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MISSING

The Canadian Architect and Builder

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The Traders Bank of Canada, Toronto.—Plans and perspective. Messrs. Carrère & Hastings, New York, and Mr. F. S. Baker, Toronto, Associated Architects.

ADDITIONIAL ILLUSTRATIONS IN ARCHITECTS' EDITON.

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The Late Mr. F. E. Kidder.

Frank Eugene Kidder, C. E., the author of the well-known *Pocket Book* for architects and builders, died recently at Denver, Colorado, where he had been obliged to remove from Boston because of the delicacy of his lungs. He was only in his forty-sixth year. The *Pocket Book*, which has reached a fourteenth edition, was first published when he was but twenty-four. His other important work, *Building Construction and Superintendence*, is almost as well known. He wrote also a work on "*Churches and Chapels*," and many articles in architectural and engineering periodicals. His attitude towards construction and design was not so much critical as observant. His treatises give merely an account of how things are done in American building practice, and how to do them well in this manner. He was not a guide to design, but the inventive designer can hardly adopt a safer ground of study than the methods of practice described in his books. There is always a reason at the bottom of vernacular design which is likely to be an essential condition of practical work now, and a thorough understanding of these reasons is the only safe point of departure for invention.

The Sex of Angels.

In the models for sculptured decoration for the Belmont Chapel of the Cathedral of St. John the Divine in New York, the conception of angels came near becoming Americanized by all the angelic figures being represented as feminine. This is but another example of the failure of the modern world to catch the spirit of the early workmen upon whose designs their own work is founded. For the modern decorative artist—average sensual man with a creed of art for art's sake—angels have taken a place among the abstract ideas that furnish an excuse to decorators for modelling the female form. He has lost any sense of their reality and probably does not know that there is any approach to accurate knowledge about them. As far as this knowledge goes it at any rate offers no occasion for a feminine conception, for angels in the Bible are invariably spoken of as "he." But the assurance that in neither marrying nor being given in marriage in heaven we shall be "like the angels" seems to imply an entire absence of the mundane necessity of sex, so that the masculine pronoun is applied to the angels only as the word "man" is used when we speak generically of the human race. In this respect it is noteworthy that the angels of Fra Angelico, to whom angels were a reality and their representation a work of devotion, have been known to divide an assembly upon the question of their sex; part thinking them masculine and part feminine. The truth is that they are neither. The believing mind of the painter produced a conception which is, in that respect, "as the angels in heaven." And, until the painters and sculptors of our generation can approach the subject with a like faith and reverence, the theme of angels as a subject for decoration is best let alone.

The Metallic Roofing Company Case Concluded.

This case, the first of its kind tried in a Canadian court, dates back to 1902, when the Metallic Roofing Company refused to sign an agreement submitted by the union because it contained a clause that no non-union workman should be employed by the company unless the union was unable to supply union men. Committees representing both parties discussed the matter, but were unable to reach an amicable settlement. Then the union proceeded to organize a boycott against the company by sending circulars to its customers, "stating," as the newspaper report mildly puts it, "that the firm was unfair to organized labour." What was accomplished by the circulars was, in the terms of the judge's charge to the jury, a conspiracy

by threats and intimidation to induce the plaintiff's customers, who would otherwise have dealt with the plaintiffs, to refrain from dealing with them. For this, and for (in the judge's terms again) wrongfully and maliciously coercing the workmen of the company to leave its employment, the defendants were condemned to pay damages to the company, which damages were assessed at $7,500. The interest of the case lies in the fact that the defendants were two union bodies, viz., Local Union No. 30, which declared the strike, and the International Sheet Metal Workers' Union, which endorsed it. It was distinctly stated by the jury, in answer to a question from the judge, that they could not tell from the evidence whether any of the company's workmen who were members of the union voted for the resolution which declared the strike. The damage was caused by the bodies acting in their corporate capacity and is to be paid for out of corporate funds which it was formerly thought were not attachable. The offence against the law was in bringing pressure to bear by means of the boycott. The law permits persuasion but not force.

