is carried out in a dignified late Elizabethan style, with pannelled oak walls, finished with a decorative frieze and ceiling beams in the same wood. The mantel at the end with its rich detail, is in character with the decorative treatment of this period; as is also the staircase in the stair hall to the right, which is an exquisite example of the wood carver's art.

The drawing room which is to the right on entering, is a Louis Quinte interior, having an elaborately decorated ceiling, rich hangings, and a beautiful marble fireplace; while the library, which has a moulded ceiling in geometrical design, and the reception room are finished in Southern mahogany, which together with the leaded glass of the bookcases and the marble faced mantels, speaks eloquently if silently, of dignity and culture linked with every degree of convenience and comfort

Drawing Room, Residence of Edward Gurney, Toronto. George W. Gouinlock, Architect.

Reception Room, Residence of Edward Gurney, Toronto. George W. Gouinlock, Architect.

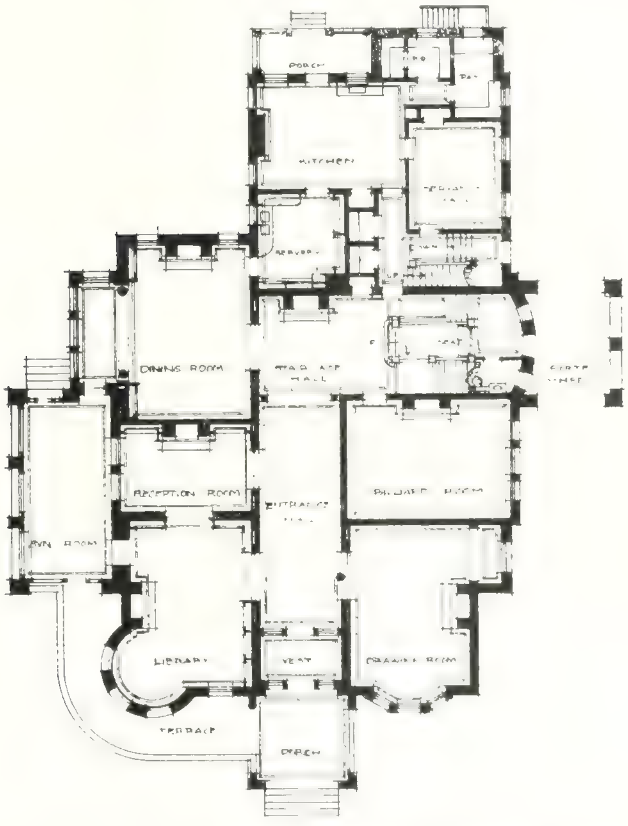
Entrance Hall and Fireplace in Late Elizabethan Treatment, Residence of Edward Gurney, Toronto. George W. Gouinlock, Architect.

Staircase Hall, Looking Toward the Di i g Room, Residence of Edward Gurney. Toronto. George W. Gouinlock, Architect.

Library, Residence of Edward Gurney, Toronto. George W. Gouinlock, Architect.

Dining Room, Residence of Edward Gurney, Toronto. George W. Gouinlock, Architect.

As regards the plan, the layout of the house presents an interesting arrangement with all the main rooms opening on the large hall. The dining room which is conveniently connected to the kitchen by a large servery, is also finished in mahogany with richly panelled walls, beamed ceiling and a hand painted frieze in oils. The furniture here was especially designed to form an integral part of the architectural scheme; two exceptionally noteworthy pieces being



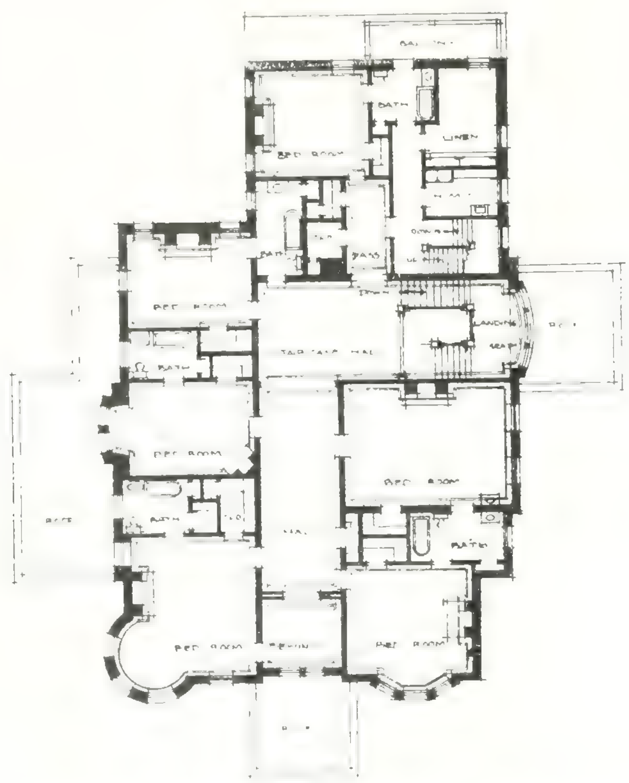
Ground Floor Plan, Residence of Edward Gurney, Toronto. George W. Gouinlock, Architect.

the beautiful sideboard and the china cabinet, seen in the accompanying view. Both this interior and the library have doors leading to the large sun room which overlooks the well-kept spacious grounds.

Aside from the main entrance, access to the hall is obtained from the porte cochere through an entrance at the rear of the stair hall. The billiard room which adjoins the dining room is also entered from the stair hall, the door being so placed as to keep this interior well apart from the other rooms, and yet make it convenient from the main portion of the house. The service department, as will be seen from the plan, is commodious and well arranged, with a large kitchen provided with a built-in refrigerator, ample store and pantry space, and a servants' hall and staircase.

On the first floor the arrangement is equally as commendable as that of the floor below; a large I shaped hall corresponding in situation to the one previously described, forming the central feature. There are six bedrooms in all, each of which has a large fireplace and an adjoining bath. The treatment here is in delicately designed wall papers with harmonizing hangings and appropriately designed furniture; each interior having a pleasing individuality of its own. In addition to the rooms mentioned, is a good sized sewing room at the front of the hall, together with ample wardrobe space, and a large linen room at the rear of the house.

The house was designed by and erected under the supervision of Architect George W. Gouinlock, and the various branches of the work were executed by the following firms: Cut stone and masonry, Page & Co.; carpenter and joiner work, J. C. Scott & Co.; slating, H. Williams & Co.; plastering, H. R. Whetter; electric wiring, phones, etc., W. J. McGuire, Ltd.; heating and plumbing, Kieth & Fitzsimons Co.; painting and glazing, Jos McCausland & Son; mantels, McLaughlin-Gourley, Ltd.; ornamental glass, Robt. McCausland, Ltd.; hardware tiling, etc., Brooks-Sandford Hardware, Ltd.; structural steel work, McGregor & McIntyre; marble and tile work, O'Keefe-Sandford Ltd.; carved caps, McCormack & Carroll.



First Floor Plan, Residence of Edward Gurney, Toronto. George W. Gouinlock, Architect.

ASBESTOS is known in China principally by two names, "shi-mien," which means "stone cotton," and "pu-huimu," the literal meaning, of which is "not ash wood," or wood which will not burn. Up to the present time it has been little used, and has been regarded more as a curiosity than an article of utility. Valuable deposits, however, have been found in the vicinity of Kuantien, a small town lying about 45 miles northeast of Antung, and it now seems that an attempt is now being made to put this commodity to proper use. Already three mines, each employing thirty men, are in operation, but as yet the mining is done in a desultory and primitive manner. The workers are mostly farmers, who devote only their spare time to mining, and use simply hammers and chisels, and gather only the asbestos which lies near the surface.

The Principal Figure.


Group Representing "Motherhood."

THE QUEEN VICTORIA MEMORIAL

Description and critical analysis of imposing monument erected before Buckingham Palace.—Republished from the "Architectural Review."

PROPERLY SPEAKING, the National Memorial to Queen Victoria in front of Buckingham Palace includes the whole scheme of gates, piers, and gardens, with the Memorial as central feature, and the processional roadway—the straightened and widened Mall—that leads to the triumphal archway at Charing Cross. But for the present purpose the description must be confined to the memorial statuary group, which was unveiled by His Majesty the King on May 16th. In referring to this, however, as the focus of the whole scheme, one cannot avoid recalling to memory the original scheme by Sir Aston Webb, which was selected ten years ago in the limited competition that was held. The perspective showed a spacious semi-circular area enclosed by a double colonnade connected to pavilions, and having water-basins and parterres. The necessary funds for this effect, however, were not forthcoming, and the scheme had to be shorn of many of its features, the enclosing colonnades being represented in the finished work by low balustrades, and the parterres reduced to quite a commonplace gardener's affair. But the greatest mistake in the alteration of the scheme was undoubtedly the bringing of the roadways from Buckingham Palace Road and Constitution Hill *within* the enclosure, instead of keeping them outside. It was obvious at the time what the effect of such a change would be, and as a result it means that the spectator has to stand in a whirl of traffic. But, setting aside such considerations of the scheme as a whole, attention may be centred on the Memorial itself, for which Sir Thomas Brock is entirely responsible. It has already been the subject of a good deal of criticism, some of which is not a little flavored with bitterness. After all, if names are an engulfing attraction to the throngs who make the turnstiles at Burlington House go merrily around year after year, they are just as much masters to the critics. The adage about giving a dog a bad name finds very pointed illustration here, and we are afraid the sculptor of the Queen Victoria Memorial has experienced more than an abundance of attention from those who were prepared to vilify his Memorial before they had even seen it. We have no intention of taking up the cudgels on his behalf, but the importance of this work at least claims that it shall receive fair criticism; and it is with the object of presenting it in a thoroughly adequate form that the accompanying photographs have been taken.

Queen Victoria Memorial—General View from the Southeast.

It must be admitted that Sir Thomas Brock has not, in this work, done anything exceptional, and the criticism that some of the figures have a too-pervading air of the studio-model has, we think, a good deal to support it. At the same time there is some notable work, in particular the boy figures, which are very pleasingly disposed, and the figure of Queen Victoria herself, which certainly is regal and imposing. The crowning figure of Peace we do not much care for, as it is of a type which is very familiar; but the figure of "Courage" below it, on the north side, is very finely grouped, strong in its lines, and worthy

Group Representing "Justice."

Group Representing "Truth."

of a sculptor who has achieved a considerable reputation.

The low-relief sculpture around the base is, in our opinion, not good. There are few sculptors who have ever achieved success in this direction. Nor can anything be said in praise of the architectural detail. It is, in fact, the worst feature of the Memorial, being of an Italian Renaissance type, with a plethora of bad motifs. The Memorial, however, certainly masses up well, and, if it does not reach any great position as an imaginative work, is imbued with a good deal of stately feeling in keeping with the great ideas it embodies.

At the time of the unveiling, Sir Thomas Brock gave to The Times an account of the genesis of his idea for the Memorial and some account of its development; and as the sculptor himself is best qualified to explain his own work, his words may here be included. He says:

"I believe that a meeting of the Executive Committee, after the preliminaries had been arranged, decided unanimously to ask me to undertake the work. I was sent for by Lord Esher and informed of their decision. They thought that they might thus get a work which would have more harmony and rhythm than they could expect if a number of sculptors were engaged upon it. I felt great diffidence in undertaking the commission, fearing that I might not be able to do justice to so great a theme; but I thought that at least I could try, and so I began my preliminary sketch-model. It was intimated to me that the committee would like me to travel for a year and examine the great examples of the monumental sculpture of Europe. I felt, however, that if I were to do so before having determined on a general scheme I should be somewhat bewildered on my return, and that the result would not embody the expression of my own personal feelings. This being so, I decided to proceed with my model, which was done to a very small scale, but was sufficient to convey a fair idea of my proposals.

"I felt first that I must begin by giving what I thought was the true foundation upon which the Throne must rest, and so it occurred to me that there should be a large raised platform surrounded by walls containing fountains and great basins into which the fountains discharged. This would suggest the maritime greatness of the Empire. This idea was further developed by the retaining walls being decorated by mermaids and tritons. It also appeared to me that this base should likewise be emblematic of the courage and wisdom of the people, which are suggested by the reclining allegorical figures over the fountains, on the one side representing the Navy and Army, typifying courage, and on the other side Science and Art, symbolizing intelligence.

"To carry this idea further I placed on the pedestals flanking the steps at the front and back of the monument groups of colossal figures supported by lions—in the front, on the right a figure of Peace and on the left a figure of Progress; and at the back, facing the Palace, figures of Labor, Agriculture, and Manufacture. These, I felt, would represent all the qualities of the nation upon which Monarchy must depend for its security.

The Monument as it Appears From the Southwest.

"The central feature, which rises to a height of 82 feet above this foundation, I devoted entirely to those qualities which made our Queen so great and so much beloved. The statue of the Queen I placed in front, seated enthroned with Orb and Sceptre and looking towards the heart of the great city whose people she knew and loved so well. On the right of the great pedestal I placed a group of Justice, and on the left a group of Truth. I felt that she was just, and that she sought the truth always and

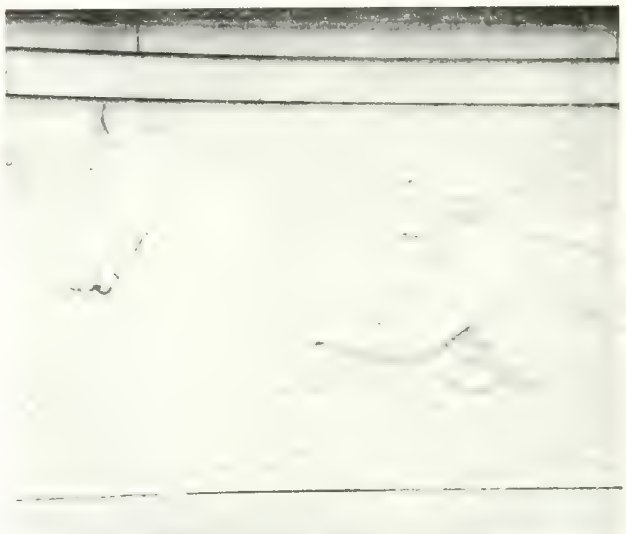
The Summit "Victory," with Supporting Figure of "Courage."

in all circumstances. At the back I placed a group of Motherhood, symbolizing her great love for her people.

"Above, ornamenting the main corners front and back, I placed eagles, emblematic of Dominion, and on the superbase figures of Courage and Constancy; and rising from above, on an orb, a figure of Victory with outstretched wings, with the right arm uplifted, and holding in her left hand a palm branch.

"The small sketch-model of this Memorial was completed a few months after Queen Victoria's death in 1901. The fact that it had so far reached maturity became known almost accidentally to King Edward, who paid me the honor of a visit to my studio to inspect it. His Majesty was favorably impressed by the conception, and made certain critical suggestions to which I deferred, and which are embodied in the Memorial as it exists to-day.

"I then proceeded with a more elaborate model to a scale of one-tenth the full size. This was completed and approved by King Edward in the summer of 1902. It was then that His Majesty realized the magnitude of the work, asking me how long it would take to complete. When I mentioned ten years he replied, 'Why, we shall all be in our graves by that time.' I did not see my way, however, to name any earlier date, but as a matter of fact it is not more than nine years since the work was actually begun. I must now leave the Memorial to the judgment of my own and future generations, but I feel it incumbent upon me to say that whatever that judgment may be, the entire responsibility for the work rests with myself; for no artist could have been accorded greater freedom or treated with more complete confidence than I have enjoyed at the hands of the Memorial Committee."



Detail of Low Relief Sculpture Around Water Basin.

As already indicated, there has been no lack of criticism—there never is—and from the columns that have been written about the Memorial a few excerpts are given below in respect of what may be called an endeavor to judge the work fairly and without prejudice.

"Sir Thomas Brock, in choosing the form of monument to Queen Victoria, set himself a task of extraordinary difficulty," says a writer in The Morning Post. "The figure of Her Majesty had to be distinct, predominant, and the sculptor has insisted on this necessary predominance somewhat at the expense of artistic coherence. Viewed from the front the Queen is in perfect scale with the groups of 'Truth' and 'Justice' on either side. But when examined from the north or the south side of the structure all sense of perspective is lost. The symbolical figures referred to are actually nearer to the eye than is the statue of the Queen; yet her figure is so much larger in proportion that unity of design is upset. The figure of the Queen, judged by itself, is on the whole splendid. The upper part, in particular, has great dignity. The front face is, perhaps, a trifle severe for the great-hearted lady who for so many years ruled the British Empire by love and kindness, but in profile the features are noble and sympathetic. The Memorial is sure to be extremely popular. It comprises all the factors that appeal to national pride and sentiment, and they are presented with a power hitherto absent in British monumental sculpture."

Another writer in the same issue says: "In our notice of the base of the Memorial we praised its breadth and nobility of scale, the magnificent sweep of the basins which repeats the curves of the sculptured pediments, and the various figures in high-relief and in the round. On the panels sea-maidens, tritons, and children sport with joyous abandon on sea-horses, dolphins, and nautilus shells, all excellent in composition. The movement of the figures has a swing and swish that suggest the seas ruled by Britannia, but the Gothic waves respond to the force of neither moon nor wind, and the living waters in the basins emphasize their archaistic rigidity. The success of the lower part led us to believe that the monument when complete would be an imposing achievement, superb in scale and noble in decoration. And our faith was not lessened as the scaffolding rose to the sky. Within the wooden posts and beams seemed to be space enough for the display of these qualities. But now that the Memorial is uncovered we find unfulfilled the early promise of a really great monument. The scale, the general proportions of the architecture, are splendid. The figures disappoint. There has been no great effort to break from the spiritless bounds of convention. 'Truth' is partly draped, wings spread from her shoulders, a mirror rests on her right arm, her left foot tramples a serpent. Then there are a naked child and a seated figure. This group is weak in rhythm, confused in line, and, save for the mirror, it might represent anything but 'Truth.' 'Justice,' which faces north, is known by her sword; 'Motherhood' by her children. From the artistic point of view 'Motherhood' is the finest group. It is broad and monumental in treatment. The idea is concentrated in a harmonious design of not very striking originality. The gilded figures which surmount the Memorial are the least impressive of all. They fail in the monumental sense of design. They seem to be modelled with the elaboration of statuettes. Distance and atmosphere resolve objects into silhouettes that express character and emotion with unmistakable truth. Detail in a work of art should never disturb the fecundity of a distant mass; and it is this insistence on unessential fact that robs the figure of 'Victory' of illusion. This 'Victory' appears to be insecure in her position. Seen in front, the wings and drapery seem to be overbalancing the figure. From almost every point of view we find in these figures awkward angles instead of buoyant or triumphant lines, and the gilt gives a heavy prominence to the forms that diminishes the suggestion of height."

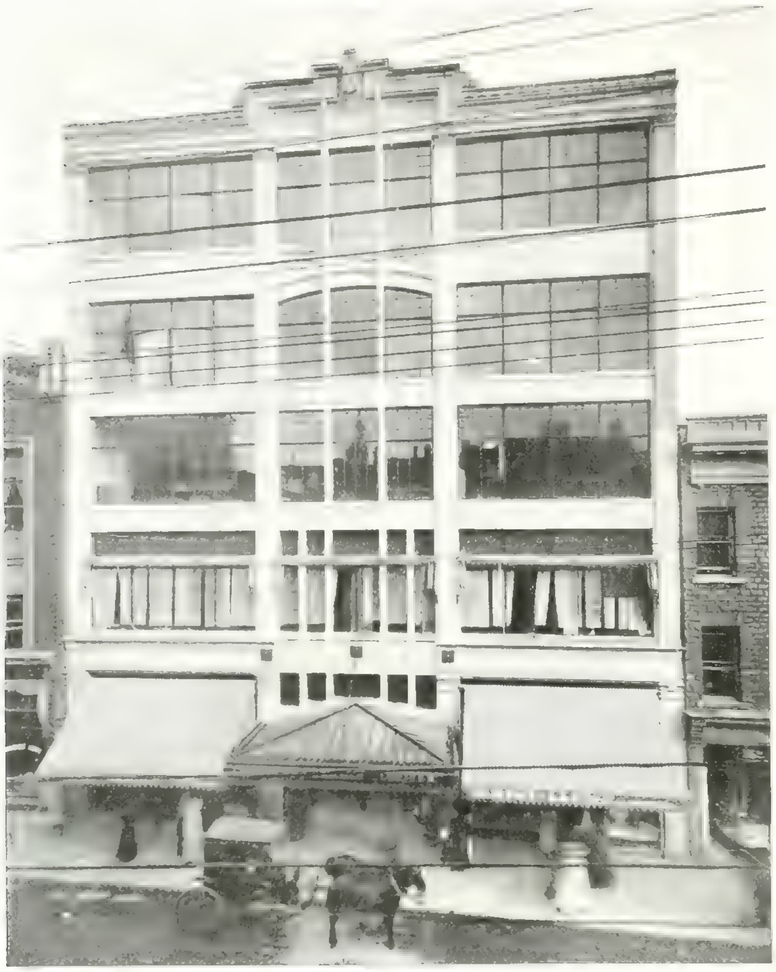
With regard to the time occupied in completing the Memorial it may be stated that the lower portion was ready to be opened to public view in May, 1909. This part included the marble basins, retaining walls, sculptured panels, granite paving, steps, plateau, and bronze electric lamps. In this portion of the Memorial there are about one thousand tons of Carrara marble and eight hundred tons of granite. Each basin measures 190 feet in length by 24 feet in width and 2 feet in depth. Shallow wells in the gravel at the end of the lake in St. James' Park, and the lake itself, supply the water for the cascades, the quantity required being 108,000 gallons an hour. Engines erected at the pumping stations in St. James' Park provide the power, and after the water has passed through the cascades and basins it returns to the lake. The chief engineer to His Majesty's Office of Works is responsible for these admirable arrangements.

The central architectural portion of the monument was executed and erected by J. Whitehead & Sons, Limited, and the architectural marble-work of the lower portion by Walton, Goody, and Cripps, Limited.

COMPOSITION FLOORING IN GERMANY.

SAWDUST AND LIKE WASTE products heretofore regarded as useless are now being utilized to no little extent in Germany in the manufacture of building products. Especially has a marked advance been made in the manufacture of composition flooring. One flooring of this character is made from a solution of magnesium chloride, to which pulverized magnesia and sawdust are added in proper proportions, the resultant composition on hardening possessing many of the qualities of both wood and stone. When the sawdust is omitted the combination of the other two ingredients forms a white, absolutely solid, artificial stone. Some of the floorings are mixed on the spot and laid soft on the space to be covered, while others are molded into plates and delivered ready made. Flooring of this kind varying from 23 to 25 millimeters (0.905 to 0.984 inch) thick costs 7.50 marks per square meter ($1,785 per 1.196 square yards) laid. As magnesium chloride is hygroscopic, these floors may become damp if the proportions of the composition are not carefully determined upon, and the salts thereby precipitated are injurious to wood and iron. Every manufacturer has his own recipe and undertakes, naturally, to overcome this quality of the principal raw material. The cheaper grades of flooring are colored to resemble linoleum or mosaic pavements, and, in many instances, have given entire satisfaction during a considerable term of years. The emigrant halls of the Hamburg-American Line at Hamburg are paved almost entirely with this composition. Floors thus made are more elastic than cement floors, are much warmer, and preserve a smoother surface. Under the fire test this type of flooring chars, but does not burn, and is a poor conductor of heat. Manufacturers of the artificial wood plates also use cork waste as well as sawdust, and produce an infinite variety of building materials, including floorings, wainscoting, and roofing plates.

EXCAVATION has been started for the new Winnipeg General Hospital. The building will be of fireproof construction and modern from the standpoint of sanitary equipment. It will cost $500,000.



The Carling Building, Sparks Street, Ottawa. Occupied as a Departmental Store of the Murphy-Gamble Company. C. P. Meredith, Architect.

THE CARLING BUILDING, OTTAWA.

Built of reinforced concrete, with Roman stone facing. Scheme of fenestration admirably adapted to lighting and window display purposes.

THE CARLING BLOCK, or as it is perhaps more popularly known, the Murphy-Gamble Building, is regarded as Ottawa's most modern departmental store, and is one of the several important business structures erected in that city according to approved methods of fireproof construction within the past couple of years. It extends through from Sparks to Queen Street, a distance of 200 feet, and is of reinforced concrete construction, faced with Roman Stone and fitted with metal sash throughout. No material is employed in any part of the entire structure that is of an inflammable nature. The front of the building shows some very interesting details in artificial stone, and a particularly commendable scheme of fenestration which admits of an exceptionally well lighted interior, in addition to an arrangement that is splendidly adapted to window display purposes. The lower view shows the interior on the ground floor and the ararngement of girders and columns. This is typical of the floor arrangement throughout, the light well being situated about equidistant from either end of the building. At the present time Ottawa has a number of important changes in its building by-law under consideration, and it is said that when the proposed revision is made, few cities on the Continent will have a better or more exacting set of regulations. The construction of the Carling Building, however, anticipates any demand the new provisions might make. From a structural standpoint, it has been most thoroughly considered in every respect, and is about as fireproof as modern building science has made possible. The floors, columns and walls are reinforced according to the Expanded Metal Fireproofing Company's system of reinforcement; and this concern, which has since become amalgamated with other important interests under the name of Steel and Radiation, Limited, also supplied the metal window sash which is used throughout. The building was designed by and erected under the supervision of Architect C. P. Meredith, of Ottawa.

View of Interior on Ground Floor—Showing the Arrangements of the Beams, Columns and Girders. C. P. Meredith, Architect.

Residence of Mrs. M. E. Webb, Lynwood Avenue, Toronto. A House with a Unique Individuality and a much more Attractive Architectural Scheme than is Usually Found in Average Houses of the Square Type. Wickson & Gregg, Architects.

A BRICK HOUSE WITH A UNIQUE INDIVIDUALITY

Novelty of effect successfully introduced in connection with a scheme that is well proportioned, dignified and simple in general character.

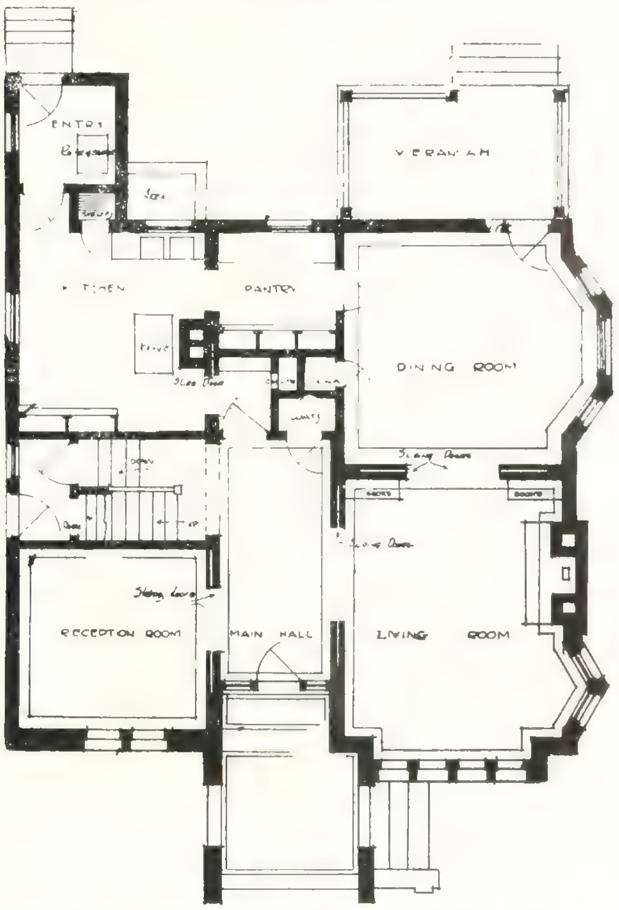
A WRITER in a contemporary which devotes considerable of its space to architectural subjects, in an article published some little time back, deploring the lack of individuality in modern residential work, stated that most houses of the square type varied but little in design, or that at least they differed only in minor essentials and detail. Evidently this remark was made in reference to the class of houses erected by the speculative builders, for it must be admitted that in the work of bona fide architects, many examples are to be found which vastly differ from one another, both as regards scheme and treatment. The residence of Mrs. M. E. Webb, illustrated herewith, may be taken as a specific instance of a house of the square type in which both a distinct individuality and a picturesque quality are manifestly evident. The exterior with its buttressed porch piers and half timber work is characterized by what might be termed a modern English feeling; and while novelty of effect exists to a degree, it is happily introduced in connection with a scheme that is beautifully proportioned, dignified and simple in general treatment. Indeed, the roof with its overhanging curved eaves—suggestive of a thatched covering—gives a unique character to the design, and together with the artistic entrance and windows, and the simple color combination worked out with red brick and harmonizing tones of greys and browns, makes the exterior of the house decidedly attractive and hospitably inviting in appearance.

The accompanying plans are quite explanatory of the interior. They show a layout that is practical in arrangement, with well-placed rooms and a somewhat open scheme. One feature worthy of note is the arrangement which brings the coat room, china closet, laundry chute and pantry all conveniently within a compact space. Attention might also be called to the wardrobe and individual toilet adjoining the bed rooms. The wall scheme of the rooms is quiet in tone and in decidedly good taste. In the reception room the treatment is in a pleasing champagne color; while in the living and dining rooms, both of which have bay windows, the decorations consist of a vari-tone green wall pattern with a

Living Room, Residence of Mrs. M. E. Webb, Toronto. Finished in Quarter-Cut Oak, with a Green Pattern Wall Scheme and Cream Colored Ceiling. Wickson & Gregg, Architects.

Dining Room, Residence of Mrs. M. E. Webb, Toronto, Which is Similar in Treatment to the Above Interior. Wickson & Gregg, Architects.

simple plate rail and cream tinted ceilings, the fireplace being in red brick with white mortar joints. The entire woodwork, trim and flooring, is in quarter-cut oak, including the hall and staircase. To say



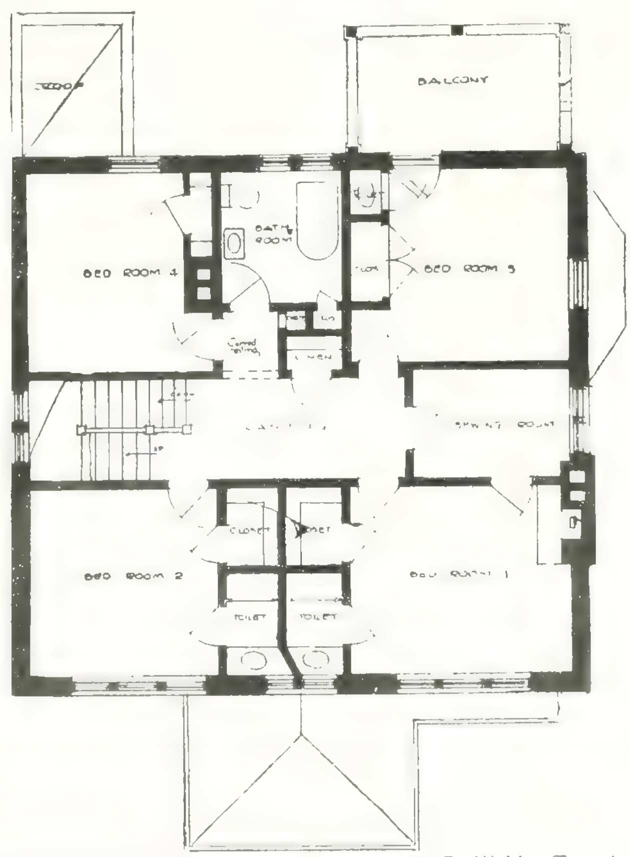
Ground Floor Plan, Residence of Mrs. M. E. Webb, Toronto. Wickson & Gregg, Architects.

the least, the house in general has much to commend it. It is well planned, original in design and liveable and inviting in every way. Messrs Wickson and Gregg, Toronto, were the architects.

CONSIDERATION OF THE AESTHETIC IN FACTORY DESIGN

Doctrine of good architecture spreading, manufacturers now realize that a well designed building is a good investment.

IT IS AN UNDOUBTED indication of progress in a people when they are not only willing to allow, but are beginning to demand, some measure of aesthetic consideration in the design and arrangement of even their most utilitarian structures. Such evidence of progress, says the "American Architect," is now found practically throughout this country. The development architecturally of no class of buildings has been more rapid than that to which manufacturing buildings belong, and through this development we find a general acceptance of the doctrine that good architecture is a good investment. Probably no longer than a decade ago less than 10 per cent. of the manufacturing buildings erected were designed by architects. Their services were not considered necessary. No value was placed on architectural qualities or general appearance, and the shop manager, whose knowledge of the requirements of space, arrangement of machinery, stock, etc., was and is undisputed, together with the builder, appeared to supply all the knowledge necessary to a successful enlargement of plant or the building of a new one. If some problem of difficult foundations or unusual roof construction presented itself the engineer of the works could ordinarily furnish a solution that at least provided a safe and secure structure. As long as the manufacturing building was considered simply as a shelter for necessary machinery and operatives, such a disposition of the problem of its construction as indicated above was probably satisfactory. But with the development of the country and the growth of culture which bring with it an appreciation of architecture and all forms of art, the realization that this unusual order of things resulted in structures that were blots on the picture and offensive to good taste, became quite general. The natural and logical course to pursue under such circumstances was to place the design of these utilitarian structures under the jurisdiction of men whose training and experience has qualified them to fully meet the requirements of good architectural design, and at the same time by consultation with those who have knowledge of the practical manufacturing requirements sacrifice no



First Floor Plan, Residence of Mrs. M. E. Webb, Toronto. Wickson & Gregg, Architects.

important detail of construction or plan that would lend convenience or economy to the operation of the finished plant. As a result it is probably safe to assert that under present-day conditions, less than 10 per cent. of manufacturing buildings erected worthy the name are built without aid, counsel or advice from architects.

In satisfying a popular demand for better, more artistic buildings and in many cases their own desires to provide physical comforts, and a degree of mental satisfaction and pleasure to employees, by supplying most modern building equipment and beautiful surroundings, manufacturers have discovered that they have apparently conserved their own interests. Evidence everywhere accumulates that the highest grades of goods are manufactured where the health and comfort of the employees are given greatest attention, and where the buildings and environment supply the greatest measure of physical and mental comfort and happiness. In fact, good architecture as a commercial asset is so indisputably established as to need no defence or explanation from the owner or investor. It is not often that a group of men can contribute to the progress and artistic development of a country, improve immeasurably the conditions of a very large class of workers and greatly enhance their own properties by a single departure from an old and established practice; but this seems to have been the net result of the change made by manufacturers in placing the designing of their buildings and plants in the hands of competent architects with instructions and authority to make them an ornament to the neighborhood in which they are erected, a source of pride, satisfaction and pleasure to the owners and a place where employees can do their work under healthful, comfortable and pleasant conditions. The circumstance is worthy of more than passing thought and notice.

SPECIALIZATION AS IT APPLIES TO THE ARTS AND CRAFTS

Fine architecture possesses of a sense of life which makes it distinct from mechanical construction, building and engineering.

TO BECOME EXPERT in the practice of art, it is undoubtedly necessary to choose a branch of art that directly appeals to us, and to devote our whole energies to the mastering of it. In making this choice, a contemporary points out, and in restricting our investigations and studies, very careful judgment is needed. It is without doubt advisable to commence to handle, as soon as possible, the material in which we intend ultimately to express ourselves, but there must always be a liability to confine ourselves within too narrow limits in our study. As a result we discover, probably only too inconveniently late, that some faculty needed to achieve distinction in our work has not been adequately developed. In our day, essentially the day of specialists, this happens with an appalling frequency. It would be well, therefore, that our rising artists and craftsmen should be warned in time of the serious consequences that depend upon the degree to which they restrict their training.

It is true, to an extent that is not readily appreciable, that all branches of applied art call, in the first instance, for a balanced faculty, commanding the delicate qualities of form, tone, color, composition, etc. It is a serious mistake to assume, for instance, that an art in which pigments or colored materials are not used does not require the fine sense of color that can be best developed by the study of painting. A good general training is, therefore, the first necessity, and the application of a knowledge of these general qualities, form, tone, etc., to the special branch of art selected must come second.

Then, again, in choosing our special branch of art, many pitfalls await us.

Remember that the separation of art and craft from one another is impossible. Without a mode of expression there can be no art, and the crafts are the modes of expression. Art and craft, by being inseparably united, produce a work of art. They are dependent upon one another equally, each upon each, and good art without good craft, or good craft without good art, are alike impossible. It matters not what branch of art is selected, from picture painting to pavement making, it must be studied as art, and it must be studied as craft, and the two must be brought together into inseparable unity. We should not be misled by the fact that, to-day, among picture painters a true craftsman is so rare; that among pavement makers an artist is so rare. Both are instances of false specialization, which limit the possibilities of achievement.

In this connection remember that designing, as a separate branch of art, is impossible except when the work is to be done by mechanics instead of craft. And, incidentally, works produced by mechanics should not be confused with works of art. The design, for instance, from which a woven fabric is made may be a work of art, but the fabric is a work of mechanics.

Remember, that in a material and the mode of manipulating it there resides the law of the art applicable to it. That this law is so extremely subtle that only by experience in the use of the material can it be known. That without this knowledge there can be no good designing, and a design for one material cannot be fully determined in any other material.

It should also be borne in mind that the separation of sculpture and architecture from one another is impossible; that the two together constitute the art of expression in solid form; that sculpture deals with this as it approximates to the representation of nature, and architecture deals with it as it approximates to abstract conceptions. In fine sculpture, architecture or expression by abstract form is present, and renders it monumental; and in fine architecture, a sense of life, the principle of life in form, is present, and makes it "architecture" as distinct from mechanical construction, building, or engineering. What have come to be regarded as separate arts are really inseparable, and were not separated in the days when the finest architecture and sculpture were produced.

Remember that all work in relief or round form, as, for instance, furniture, metal work, etc., calls for that knowledge of form secured by the study of sculpture and architecture.

Remember that the separation of ornament and structure from one another is impossible; that all ornament is essentially dependent on structure; that all good structure has in it sense of ornament.

Remember, above all, that success in any applied art depends primarily upon a knowledge of form and power of draughtsmanship.

METHODS OF BUILDING IN EGYPT

Abstract from interesting paper read at a recent meeting of the Royal Institute of British Architects, by Ernest Richmond, Licentiate

THE MANNER OF LIFE in an Egyptian town or village, to which the houses give outward expression, is as far removed from modern European life as the houses themselves are ill-adapted to European requirements. The Egyptian word for house is derived from a root meaning to pass the night. The buildings look as if they were never repaired, and many of them as if anything short of reconstruction would be impossible. Their dilapidated appearance is to be largely attributed to the condition of the surface rendering of the walls.

The prevailing physical conditions of the country may be said, broadly speaking, to arise, on the one hand, from the annual miracle of the Nile flood, and, on the other, to the daily miracle of the Egyptian sun. During the flood season a building's foundations are in water or in mud; and, after the Nile has fallen, on hard-caked clay. These changes do not take place without some effect upon the foundations and superstructure. There is also an extensive range in temperature, not only between winter and summer, but between night and day, producing stresses greater than a wall can resist. Further, the atmosphere is remarkable for its dryness. The floor of Egyptian towns has not been laid down by the Nile, as is the case of the surrounding cultivated land, but has in the first instance been deposited by man, with the object of attaining a ground-level for buildings above the reach of floods. The levels of towns and villages have progressively risen through the ages. A desert site may be sandy or rocky; in the former case the watering of the gardens around the house may result in foundation settlements.

In both the ancient buildings and the mediæval monuments of Egypt the tendency has been to keep the foundations as near the surface as possible. In ancient Egypt there can hardly be said to be any foundations at all, and no attempt has been made to obtain equal intensities of pressure upon the ground or to restrict the intensity to as low a unit as possible. The foundations of the mediæval buildings in Cairo are taken well below the ground-level, but never to a depth sufficient to reach the level of permanent saturation. The depth depended, probably, on that of the surface rubbish, which, in a comparatively modern town such as Cairo, was not great enough to involve much excavation. Modern Egyptian builders also dig until they get through the surface earth and reach the naturally deposited alluvium, or, as they term it, the "black mud." In the ancient towns, to dig down to the original ground would be out of the question, and in excavating in such places a rule of thumb is followed by the natives. For two-storey houses they dig to a depth of two metres and a half, and for three-storey houses three metres or three metres and a half. Buildings in the highest parts of ancient towns must necessarily stand upon foundation beds of "made" earth compacted only by time.

The original building material in Egypt was mud brick. This material is still used to a very large extent; and although, for important work, it has been replaced by stone and burnt brick, yet the traditional conception of walling derived from mud-brick construction has remained, throughout history, inherent in the Egyptian builder; and it is therefore possible to detect through all Egyptian work—ancient, mediæval, and modern—the dominating presence of those ideas which originated from mud-brick construction. The wall of a building in sun-dried brick and mud mortar is a fairly homogeneous structure; stability is secured not by bond but by thickness, such as is obtained by three or more walls side by side. In modern Egypt one, in fact, of the most noticeable features of native methods of walling is the absence of bond.

In native practice, the materials now most generally used throughout Egypt are burnt brick and mud brick. Rubble stone is also employed, but principally in Cairo and Alexandria, owing to the proximity of convenient quarries. The tendency of an Egyptian mason, if left to himself, when using rubble stone, is to break it into small pieces approaching the size of bricks. The native-burnt brick is usually very rough; it is made of a mixture of mud and chopped straw cast in moulds, then built into clamps and burnt. The just proportion of width to length, necessary for bonding purposes, is not considered, nor is much attention paid to burning the bricks evenly. The materials used for the composition of mortars are Nile mud, fat lime, the dust resulting from crushing burnt bricks, sand, gypsum, and, lastly, "kosremil," which is the residue or ash of a fuel composed of street sweepings used for heating native baths. Various mixtures are used, depending on the locality and on the riches or poverty of the building-owner. The mortar must be prevented from drying too quickly and thereby crumbling to dust instead of hardening. The need for damp in walls built in mud mortar is exemplified by the objection on the part of many native builders to damp-proof courses.

With the materials described above thin, well-bonded, homogeneous walls would neither be safe nor practicable. The Egyptian rarely, if ever, builds a wall less than half a metre thick. If rubble stone is used the masons work in pairs, one man on one side of the wall and his colleague on the other. Except that each proceeds at more or less the same pace, there is little connection between their work. There is no through bond. Practically two thin walls are constructed independently, and the space in between is filled with smaller stones and large masses of mortar. The mortar, if it is of mud, kosremil, and fat lime, and if it keeps fairly damp, hardens rather than sets. On the hardening of the mortar, more especially on the outside of the joints, the stability of the wall largely depends, and, in order to fortify the outer joints and to render them as capable as possible of serving as small retaining walls to any inferior mortar which may have turned to powder instead of hardening, it is common to bed in the surface joints small pieces of stone. When fat lime and sand mortar is used the same practice is often followed, for it is recognized that this mortar sets only on the face. If the wall is constructed of brick hardly any more attention is paid to bond than in the case of a rubble-stone wall. The same mortars are used solely to provide beds on which to place successive courses of brick. A more or less systematic appearance of bond is given to the face, but the principle is not extended to the interior. Each course is constructed by laying bricks side by side about one centimetre apart; the vertical joints between the bricks are purposely left open. Native-built brick walls, like those in rubble, are rarely if ever less than half a metre thick. Such walls, whether of brick or rubble, and standing upon a foundation bed liable to frequent movements, would of course soon collapse unless the entire absence of bond in the masonry itself were not supplemented. The bond necessary for giving some degree of stability is provided by means of horizontal pieces of timber placed over and under all openings and forming lintels and sills. Ranges of these timbers are carried round the building, and similar ranges are bedded in the walls at the levels of floors and roofs, where they form plates to receive the joints; and other timbers are placed, apparently promiscuously, in any position, independent of opening or levels of floors and roofs. The amount of timber judged necessary depends on the nature of the land built upon, more being used in buildings upon "made" soil, or in soil with an admixture of sand, than in those constructed on the black alluvium.

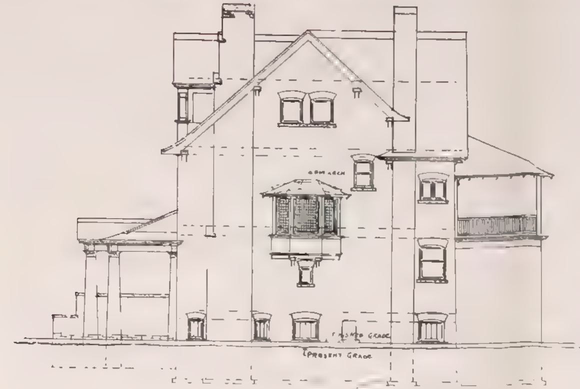
The surface of the wall is, when finished, provided with a rendering very generally composed of fat lime and sand, to protect the outer joints of the masonry from the destructive influence of the sun and wind. The joints would, without it, become cracked and gradually destroyed, and so prepare for the gradual collapse of the building owing to the escape of the dried and crumbled mortar in the interior of its walls, unless built so phenomenally thick as to be disproportioned to an ordinary building.

The main characteristics of a wall such as that described appear to be its elasticity and the capacity it possesses to adapt itself in a certain measure to movements, both those in the foundation bed, caused by the rise and fall of the sub-soil water, and those in the superstructure itself, caused by stresses set up by changes of temperature. But such methods cannot produce a building which will not soon after completion begin to show signs of dilapidation. To maintain it in a state of repair considered essential by European or those influenced by European ideas is impossible. The defects being obvious, it is not difficult to propose remedies whereby a more solid, a healthier, and a more fire-resisting building could be erected.

Up to a few years ago it was usual to lay down a thick raft of concrete. This method is now largely replaced by driving concrete piles about three metres apart and connecting the tops with beams of reinforced concrete on which the walls are laid. Broad-spreading foundations of reinforced concrete have also given good results. The introduction of new methods is by no means an easy task, nor is the result invariably successful. It has been found that it is not easy to determine the degree of rigidity which must not be exceeded. Almost as great inconvenience may be caused by too rigidly building a wall or roof as by one which is too loosely put together. Of the boundary walls, for example, enclosing various groups of buildings erected on a desert foundation near Cairo, some were built in bricks and cement mortar, others in bricks and local fat-lime mortar. Those built in cement mortar cracked vertically at intervals of from five to 20 metres throughout their length, while those built entirely in lime mortar were undamaged. It may be added that some walls were built in lime mortar, but with the top course of brick on edge set in cement mortar where this was done the cracks occurred about five metres apart; the cracks extended only through the top three or four courses.

There has been, and still is, a tendency to neglect the effects of temperature changes and to design without reference to them. Modern materials and methods are not unattended by dangerous, or at least highly inconvenient, results in Egypt, owing to the temperature conditions. It is a question yet to be answered how far the modern tendency towards thinness and homogeneity of construction are applicable in that country. This question can only be answered by continued experiment and research. In Egypt there is, as yet, no established tradition capable of providing a suitable and complete guide when building for the fulfilment of modern needs. It is not, then, surprising that European builders have met with some experiences neither happy nor expected. The problem before them is of a two-fold nature. How, on the one hand, to build so as to fulfil modern requirements in regard to stability, fire-resistance, health, maintenance, and repair; and, on the other, to keep within the limits imposed by local physical or climatic conditions. To find the middle way, and to make a satisfactory harmony between the local conditions and requirements of foreign origin must be an object of the architect as well as of other workers in Egypt.

EAST ¼ SCALE

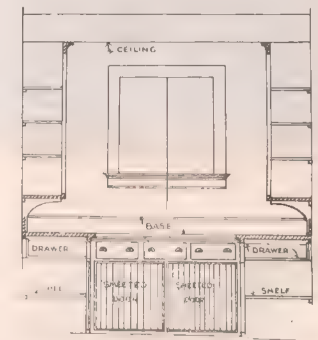


WEST

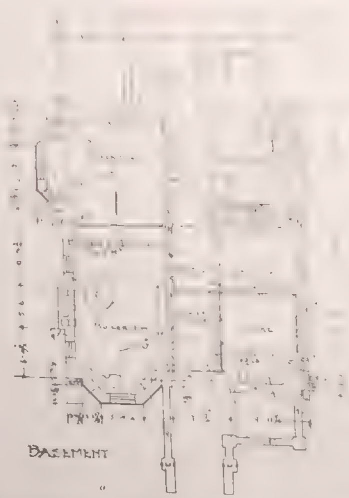
REAR ELEVATION

RESIDENCE
of
J. T. Eastwood
Lynwood Avenue - - Toronto
E. G. Wilson - - - Architect

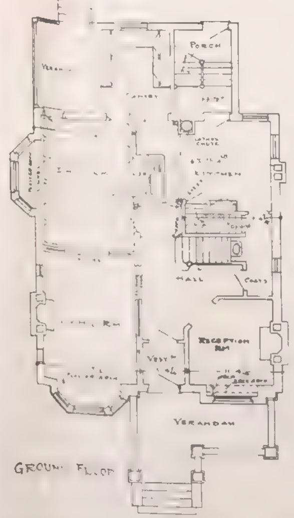
Supplement to
CONSTRUCTION
September, 1911. Vol. 4, No. 10.
For Description See Page 81



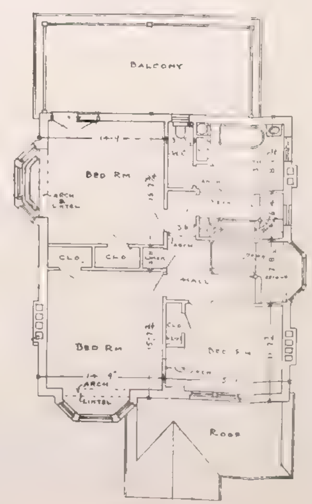
SOUTH END



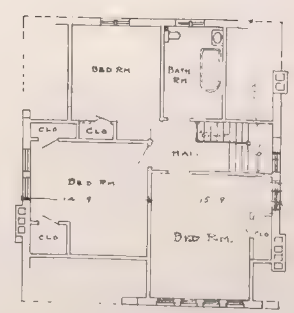
BASEMENT



GROUND FLOOR



FIRST FLOOR



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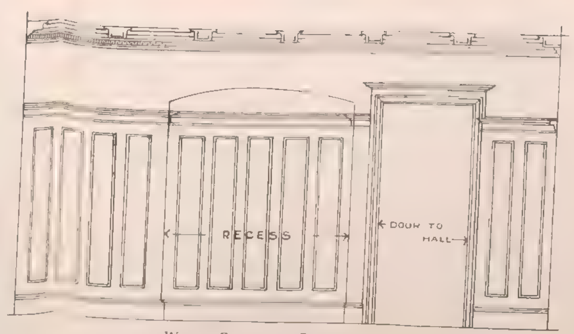


WEST SIDE OF DINING RM

Residence of J. T. Eastwood, Lynwood avenue, Toronto. Ewart G. Wilson, Architect.