Combines and the Law.

One may not say anything about the Master Plumbers' Association of Canada, while it is in court. It is charged with conspiring to restrain trade, but nothing is yet proved. Indeed there is danger of unlawfully prejudging almost any trade, by associating it by name with the inflation of building prices, for as the County Crown Attorney has thought fit to seize the books of an accountant in Toronto, who has acted for several bodies, it is not possible to say on which body his hand may not be laid—excepting, perhaps, the plasterers who are said to have burned their books. But it is not necessary to be specific. There is a condition in building affairs which is like electricity; it is something in the air, we do not know exactly what it is, we only know what it does, and that when uncontrolled it is deadly. It is a condition which is upsetting the equality of Canadians in trade, making some the slaves of others; and it is therefore contrary to the intention of the law. It is a matter for congratulation that, as the evil has grown, the courts have been able to support injured persons who have appealed to them, and that the agents of the law have been active to arraign those who have been suspected of overstepping its limitatlons in carrying out grasping methods of trade. But it must be remembered that the agents of the law are not concerned with questions of abstract right and wrong. Their concern is only with the law; and, if a wrong once becomes a matter of law, there is no redress while the law lasts. It is legislators who have to consider the questions of right and wrong that enter into statutory law; and it is at this stage that the country should see that no wrong is done; that there is no legislation for the advantage of one part of the community over another part. If either capital, trade, or labour seeks strength in union, we must look to it that the law permits none to have advantage over others; that, both in what it favours and in what it restrains, the law which bears upon this question provides alike for all. If there is to be strife between different classes and callings in the community let it be in advance of law-making—at the polls and in parliament—that we may keep class legislation out of this country

Antiquity of Plumbers.

This note, which has no connection with that above, is suggested by no more serious question than the historical speculations of an English newspaper, which, commenting upon the list of trades represented at the Trades Union Congress, said that "Shakespeare would have been puzzled by a plumber." Would he? Plumbing as we understand it is a modern conception, but the plumber, in the primary and Pickwickian sense of a worker in lead, is no new idea. The French nobility, before the Revolution restrained their natural liberties, used, as they came home from the chase, to shoot plumbers, for the pleasure of seeing them fall off the roof. We are not to suppose that these were members of the union, constantly engaged in running soil-pipes through the roof. The roof itself was their care, which was covered or flashed with lead. But the plumber, in the more familiar capacity of a solderer of water pipes, is as old at any rate as the Roman Empire. In the museum at Arles in the South of France, which was a Roman colony, is a piece of lead pipe, exactly like the seamed lead pipe which, as met with in old houses to be altered, is within the experience of architects of the present day, who have been practising for not more than twenty years. The pipe is said to have been taken from a Roman equeduct, and bears the evidence of its genuineness in a trade mark, stamped on the pipe, which, as copied into the writer's sketch book, reads SCANTIUS+POIHINUS+FAC.—Scantius' Poihinus makr. How near that trade mark seems to bring the pipe to modern times, and reminds us that the citizen of the Roman Empire, except that he did not wear trousers and his science was not sound, was a very modern person, and Rome in those days not unlike New York. Among other points of resemblance, which bring it nearer to our own days than to those of Shakespeare, there was the distribution of heat, it is said, but certainly water in the villas of her millionaires; and, if we may trust the evidence of the museum at Arles, the distribution of water was done by means of lead pipe—put in by a plumber.

BOOK NOTICE.

ARCHITECT, OWNER AND BUILDER BEFORE THE LAW, BY T. M. CLARK, F.A.I.A. PUBLISHED BY THE MACMILLAN COMPANY, NEW YORK. AGENTS FOR CANADA, MORANG & CO., TORONTO. PRICE $3.00. This volume, written, like Mr. T. M. Clark's other books, in a clear and interesting manner, gives an account of the relation between the architect and the owner, the architect and the builder, and the builder and the owner, as laid down in the decisions of some eight hundred cases in American, English, French and, (in two cases), Canadian courts. The complications that may arise in these different relations are described and the view likely to be taken by the law illustrated by stories of cases which make interesting, and, though the majority of the cases are American, useful reading; likely to keep a man not only out of court but out of the trouble that leads to court. This is the best use that could be made of the book—to read it and get business experience from other people's trouble instead of from one's own. For the purpose of reference the book has an index of the points considered and a double index of the cases cited; giving them in alphabetical order, first as a whole and a second time according to the countries or states in which the case was heard.

THE COMPETITION FOR THE PUBLIC LIBRARY BUILDING AT TORONTO

The programme of the above competition was issued to architects on the last day of October and contains many commendable requirements as well as some that are otherwise.

There is a possibility that the winner of the 1st prize may fare worse than the winners of the 2nd, 3rd and 4th prizes. They stand a fighting chance of earning at least some return towards the cost of the preparation of their designs, while the winner of the first prize gets nothing whatever if his design exceeds the prescribed limit of cost. Before this can be determined he will be compelled to go to the further trouble and expense of preparing full working drawings and specifications, which, to compass the full cost will have to include specifications for plumbing, heating, lighting and book stacks.

The amount of the prize money seems inadequate to the work involved, $350 being the second prize, $250 the third and $150 the fourth—the work going to the winner of the first prize. It is a question if, under the strict conditions and the great possibility that the winner of the first prize will have his work for nothing, a larger number of architects would not have competed if a first prize of say $800 to $1000 had been offered, with the condition that if the work were carried out from his design, the prize money would be merged in the commission.

The competition is restricted to bona fide residents who have been practising "their profession in Canada at least six months prior to this day."

The words "this day" are somewhat ambiguous but as the only date in the programme is that set for the reception of the designs, (July 31st, 1906) it may be presumed that this is the day referred to.

As there is but a nominal duty on foreign plans, and as no Canadian architect residing at home may practice his profession in the United States, the above provision seems eminently just.

The composition of the Board of Judges is open to criticism in that but three out of the six may lay any claim to be ranked as experts.

It is difficult to see what qualifications the Mayor, an alderman and a member of the Library Board have (as holding such offices) that should especially fit them for the position of judges in a purely architectural problem.

It is eminently fit that the Chief Librarian should be on the board on account of his knowledge of the requirements of the building and that the City Architect should be there to represent the city's interest, but it seems incomprehensible that the other members of the Board of Judges should be any other than men of recognized architectural knowledge and ability.

It is true that the five men above mentioned are to elect a sixth judge, who shall be an architect, but, unless those who may be termed "lay members" are prepared to accept the judgement of the professional members as to the best designs, there may be either a deadlock or the selection of a design lacking proper architectural merit.

A meretricious design may capture these lay members who may be led away with something showy or catchy while passing by designs of quite scholarly excellence, the difference being understood only by men trained to understand from the drawings what the completed effect will be.

The Board is to be commended in strictly limiting the number and character of the drawings, thus greatly reducing the amount of work required of the competing architects as compared with many competitions of this kind.

The limit of cost, $260,000.00, is likely to prove the greatest stumbling block in the way of intending competitors. The sum is so manifestly inadequate that busy men at all events will hesitate before deciding to spend precious time on that which may prove a fiasco as far as they are concerned.

Those who drew up the terms appear to have been doubtful as to the sufficiency of the amount when they admitted that it is "Manifestly impossible to secure in competition a design carefully studied out and perfected in all details and capable of execution at a *definite point of cost.*"

About the only way of arriving at an approximate estimate of the cost of the building without previously drawing the plans and sections is by cubing the required contents of the building and allowing a percentage for the necessary halls, corridors, etc. with allowance for the thickness of the walls and partitions.

An examination of a large number of plans of similar buildings discloses the fact that from thirty to forty per cent. of the total floor area is occupied by halls, corridors, etc.

If only thirty per cent. is allowed in the Toronto building, the Main building will contain not far from 965,000 and the Stack building 184,000 cubic feet.

To bring the structure within the appropriation, the Main building will, based on the above figures, have to be erected at a cost of 22cts. and the Stack building at a cost of 19cts. per cubic foot, figures which are manifestly absurd when all the requirements are taken into consideration.