A COMPACTLY PLANNED CITY RESIDENCE

Interior scheme conveniently arranged with the various rooms so placed to give ready access from one part of the house to the other

COMPACTNESS OF PLAN and convenience of arrangement, two important considerations in the successful designing of a ten or twelve roomed house for the average city lot, are well in evidence in the residence of J. T. Eastwood, Lynwood Ave., Toronto, illustrated above. The exterior, which is modern in its lines, is carried out in dark red brick with dark mortar joints, Ro-
out in dark red brick with black mortar joints, Ro-
characterized by any particular style of design, it is at least, taking into account the investment and accommodation, well considered and substantial in character. An examination of the plans in the accompanying supplement shows a simple and convenient scheme with a centrally placed hall giving direct access to all parts of the house, and the rooms so situated as to give ready communication from one interior to the other. Both the hall and the staircase which has an oriel window at landing, and the dining room, are finished in quarter cut oak. In the dining room, which has a recess space opposite the bay window for the sideboard, the ceiling is beamed and the walls are panelled to a height of 8 ft. 6 ins., and finished with a simple plate rail and stucco freize. At the rear, conveniently situated between this room and the kitchen is a large pantry equipped with built-in shelves and cupboards, the detail of which is shown in the two accompanying drawings. The living-room which is finished with a plastered ceiling and corbelled plate rail, has a large Roman brick fireplace, while a similar feature executed in tile, with a mantel made to detail, is found in the reception room which is carried out in white enamel. Behind the staircase is a small second hall, leading from the main hall to the kitchen, and giving access to the stairs connecting with the basement where the boiler room, laundry and usual storage compartments are to be found. On the first floor are three good size bed rooms with well arranged wardrobe accommodations. While not shown on the plan, the large bedroom at the front, which is now used as a sitting room, has a tile fireplace similar in design to one in the reception room. All the rooms on this floor are finished in white enamel with the exception of the sitting room, which is in quarter cut oak. Attention might be called to the toilet arrangement in which the bathroom, which is finished with a tile-dado and floor, and the closet accommodation, are kept separate from each other within a compact space.

South Front, Chapel of The Thistle, Edinburgh. R. S. Lorimer, A.R.S.A., Architect.

East End, Chapel of The Thistle, Edinburgh. R. S. Lorimer, A.R.S.A., Architect.

CHAPEL OF THE KNIGHTS OF THE THISTLE

Beautifully appointed edifice erected in connection with St. Giles Cathedral, Edinburgh. Description of its plan and architectural features.

THE CHAPEL of the Knights of the Most Noble and Ancient Order of the Thistle, which was opened at Edinburgh, by His Majesty, King George, on July 19th, is situated at the south-east corner of St. Giles Cathedral, and was erected from the designs and under the supervision of Mr. Robert Stodart Lorimer, A.R.S.A., in association with a body of select craftsmen. The construction of the chapel brought to a consummate state, a scheme in which the late Sovereign, Edward VII, held a cherished interest. As will be recalled by those who are familiar with the project, the late Earl of Leven and Melville, subject to the terms of his will being strictly followed, left a sum of £40,000 with which to restore Holyrood Chapel as a chapel for the Knights; but as restoration, in the view of those best capable to judge, would have meant complete reconstruction, the Holyrood scheme was wisely abandoned, and the money reverted to the estate. Subsequently, however, the young Lord Levin and Melville offered his portion of the £40,000—amounting to between £20,000 and £25,000—in furtherance of a duly authorized scheme. The architectural plan finally adopted admirably solves various problems connected with the cathedral as a place of worship and the restricted space in Parliament Square.

Architecturally the chapel, 35 feet long by 18 feet wide, aims to carry on the style of the stonework of the old unrestored portions of St. Giles', for it was inadvisable to heed the stifled Gothic of the main edifice as veneered by Burns in 1850. To conform with the exigencies of space, which happily coincide with imaginative appropriateness, the dominating sense, especially within, is one of height. On the exterior, the plain surfaces of the sensitively-flushed grey stone is divided by buttresses, which correspond with the vaulting-ribs between the bays inside. At the top of the buttresses Mr. Lorimer has introduced a few grotesques, such as at one time doubtless peered from the structure of the Cathedral. Below the windows are carved in stone the coats of arms of the sixteen existing knights, while at the east end are figures of the Patron Saint of the Order, St. Andrew; the arms of its founder, and its reviver, James VII. and Queen Anne; and below the window the Royal Lion. Within, the value of what has been called the spiritual dimension—height—is enhanced by means of contrast. Through the round arched doorway of about 1640, which to excellent purpose, has been introduced into the new structure approximately at the place where was formerly the Royal entrance to the Cathedral, there is reached the low ante-chapel, its vaulting heavily bossed. The restriction here of the upper space serves to compress into their smallest limits mental and emotional activity, as a preparation for the immediate succeeding experience. It is from this low ante-chapel that we pass through a doorway richly carved with the Leven and Melville coat of arms, into the soaring Chapel proper, over 40 feet high. Its plain walls have been made solidly beautiful both by the subtly varied color and markings of the stone, taken from the Cullalo Quarry, near Aberdour.

Concerning the treatment of the interior, the "Builder," London, to which we are indebted for the accompanying illustrations, says: The linen-fold panelling, which lines the aspidal end, is peculiarly successful in point of design, execution, and the quality and color of the wood. Throughout the woodwork the clear-cut but by no means inhuman precision of the workmanship upholds the freshness of the design. The chair of investiture is placed on a granite step, and the lion and the unicorn on the octagonal uprights on either hand can be distinguished, and on either side of the chair the hanging lamps of wrought steel in the form of an angel holding a torch, with pendants of the "Pelican in her Piety" (a device which recurs frequently, being symbolical of knightly virtues) in spherical form below. On the right hand is seen the Dean's chair, with its plain *prie dieu;* on the left the lectern, with four "buttresses" terminating in the emblems of the Evangelists. The underside of the canopy of the chair is richly panelled and carved, and in a niche is placed an allegorical winged figure, with a spear, treading on and overcoming the dragon, Evil. The canopy is octagonal in form. The floor is of Ailsa Craig granite varied in color, set in a simple pattern, with squares at regular intervals of Iona marble. It forms an admirable complement to the brown woodwork and light-colored stone. The quality of the woodwork is perhaps best seen in the detail view of the King's stall at the west end.

The only existing examples of ecclesiastical woodwork in Scotland of any importance are the few stalls at Dunblane Cathedral and the woodwork in King's College, Aberdeen, and, consequently, the architect, though reverencing tradition, was left almost unaided and free, and the design, as eventually carried out, was evolved partly from drawings and partly from models, a large shed being erected in the

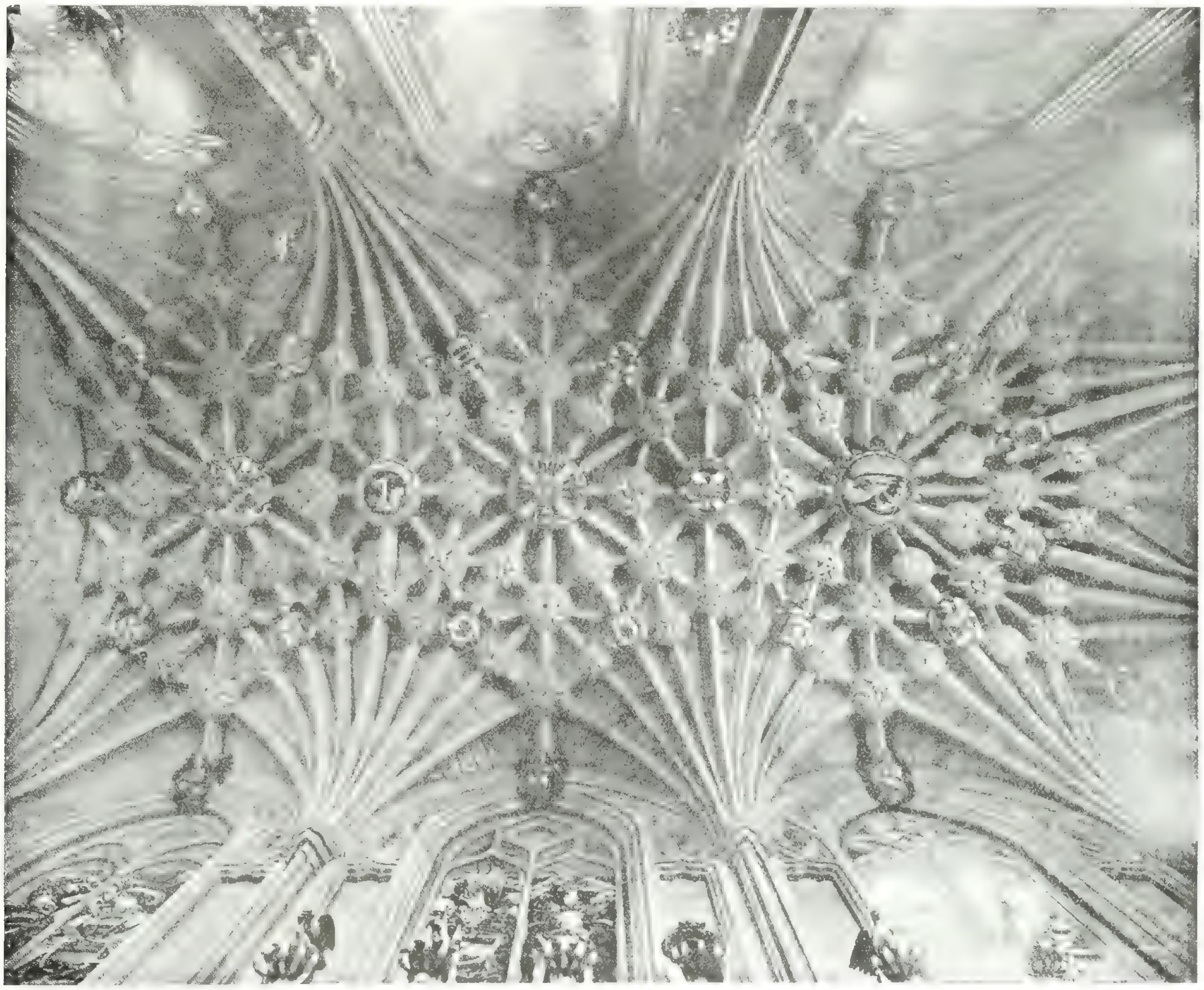
The King's Stall, Chapel of The Thistle, Edinburgh. R. S. Lorimer, A.R.S.A., Architect.

The East End and Chair of State, Chapel of The Thistle, Edinburgh. R. S. Lorimer, A.R.S.A., Architect.

building yard, where models were prepared—the design growing and changing as possibilities and limitations became apparent to the architect and the carvers, with whom he has worked continuously for the last fifteen years. The decorative motives employed, where they are not heraldic or appertaining to ecclesiastical allegory, are drawn from themes in Nature—the thistle, the vine, the rose, the acorn, and so forth, so treated as to make a cohert scheme of natural symbolism throughout.

The dais on which the Royal stalls at the west end are set is about 1 ft. 4 in. in height, His Majesty's seat in the centre being a little higher than the Prince

met, the coronet and crest, and the mantling peculiar to the knight concerned. These achievements, in combination with the stall-plates in Champleve enamel, give color and an ordered variety of inestimable value. The windows, necessarily at a great height from the floor, to clear the stalls, also give color, but of a more accustomed sort. Each with the exception of the small west window and the central one of the eastern apse, are double-light windows, heavily traceried at the top. The square west end has one small window, with very deep embrasures obtained by setting it in an exceedingly fine oriel. The hexagonal apse has three windows, and the



Detail of Vault, Chapel of the Knights of the Thistle, Edinburgh. R. S. Lorimer, A.R.S.A., Architect.

of Wales' and the Duke of Connaught's on either hand, and above, the "stepped" arrangement of the canopies, seen best in the view showing the whole chapel, is happy in the effect it gives of additional dignity to the Monarch's seat. In this canopy may be seen St. Margaret of Scotland, leading children, while on either side, but hidden in the photograph, are St. Kentigern, with the model of his cathedral, and St. Columba in full canonicals, and with the robin perching on his wrist. The height from the floor to the top of the King's canopy is 33 ft., whereas that of the side stalls is only 25 ft. Each is surmounted with the "achievement" of the Knight for whom it is destined, consisting of the sword and hel-

south side three and the north only one—by a happy inspiration which chose to fill the two western bays with colored panels in relief, and so avoid a distressing conflict of cross light, and induce a sense of attachment to the larger structure of St. Giles on that side. Each double window carries in clear colored glass the name and arms of two of the knights. The one-light eastern window is dedicated to St. Andrew. The west window, in a color scheme of gold and brown, carries the Royal arms, according to the Scottish quartering, and underneath those of the Prince of Wales and the Duke of Connaught.

The roof is founded on late XVth century examples, which time is by many people considered to be the

Knight's Stalls, Chapel of The Thistle, Edinburgh. R. S. Lorimer, A.R.S.A., Architect.

Detail of King's Stall, Chapel of The Thistle, Edinburgh. R. S. Lorimer, A.R.S.A., Architect.

zenith of the Gothic style, as the roofs of that period read as real constructive builder's stonework, which cannot be said of the fan tracery type of vault which came later. The aim has been to keep the stonework strong and vigorous, partly because the Scottish Gothic never attained the exquisite refinement seen in some English examples, and also because modern work is often too timid in scale as compared with old. As regards the bosses, the main bosses at the apex of the chapel roof represents the Royal Arms, St. Giles, St. Andrew, the Jewel of the Order of the Thistle, and the large boss at the intersection of the apsidal end of the chapel, the "Pelican and her

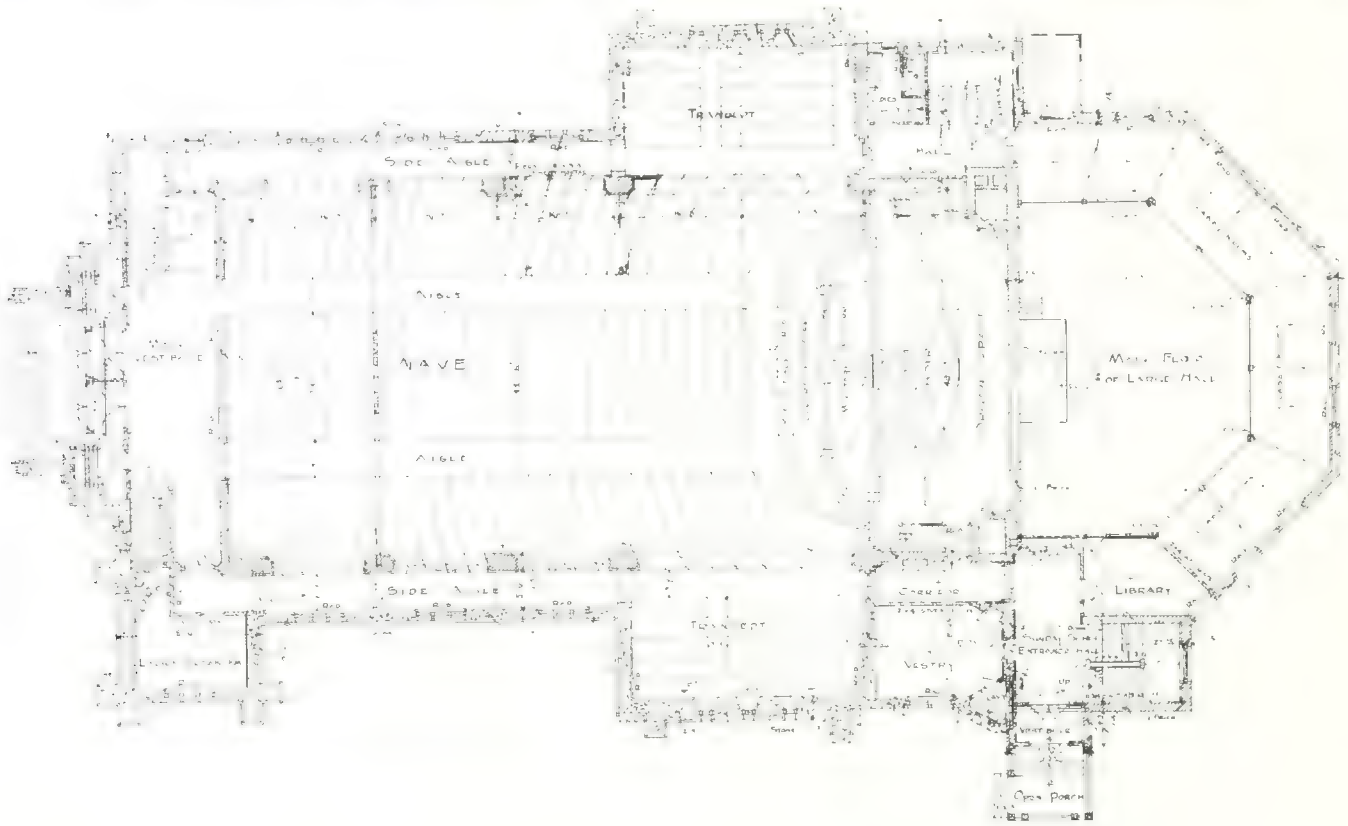
Entrance from the Ante-Cahpel—Chapel of the Knights of the Thistle, Edinburgh. R. S. Lorimer, A.R.S.A., Architect.

Piety." The bosses that are not heraldic are treated with some definite motive from Nature in the manner noted above concerning the canopies. The ante-chapel is 25 ft. in length, by 14 ft. It is vaulted in two bays, and, like that of the chapel proper, its vault may be described as groined vaults, richly ribbed, having main ribs, transverse, tierceron, and lierne ribs with carved bosses at all intersections.

CANADIAN SLATE.

AN ACCOUNT of the slate deposits and the slate industry in Eastern Canada is included in a report recently issued by the Geological Survey Branch of the Department of Mines, Ottawa. According to this publication, that portion of the Province of Quebec which lies south of the St. Lawrence River is traversed in a north-easterly direction by a series of serpentines and related rocks, known as the serpentine belt. This belt is important for its production of asbestos—a large part of the world's supply—and for the deposits of chromite, soapstone, copper and antimony, which it is known to contain. The principal quarry of roofing slate now in operation in Canada and some promising bodies of marble are also intimately associated with the igneous rocks of this belt. Slate of good quality, both for roofing and other purposes occurs in several places in the Ordovician and Cambrian strata adjacent to the serpentine belt. In a number of these places quarries were opened between 30 and 50 years ago, but most of them have long since been closed from one cause or another, principally, it would appear, from an insufficient market at the time they were operated. At the present time these conditions have apparently changed for the better, and the slate deposits might properly receive renewed attention. The imports of slate into Canada for the year 1908 had a value of $131,069, while the slate produced in Canada during the same year, all of which came from this district, was valued at $13,496. The Ordovician slates are dark, or bluish grey in color, and have an excellent cleavage, nearly vertical, which may be at any angle to the bedding planes. These slates have been quarried at Danville, Corris, Brompton, Melbourne and New Rockland. The last mentioned quarry is the only one at present in operation in Eastern Canada. The slate produced is of excellent quality. The new Rockland quarry has been operated almost continuously since 1868. During the past eight years it has been worked by Messrs. Frazer and Davies under a lease from the New Rockland Slate Company. Some 35 men are emplyed, two steam drills and three derricks are in operation, steam and water power are used. Only roofing slate is now made. The quarrying is done in open pits, the work being cut down in benches. While working on higher levels in a deep pit, the waste rock is allowed to accumulate to some depth in the bottom in order to lessen the loss from breakage of good slate by falling into the pit after blasting. The Cambrian slates are green and reddish or purple in color, and where there is a mingling of these colors a handsome mottled slate results. The grene color is that known as the unfading green. They split less smoothly than the dark slate, having a coarser texture and are frequently not so strong. The quarries that have been opened usually show large bodies of slate free from quartz veins and sometimes having different colors in different parts of the same pit.

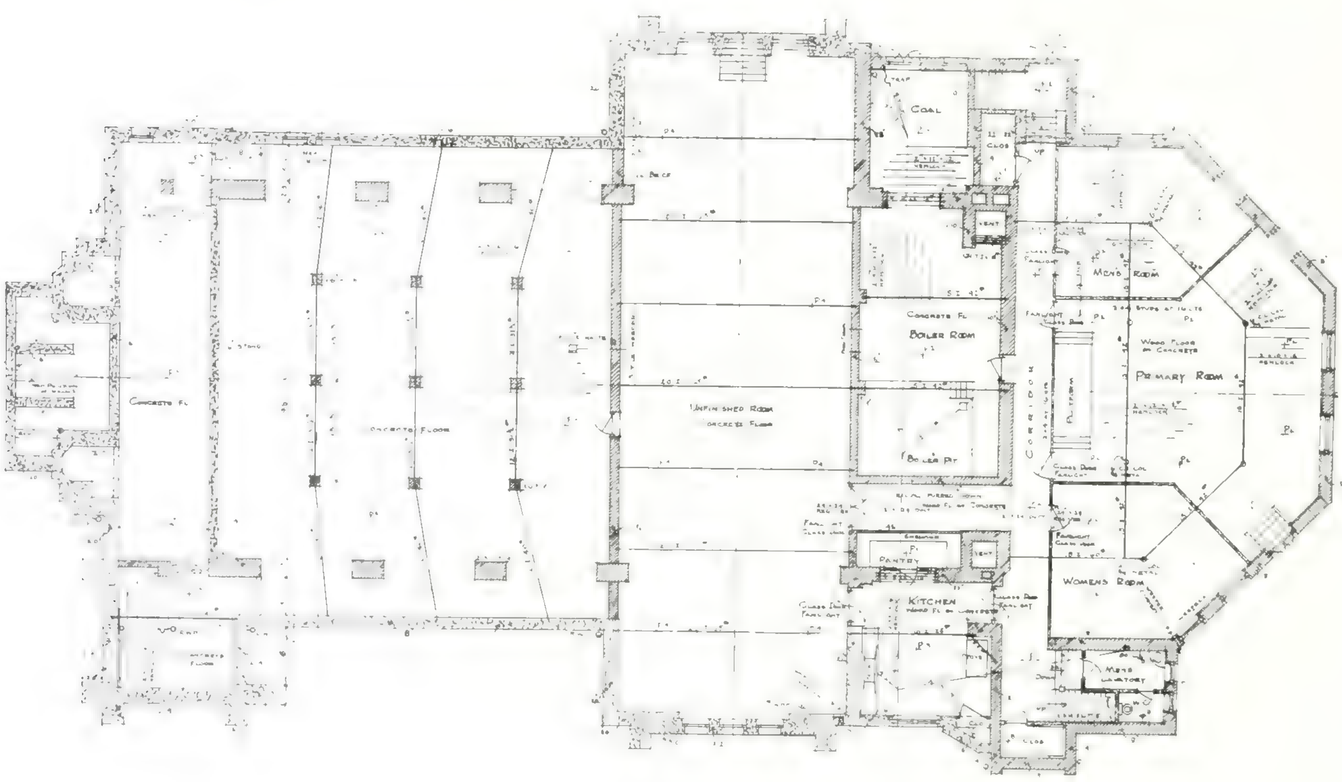
RECENT TESTS at Sandy Hook, of the resisting power of reinforced concrete as a defence against high-powered projectiles confirm the calculations of the penetrating power of the twelve-inch gun. A concrete wall twenty feet thick, heavily reinforced with steel beams, was pierced by a twelve-inch projectile fired at high velocity. The blow delivered was sufficient to penetrate twenty-two inches of armor plate, and the reinforced concrete withstood the attacks so well that it will probably be used in the construction of the new wcoast defence fortifications in the Philippines. A similar attack is to be made with the fourteen-inch gun.



Ground Floor Plan, New Deer Park Presbyterian Church, Toronto. Sharp & Brown, Architects.

CEMENT BUNGALOWS.

ARCHITECTS AND HOME-BUILDERS have discovered, of late, that cement can be adapted to the construction of the bungalow with distinct success. Following this discovery, many bungalows of this kind are being erected in various parts of the country, and when skill and good taste are exercised in designing them, they present a very homelike and attractive appearance. Indeed, the indications are that cement will be one of the most common materials used in the construction of bungalows during the years to come; for the bungalow, as a type, has become firmly intrenched in the esteem of the people who desire simple and unpretentious homes, while cement has been established as one of the most valuable building materials known.—Suburban Life.



Basement Plan, New Deer Park Presbyterian Church, Toronto. Sharp & Brown, Architects.

Perspective of New Edifice Now Being Erected for the Deer Park Presbyterian Congregation, at the Corner of St. Clarens Avenue and Foxbar Road, Toronto. Sharp & Brown, Architects.

THE DEER PARK PRESBYTERIAN CHURCH, TORONTO

New edifice now in course of construction interesting in scheme and plan. Will provide accommodations for 1,050 worshippers.

THE NEW EDIFICE for the Deer Park congregation, which is now in course of erection on St. Clair Ave., Toronto, presents an interesting scheme in that the plan is more of an ecclesiastical type than is usually found in Presbyterian churches. The nave, which terminates in a choir and organ recess or chancel, has a long effect with a gallery extending across the rear end only. The lighting of the nave is through windows in the clerestory which is carried on an arcading. In that the side aisles only are outside of the piers of the arches, the arrangement is such as to give an entirely unobstructed view of the pulpit and the choir from any part of the edifice. The roof of the building, which is vaulted and intercepted by the vaulting of the transepts, will be of stucco plaster with molded ribs running down to carved brackets on the side walls, while the arches and arcading will be finished and jointed in caen stone cement. As regards seating, the church will accommodate 1,050 worshippers. The Sunday school, which adjoins the church on the south, is divided into class rooms for the primary and Bible class departments, the rooms and the large hall about which they are grouped, having a total seating capacity of about 500. This part of the building has an outside entrance of its own, and can also be entered from the main edifice through corridors placed at either side of the choir and organ space. In the basement of the building is a large recreation or social hall, which is fitted up with a modernly equipped kitchen and pantry. This part of the building also contains the boiler room and men's wash room. In planning the edifice, provisions have been made for future extension of the primary and ladies' departments in the wing west of the Sunday school, shown on perspective drawing. The church and Sunday school are of Credit Valley stone of a warm buff color in hammer squared rubble, with Indiana stone trimmings on the ground floor, and terra cotta trimmings and tracery windows above. The main roof is carried on steel trusses and is finished with slate. The tower is 80 feet high, and the parapet and pinnacles are of terra cotta. The structure is being erected from the plans, and under the supervision, of Architects Sharp & Brown, Toronto, and the firms connected with the various branches of the work are as follows: Mason work, Leslie & Killer; carpenter work, Geo. Nicholson; plastering, Thos. Fitzgerald; plumbing and heating, W. J. MacGuire & Co.; electric wiring, Geo. Beattie; roofing, G. Duthie & Sons; painting and glazing, J. McCausland & Sons; terra cotta work, Chillas & Black; Steel metal work, W. Davis & Son.

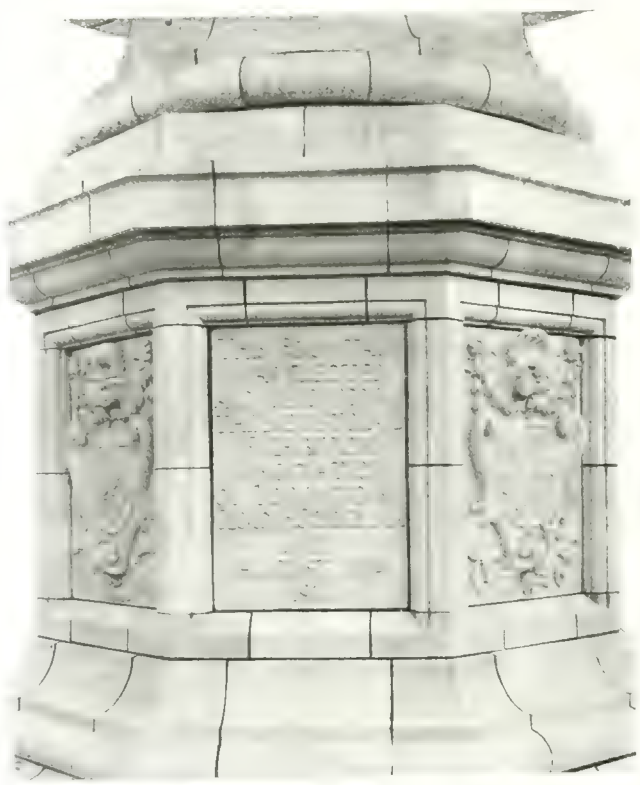
The new Gooderham Fountain which forms an Attractive Feature on the Main Concourse at the Canadian National Exhibition Grounds.

THE NEW FOUNTAIN AT THE EXHIBITION GROUNDS, TORONTO

Reproduced in terra cotta from one of two similarly designed fountains by Michael Angelo in front of St. Peters', Rome.

NO ATTRACTION at the Canadian National Exhibition this year is being more generally admired, or exciting more favorable comments, than the new Gooderham Fountain which stands on the main concourse between the Gallery of Applied Arts and the Manufacturers' Building. The consensus of opinion is that it is a beautiful piece of work, and a credit to its donor, Mr. George H. Gooderham, President of the Board of Directors, who presented it to the City of Toronto on the opening day as a permanent feature of the Exhibition Ground, as well as a tribute to the skill and workmanship of those who were entrusted with its execution and erection. The fountain, with one exception, is an exact copy of one of the pair of similarly designed fountains erected by Michaelangelo in front of St. Peters at Rome. Instead of the papal emblems, the shields on the octagonal base represent the British, Dominion, Provincial and City coat of arms, with one of the eight spaces taken up with the presentation plate. Aside from this one deviation, the exact design with its chaste detail, has been reproduced with the greatest care and fidelity. The fountain is built entirely of "Carrara" terra cotta, which derives its name from the resemblance which its semi-glazed appearance bears to the soft grayish tone which white Carrara marble, such as is used in the original fountain, takes on in time. This terra cotta is manufacturer by a secret process and was supplied by Doulton's Ltd., an English firm, for whom Chillas and Black, of Toronto, who secured the contract and supervised the erection, are the Canadian Selling Agents.

From the base to the top of the semi-spherical cap, which crowns the terminating pedestal, the height of



Detail of Octagonal Base—Showing Two of the Seven Shields and Presentation Plate.

the fountain is 25 feet, while the enclosing wall of the basin which surrounds it, is 44 feet in diameter. It is a gift of which the city might well feel proud and as a piece of decorative work in terra cotta, few examples can be found which are its equal.

PARIPAN.

IT IS NOT GENERALLY known that disease germs can be projected 40 feet by a speaker, yet according to a statement made by Mr. F. Sturgeon, 34 Yonge St., Toronto, agents for Randall Bros., at their exhibit of Paripan in the Stove Building at the Canadian National Exhibition, this fact has been satisfactorily established. As his authority, he quotes an extract from the "London Times," the well known English newspaper, which is as follows: "The British government investigations as to the spread of disease, such as epidemics of diphtheria in schools, and of influenza in the House of Commons, have proved that the cause is attributable to bacterially-contaminated moisture, projected from the mouth when speaking. Experiments show that persons infected with, or convalescent from contagious and infectious diseases, and carrying the bacilli on the mucous membrane of the mouth and throat, can project them a distance of 40 feet. A specially prepared plate having been placed upon the Cabinet Minister's box in the House of Commons, a speaker's throat was inoculated with a special, but harmless and easily recognized bacillus (*B. prodigiosus*), subsequent examination proving that no less than 83 colonies of this particular bacillus had been formed upon the prepared test-plate, and this from the mouth and throat of one speaker only! This statement is employed as an argument by Mr. Sturgeon to show the need of the use of "Paripan," which is a lacquer enamel finish, having a hard, dense, sanitary surface, in building of a public and semi-public character. This enamel, it might be said, has been in use in some of the most world-famed hospitals, for ten to 15 years without being renewed, during which time it has been washed down regularly without in any way affecting its color or sanitary advantages. The diagrams showing the surface of "Paripan," and also the panels which are being exhibited, make the advantages claimed for this product fairly obvious to the naked eye. Unfortunately, most of the "Paripan" exhibits have been delayed owing to the strike in England, but as these will probably arrive before the end of the week there will still be an opportunity for interested parties to view them.

HEART-SHAPED MIXERS.

AS IN PAST YEARS, a large number of visitors at the Canadian National Exhibition were attracted by the display of Wettlaufer Bros., who demonstrated in a practical way nine different sizes of their new improved concrete mixers in a large tent opposite the Machinery Hall. The many claims made for "Heart Shaped" mixers seem to be well substantiated by the increasing orders which the sales department of this firm is recording year after year. One of the more important undertakings on which they are being used at the present time, is the manufacture of cement poles for the Hydro-electric system, which are to be seen throughout the residential sections of Toronto and towns in the province. So for over 12,000 poles have been manufactured and at the present time the contractors are turning them out on an average of 250 a day. "Ask those who are using the Wettlaufer mixer, they'll tell you," is the confident manner in which this firm invites prospective customers to investigate the merits of their product; and it must be said that at the Exhibition grounds there were among those who stopped at the Wettlaufer tent, a large number of contractors and engineers who readily gave their endorsement. Prices, testimonials, etc., will be mailed to any interested party writing this firm at any of the addresses found in their advertisement in this issue.

SOME RECENT CONTRACTS.

RECENT WORK SECURED by the Bishop Construction Company of Montreal and Toronto, includes the new building to be erected by the Herald Publishing Company, at the corner of Craig and St. Alexander Streets, Montreal. This structure is to be of reinforced concrete, seven storeys high, with about 12,000 square feet to the floor. The outside walls are to be finished in brick and terra cotta, with metal sash and frames for all openings. The elevator wells will be encased in hollow tile, and all interior partitions will be of reinforced concrete. When completed, the building will be one of the most modernly equipped fireproof structures in that city. Messrs. Brown and Vallance, of Montreal, are the architects.

Another contract of recent date is the D. M. Ferry Building, Windsor, Ont., which is to be erected at a cost of $72,500, after plans by Henry Mason, Architect, of Detroit.

The company has one of the largest and most efficient working organizations in Canada, and it is admirably prepared to render architects a prompt engineering service, and to execute important contracts in any part of the country.

THE NATIVE STONE used for building construction in Bermuda, is of peculiar formation, being the result of the work of coral and other sea creatures through the countless ages since a volcanic disturbance at the bottom of a very deep sea first sent up, with many subsidences and subsequent upheavals, the island that for nearly 300 years has now remained without perceptible change. This stone is soft and friable, hardening with exposure. It is cut out with handsaws and, with a coating of cement, becomes waterproof. It is used principally for building and for garden walls. A very hard stone of this class is found in limited quantities; crushed or broken it makes excellent road ballast.

THE LINDE BRITISH Refrigeration Company of Canada, with head offices at Montreal, will hereafter be known as the Linde Canadian Refrigeration Company. The change in the name, however, will in no way alter the personnel of the company, or affect in any particular the construction of its well-known refrigerating machinery. This firm is purely Canadian, and it is the only concern in the Dominion engaged in this particular line of manufactory.

IT IS A MISTAKE, says "Insurance Engineering," to suppose that premiums paid for fire insurance suffice to replace what has been destroyed by fire. The conflagration losses in San Francisco, Baltimore, Paterson, Toronto, and in hundreds of smaller places, during the past ten years, were not paid from the premiums collected in each of those cities or towns, but from funds contributed by the entire country. Without this help, San Francisco, for example, would have been compelled to raise several hundreds of millions of dollars for building purposes, with little security to give. The fire waste is a tax on all. Shifting the burden of fire prevention and fire protection onto the community is selfish and unbusinesslike. No man can conduct a business without dealing with others. Conditions in American cities are such that personal neglect frequently spreads disaster to one's neighbors. A personal interest in fire prevention on the part of every man, woman and child will quickly bring relief from the fire waste to the entire country.

WANTED—Party experienced in fabricating light Structural Steel Angles, Etc., and with some draughting abality to superintend the manufacture and erection of small buildings, warehouses, sheds, etc. Good opening with established firm, for reliable, ambitious man. State qualifications, age, salary wanted, and give references. Box 28, Construction, Toronto, Ont.

CONSTRUCTION

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

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CONTENTS

TERMS OF SUBSCRIPTION

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H. GAGNIER, Limited, Publishers

Saturday Night Building

TORONTO - - - - - CANADA

BRANCH OFFICES

MONTREAL—Board of Trade Building. LONDON, ENG. Byron House, 85 Fleet St. E.C.

Bird's Eye Perspective of the Grand Trunk Railway Terminal at Ottawa, Showing New Grand Trunk Hotel, the Chateau Laurier, the Passenger Station and the Railway, the Laurier Plaza and the Parliament Buildings. Ross & McFarlane, Architects of the Hotel and Passenger Station.

Quebec and Boston open practical trade schools, the beginning of concerted movement in Canada and the United States toward trade education.

THE MOVEMENT TOWARD establishing technical schools in Canada is fully abreast with the United States. Both countries are beginning to realize in mass what has long been felt by individuals, that too much attention has been given to the education of youth along professional lines and too little in preparing them for industrial work. In the United States the faithful and continuous work of such men as Anthony Iltner, of St. Louis; John J. Tucker, of New York; Stevens, Watson, McGlensey and others at Philadelphia, and William H. Sayward at Boston, and an equally earnest group in Canada has resulted in the establishment of real trade schools where the rudiments of the trades are taught and those already engaged in them can find further instruction. In this department of human endeavor and simultaneous in point of time, Boston and Quebec are opening such institutions. At Boston the Wentworth Institute aims to furnish practical education in the mechanical arts to all who may apply at rates within the easy reach of workmen, especially in carpentering and building. At Quebec, the Quebec Technical School, founded by the Provincial Government in 1907, is now completed and will be formally opened on October 2nd. It has, also, the same object, that of giving instruction in the mechanical arts to both apprentices and journeymen in the lines of pattern-making, carpentering, molding, forging, wood-trimming and drawing. In both, the founders realize that to the young man who ends his studies in the grammar school the problem of what to do for a living presents itself. It is in solution of this by giving him an opportunity to receive a trade school education and in a practical way lay a foundation for his future career, that these schools have been established. There is no greater philanthropy than to aid in the establishment of such schools; there is no greater political wisdom than in their establishment. It is the long-sought solution for the ever great and rapidly increasing problem of the proletariat.

The development of reinforced concrete construction from a rigid mass to an æsthetically attractive composition, one of the certainties in architectural practice.

THAT DECORATION and its development is an integral part of constructive art forms the last word in architectural form and expression. The Greeks, and following them, the Romans, did not acknowledge this interpretation, and it remained for Gothic art to reduce it to a working principle. Here, perhaps, there was no reasoning upon logical lines, but an expression of the feeling of the artist builder given expression in permanent material. The reason why the United States Government and conservative architects in the United States will not use concrete except in the supporting of quiescent loads, is principally because in testing in individual parts it cannot be reduced to a unit of strength. But beyond that there seems to be that very lack of mobility that makes for artistic expression in the constructed mass. This view is only temporary, for we believe that with its development in the hands of artists reinforced concrete has possibilities beyond those of stone, and that its development from a purely constructive agency to a union with the highest decorative principles is only a matter of time and necessity. This latter feature is the most important because only the direct need for its use will force the architect-designer away from trodden paths of materials to this new and probably, for many purposes, better material that is found in concrete. The scarcity of wood will lead to its universal use in the small house and the suburban buildings where fire limits are unknown. The growing scarcity of iron will call for the use of concrete to take its place, and even stone and brick will feel the competition as soon as the architects of the world are forced by the call for additional permanency in structures to turn to reinforced concrete to obtain it. Its æsthetic treatment will follow, but its development will be slow, and its permanent quality will perpetuate many defective designs. It has also in this generation, where the movement of cities is rapid, the objection of permanency when the change in character of a street demands the removal of the structure to give place for buildings devoted to the newer use. Much harm has been done the structural concrete industry by undue haste, but that is likely to correct itself. The manufacturer of the block machine no longer tells the farmer boy that all he has to do to gain wealth is to get a machine and set it up behind the barn, and shovel the material from the nearest sand-pit. The facing with brick in a concrete structure to give it architectural color and form will not be necessary when the designer understands that here is a material that is most plastic and yet has been used rigidly, and that it only needs an artistic hand that has sufficient restraint to be simple, in a bridge or a bungalow, to have that expression of strength, of grace and of beauty of line that we call art.

¶ *The Architectural Exhibit of the Ontario Association of Architects presents interesting designs and drawings at the National Exposition of 1911 in Toronto.*

THE ARCHITECTURAL presentation at the Toronto Exhibition, that was hung under the auspices of the Ontario Association of Architects, was interesting in variety and in individual and instructive subjects, but the advance either in quality or quantity upon the exhibits of previous years was not as marked as either the standing of the Association or the importance of the Exhibition warranted. It is with no desire to be censorious that we say that the Exhibition of drawings failed to present that representative character that both the high calling of the architectural profession and the character of the Canadian National Exhibition would warrant and the general public expect. There were some well-drawn and colored sketches of residence work, a sprinkling of more ambitious public work, and an incomplete assortment of competition drawings, but some of the best work of the year by the best men in the profession was not in evidence, and in one case the premiated design in a competition that the public was much interested in was absent from the collection.

It is hard to say that this failure on the part of the profession to take advantage of this great opportunity of the year to place before the public instructive examples of the work of the architect, lies with any one individual or committee. It lies further back in the failure of the profession to feel the importance of public instruction in the detail work of the architect. The profession has always labored under public misapprehension. To the man on the street the architect is largely a picture maker and a dreamer of dreams. To him it is the man with the capital to pay and the mason with his trowel to build who is the important factor in the erection of a building. The architect, he dimly comprehends, has a place between the two, but his knowledge of where it is is small. Besides this selfish reason for showing by drawings the importance of the design, construction and plan of the architect and the paramount position he occupies in the erection of any structure, there should be the general one of giving the public an adequate idea of the many intricate problems that must be worked out accurately on paper by the architect before the stakes can be driven for the measured excavation. This in its general aspect the Exhibition of this year failed to do.

It is always the rule with such exhibitions that the indifference of the profession, or rather its neglect of the opportunity, must be systematically met by the faithful work of a few individuals. These as individuals must call upon the profession and collect the drawings and by their personal solicitations secure them for the Exhibition. There is no other way to make such an assured success. It is incomprehensible why the artistic pride or the business acumen of the architect is not roused when he recieves the committee's circular asking for drawings. Perhaps it is, but the majority will forget to collect and send them and the result is a most misrepresentative exhibit. In the Exhibition under discussion half a dozen offices in Toronto alone could have covered the entire wall space with interesting work, not only to the profession, but to the public, who might not thoroughly understand them in detail, but to which the mass and subject would give a comprehensive idea of the work of the architect.

In strong contrast with the excellent exhibition of last year the only foreign representation was by Sir Edgar George, of London, who sent an etching of the Ponte Vecchio at Florence and three water colors, street sketches, of Amiens and Genoa, and the Rialto bridge at Venice. These were a delight to the eye and gave an artistic tone to the entire exhibition. It is hoped that next year the artist architects of Canada will be represented as they should be by designs, and that these will be supplemented by the working drawings and plans of the phenomenally large quantity of notable buildings that are now being erected throughout the Dominion. Canada has in the profession many who are the peers of those both of the United States and of foreign countries, and at this National Exhibition of the country's arts and industries they should be adequately represented.

¶ *Some pertinent and at the same time laudatory observations on the civic aspect of London, by Arnold W. Brunner, of New York.*

THE CARELESSNESS with which England views her architectural growth of centuries and permits what would be termed vandalism in France or Germany, evidenced in the proposed "skyscraper" hotel at Hyde Park Corner, should receive some check from the observations made by Arnold W. Brunner, of New York, recently. Mr. Brunner is one of the commissioners for the civic development of Cleveland, is connected with the commission in charge of improvements at Baltimore, and is at present at work on a design for the Foreign Office building for the United States Government at Washington. In an interview in London, Mr. Brunner touched many of the points that closeness of vision causes the Londoner to overlook, but to his interested and critical eye is most apparent. In speaking of his visit, Mr. Brunner said:

> "Inspiration is what I really want, and I know of no better place to find it than here. I have traveled in many countries and made many sketches of beautiful buildings, but I frankly confess that London beats the world in architecture, because it is so individual, so distinctly national in its expression. It tells the story of the strength and solidity of the British Empire as nothing else does, for it reveals the character of the people from which that Empire has sprung. It even shows the iron conistic of the English race, but in architecture that is a virtue rather than a fault. I have visited London frequently, and each time I come I see changes for the better. In her slow, dignified way London is being transformed. Streets and approaches have been widened both for artistic as well as practical purposes, impressive arches and monuments erected, and vistas extended. No finer example of architectural landscape treatment than the Thames Embankment can be found anywhere, while the residential squares of London are a treat to the eye, as also are such buildings as the National Art Gallery and the Foreign Office. Of course, I speak from the point of view of an architect. They are serious, massive, and imposing outside, and equally impressive inside. It is true that much of their exterior beauty of outline and treatment is lost beneath a coating of grime that seems to be a necessary evil of all large cities; but I deplore the almost criminal resort to fresh paint that is so prevalent here. Paint may be clean and hygienic enough, but when applied to stone finally makes them look tawdry. We have a system of hydraulic cleaning in America that is both better and cheaper. The spirit of evolution is at work, and even that will come to pass. You might have a few more trees in your streets. The new Mall is something for Londoners to be proud of, and when its trees are more mature it will be one of the finest driveways I have ever seen. A few more such avenues and London will be the city beautiful of the world. It would be a crime, for instance, to erect the proposed hotel at Hyde Park Corner. If you have any law to cover it, the authorities should interfere and stop it. A skyscraper in London would be an abomination and a discord. In America, especially in New York, the skyscraper was a necessity, but it has robbed our architecture of all beauty. Indeed, our country is still so new, and hampered by abnormal growth in a material sense, that we may have not developed an individual architecture of our own as yet. The nearest approach to it is our 'Colonial' style, which is really beautiful and impressive in its simplicity, but that is a mild adaptation of the English Georgian style, and consequently not original. However, we are becoming steadily more serious in our tastes and some of our newest public buildings are really worthy examples of architecture."

Mr. Brunner is not an enthusiast or a biased admirer of England or the English. He is one of the foremost architects of the United States, who has designed on extensive lines, travelled, and studied deeply, and while his conclusions refer to London, his deductions can be applied to all large progressive cities where the commercial spirit is apt to control and ruin the future chances for artistic greatness.

¶ *The admirable plan of Australia for securing design for a capital city liable to defeat in its inception through defects in the competition programme.*

ONE OF THE MOST attractive projects over placed before the architectural profession of of the world is that for the capital city of Australia, for which a world's competition is announced. The taking up of a tract of country and planning and building a capital city thereon, without limit of cost, is certainly attractive to the dreamer of dreams as well as the man of concrete ideas. It is upon this attractiveness that the commissioners seem to rely when they ask architects to compete, because, while the winner in the competition will receive the work as a prize, the remainder of the competitors will largely have the enthusiastic effort for their pains, as the total amount of the three prizes is but fifteen thousand dollars. In a project of this kind the shop cost of the drawings will probably amount to several thousand dollars, and architects have become so practical that they are apt to think that even the attractiveness of the problem will hardly compensate them for the outlay in money and the loss of commissions involved while the work of city planning is on the boards. In the United States and Canada there are at the most but four or five capable through practical experience, of making an adequate plan for the capital city required by Australia. Any one of these would demand a much larger sum than that offered in prizes to even present preliminary sketches. As these architects are constantly engaged in large undertakings, it is safe to say that none of them will be found in the list of competitors. Outside of D. H. Burnham, Cass Gilbert, Arnold W. Brunner, F. W. Fitzpatrick and Frank Miles Day, we know of no architect who has had the practical experience required, though there are many who have given more or less study to city planning. The prize, then, must be given to one of these or to some young and talented draftsman who has seized the opportunity to place his dream on paper and to whom it may come true, as it is plain this competition is not for the men who know, but the man who has everything to win and nothing to lose. The original scheme of the Australian commissioners of selecting an architect for the work was much better than this high-sounding world's competition, the success of which we wish for as much as we are skeptical regarding its result, particularly as there seems to be no adequate provision for expert adjudication of the competitive drawings, which fact alone will bar out the best professional men of Canada and the United States.