These requirements cover a construction of brick, stone or terra cotta and a building thoroughly fireproofed throughout. Architects' fees and clerk of works' salary are also to be included in the total cost.

The new Art Gallery on the grounds of the Exhibition Association has cost about 16cts. per cubic foot, contains but a single floor, and has no fittings, no heating, and practically no plumbing, while the cornices and frieze are of galvanized sheet iron.

Can the Stack room of a first class Public Library, with its iron stacks and floors, and its heating, be erected for three cents, and the Main building with its numerous rooms, its staircases, lavatories, heating, lighting and other etceteras for six cents more than this gallery?

The proposition seems entirely untenable.

The Main building will doubtless cost 30cts. and the Stack room 25cts. per cubic foot, running up the cost, with architects' fees and clerk of works' salary, to about $353,000.00.

How is the first-prize man going to get around the difficulty?

The Board told the protesting committee of architects that $250,000.00 was enough, but evidently not feeling too sure added another $10,000.00 and virtually guaranteed the $260,000.00 to be a sufficient sum for the purpose.

The architect aspiring to be a prize-man has there

fore to see to it, without cavil or gainsay, that his building can be erected for the money.

If he cannot afford a stone cornice and frieze he will have to be content with that most detestable of all materials, galvanized sheet iron. If the roof is flat it will have to be of felt and gravel at $4.00 per square of 100 feet.

His pilasters and quoins will have to be of brick or artificial stone; his fireproofing will have to be of metal, lath and plaster; his trim will have to be of cheap wood; his plaster without enrichment; his glass, sheet instead of plate; his floors, cement instead of tile, and everything starved to a similar scale.

So long as his plan is suitable and the design good who can say him nay—the Board has decreed it.

Then, if the Board wishes anything better, when the working plans are ordered will be the time for him to take a firm stand—if he does not, he is lost.

It will be the time for him to insist on a waiving of the conditions as to limit of cost to the extent of any additional cost which may be involved by the suggested changes. The other alternative will be to blindly take the risk, design a good building, specify good material and trust to fortune (and the Board) with the hope of an increased appropriation.

The Board has agreed to furnish a Clerk of Works, the usual thing, but it should be clearly understood that he shall be nominated and directed by the architect in order to make sure of a competent man, and one who shall work in harmony with him.

The eleven "suggestions" at the end of the programme including instruction to "provide telephone connection throughout" and "alarm bells for emergencies and routine signals" have an amateurish smack, and would be more in order as instructions to the successful architect when preparing his working specifications.

We look forward to an interesting sequel to this Competition.

The work may go to a man who will be able to persuade the Board to find additional funds for a suitable building or it may go to a man who will simply give what is asked for, to the lasting regret of all who have desired to see a building worthy of the purpose, the site, and the City.

THE TARIFF ON PLANS.

The session of the Tariff Commission in Toronto, on November 14th, gave an opportunity to the Ontario Assocation of Architects and the Architectural Eighteen Club to express themselves on the subject of the reason why a duty should be collected on foreign plans and what should be the basis of the tariff. Foreign plans of course means plans from the United States; and the reason why architects in general want a duty to be placed upon them is that the United States is entirely closed to Canadian architects, and practitioners on the border are in the position of being exposed by their own government to the attacks of a foreigner whose government effectually protects him from retaliation. In the large cities it is the prestige of New York that is the trouble. The promoters of anything larger than usual are not happy unless they have a New York or Chicago architect; and the architects of Montreal and Toronto think that this process ought to be made to cost something, so that it may not be lightly adopted or extended unduly downward in the scale of work.

The deputation of architects presented the following memorandum:

NOVEMBER, 14TH, 1905.

To the Hon. W. S. Fielding, Chairman Tariff Commission.

SIR:—The Ontario Association of Architects and the Toronto Architectural Eighteen Club beg respectfully to call your attention to the injustice done to Canadian Architects by the present tariff on Architectural drawings. Prior to December, 1901, the duty on drawings, coming into Canada from the United States was as follows:

"Each set of original drawings, or single set of blue prints of same if brought into Canada as a substitute for the original drawings, 2% of the estimated cost of the building to be erected thereon."

"Same, if accompanied by details, 3% of such estimated cost."

"Details or blue prints of same, if imported separately 1% of the estimated cost of such detail."

"When additional sets of blue prints of the same set of drawings are imported, such additional sets of blue prints are to be valued for duty at $5.00 per set in addition to the value of the original drawings or first set of blue prints imported in lieu thereof, as above."

This schedule was cancelled after the above date, for what reason we are unable to state.

The duty as now in force is practically nominal, being a charge upon the value of the paper only, and the time spent in making copies, such as blue prints.

As an evidence of the unreasonableness of the present tariff and the hardship inflicted on Canadian architects, American architects may erect expensive buildings in Canada, having all the draughting done in the United States, whereas Canadian architects are practically debarred from carrying on work in the United States under any condition by reason of the duty and the alien labor law.

We would suggest a tariff as follows:

Each set of original drawings or single set of copies or blue prints of same, if brought into Canada as a substitute for the original drawings 40% of the architects fee.—The architect's fee being at 2½% on the estimated cost of the building—for working drawings and specifications. The same if accompanied by full details or for full details afterwards furnished 40% of an additional fee of 1% on the estimated cost of the building.

When additional sets of copies or blue prints of the same set of drawings are imported, such additional sets of copies or blue prints are to be valued for duty at $5.00 per set in addition to the value of the original drawings, copies or blue prints. A declaration to be taken that such sets are merely duplicates of drawings or copies or blue prints already imported.

The following is a comparison of the 1901 and the suggested schedule, as they would work out in a $100,000.00 building *:—

THE 1901 SCHEDULE.

2% on cost of building ($100,000.00)	$2,000.00

THE SUGGESTED SCHEDULE.

1% on cost of building ($100,000.00)	$1,000.00
Or, instead of the above by a rating of 40% on the architect's fee which should be put at 2½% on the cost of the building for plans and specifications (Example) the duty on a building costing $100,000.00 would be, architect's fee at 2½%, $2,500.00, and a duty of 40% on such fee would be	$1,000.00
For detail drawings the architect's fee should be put at 1% on the cost of the building	
(Example) the fee on details of a building costing $100,000.00 would be 1% on $100,000.00 or $1,000.00 and a duty of 40% on such fee would be	$ 400.00
Note.—The present duty on drawings of a $100,000.00 building is the nominal sum of say	$ 5.00

This is a logical way of getting at the case. The importation is the architect's services. This is what the owner has purchased and the purchasing price should be the basis for the estimation of customs duty. The drawings are "but instruments of service," and the service is not that of the office boy who prints them but that of the architect who owns and uses them in carrying out the service for which he is paid—the production of a house

* It should be noted that the proposal is to collect only half of the 1901 tariff, which was thought too high.

OUR ILLUSTRATIONS.

THE ROYAL BANK OF CANADA, BRANCH ON ST. CATHERINE STREET, MONTREAL. MESSRS. EDWARD AND W. S. MAXWELL, ARHITECTS, MONTREAL.

The photograph we have received can hardly do justice to the peculiar character of this building with its necessary contrasts of colour. Viewed through a magnifying glass, so as to get the appearance from the point of view of a passenger on the street, the front is not only novel and interesting but pleasing. We should question however, first, the desirability of cutting the wall down so low beside the doorway, (it appears to be more than is actually convenient, if one may judge from the curtains that have been strung across the opening at a height of about six feet above the step which runs past the door), and, secondly, the curved lines of the door abutments seem hardly severe enough for their position at the base of the building. Doubtless the subsidiary position of the doorway, as a feature within the structural opening, suggested their form, and they were intended to connect the doorway with the base line ; but they might reasonably have been higher, as high as the curtain at least, and, if severely rectangular, could be made none the less interstitial by treatment.