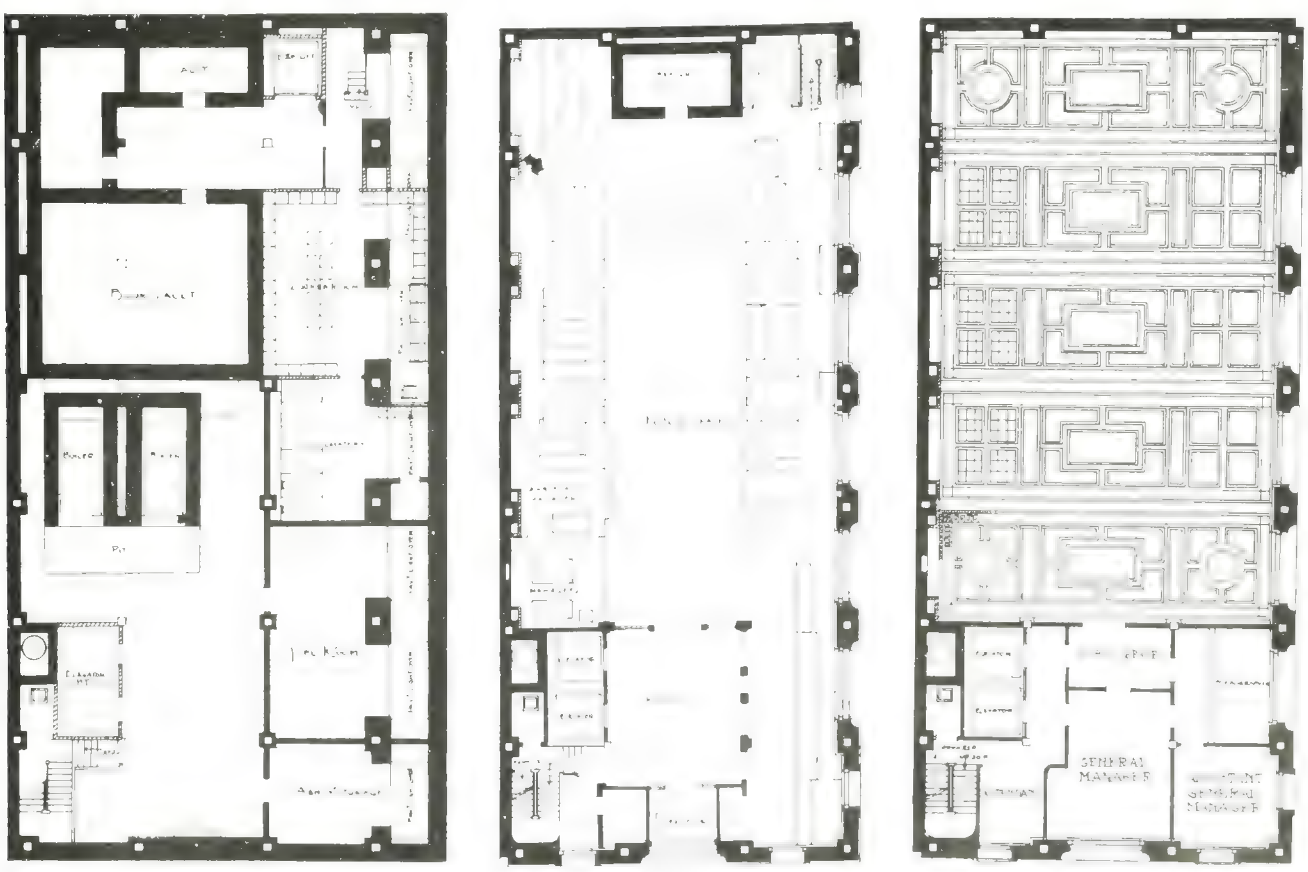
New Premises of the Standard Bank of Canada, South-East Corner of King and Jordan Streets, Toronto. Darling & Pearson, Architects.

THE NEW PREMISES OF THE STANDARD BANK, TORONTO

Carefully studied business structure at King and Jordan Streets which is successfully planned to meet modern banking house requirements.

THE NEW PREMISES of the Standard Bank of Canada, corner of King and Jordan streets, is the first structure to reach completion of several imposing buildings that will shortly effect a marked change in the architectural aspect of what might be termed Toronto's financial district. Aside from this it can lay claim to the distinction of being the first important office building in Toronto, introducing on an extensive scale the use of terra cotta in its external scheme, for apart from the two lower stories, which consist of hammered granite from the Stanstead quarries, the entire exterior, including the deep cornice enclosing the roof, is carried out in this material. From an architectural standpoint, the building presents a modern scheme worked out with simple lines and decorated with classic ornament. In order to relieve the greyish-white tone of the general mass, the architects have adopted green terra cotta for the panelling occupying the horizontal space between the windows. This panelling, which is possibly the first colored terra cotta work seen in Canada, is also intended to accentuate the continuity of the vertical lines which give to the design a simple grace and dignity that stands out in distinction to the massive effect so general in the average building of this type.

On the interior the arrangement is well calculated to give in every way accommodations that are admirably suited for both office and banking purposes. The entrance and the rotunda, which gives direct access to all parts of the building, are both carried out in Laurentian marble and mahogany woodwork, with bronze metal grilles enclosing the elevators. To the left, in a convenient position to the entrance, is the savings department, while directly opposite the door is the main banking room, rising to a height of two stories and taking up the entire remaining portion of the ground floor. The public space, which is 25 x 70 feet, is enclosed with counters in Laurentian marble marked off with octagonal columns in a variegated marble of Bancroft green, which termin-



Basement. Ground Floor. Mezzanine.

Lower Floor Arrangement. New Premises of the Standard Bank of Canada, King and Jordan Streets, Toronto. Darling & Pearson, Architects.

Rotunda, New Premises of the Standard Bank, Toronto, Showing Savings Department to the Left. Darling & Pearson, Architects.

Banking Room, New Premises of the Standard Bank of Canada, Toronto, Looking Toward the Rear. Darling & Pearson, Architects.

Banking Room, New Premises of the Standard Bank of Canada, Toronto, Looking Toward the Rear. Darling & Pear-Pearson, Architects.

Manager's Suite, New Pr emises of the Standard Bank of Canada, Toronto. Darling & Pearson, Architects.

ate in plastic caps treated with the bronze finish, and support a coffered ceiling having a simple plaster enrichment. Forming a feature at the rear is the treasury vault, which, in keeping with the counter scheme, is also in Laurentian marble, the clock over its door having a black marble dial with polished brass hands and numerals. The lighting is by large west windows and a series of ceiling lights extending north and south the entire east side of the room; the arrangement in this respect being such as to provide an evenly diffused light and to display to advantage the rich effect of the marble and general scheme. The floor here and in the rotunda is in Tennessee marble tile with a light field, red band and light border. Both as regards the utility in plan and decorative detail, the scheme in general shows an interesting consideration. The clerks' space, which provides for a roomy working arrangement, is fitted up with modern equipment both as regards desks and cages; the furniture and the woodwork throughout being of polished mahogany.

Mahogany furniture and woodwork are also used in the scheme of the General Manager's suite, which is situated immediately over the rotunda. Here the walls are hand-painted, while a feature of the plan is a room for business visitors overlooking the main banking room. Aside from the suite and the space devoted to the head office on the third floor, the entire upper portion of the building is taken up with modern offices. These offices open on to well-lighted spacious corridors with tiled floors, and are finished in oak with burlap-panelled walls.

Constructively, the building is of steel frame type with concrete floors and hollow tiled partitions. It has a frontage of 50 feet by a depth of 107 feet, the superstructure resting on concrete caissons extending down many feet below the sidewalk level. In every particular the type of construction is fire-resisting, the steel work being fully protected in every part, and the windows throughout being of the metal sash and wire glass type. One special feature of the exterior treatment, which is not in evidence in the accompanying view, is the pent-house, usually unsightly on the modern building, which in this case has been given architectural consideration. The basement of the building is divided into two parts, each of which is served by a separate staircase, the engineers' department consisting of four rooms occupying the front portion, while the rear is taken up by wardrobes and toilet accommodations for the banking staff. Modernly equipped toilet rooms in Italian marble are also provided on the fourth, sixth and eighth floors. The building was designed by Messrs. Darling & Pearson, Toronto, and the following firms were connected with the various branches of the work: Masonry, Fussell & Thomas; granite, Robert Gullett; steel work, elevator enclosures and counter grills, Canada Foundry Co.; woodwork, Globe Furniture Co.; marble work, Hoidge Marble Co.; plastering, W. J. Hynes; plumbing, W. J. McGuire, Ltd.; heating, Jos. Harrison; painting and decorating, Thornton-Smith Co.; electric wiring, Hudson Electrical Co.; electric fixtures, Oxley-Enos Co., Ltd.—all of Toronto. "Carrara" terra cotta furnished by Chillas & Black is used for the exterior.

IN AN ARTICLE dealing with the effect of ivy and other climbing plants on masonry walls, an English publication states that in many cases the unchecked growth of ivy and other chance-sown plants is not merely concealing our old ruins, but destroying them. Ivy is not inevitably destructive to masonry over which it clambers; and it would be not much less unreasonable to demand that every stem of ivy should be stripped from all old buildings than to leave them totally neglected in its clutches. It is very doubtful whether any real harm is done by the younger and thinner shoots, even though they may cover a large expanse of wall, and appear to be eating into it with their fringing rootlets or suckers. The damage is done to old walls when the ivy plant becomes a veritable tree, driving its sinuous stems, as thick as a man's arm or leg, into the joints and interstices of the masonry. The stems then act as living wedges, prising the wall asunder as they continue to grow. Although in some cases the plant may for a time counteract its own disruptive action by binding the loosened masses together with other cords, the wall, once split, must almost inevitably fall asunder in course of years, when the ivy perishes, or its strain changes direction in the course of growth. The splitting force of the stems is greatly increased in storms by the pressure of the wind on the massive crowns of foliage; and it is generally after a high wind that portions of an ivy-covered ruin are flung earthward or are seen to be hanging detached. Even greater damage may be done by trees which spring on the wall from bird-sown or wind-blown seeds, or gain a foothold in the soil near its base. On old, mouldering walls, yews, ashes, and other trees will often grow to a considerable size, so that the power of their roots in a high wind becomes very destructive. Worst of all is the swaying action of tall, slender trees, such as elms, poplars, or pines, when their roots undermine an old wall at its base. Large trees should never be allowed to stand close to any wall, or sooner or later cracks will almost certainly appear. But the growth of ivy and of smaller plants and bushes about the building may be permitted without anxiety up to a certain limit, if they are kept under observation and not allowed to grow large and woody. An excellent example of the intelligent utilization of climbing plants upon ancient ruins was given recently by a Rome correspondent in his account of the replanting of the Forum under the direction of Commendatore Boni. Ivy and flowering plants have been used to beautify bare corners and to conceal the supports and buttresses of new masonry which it has been necessary to insert in various places. On the other hand, nothing is allowed to grow where it can either hide or injure any existing feature of interest, or might impede further excavation at any likely point. It is to be wished that all our own famous architectural sites were watched over with equal providence and good taste.

CONSTRUCTION

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Vol. 4 Toronto, October, 1911 No. 11

CURRENT TOPICS

CONTRACTS ARE BEING LET for a private hospital at Saskatoon, designed by Architect Fortin of Regina. It will cost $100,000.

* * *

TWO STRUCTURES in Saskatoon for which Thompson, Daniel & Colthurst are architects, the St. John's Parish Church, and the new four-story Y.M.C.A., indicates the character of buildings that progressive city is erecting.

* * *

WORK IS NOW IN PROGRESS at a point in the Boise River canyon twenty-two miles northeast of Boise, Idaho, on the highest dam in the world. It will be 350 feet high, or 24 feet higher than the Shoshane dam at Cody, Wyoming. The structure is to be of concrete and rubble masonry, and cost in the neighborhood of $600,000. It will have a storage capacity of 200,000 area feet.

* * *

THE NEW METHODIST COLLEGE which is now being erected at Regina at a cost of $275,000 is shortly to be supplemented by a Woman's Building to be built from a sum of $100,000 donated for this purpose by the Massey estate. The building will be similar in architectural scheme to the main structure and will be the second of an imposing group that will ultimately enclose a large open quadrangle.

FROM PRESENT INDICATIONS the city of Brantford will build a number of new school buildings in the near future. Brantford is a most progressive city and will probably engage architects of ability in the line of school design and plan to give them model school buildings.

* * *

AMONG THE MORE IMPORTANT building undertakings in South America, is a reinforced concrete cathedral which is being erected at Valparaiso, Chili, from the design of a native architect. The building, which is now nearing the stage of completion, is 195 feet long and 162½ feet wide, and has a large central dome rising to a height of 130 feet.

* * *

SASKATOON has a church competition, St. John's Church accepting the plans awarded first place by Thompson, Daniel & Colthurst, architects. The award was made by Mr. Allan Richardson, Bachelor of Architects, McGill University, assisted by Mr. Blackwood. Other architects who stood high in the competition were R. W. Thompson, J. H. Noel, and Clemesha & Coltman of Regina.

* * *

SO FAR AS IS KNOWN, the largest oak tree in the world, or at least in America, is the Sir Joseph Hooker Oak, at Chico, in the Sacramento Valley, California. It is 105 feet high, and its trunk has a circumference of 23 feet 1 inch. It is the California white or valley oak (*Quercus lobata*) that is peculiar to California, though it bears a close resemblance to the English oak. It is not only a large tree, but a beautiful one, its branches being very symmetrical.

* * *

IT SEEMS POSSIBLE that Hetty Green, who has been notable only because she is called "the richest woman in the world," and also because she was never known to improve or repair a piece of property, will yet do something for her country. In conjunction with Countess Annie Leary, also reputed rich, she is reported to have undertaken the work of founding a great university on Staten Island, New York, in memory of Christopher Columbus. If she goes Mr. Rockefeller one better and surpasses the Chicago University then her name will be blest in the land.

* * *

NO TIME IS TO BE LOST in carrying out the extension which the Dominion Government will make to the Intercolonial Railway terminal at Halifax. Preliminary operations have already been started, and it is expected that the Nova Scotia Construction Company, which has the contract, will shortly have a large force of men engaged on the project. The workfi which will cost $914,600, will consist of the construction of a reinforced concrete wharf 800 feet long and 250 feet wide, together with a large addition to the existing shed. The wharf will be the first of four piers to be built at Halifax according to plans submitted by Engineer John Kennedy of Montreal, and which will cost in all about $3,000,000.

THE GRAND TRUNK PACIFIC terminal plans for Fort William, just given to the public, include elevators with a capacity of 60,000,000 bushels. They also show concrete docks and three great piers in the Mission River harbor, from which 75,000 bushels per hour can be dropped from the elevators into the lake boats, and cars can be unloaded at the rate of 2,400 cars every twenty-four hours. The buildings of this great terminal will be absolutely fireproof in construction and will be largely of reinforced concrete resting on concrete-capped wood piles. The plans of the Grand Trunk Pacific for its Fort William terminal are so great as to almost seem visionary when compared with similar terminals, but it is probable that as in other cases of Canada's most phenomenally rapid development, it will not be long before the full capacity will be reached.

* * *

AT A RECENT MEETING of the Executive Committee of the Canadian Cement and Concrete Association held at Montreal, August 22, in regard to the Cement Show this year, it was decided to communicate with the various manufacturers, particularly those of cement, and ascertain their answers to the following questions: "Are you in favor of the holding of a Cement Show by this Association during 1912? If so, have you any preference in the matter of the place where the show shall be held? Are you prepared to support such a show financially and with an exhibit?" While it was not definitely decided, it was apparently the temper of the meeting that unless satisfactory replies to these questions are received before the end of September, the proposal to hold a Cement Show will very likely be dropped and the energies of the Executive concentrated on securing as successful a convention as possible.

* * *

THE FOURTH GENERAL annual assembly of the Royal Architectural Institute of Canada will convene at Montreal on October 3 and 4, 1911. This assembly will be most important and it is hoped that members will take this opportunity of meeting their colleagues from every part of the Dominion. The headquarters of the Assembly will be in the rooms of the Royal Architectural Institute of Canada, No. 5 Beaver Hall Square. The general programme as laid out by the local committee of arrangements comprises the following items: Tuesday, 9.30 a.m., meeting of the Council; 10.30 a.m., inaugural session, and miscellaneous matters. At 2.30 a general conference on town-planning will be held. At 8 p.m. the annual dinner will be given at the St. Regis. On Wednesday the proceedings will include, at 11 o'clock, reception by His Worship the Mayor, drive to points of interest, visit to Montreal Technical School, and luncheon. At 2.30 there will be a business session; at 3.30 a conference of the P.Q.A.A. respecting proposed changes in the charter of the R.A.I.C. in view of a federation of the various Canadian architectural bodies. At 4.30 a meeting of the new Council will be held.

THE HIT OR MISS POLICY of the past in grouping University buildings, or rather the lack of attention paid to grouping, is not in evidence in the arrangement of the projected University buildings at Winnipeg. Frederick Law Olmstead, jr., son of the late landscape architect of that name, the most famous designer of landscape of his time, has been engaged to plat the grounds for this great University. Western Canada is to be congratulated upon starting this educational group right. It now remains for the trustees to see that architects of ability are secured so that the architecture of the buildings will have that harmony and dignity of design that is called for in this representative educational institution.

* * *

ARCHITECT E. D. PITT, of Niagara Falls, Ontario, has prepared designs, and the Bishop Construction Co. of Montreal and Toronto have the contract, for the erection of the $100,000 factory to be established by the Yale and Towne Manufacturing Company at St. Catharines, Ontario. The builders' hardware department of the Yale and Towne Company commenced when in 1886 it made the bronze door plates and knobs from Root's special designs for the Rookery Building in Chicago, and from that commencement has grown to be the largest builders' hardware manufacturing concern in the United States. The establishment of the works in Canada will give to Canadian architects an opportunity to procure hardware that has the best of art and the most reliable material in its composition.

* * *

THE "CEMENT GUN," a device for putting concrete in place by compressed air, such as was demonstrated at the Cement Show held at Toronto last March, is being used by the Quartermaster Department, United States Army, in the Hawaiian Island, and is proving of value in the construction of the ordnance shop at Fort Ruger. The nozzle originally furnished with the machine became worn and clogged easily after being used but a short time and was replaced by a rubber-lined nozzle invented by Captain Edwards, that has completely overcome the difficulty and is giving most eminent satisfaction. Tests are also being made by the Isthmian Canal Commission at Panama to determine the value of cement applied by this method as a preservative for iron plates. Twelve plates, 63.8 by 14 inches, have been coated with a 1 to 3 mixture of cement and sand, after they were cleaned to gray metal by the sand-blast process. Six of these have been covered with a half-inch coating, and the remaining six with a one-inch coat on one side, and a 1½-inch coat on the other. Three plates of each kind have been sent to Balboa, and three to Cristobal, where they will be kept immersed in salt water to test the mortar method of preventing corrosion.

A MISTAKE in the advertisement of the Standard Ideal Company last month names E. & W. S. Maxwell as the architects of the Bank of Toronto at Montreal. The architects of this building were Ross & McFarlane.

Roman Bridge over the Rhone, at Viviers, France.

THE STORY OF THE BRIDGE

By WALTER SHAW SPARROW

Abstract of a carefully prepared paper printed in the "Builder" in four parts. Part 1. Primitive Bridges. Part II. The Roman Genius. Part III. Medieval. Part IV. In the Middle Ages.

I.—Primitive Bridges.

IT IS REASONABLE to suppose that prehistoric man owed his first timber bridge to a storm of wind, which hurled down a tall tree across a wide crevasse in a glacier of the Ice Age. Many a bridge of this accidental sort was probably used long before the period of the cavemen, during those mysterious times when a type of ape, growing tired of its own active life on all-fours, passed through its evolution from monkeyhood into manhood, leaving a great many of its kith and kin either stranded for ever at the halfway stations of gorillahood and chimpanzeeism, or hopelessly in the rear as little and agile tree-climbers. As man seems to have had for his ancestors a breed of apes born with a taste for experiment and discontent, it is not surprising to find that the earliest human efforts to pass from bad to better took hints from Nature and her marvels. Cave-lions and cave-bears were compelled to give up their homes to man; the fire stored in flint was discovered when the first human weapons were chipped to a point; clay was moulded into utensils, and the building methods of birds and beasts were patterns for imitation. We know, for instance, that man dug round pit-dwellings into which he crawled on his stomach along a circular burrow, finding warmth and safety in the earth like many other animals. Later, encouraged by the example set by beavers in their dams and lodges, human craftsmanship evolved the lake-dwelling, and the round hut, using for the timber walls the same plaster of mud mixed with straw and loam that house martins have ever employed in their nest-building.

Well now, as soon as man had passed through that technical evolution to which he owed the solid foundation of his lake-homes he was a primitive architect, with knowledge enough to build a bridge of timber; and if we keep in mind the way in which he laid enduring foundations in a lake we may infer, without any great extravagance, that his wooden bridges were akin to those at Srinagar, the capital of Kishmir, a city founded in the 6th century, A.D., and justly famous for the quaint youth of its unchanging architecture. Seven bridges there span the River Jhelum, which is the Hydaspes of the Greek historians, and to study their construction is to feel oneself intimately in touch with a little Venice belonging to the long ago of primeval handicrafts. These have a superstructure of frail shops, partly held up by poles, the probable resemblance to a lake-village is plain for us to see. The piers are made of beams laid criss-cross, and in one bridge there is no angular platform below the piers to break the force of the current after heavy rains, while the pier timbers in the other rest on foundations similar in shape to those that Colechurch and Isembert designed and made for the great Old London Bridge, with its romantic houses, its chapel, its defensive towers, and cellars in the thickness of the piers. Old London Bridge, finished in 1209, and destroyed in 1830-31, had the same lineage as the shop-bridges of Srinagar, the first ancestors being prehistoric huts built over lakes on artificial islands formed of logs, brushwood and peat, with upper layers of timber, and branches held in position by scores of little piles.

But, although the workmanship at Srinagar is very primitive, you will see that the piers have been influenced by the progress of art in India, for the horizontal beams, cut in varying lengths, are composed, and they suggest a rude arch between the piers. This evidence of progress, too, is more noteworthy in another bridge at Srinagar, a bridge of unmortared stone, with booths of timber, over the Marqual Canal. Here the arch is nearly triangular, suggesting a descent from that cone-shaped hut from which the beehive houses of stone inherited the inclined jambs to their doorways.

The bridges of Srinagar, again, are not all burdened with houses. Some have nothing more than a narrow footway of boards and parapets of simple latticework. A very attractive example, with six piers, crosses the Jhelum at Baramula, and beyond, but near to it, a primeval-looking village basks in the shade of the Himalaya Mountains. Here, if anywhere, we have a type of bridge similar to the prehistoric—if, as certainly seems probable, the art of the lake-dwellers left its sheltered moorings and adventured across rivers.

India is rich in primitive bridges, and I have now to speak of the suspension bridges of bamboo, near Darjeeling, for instance, and also in the Bermulda Hills. Here, in the Buria Kol, bridge-ropes are made with the glossy and silky fibres of the Nilgiri nettle. As to the general look of the handicraft, it is like human spider-webbing, and its effective

The Weaver's Bridge, Wycollar.

simplicity and strength ought to lessen the busy pride that engineers now take in metal suspension bridges having often a prodigal ungainliness.

Thus far we have taken a rapid glance at primitive work in wood and in cane. To this part of our subject several Roman bridges belong. The earliest bridge built at Rome was called the Bridge of Stakes, Pons Sublicius, built, it is said, by Ancus Martius, then reconstructed by the high priests, who thereupon became known as "Pontifices." An illustration of the Pons Sublicius, adapted from historical descriptions, will be found in Colonel Emy's "Traite de l'Art de la Charpenterie." The piles were driven into the river's bed, then straightened at the top with strong wind-braces; hurdle-like piers were formed in this way for the superstructure, which had latticed parapets. On this bridge Horatius Cocles passed for all time into the heroisms that beget their like.

The Pons Sublicius is believed to be the form of

The Bridge of Shops Srinagar, Kishmir.

bridge that the Romans used frequently in their colonies, and this belief is reasonable, particularly as regards England, for England was a land of forests, and if the Romans had built important bridges of stone some relics of them would have been found in our larger rivers. Timber bridges, too, belong to the traditions of English workmanship, and a good many of them were stake-and-pile bridges. There was one at Windsor in the 18th century, and its primitive craftsmanship contrasted oddly with the Castle.

But we turn now to another point. How were stone bridges evolved? This question belongs to the domain of speculative reasoning, but we can start out from definite facts. It is safe to believe that primitive man must have used the stepping-stones across rivers that the hazards of Nature often placed in the waters. This was the earliest bridge of stones, but its value to man not only varied from day to day, but was of no use at all when it was needed particularly—that is to say, after heavy rains, when rivers became too rapid or too deep to be forded on foot. Primitive man could not fail to notice this fact, and would he not apply to it his ripening intelligence as a builder? Each stepping-stone was a foundation for other stones to rest upon, and a cluster of them, carried up to a given height above the surface of the river during a flood, would form a pier, across which logs or slabs of stone could be laid to another pier, just as they are to-day in the Pont-y-Pant, in the Lledr Valley, Wales.

One remembers, in this connection, that a famous bridge at Babylon, over the Euphrates, mentioned by Herodotus and Diodorus Siculus, had stone piers and a footway of movable planks, which were not left down at night. This bridge is ascribed by Herodotus to Nitocris, and by Siculus to Semiramis. It was easy to defend, and this good quality gave a long life to its central idea. A mediæval bridge with movable planking still exists in France. I have seen a photograph of it, but forget the name.

Very often the Romans used stone piers and a superstructure of wood, as in Trajan's magnificent bridge across the Danube, just below the rapids of the Iron Gate. This great achievement, dating from A.D. 104, and designed by Appollodorus of Damascus, was partly destroyed by Hadrian, who said that it made a passage along which the natives could make raids to the injury of the Roman rule; as if a system of barriers and guards could not have held the great footway against all comers. Still, relics of thirteen piers remain to this day. Originally the bridge was about 1,300 yards long, with twenty arches of hewn stone, which, according to Dion Cassius, were 150 feet high, 60 feet wide, and 170 feet from each other. Here we have travelled far from the Pons Sublicius and the primitive bridge of planks or of stone slabs resting on stones. It is believed that in Trajan's bridge the piers were founded by sinking caissons, while during the building of the piers for the Babylon Bridge the Euphrates was diverted from its course. This happened also to the Thames when Old London Bridge was constructed, according to Stow.

Finally, which is the earliest type of stone bridge in Great Britain? If stepping-stones were ever de-

Bridge over the Thouet, St. Generoux, France, 14th Century.

veloped into piers of loose boulders, we must expect to find some tradition of it in those parts of the country where descendants of the prehistoric inhabitants sheltered themselves from successive invasions. Ethnologists are now pretty well agreed that there are people in the British Isles whose lineage is probably as old as the Neolithic folk of England. They are dark, short, virile, and oval-headed; their features are small and their tempers quick; they are to be met with in Cornwall, Wales, the Isle of Man, Ireland, and the West of Scotland, as far north as the Orkneys. Well now, it is from Dartmoor that I choose for illustration a very primitive bridge made with granite slabs resting on granite piers. It stands at Postbridge on the East Dart. Locally it is called a "clapper" bridge, and its type is common in Cornwall. One is reminded at once of Stonehenge.

This does not mean that the "clapper" bridges still extant belong to pre-Roman times. They are mediæval, but the principle of their structure is prehistoric. The same type, but with variations, is found also in Wales, and I note particularly the Pont-y-Pant, in the Lledr Valley, for its piers are loose fragments of rock, and the wooden footway is primitively rustic. Here is a bridge that belongs to what I venture to call the period of developed stepping-stones.

II.—The Roman Genius.

Roman Aqueducts and bridges, says an authority, "were really of a more engineering than architectural character, being in the main utilitarian." What does that mean? Was a Roman temple less utilitarian than a Roman aqueduct? Less needful as a part of the national life? But, when a lover of Greek art tries to write on the Roman genius, very absurd things are often uttered. Thus we are told by the same authority that the Pont du Gard, near Nimes, in France, is built of "rough masonry." What next? Sandow, in comparison with a Tom Thumb, is a man of rough muscle and sinew, and if Tom Thumb is to be our standard of symmetry and grace, then Sandow is a masterful mistake in proportion and vitality. To describe the Pont du Gard as "rough" is to be a Tom Thumb in criticism.

When J. J. Rousseau visited the Pont du Gard he was awed into silence by the immensity of the three arcades. For the first time in his life he understood the grandeur of the Roman spirit in adventurous achievement. As he walked along each arcade the echo of his footsteps enabled him to hear the great voice of the builders. How had all the large stones been brought to this place, in a neighborhood where quarries seem to have been unknown? And whence came the art that piled them up into a silencing design? Each stone was laid in its allotted place quite dry; neither mortar nor cement was employed, except as a lining to the water-channel on the third tier. Rousseau spent hour after hour in meditation, and then he remembered a humorous fact. He had been warned against the beautiful girls of Montpellier, and here he was alone with the Pont du Gard, and completely fascinated!

A classic tradition says that the stones in the Pont du Gard were joined together by iron bands. Is that true? The iron clamps, if employed by the masons, were not left on the surface of the stones, for there's no reference to them in the writings of modern students and travellers. That the Romans did use iron bars bent at the ends and fastened into huge stones with molten lead is proved by the ruins of the Roman bridge over the North Tyne at Chollerford, near Hexham. This was probably a bridge with a wooden superstructure, as voussoirs have not been found among the debris of stones. You will find full information in Dr. Bruce's book on "The Roman Wall," and in "An Account of the Roman Antiquities preserved at Chesters, Northumberland," by E. A. Wallis Budge.

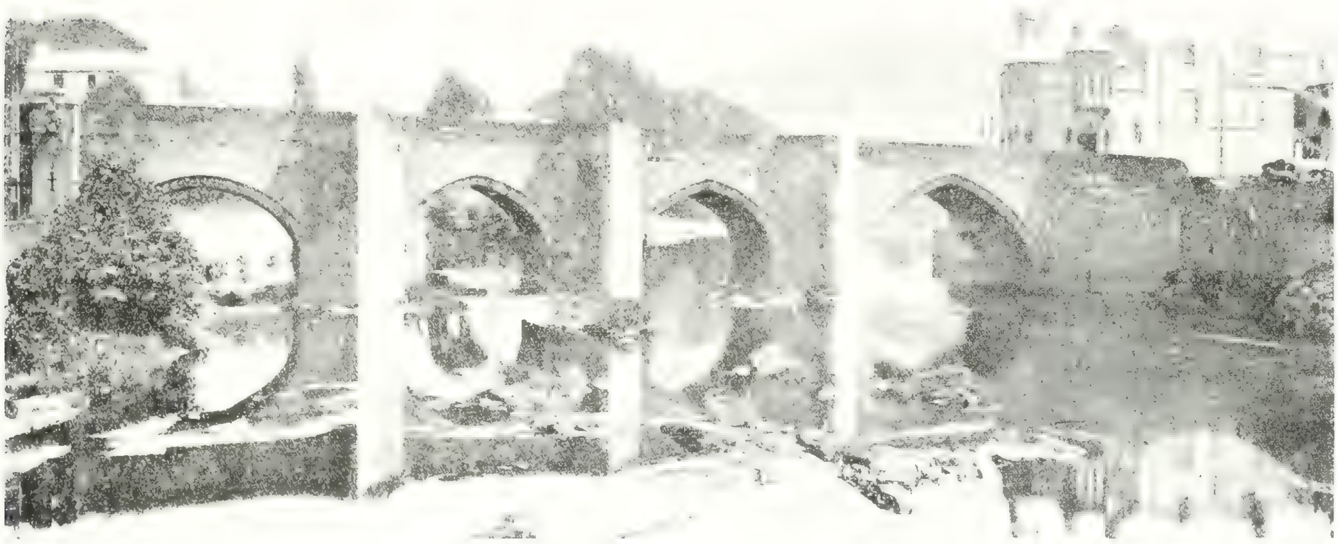
The Pont du Gard is immense, its height being not less than 47 metres and 20 centimeters. The first tier has six arches, the second has eleven, and the third thirty-five. The first tier is 20 m. 10 cm. high and 161 m. 80 cm. in length; while the middle tier is 19 m. 40 cm. in height, and 257 m. 90 cm. long. Note, too, that the architectural centre of the design is not the real centre; this was determined by the course of the River Gardon, and we find it on the north in the second arch of the first bridge, the arch under which the river flows. It has a span of 25 m. 30 cm., while the neighbor on each side is smaller and narrower, having a chord of 19 m. 20 cm. The other arches of the first tier dwindle to 15 m. 75 cm. in span. As to the centre of the second story, it corresponds with the first, for the largest vault is above the river; it carries four little arches of the third arcade, while the others support only three. Thus the symmetry of the whole work must be judged in its relation to these facts. Some critics see nothing more than the unequal size of the arcades, when the real point is to find the *milieu architectural*, whence the design radiates, majestic and imperious. Fergusson said very well that the topmost arches give to the structure the same finish and effect that an entablature and cornice give to a long range of columns.

We cannot put a date on the Pont du Gard because there are differences of opinion in this matter. The historian of Nimes, M. Menard, attributes the work to Agrippa, son-in-law of Augustus, who is said to have ordered its construction in the nineteenth year B.C. The style belongs to the Tuscan order, and all the arcades are groined and semicircular. The curve of every arch springs from a ledge, an impost resembling a cyma, about 50 centimetres high, and as much in projection. There are four groins in the arches of the first tier, and three in the second, while the third tier has either one or two. The water channnel, placed on top of the third arcade, is 1 m. 30 cm. wide and 1 m. 60 cm. high; has side walls with perpent stones, and these bonders, 0 m. 80 cm. in size, bear cemented flagstones, a metre wide and having a thickness of 0 m. 32 cm. The channel itself is nearly blocked up with a thick deposit of lime, but when this substance is detached antiquaries find on the side walls a deep layer of cement painted red. The bed of the canal is a solid floor 0 m. 22 cm. in thickness, its component parts being small pebbles mixed with lime and gritty sand.

We pass on now to another Roman bridge, at Vaison in Vaucluse. It is a bridge of stone over the River Ouveze, and its span measures 30 metres.

Another Roman bridge, not generally known, is found at Pollenza, in the island of Majorca. It has two arches. One is semicircular, and springs from the river-bed, while the other is a long segment arch stretching from an abutment wall on the bankside to the buttress guarding the pier. Above the buttress is a small archway to break the force of a flooding river. This is what the French call an *arche de decharge pour les hautes eaux.* To find it in a Roman bridge is interesting, for it gives a classic origin to the use of discharge arches in mediæval bridge-building.

Much larger and more impressive is the probable Roman bridge at Viviers, in France (*Ardeche*), Note, too, with interest, that the timber piers are constructed like those at Srinagar, in Kishmir, which appeal to us as primeval carpentry in all likelihood developed from the log foundations of lake-dwellings. It is quite an easy thing to make a bridge in the Gaulish fashion. You choose a river with steep banks, just wide enough for a single span. On each bank you make a bed of flad boulders, and then begin to raise up your timber pieces, using tree-trunks laid in a criss-cross manner. In order that the footway from pier to pier may not be too long, and therefore unstable, you increase the length of your horizontal logs as the piers rise in height; and because these logs on each side jut farther and farther across the water a rude arch is suggested by them, not a perfect arch, since the timbering of the footway gives it a flattened head. The inconvenience of a long footway in a wooden bridge may have suggested this method of pier-building to prehistoric craftsmen. If so, how are we to think of it



Llangollen Bridge, 14th Century.

built mainly with pebbles and small stones. Photographs show clearly the workmanship, and I give here a view of the west side. Viviers is only a village to-day, with less than 2,000 inhabitants; but in the Middle Ages it was a cathedral city, with a pride much greater than its population, which numbered 15,000. The Roman name for it was Alba Augusta, but its Roman civilization was destroyed by the Vandals in the 5th century, and another type of society came to life amid the ruins, the old bridge remaining as a bond of distant union between past and present.

Viollet-le-Duc believed that the Romans in their colonies built few bridges of stone, preferring timber because it was always plentiful and easier to use. The old Gaulish methods of bridge-building has outlived the Roman domination by many centuries; it may be seen to this day in Savoy. Viollet-le-Duc drew attention to this circumstance, and said with truth that timber bridges in Savoy descended not merely from the workmanship described by Julius Cæsar, but from some remote age in prehistoric time.

in relation to the origin of arches? On the other hand, prehistoric timber piers may have had the same width all the way up; perhaps the progress of architecture in Roman and in Indian work suggested the use of longer logs to project over the water, and to make at last a jutting support under the timbers of a footway.

From the rarity of Roman bridges in Great Britain we learn that wood was the material used in early historic times. Do we possess even three or four Roman bridges with an authentic record? Here and there local traditions attribute a bridge to the Romans, but how many do you know having the support of distinguished antiquaries? A good many along the Roman roads have Romanesque traits, but I should like to find a true example of Roman craftsmanship.

Along the old Roman tracks in Lancashire there are many single-arch bridges having a Roman character, but without a stalwart air of authetic dignity. The one near Clitheroe looks genuine, while the others speak to me of a Roman tradition enfeebled in much later days by a different spirit in craftsmanship.

III.—Mediæval.

To encourage the making or the upkeep of bridges was counted as an act of piety in mediæval days, "a blessid besines," a charitable duty, essential to the safety of pilgrims and wayfarers; so bishops and abbots, to bring this matter home to lay minds, granted remissions of penance to those (and they were many) who forgot that the King's highways had to be kept in order by every landlord who owned property in their neighborhood.

By way of example I give the famous Llangollen Bridge, with its four unequal arches, and its look of bluff vigor in old age. It comes down to us—a little widened, thirty-three years ago—from John Trevor, Bishop of St. Asaph, who died in 1357, and whose workmen did not care a rap for uniformity of design. What they liked was a secure foundation for each of their piers, and it saved time and expense to sound the river-bed and to build from the flattest pieces in slippery rock. The widest arch would have a span of 28 feet, and the two smaller ones would occupy the central position. But the main point, after all, was to do such work as would withstand the fury of a gathering flood. In this one matter the craftsmanship was a complete success. But there is no ambition, no imagination, in the design of Llangollen Bridge. It conquers the dangerous waters, but in a stubborn, dull fashion. It has the look of Hodge in armor, heavy and dogged, dauntless and lumbering. And this applies to many a British bridge having a long history. The one over the Nith at Dumfries, which was long considered the finest after Old London Bridge, is a damaged exception, dating from the 13th century. Formerly it has thirteen arches—an unlucky number, perhaps, for only seven are now in use. There used to be real aspiration in the design, a certain high triumph over difficulties and perils, and for this quality we have reason to be grateful.

Old England used to speak with delight about a certain beauty described as "faerie," a certain grace that aspired with an air of heroic life, as if it came into the common world from that enchanted time when King Arthur ruled. It is just this faerie magic that old English bridges lack. They are good pedestrian prose, often enough, but the great poetry of Gothic art, its easy triumph in upward flight, is absent as a rule. Here and there we come upon a half exception, like the ever-famous Twisel Bridge, Northumberland, which has changed but little since Lord Surrey threw his army across it to reach Flodden Field, turning the flank of the Scotch hosts.

It is a graceful piece of architecture, alert and wide-awake; it has one strong arch, with a touch of the 13th century in its semi-circular span, which measures 90 ft. 7 in. from abutment to abutment. The parapet from its centre shelves downwards at each side, its greatest height from the waters of the Till being 46 ft. 2 in. I note too, that the arch is groined and ribbed, quite a common trait in mediæval bridge-building, above all, in Poitou and in England. Viollet-le-Duc mentiones this kind of arch, and says that the groins, separated from the bed of the road by a space filled with loose flagging, were *poses en rainure dans les piles en conservant une parfaite elacticite.* All rain water that found its way through the road passed with ease between the joints of the flagging, without leaving a deposit of saltpetre on the haunches of the arch; and, as the work was lighter than in other arches, there was less pressure on the piers. Moreover, this system of arch-building, which dates from the end of the 12th century, or from the beginning of the 13th, was more economical than any other, employing one-third less of keyed materials. The spandrels above those groined arches were of ashlar, and it was easy to repair them without interrupting traffic.

The Valentre Bridge at Cahors, France.

Another distinguishing characteristic of mediæval bridges is what the French call the *dos d'ane*, the shelving parapet and roadway on either side from a point just above the keystone of the central arch. It is often supposed that this trait is European, yet it is found also in Chinese bridges, which are very graceful at their best, pure and strong in design, and having fine arches in which the semicircle is prolonged without forming a true horseshoe. I have chosen a Chinese bridge as an illustration, and set it side by side with two Spanish examples, the Puente de San Juan de las Abadesas at Gerona, and the Puente Mayor over the Mino at Orense, Galacia, which, to my mind, is the most stately of all shelving bridges. The Moors left in Spain a peculiar grace of style which native architects often united to their own qualities, a haughty distinction and a lofty ambition. Consider the immense nave in the Gerona Cathedral, a glorious pointed vault measuring not less than 73 ft. from side to side, almost double the width of Westminster nave. It belongs to the 15th century, yet in the magic of its youthful hope it proves that its archtiect, Gullielmo Boffiy, was a child of the 13th. And the great central arch of the Gerona bridge has in it some of the soaring courage that transcends all expectation in the cathedral nave.

This bridge, with its look of battered antiquity, is certainly very fine, but less majestic than the masterpieces at Orense, a stone bridge of the 13th century, with seven elastic arches, all alertly dignified, and with a total length of more than 1,300 ft. The great central arch is 156 ft. wide between the piers, and its keystone is 135 ft. wide above the river-bed "The Mino rises rapidly and to a great height," says Walter Wood, in "A Corner of Spain"; and it was with the object of safeguarding the bridge against the sudden inundations that the arch was made so high."

And this brings us to the origin of those bridges that shelve down at each side from a point in the centre of their parapets and footways. Two useful purposes were served by making the central arch wider and higher than the others, since there was greater space for navigation as well as for waters in flood; but when a bridge had only one arch, its up-and-down roadway was usually inconvenient, because the incline was not long and gradual, but short and steep. Take the Pont-y-Prydd, near Cardiff, built in the 18th century, and having a pathway so abrupt in its slope that laths of wood used to be stretched across as a foothold for horses. In frosty weather a shelving bridge was often a breaknec' place; and there is evidence that architects at an early date told each other that their departure from the Roman tradition of level bridges was undignified. It was a tradition not without exceptions, since the *dos d'ane* was used at times by Roman bridge-builders; but a level causeway was more typical of Roman craftsmanship, and it influenced mediæval architects and engineers. Among my illustrations is a good example, Le Pont des Consols over the Tarn at Montauban. It is a bridge entirely of brick, 250 metres 50 centimetres in length. The bricks are excellent in quality, and measure 5 centimetres in thicknenss, 40 centimetres in length, and 28 centimetres in width. The roadway is perfectly level, and its height above the level of the Tarn is 18 metres. There are seven pointed arches, having an average span, or chord, of 22 metres; and the six great piers with beaked buttresses are 5 m. 55 cm. in thickness, and note how they are pierced with high arched bays to facilitate the passage of water during floods. The defensive towers have gone, but the strongest one of all w built at the end facing the town. It was square in shape, and its summit was a platform with crenelles and machicolations. The other end tower was a weaker version of this one, while the central defence, built over the middle buttress on the side looking down the river, was triangular, and there was room enough in it for a chapel. A flight of winding steps went down to a postern pierced through the buttress at the water's level; and at the other side of the pier, just below the arched bay, hung a sort of see-saw that carried an iron cage in which blasphemers were put to be ducked in the river.

IV.—In the Middle Ages.

Mediæval England was a forestial country, and in woods along many roads and byways footpads and bandits lay in wait, as ready to cut a throat as to broach a tun of wine. Rivers were feared then by pilgrims and horsemen, not only because fords were very common, but because thieves knew that an ambush near a ford was particularly unpleasant to anyone who had to make his way through it. Till the 14th century, and even later, fords were in vogue at and near many towns of the lesser sort.

And the life and limb tax claimed by rivers was not the only trouble. The keepers of a ford knew no pity, but got their toll in relentless ways, taking

Chinese Bridge.

bread from the beggar's wallet, and "a hood or a girdel" from "the pore penyles." Pretty often, again, great woods encircled little riverside towns and manors, so that outlaws after dark could steal up close to the houses and the bridge; it was then that pilgrims and wayfarers welcomed with the greatest relief the cresset-lights that glimmered from some friendly building on the bridge—a chapel, a defensive gateway, a small bickering windmill, or a good house buttressed up against a pier and rising above the parapet.

Some defensive bridges in Old England had an important look as late as the reign of George III. Thus the Welsh Bridge at Shrewsbury has quite a noble air in engravings of that period. At the present time our gateway and towered bridges are plain specimens of this mediæval tradition. One at Warkworth, Northumberland, belongs to the 14th century. It has a squat tower with plenty of stonework above the gateway, but the gateway itself is so low and narrow that a gipsy's caravan cannot pass through it. As to the bridge, its simple dogged architecture has points worth noting. There is the roadway, which has a pleasant line dipping towards the gateway, and having a triangular recess for the convenience of travellers in the great central pier. The gateway is at some distance from the abutment, and the wall that unites them has a curve that repeats in two places, but in a modified manner, the line of parapet formed by the recess. Although the pier midstream is triangular, an attempt has been made to mask the false principle involved in this type of cut-water; that is to say, the mason tried to thrust into the oncoming river a larger bulk of masonry

Bridge Chapel, Bradford-on-Avon, Wilts.

than was usual in sharp-beaked piers and buttresses. It is odd, but mediæval bridge builders very often believed that a pier, however substantial in bulk, ought to cut water like a knife, instead of presenting a bold surface to the swift current, a surface having weight and resistance, as in those occasional piers in French bridges of the Limousin, whose sectional form is similar in shape to a Gothic drop arch, or else to an arch which is formed on an equilateral triangle. It is clear that a section of this kind has a greater surface than that of a triangle, and consequently greater power and opposition.

As a fair type of the defensive bridge in Great Britain, I have chosen for illustration the Monnow Bridge at Monmouth. The bluff old tower has rounded ends facing the river, and one arrow-hole can be seen in my photograph. There are machicolations above the gateway, flanked by arrow-slits,

The Monnow Bridge, Monmouth.

and just below the roof is another aperture through which stones could be hurled or molten lead poured. Horatius Cocles would have been glad of a tower like this on the Pons Sublicius. It was not till much later times that the Romans, by building triumphal arches on the roadways of important bridges, created a tradition that passed through the Middle Ages onward to our own time and to contemporary work. The arches in the Monnow Bridge are round, and note that they are *arcs doubleaux*, as the French describe those vaults in which at certain intervals a concentric arch is supposited, or the vault itself at certain places is of double or greater thickness than at others, so that bold ribs project from the belly of arches. *Arcs doubleaux* are common in old English bridges, and some of the most interesting are Elizabethan, notably in the beautiful Wilton Bridge across the Wye, near Ross, in Herefordshire, built of reddish sandstone in 1599. In the Wilton Bridge the voussoirs are notched or joggled into each other in accord with that Norman fashion which left a history of itself in such work as the fireplaces in Fountains Abbey. Many students of the evolution of bridges give insufficient care to the ring of arch stones. In the Monnow Bridge at Monmouth a slight tentative effect has been made to give the arch stones some freedom from the oscillation sent through the spandrils when a great weight passes over an arch. A slight tentative effect, I repeat, because the voussoirs have not been made independent from the spandrils. To find arches of this type we must go to the noble Valentre Bridge at Cahors, dating from the 13th century. Five acute-angled piers rise from the water to a high parapet, forming crenelated recesses on each side of the roadway; and the voussoirs of the six principal arches, gracefully pointed, are, as Viollet-le-Duc says, extradosses, like the round arches in the best Roman bridges. This makes the ring of each arch independent from the construction of the spandrils, so that they keep their elasticity, and cannot pass on through the rest of the bridge any tremor sent down from the roadway into the spandrils. On the other hand, when arch stones are unequal, thicker in their haunches than in their crown, oscillating movements go along the full length of a bridge, causing undue fatigue to the piers, and sometimes a very noticeable trembling, as in the bridge by Inigo Jones at Llanrwst. Perronet, the great French engineer of the 18th century, forgot this effect of repercussion when he designed and built Le Pont Louis XV. at Paris; and in the hope that he would remedy his mistake he clamped his arch stones together with iron all along the soffit, as if metal fastened into stone could never in the course of time become a destructive agent.

The architect of Valentre Bridge was wiser than Perronet, every arch in his work being an elastic bow that is able to move between two piers without conveying its oscillation beyond those supports. To our modern eyes, no doubt, there are too many arches across the River Lot at Cahors, but this was necessary in the Middle Ages, and for two reasons. It was a necessity of defence, because narrow arches were easier than broad ones to protect from the roadway if an enemy wished to assemble boats under a bridge; and since in the frequent wars of those days a bridge had often to be cut as a final resource against defeat, it was essential that the destruction of one arch should not upset its neighboring piers by the withdrawal of a counterbalancing thrust from one side of the piers. Many piers of a large size were essential, above all, when the greater lateral thrust of round arches had to be considered in its relation to a bridge cut in a single place. Further, bridges in the Middle Ages were built very slowly, bit by bit, their construction lasting from ten to twenty years; and as war at any moment might stop the masons, there was a great need that every arch should have for their support such strong piers as would be equal to the stress and strain of all eventualities. From this standpoint, then, as well as from the militant strategy of bridge-building, many powerful piers were necessary, and a bridge gained very much in value when its pointed arches had in their voussoirs the characteristic which all authorities praise in the Valentre Bridge at Cahors.