STRATHCONA HALL, MONTREAL.—MESSRS. FINLEY & SPENCE, MONTREAL, ARCHITECTS.

The McGill University branch of the Y.M.C.A. have erected this building as a residential club for students of the University. There are rooms for about 60 students, besides dining and recreation rooms. The building is on the corner of Sherbrooke street and McGill College avenue, facing the University grounds and nearly opposite to the principal entrance gate. The facade on Sherbrooke street is of yellow sandstone, the side wall on McGill College avenue is of brick, to match the stone on the front, and combined with it by means of string courses of stone running with the heads and sills of the club-rooms as far as they extend. It is the external manifestation of the internal arrangement which gives the design its severity in the upper storeys. Below we have the important and, we may presume, beautiful club-rooms, which get their proper representation on the facade. Above, all is of a private and simple nature; small rooms (though their single windows being paired do not announce that fact) and without predominant motive, for one bedroom does not differ from another bedroom in glory. The upper part is therefore properly plain. But it is not entirely satisfactory. The law that the more severe should be below the more elegant is as inexorable as the law of gravity, and this design suffers from the insertion of those graceful round headed windows, (which should be at the top of something), as the supporting members of the piles of square headed windows which belong to the bedrooms. As the round heads do not appear within the room of the principal storey there is no apparent objection to crowning the double storey of club-rooms emphatically, with a string cornice, and slipping the main cornice up to the top of the building; which seems its proper position, (if the external presentation of internal arrangement is to be carried out consistently), for it hardly seems possible that all the 60 bedrooms are below the attic and, if they are not, there is no reason to mark off the upper storey as inferior. Then the cornice would be in a position to receive graceful treatment to any extent that was necessary to duly adjust the whole design to the law that the most elegant should be uppermost.

There seems, however, to be some complexity of level, shown in the fenestration of the two lower storeys on McGill College avenue, which was probably at the bottom of the present arrangement of the composition.

THE TRADERS BANK OF CANADA, TORONTO.—MESSRS. CARRERE & HASTINGS, NEW YORK, AND F. S. BAKER, TORONTO, ASSOCIATED ARCHITECTS.

We cannot regard the arrival of the tall building in Toronto with entire satisfaction, but it is at any rate satisfactory that the first—for this is the root of dissatisfaction, that it will not remain long alone, so susceptible to public approbation are the banks—it is satisfactory to have at least a good example to begin with.

The plan, which devotes the first and second floors to the bank offices, making of them a two-storeyed chamber, is exactly represented on the exterior, giving the bank offices distinction both externally and internally in the same manner. The elevation of the banking room above the street is new in Toronto, but it helps to serve the problem—how to get the public into the middle of the floor space, and keep the clerks in unbroken connection on the outside where the light is. The entry most in use will be no doubt be that from the elevator hall, so that the connection on the ground floor will be still interrupted to some extent but the fact of the other entrance makes for the reduction of the entrance from the hall. The flight of steps (there are only 22) will be the more convenient means of exit, and the bank entrance on the street, which is an exterior essential, gets thereby a justification in plan. The rest of the exterior is admirable. The limestone base, formed by the ground floor and the bank double-floor with its emphatic Doric order is terminated by a terra-cotta cornice, not of the light character shown by the artist in the perspective drawing, but a cornice of ordinary classic proportion, surmounted, however, by the balustrade shown. This is gracefully eased into the shaft of the building by the pedimented tops to alternate windows of the bottom storey of the shaft. The shaft is further united with the base in composition by continuing up the solider corners as a mass more solid and more perpendicular than the rest of the building. The effect of solidity, (which is obtained by projecting the wall slightly for about 17 ft. from the corners and by rusticating the brickwork with a recessed course at intervals of about a foot), and the effect of perpendicularity, (which comes chiefly from banding the central portion of the wall at intervals with strings which stop against the projecting corners), gives the corners a value in composition equivalent to that of quoins on a large scale, or of pilasters ; giving the corners a firm appearance. The large cornice at the top projects fully 6 feet, and will be, (alas!), copper ; covering, however, a steel construction which will make of the cornice a practicable gallery with a view over the lake. A virtue of this projecting cornice for the people of Toronto is that it will reduce the building in appearance to a twelve storey building ; for the thirteenth storey is contained in the cornice, and everything above, if it appears at all, will count as roof.