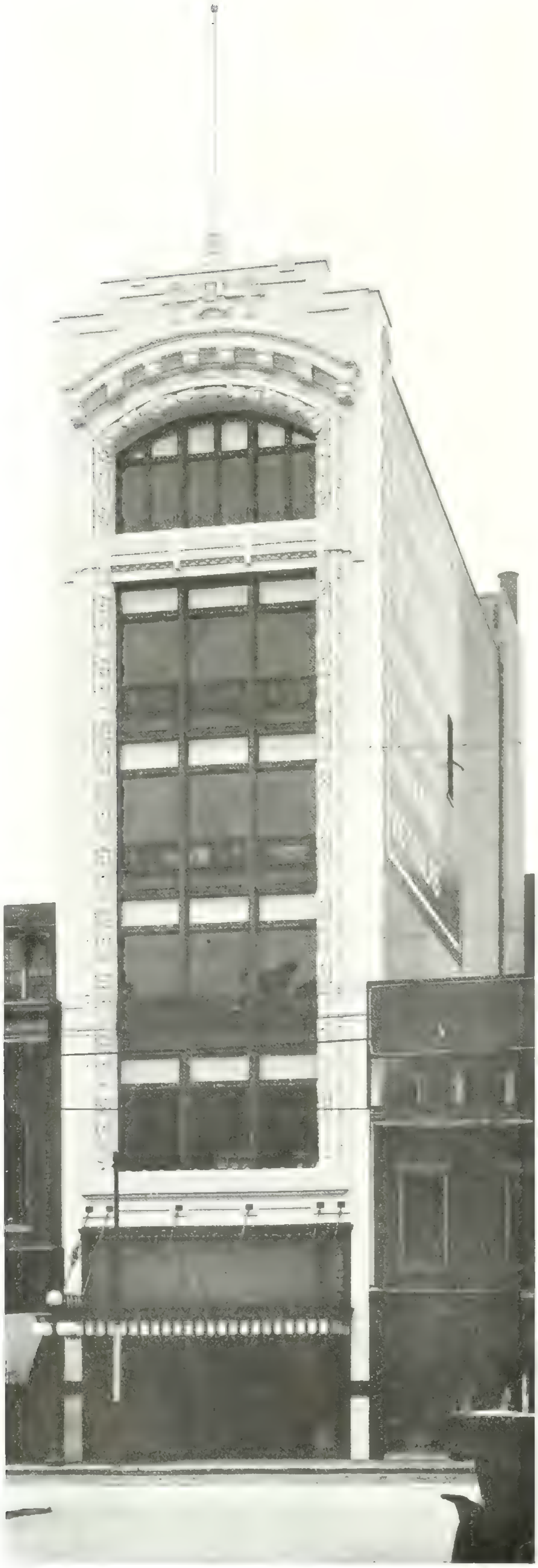
But it is time now to say a few words about bridges with chapels. These became common in the 14th century, and in most cases they were built up against their bridges from the water-level so as to be like extra piers in times of flood. We are fortunate enough to possess four examples at the present time, despite the vandalism which followed the suppression of monastic houses by Henry VIII. The chantry on Wakefield Bridge suffered greatly in those days, and its desecration continued till the year 1847, when its beautiful architecture, dating from the time of Edward III., was restored at a cost exceeding £2,000. Some authorities believe that the style belongs to Edward II.'s time, but the endowment was certainly made by Edward III. in a charter written at Wakefield; he settled £10 per annum on William Kaye and William Bull and their successors for ever to perform divine service in a chapel of St. Mary newly built on the bridge at Wakefield." There has been much controversy over this bridge chapel, so I refer you to C. A. Buckler's "Remarks upon Wayside Chapels," and to N. Scatcherd's "The Chapel of Edward III. on Wakefield Bridge." Perhaps the precise date of the charter of endowment may have been 1362, a jubilee year, in honor of the fiftieth birthday of our third Edward. This king did much to protect the wool trade, and Wakefield was dependent upon woollen handicrafts, and an ancient tradition says that the chapel on Calder Bridge was built by the inhabitants of Wakefield. Another endowment seems to have been made by the fourth Edward, in memory of his father Richard, Duke of York, killed at the battle of Wakefield in 1460. It is certain, I believe, that the chantry was much visited by local pilgrims who came to do honor to a statue of the Virgin.

Yorkshire owns another chapelled bridge, the one at Rotherham, first built in 1483, but it has less charm than that which belongs to the little dovecot chantry on the picturesque bridge at Bradford-on-Avon, Wiltshire.

Do we possess a bridge buttressed by a watermill? Bridge and mill are often close together, but not so near as they are in some French examples. In the Middle Ages they often formed but one construction, built entirely of wood. A good example survived at Meux, in Brie, till 1835, having weathered storms since the 15th century.

The Puente Mayor over the Miño, Orense, Spain

Mason & Risch Building
Toronto



Bond & Smith
Architects

THE MASON & RISCH COMPANY'S NEW PREMISES, TORONTO

Handsomely appointed structure designed for the display of piano and other musical accessories. Description of its plan and features of decoration.

NO WORD IN THE BOOK of adjectives more aptly describes the new Mason and Risch building, Toronto, than the much misused term "unique," for apart from representing the solution of an unusually interesting constructive problem, it has the features of plan and decoration which rightfully entitles it to this attributive. Without obscuring the purpose for which the building is intended, the architectural scheme, nevertheless, departs from the conventional arrangement and decorative character of the average music house to an extent which induces one to regard it more as a metropolitan conservatory, incorporating in its plan a series of artistically appointed music chambers, than a building designed for the display and sale of pianos and other musical accessories. This impression prevails immediately upon entering, for there is little to suggest a commercial institution, such as the large windows of the exterior indicate.

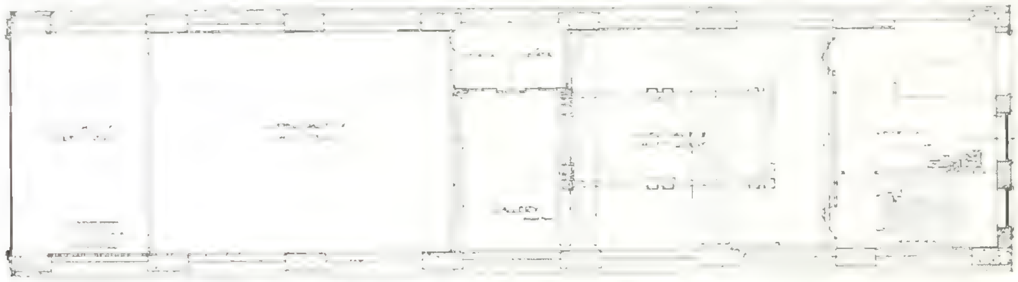
The reception room, which is entered from a richly panelled vestibule, is designed in Italian Renaissance with hand-carved walls of Circassian walnut, and an enriched ceiling decorated in tints of green and brown. The lighting, which is by artificial means, is effected by wall pendants executed in bronze and having alabaster bowls carved from the architect's design at the quarries in Italy; and also by hidden lights above, which sends their rays through alabaster slabs forming the panels of the ceiling. Above the wall panels are the names of the great composers forming a part of the carved decoration. The floor is in Italian marble mosaic, while special furniture, a Turkish rug, and a large palm which spreads its branches from an Italian sculptured vase, complete the adornment and enhance the richness of the scheme.

At the rear is a small hall giving access to the elevators, and the palm room or Roman court which adjoins. This latter room, which is in Roman-Doric style, is carried out entirely in English semi-glazed terra cotta. Here the lighting fixtures consist of alabaster bowls resting on bronze tripods, while well proportioned columns support a mezzaning or gallery floor, provided with desks and chairs, where customers may rest and talk over articles which they contemplate purchasing.

Ground Floor Plan, Mason & Risch Building, Toronto. Bond & Smith, Architects.

It might be mentioned in this connection that there are no two floors that are typical in arrangement, nor any two rooms that are identical in decorative detail; yet the effect throughout, both as regards line adjustment and color is one of exquisite harmony. For instance, the second floor, or art floor, as it is designated, is taken up by rooms representing various periods, the principle one being the large Empire room for the display of high grade pianos, which is carried out in a tone of soft amber, the walls and ceiling being both hand carved and hand painted, with medallions of great musicians above the panels, and chandeliers in bronze and English gilt of Empire design. In addition to this room, the

Basement Plan, Mason & Risch Building, Toronto. Bond & Smith, Architects.

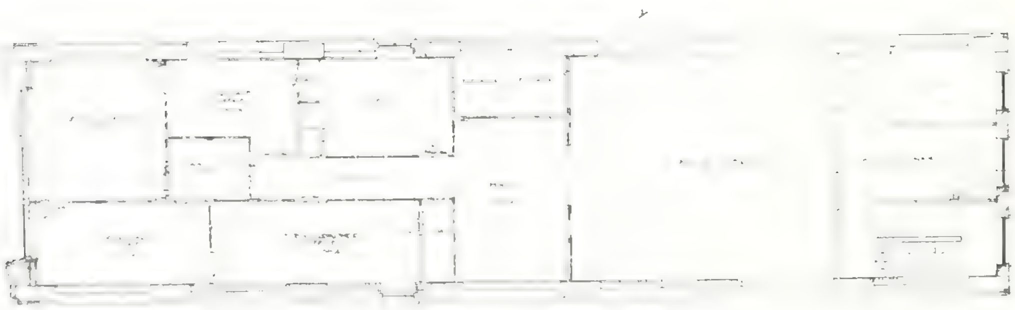


Mezzanine Between First and Second Floor.

Second Floor.

Third Floor.

Fourth Floor.



Fifth Floor

General Floor Arrangement, Mason & Risch Building, Toronto. Bond & Smith, Architects.

suite includes a Louis XV. interior; a Georgian room with Ionic pilasters and Sheffield silver sconces and chandeliers; a Mission room with instruments to correspond, and an organ chamber which is finished in white enamel. When the organ is playing the sound will be conducted through an ingenious arrangement of grilles opening onto the mezzanine and

Detail of Entrance, Mason & Risch Building, Toronto. Bond & Smith, Architects.

thence through the court into the reception room, the sound gradually diminishing in volume, and the notes on striking the ear at the entrance producing a soft and low effect like distant music.

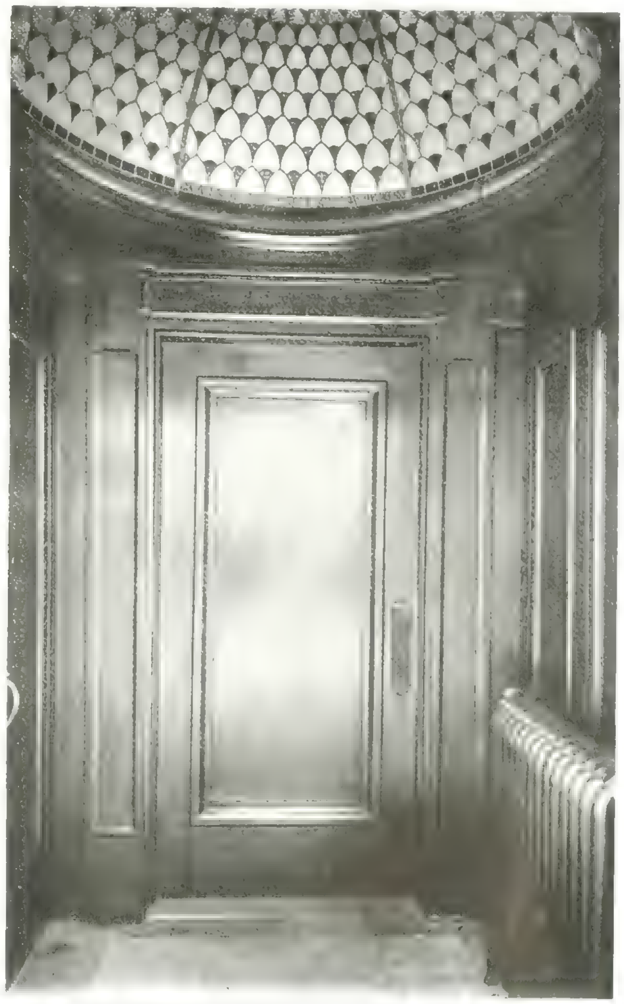
On the third floor is another large piano room, together with a tuning compartment, and three sound proof interiors furnished similar to drawing room with hardwood floor and rugs. The president's office and board room at the front are two interesting rooms, decorated with soft brown wall effect and furnished with mahogany furniture and rich, soft rugs.

The fourth floor comprises the player piano department. Four front rooms panelled in leather effects are designed to advantageously display these instruments. In addition, this floor has several sound proof "try" rooms for demonstration purposes, as well as a large room for exchange and second-hand pianos. While some few rooms in the building are similar in certain features of design, the color effects or wall patterns vary, so that each interior has a a scheme that differs from the others.

The executive suite is on the fifth floor, the general manager's office and that of the secretary, being furnishd with mahogany and Turkish rugs. On the walls Japanese grass cloth in tones of blue, old rose or brown, serves to effectively individualize the various rooms. Adjoining are the stenographer's quarters, while a large room at the rear, houses the circulating library of musical records which are exchanged by the patrons like books.

The sixth floor is finished in green stained cypress, and is occupied by the firm's general offices which are well lighted and arranged, and have large well ventilated coat rooms and modern lavatories adjoining for the accommodation of the general staff.

All the floors including the basement are served by two passenger and one freight electrically operated elevators. One of the passneger elevators is of the traction type, having a speed of 300 ft. per minute, and is equipped with safety slow-down and stopping switches in the hatchway, and oil cushion buffers in the pit for both car and counter-balance. The other car is an automatic lift, intended mainly for the use of employees. It is brought to the floor where its use is required by push buttons on the outside of



Detail of Vestibule, Mason & Risch Building, Toronto. Bond & Smith, Architects.

each doorway. After closing the door the passenger presses a button corresponding to the floor which he desires to reach. No door can be opened except at the floor where the car stops, and as long as the door remains open the car cannot be started. While the car is running it cannot be interfered with by any of the floor push buttons, but if the passen-

Palm Room, Ground Floor, Mason & Risch Building, Toronto—Designed in Roman-Doric Style and Finished in White Glazed Terra Cotta with Mosaic Floor. Bond & Smith, Architects.

Mezzanine or Gallery Overlooking Palm Room, Mason & Risch Building, Toronto—Showing Grille in Ceiling Beneath Organ Chamber. Bond & Smith, Architects.

Reception Room, Mason & Risch Building, Toronto, Looking from Entrance Toward Palm Room. The Wall Scheme is in Hand Carved Circassian Walnut and the Lighting Fixtures are in Bronze with Alabaster Bowls Carved from Special Design at the Quarries in Italy. Bond & Smith, Architects.

Period Rooms, Second Floor, Mason & Risch Building, Toronto. Bond & Smith, Architects.

Staircase and End of Basement Corridor, Mason & Risch Building, Toronto. Bond & Smith, Architects.

Hall Scheme of Phonograph Section in Basement, Mason & Risch Building, Toronto. Bond & Smith, Architects.

Board Room, Third Floor, Mason & Risch Building, Toronto—Finished in Mahogany with Soft Brown Wall Effects. Bond & Smith, Architects.

Large Piano Room, Third Floor, Mason & Risch Building, Toronto. Bond & Smith, Architects

Empire Room, Second Floor, Mason and Risch Building, To ronto. Bond & Smith, Architects.

Louis XV. Room, Second Floor, Mason and Risch Building, Toronto. Bond & Smith, Architects.

ger wants to stop the car this can be done by merely pressing a special button in the car. This system makes the elevator perfectly safe against accidents. These elevators are equipped with plate glass mirrors on all sides, and lighted by overhead clusters of five frosted lamps. The car grille and fixtures are specially designed and are finished to harmonize with the general scheme. The elevator doors are of the kalameined type in verde antique with polished wire plate glass panels arranged to give a two-thirds opening. These doors correspond with the type of fireproof doors used throughout the building.

In the basement, which is occupied by the phonograph department, is the largest record rack in Canada. Here there are several rooms for demonstrating purposes, one finished in white and gold, and the others in mahogany with Japanese grass cloth covering the walls. At the rear is a staircase of Canadian marble and a door leading to one of the most modernly equipped engine rooms to be found in Canada.

The construction of the building, which was described in detail in the March issue of "CONSTRUCTION," is of skeleton reinforced concrete with floors of hollow-tiled blocks 12 x 12 x 8 inches. These blocks are placed end to end between the beams in rows at 16 inch centres, (allowing a 4 inch joist between), and covered with two inches of concrete which in turn carries a two inch strip of cinder concrete fill, having two inch wooden strips to which the flooring is nailed. This construction gives a floor that is not only light in itself, but sound proof and resonant, which feature is an important consideration in a building of this character. The concrete used throughout is a 1: 2: 4 mix; the Kahn system of reinforcement being used, and the work in general being carried out according to the specifications of the Trussed Concrete Steel Company.

The exterior of the building is in glazed terra cotta with verde antique metal window frames and marquise of similar metal over the entrance; the treatment of the facade being particularly meritorious. The building rests on concrete caissons carried on to bedrock 48 feet below the sidewalk level.

A brief reference might be made here to the electric lighting scheme, which may well be considered as representative of the possibilities which lie in modern illuminating engineering, and how the application of artificial light to modern requirements has been reduced to a scientific basis. In the reception room, as previously mentioned, the general illumination is accomplished principally by concealed ceiling lights, the light rays being filtered through sixty white Alba panels forming the overhead scheme. The soft effect produced by this arrangement is further added to by the well placed bracket lights, which are beautifully designed, and also by the extreme height of the room. From here throughout the entire building the lighting units are of distinctive design, thoroughly in keeping with the periods represented in the decorative scheme of the several rooms. The fixtures in the Empire, Louis XV. and Georgian rooms are particularly noteworthy, while the simplicity of the lighting unit employed in the Mission room, as well as the ornate and simple character of the Classic units used in the balance of the rooms, suggest a consideration such as details of this nature seldom receive. A novel feature of the show window lighting is the elimination of any direct glare and the shadowless results that are produced, while an unique arrangement of electric light transmitted through leaded glass is found in the vestibule, where a beautifully colored dome forms an attractive feature.

The architects of the building were Messrs. Bond & Smith, and the contractors for the structure itself were the Bishop Construction Co., of Toronto and Montreal, who carried out the work in record time.

Sixth Floor Plan, Mason & Risch Building, Toronto. Bond & Smith, Architects.

Other concerns connected with the erection of the building are: Joiner work, R. J. Kirby; plumbing and heating, John Ritchie Plumbing and Heating Co.; plastering, W. J. Hynes; roofing, W. E. Dillon & Co.; interior hardwood, Charles Rogers; elevators, Turnbull Elevator Co.; cast-iron window frames, Canadian Ornamental Iron Works; painting and decorating, E. J. Linington; fireproof doors, A. B. Ormsby, Ltd.; lighting system and fixtures, Tungstolier Company of Canada, Ltd.; electric fixtures, the Sterling Bronze Co.; sidewalk lights, mosaic flooring, Luxfer Prism Co.; steel sash and hardware, Aikenhead Hardware Co.; metal lath, Trussed Concrete Steel Co.; alba glass, Macbeth Evans Glass Co.; bronze store front, marquise, and interior stairs, Canada Foundry Co. The exterior terra cotta work was set in place by Elgie & Page, and was furnished by the Eadie-Douglas Co., which firm also supplied the interior terra cotta and marble work.

A REPORT from St. John, N.B., states that there is an increasing demand for modern hotel and apartment house accommodations and that in all likelihood several important buildings of this type will be erected in the near future. At the present the nearest approach to an apartment house is a remodelled hotel in which the suites rent from $35 to $50 a month.

MEMBERS OF O. A. A. CONVENE AT OTTAWA

Proceedings of the twenty-fourth general annual meeting of the Ontario Association of Architects, held at Ottawa on September 13, 14 and 15, 1911.

PROCEEDINGS of the twenty-fourth annual convention of the Ontario Association of Architects were conducted by a fairly representative number of Association members. The business meetings occupied the mornings of the first two days. The officers elected for the year are: President, A. Frank Wickson; Secretary, Herbert E. Moore; First Vice-president, Jules F. Wegman; Second Vice-president, Colborne Meredith; Treasurer, Grant Helliwell. The Council consists of A. F. Wickson, Jules F. Wegman, Colborne Meredith, Grant Helliwell, Professor C. H. C. Wright, J. Power, A. E. Nicholson, J. A. Ewart, and Herbert E. Moore. The three new members who were elected to the Council are Messrs. Meredith, Power and Moore. The general business which occupied the first session of the convention may be summed up in the President's address and the reports of officers and committees.

President A. Frank Wickson's Address.

To the Members of the Ontario Association of Architects:

It was with much pleasure that our Council accepted the invitation of the Ottawa Chapter to hold our twenty-fourth annual convention in the Capital, and we are indebted to the Chairman, Mr. Nofke, and members of the Chapter, for arranging for most of the interesting features of the programme.

Last year's convention was somewhat unusual, owing to the transference of all business from January, 1910, to this year's meeting, all members of the Council holding office until that date. The convention, however, was by no means devoid of interest. One part of the programme was an excursion to the historical Brock's Monument and the inspection of the Electrical Development Company's plant at Niagara Falls, and those who joined in it will not soon forget the pleasure of the occasion.

A special general meeting was held in January, 1911, at which, as referred to in the Registrar's report, the important question of federation with the Royal Architectural Institute of Canada was considered, and the joint report of the Committee of the Quebec Association and the Ontario Association was adopted. The portion of the evening which is well worth repeating, was the attempt to have subjects of a very practical nature and of everyday occurrence, presented in a manner that would be useful in one's actual office work, such as the short illustrated descriptions of the design, construction, difficulties and experiences in connection with several large buildings. It was the kind of meeting that the Chapter might well have quite frequently.

At the last convention, the Council was instructed to take a plebiscite on the question of applying to the Legislature for certain changes in our charter, but on finding that there was a large section of our members opposed to the application, we deemed it inadvisable to even take such a plebiscite until at least it was reported back to another convention.

The Council has given considerable time and attention to the admission of new members, both as regards those taking examinations and those applying on other grounds, and as a result has refused membership to quite a number of applicants, almost in every instance because the character of the designing was not considered satisfactory, and in the future there will likely be more refused admission than in the past for the same reason. In the case of a student, however well one may pass the examinations in technical subjects, until he can design, he should not be a member of our Association in full standing, and the final word in connection with any person's application should be as to his ability to design, rather than construct, though, of course, construction cannot by any means be minimized.

The usefulness of our Association can be infinitely increased by having for its members only men with ability to do real good work, because in this way only can we prove that we have a right to obtain the work; skilful designing and a strict adherence to the higher ideas in connection with all business matters and professional ethics, if persisted in, are bound to tell.

Architects who have only their own personal and financial advantage in view are not the ones who are a source of strength to the Association. Applicants for membership in any Association such as ours, who strive to obtain admission not from the sense of honor of belonging, nor because of their professional fitness for membership, for the advancement of the cause, nor because of what they can do, but rather for the standing they would get if admitted, are a detriment instead of a help.

The greatest aim of our Association should be the improvement of architecture in our own country, both by education for the coming generation and by continual effort to improve our own work. I could almost implore the individual members to this end to make it the greatest ambition of their lives to do good work. No decent man is honest simply because he considers it pays, but nevertheless an honest man who plugs away at his work, living a life of strict uprightness because he believes it is the proper way to live, usually finds in the long run that it does pay, and in a similar manner the architect who works and studies and worries over his designing, often thinking it a waste of time financially, but believing it to be the only way to practice, ultimately finds that it has paid him well. I mention this because in spite of any mistakes we have made and opportunities we have lost, our organization is now fairly universally recognized, and with the standing that is already obtained I am positive it lies with us to become a powerful influence in the Province. More legislation might or might not accomplish much for us, but with more legislation, less legislation, or in spite of what we already have, our members can, by persistent efforts along the lines above referred to, give us a still more desirable professional position.

It is astonishing, as one looks around the cities and towns of our own country and of the United States, to see the amount of average ability or less displayed and in consequence the really meritorious works are quite conspicuous instead of being quite usual. Of course every architect cannot be a genius, but all can try to design logically and all can study good example. The reading of desirable books, even if some of them seem to belong to the amateur class, is often a good reminder of some of the essentials of architecture. I believe the study of good books to be of almost more importance than that of the current periodicals, although the latter should not be neglected. An architect is too old to practice just as soon as he is too old to read on architecture.

To practice one's profession under the conditions above referred to, the architect must be reasonably remunerated, and while many years ago the habit of doing work cheaply was not unknown, it now gives one almost a shock to be informed of an architect accepting commissions at far less than the accustomed percentage. Our Association is not a combine nor a trades union, and it does not attempt to control members in their charges, but nevertheless, in this connection, I should like to emphasize the fact that no architect can do his work honestly and make a decent living at less than the accepted rates as outlined by our schedule; either he neglects his work or loses money, and by neglecting work I do not mean necessarily the leaving of his office unattended or the lack of inspection, but I do mean these and the rushing of drawings through without the study that is necessary to make the best of the problem he has in hand. We have no right to criticize a member for doing work for cost or even less if he chooses, but he is open to the most severe criticism if he does not make it plain to his clients that he is not charging a reasonable and honest fee for his work. One might deliberately lose money on work for some ulterior motive such as prospects of future larger work, or he might do it for purely philanthropic motives, but to neglect to make it plain to one's client that the charges thus made are not in any sense an indication of the value of the services rendered is to leave all other architects in the false position of apparently overcharging for their work, and is to that extent dishonest. In respect to the general trend of work, there are indications that a move in the right direction has been made in regard to the planning and designing of churches, many of the most recent ones conforming to the Gothic plan, as well as the exterior design. Houses, too, are in many instances being designed in a simplified way. We, and the Americans also, have at last learned that the English know how to plan, to design and to live, and their influence is certainly being felt on this continent with good results to our domestic architecture.

It may seem like a superfluous suggestion to plead for some harmony in contiguous buildings, but generally speaking, it is a matter almost entirely overlooked. A refreshing instance has been given in Toronto, where two buildings to be erected side by side were glaringly inharmonious, and through the intervention of the Guild of Civic Art attention was drawn to the incongruity. As a result one building was raised a story in height and the other was made of a material of a color much more suitable. The question for us is, should not this have originated with the architects interested in the two buildings?

The question of competitions has, as usual, been prominently to the fore, and we have to record one satisfactory instance, viz., that of the new Knox College, in which the conditions were of such a character as to encourage good architects to take an interest in it. The others were those for the Hamilton Library, the Goderich Town Hall, and the Government House, Toronto, and the less said about these the better. It is to the credit of the Association that, however much they would have liked to participate in some of these, many declined to be drawn into anything so unsatisfactory as these promised to be and ultimately turned out to be, and some of those who did enter would not have done so, in one instance at least, but for a misunderstanding as to the conditions being revised. In regard to the Government House, it is stated in one of the dailies that the work is now being principally done by a New York architect. As many architects are constantly receiving inquiries about competitions and invitations to enter them, it might be well for our Association to have some new printed matter relating fully to the subject and describing the different ways in which competitions might properly be held, then one of these folders could be sent to any inquirer.

The Toronto Industrial Exhibition two years ago established an architectural department which is most heartily commended to the attention of all our members. It is one of the opportunities to have a large public become acquainted with works of merit and we cannot hammer away too insistently at the educational side of our work. The English examples, when we can obtain them, should be a source of great pleasure as well as profit.

We have had many occasions in the past to be dissatisfied with the giving of large works to American architects, and there are still too many cases of discrimination against our own countrymen. It therefore gives pleasure to be able to record the fact that the Hudson's Bay Company's departmental store at Calgary is in the hands of a Canadian firm, also the new C.P.R. office building in Toronto.

One of the ways by which Canadian architects can commend themselves and our Association to the public is to be careful in giving estimates for work, so that the tenders when taken do not belie the figures. Backbone enough to tell clients what a building is really likely to cost not only saves trouble, but in the end engenders a respect that has much to do with confidence in local men.

The homely character of this may seem almost unworthy of an annual address, but owing to the frailties of our human nature, we seem to need frequent reminders of the most ordinary principles, and I have felt so strongly on the subjects referred to that I have taken chances of being considered very ordinary.

In closing, I wish to express my appreciation to those members of the Council who have done so much of the work, and to the Registrar for the efficiency and persistence with which he has carried on his end of our Council's proceedings.

Registrar's Report.

The Registrar's report for 1910-1911 of the Ontario Association of Architects, was read by Registrar Herbert E. Moore, as follows:

Membership: The present membership of the Association is 104, of which three are honorary members and 101 regular members, from the following points:

Toronto	60	Port Arthur	1
Ottawa	18	Fort William	1
London	4	Peterborough	1
Hamilton	2	Collingwood	1
St. Catharines	1	Chatham	1
Guelph	1	Kingston	1
Pembroke	1	Winnipeg	2
Barrie	1	Montreal	1
Paris	1	Regina	1
United States	2		

The present membership represents an increase of 17 since January of 1910. Of this number 7 were admitted by examination, 8 were admitted through acceptance of application for membership, and 2 were reinstated in good standing. Of the present membership, it is probable that at least three will be crossed from the books, due to either intended resignation or non-payment of fees.

Council: From January 12th, 1910, (Winter convention) to August 31st, 1910 (Summer convention), the Council held eleven meetings with an average attendance of six. From August 31, 1910, to September 13, 1911 (annual convention), the Council held fourteen meetings with an average attendance of five. The personal attendance of the members during these two terms, consisting in all of twenty-five meetings, is as follows: Wickson (President), 24; Wright (First Vice-president), 10; Sproatt (Second Vice-president), 14; Helliwell (Treasurer), 22; White (Toronto member), 20; Brown (Toronto member), 16; Wegman (Toronto member), 19; Nicholson (St. Catharines), 8; Ewart (Ottawa), 0; Moore (Registrar), 25.

Students' Examinations: Examinations were held in April, 1910, and in May, 1911. In April, 1910, 20 students came up, including 6 supplementals in the final year, of which 6 passed the first, 3 passed the second, and 7 passed the third. One student in the final was allowed a supplemental in Design, which he passed, and one student was allowed a supplemental in Architectural Jurisprudence. In 1911, 13 students came up, of which none passed the first, 5 the second, and none the third, although two out of three will be allowed a supplemental in Design. Regarding the subject of Design, the showing has been so poor, both as to students and applicants for membership, that the Council, appreciating the fact that Design is the basis of architecture, deemed it necessary in the best interests of the Association to raise the standard and maintain a policy of admitting to membership only those who are in all respects properly qualified.

Guild Fund: No award has been made for the past two terms from the Guild Fund, which now consists of a $400 debenture and savings account balance of $106.75.

Proceedings: The tenth annual Volume of Proceedings was printed in June, 1910, and about 1,100 copies have been distributed. This volume contained an innovation in the way of a series of plates of various buildings erected by members of the Association.

Architectural Exhibitions: During the past two years very creditable architectural exhibitions have been held in connection with the Canadian National Exhibition in Toronto, and under the auspices of the Association. This has resulted in considerable additional work for the Council, and it is hoped the results will warrant the co-operation of every member of the Association.

Report of Board of Examiners.

Edmund Burke, Chairman of the Board of Examiners, Ontario Association of Architects, for the years 1910 and 1911, made the following report:

The following report deals only with the applicants for membership who desire to be admitted without passing the prescribed examinations. They are, as a rule, men already in practice and too far on in life to take up the work of preparing for examination.

During the past two years your Board of Examiners has considered and reported on twenty-one applications for membership, eight of which were passed and admitted to membership in the O.A.A. by Council, five were rejected, while the eight remaining applicants failed to appear before the Board after being notified to do so.

It is the practice for the Council to refer all applications of the kind above referred to, to the Board for a report, and the applicant is required to appear personally for examination, submitting drawings and credentials, or to forward, if non-resident, drawings, credentials and such information concerning his ability and character as may be required. The report and drawings are then forwarded to Council for consideration and decision.

While the ability of the men passed upon by the Board and accepted for membership has been, in the main, of a satisfactory nature, the status of those rejected has been unsatisfactory chiefly from the standpoint of design.

In making its reports, the Board has been careful to adopt a policy tempered with leniency and due appreciation of the conditions and the facilities for obtaining an architectural education, but at the same time to preserve a standard, commensurate with the architecture and requirements of the times, and bearing in mind that the business prosperity and growth of the country have resulted in raising the standard in all educational institutions as well as in all professions.

As to professional ethics, the applicants as a rule seemed earnest in their expressed desire to respect and uphold the aims and objects of the Association, and such deserve to be given every encouragement, while there also are those who would, apparently, desire to merely further personal commercial interests in their endeavor to become members of the Association. Your Board begs to express the opinion that we must ever bear in mind that it is only by maintaining a high standard that our Association will be made a force for public and professional good and preserve it as a body to which it is an honor to belong.

Report of Toronto Chapter.

Gordon M. West, the Hon. Secretary-Treasurer of Toronto Chapter of the Ontario Association of Architects, reported for his Chapter as follows:

The Chapter has with success continued its fortnightly luncheons with an average attendance of slightly over sixteen for the season. The younger members of the Chapter have been particularly well represented.

During the course of the year a committee of three was elected as part of the general citizens' committee appointed to make a memorial to the municipal authorities with a view to securing a revision of the city building by-law. The Chapter has also undertaken its share of the financial burden in this respect.

A committee was appointed to act with the Council of the Association towards securing exhibits for the Canadian National Exhibition, and Messrs. Watson and West were appointed a committee to meet the Council of the Association in connection with the proposed instruction or classes in Design in Toronto this winter.

During the latter part of the season the stereopticon purchased by the Association has been used considerably, notably to view a number of slides kindly loaned by the Department of Architecture at the University. One or two interesting talks were also delivered by Mr. C. Q. Cole, consulting engineer, and Mr. McConnell of the University.

It is the intention of the Chapter to continue along similar lines during the coming season, when even better use may be made of the stereopticon and some interesting and instructive evening meetings may be held.

Treasurer's Report.

Treasurer Grant Helliwell made a detailed financial statement covering from July 31, 1910, to July 31, 1911, and for the seven months from January 1 to July 31, 1910, which showed the Association to be in excellent financial condition. The business-like character of this report and the close attention to the financial details of the Association that it evidences, should win the appreciation of the Association. An interesting paper by Professor Charles Currelley, of Toronto University, on the Architecture of the Egyptians in relation to Archiology, with discussions upon this, and the various reports, closed the business of the convention.

THE "YOUNG CHICAGO" ASPECT OF FORT WILLIAM.

THE EXTRAORDINARY, it might almost be said ridiculously, high price of real estate at Fort William, Ontario, has a good excuse in the great promise of that rapidly growing city. The terminal of three great transcontinental lines, which make it with Port Arthur the greatest port on Lake Superior, and its wide, deep river, causes the observer to remark, "a young Chicago." In fact the situation and topography of the two cities are very similar, and the same causes that have made Chicago great in population and commercial importance are found in this northern city. The Canadian Pacific Railway at Fort William and the Canadian Northern at Port Arthur, have already built terminals, docks and elevators that are among the largest and best in Canada. The great territory reserved by the Grand Trunk Pacific bids fair to equal both in extent, while for shipping, with a river of sufficient depth for the largest steamers and a natural width of four hundred feet that can easily be increased, the shipping facilities will be commensurate with the railway freight demands. Great transfer warehouses are being built on the river front. The one most in evidence at the present time, the foundations being excavated, is that of the International Harvester Company. It will be built in three sections and when fully completed will have a frontage of six hundred feet. It will be one hundred feet wide and five stories high and a capacity of fifteen hundred car-loads. In plan the cities of Port Arthur and Fort William are similar to that of Duluth and Superior, though they will from natural causes become much larger cities. Port Arthur, with its high terraced situation overlooking Thunder Bay, is an ideal residence city, but the business and mass of population will gather on the Chicago-like low, flat alluvial deposit that forms the many square miles of site that spread out on both sides of the river, for Fort William's warehouses, docks, railway yards and the homes of those who are employed in them.

Lounging Room, Freemasons' Hall, Toronto. Edwards & Saunders, Architects.

Auditorium, Freemasons' Hall, Toronto. Edwards & Saunders, Architects.

A NEW HALL OF FREE MASONRY AT TORONTO

Devoted to the uses of St. George, Occident, Alpha, Zeta and University lodges, Occident Chapter and Cyrene Receptory.

THE MASONIC ORDER in Canada is one of its most basic institutions, and its structures, both in Canada and the United States, lend dignity to the streets they occupy. It should be remembered that it was the Masonic Order that promoted the erection of the "highest building in the world" when the Masonic Temple was designed by John W. Root and built in Chicago in 1886, the commencement of the "skyscraper" epoch in architectural history. The Masonic Hall at Philadelphia up to this time was the largest Masonic building. These are the most prominent cases where the Masons have gone out into the investment field and built structures that, outside of the needs of the Order, furnished general offices to the public as a source of revenue for the local organizations.

In most cases the Masonic Hall is designed to meet the special requirements of the local body, and in each case the designer seeks to express in his design something of the strength, dignity and high purpose of the Masonic fraternity.

The Freemasons' Hall, the new building on College street, Toronto, designed by Architects Edwards & Saunders, which is here illustrated, is an example of this expression. In its exterior it has the lines of strength in its massive stone work that typifies the long heritage of Mason builder traditions from which the Order sprung and even on this modern street it stands as a Masonry monument to the builders of other times and epochs. It is situated on the south side of College street between Palmerston and Euclid avenues, and is the largest Freemasons' Temple under the auspices of St. George's Lodge. It is not a "one lodge" temple, as it will be the home of St. George's, Occident, Alpha, Zeta, and University Lodges, Occident Chapter, and Cyrene Preceptory. The building is forty-six feet and a half by one hundred and thirteen feet, is three stories and basement in height.

The facade is of white sandstone. The Corinthian columns are three feet in diameter and thirty-three feet in height. Each column bears a bronze lamp of special design. An illuminated keystone is placed above the main entrance, and above in the gable is an illuminated medallion bearing the symbolic G.

The interior is well and in some cases ingeniously designed for the purposes of the several lodges, as is noted in the arrangement of stairs and doors, which obviate any interruption by several committees meeting at the same time. In the basement is a supper room, forty-two by fifty-seven feet, having a seating capacity of four hundred. This is for large banquets. The front portion of the basement is devoted to a buffet and luncheon room for use in conjunction with entertainments, and may be approached through different entrances. The first floor arrangement includes an auditorium, forty-two by fifty-seven feet in dimensions, a commodious and luxurious smoking-room, and a large committee room for the general purposes of the various lodges which meet in the new Temple. The ceiling of the auditorium is supported by eighteen-inch steel beams forty-four feet long. The lodge room on the second floor is forty-two by fifty-seven feet. The woodwork is mahogany, including the chairs and the case of the pipe organ, which is a feature in the rear of the room. In the front of this floor is a small supper room and a lounging room, with a coat-room on the mezzanine floor. The lighting fixtures were specially designed, and there are all the conveniences which modern architecture can suggest.

Freemasons' Hall, College Street, near Palmerston Avenue, Toronto. Edwards & Saunders, Architects.

Freemasons' Hall is the result of many years of earnest effort on the part of Frank Saunders, its architect, a Past Master of St. George's Lodge, to have a central temple for the Masonic lodges of Toronto, and in designing the building and in its construction has endeavored to give to his lodge a structure as near perfect as workmanship could make it.

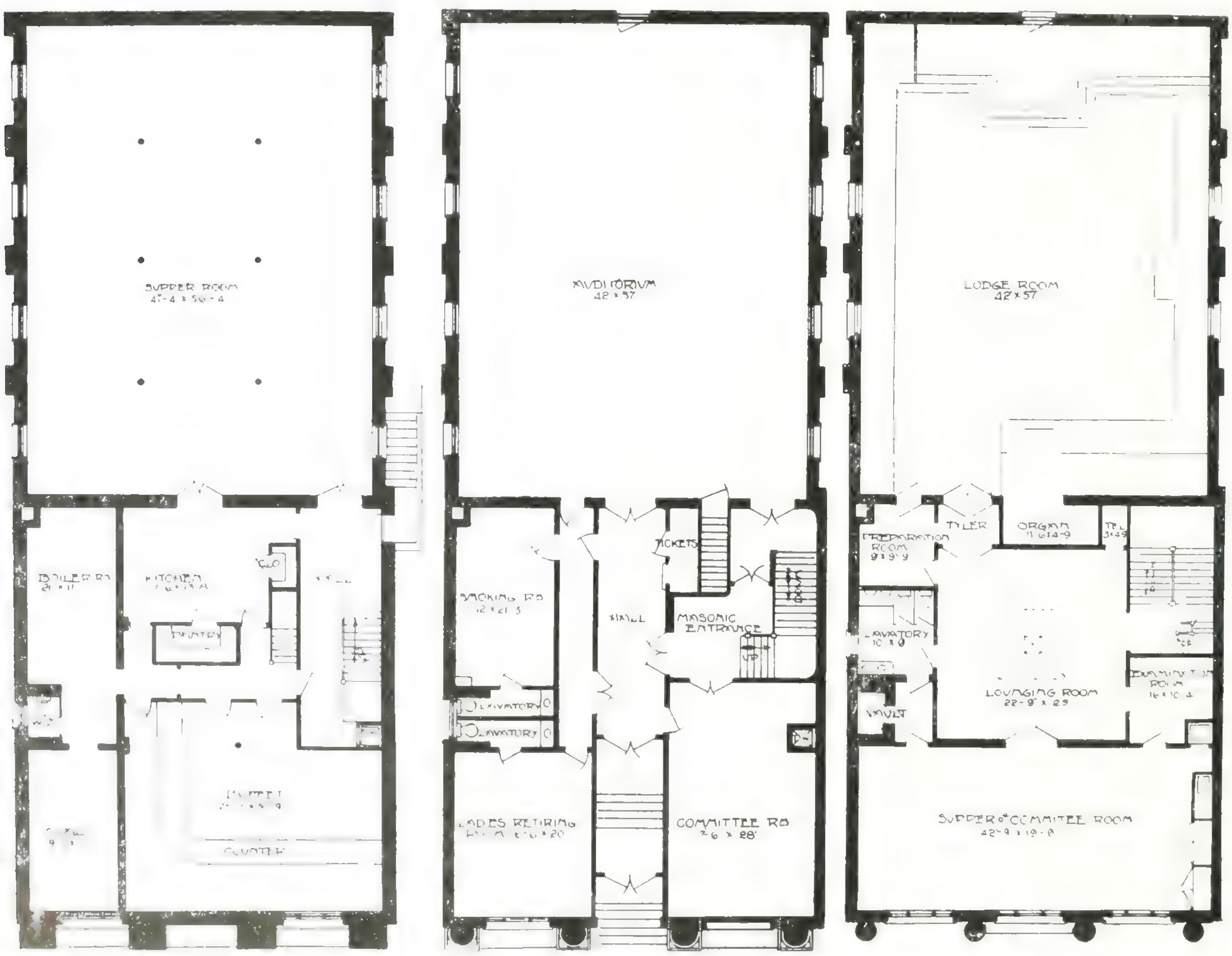
THE LESSON OF TATTERSALL CASTLE

CONSIDERABLE INDIGNATION has been provoked amongst the inhabitants of the little Lincolnshire town of Tattersall by the extraordinary and incredible mutilation that the 15th century castle, in which they take so much pride, is suffering at the hands of its most recent purchasers. The secrecy in which the whole transaction has been veiled, says *The Builder*, indicates that its perpetrators, whosoever they may be, realize its discreditable nature; but the visible progress of the work is a sufficient exposure of its barbarism and folly. The first of the four wonderful stone chimney pieces to be torn out from the walls has proved by its shattered fragments (as everyone familiar with them anticipated) that their beauty and preservation depended on the support of the brickwork in which they were structurally incorporated. The whole series forms so complete an heraldic illustration of nearly four centuries of family and memorial history that their re-erection elsewhere will be an incongruous absurdity, the very falsehood of which will rob their art of all that beauty which consists in fitness. All the antiquarian societies, national and local, are keenly striving to arrest or repair such gross vandalism, but their task is a difficult one.

This is but one more example of the urgent need of Government control over our national monuments. However well informed and energetic our voluntary societies may be, it is impossible for them to take the place of, and act as efficiently as, a properly constituted authority for the purpose of protecting works of artistic or archæological value, and the other features of interest such as typical scenes of natural beauty and the haunts of wild life.

All these matters would fall within the province of a Minister of Fine Arts when we get him appointed. Our readers are doubtless aware that steps have been taken towards scheduling buildings of special value up to the end of the 17th century, and that considerable progress has already been made in the preparation of this list. But, important as is the work of the Royal Commission so engaged, it by no means covers the ground necessary to include all that it is desirable to preserve. For one thing, it is limited to structures from the hand of man and does not extend to objects for the beauties of which we are indebted to the workings of Nature; besides, why should the period be arbitrarily limited by the date 1700; surely there is much that we should be sorry to lose belonging to more recent periods?

We would urge our legislators to take some such step pending the years that must elapse before a full list is prepared. Other nations have long been in advance of us in this respect, and we must endeavor to make up the leeway in the most expeditious manner, even if we have to discard the claims of strictly logical procedure in so doing.



Basement Plan. First Floor. Second Floor.

Floor Plans, Freemasons' Hall, Toronto. Edwards & Saunders, Architects.

Bungalow for E. C. Jury, North Toronto. Curry & Sparling, Architects.
View from South-east.

RESIDENCE IN NORTH TORONTO FOR E. C. JURY, ESQ

An attractive and well proportioned design in boulder stones and paving brick, which will be still more effective when decorated with ivy and shrubbery around the base of the walls

THERE ARE QUITE A FEW people who think that they can build a residence, or for that matter any kind of a building, without the services of an architect. We will grant that this is the case, that there are a few who can build something fairly respectable, but at the same time there are very few who can produce something that will show the hall marks of an architect. The general lines are bad, or else the work carried out worse, probably both. This is where some would speak up and say that the architects are often at fault themselves, but they little remember that the architects are not always given a free hand to carry out their original ideas. Sometimes, for the reason of expense, other times for some particular idea of the client's.

Thus the most successful residences are found where the client and architect have worked together, the client retaining the architect as he would a lawyer or doctor, giving him all the information possible regarding the kind of house in design and plan that he thinks he wants, and leaving the architect in perfect freedom to work out the problem and produce the building. Such a house meets the approbation of the architectural critic and gives comfort and joy to those who live in it.

In the E. C. Jury bungalow, here illustrated (Curry & Sparling, Architects), this rule has been carried out, and in this particular case the architects and client have produced one of the most artistic country homes on the outskirts of Toronto. The house is situated overlooking a ravine in private grounds consisting of about eight or nine acres, with several clumps of pine trees and shrubbery.

The residence and outbuildings are built with field stones interspersed with a few clusters of clinker bricks. The roofing material is of absestos cement shingles. The vestibule leads into one large living-room out of which leads the stairway, dining-room, kitchen and sun room. The sun room also has an entrance into the front verandah. On the other side of the dining-room there is situated a large conservatory with access to the basement. Under the main stairway there is a stairway to the large billiard room in the basement. As seen from the plans, it is possible to go to the stable and outbuildings without being exposed to the weather, the house being connected to the stables by a large driving-shed. The stable is up-to--date in every respect with accommodation for cow, horses, etc. Back of the stable is situated a large hennery.

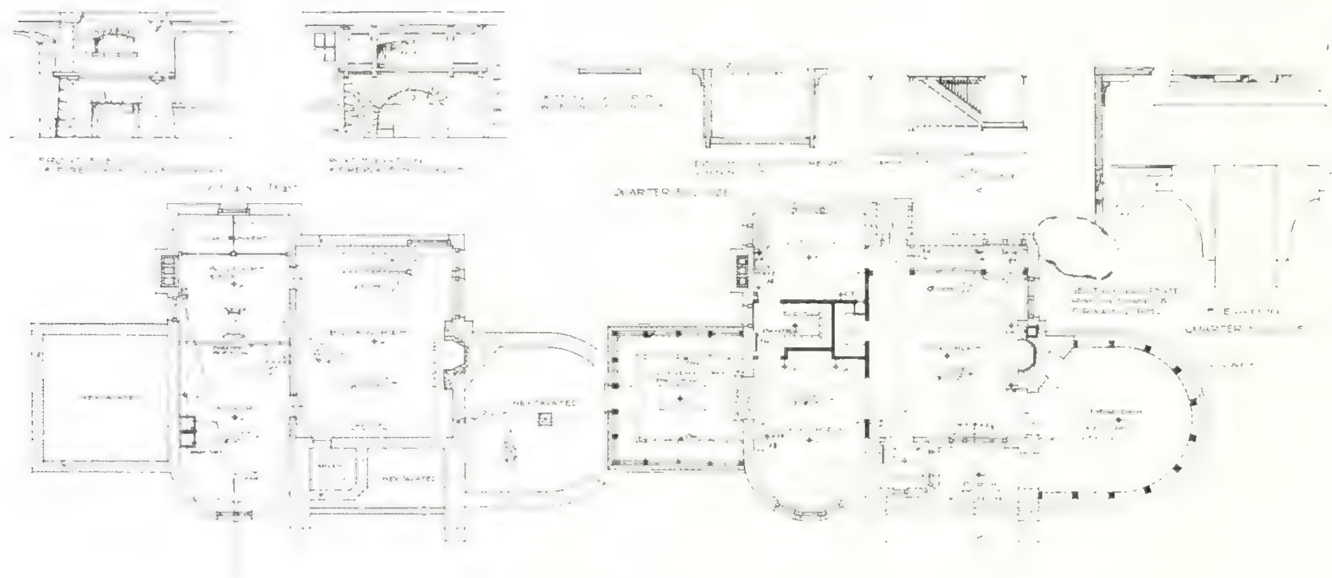
To make this place as up-to-date as possible, hot water heating was installed, with an up-to-date bathroom equipped with a septic tank in the ravine. Soft water is supplied throughout from a cistern installed to receive all the rain water.

View from North-east.

View from South.
Bungalow for E. C. Jury, North Toronto. Curry & Sparling, Architects.

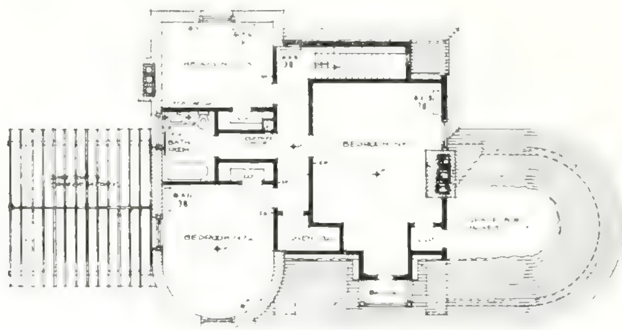
Dining Room.

Living Room.
Bungalow for E. C. Jury, North Toronto. Curry & Sparling, Architects.

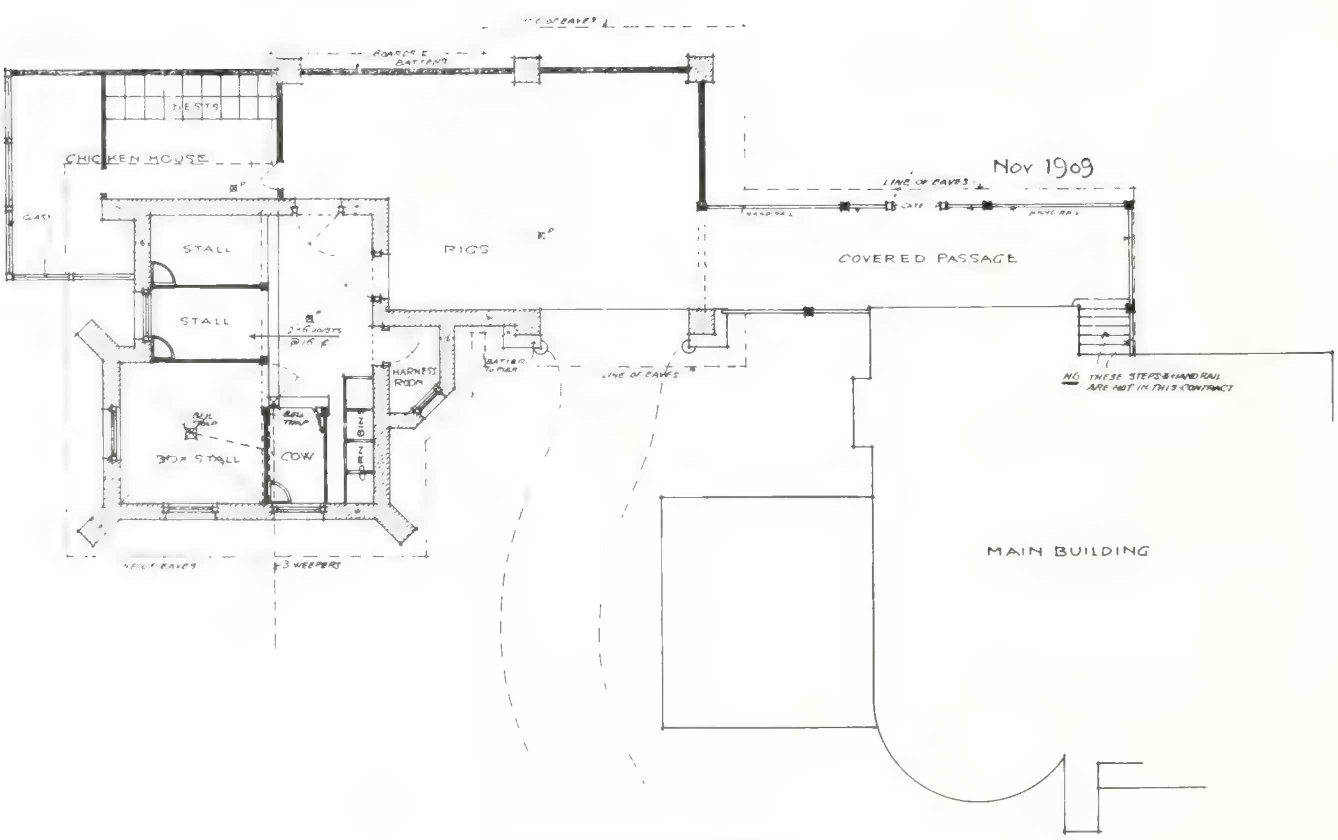


Basement and First Floor Plans and Details.

BUNGALOW FOR E. C. JURY, NORTH TORONTO.
CURRY & SPARLING, ARCHITECTS.



Second Floor Plan.



Plan of Stable and Grounds.

ARTIFICIAL LIGHTING OF HOSPITALS

Abstract of a paper read at the Congress of the Royal Sanitary Institute at Belfast, by Mr. John Darch. On the Subject of Proper illumination.

NO ONE WHO HAS HAD any insight whatever into the work of modern hospitals could do otherwise than feel the greatest admiration for the splendid service and effective equipment that characterize those institutions; and yet it must be said that models of elegance and hygienic forethought as they are their elegance is usually marred by the engrafting thereon of systems of artificial lighting that would justify a repetition of Miss Nightingale's trenchant observation that "the very first requirement in a hospital is that it should do the sick no harm."

In visiting the principal London and other hospitals I have been keenly struck with the universal want of discrimination in lighting; there is a kind of trade orthodoxy which cherishes certain forms and fittings, and decrees their use often in defiance of common sense. Take, for example, the ubiquitous plain 10-inch opal shape pendant that does duty with equal impertinency in ward, kitchen, operating theatre, corridor, and consulting room. It would be difficult to find a more irrational, inefficient, and indefensible fitting for most of the purposes to which it is applied, while it can hardly lay claim to be a thing of beauty. The shade affords no protection to the eyes of patients or nurses against the sting of the glowing filament, and from the fact that thousands of cardboard "eye-screens" have been sold to patch up this so-called "shade" for the necessary protection of the eyes of the healthy and vigorous in office and shop, it must be obvious that it is unsuited to a hospital. Again, the shade darkens the ceiling, and, by preventing reflection from its large white surface, practically darkens the room.

Another token of orthodoxy is the swan-neck bracket, which, with its popular form of "shade" that shades nothing, and its bare light, has been described as "nothing less than an instrument of torture." In some hospital wards the brackets have been mercifully placed lower and closer to the walls. Much more might be said to show the need of reform.

It is not so much a question of gas v. electric or any other illuminant as that of the art of illumination which regulates the arrangement of the lighting units after they are brought into the room. I do not propose, therefore, to enter into a comparison of the merits of the various lighting media, although some plain statements from one unbiassed by any of the conflicting commercial interests might prove useful. I will only say that whether electricity, coal gas, acetylene, petrol-air gas, or even oil lamps be employed, it should be possible to successfully illuminate every department of a hospital with either.

Light (and in that term radiation both visible and invisible must be included), like any other form of power, may become an agent of destruction or a minister of health and blessing precisely in accordance with the wisdom shown in its application; and it is the duty of the professional adviser, be he architect or engineer, to understand all that pertains thereto before he can pretend to satisfactorily invest his buildings with the instruments of such a force.

There are to be avoided, on the one hand, the evils of glare, and particularly that which, in a ward patient, would enter the lower part of the eye; the evils of excessive brilliancy, of violent contrasts of light and shade, and of the injurious and troublesome rays of heat and actinism; there is also to be avoided the risk of eye strain consequent upon insufficient light or upon the effort to see in the face of misplaced lights. On the other hand, there is to be sought the comfort of a soft and well-diffused light so arranged that vision may be both easy and pleasant, which, after all, is the proper object of lighting. The value of illumination depends not on the amount of light that is shed throughout a room, but on that which is reflected from visible objects. An essential part, therefore, of any scheme of illumination is the coloring of walls and ceilings, the strength of which must be properly balanced with the amount of light available. Dark colors eat up the light, and are, therefore, wasteful. White ceilings, cornices and friezes not glossy, with pale tinted walls and slightly darker dados, will best serve the hospital and its inmates.

Let us proceed to consider some practical methods of dealing with the subject, and begin with

The Hospital Ward.

The average ward unit—of, say, twenty beds—should be provided with two kinds of illumination, viz. (1) general, and (2) local.

1. The general lighting need be no more than enough to see clearly about the room, say, 0.5 foot-candle.

No sources of light, nor any illuminated surfaces exceeding 0.1 candle-power per square inch (14 c.p. per sq. ft.) should be exposed to the patients' or nurses' eyes; whereas the intrinsic brilliancy of the

Gas mantle averages	30 c.p. per sq. in.	
Acetylene flame	40	" "
Electric carbon filament	400	" "
Electric metallic filament	1,000	" "

Direct illumination, therefore, useful enough in the lofty outpatients' hall or elsewhere, is quite unsuited to a hospital ward.

Direct lighting lamps may, however, be used if provided with proper shades, but everything depends upon that word "proper." Glass shades and all transparencies are inadmissible, nor should any partial translucency exceed the above-named limit of brightness, while any shade that is used should effectually screen the eyes without materially darkening the room. If bracket lights are used for general lighting, a half circle shade should be used so as to illuminate the wall. The practical result of all this is a soft all-over illumination which is very pleasing.

High placed ceiling lights will prove equally successful with a carefully calculated shading.

Indirect lighting by means of the inverted electric arc is deservedly gaining favor, but although it would serve well in many parts of a hospital, I could not recommend it for the ward, as the ceiling would be too dazzling for those who have to lie on their backs. A happy effect may, however, be obtained from indirect lighting, with tungsten or other metallic filament lamps, placed inside a shallow metal bowl, white on the inside. To obtain the best effect they should be hung as low as convenient, nor should the lamp be set too low in the bowl.

Excepting in the winter, artificial lighting is little needed in the ward, for hospital economy favors very early hours, but some sort of subdued lighting is necessary during the night watch all the year round. With gas or acetylene a small burner, shaded, on a bye-pass would do. In electric lighting, several expedients have been adopted, but a 2 c.p. shaded lamp is the most economical. An excellent arrangement is indirect lighting from an 8 c.p. lamp in a small bowl. This is employed, for night purposes only, at Tooting Bec Asylum.

2. Local lighting: The sisters' and nurses' tables should each have a well-shaded lamp, that is adjustable in height, so that any desired intensity may be obtained. A comfortable illumination for reading is 4-foot candles, but 10-foot c. is not too much for some purposes. A good form of shade is a deep cone of dark green opal, with the lamp entirely recessed. A more cheerful form would be one with a rose silk flounce with white lining, deep enough to hide the lamp, and for cleanliness the top should be of white opal glass, and the flounce easily removable. The patients' lights are best placed one at the head of each bed, hidden in a dark green opal shade and somewhat to the left, so as not to radiate heat on the patient's head, and to avoid gloss in reading. An illumination of four candle feet should be available. This lamp will be useful for examination, and should illuminate the patient's chart. Near this there should be a plug for a hand or standard lamp.

If gas is the lighting medium, a "bijou" inverted mantle similarly shaded would be suitable for both patients and nurses. If acetylene, a small flame burner.

Steadiness is an essential condition of good sanitary illumination, for fluctuation and flicker are not only very disturbing, but may amount to permanent injury. This trouble may arise (*a*) from the glow lamp when used on an alternating current whose frequencies are below, say, 35 per second; (*b*) from an arc lamp when the light varies in intensity and color, due to unsuitable or impure carbons, or when it "pumps," due to defective feed mechanism; (*c*) from the gas mantle, due to an ill-regulated air supply, accumulated condensation in pipes or the wind from the open windows of the ward; and (*d*) from all flame burners by the two last-mentioned causes.

Gloss is frequently as troublesome as bare lights, and yet the majority of hospital wards have shiny ceilings. There should be no difficulty in getting a diffusive or dead surface as sanitary as that of the objectionable gloss.

The Operating Theatre.

The operating theatre needs good artificial light, and plenty of it, for there is a large proportion of surgical work done after dark. It should have a separate general illumination with screened lamps over the sinks and sterilizers. The ceilings and walls should be completely reflective, and are best lined with close-jointed white glazed tiles or opalite, with a little relief in the form of a pale green or grey dado.

The illumination of the operating table is, of course, the leading consideration. The light should approximate to the color, the perfect diffusion and the high intensity of broad daylight; both the nuisance of overhead heat and the septic risks of dust collection should be avoided, and the fittings and glass employed should be plain, smooth and easily cleansable.

It is important that the lights should not all be clustered together, forming deep and troublesome shadows, nor be situated directly over the table to worry the surgeon with the shadows of his own head and hands, or that would necessitate the frequent shifting of the table. Yet these are the arrangements most commonly met with.

Every hospital has its own pattern of operating light (scarcely two are alike), while many of them are very curiously contrived. The following may be taken as typical of the more usual arrangements:

1. One or more plain shade pendants of the common type, sometimes with a dust-raising counterweight and pulley.
2. A cluster of from two to twenty glow lamps under a large opal shade.
3. Rectangular trough 4 feet long with opal sides, full of lamps, and sometimes with a sheet of opal glass underneath; this gives an excellent light, but the heat is intolerable.
4. A four or six-light electrolier, each arm with a separate lamp and opal or aluminum bell shades.

Either of the foregoing may depend from the ceiling or from the end of long swing brackets. Glow lamps should have metallic filaments; tungsten is said to give the whitest light. Gas burners are sometimes attached.

At Charing Cross the drawback of concentration is well met by distributing the light over the long arms of four brackets and round the gallery front.

The London Hospital and that at Ryde are fitted with Marshall's operating light, consisting of a fixed central 100 c.p. lamp under an opal reflector, with four hinged arms, each with a 60 c.p. Nernst lamp in a condenser tube projecting the light to any desired spot.

Electric arc lamps are employed in some Continental theatres.

Direct lighting with ordinary arc lamps is out of the question on account of the unavoidable shadows; excepting, perhaps, for general lighting. But where there is a large skylight a splendid direct illumination may be obtained from white flame arc lamps, which have a remarkably high efficiency, and throw most of their light downwards. Four of these may be suspended over, but not too close to, the ceiling light, which should be of clear fluted glass to spread the light. They may be fixed, or may move on rollers worked by cords in the room. Questions of dust and the intrusion of lamp trimmers are thus eliminated.

Indirect arc lighting, particularly where there is no skylight, is eminently suitable. Four 10-ampere open arcs, properly placed and reflecting directly against a white ceiling, would give a brilliant illumination, with all the advantages of daylight.

Professor Siedentopf has invented an ingenious arrangement for lighting the operating table by means of isolated beams of light, which are not only ample but entirely avoid the dust question. There are two forms of it:

1. The single, in which a 20-ampere projector, or search light, is placed outside the theatre, and about 7 feet 6 inches high, from which a parallel beam of light is directed through a hole to a small mirror, thence to the table, or through a second mirror to the table. This beam is controlled by an iris diaphragm and smoked glass. It is best suited to the gynæcological and throat theatres. It is necessary to have good general lighting.

2. The compound form is more satisfactory. A projector lamp as before, but of 25 to 30 amperes, directs the light through an aperture to a thin metal disc, on which are placed small distributing mirrors which divide the main beam into a number of smaller ones, and which are separately projected to receiving mirrors placed around the room. These mirrors re-unite the light on the table in a many-sided form, free from shadows.

Electric fuse wires have a knack of "going" at most inopportune moments, while a breakdown on the part of a supply company is not unknown. It is, therefore, essential to have a reserve for such an emergency. The fusing trouble is more common on branch circuits; one excellent precaution, therefore will be found in wiring glow lamp fittings from two separate main branches, either of which failing, enough light may be left to work by.

To provide against failures on the main there are two methods:

1. A gas lamp with an inverted mantle, as at the West London Hospital, which should be lit during operations.

2. An electric accumulator, from which a small emergency lamp should be kept alight during operations, and in connection with which it should be possible to immediately switch on sufficient light from the accumulator to complete an operation. Separate lamps would be required for this purpose unless it would be convenient to have the voltage of the accumulator equal to that of the circuit.

Some hospitals keep oil lamps ready to hand.

Hand and standard electric lamps of a variety of patterns are to be found in every operating theatre.

The Dispensary

is usually the worst served of any department. It is in London, frequently to be found in the basement or in some other part of the building lacking daylight, while the artificial illumination is commonly so inadequate that it sometimes becomes a difficulty and a worry to read the prescriptions.

A properly shaded light yielding four or five foot candles is required to each man on the dispensing benches. The shelves should be illuminated with screened lights to facilitate visual acuity; in fact, no bare lights should be visible. Undoubtedly, the inverted arc lamp with a white ceiling would afford the best illumination, while the running cost of it should compare favorably with that of glow lamps. Where is the dispensary or laboratory that provides facilities for reading the graduated measuring glasses? Nothing is more productive of eye strain than the effort to decipher any kind of graduated scale, but with the faint lines of a glass measure in the twilight of the average dispensary held up to a patchwork background of bottles the strain is increased. It would save time and afford comfort if small white screens were fitted up, one in front of each man, adjusted to catch the chief incident rays from a skylight or window at such an angle that they reflected towards the dispenser. The same screen could be used under an artificial light or in a permanently dark situation, or there should be an illuminated panel of either reflected or transmitted light.

THE HIGHWAYS DEPARTMENT of the city of Leeds has recently treated portions of a macadam roadway with granular calcium chloride to combat the dust. Solutions of the same had previously been tried at greater cost and without such satisfactory results. The road is first well swept and two applications of the chloride are made on successive evenings, of about one-half pound per yard, at a cost of about $0.008 per square yard.

TO NEW PREMISES

THE CANADIAN ART STONE Company, Toronto, is now located in its large new plant at 353 Pape avenue, where the accommodations and facilities in general are more adequate and better adapted in every way to meet the demand of the company's rapidly expanding business, than the factory on Price street, recently vacated. In planning and equipping the new premises, General Manager C. H. Badgley, who is also President of the concern, has worked out an arrangement that gives the company a number of advantages both as regards the manufacture and shipment of its product. The popularity of "Art Stone" among architects and builders is clearly demonstrated by this concern's rapid growth. When organized five years ago it started in with a space of but fifty square feet, while the new plant which it now occupies covers a full acre of ground. The company is splendidly equipped in every way to promptly execute contracts in any part of the Dominion. It has direct shipping facilities, and is prepared to either manufacture and ship to any point, or manufacture its product at the place of building. S. F. M. Smith, Builders' Exchange Building, is the Montreal representative.

SYDNEY'S SHIPBUILDING DOCK

HOW SERIOUS THE GREAT PLAN for a ship-building dock at Svdney, N.S., may be is open to conjecture, but it is certainly laid on practical lines, and will, if carried out, give to Canada a maritime supremacy that is equal in national importance with the Panama Canal. In its exterior the plant proposed by the British Canadian Shipbuilding and Dock Company covers a half mile square with room for further extension and ten million dollars is an estimated cost.

BATHROOMS IN SOUTHERN EUROPE

THE VALUE OF BATHROOMS is receiving somewhat extended recognition in the principal cities of Southern Europe, these conveniences being installed in most of the large buildings constructed for domiciles and being added to many old ones. The fixtures and their arrangement, in appearance or utility, are not equal to similar fixtures made on this continent. Generally speaking, the water-closet fixtures are poor and inefficient, and are installed regardless of artistic and sanitary requirements. The practical exhibition of an American bathroom and water-closet, both separately and together, in the large cities of Europe, would furnish business for the manufacturer who would install the exhibitions. Agencies should be established in this way. Correspondence and illustrated literature printed in English will be as profitless as pouring water in a sieve.

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CONTENTS

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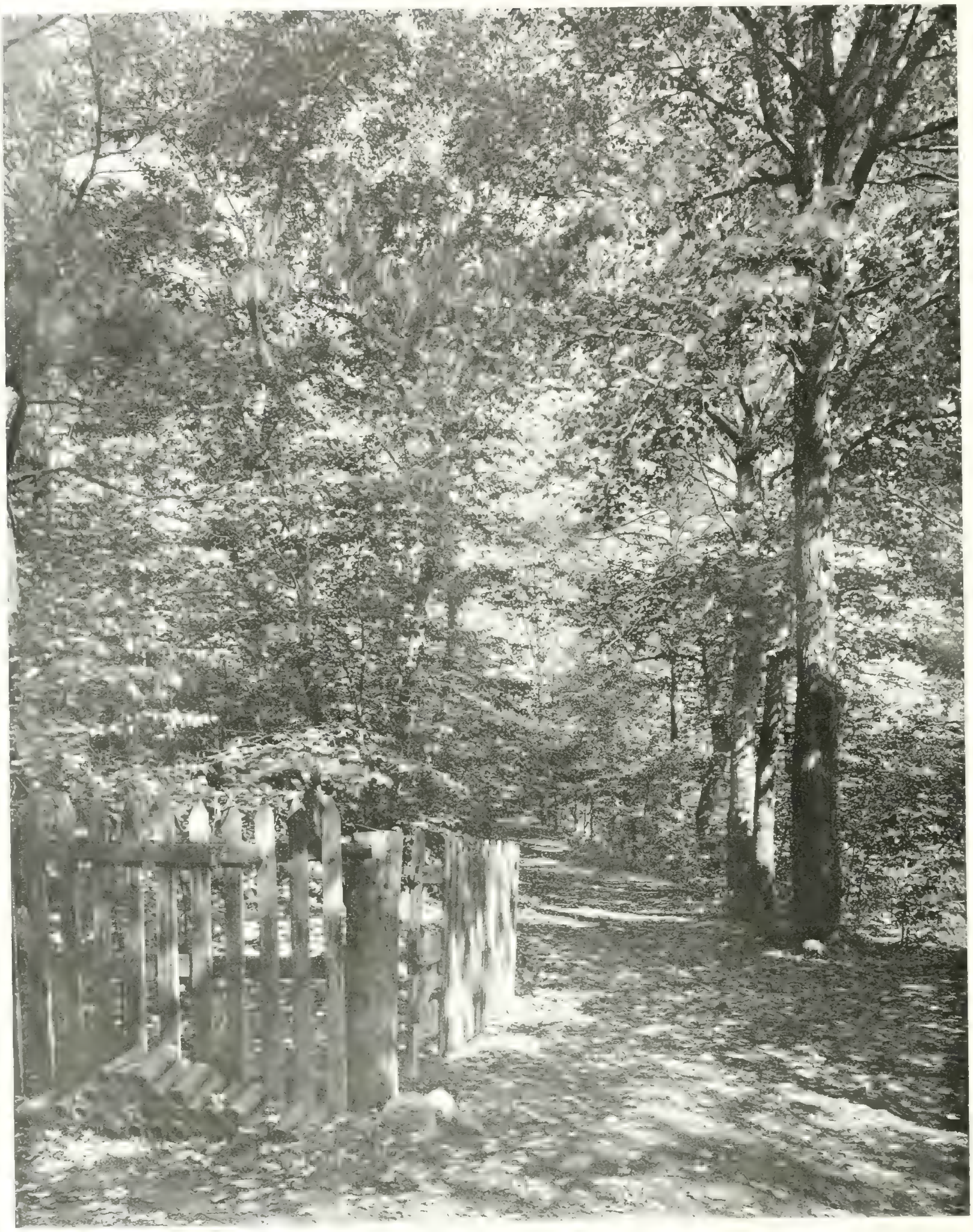


The Road of Yesterday.

The Federation Convention of the Royal Architectural Institute of Canada, the most important event in Canadian Architectural Association history.

THE ANNUAL CONVENTION of the Royal Architectural Institute of Canada was, next to that in which it was formed, the most important in its history. In the consolidation of all the Provincial associations under one governing body, it has unified the architectural interests of the Dominion and brought to a point of execution the many measures that have been held in abeyance through the many different organizations acting on a more or less independent basis. It has placed the profession in Canada on a plane with that of other nations, and in its potential aspect is a signal event in the history of Canada's advancement along artistic and constructive lines. It will only be noticed by the public in the betterment of building laws, the development advance of town planning, the better designing and construction of Government buildings and other visible features of improvement in the attractions of cities and the comfort of the people. But each improvement will reach back to the action or the influence of this unified body of architects reaching from one shore of the Dominion to the other, and using its interest in an unselfish way upon local and national projects for the betterment of the people. It is one of the strange facts of our civilization that the public is slow to recognize the direct influence the architectural profession has upon its affairs. It can understand the millions of money that the Government or private individuals invest in structures, and has some conception of the work of the contractor who erects them, but it accepts design and plan as something that grows out of the investment and its labor without question, and does not realize that each would be helpless or abortive were it not for the skill and the advisory council of the profession. In congratulating Canada upon this unification of its architectural organizations, CONSTRUCTION believes that the convention at Montreal has done a work that will have a beneficial effect upon the future architecture of the Dominion, and a restraint upon the haphazard manner in which growth in public structures and improvements has been carried on. This generation will not be the only one that will look back upon this convention at Montreal as an epoch in our national history.

The removal of the unsightly and dangerous service wires of the electric companies in Toronto demanded by city progress and safety.

THE POLES FOR CARRYING all sorts of wires to convey electric current for power or illumination are a common nuisance in most cities, but it is probable that no city on this continent has a greater variety or quantity of unsightly or dangerous supports obstructing its streets than Toronto. They are of wood, iron and cement, and carry everything from party line phones to the power from Niagara Falls. They are becoming so numerous that there is no logical arrangement, even, and on some corners the poles and wires almost obscure the buildings which they front. Like the automobile nuisance, the pole excrescence is only tolerated because it has grown gradually and the people have become used to it. If either of these nuisances had been thrust upon the city in their present aggravated form they would not be permitted to exist for a minute. But a combination of a real utility and strong financial interests involved, aids in their perpetuation. As the public have begun to talk of prohibited districts, and will soon demand special roadways for the automobile, so it should at least begin to work toward a clearing of all electric wires from the streets of our cities and their suburbs. It seems to us that the cost of burying the wires in conduits would be more than offset by the saving in repairs, and that even tunnels for their reception would be a paying investment. It was found so in Chicago. But even if it was a charge and reduced dividends the people should insist that the unsightly poles and dangerous wires should be removed from the streets of the city. They are relics of the crude days of temporary construction, and now that Toronto is entering upon an epoch of stable and permanent life there is no more argument against the removal of wire-poles than there would be against that of a pile of brick from the corner of King and Yonge streets. That the wires of the fire department are above ground and subject to interruption by storm when most necessary, would be ridiculous if it were not tragic, and the impossibility of erecting ladders against buildings because of the mass of wires will find its answer in the first factory fire.

City planning and the rearrangement of existing conditions an immediate and imperative necessity in every city that expects to grow.

WHEN MR. KIPLING made that profound observation that "The Colonel's Lady and Judy ~~Biddy~~ O'Grady are sisters under the~~ir~~ skin~~s~~," he presented the situation, not of human nature alone, but of peoples. Interview the people of any city and they will tell you, "But we are different here, and can't do the same things or act in the same manner as in other cities," when a reproduction or "photograph" of points of view, narrow outlook, or broad enterprise of one city will find its facsimile in every other city in the land. The necessity for town planning is a case in point. Comparatively small towns like Toronto, Louisville or Minneapolis may think it may be necessary in New York or Chicago where "conditions are so different, you know," but exactly the same need exists for immediate reconstruction to meet present conditions and provide for future development in one city as the other. In each case, too, the demand is immediate. It has been immediate since every city in the country started without a plan. Only in some it will cost more in labor and money than in others. Where New York and Chicago must spend millions, and has arrived at a point where the question is not how much money, but how soon can it be done, other cities are only at the stage where the necessity is becoming apparent, and where the future "must" can be clearly pointed out. The money cost increases with each year's delay. It is strange, but true, that in regard to our manner of living we are as yet but half civilized. We are civilized enough to keep our lawns mowed and to remove piles of rubbish from our front yards so that the visitor or ourselves do not have to climb over an unsightly pile of rubbish to reach our front doors. We even in some cases think it advisable to clean up our back yards and to have a sand pile there for the children to play in so they need not play in the street. But we are not civilized enough to make the entrance to our city a broad spot of welcoming space surrounded with our best buildings, to provide broad avenues that go through the city for the convenience of traffic, remove the slums that crowd closely on to our best business or residence sections, or even to provide the small parks in residence districts, particularly where there are no back yards, for the children to play in where they may gain physical strength and moral healthfulness. In this every city in the country is alike, though some have commenced to alter these conditions. Each opposition is met with the cry of the ratepayer, "it will increase my taxes," and each has the same ignorance of city officials, however honest, in regard to what should be done, and the same reluctance of these same officials to call a "doctor," who, by a well considered plan by way of diagnosis and prescription, commences the cure of the disease. Then, again, the average man's impatience is a deterent factor, for when a city has at last decided to act he asks, "how long will it take and how much will it cost." He does not know that properly handled it does not cost anything, but that a cure is never complete while the city grows. The doctor will tell him that the main thing is to adopt a system of cure and faithfully follow it. The city that has a plan that takes in every condition of transportation and attractive and sanitary housing, not only for the present, but in its general lines reaching over the next fifty years, and can "nail it down" so that every dollar spent will be in accordance with that plan (and any other plan, of a viaduct to cross tracks here and a widening of a block to relieve congestion there, is useless and wasteful), has made an advance in civilization. We do not mention particular cities for these rules, like the conditions both in necessity for relief and ignorant opposition or interference with partial plans, apply to all cities. For, as all human nature is alike in selfishness as well as in broad-minded action, so all cities have the same conditions to meet and the same forces to aid or retard their growth.

The immediate necessity of establishing reforestation and control of hardwood and pine on a European basis in Canada should be promptly acted upon.

THE CANADIAN PEOPLE cannot call upon the Government too often or too insistently to use every means in its power to compel the elimination of wood waste and the development of forestry. While the balance of soft pine area remains with Canada and will last for domestic consumption for many years, a lesson should be sharply drawn from the wastefulness of the United States in the past and the consequent strenuous efforts that country is making by reforestation to amend it, and commence now to conserve the pine forests that are great still but will not last forever. But if this is necessary in regard to pine, how much more imperative does it become when it refers to the hard woods. Canada already feels the shortage in hardwood supply, and its annual importation from the United States exceeds by more than fifty per cent. the value of the hardwoods manufactured into lumber, and the stock in the United States is getting so low that soon even that source of supply will be gone. In Ontario, southern Quebec, and the Maritime Provinces, wherever hardwoods grow, a system of strict conservation should be established and reforestation commenced at once. Hungary, the oldest country in Europe, exports to-day more lumber than any other European State, and France and

Germany are large exporters of lumber, but it is hundreds of years since the first reforestation was commenced in these countries, and some of their forests are equal to our best wild timber lands in the value of their output of pine and hardwoods. It is not too late, but it is high time that Canada realized the heritage she is squandering in the indiscriminate consumption of her timber, and commence practical reforestation and control established on a European basis.

¶ *Irregularity in competition programs largely due to the countenance given by individual members, but constantly improving through the energetic efforts of the Institute.*

IT IS PROBABLE that the vexed subject of architectural competitions will never be settled except in the mind of the individual architect and by the circumstances surrounding a particular program or practice. The world in a broad way recognizes that "competition is the life of trade," and to professional men there is always a revulsion of feeling where the elements of competition are presented in concrete form, no matter how much it exists in the abstract. The history of architectural competitions this side of the pond is interesting if not instructive. There is a record, almost lost in the mists that obscure the professional life of the early architects, when at the inception of the first organization of architectural practitioners, the American Institute of Architects, about 1857, the subjects of competitions and of fees came up, and a committee was appointed to consider whether it were professionally proper to even discuss these subjects in a meeting of the society. In 1885 at the second convention of the Western Association of Architects held at St. Louis, D. H. Burnham as chairman of a committee on competitions indicated the situation by commencing his report with, "Architectual competitions are a necessary evil and must be recognized," and plainly stated that while this was fundamentally true, that they should and could be so regulated as to destroy much of the baleful influence the competition evil was having on architectural practice. The competition code which this report presented became the foundation for the competition programs considered proper in architectural practice for the next twenty years, but not being in any way mandatory its provisions were more prominent in the breach than in the observance. This led to the rule lately adopted by the American Institute similar to that followed by the Institute of Canada, in which a code was formulated making it unprofessional for a member to enter a competition which does not recognize that code's principles as a basis. That even this progress in the regulation of competitions leaves much to be desired is evidenced by the reference to them by the President of the Ontario Association of Architects in his address before the late convention at Ottawa, which says: "The question of competitions has, as usual, been prominently to the fore, and we have to record one satisfactory instance, viz., that of the new Knox College, in which the conditions were of such a character as to encourage good architects to take an interest in it. The others were those for the Hamilton Library, the Goderich Town Hall, and the Government House, Toronto, and the less said about these the better." Even that one out of four committees was intelligent and honest enough to present to the profession a programme that was equitable and gave an opportunity for unbiased selection of an architect through the most meritorious design is a matter for congratulation, for it seems singular, but is the fact, that the average business man who is honest in his business dealings will expect the architect to enter the most pronounced gambling enterprise where the dice are loaded in advance, or where the main idea is to get something for nothing. If the members of the profession will take the Frenchman's advice in relation to matrimony, "don't," and rigidly apply it to all competition programs that have not the approval of the Council of their own or some other established architectural association, the public may in time learn through experience what is absolutely true, that disaster in some form always follows the procurement of plans by an irregular competition.

IT MAY INTEREST other cities to know how Toronto's Department of Public Works saves money on its contracts. On all tenders on civic contracts the City Engineer competes with the contracting firms. When the city's bid is lowest other bidders can have the work at that figure, otherwise the city does the work itself. The way it works out is that recently out of twenty contracts the City Engineer's bid was lowest on fifteen. The contractor who bid lowest on the other five took the fifteen at the city's figures. There was a saving to the city of $2,400 on these contracts as well as the indirect saving on all contracts, through the city's competition. Pretty good scheme if the city's engineer is straight and capable, and that describes City Engineer C. H. Rust of Toronto.

THE ELECTION RESULT is readily seized upon by the Commercial Review of Vancouver to point a moral and adorn the otherwise bold fact that advertising pays. It points out that it was almost if not quite wholly by the strong advertising campaign in the newspapers of the Dominion against reciprocity that overturned a Government strongly entrenched and conforming with the policies most approved by a majority of the people. The advertising of "another brand of goods" was so effective that it should convince every manufacturer of the value of advertising space. If a publicity campaign can change a man's political opinions it surely should be more effective when used to convince him of the merits of a particular manufacture. It is commonly supposed that one's politics and religion are scarcely subjects for convincing argument. The minds of men are open to the claims of a needed commodity.

Front.

Garden Front.

Residence for Colonel J. B. MacLean, Toronto, Ontario. John M. Lyle, Architect.

Garden Alcove, Residence of John S. Ewart, Ottawa. Colborne P. Meredith, Architect

DOMESTIC ARCHITECTURE AS ILLUSTRATED IN SUBURBS AND COUNTRY

The Canadian expression of livable houses, eclectic in design, and brick, stone and cement used in their construction

TO THE STUDENT of architecture, professional or layman, there is something inspiring in the many types evolved by practitioners, and their application to environment. This variation in type is particularly true of the suburban or country residence, though in the former it is most pronounced. In the country residence, while the architect designs with a particular view to conditions, the type of English country house is followed to a predominating extent. But whatever the form of design the plan is apt to be one which most closely suits the needs of those for whom the residence is built. For, as Nathaniel Cotton says in "The Fireside:"

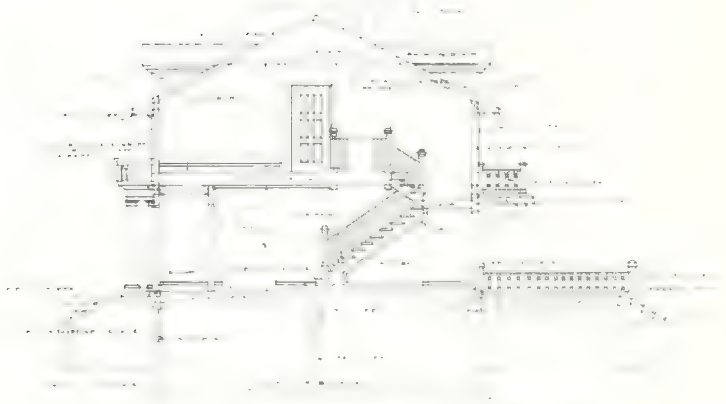
"If solid happiness we prize,
Within our breast this jewel lies,
And they are fools who roam.
The world has nothing to bestow,
From our own selves our joys must flow,
And that dear hut, our home."

It is home. Long enjoyable hours have been spent by the family in discussing the plan, and each member of the family, their tastes and their desires, as well as general utility and convenience, has been considered before the architect has been approachd. Thus, the form of the "dear hut," its rooms, alcoves, window views, sunlight; all the interior of the house, is of direct interest. Then comes the exterior upon which the mind is somewhat hazy, but all have the sense that says that it should fit the surrounding landscape. It must "belong." This, of course, is also the architect's view, and when this intelligent knowledge is vested in his client the architect works with freedom and inspiration. Too often the "little knowledge" of the client, however, is dangerous to the success of the whole through the inclination to interfere in the architect's interpretation of the client's desires, and the result is injured to that extent through the interference of the client's lack of confidence in the architect and over-confidence in himself.

The growth of the suburb is one of the striking social movements of the time. It is not altogether

East Elevation

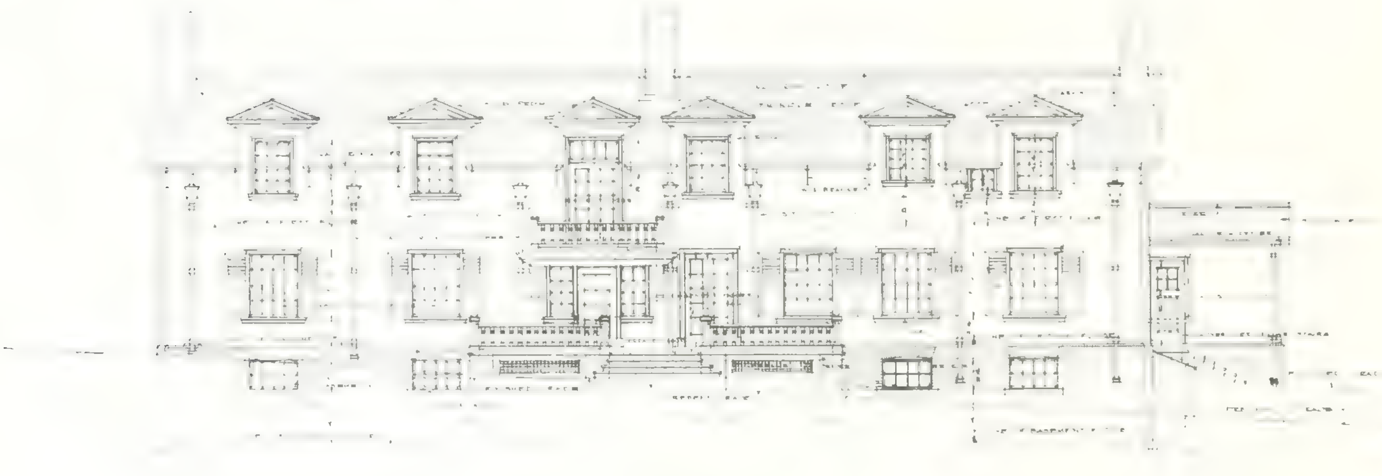
West Elevation.



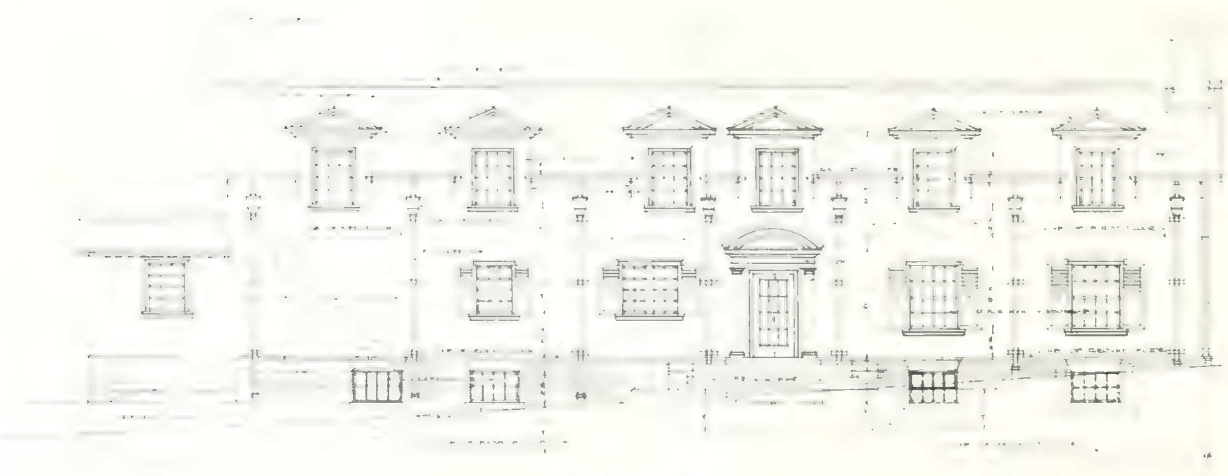
Section Through Hall.

ALTERATION ELEVATIONS OF RESIDENCE FOR COL. J. B. McLEAN, WELLS' HILL, TORONTO, ONTARIO.

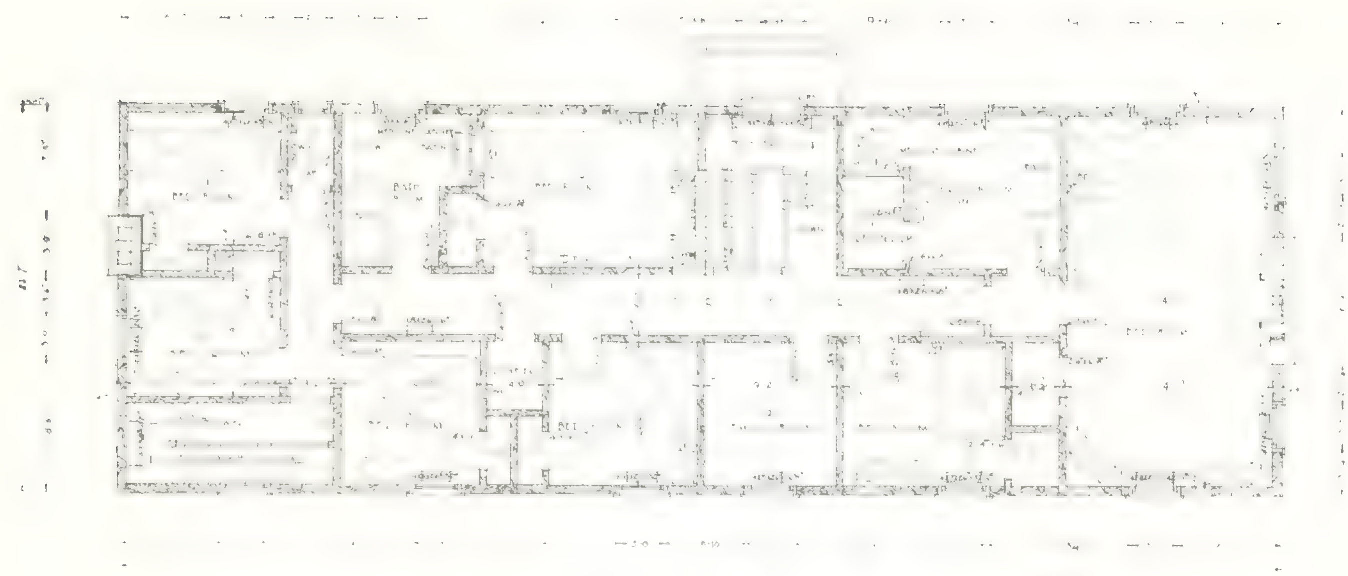
JOHN M. LYLE, ARCHITECT.



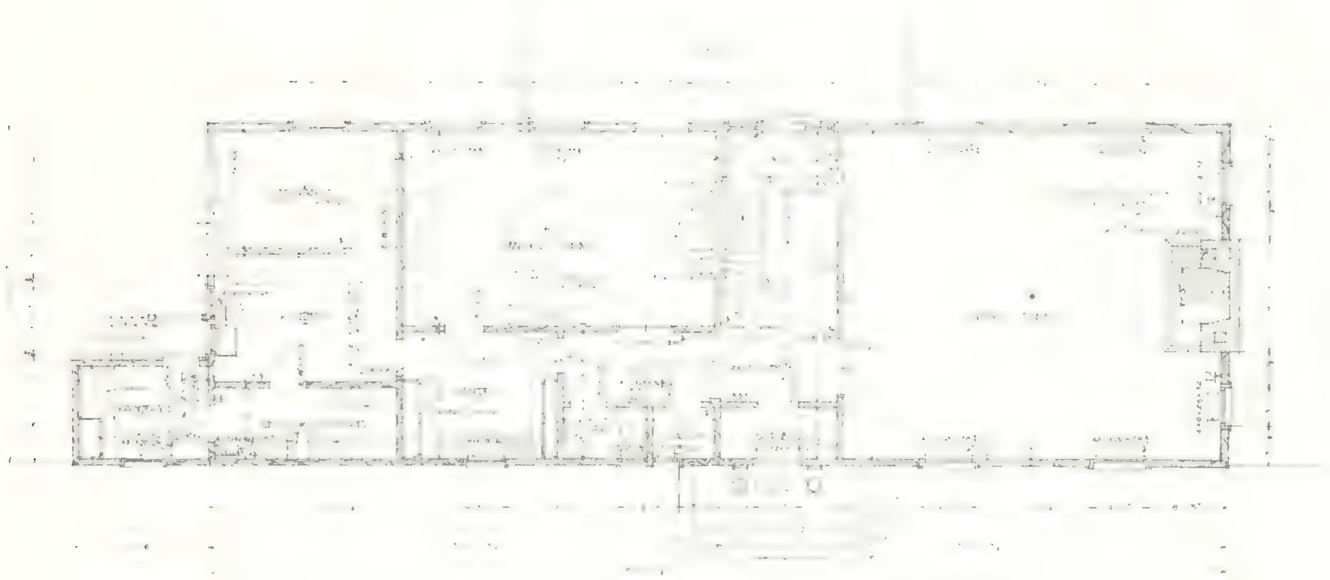
North Elevation.



South Elevation.



Plan of First Floor



Plan of Ground Floor

Plan of Basement

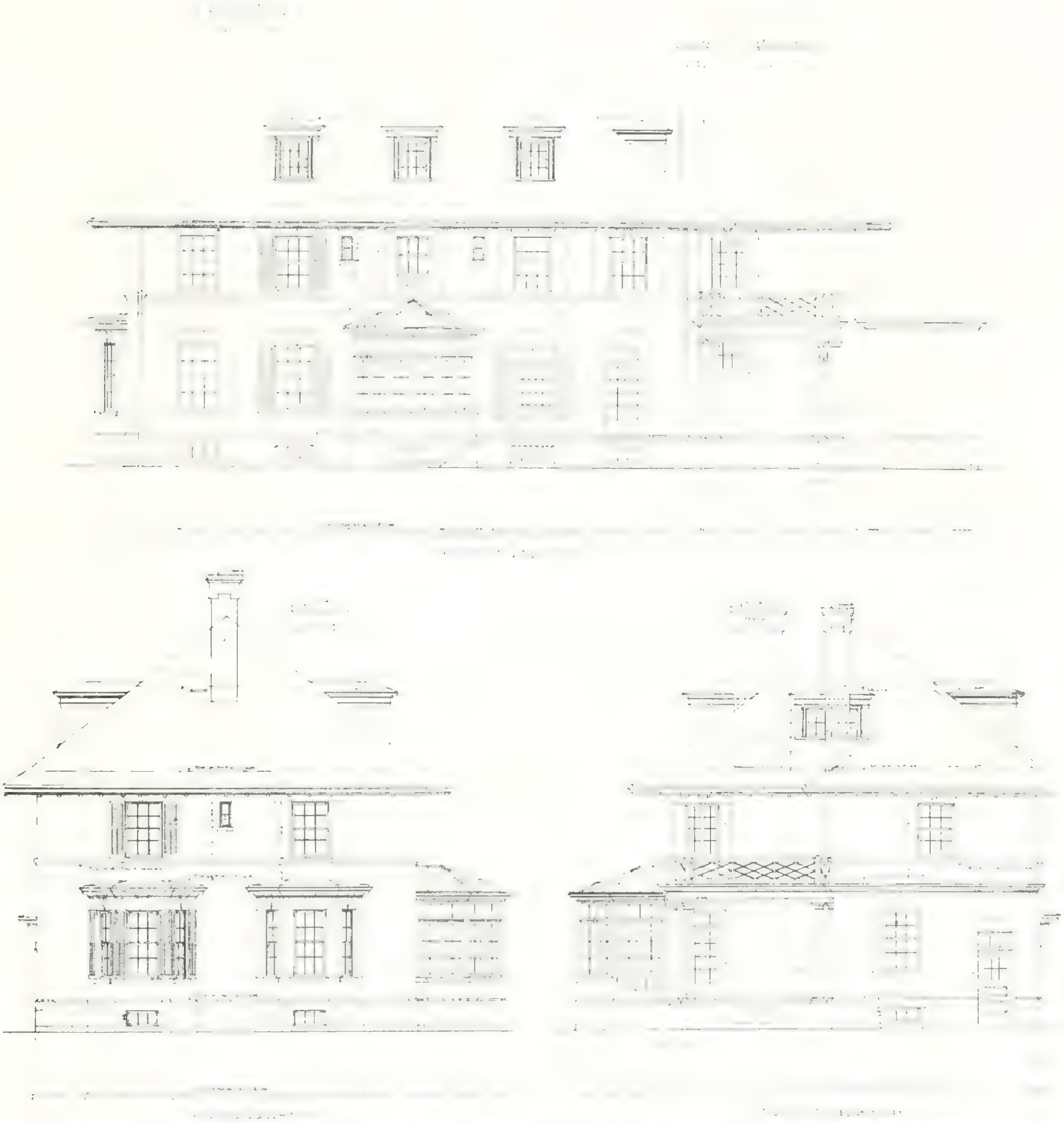
[illegible] Plans of Residence for [illegible] B. MacLean, Toronto, Ont. [illegible] Lyle, Architect.