THE MONTREAL BUILDING BY-LAW.

The recent amendments to the Montreal Building By-law, 1901, were published in the Municipal Gazette of the city of 9th October, 1905. The complete By-law in its revised form is in preparation, but has not yet been issued.

The amendments naturally take the form of improvements, and, if everything is not yet as perfect as it may be hoped some day to be, yet all such real improvements as have been made must be hailed with satisfaction. The principal alterations and extensions are made with a view to improving the fire-proof quality of buildings, especially those of the first class—theatres receiving most attention. The sections relating to the strength of beams and columns of steel, iron and wood have been revised, the ultimate stress required as a minimum being considerably raised for nearly every material. The raising of the compressional and tensional strength of rolled steel, from a minimum of 48,000 pounds per square inch to that of 64,000 pounds per square inch, is a considerable difference but still not an overstringent requirement.

For bricks the requirement still stands "the bricks used in all buildings shall be good, hard, well burnt bricks," in spite of the circumstance that at the present moment large quantities of bricks are being used which are not burnt at all. If they are suitable for building, there should be some space allowed for such materials in the by-law. It is now provided that "when the thermometer is at or below freezing point, hydraulic cement shall be used in the composition of mortar for brickwork." This is the more essential by reason that the somewhat easy terms allowed for bond in brickwork are in the ordinary practice of the city much honoured in the breach, and therefore the quality of the mortar is of the greater importance. The use of re-inforced concrete as a wall material seems to be still unprovided for in the regulations, though perhaps not necessarily debarred.

The question of fire-proofing has, as already stated, been given most consideration. The materials which are to be considered as fulfilling the conditions of fire-proof coverings are defined as:—First, brick; second, hollow tiles or burnt clay (terra cotta) or any other material recognized as incombustible, applied to the metal structure according to a stated method; third, porous terra cotta of prescribed thickness; and, fourth, cement concrete not less than 1½ in. thick. Cinder concrete is disallowed, unless treated so as to be free from material which would render it combustible at a temperature of less than 1,500 degrees Fahrenheit.

To the clauses which regulate the construction of theatres a number more have been added, and, as they contradict existing clauses in many respects, it is to be hoped that, when the by-laws are printed in amended form, it will be quite clear that these revised clauses take entire precedence of the others. Thus the new clauses provide for doors with "no locks of any kind"; whilst the actual clauses, which presumably are still to remain part of the by-law, call for fastenings upon the inside only. The new clauses take 20 inches of width for each 100 permanent seats of the auditorium as the basis for regulating the width of exits. The old clauses gave eighteen inches per 100 seats as the basis, and it will be necessary to revise these provisions wherever they are mentioned. As regards width of aisles between seats, the old law made better provision than the new one does. The spacing of seating is now for the first time defined:—"Seats shall not be less than twenty inches in width, measured at the top of the seat; back rows of seats shall not be less than two feet six inches from back to back. No more than 12 seats shall be arranged in any one row between aisles; no more than 5 seats shall be arranged in any one row between one aisle and the wall," etc. Nothing is said of continuous seating however.

A good provision now introduced is that the staircases of theatres shall have an independent lighting system of electricity, gas or sperm oil. It is regrettable that the conditions as to staircases remain meagre and unsatisfactory. In assembly-halls, hotels, etc., they must be enclosed by walls on three sides, but there is no such requirement for theatre staircases, though this and more is absolutely essential to public safety. In more than one of the best theatres in Montreal the public habitually enter and leave the dress circle or balcony by an open stair at the back of the ground floor auditorium; the other exits being perilous looking external iron fire-escapes. Theatre stairs should all be built around on four sides surely. The stairs themselves are permitted to have hardwood treads, and, as no thickness is specified, nor anything said about bedding these down on concrete, a thoroughly dangerous stair may comply with the requirements.