Dressing Room.

Living Room.

Residence for Colonel J. B. MacLean, Toronto, Ontario. John M. Lyle, Architect a back to the farm spirit which induces the average man to seek the city's environs and become a "commuter." It is here that the sunlight, fresh air and space of broad streets, and a house with at least a frame work of grass and trees can be enjoyed, because the transportation problem has been solved by the electric car and the auto. While not in the province of this article, it might be mentioned that this from city to country movement will have its result in the former residences of the well to do being taken by the classes that rapidly create slums, if the city corporations do not quickly meet the issue by purchasing the old residences and removing them, and build appropriate housing for this class.

To return to our residences, it is also one of the changes that is coming across the social aspect of this country that the nomadic spirit that has been a basis for action ever since Sir Walter Raleigh landed in Virginia, or Champlain viewed the St. Lawrence from Mount Royal, is rapidly changing into a stable home-establishing condition. The tenement is disappearing, and the money that formerly was paid for rent, for a room in an apartment building or a house, is being invested in a home owned by the occupant where he feels that he will live the remainder of his days. Therefore, where our habitations from tent to log hut and from log hut to wooden frame house each a confessed temporary makeshift, the home must now be built of stone, brick or other permanent and time resisting material.



Elevations of Residence for Mrs. Larratt Smith, Toronto, Ontario. Langley & Howland, Architects.

If the premise be true that the first function of a house lies in its ability to prove itself a home, in the real sense of the word, the ways and means of arriving at that end are many.

In its outward and physical form, therefore, the home should first make the attempt to express domesticity. And nowhere in the wide field of do-

Hall.

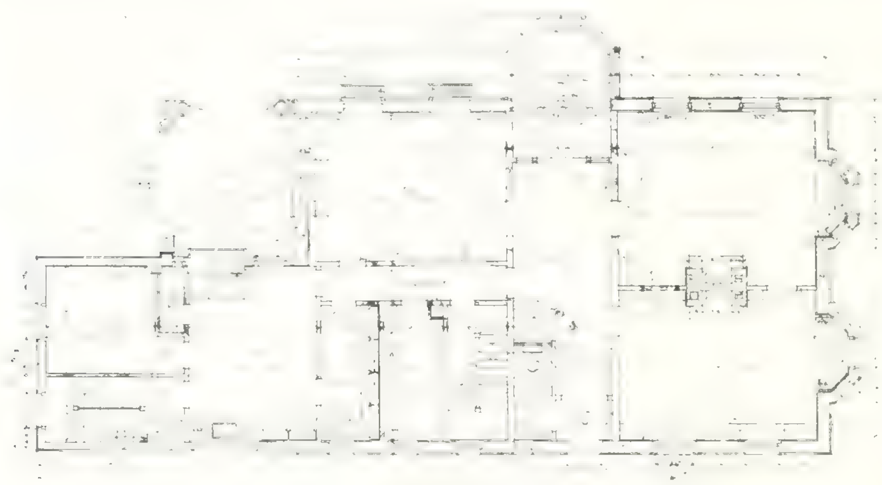
[illegible] f Mrs. [illegible]tt Smith, Toront[illegible], Ont[illegible]. Langley & Howland, Architects.

Living Room

Dining Room

Residence of Mrs. [illegible] Smith, Toronto, Ont. [illegible] mestic architecture is the home feeling better exemplified than in the English type.

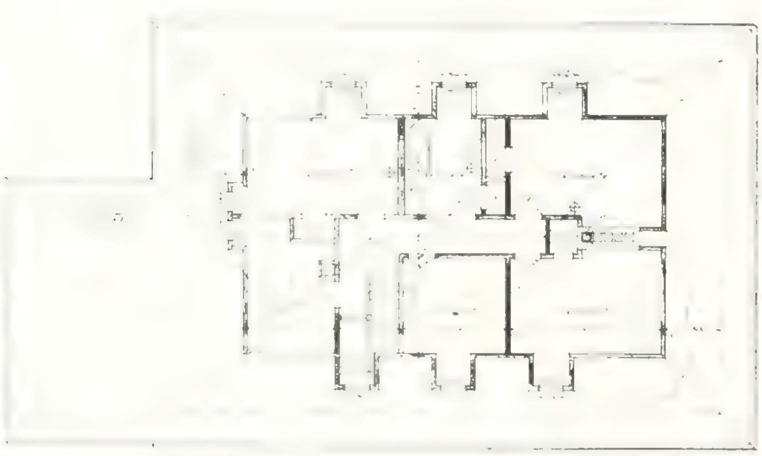
It is a fundamntal law in architecture that what is



The Mrs. Larratt Smith Residence—Ground Floor Plan.

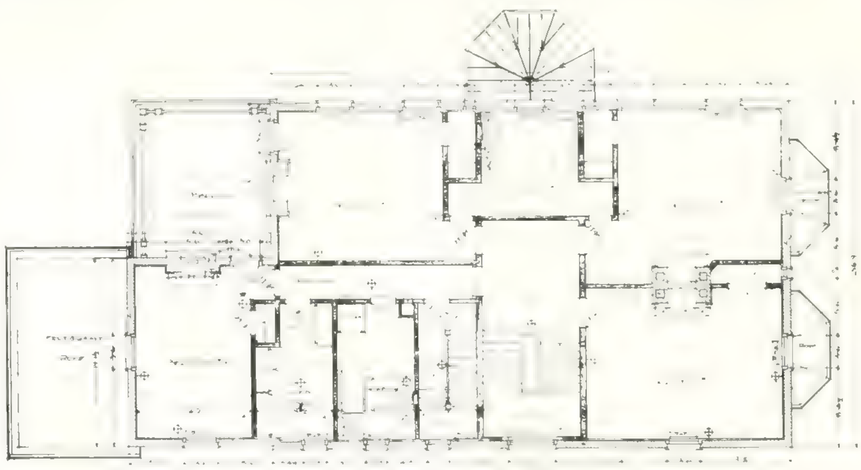
perfectly adapted to one people at one time, can rarely be successfully modified or altered to suit nw requirements. Ours must be a natural growth, answering to well defined demands and needs; for we are called upon to express the life of our own day and generation. There are, however, certain characteristics which can be adapted to advantage, and certain forms which are as appropriate to our time and country as they were and are to England. We are gaining ground in our domestic architecture when we follow our English cousins, just as we make our country life more rational when we plan it on English lines. We are beginning to build country homes which are fit to be called homes, rather than summer villas, and to remain longer in these houses and take a more general interest in the things of the country.

There is in this suggestion no bid to present the



The Mrs. Larratt Smith Residence—Attic Plan.

English country house or cottage as an ultimate type suited for a national domestic style. It is merely to insist on the value of this old work as an inspiration, and the necessity of studying it as the foundation of architectural education and good taste. Our Colonial work, founded on the best expression of the Georgian, will rightly always remain, under certain conditions and for certain environments, the most rational style fo rour domestic architecture. But as we borrowed them from England in her formal moods, so now can we also borrow to advantage her more humble architecture when the setting of our houses permits an expression of the picturesque. On all sides of us we have country which fairly calls for the picturesque in the building. Moreover, as the houses were then for the most part considerably isolated on large estates, and even the villages were of a rural character, the Georgian style, on this side of the Atlantic, at least, has always seemed to typify the country, and to be most appropriate here. This tendency is a happy one, too, for the simplicity and dignity of its



The Mrs. Larratt Smith Residence—First Floor Plan.

lines are quite in keeping with the ideals as well as the actual surroundings of country life; while, from a far more practical standpoint, the style as a whole possesses, to a greater extent than any other, that valuable quality of appearing as appropriate for a small house as a large one.

Another architectural style of early days lends itself readily and inexpensively to modern reproduction. And that is the Dutch. This prototype has, however, many disadvantages. The client who favors this "style" requires upstairs four well lighted and well ventilated bedrooms, and the original attic was lighted only from the ends, and the ceiling much broken up to conform with the graceful lines of the roof, and it is impossible to follow those quaint and attractive lines and have inside comfort and convenience. For the sake of ample fenestration the roof must be broken by dormers, although in the original Dutch farm-house they were absent. Whether this was because a dormer exposed too

View from Northeast.

View from Northwest.

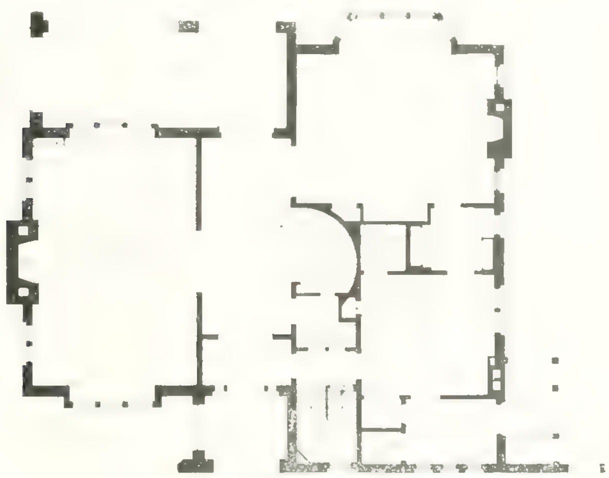
"Marbrae" Residence of Melville P. White, Hawthorne Gardens, Toronto. Burke, Horwood & White, Architects.

Dining Room.

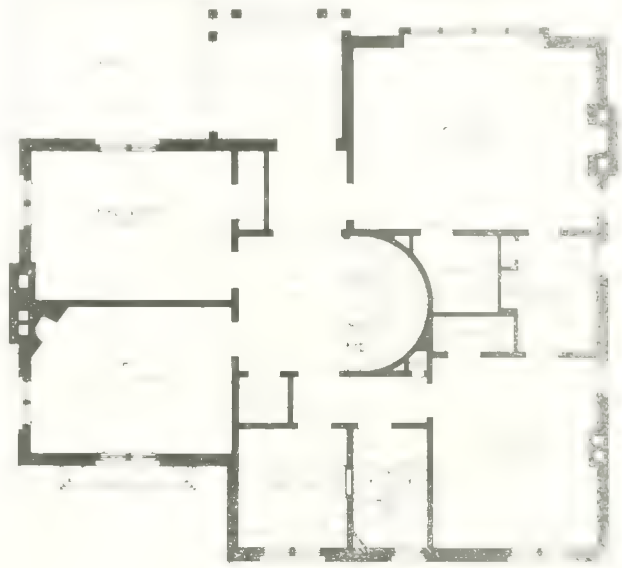
Library.

"Marbrae," Residence of Melville P. White, Hawthorne Gardens, Toronto. Burke, Horwood & White, Architects.

much area to winter winds, or because its construction implied the difficult metal flashings which were ever a bugbear to the carpenter, or whether phlegmatic Father Knickerbocker had no sympathy with such facetious and flippant interruptions in his roof expanse, we do not know; but certainly whatever dormers are now seen were later additions to the house—either a cry for more air than the tiny floor-level windows admitted, or a concession to the ex-



Ground Floor Plan.

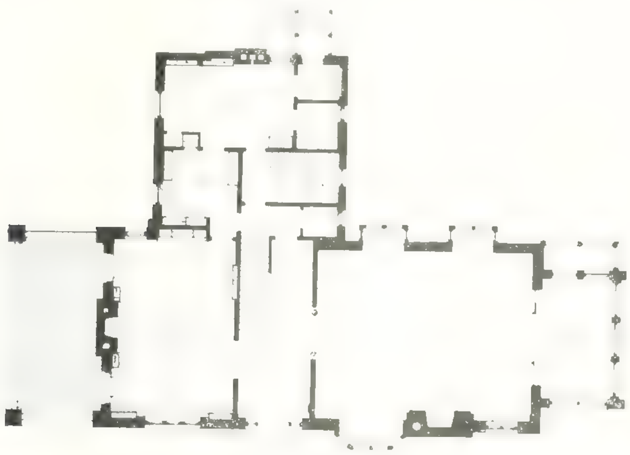


Second Floor Plan.

The M. P. White Residence.

travagance of some succeeding generation. At any rate, the dormers added were usually small and not compactly grouped under one roof so as to make a prominent note on the exterior. Though a departure they are by no means a detraction, contributing as much variety outside as they do convenience inside.

The best construction implies, of course, that the second story floor beams project to become the



First Floor Plan.

Second Floor Plan.

The Harry H. Love Residence.

eaves, where the ceiling tapers down to nothing. If a maximum of head-room in the second storey is not vital, this honest method is never departed from; but if a flat ceiling throughout is desired, an expedient resorted to often by the Dutch themselves (but rather mildly, as if none too convinced of its integrity) was to raise the roof and eaves somewhat above the upstairs floor by means of carrying the vertical studding up to the required height where, capped by the plate, it supports the roof. This leaves the eaves to be formed by prolonged rafters and horizontal outlookers. To these horizontal outlookers are nailed the sheathing of the soffit of the eaves. This is not as logical construction as that first described, but it gains you additional head-room. It necessitates the dormers being three and one-half or four feet above the floor, by no means an inaccessible height and one which gives the room a quaint look. The whole ceiling level is extended out to the dormer face, and the remaining irregularity in the corners is converted into closets.

But whatever may be the "style" or no style that is selected for the design the home idea is paramount, and it is natural that the home idea in Canada must run parallel with that in England. An Englishman's idea of home is shelter and seclusion, two inherent tenets of the Anglo-Saxon faith. In the United States it is the custom to place a house on the topmost pinnacle of a hill where it will be exposed to the relentless sunlight and to all the winds that blow; where it may be seen from afar and become known as a landmark in the country, a sort of advertisement for the architect and owner. This idea is distinctly opposed to the Englishman's conception of a place for a dwelling that is to be continually occupied. The English house was not built to be boarded up for eight or ten months of

Dining-Room.

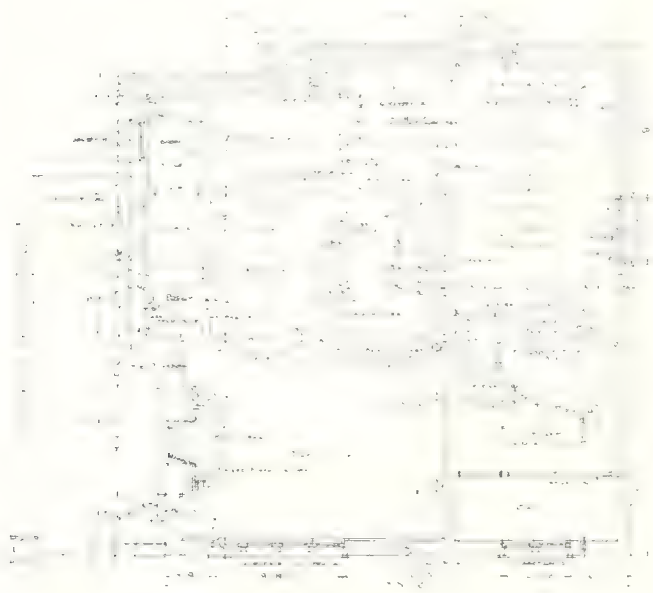
"[illegible]" Residence of Harry H. Love, Toronto, Ontario. Burke, Horwood & White, Architects.

Living Room from Hall.

Living Room from Front Windows

Faeriebanke, Residence of Harry H. Love, Toronto, Ontario Burke, Horwood & White, Architects.

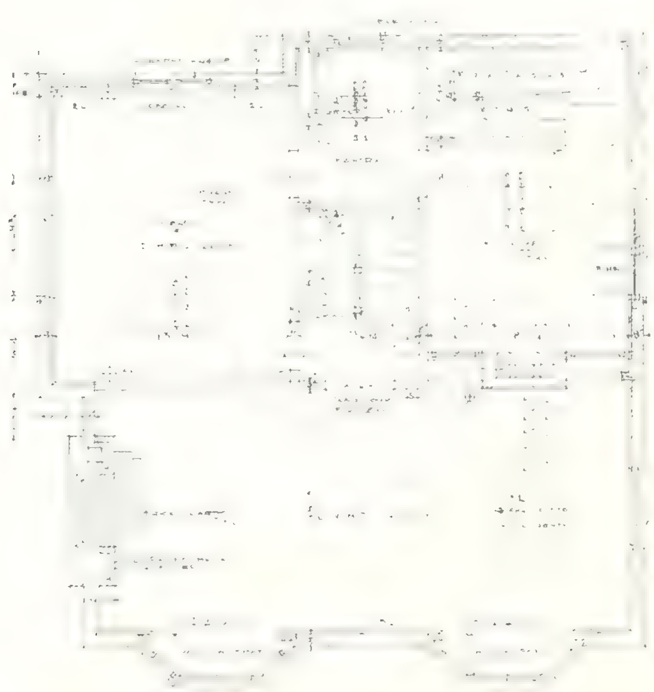
the year, but by being lived in generation after generation it was gradually brought to the present state of perfection that is the envy of Americans to-day, for each generation left an impress of its personality on house and garden. In the houses here illustrated no attempt has been made to select those which were pronounced in style, but rather to show some of the best of our recent architecture, that, aesthetic



The John M. Lyle Residence—Basement Plan.

in spirit and involving the inclinations of many people and their interpretation by the architects who designed them, as a whole expressing the present type of Canadian homes.

The residence of C. P. Meredith, architect, situated on elevation to Strathcona Park, Ottawa, Ontario, stands in an elevated situation, commanding

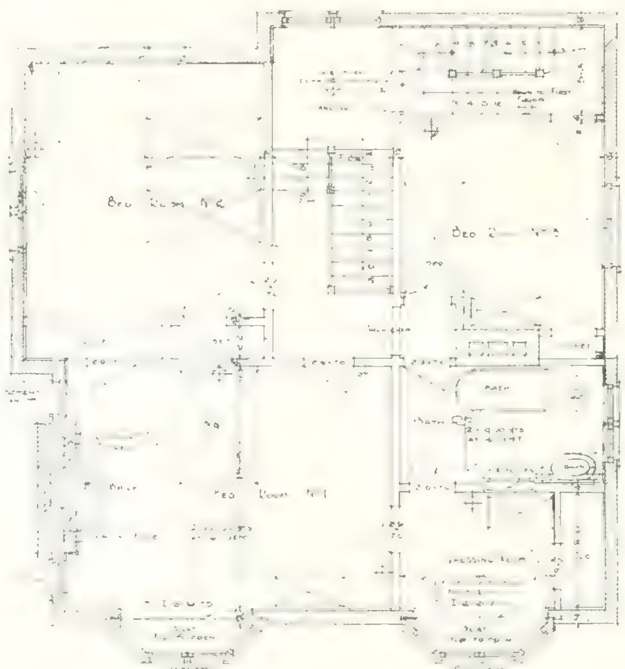


The John M. Lyle Residence—First Floor Plan.

extensive views over the park and valley of the Rideau River. It was designed by the owner for his own habitation. The first storey is Laprairie rustic shale brick with very wide white joints, and the upper storey is covered with rough cement. The verandah is constructed so that it can be entirely closed in or made open as desired. The door frames shown are all readily removable. The roof is stained a rich deep brown, and the whole house has an air of simplicity and refinement.

A picturesque hit is Garden Alcove, attached to the residence of John S. Ewart, Esq., K.C., at Ottawa, Colborne P. Meredith, architect. It is a feature in the garden surrounding a house which was illustrated in a previous number of CONSTRUCTION. It was primarily erected to screen an undesirable view, but in its use has developed into a charming snuggery. It is build of pine, painted dead white with square red tile floor.

The residence of the Hon. Mr. Justice Duff, on Goulborne avenue, Ottawa, Colborne P. Meredith, architect. It is inadequately shown a sit was impossible to get a satisfactory photograph of this building owing to the hilly nature of the locality.



The John M. Lyle Residence—Second Floor Plan.

The house is built on the hillside, and has a charming outlook to the east. The material used is a coarse red brick with half timber above. In designing this residence the owner's wish to have a maximum amount of sunlight was considered, and the sun room and terrace on the south and east with large windows on these sides have made the building very successful from this point of view. In addition to the rooms shown on the first floor, the basement is arranged with a large billiard room on the hill side with windows to the south.

The residence for John M. Lyle, on Avondale road, Toronto, was originally designed for a fifty-foot lot situated on the side of a steep hill. The adjoining lot to the east was purchased at a later date. The problem was to find an easy means of approach from the front, and to so plan that the kitchen floor could be easily reached from the rear, there being a service lane at the back of the property, from Rosedale road. It was decided to enter the house on the level of the basement, and by putting a brick wall across the middle of the

Mantel in Living Room

A Door in Dining Room.

Residence for John M. Lyle, Architect, Toronto, Ontario.

Bedroom.

Library.

Residence for John M. Lyle, Architect, Toronto, Ontario.

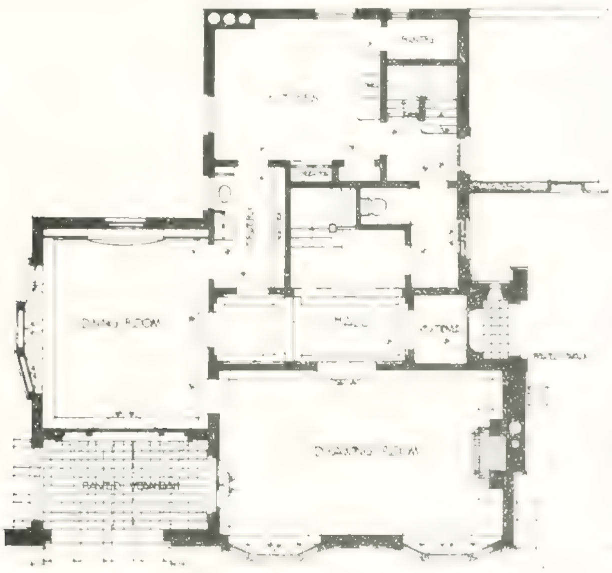
Living Room.

Residence of F. C. Calder, Winnipeg, Manitoba. J. H. G. Russell, Architect.

Residence of Colborne P. Meredith, Architect, Ottawa, Ontario.

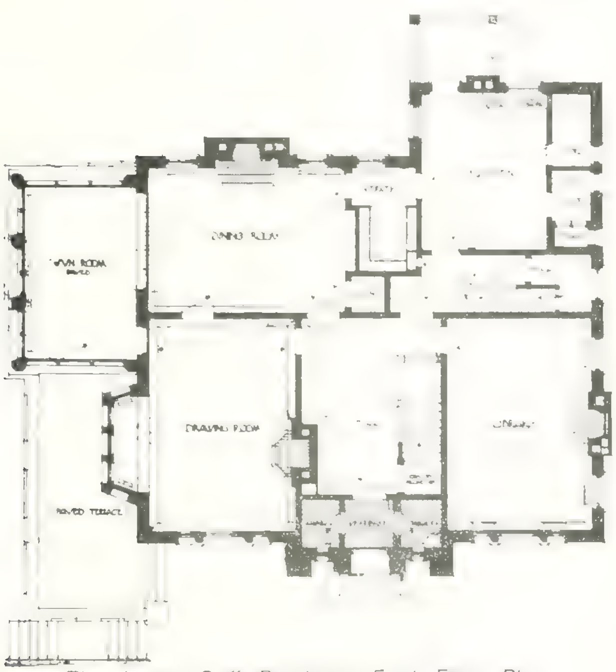
Residence of Hon. Justice Duff, Ottawa, Ontario. Colborne P. Meredith, Architect.

house to use half of the cellar for staircase, hall, lavatory and reception room, the balance to be devoted to cold storage, laundry and furnace room. This scheme gave an easy approach from the front and enabled the kitchen, pantry, dining room and living room to be placed on one floor. Generally



The Colborne P. Meredith Residence—First Floor Plan.

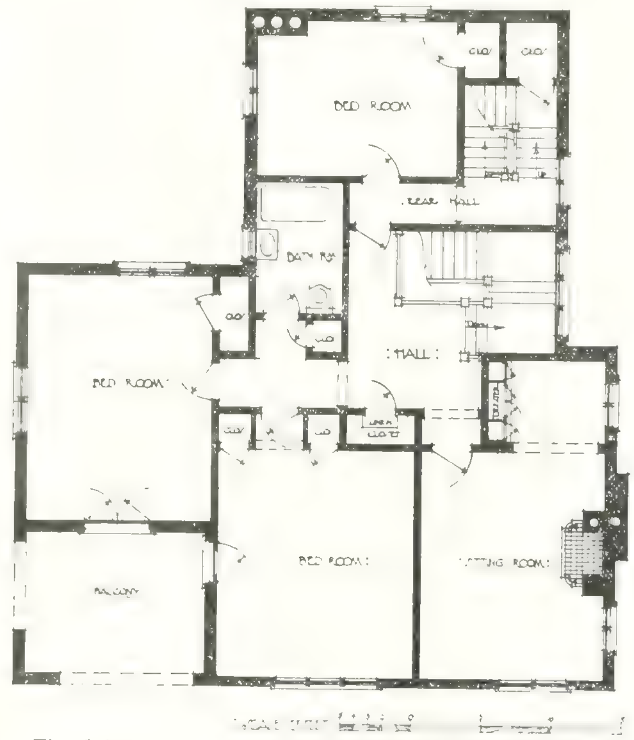
speaking, this residence has been planned to give large rooms in a small house, and with this end in view, the staircase and halls have been reduced to a minimum. The exterior is built of John Price's deep red stock brick, laid up with a wide white mortar joint. The floors throughout are oak, birch and maple; the trim in living room is red oak with



The Justice Duff Residence—First Floor Plan

red oak ceiling. Bedroom floors pine, painted finish.

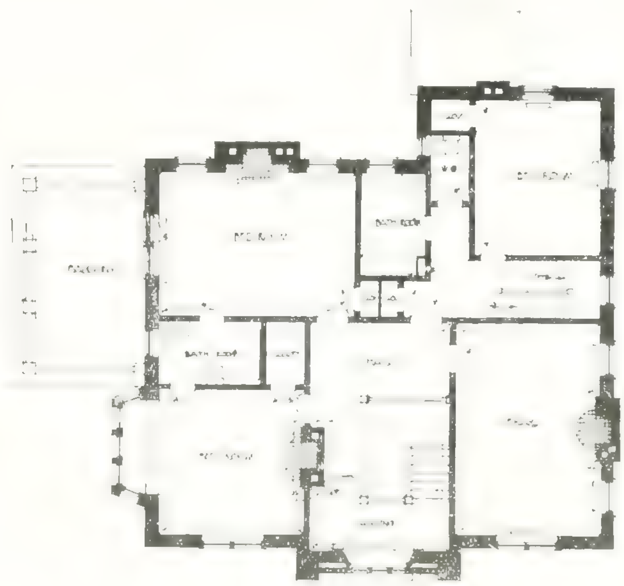
The residence for Lt.-Col. J. B. Maclean, on Wells' Hill, Toronto, John M. Lyle, architect, was originally planned as an alteration, it being the intention to place an old frame house and an old wooden barn together to form a new house. It was finally decided to abandon this idea, and the original plans were carried out in new materials. The big living room is the essential feature of the plan. The exterior is built of stucco on metal lath, the same being laid on sheeting placed on wooden studs. The interior floors are Georgia pine, birch



The Colborne P. Meredith Residence—Second Floor Plan.

and maple. The trim is Georgia pine in the living room, with Georgia pine panelling and ceiling. Staircase is mahogany and white finish. Dining room, hall and bedroom floor trim pine, painted finish.

The Stuart Strathy House, Toronto, Langley & Howland, architects, is so arranged in plan that



The Justice Duff Residence—Second Floor Plan.

principal rooms open on the garden at back of house, the entrance, however, being on street side, the kitchen also being on street side. The house is constructed of red brick with gray stone trimmings at entrance, etc., and portions of exterior walls above first storey are of frame finished on exterior with

Residence of Stuart Strathy, Toronto, Ontario. Langley & Howland, Architects.

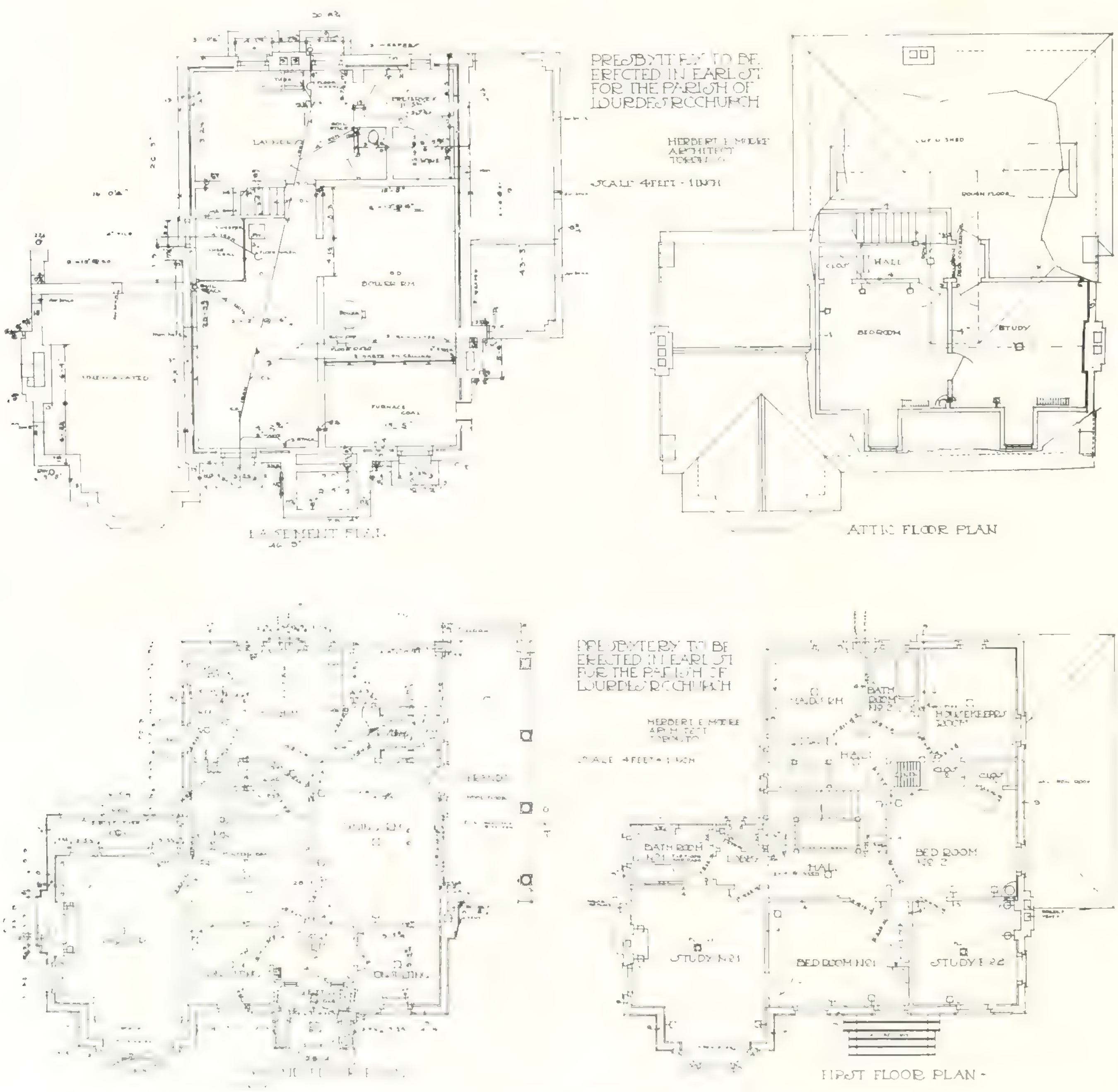
Library.

Living Room.

Residence of Stuart Strathy, Toronto, Ontario. Langley & Howland, Architects.

metal lath and cement stucco, gables being finished in half timber construction. The roofing is of green slates. The main stair hall, stairway and library are finished in oak and remainder of house trimmed in pine with white finish.

Mrs. Larratt Smith's house, Toronto, also by Langley & Howland, is placed on a lot at southeast corner of two streets, the house being placed close to north boundary of lot so a sto have ample garden space to south. The entrance is from north side, thus giving entire privacy to garden, and the plan is so arranged that all principal rooms face the south and overlook the garden, the lot extending about 200 feet to the south. The drawing room and library and rooms over have an outlook on street and to west, in this case the kitchen is again placed on the street, and it might be mentioned in this case that this arrangement has been found to be very desirable under conditions of this kind. The main entrance on north side of house is practically at grade level, the steps rising to ground floor level by inside. The kitchen portion is well isolated from remainder of house, including dining room, by a passage way, two doors have to be passed before going to kitchen from other portions of the house. The verandah is placed off the dining room at the southeast corner of the house, so as to give privacy from the street and yet have full advantage of the garden on the ground floor. Opposite the entrance and main hall at the south side of the house is arranged a conservatory, which is really used as a sun room. The main stairs extended on from the ground floor to the first floor and the back stairs extend from basement to attic for service purposes. The interior of dining room and library are finished in oak, the drawing room, hall and bedrooms are finished white, the doors in the principal portions of the house are finished in mahogany, including the posts, and hand rail of stairway. All principal rooms off ground floor and first floor have oak floors. The house is constructed entirely of dark red brick with white mortared joints and gray limestone trim-



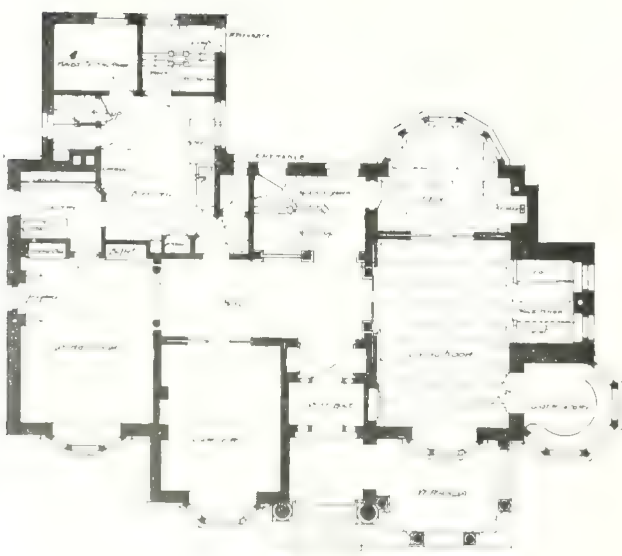
...sbytery, Our Lady of Lourdes Church, Rev. Hugh Canning, Pastor, Earl Street, Toronto. Herbert S. Moore, Architect.

Reception Room.

Stairway.

Presbytery, Our Lady of Lourdes Church, Rev. Hugh Canning, Pastor, Toronto, Ontario. Herbert S. Moore, Architect

Presbytery, Our Lady of Lourdes Church, Rev. Hugh Canning, Pastor, Earl St., Toronto. Herbert S. Moore, Architect.



First Floor Plan.

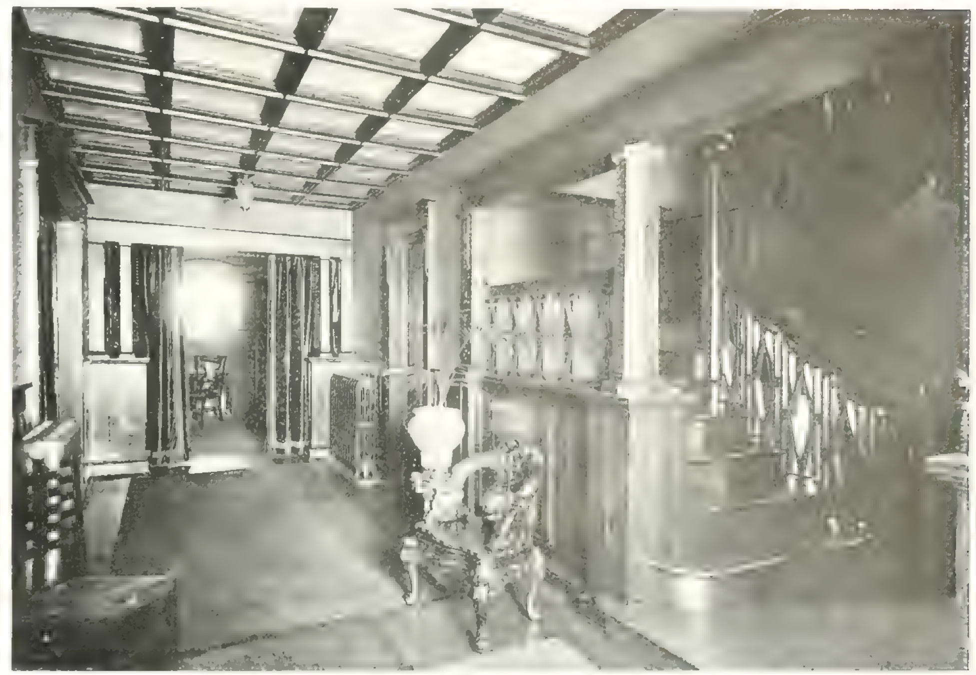
Second Floor Plan.

The Harris Residence.

Front.

Dining Room.

Living Room.



Reception Hall and Staircase.

Residence for W. T. Harris, Toronto, Ontario. Henry Simpson, Architect.

Dining Room.

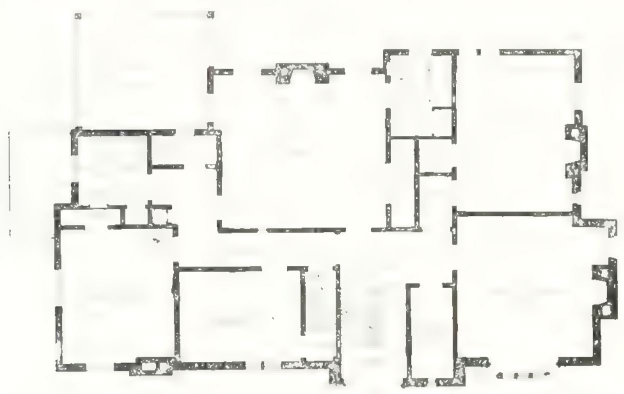
Residence for Mrs. H. C. Hammond, Toronto. Eden Smith & Sons, Architects.

Hall.

Hall, Looking Toward Sun Room

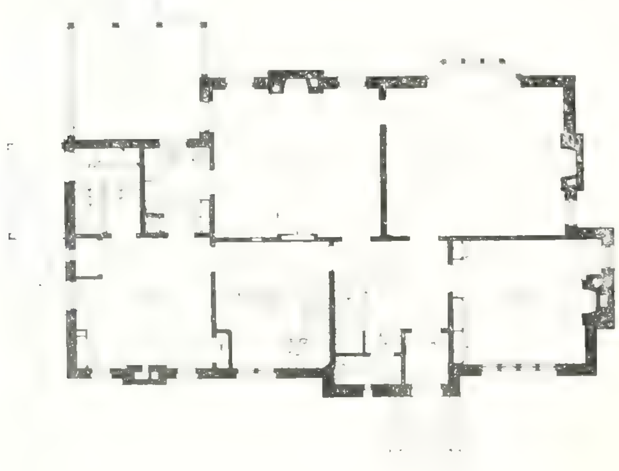
Residence for Mrs. H. C. Hammond, Toronto. Eden Smith & Sons, Architects mings. The roof is covered with mottled green slates.

The residence of W. T. Harris, Broadview and Bain avenues, Toronto, designed by Architect Henry Simpson, stands on spacious terraced grounds, and is planned to take advantage of an elevated site overlooking Riverdale ravine. The exterior is built of red brick with Indiana limestone trimming and a slate roof. Entrance is by a large verandah floored with red Welsh quarries, into a large reception hall



The Stuart Strathy Residence—First Floor Plan.

having a molded staff ceiling and an open staircase of unique design. Both here and in the principal rooms the woodwork is in quarter-cut oak, with panelled wainscotting from one-half to three-quarters the height of the walls. Off the living room, which has a beamed ceiling and an ingle nook with a large clinker brick fireplace, is the owner's den, elevated one step above the main floor, and so arranged as to form an improvised platform or stage for musicales and children's entertainments. The dining room, which has also a moulded staff ceiling of ornate design is decorated above the wainscotting with mural painting, a feature of the scheme being the built-in buffets which are seen in the accompanying view. In every respect the plan shows an interesting

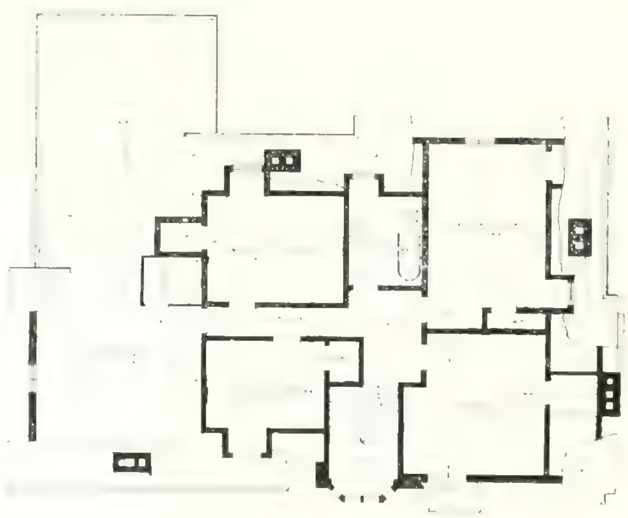


The Stuart Strathy Residence—Ground Floor Plan.

consideration with all rooms advantageously placed, and direct means of communication from one part of the household to the other. The kitchen, which is situated in a northeast position, is modernly equipped and provided with a large built-in refrigerator having an outside door for the reception of ice. Directly above the kitchen are the servant's quarters, isolated from the rest of the house and provided with every necessary accommodation for convenience and comfort; the rooms opening onto a balcony overlooking the east lawn and vegetable garden, which form an interesting part of the ground scheme.

The exterior of the Harry H. Love residence is constructed of stone to the second story, with large exterior chimney of the same material. The second story is of brick faced with plaster. The gables and roof are gray colored shingles. The living room is finished in birch. The walls are tinted in old colonial buff green. A fireplace of Dutch tile ornamented with Dutch painted tile in centre completes the attractive design. The second floor apartments are finished in white enamel with mahogany doors.

The residence of Mr. White, of the architectural firm of Burke, Horwood & White, two views of which are shown, is constructed of brick, stucco



The Stuart Strathy Residence—Attic Plan.

faced. The shingles and timber work are stained brown. The hall and dining room are finished in oak and the living room in selected black ash with beamed ceiling. The walls are decorated with cork velour, the hall and dining room in buff, and the living room in green paper with a small design in the pattern. The hall has an elliptical plaster ceiling. The main stairway is of iron, semi-circular in form. The second floor is finished in white enamel with mahogany doors.

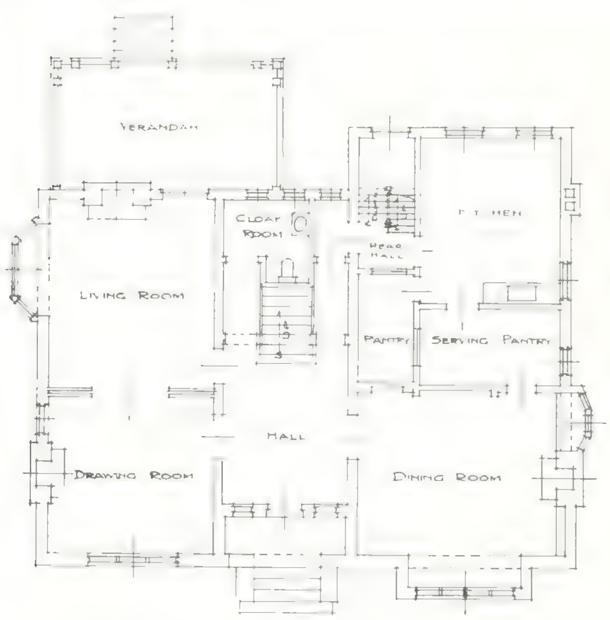
The residence of T. Ross Boys is built on a lot 75 x 170 feet, advantageously lifted above the sidewalk and shaded by well selected trees. The walls are stock red brick with gray stone trimmings. The roof is shingled, stained green. The interior is finished in quarter-sawed oak stained a dark tan. The fireplaces are of brick, well designed and attractive. The wide central staircase is the principal feature of this exceptionally well studied interior.

While no floor plans are shown of the two Toronto houses designed by Architect Charles B. Band, the exterior and interior views in either case are sufficient to indicate a well devised arrangement. The Clarendon avenue house, with its projecting ends and half-timber work, presents a scheme that is happily invested with both graceful lines and a decided architectural character. Attention might be called to the location of the garage, to the left of the approach, which provides accommodation for two cars at the front of the house. Entrance to the house is through a panelled vestibule floored with hexagonal tile and finished with an elliptical ceiling. The reception hall is panelled the full height to the beams of the ceiling overhead, and the main living room is carried out in oak. The lavatory and approach to the billiard room in the basement is under the main stair. This latter interior, the position of which is shown by the two basement windows noted in the rear view, is located and arranged to take advantage of the natural fall of the ground on this side of the house. At the end of the main hall opposite the vestibule is a palm room separated from the hall by a glass door. The floor of the palm room is tiled with red quarries 3 by 6 in., laid "herringbone," while the walls are tiled with a pale greenish yellow "Pantilicon" tile. The servants' dining room, which is situated beneath the main dining room, is connected with the kitchen by a dumb waiter. The house is equipped with a vacuum cleaning system and all electric wires are run in conduits. The billiard room is finished in an autumn tint with strapped dado walls filled in with a wine-red cloth.

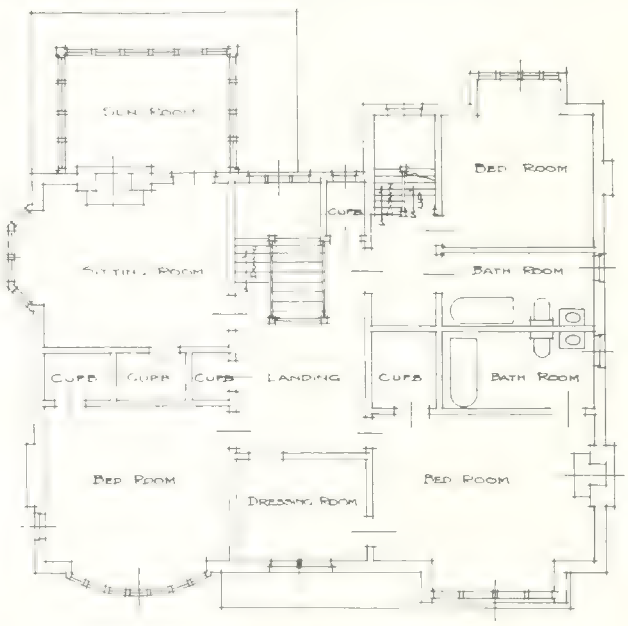
An interesting domestic character has been imparted to the stone and stucco residence on St. Clair avenue designed by Mr. Band. In this house the entire lower floor is in oak, while oak and white enamelled woodwork has been adopted for the rooms above. A feature of the upper floor scheme is the arrangement of the sun room, which is finished with a tile floor, and the large sitting room, which is placed on a higher level and has a glass door giving a view through the sun room to the outside. In the dining room, which is decorated in excellent taste, the panelling is four feet wide, while the walls above the plate rail are finished with a stencilled frieze. An interesting feature of this room is the fireplace, the detail of which can be seen in the accompanying view. Beneath the staircase, convenient to the door of the verandah on the west side of the house, is a laboratory and cloak room. This verandah can be approached from either the hall or the drawing room The exterior is carried out in stone with stucco and Vermont green slate roof, the mullions in the window being of stone with metal frames and sash.

The presbytery of Our Lady of Lourdes Church, Earl street, Toronto, designed by Architect Herbert E. Moore, has little of the marked austerity which often characterizes the treatment of residences designed for this purpose. Like all well considered Georgian houses, the scheme, while dignified in feeling, is yet essentially more homelike than formal in character. The exterior, which is interesting both as regards the color and texture of its walls, is carried out in red pressed brick laid up in Flemish bond with

Residence of T. R. Boyes, Toronto, Ontario. F. S. Baker, Architect.



First Floor Plan



Second Floor Plan.

Plans of the Boys' Residence.

white mortar joints, grey cut stone trimmings, green painted shutters and an unfading green slate roof. Entrance is by a hooded doorway into a vestibule having consulting room on either side. These rooms take the place of a general reception room and make it possible for a private administration of the parish affairs without an encroachment on the household proper. Back of the lobby is a large hall off which the parlor, dining room and service portion of the house open. The servants' rooms, which are located at the rear of the upper floor, are cut off from the rooms of the pastor and his assistant by a solid wall, each part of the second floor having its own separate staircase. All rooms are papered with appropriate patterns, and the electric fixtures and handware were selected from Georgian and Colonial designs to harmonize with the treatment of the various rooms. The parlor is finished in white woodwork with a plastered cornice; the stair hall and consulting rooms in white woodwork with mahogany doors, while the dining room is in Georgia pine stained a rustic brown. Georgia pine is also used for the two studios, which, together with the parlor, have interestingly designed fireplaces.

While a detailed description of the residences illustrated from designs by Winnipeg architects cannot be given, it is apparent that the correct use of brick and a feeling for its true place in design is possessed by the designers in that city. In these days of half-timber, plaster, stucco and concrete, when even in the last year's volume of the leading exponent of Brick in the United States, the word "Brick" cannot be found, except as a part of its title, it is refreshing to note that many of the best residence designers refuse to adopt the Spanish adobe or the Italian stucco in expressing their conception, but adhere to the rich color, varied bond and arrangement of brick for the warm, dignified, and inviting color and shape of the brick wall, than which for residence work there is none to compare. It never is obtrusive, and in the hands of even an incompetent designer its texture and color gives a softening effect to bad lines, even as massive stone in crude design shows dignity and strength. In the Aldinger house, by Herbert P. Rugh, a screened veranda, with brick corner piers, opens into the living room, which is separated from the dining room, also fronting on the veranda, by wide glass doors.

In the Allen and the Ball residence, by John D. Atkinson, the plans are similar, both having a central hall with living and dining rooms on either side. The entrance to the hall in the Allen residence, however, is direct from the street through a well designed and dignified doorway, colonial in design. The entrance to the Ball residence is from an enclosed tender across the entire front. The residence of C. F. Calder, by J. H. G. Russell, is also of brick, and here, too, the hall is in the centre and entered from a broad screened porch with brick corner piers.

ACCORDING TO A REPORT recently submitted to the British Government, the Chinese to a considerable extent are changing their mode of construction and adopting European methods and materials. The dilapidated rows of one-storied houses of lath and plaster, dark, unsanitary and comfortless, which formerly did duty as Government offices, schools, barracks, etc., are rapidly disappearing before buildings in foreign style of brick and stone, fitted with such up-to-date conveniences as electric light and steam heat; while in all the large cities and trading centres merchants and shopkeepers are replacing the shanties of former days with modern structures in which the *yanglou* or foreign upper story, and the plate-glass window, are usually conspicuous features. The style is more often than not atrocious and the work shoddy, but in places like Shanghai and Pekin, where the erection of business buildings and Government offices has been entrusted to foreign architects, the results are not unworthy of a European city. Approimately $7,000,000 worth of foreign building materials were imported by China in 1910.

Dining Room.

Hall.

Residence of T. R. Boys, Toronto, Ontario. F. S. Baker, Architect.

Front.

Residence on Clarendon Avenue, Toronto. Charles P. Band, Architect.

Rear.

Residence on Clarendon Avenue, Toronto. Charles P. Band, Architect.

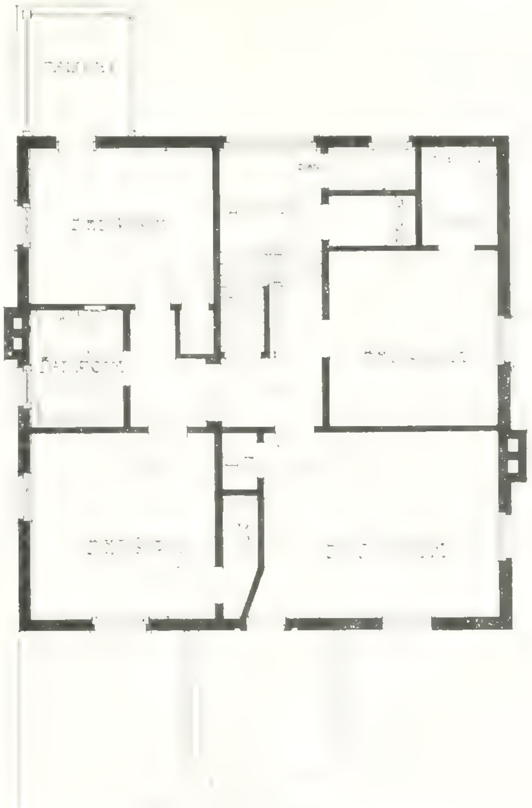
Hall.

Living Room.

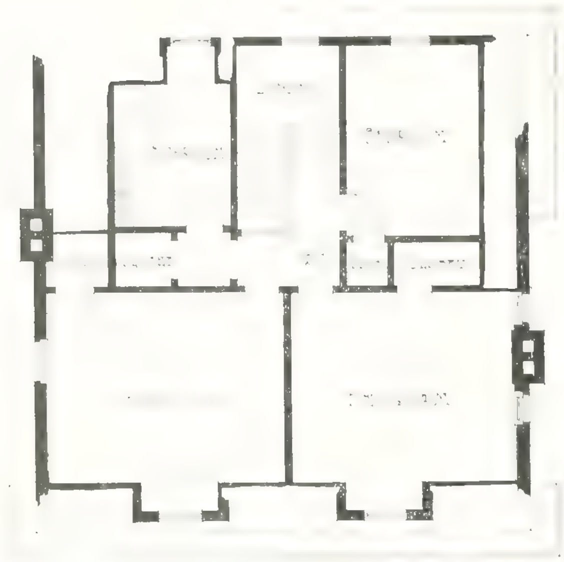
Residence on Clarendon Avenue, Toronto. Charles P. Band, Architect.

Dining-Room.

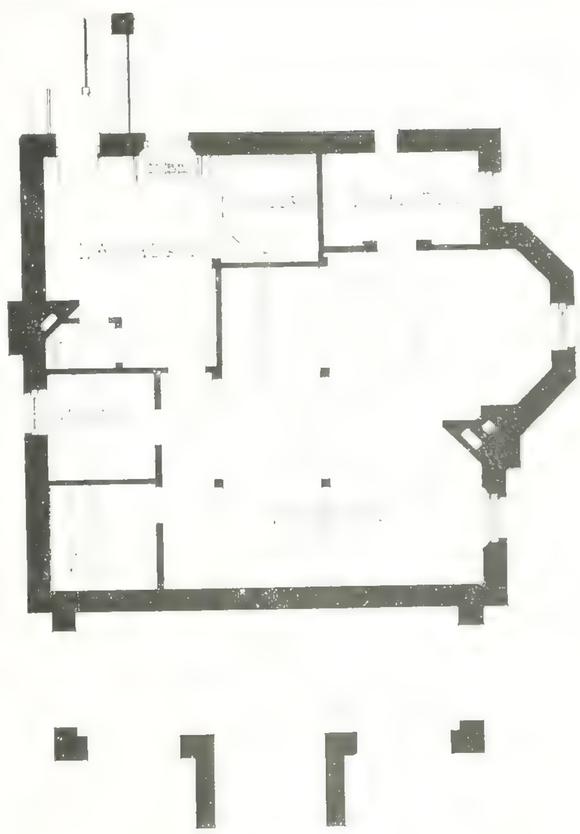
Residence on St. Clair Ave., Toronto. Charles P. Band, Architect



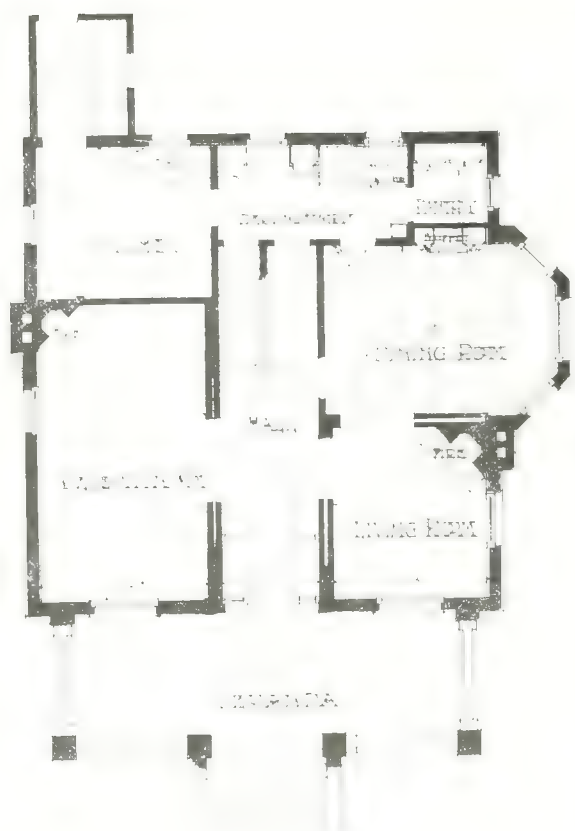
Second Floor Plan.



Attic Floor Plan.

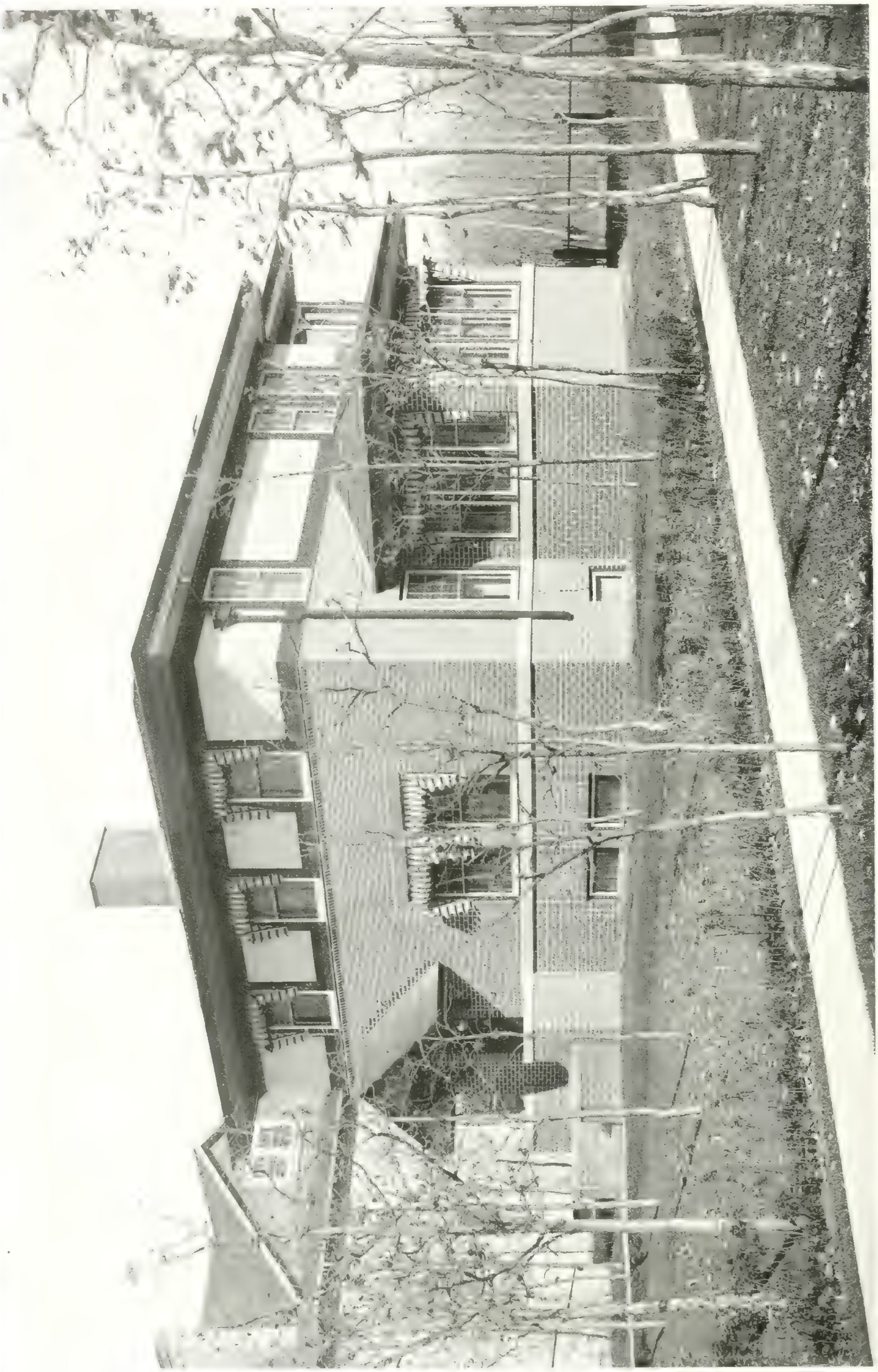


Basement Plan.



Ground Floor Plan.

Plans of Residence of N. F. Calder, Winnipeg, Manitoba. J. H. C. Russell, Architect. See page 69.



Residence for A. H. Aldinger, Winnipeg, Manitoba. Herbert B. Rugh, Architect.

Fireplace in Living Roo....

Dining Room.

Residence for A. H. Aldinger, Winnipeg, Manitoba. Herbert B. Rugh, Architect.

Residence for G. W. Allen, Winnipeg, Manitoba. John D. Atkinson, Architect.

Dining Room.

Living Room.

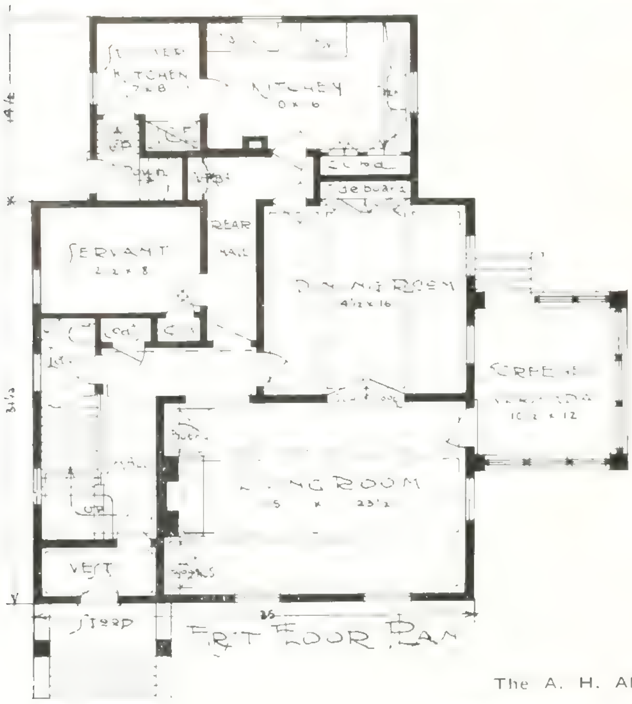
Residence for G. W. Allen, Winnipeg, Manitoba. John D. Atkinson, Architect.

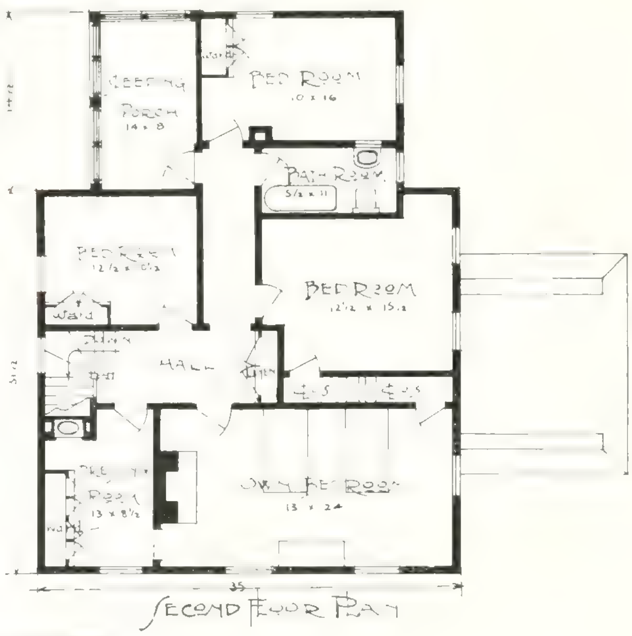
Residence for W. L. Ball, Winnipeg, Manitoba. John D. Atkinson, Architect.

Living Room.

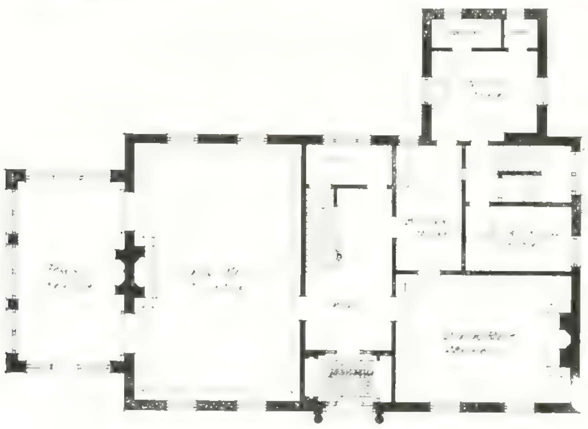
Living Room, showing Sun Room

Residence for W. L. Ball, Winnipeg, Manitoba. John D. Atkinson, Architect.

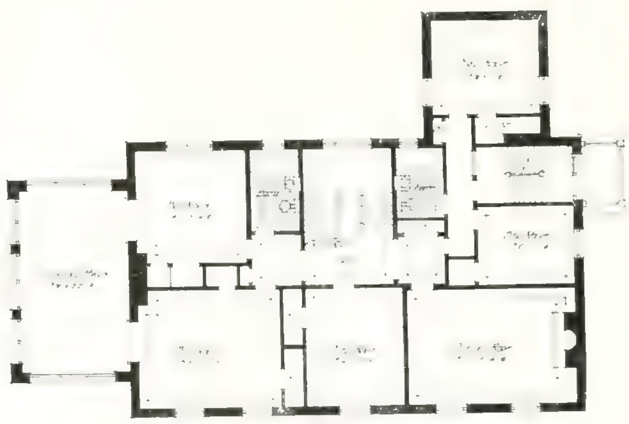




The A. H. Aldinger Residence.

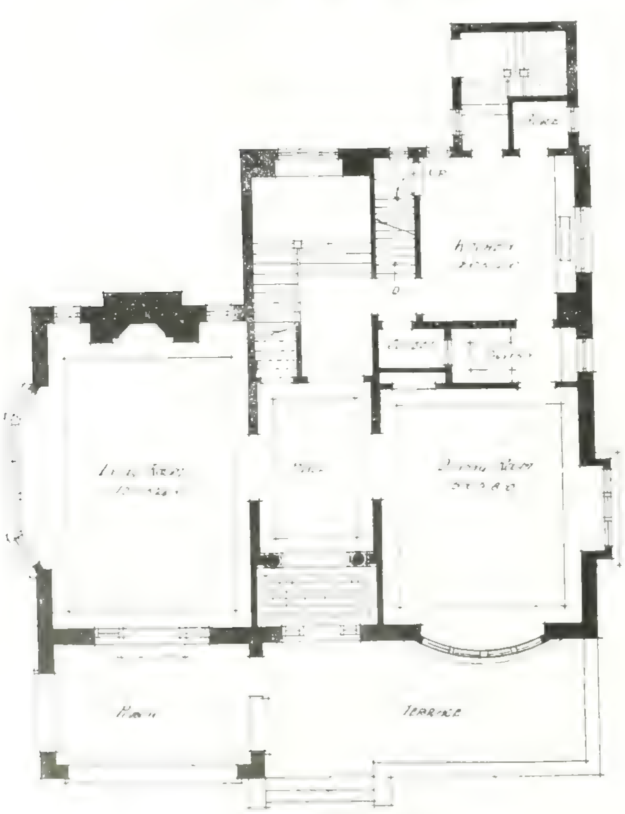


First Floor Plan.

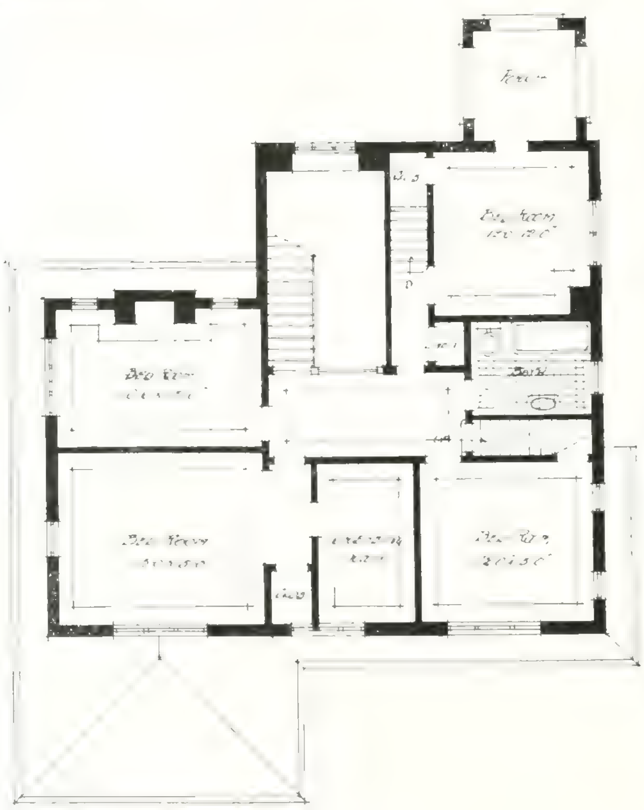


Second Floor Plan.

The G. W. Allen Residence.



First Floor Plan.



Second Floor Plan.

The W. L. Ball Residence.

CONSTRUCTION

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

Robert Craik McLean Editor

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

Vol. 4 Toronto, November, 1911 No. 12

CURRENT TOPICS

SASKATCHEWAN IS TO HAVE an architectural association in the near future, which will add another Provincial association under the new federation of the Royal Architectural Institute of Canada.

* * *

TORONTO has joined the movement so active in Ottawa and Montreal in the direction of replacing the city slums with properly planned houses. A sub-committee of the Board of Health reports on broad lines. It demands suburban garden cities with rapid transportation, a proper scheme of city planning, including the surrounding area of the city, and the housing division of the health department under the control of a representative committee of citizens. The sanitary features to such a programme are most important, and it should have extraordinary powers for the repair and instalation of sanitary appliances in houses and the razing of houses of the worst class. In Ottawa and Montreal Earl Grey did much during his official residence, and in his last speech to the people of Canada, at a banquet at Montreal, he departed from his written argument and gave a large portion of his time to remarks on the subject that is so near his heart, the building of workingmen's houses.

NOTHING SO THOROUGHLY indicates the growth of our Western cities along substantial and permanent lines as the buildings that are being designed and erected by the Western architects. Cities where eight years ago the prairie spread a limitless plain, are now, through the enterprise of investors and skill of architects, assuming metropolitan appearance. The reason why these Western cities can equal those in the older East (and this is true in the United States as well as in Canada) in point of design, is that some of the best designers in the crowded East have gone West and thrown their fortunes and their enthusiasm into the work of building the cities of a new empire.

* * *

THE MODEL HOMES Association of Ottawa plan for a workingman's house worked out in detail by Albert J. Hazelgrove, illustrated in this issue, presents the problem of a small house of substantial construction and convenient plan. This association is presenting in a practical manner the main point in the workingmen's homes' movement, and the studied plans presented by Mr. Hazelgrove are as near a solution of the most warm, comfortable and sanitary house for the least money that has yet been presented. His plan presents in a practical way a house that contains each necessity of the ordinary Canadian citizen and leaves out unnecessary luxury. As such it cannot receive too much attention from the associations in other cities who are discussing and urging upon the civic and provincial authorities the absolute necessity for the abolition of slums and substitution of livable housing for the working people.

* * *

AT ITS LAST MEETING the Manitoba Association of Architects discussed a report of progress of a committee appointed to meet with committees of the Western Art Association and the Crafts Society to study and work out the details for the formation of an Art Institute. The intention is that the new Art Institute would provide for art classes, the holding of regular exhibitions, and the securing of a permanent building through the assistance of the city and provincial governments. No better enterprise of a civic character could be engaged in by the Architectural Association or individuals of the province who have the progressive future of the people at heart. The movement should receive the active and financial support of the commercial public that will be benefited and not be left to the artists who are most closely allied to it, but for whom there is no direct recompense but the satisfaction of having made two blades of grass grow where one grew before.

* * *

MONTREAL is taking the right course in regard to the construction of school buildings. It not only has a by-law that provides that the construction of all schools must be fireproof, but the law is retrocative and buildings designed before the law went into effect must come under its provisions.

Now that fireproof materials are within a small percentage as cheap as those that are combustible, there is no excuse for other than fireproof school houses, and even the lessening of the number built would be compensated for by the security of the occupants. The troubles of the average school board are many as an inadequate school fund is the rule, but the law should protect it in this desire to build substantial buildings, even against the parsimony of those who are directly benefited by the fireproof building rule.

* * *

CANADA LEADS in the movement toward providing homes of modest cost and convenient and healthful places for the wage earning population, and it extends from Cape Breton to Vancouver. In the large cities it takes the form of the abolition of slums that threaten the health, to say nothing of its humanitarian aspect, of the balance of the population. In the smaller places, where individual concerns employ large numbers of people, and where the proprietors do not follow Herr Krupp's plan of providing garden cities for the employes, men of capital should take the matter up, first as an investment, and second because of the benefit it would be to the city at large. In every industrial community there are a large proportion of married men who are boarding and sending the balance of their wages to their families in distant cities. These would occupy houses if they could find them at a reasonable rental, and add that much to the city's population and business. The most pressing want in every large city and industrial community is the proper housing for the wage-earning portion of the population. The influx of workingmen from the United States, who are used to better living conditions, seems to be utterly disregarded as far as their living accommodations go, and the same can be said of the cities. The result is a crowding of tenements in unhealthy districts and a condition evolved that is decidedly against the best interests of any city.

* * *

THE FIRM of James Stewart and Co., which is bidding on Toronto's three miles of subway, or "tubes" has an interesting history. The founder of the firm, James Stewart, was a builder in Scotland in his early life, and was the builder, and the designer as well, of Balmoral Castle. He emigrated to the United States in the seventies, and settled at St. Louis, and soon was one of its largest contractors, his work extending down and up the Mississippi River, and in variety from bridges and jetties to residence construction. When Alexander, the youngest member of the firm, grew up he received an architectural education, and for a number of years an architectural office was a department of the business of James Stewart and Sons. As the business grew, general contracting for large buildings occupied, to a large measure, the attention of the firm, and in that direction its name is international. It was John Stewart who showed the English builders American methods, and erected a building in one year that the native contractors were positive could not be finished in five. It would be singular if the sons of the builder of Balmoral should build a subway in Toronto.

* * *

ONE HUNDRED years of peace will be celebrated by a bridge between Fort Erie and Buffalo if the plans of public spirited and patriotic citizens on both sides of the line are carried out. The bridge is a necessity for the proper communication of the people on the southern end of the Niagara peninsular and Buffalo, and the people are calling upon the representatives at Ottawa and Toronto to do every thing in their power towards its accomplishment. The sentimental nature of such a permanent memorial is of more lasting and concrete value than is usually supposed by those who do not take into account the fact that it is sentiment that makes or unmakes nations and governs financial panics.

* * *

THE VARIETY of purposes to which concrete lends itself as a material is indicated by the output of the National Concrete Manufacturing Company, which has recently erected a factory covering several acres at Lindsay. Besides turning out all kinds of concrete building material from foundation walls to shingles and chimneys, the company is prepared to furnish plans and estimates for the complete erection of concrete houses or buildings of any kind, and will make specialties of cement verandah columns, piers, railings, balusters, etc., porch steps, lawn vases, flower pots, window sills, lawn rollers, lawn fences, gate and tie posts, well linings, watering troughs, feeding troughs and cisterns for both barn and house use, concrete silos of most perfect construction and design, also culvert tile and sewer pipes of all sizes.

* * *

INFORMATION COMES TO CONSTRUCTION that a majority of members of the Upper House in the Japanese Diet are in favor of constructing a new Diet building, at a cost of about $2,500,000. A bill to this effect will probably be submitted to the next session of the Diet. This ought to be interesting to architects who are desirous of extending their clientele beyond the Dominion, or designers who would find a foreign commission attractive. There have been many Japanese draftsmen educated in the United States, but on so important a structure it is probable that an "imported" architect would be favored.

* * *

VINCENT MASSEY of Toronto has given the Regina College a woman's building, to cost upwards of $200,000. The donor's object is to place at Regina for the benefit of the women of the Saskatchewan district, the best equipped educational institution for women in the Dominion.

An Interesting Detail of Garden at "Flagcourt," Residence of Mr. John Firstbrook, Lawrence Park, Toronto. Chadwick & Beckett, Architects.

THE ARCHITECTURAL DEVELOPMENT OF A SUBURB

Under architectural direction, and with the sympathetic cooperation of appreciative clients, Lawrence Park, North Toronto, is developing ideal suburban conditions.

ONE OF THE DISTINCTIVE features noticeable in the growth of Toronto is the development of its suburbs. The country around the city is rich in residential possibilities that have only recently been recognized by the real estate dealer and the home builder. It is most regrettable that of the two the real estate dealer "saw it first," and by paying the farmer hundreds per acre he is holding up the builder for thousands per lot, a feature that will equalize itself in time. At the present the purchase of one of these ideal building sites is a luxury rather than an investment, and only those who can afford the luxury are apt to purchase at present inflated prices that will continue until transportation facilities bring other districts into the market for the man of moderate means. But meanwhile, the residences that are being designed by Toronto architects fully meet the requirements of their beautiful surroundings. On the east and west of the city, where high bluffs overlook the blue waters of Ontario, the suburb is a thin string of villas, each with its own individuality, but all having that feeling of association with surroundings that makes for residential beauty. On the north of the city, on high ground cut with ravines, their pine-clad banks covering the scars left by the eroding water or glacial drift that made them, with sloping hillsides between, the subdivision called Lawrence Park, is located.

From a collection of farms the art of the landscape architect and the designer of homes has changed the bare slopes of the hills into a homelike collec-

Living Room.

"Flagcourt," Residence of John Firstbrook, Lawrence Park, Toronto, Ontario. Chadwick & Beckett, Architects.

The Garden.

Detail of South Front.

"Flagcourt," Residence of John Firstbrook, Lawrence Park, Toronto, Ontario. Chadwick and Beckett, Architects.

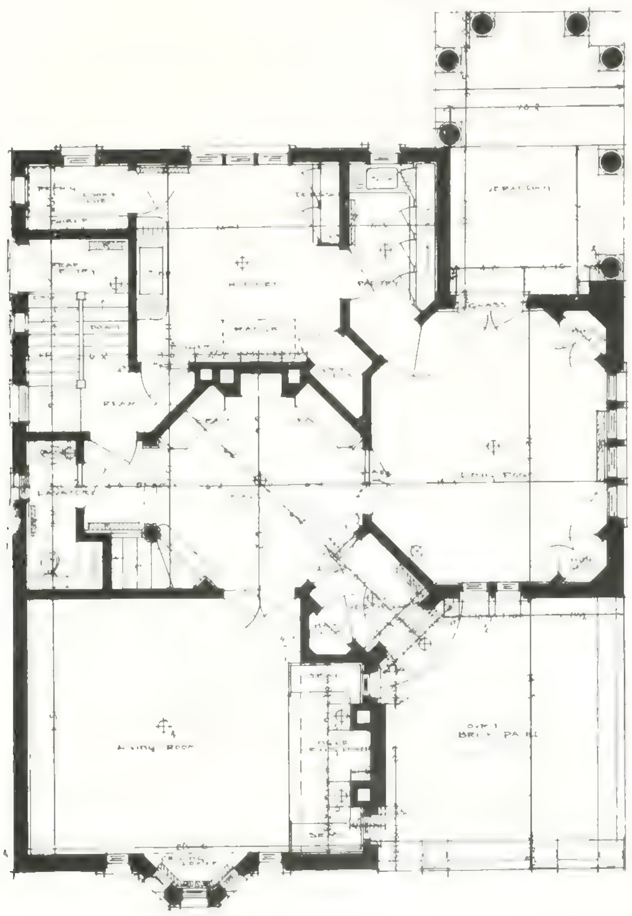
Living Room.

Residence of W. S. Dinnick, Lawrence Park, Toronto, Ontario. Chadwick and Beckett, Architects.

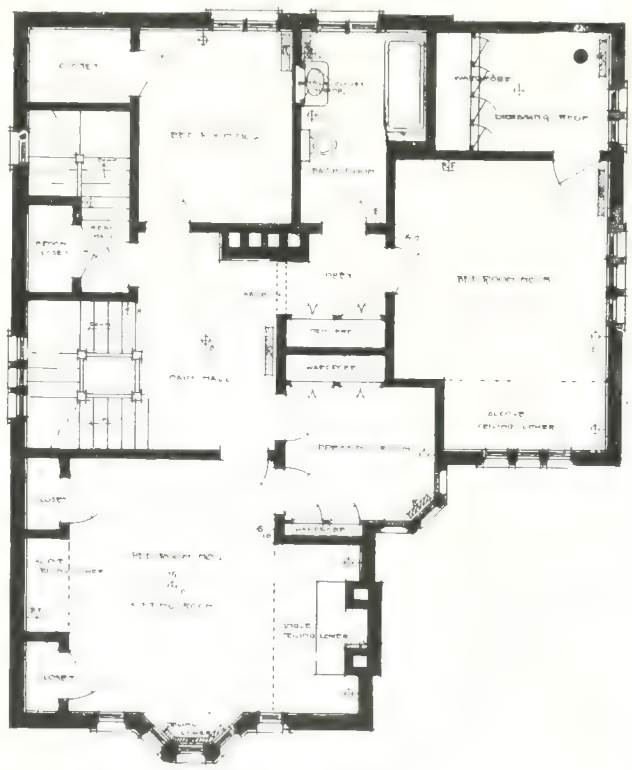
tion of suburban residences. Each house has a commanding position and magnificent views of hill, valley and pine embowered ravine, are made a part of the study given to the plans by the architect who designs the home.

The official architect of the suburb is S. G. Beckett, of the architectural firm of Chadwick and Beckett, and though each owner is at liberty to select his architect, this firm have designed the majority of the houses yet erected. With a fine sense of proportion and a keen sympathy for the association of house and landscape in the completed picture, the architects have produced a number of types of suburban residences here that are individually delightful and collectively give an air of refinement to the suburb that is usually conspicuous by its absence in the majority of similar suburbs. Even here it is regretted that already the iconoclast that thinks the carpenter or mason and a plan book is all that is required in the erection of a house is in evidence, and the houses thus erected will continue a blot upon an otherwise exceptionally artistic picture of suburban design.

In presenting a few of the completed residences, it is noted that they are new. The garden growth and the vines in the pergolas give that decorative effect that is so necessary to complete the picture, but it will be years before the picture is finished through the growth of trees. But these are all part of the plan, and, like the streets that are still unfinished, will in time give the effect that will make Lawrence Park a credit to the architects who have designed it.



Ground Floor Plan.



First Floor Plan.

The W. S. Dinnick Residence.

The home of Mr. Evans, designed by Chadwick and Beckett, architects, of Toronto, is appropriately named.

Grey Gables is a hilltop house, standing out boldly on the skyline, built of stone and stucco. The stucco is finished with a bold trowelled finish. The roof is of shingles stained in three shades of green. The ground floor consists of a large living room with an ingle, the latter paved entirely in brick; dining room with built-in sideboard, kitchen, pantry, etc. The woodwork is of Georgia pine stained to a warm chestnut brown. The walls and ceilings are of stucco plaster. The verandah is paved with Welch Quarry tile. The exceptional feature of this house is the treatment of the upper hall. The main stair is enclosed and is without balusters or newels, stucco plaster parapets being carried up instead with posts ceiling high springing from each corner and supporting beams and cross beams at the level of the first floor ceiling. The rose garden is paved with large Credit Valley flag stones, from Mr. Graham-Bell's quarries; in the centre is a Roman stone sundial, and a cedar hedge surrounds the whole. From the rose garden a gate leads to the formal garden in the rear, in the centre of which is an octagonal basin of rubble masonry with a Roman stone fountain modelled by Messrs. Green & Wicks, and a pergola. The whole is enclosed by a dry stone wall. The French window from the living room leads to the formal garden. On the north side of the house the drive leads to a small stone garage and drying ground, separated by a dry stone wall from the garden.

Mr. Jones' house is built of clinker brick and stucco plaster stained a warm ochre with half-timbering. It is also finished in Georgia pine, with oak floors. In the basement is a billiard room. A flight of

Hall.
Residence of W. S. Dinnick, Lawrence Park, Toronto, Ontario. Chadwick & Beckett, Architects.

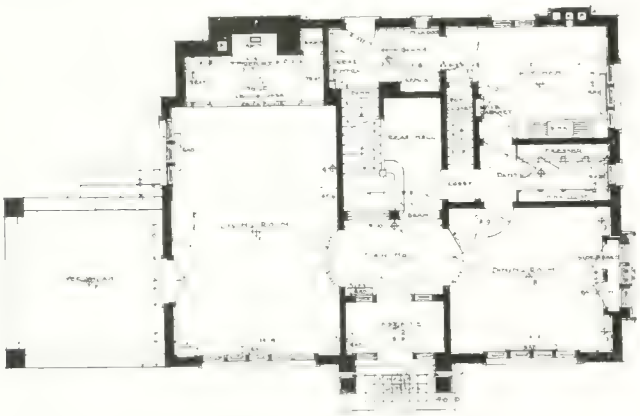
Living Room.
Gray Gables, Residence of J. H. Evans, Lawrence Park, Toronto, Ontario. Chadwick & Beckett, Architects.

View From Rear.

Garden Detail.

Gray Gables, Residence of J. H. Evans, Lawrence Park, Toronto, Ontario. Chadwick & Beckett, Architects brick steps leads to a simple garden enclosed by a brick wall, with pergola built of the same material. In rear of this is a vegetable garden and tennis court. There is also a small garage.

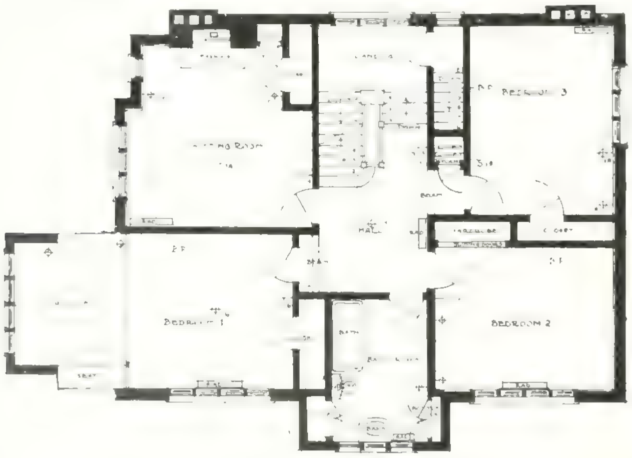
Mr. W. S. Dinnick's house. This house has a somewhat interesting plan. The house is situated on the north boundary of the estate, and the principal view is to the southwest. In order to make the most of this view, the vestibule and main hall



Ground Floor Plan.

The Jones Residence.

were placed on a diagonal axis. The main hall is octagonal, and from two sides of the octagon the living room and dining room opens. This house is finished in black ash with ingles and beamed ceilings, etc. The dining room has a white enamelled wainscot and plate rail 7 feet high. It is octagonal in shape with china closets in the corners. The ceiling and frieze are of panelled plaster with decorations by Mr. Hahn. The verandah is paved with Welch Quarry tile, and in winter will be enclosed and heated to form a sun room; it opens directly into the garden. The first floor is arranged



First Floor Plan.

The Jones Residence.

with a very complete suite, consisting of own bedroom, boudoir and dressing room, bathroom and night nursery. The garage is a very complete one for four cars with living quarters for the chauffeur above. A circular drive leads up to an open terrace at the front of the house. On the south side is a rose garden and sun dial of Doulton terra cotta. The terrace is of paving brick with Roman stone parapet. The formal garden has a circular pool and jet in the centre, surrounded by a circular pergola of cement stone around which are arranged formal bed and borders. To the north of the house is a tennis court surrounded by a cedar hedge and flower border. In rear of the tennis court is the rose garden with flower and vegetable beds. The circular drive and court leads to the garage and drying ground in the rear. The garden and drive are surrounded by brick garden walls. The house is in Tudor style of light red stock brick with Roman stone sills, quoins, mullions and lintels to all windows, which are glazed with leaded glass throughout. The roofs of the house and garage are stained a light tile red.

Mr. McConnell's house is built in Dutch Colonial style with gambrel roof and stucco pillars to verandah. The brick work is in Flemish bond. The

Hall in the Evans Residence.

roof is of cedar shingles in the natural state. The verandah is paved with brick and Roman stone border. The terrace covered by the pergola leads to the front door. The ground floor consists of reception room, staircase hall, living hall, dining room, pantry, kitchen, etc., all of which are finished in white enamel with Colonial mantels and Colonial detail generally

Mr. Brooke's house is entirely in "pebbledash" stucco and brick, with a brick base and cement borders to the windows. All windows are metal casements with leaded glass. The living room and dining room have strap dados with panels of leather and stucco respectively, decorated with stencilled borders by Mrs. Brookes. The verandah is paved with Welch Quarry tile.

Mr. Julian Sale's house stands boldly on an eminence. It is of dark red brick and green stained shingles. The living room is finished in stucco plaster with a large paved brick fireplace. The dining room is finished in mahogany.

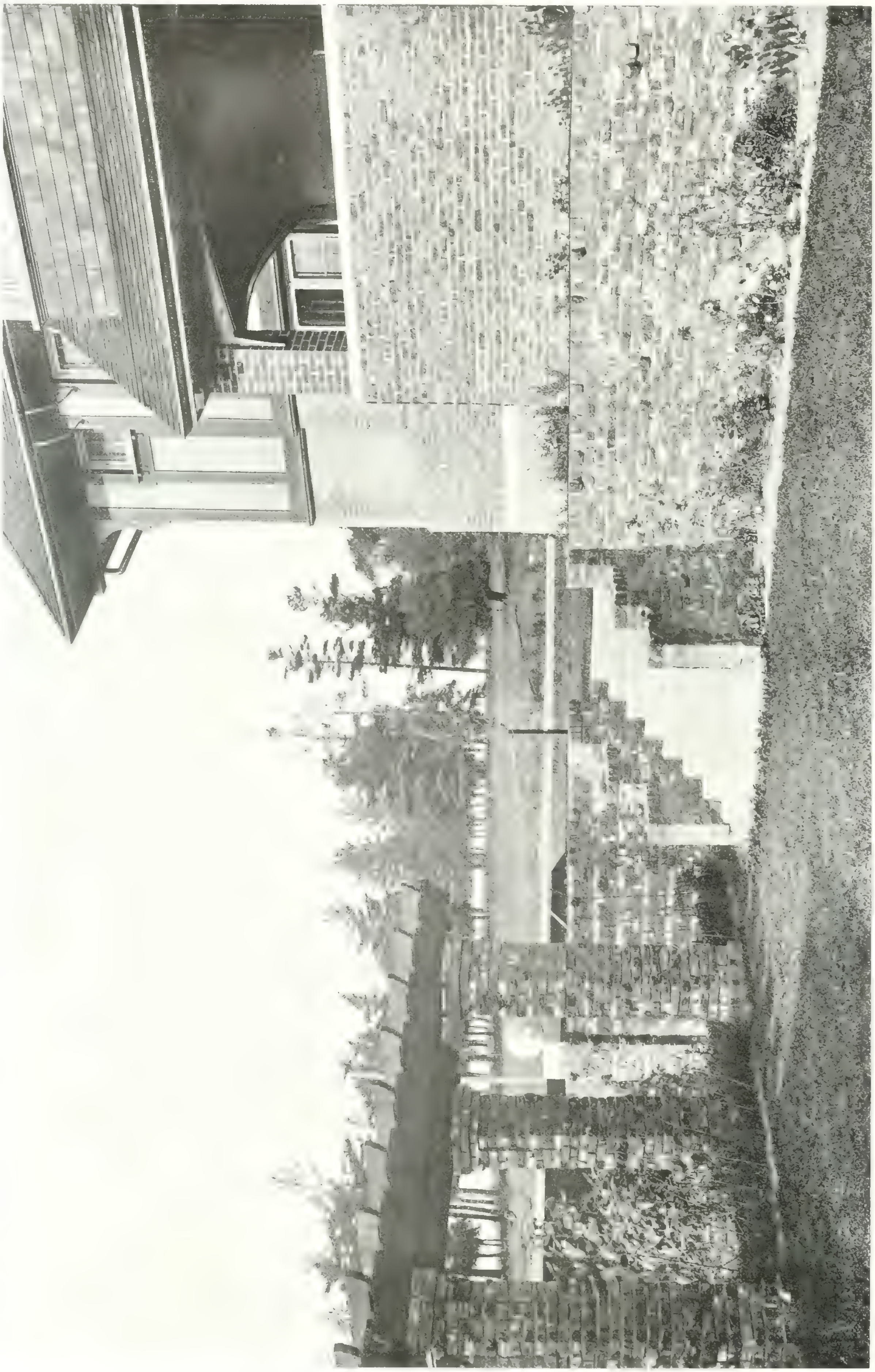
Residence of F. A. Jones.

Residence of Julian Sale.

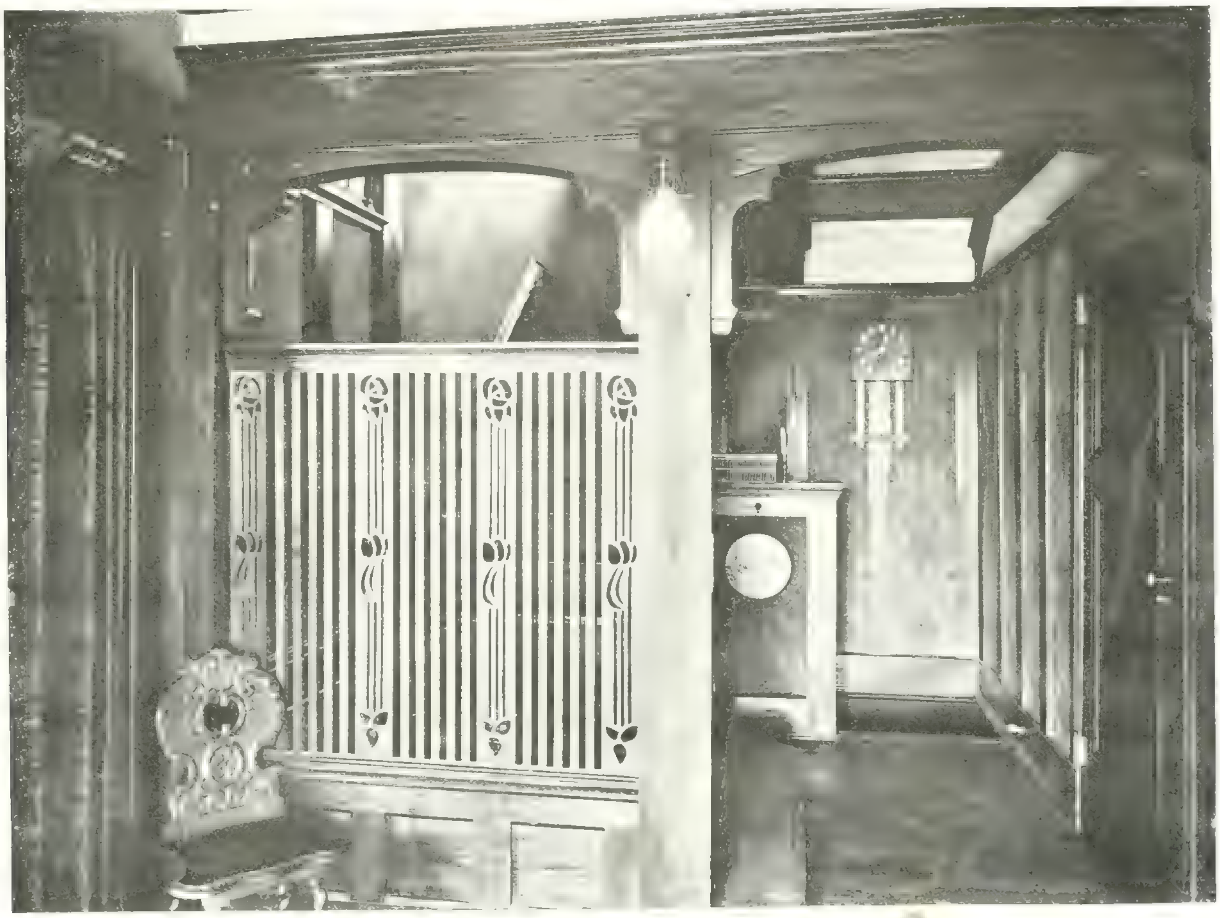
Residence of John Brooks.

Residence of John McConnell.

Typical Residences at Lawrence Park, Toronto, Ontario. Chadwick and Beckett, Architects.



Garden Detail, Residence of F. A. Jones, Lawrence Park, Toronto, Ontario. Chadwick and Beckett, Architects



Hall

Living Room

Sunnyholm, Residence of F. A. Jones, Lawrence Park, Toronto, Ontario. Chadwick and Beckett, Architects.

Detail of South Porch and Sun Room.

Residence of Dr. Dinnick, Lawrence Park, Toronto, Ontario. Chadwick and Beckett, Architects.

THE FOURTH CONVENTION ROYAL ARCHITECTURAL INSTITUTE OF CANADA

The final act of federation of all provincial associations under the title of the Royal Architectural Institute of Canada the principal work of the Convention held at Montreal, October 2nd and 3rd, 1911.

THE FOURTH GENERAL Assembly of the Royal Architectural Institute of Canada convened at Montreal on October 3-4, 1911. The attendance, numerically small, was representative, delegates being present from the Quebec, Ontario and Manitoba Provincial Associations. F. S. Baker, of Toronto, President; Alcide Chausse, of Montreal, Hon. Secretary, in the Assembly Hall of the Province of Quebec Association of Architects, 5 Beaver Hall Square. President F. S. Baker opened the first session and introduced His Worship the Mayor of Montreal, Hon. J. J. Guerin, M.D., who welcomed the Association to the city, and expressed a hope that the meeting would have an effect in advancing a movement toward better housing for workingmen.

J. R. Gardner, President of the Province of Quebec Association of Architects, welcomed the delegates in behalf of the Quebec Association. Mr. Gardner congratulated the President upon the programme outlined for the convention, and endorsed the remarks of the Mayor in regard to the bettering of workingmen's houses. He referred to the death of Vice-President L. Lemieux, which was a distinct loss to the Association, the Institute and the profession in Montreal. Mr. Gardner announced that King George had consented to become a patron of the Institute. He then reviewed the work that had been done in the direction of federation and said that the foundation having been laid the next meeting of the Institute would probably be a solid gathering of Canadian architects. Mr. Gardner then spoke on civic improvements and the importance of the work of architects in relation to them. He referred to the late city planning conference at London, at which 1,500 delegates were present. Various matters were touched on by Mr. Gardner such as the St. Alban's Cathedral, in which he referred to the recent appointment of Ralph Adams Cram of Boston, stating that while he admired Mr. Cram's work and his standing as an exponent of English Gothic, he had hoped that the Bishop would engage a Canadian if not an English architect, and thought it a pity that a Canadian had not been appointed. Referring to the late change of Government, Mr. Gardner expressed a hope that it would result in a more pronounced recognition of the profession, as the last Government presented a "cold shoulder" to architects on every occasion and that it was probable that this had a certain influence on the election. He hoped that the new Government would take advantage of the willingness of the profession to advise with it upon a basis of general good and not because the profession was looking for fees, to the bettering of Government work in the Dominion. Mr. Gardner then in detail spoke of the necessity of an architect being added to the Government Art Committee and that this committee pass upon designs of all public buildings, and the important improvements now going on in the Capital city of Ottawa, without such inspection of design and, what was more serious, the absence of any general city plan. Mr. Gardner made a strong plea for the improvement of opportunities for the architectural student and the establishment of scholarships in architecture by the Government, or an academy where architects and other artists could take degrees. In closing, the speaker paid tribute to the Ontario Government for its reservation of Algonquin Park for the use of the public. The reservation of this great park with its three hundred lakes, two thousand feet above sea level, is an example for other Provinces and cities.

President Baker replied to these welcomes. He said that this meeting was not perhaps as important as some they had had, as matters were in a state of development, owing to the condition they were in so far as the relations with the Government were concerned. The President then referred to the death of the late Vice-President, J. Z. Resther, whose demise was a great loss to the Institute. The efforts to bring about a federation of all architects of Canada in this Institute were coming to a completion, and as soon as some amendments were made to the charter of the Institute the matter would be accomplished. They could look forward to the next meeting as being one of architects from the Atlantic to the Pacific. There had been considerable correspondence with various people as to competitions, and in all cases the Institute had given advice with good results.

Referring to the town planning conference in London, where the President was the representative of the Institute, Mr. Baker said he had never attended meetings where such enthusiasm was shown. Two gold medals had been awarded by the Societe Academie d'Histoire Internationale, one to Mr. Watts, and one to himself, the latter on the suggestion of the gentleman nominated by Mr. Baker. The Institute had had some correspondence with the Government on the question of good architecture, and the President expressed the view that some members of the Government seemed to think it did not matter so long as they obtained well-built structures. There was also the question of the new St. Alban's Cathedral, Toronto. The Institute asked that a Canadian architect should be employed, or in the alternative, a British architect. The chapter, however, replied that they had decided to employ a foreigner, and had retained Mr. Cram, of Boston. It seemed a pity that in a country of this size that its professional men could not be looked upon with confidence in every respect. There had been a change in Government since the last meeting, and he hoped that so far as architects were concerned it would be a change for the better. The Laurier Government had cold-shouldered the architects on every occasion that he knew of. They had offered them advice which would cost the Government nothing, but their own officials seemed to think they knew best. He hoped the new Government would see the wisdom of consulting those who had spent their lives in studying these questions and were not always looking for fees. There were many buildings in contemplation by the Government, and he trusted the architects would receive more consideration than they had done in the past. He was also sanguine that the Government would do something for them in the way of education for architectural students; the Government might establish a scholarship for architects or an academy in which architects or musicians might take a degree of a more permanent character than that obtained from the Provincial Governments. Mr. Baker, in conclusion, suggested that other Provincial Governments might follow the example of the Ontario Government and establish parks similar to that of Algonquin Park in the northern part of the Province.

The report of the auditors on Treasurer J. H. W. Watts' report showed the accounts to be correct and a handsome balance in the Institute treasury.

The matter of a higher standard of architectural education in the Provinces was taken up by J. P. Hynes of Toronto. He said that the entire regulation of architectural practice and the improvement of design and construction lay in the education of the student of architecture, and that it was the duty of Provincial Governments and that of the Dominion to establish schools of architecture, not departments, in the universities. That the progress of the country and the building for the future required skilled architects, and it was the duty of the Government to undertake that education. In his opinion the only way to successfully combat the influx of foreign architects was to produce better qualified practitioners. He called attention to the fact that all other professions have well established means of education except the architectural, and it was taking on too great a burden for the private practitioners to educate young men in their offices, and it was essentially the province of the Government which endowed universities to see that adequate provision was made for architectural education. He called upon the Institute to make the proper representations to the Government with this in view, and made a motion to that effect.

In seconding Mr. Hynes' motion, Mr. H. B. Gordon of Toronto said that under some well devised plan the Provincial Governments should take measures to elevate the standard of architectural education and thus provide better public and private structures, and suggested that committees from representative architectural bodies in the various Provinces be appointed to personally wait upon the Ministers of Education and urge the establishment of improved courses in architectural education.

J. H. G. Russell, of Winnipeg, reported that the architects of Manitoba were trying to obtain the establishment of an art school in the Manitoba University which is now in process of formation. Mr. Ross, his colleague, gave a sketch of the situation, in which he stated that the Minister of Public Works thought that engineering and architecture would be taken care of by the Provincial educational authorities.

The convention was in thorough accord with Mr. Hynes' plan of thoroughly established courses of architecture in Provincial universities, following the precedent of the McGill University School, which was established personallv by Sir William Macdonald, and that all the affiliated associations should get together with this establishment of educational facilities for the future architects of the Dominion in view, including the endowment by the Government of post-graduate courses in the arts of architecture, painting, sculpture and music, and when special talent was shown a Canadian academy be formed of representatives of these schools. Mr. Watts endorsed the motion with the suggestion that Mr. Hynes head such a committee. After a full discussion a motion was unanimously adopted to the effect that a committee be appointed to wait upon the Minister of Education, and urge the establishment of architectural schools, and that the Dominion Government be urged to establish an academy and a post-graduate course in architecture and other arts. The session then adjourned.

Second Session.

The second session was devoted to a joint conference between the Institute, the Province of Quebec Association of Architects, and the City Improvement League of Montreal, on the subject of town planning and the betterment of workingmen's homes. The discussion was introduced by Dr. W. H. Atherton, Ph.D., secretary of the City Improvement League, who said the main thing was to have a thing, to know it when you have it, and how to keep it when you have it. He reviewed the situation in Montreal previous to the formation of the City Improvement League, and dealt with the Metropolitan Park Commission, and described the struggle to show the city the importance of parks and playgrounds, a movement which called for the co-operation of all social workers. Then the formation of the League was made in order to strengthen the movement toward better conditions in the way of water filtration, child culture and city planning all concentrated in a Metropolitan Park Commission.

In regard to city planning, Dr. Atherton said the case did not need any special pleading before such an audience. The world-wide movement for city planning was so well known by the architectural profession and members of the City Improvement League and members of associated bodies. The purpose of his paper was to indicate what stage that movement had reached in Montreal, and what the League was doing in the problem.

Tracing the history of the movement, Dr. Atherton showed how, prior to the inception of the City Improvement League, there had been individual efforts for the provision of playgrounds, improved transit facilities, and the development of the harbor front and beautification of the river banks, but the movement to draw up a bill for a Metropolitan Parks Commission had died down owing to lack of a strong public opinion. The League had been formed to be a ready vehicle to concentrate public opinion on civic improvement by being the convention ground of all those best elements of thought in the city, both of societies already working or of individual experts. The speaker claimed that the water problem conference had led to the new filtration system being undertaken, and the conference on Child Welfare was going to eventuate in the exhibition of 1912, while the two conferences on city planning and housing had started the present movement for a city plan, which had attracted attention under the name of the Metropolitan Parks Commission.

The steps taken in regard to the drafting of the bill for the Metropolitan Parks Commission were outlined by the speaker, who showed how that measure had received the support of the mayor and controllers, and how a preliminary commission of enquiry was appointed. The powers given by the Act of last session were "to propose plans and seek the best means of putting them into execution for the establishment of parks, boulevards, recreation grounds, baths, street and model dwellings for working men, and for the general improvement of Greater Montreal and its environs." The commission, after visiting other cities, had recommended what was known as the "city plan," which had most of the foregoing features, together with efficient transportation, and the provision of garden suburbs.

It was want of unanimity, concluded Dr. Atherton, that was responsible at the close of a busy session for the side-tracking of this scheme. Many were asking what the Parks Commission was doing. "They are doing nothing," he answered, "because no commission exists. They had no idea that such a good idea could have been utterly squashed. It had made its report and the commission was dead as far as actual powers were concerned, but the body that was promoting it was not dead, and intended to go on following it up."

A general discussion ensued. Mr. W. D. Lighthall urged the architects to lend their support, and referred to the efforts of those who had pushed the scheme. He emphasized the humanitarian side of the project, and said that as in London it had been said that the fourth generation became extinct in the crowded slums, so the same thing must be happening in Montreal. He held that the Provincial Governments should be the target for first effort.

Mr. Lighthall spoke of instances in England where sections of land were bought, tracts cleared and houses for workingmen built and rented for five and six shillings a week, and the investment paid three per cent. It was singular that a city like Montreal, that could buy park property for one-tenth of what Chicago was paying should not do so. These represented two distinct problems, city planning, and housing, and should be kept separate.

Mr. J. P. Hynes, of Toronto, reviewed the history of the present city planning movement that first took concrete form eleven years ago at the initial convention of the Architectural League of America, at Cleveland, Ohio, in a movement for a city plan for Cleveland, which rapidly solidified till to-day, under the commissionership of Architects Daniel Burnham and Arnold W. Bronner, is probably the most advanced of any of the civic plans for American cities. In the development of a civic plan it was not necessary to destroy revenues, but the contrary. In King's Park in London, and the Metropolitan Park in Boston, the land was bought at a low figure by the municipality and sold at a largely advanced profit. Mr. Hynes said that in the development of a city plan, in giving the charter the Legislature should see that the plan included a proper water supply, sewer system, etc., and that provision was made for proper financing. He also spoke in favor of a provincial publicity bureau for the spread of information on city planning among the general public.

Alderman Emard, president of the Parks Commission, regretted that the municipal authorities did not keep in touch with bodies such as the Civic Improvement League.

Reverend Dr. Paterson-Smyth advocated the movement from the humanitarian standpoint, and spoke of his own knowledge of certain parts of his parish, where factories were being erected, but houses were not. "The case of these people in their houses with big rents is very awful," he said. He told his hearers of an experiment in Dublin, where the council had borrowed some millions on a rebuilding scheme and made it pay four or five per cent.

Mr. Recorder Weir expressed the hope that any city improvement scheme would include something to dissipate the noises of the city. Street noises were, he said, becoming intolerable, and it should not be beyond the power of modern invention to remedy this.

Lieut.-Col. Burland and Dr. Pelletier, both said something from the health point of view, and Senator Dandurand, Mr. Alp. Venne and Miss Watts, secretary of the Playgrounds Association, of Montreal, also lent their support to the city plan.

The chairman, Mr. F. S. Baker, in closing this part of the discussion, referred with appreciation to the interest displayed by Earl Grey to the city planning movement, and stated that the city Boards of Trade and the Manufacturers' Association should be called upon to back up any movement toward a city plan.

A motion was then presented by J. W. H. Watts, seconded by Alcide Chausse as follows:

"Resolved, that this assembly of the Royal Architectural Institute of Canada earnestly desires to urge upon the attention of the several Provincial Governments the necessity of providing without delay parks and playgrounds and housing commissions for each large city under their jurisdiction, especially with the object of preventing excessive mortality, and making better provision for the health, comfort and recreation of the masses. That the Government of the Province of Quebec is especially urged to appoint a permanent Metroplitan Parks Commission for Montreal with executive powers.

After some discussion, in which Mr. C. P. Meredith, Dr. Atherton, Mr. H. B. Cordell, Mrs. Jane Radford, Mrs. Alfred Grafton and Mr. Ross took part, the motion was carried with unanimity. The session then adjourned.

A paper giving a resume of the proceedings at the recent town planning conference at Philadelphia was read by Mr. C. P. Meredith, F.R.I.B.A., of Ottawa, and is printed in full in this issue.

Third Session.

The third and last session of the convention was largely devoted to the final ratification of changes in the Royal Architectural Institute charter, in the line of making it conform to the new conditions established by the proposed federation

Mr. J. W. H. Watts moved, seconded by Mr. Gardiner (president of the Province of Quebec Association of Architects), that clause 6 read:

"*Composition of the Council!* The Council of the Royal Institute shall be composed of representatives appointed by each provincial association from its membership. Associations of forty (40) members or less to elect two (2) representatives each. Associations of over forty (40) members to have one (1) representative for each additional forty (40) members or fraction thereof. This Council to elect the officers of the Royal Institute"

The resolution was carried unanimously.

Members of the Institute not members of Provincial associations are placed in a separate class, known as non-registered members. They have no voting power, and any members joining the Institute hereafter will have to come through the Provincial associations.

The previous board of officers and Council were reelected as follows: Officers—President, F. S. Baker; Vice-Presidents, Edmond Burke, S. Frank Peters, G. A. Monette; Hon. Secretary, Alcide Chausse; Hon. Treasurer, J. W. H. Watts. Council—A. F. Dunlop, H. E. Gates, J. P. Hynes, Wm. H. Archer, H. B. Gordon, R. P. LeMay, C. B. Chappell, E. L. Horwood, C. P. Meredith, David Ewart, P. E. Nobbs, Sam Hooper, C. E. Fairweather, Jas. E. Wize. L. F. Taylor and F. J. Alexander of Ottawa were elected auditors for the ensuing year.

It was moved by Mr. Alcide Chausse, secretary of the institute, and seconded by Mr. J. W. H. Watts: That the council be instructed to approach the Federal Government with the view of having the matter of departmental buildings about to be erected, reconsidered with reference to site and designs.

The motion was accepted without discussion.

In connection with this motion the following resolution was proposed by H. B. Gordon of Toronto, seconded by J. H. G. Russell of Winnipeg:

"Whereas the Federal Government of Canada has for some years been distributing a certain amount of money with the laudable intention of beautifying the city of Ottawa and its environs; and whereas this work has been carried out without any comprehensive interest or plan of the whole possible scheme of improvement; and whereas many things have been done which are unsuitable and inadequate and will require change, the Royal Architectural Institute of Canada, in their annual convention assembled, respectfully petition the Federal Government of Canada to appoint an advisory commission of not more than five persons, all of whom have artistic or technical knowledge directly valuable to the evolution of a general scheme; such gentlemen to serve without remuneration (their travelling expenses only being reimbursed); this commission to have authority to employ such technical help as may be necessary for the amplification of their ideas and the preparation of the necessary drawings. Also to consult specialists in regard to the feasibility and desirability of carrying out any or all parts of their proposed scheme; and that the Federal Government be asked to assume the expense of such commission as above outlined; also that the Federal Government be respectfully solicited to exercise their good offices in securing the cooperation of the authorities of the city of Ottawa and the present Ottawa Improvement Commission in the carrying out of the suggestions of the proposed Advisory Commission."

The clause relating to the voluntary service of the members of the proposed commission was criticized by Mr. Percy E. Nobbs, of Montreal, who complained that too much in the way of sacrifice of this nature was being asked of professional men, while the Department of Works was squandering money quite light-heartedly. He advocated that they should be paid experts on the commission.

Mr. Gordon stated that this had been fully considered in forming the resolution and was placed in its present form both to convince the Government that the resolution was entirely public-spirited in character and to avoid making it abortive when carried out through unsuitable persons lobbying for the position to secure the pay, and attract office seekers and involve political jobbery. This view was shared by J. W. H. Watts and C. P. Meredith, of Ottawa.

Mr. Baker stated that while architects, to a greater extent than any other profession, were called upon by the public for gratuitous service, it did not seem possible to get the bill through in any other form. The situation was simply that the architectural profession as represented by the Institute wants things done in Canada for the betterment of the cities and the people, and the only hope in regard to recompense was that some time the public might recognize its efforts. He fully shared the opinion of Mr. Nobbs regarding the too many sacrifices asked of architects. He was inclined to think that either the Institute should have the power to nominate the members of the commission, or they should be paid if appointed by the Government.

The motion then carried.

A vote of thanks was tendered to the local association for the use of its quarters, and the City Council for courtesies extended, and the convention adjourned.

REDUCTION IN PRICE OF CEMENT

Important announcement made by Canada Cement Company. Reduction made possible by increased output.

IN NOVEMBER, 1910, it was announced that the price of cement had been reduced. That announcement was admitted by many as corroborative of the opinion that the merging of the cement interests in Canada would prove a good thing for the public.

The theory of a consolidation such as the Canada Cement Company is that the consolidated interests are in a position to effect economy in production and distribution.

That the Canada Cement Company are working upon the idea of increasing consumption by lowering prices, rather than curtailing production and obtaining higher prices, is clearly shown by its President's report to the shareholders at the last annual meeting, when he stated: "It is confidently expected that the increased demand and increased output will result in further savings in the cost of manufacture and distribution, and it is the policy of your directors to give your customers the benefit of these reductions."

This is further evidenced by the announcement which was made on November 1st, 1911, of a still further reduction in the price of cement. The reduction in some districts is 10c. per barrel, and in others, 5c. On the whole, it will probably average 7c. per barrel. This reduction, with the reduction made last year, means a very large saving to the cement consumers of Canada.

We trust that the expectations of lower cost voiced by the President of the Canada Cement Company will be realized again next year, so that the company may continue its policy of giving the benefit of these reductions to its customers—thereby enlarging the uses to which cement may be put.

MARKED ACTIVITY IN BUILDING LINE STILL CONTINUES

September witnesses heavy operations in practically all sections. Thirty-one cities note average gain of 69 per cent. over corresponding period.

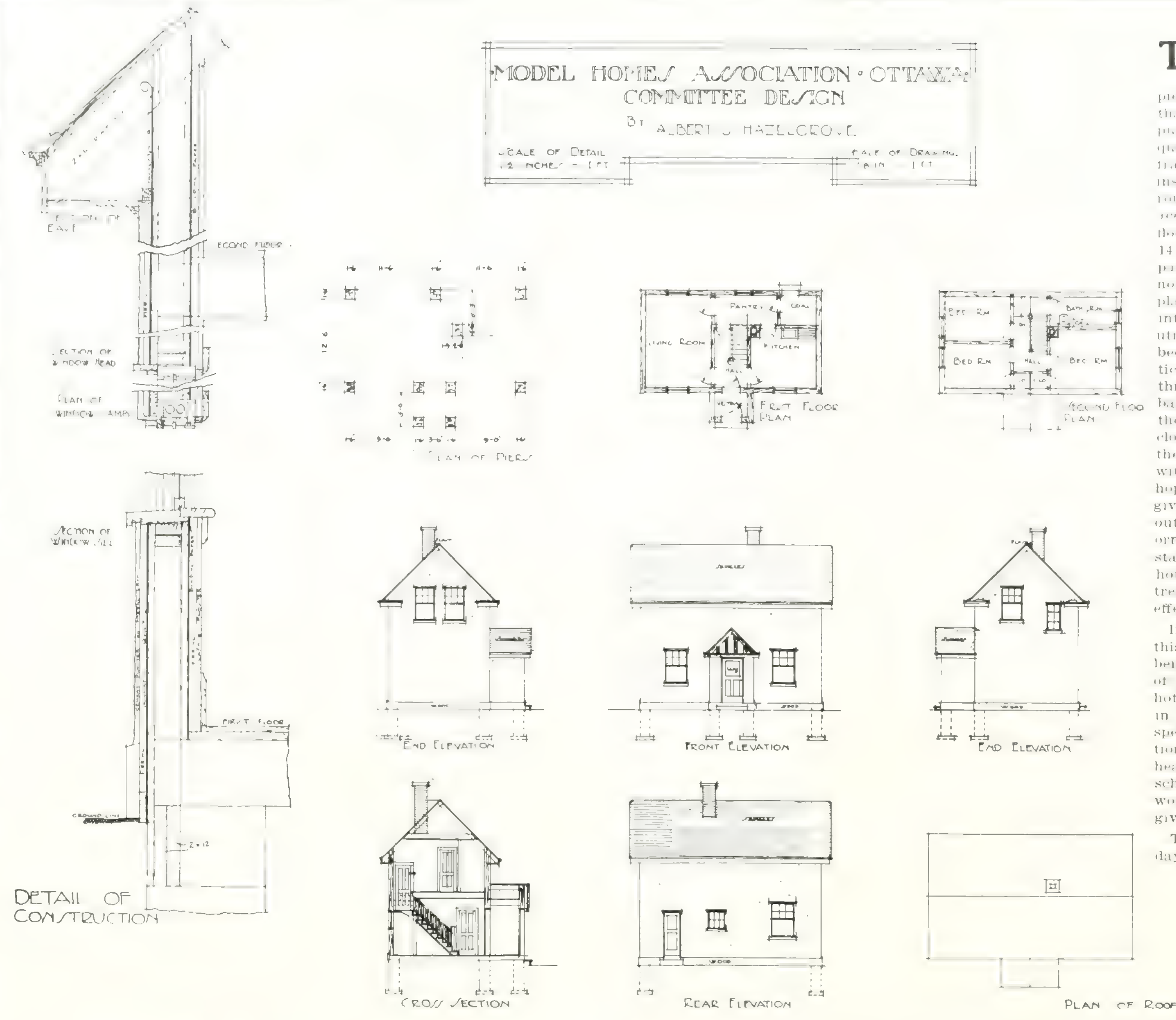
A HEAVY GAIN in building operations has become such a regular thing, so far as the Canadian field is concerned, as to resolve itself into a mere matter of monthly record. To say that a new mark has been established is to use a much worn phrase that repeatedly suggests itself as each succeeding period comes around. There are few communities in the Dominion that cannot boast of substantially increased investments, and a still less number, it might be said, which have not extremely promising prospects immediately ahead. September found nothing to stay the remarkable progress that has signalized development up to the present time. On the contrary, the returns from thirty-one cities reporting to "Construction" show an average gain of 69 per cent., the total investment amounting to $12,478,900 as against $7,311,577 in the corresponding month of last year. Not only was the force of activity previously reached fully sustained, but in several cases the totals are such as to denote a growth entirely without parallel as regards ratio of increase.

For the fourth consecutive time, Winnipeg, with a total of $2,547,000, representing a gain of 212 per cent., registered the heaviest amount from a standpoint of investment. Toronto was second in order with an expenditure amounting to $1,904,810, which is 42 per cent. in excess of her comparative figures; while Vancouver came third with an aggregate value for new work amounting to $1,736,568, equivalent to a gain of 134 per cent. over the amount recorded in the same month last year. Montreal, where permits were issued to the extent of $1,157,876, also made a very substantial showing, the gain noted being 16 per cent., which, to say the least, is most satisfactory, especially in view of this city's previous heavy investment and the fact that several important projects have been a trifle slow in materializing.

These figures but indicate the vast improvement experienced in a general way, for aside from the eight cities in the list which failed to equal their corresponding mark, a decided upward trend was manifest on every side. Places such as Guelph, whose total of $103,000, representing a gain of 1,905 per cent., and Nelson, B.C., where an advance of 750 per cent. was made, show a condition the direct reverse to that which obtained in these centres a year ago. Ontario witnessed heavy operations in the majority of cases, although five of the nine decreases noted occurred in this Province, viz., Brantford, 3; Fort William, 13; Kingston, 23; London, 23, and Stratford, 16 per cent. These decreases,

(Continued on page 119.)

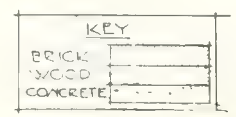
	Permits for Sept., 1911.	Permits for Sept., 1910.	Increase Per Cent.	Decrease Per Cent.
Brandon, Man.	$ 150,200	$ 438,675		65.76
Brantford, Ont.	84,900	87,775		3.28
Calgary, Alta.	903,210	720,372	25.38	
Edmonton, Alta.	369,970	169,863	117.80	
Fort William, Ont.	147,500	170,340		13.41
Guelph, Ont.	102,300	5,100	1905.88	
Halifax, N.S.	20,405	148,119		86.23
Hamilton, Ont.	771,200	266,475	189.40	
Kingston, Ont.	13,425	17,576		23.62
Lethbridge, Alta.	93,200	72,180	29.12	
London, Ont.	114,463	148,950		23.16
Medicine Hat, Alta.	174,600	16,500	958.18	
Montreal, Que.	1,157,876	993,386	16.56	
Moose Jaw, Sask.	192,400	35,600	440.44	
Nelson, B.C.	20,620	2,425	750.30	
Ottawa, Ont.	277,275	160,950	72.21	
Peterboro, Ont.	88,954	21,865	306.83	
Prince Albert, Sask.	147,600	188,150		21.55
Port Arthur, Ont.	75,400	42,450	77.62	
Regina, Sask.	425,700	209,750	102.95	
Saskatoon, Sask.	330,950	183,550	80.30	
Stratford, Ont.	15,000	18,000		16.67
St. John, N.B.	25,000	17,200	45.34	
St. Thomas, Ont.	35,750	25,650	39.37	
Sydney, N.S.	18,650	25,110		25.73
Toronto, Ont.	1,904,810	1,332,535	42.95	
Vancouver, B.C.	1,736,568	740,715	134.44	
N. Vancouver, B.C.	78,344			
Victoria, B.C.	406,295	199,686	103.43	
Windsor, Ont.	49,425	38,300	29.05	
Winnipeg, Man.	2,547,000	814,350	212.76	
	$12,478,990	$7,311.597	69.60	



THE HOUSE is being built on concrete piers, there being no basement. The piers and beams are so arranged that the tenant can if desired put in concrete basement subsequently. The walls are of stud-framing covered with boarding, insulating quilt, battens and roughcast on metal lath. The accommodation on the ground floor consists of a living room 14 by 16, kitchen 10 by 9, large pantry and fuel store. It is noteworthy that the kitchen is planned to face the street, not into the back of the lot. The utmost economy of space has been sought for in every particular. On the upper floor three bedrooms and a complete bathroom are provided, two of the bedrooms have complete closets. The aim has been in the interior to unite economy with good appearance, and it is hoped that the simple lines will give character to the mass without the addition of unnecessary ornament. The roof will be stained a bright tile red. The house is backed by a clump of trees, which will help in general effect.

In regard to the heating of this house, a special system is being evolved by a leading firm of heating engineers, whereby a hot water heater will be placed in the kitchen, connected with a special range with gas connections for the summer. This will heat the whole house. As this scheme has not yet been fully worked out, it is not possible to give details.

The cottage is being built by day labor.



In the accompanying Plans and Details, "Construction" presents Mr. Albert J. Hazelgrove's scheme for a Model House of Five Rooms, with Bath, Hall and Pantry, for the Small Investor. This Design was Approved by the Model Homes Association of Ottawa, of which Mr. Hazelgrove is Honorary Secretary.

Margaretenhohe, Essen, Germany. The Approach from the Bridge.

THE HOUSING PROBLEM IN FOREIGN COUNTRIES

Essen and Ulm in Germany, and the new law in New Zealand, illustrates the attention given abroad to the proper housing of wage earners.

ESSEN AND KRUPP'S in Germany are inseparable. All around Essen and in the city itself everything seems to be impregnated with the greatest iron firm of modern times. According to the status of May 1, 1910, the total number of persons employed at the Krupp works, inclusive of 6,840 officials, amounted to 68,905. In this total the different departments share as follows: Cast steel works and paving grounds, 37,848; collieries, 10,035; iron ore mines, 4,763; iron works on the Mde. Rhine, 1,075; shipping agency at Rotterdam, 49; Fredrich-Alfred-Hutte, 5,665; steel works, Annen, 1,027; grusonwerk, 3,939; Germaniawerft, 4,504, a total of 68,885.

With such a magnitude of people to control, etc., it follows that the question of housing is one that demands serious thought and consideration either by the municipal authority or by the Krupp firm itself, and it is of interest to know that the firm have, and are entering upon new schemes of housing for their work-people.

What is known as the Margarethe Krupp Habitation Fund, was created by one of the Krupp family and is chiefly intended to provide habitations for officials in minor positions and circumstances.

The endowment made by Frau Krupp comprised a capital of one million marks and building ground to the extent of 50 ha. (123.5 acres). By a further donation on the part of Frau Krupp, the whole of the settlement has been encircled by a belt of meadow and wooded land, which is eventually to enclose the city which is in course of building.

To start with, houses are going to be built to the value of one million marks. These houses will be mortgaged to raise further capital, which again will be spent in more buildings in the course of years to come. The whole settlement is intended to house between 15,000 and 18,000 people. The total expenditure is calculated to be about 20,000,000 marks.

The fund was not meant only to benefit employees of the Krupp works, but anyone who cares to live in the settlement. Among the first tenants to whom houses were let, 45 per cent. about, were connected with the Krupp works, the others being officials of the local administration, railway workers and the working classes generally.

The endowment capital of one million marks, as has been said, is destined for the building of houses. A portion of it, however, limited to a total of 250,000 marks, may be loaned out as building money to those who have acquired a copy-hold or hereditary tenure of a building plot.

In the first place, the peculiar position of the ground set aside for the houses of the Margarethe Krupp Fund had to be considered in laying out the plan of the new city, in dividing it up, and in tracing out the streets. The district is charming, rivulets cutting the deep valleys between the rising hills, the whole encompassed by a belt of beautiful forest trees, mostly firs and pines.

The ground plan of the streets has closely followed the contour of the ground, so as to avoid expensive shifting of earth, and in consequence of this practical consideration as is natural, the curve predominates. It should, however, be understood that the rectilineal street will be adopted, at later building periods, wherever the ground offers a plainer surface, and consequently involves no extravagant costs.

The Margarethe Krupp Settlement has no presumption of being a garden city. It is merely meant to be a quarter or suburb laid out and built on artistic principles, and later to be attached to the city of the Krupps, namely, Essen. Its unique position on the sloping hillside makes it beautiful, and the cheapness of its rentals offers the greatest advantage to those who wish to take the same.

Each inhabitant of the settlement is provided with a garden varying in sizes 70 to 300 sq. meters, and it is one stipulation in taking a house that the garden must be kept in good condition in order that each unit may add to the collective ideal.

In the making of the settlement various difficulties presented themselves, viz., the deep ravine between the city and its offspring, and a railway running on the slope. These conditions at once suggested the idea of overspanning the valley by a bridge, thus creating broad and easy access to the settlement. The bridge is 170 metres long, 14 metres wide and 14 metres high, built of massive sandstone at a cost of 200,000 marks. Needless to remark, the bridge gives a noble and imposing entrance to the colony. At the entrance of the bridge, two pavilions have been erected, the one as a waiting room for the electric tram line, the other as a refreshment room. All houses have the so-called sitting room-kitchen, annexed to which is a scullery, reserved for all kinds of work giving off steam and offensive smells. The scullery is to relieve the sitting room-kitchen and secure to the latter good hygienic conditions. Bath, sitting room-kitchen and sculleries have automatic ventilating arrangements.

In planning the bedrooms, the leading idea was to have one large bedroom, all the others to have smaller dimensions for the sake of economy, so that the bedrooms will be more numerous, but small, to make it possible to separate the children by sexes.

Entrance to Margaretenhohe, Essen, Germany.

In Germany the people are obliged to heat their rooms during seven months of the year, therefore particular attention has been paid to the heating arrangements, which are placed in the centre of the houses, so that from one single firing place all the apartments of the houses can be heated.

The kitchen range has been connected with a central stove, so that the waste heat, which ordinarily makes its way into the chimney, is taken to the central stove, where it is completely utilized before going

Inside Garden City, Margaretenhohe, Essen, Showing Mansard Roof Construction.

into the chimney. By this simple arrangement it is possible to heat the whole house during the seasons bordering on spring and winter.

A second reserve fireplace is lodged in the stove, and is supposed to be used during the severe cold of winter. The heat is taken up to the upper stories by sheet iron pipes, each of the rooms being provided with a throttle valve by which the flow of the heat into the room can be put on or off.

A water reservoir is placed in the stove so as to keep the air humid. The heating apparatus is so calculated that in cold weather the temperature of bedrooms can only be raised 12° centigrade, so that the occupants do not get accustomed to too high temperatures. If one of the bedrooms is to be warmed to a higher temperature, other bedrooms have to be cut off.

Successful trials have been made with clothes-drying compartments or wards in which clothes hung up may be dried by the heat of the stove.

To such inhabitants of the settlement who are desirous of obtaining cheap and durable furniture, money is loaned free of interest on the condition that the furniture purchased is good, lasting and artistic in appearance.

The houses of this Krupp Settlement are let at the rate of 200 to 500 marks per year. The calculation is based on the rate of 68 to 100 marks per room.

The cost of building of the several houses, not counting the laying out of the streets, is between 3,500 and 7,000 marks. The building and erection of this colony makes one of the very many steps which are being taken by the Germans to house their people.

Solving the House Problem at Ulm.

In connection with the Krupp improvements at Essen it is interesting to note how the German city of Ulm solves its housing problem.

The United States consular agent at Coburg, Germany, reports that Prof. Atwood, secretary of the American Association of Commerce and Trade, Berlin, has made an interesting report on the housing problem as solved by the German city of Ulm, in Wurttemburg. The city is an important manufacturing centre with about 56,000 inhabitants, and the municipality now owns 80 per cent. of all real estate in and around the city.

When the old fortifications were sold to the municipality in 1902, the authorities immediately seized upon the opportunity to organize a very liberal city planning and housing system. When the inner walls were transferred to the city the ground outside these limits naturally rose in value. In view of the city's great undertaking, combined with the large outlay in buying the fortress, for razing and removing the walls, and for the building of many new streets, the authorities had decided that these improvements could be made on the sole condition that the city treasury and not the former proprietors of the land should benefit by the great rise in real estate. With this object in view the town council began buying up land as early as 1891. At the close of the year 1908-9 nearly 1,210 acres had been purchased at a total cost of $1,389,640. Of this land 405 acres had been sold for $1,623,924, so that the municipality had profited $234,284 and still owned 805 acres. In addition, the disused fortress, covering 172 acres, was bought for $952,000, and $595,000 was spent in purchasing houses in the old part of the town in order to improve sanitary conditions. In all, the city to-day owns 4,942 acres.

The principal points in the plan for developing the city were: To make direct roads from the gates of the old wall to the main roads leading to all parts of the country; to connect the suburb Soeflingen by direct new thoroughfares with the city proper; to build boulevards within the walls; and to build a freight station west of Ulm within easy reach of the city.

It then remained to divide and parcel out the land, which was done as follows: The valley between Ulm and Soeflingen was reserved for all kinds of trade, small industries, and dwelling houses for the general population. In order to economize space, it was decided to build in rows, with space between the buildings. For large manufacturing plants, land was reserved east of Soeflingen, connected with the freight station by a railway line constructed by the town. The same will be done east of Ulm. For workpeople and peasantry of the suburb Soeflingen, land was allotted in the northeast of Soeflingen—the houses to be built at intervals of 17 feet; for ordinary family houses, the hill in the south of Soeflingen—the houses to be 23 feet apart; for villas and more pretentious houses, the hill west of Ulm with houses at intervals of 33 feet; for people of the more prosperous class, the "Michelsberg," a sunny hill north of Ulm—distance between houses to be 47 feet. The woods east of Ulm afford ample opportunity for recreation and sport. Land east of Friedrichsau, near the Danube, has been reserved for a future harbor.

Extensive ownership of land enables the city to keep prices within reasonable limits and to furnish land at a very moderate rate for undertakings of public interest for manufacturing purposes, houses for workmen, etc. Persons purchasing land of the city must agree to build on it within a given number of years, the city having the right to buy back such land at the price originally paid for it, including 3 per cent. interest. Ground for the erection of workmen's houses can always be had at a very moderate price, but solely on conditions excluding personal profit or speculation.

The city itself has built 175 houses with 291 flats for 1,367 inhabitants on the following conditions: Th city builds the houses and the purchaser pays the net price, 10 per cent. down and the rest at 3 per cent. interest and 2 per cent. on mortgages. In order to secure for the future low prices for the houses and low renting, the city is authorized within 100 years to take back the houses at the original purchase price if the owner is unable to pay the interest; if he does not live in the house, but sublets it; or if he wishes to sell the house.

Other houses built under the foregoing conditions have been erected by companies, societies, etc. The Society Anonyme Wohnungsverein has constructed 18 buildings, with 62 flats, at a cost of $53,274. Flats of two rooms rent for $41.65 per year, while three-room flats, with kitchen, etc., bring $57.12. Shareholders are restricted to 4 per cent. interest on their capital. In houses built by the Savings and Building Co., two-room flats rent for $52.36 and three-rooms, with kitchen, etc., bring $59.50 to $90.44. The Unlimited Building Co. builds houses for letting to members. The ground remains the property of the city, which after 70 years is obliged to buy the houses for 80 per cent. of the building value. The houses contain 5 to 10 rooms and cost $3,808 to $7,140 without ground. The Kingdom of Wurttemburg, the postal administration, and several industrial works have built houses for employees. Altogether, since 1891, 388 buildings, with 1,006 flats for 5,000 inhabitants, have been built on condition that the letting price can not be increased whenever the price of land rises.

Workmen's Dwellings in New Zealand.

In accordance with an act passed in December, 1910, the Government of New Zealand is now putting into operation a plan for the sale to workmen, in cash installments, of dwellings especially suitable to their use. The new houses, whether of wood, concrete or brick, are intended to be substantial, comfortable, and inexpensive, but not without ornamentation of a quiet character. The following is a description of five types of houses as planned by the Government architect:

In addition to this plan of constructing houses for workers, the Government has had in operation since 1894 a plan of advancing to settlers, either agricultural or suburban, money on first mortgage of lands and improvements, and since 1906 the same plan has been extended to include a system of advances to workers desiring to provide themselves with homes, and offering first mortgages on their homes as security. In 1909, in the State-Guaranteed Advances Act, there were some important extensions and improvements, and the advances to settlers and workers were all put in charge of a special department of the Government called the state-guaranteed advances office. This office has power to raise money for advances to settlers and workers up to the amount of £1,500,000 ($7,299,750), during any one financial year.

1. A dwelling of four rooms with conveniences, a scullery 7 by 12 feet being counted among the latter. There are two front rooms about 12 feet square, a living room 16 feet 4 inches by 15 feet 4 inches which contains the range fitted with hot-water apparatus, a bedroom 12 feet by 9 feet 6 inches, and a reasonably large bathroom. The front door leads to a hall 4 feet wide and at the back is a lobby containing a coal bunker under shelter. The wash-house, with copper, has two fixed tubs. Price, $1,380 to $1,825.

2. Five rooms, planned similarly to the first type, but with an additional bedroom at the back 8 by 9 feet, and slightly more generous proportions. The front elevation is made attractive with a gabled porch and ornamental glass door. There is a corner fireplace in the front room. Price, $1,450 to $1,900.

3. Four rooms; this is distinctive in having a veranda along the whole front, and it will probably be popular because it is of the familiar "square" type of architecture beloved in the colonies. Three bedrooms (one with a fireplace and suitable for sitting room) are 12 feet square, while the dining room is 12 feet by 11 feet 4 inches. Price, $1,350 to $1,700.

4. Six rooms; this is the most elaborate of the set, but there is no waste room or over-ornamentation. Most of the money will go to provide actual accommodation. The front elevation shows the bay window of a sitting room 12 by 12 feet, having a corner fireplace, and a veranda 4 feet 6 inches by 16 feet. The hall, 5 feet wide, leads past an arch and then narrows to 3 feet, ending in a glazed door at the kitchen. The living room is 12 feet 6 inches by 15 feet and has a broad window, V-shaped, standing out from the side wall about 2 feet. The three bedrooms are 12 feet 6 inches square, 12 by 11 feet, and 12 feet 6 inches by 11 feet, respectively. The kitchen is 10 feet by 9 feet 6 inches and around it are grouped the washhouse, scullery, and coal bunker. Price, $1,825 to $2,200.

5. Three rooms with provision for extension of two rooms if required, at a cost of £75. A recessed corner of the house 3 by 7 feet serves as a modest porch for the front door, and there is a tiny hall 4 by 6 feet. The rooms comprise bedrooms 10 by 12 feet and 7 feet 2 inches by 9 feet 6 inches, and a living room 14 feet 4 inches by 11 feet. Hot water and a bath are provided. Price, $850 to $1,075.

Any person, rich or poor, may secure a Government loan for the building of a home, under the plan of advances to settlers, but such loans can not be for less than £25 ($121.66) or for more than £3,000 ($14,600). Applications for loans not exceeding £500 ($2,433) have priority over applications for larger sums. Mortgages are repayable by half-yearly payments of principal and interest combined. They may also be repaid in whole or part at any time. Interest is charged at the rate of 5 per cent., reducible to $4\frac{1}{2}$ per cent., provided payment is made not later than 14 days after due date and no arrears in respect of installments or other payments under the mortgage remain outstanding. Loans are granted on freeholds up to three-fifths of the value of the security, but in the case of first class agricultural freeholds they are granted up to two-thirds of the value. On leaseholds loans are granted up to three-fifths of the value of the lessee's interest in the lease. The loans mature between periods of 20 to $36\frac{1}{2}$ years.

Workers of either sex engaged in manual or clerical work not in receipt of an income of more than £200 ($973) per annum, and not the owner of any land other than that offered as security, may obtain advances up to £450 ($2,190) and not exceeding three-quarters of the total value of the security in case of freehold land, or three-quarters of the value of the lessee's interest in the case of leasehold lasd, and in no case are advances granted which exceed the values of the dwelling houses, nor to applicants who do not take up their permanent residence under security. As in the case of advances to settlers, interest is at the rate of 5 per cent., and reducible to $4\frac{1}{2}$ per cent. if payment is not over 14 days overdue, and the loans run from 20 to $36\frac{1}{2}$ years. The valuation fee is 7s. 6d. ($1.82).

MARKED ACTIVITY IN BUILDING LINE

Continued from page 113.

however, with the possible exception of those of London and Fort William, detract but little from the general investment. On the other hand, Hamilton emulates her past achievement by recording a total of $771,000, which is a gain of 134 per cent. or $500,000 more than was invested in the previous September. Ottawa advanced 72 per cent., and Peterboro' registered an increase of 306 per cent. Other increases noted are: Windsor, 29; St. Thomas, 39; and Port Arthur, 77 per cent. It might be pointed out in this connection that despite their setbacks, London and Fort William made investments of $114,463 and $147,500 in order named.

Extensive developments were also experienced in a large number of Western cities other than the three previously mentioned; although respective decreases of 65 and 21 per cent. were noted at Brandon and Prince Albert. Aside from the gains already noted in the case of Vancouver and Nelson, Victoria has an increase of 103 per cent., while North Vancouver undertook operations amounting to $78,344. In Alberta, all principal centres are ahead. Calgary made a gain of 25 per cent.; Edmonton advanced 117 per cent., while Lethbridge and Medicine Hat annexed respective increases of 29 and 958 per cent. Substantial increases were also made in the three principal Saskatchewan cities, viz., Moose Jaw, 440; Regina, 209; and Saskatoon, 80 per cent., the amounts in each case showing a heavy investment.

Of the three eastern cities, St. John, which notes a gain of 16 per cent., is the only one ahead; Halifax and Sydney both registering respective declines of 86 and 16 per cent. The somewhat optimistic comment on the situation volunteered by Building Inspector Thompson of St. John, that "nothing since Confederation and inauguration of the National Policy looked brighter," indicates that the eastern section has a large volume of important work in prospect. This statement is quite typical of the optimism that prevails in general, and it is quite safe to assume that no serious check in the situation will be felt for some little time to come.

ONLY SECOND TO THE VAST improvements undertaken at Fort William are those projected for Port Arthur, which is the Canadian Northern terminal. The "largest elevator in the world," as it has been called, is to be enlarged to double its size to hold fourteen million bushels of grain, with docks and warehouses commensurate with the increase in trade which this enlargement indicates—will be built. The harbor is one of the best on the Great Lakes and gives ample opportunity for the establishment of docks, in connection with which an immense shipbuilding plant and dry dock is one of the certainties of the future. It has been officially announced that the foundry and blast furnace plants that are located at Port Arthur will be largely extended. The furnace capacity will be doubled and a foundry for manufacturing the product will be established. In the growth of commercial Canada this lake terminal at Port Arthur and Fort William seems to be destined to lead; its commanding position between the east and west being its most significant feature.

MESSRS. BOND & SMITH, 18 Wellington street W., Toronto, have been engaged as consulting architect by the Niagara Power Company, which, at the present time, is adding a 300 foot extension with a central feature to its plant at Niagara Falls, Ont. The new portion of the building will contain the general offices and the main switch board controlling the general power equipment. It is being carried out in Queenston stone to correspond with the existing structure, and will have a Ludowici tile roof.

A CONSULTING structural engineer is necessary to any city, as the majority of architectural firms do not carry on a business sufficiently large or varied to warrant the employment of a structural engineer in their office equipment. Mr. C. R. Young, Lecturer in Structural Engineering in the University of Toronto, and late of Barber and Young, structural engineers, Toronto, has opened an office as consulting structural engineer at 318 Continental Life Building, Toronto. Mr. Young will give special attention to bridges, buildings and foundations.

TRADE NOTES

NO DISCOVERY or development in cementitious materials since the invention of Portland Cement, it is claimed by the manufacturers, equals in importance that which resulted in the production of "Alca" Limes. Modern methods of building construction require that all materials to be used in the work shall be ready for such use without special or lengthy preparation at the building site. With the sole exception of lime, each cementitious material as now placed on the market is thus ready. The invention of "Alca" Lime enables the lime manufacturer to place lime on the market in this ready-for-use form, with the further advantage that "Alca'f Lime can be used for making every mortar required in ordinary building construction, as it gives entire satisfaction in all classes of work, giving strength approaching that of Portland cement when used in the laying of the stone foundation walls, plus greater water-proofing qualities, which is also true in the laying of brick work, the cost of laying which is greatly reduced by the ease of working of "Alca" Lime mortars. In interior plastering it is far superior to ordinary limes, or gypsum plasters, while for exterior plastering or stucco, it excels all other materials, being more water-proof, less subject to attack by the elements, or to contraction and expansion through changes in temperature and moisture. With "Alca" Lime these conditions are entirely overcome, and they have the additional advantage of lending themselves to any color scheme from a pure white to any tint desired, in contradiction to cement stuccoes, which are usually cold and unpleasing in their tint. "Alca" Lime is a mixture of hydrated lime and an aluminous accelerating material in the proportions of approximately 85 per cent. lime and 15 per cent. of aluminous accelerator. This is a combination practically of the old, reliable lime element, plus the active cement element (Calcium Aluminate), and it can be used in any work where cement or lime-gauged mortar is needed. This product is being placed on the Canadian market by the Stinson-Reeb Builders' Supply Company, of Montreal, and is another evidence of this firm's progressive policy which has resulted in the building up of a large and constantly increasing trade.

THE MASTER BUILDERS' COMPANY, with offices in New York, Philadelphia, Cleveland and San Francisco, have established offices in Toronto and engaged A. D. Dame as general sales agent for the introduction and conduct of the Master Builders' Co. method of repairing and resurfacing

A. D. DAME,
General Sales Agent for Master Builders' Company.

defective or worn concrete floors, and also of laying new floors which are absolutely wearproof, dustproof and waterproof.

The Master Builders' Co. has been experimenting, manufacturing and testing this method for nine years, and during that time it has been successfully used by many of the largest concerns in the United States, under conditions which were considered impossible. Realizing the enormous field opened in Canada, Mr. S. B. Newman, a member of the company and general sales manager, has spent considerable time investigating conditions and also ascertaining the attitude of those connected with the building interests toward his company's cement surfacing material. Having found a general appreciation, the services of Mr. Dame were engaged, and in the few weeks in which he has devoted his time to the work, a long list of substantial sales have been made to leading Canadian concerns.

The securing of Mr. Dame's services is opportune for he is thoroughly in touch with the building interests throughout the country, his former well-known connection with steel products branch of Steel and Radiation, the Expanded Metal and Fireproofing Co., the Galt Art Metal Co., and the the Metal Shingle and Siding Co., during the past twelve years, eminently qualifying him for his new position. Mr. Dame will make his headquarters in Toronto.

ROMAN STONE has so rapidly gained favor that its substitution for sandstone of the finer grades has become quite general. In the description in CONSTRUCTION of last month the facade of the new Freemasons' hall at Toronto was stated erroneously to be "white sand stone," when the material of the facade is Roman stone furnished by the Roman Stone Company, Limited. It meets every struc-

Freemasons' Hall, College St., Toronto. Edwards & Sounders, Architects.

tural and artistic requirement of the architect equal to the best grades of natural stone, and in the case referred to was not found different in texture under casual inspection. It speaks well for the effective quality of Roman stone as its use in so important a structure is a comment upon its stability.

A CHANGE IN DIRECTORY of an important Hamilton concern, the B. Greening Wire Company, the wire rope and wire cloth manufacturers, makes the son of the former President, the late S. O. Greening, who has been acting as Managing Director, President of the company. The company is now officered by H. B. Greening, President and Managing Director; R. H. Merriman, Secretary; F. J. Maw, Superintendent. Mr. Maw is a son of John Maw, who was superintendent on the incorporation of the company in 1889, and retired from active management, but is still on the Board of Directors.