The standard of equipment, in case of fire breaking out, has been very much raised.

In describing fire escapes, the words "cloth or metal tubes" might with advantage be omitted, leaving "or other means of egress . . . as may be approved of . . . . . by the Inspector" to cover special cases.

A by-law concerning the erection of buildings in St. Catherine street aims at the improvement in character of buildings in this important thoroughfare and insists on frontages of solid and incombustible character. The requirement that "the new buildings shall not have less than thirty-eight feet from the sidewalk to the top of the roof" ought obviously to be enforced with considerable discretion.

THE WRECKING OF A WORLD'S FAIR.

The work of demolishing the splendid buildings at the Louisiana Purchase Exposition is a colossal task, as indicated by the amount of material collected by the company which purchased the structures from the fair management. In a list sent out to prospective purchasers of the material no less than 100,000,000 feet of lumber is offered for sale, comprising every kind and description, 50,000 sash, 10,000 doors, together with one milllon dollars' worth of copper wire, and other electrical material, vast quantities of pipe, fencing, roofing material, furniture, in fact, an aggregation of second hand goods such as never before was placed on the market. A novel feature is the offering of 25,000 bamboo poles used by the government in the Philippine Reservation, the last memento of the man-eating natives of Uncle Sam's new possession. It would be interesting to know where all of this material will find its destination. Gne may imagine that some of it may go to dwellings in the west, the other parts of it may do service in the east, and still others in the south and in the north, distributing to all parts of the country souvenirs in the shape of building material from this greatest of modern expositions.—*The Ohio Architect and Builder.*

THE PLANNING OF DECORATION.

GENERAL ANALYSIS: Architecture is primarily proportioned construction, so that the first duty of the ornament which is associated with it is that the expression of the construction should not be denied or violated; and as construction is made up of a number of parts, the ornament naturally accents those parts and their combinations. A building has mass, stability and focus. Its mass is expressed by its surface, its stability by its perpendicular and horizontal lines, its focus either by its axis, its largest unit or both. As it is made up of a number of integral parts or cells, the parts must correlate and group about one another, usually with the smaller units about the larger. These groups form stratifications and axes, and it will be found that a large proportion of the ornament applied to architecture is devoted to accenting these stratifications and axes. All decoration of string and belt courses and entablatures belong to the stratified type, while decorations of columns, pilasters, piers, mullions and many of the terminal forms belong to the type upon axes.

The decoration of the surface of a building is of minor consideration, and is merely to give scale, tone, or color to the mass. As a building is made up of cells, the main axis of each cell is its centre line, and therefore upon a void and not upon a solid or wall line; and because of this fact, and also that all architecture has grown either from the single cell or from a group of cells about the central one, the main axis of the majority of buildings is upon a void, not upon a solid; and as walls are above walls and cells above cells in ordinary construction, voids come naturally above voids, and openings are over openings on the same axis. So much is this the custom, and so long has it been felt to be an expression of stability which it is unwise to violate, that the axiom, solids above solids and voids above voids, has become universal in architectural design as far as construction will permit. When, as in the Ducal Palace in Venice or in the arcaded streets of Bologna, plain walls with comparatively small openings are carried upon supports, both the columns and lintel carrying such walls are given strong and vigorous treatment and the walls above as light a treatment as possible, either by texture or by delicacy of detail; and this is the mere common sense of design expressing stability. As far as stratification of exterior is concerned, the wall is divided into storeys and has a crown or termination, and ornament is associated with belt courses and cornices.

The consideration of least importance upon the exterior of a building is the decoration of its broad surfaces, which in most cases are best left plain. If, however, for purposes of scale, tone or colour these surfaces are to be decorated, they become an all-over pattern, either a diaper or of parallel bands or forms suggested by the material of which the surface is built; for instance, if of brick the patterns are based on checkers or are stratified; if of stone, they accent each stone at either horizontal or perpendicular joints, or both; if of shingles or other lapped covering of small pieces, scale patterns are suggested. The most prolific motives are those of the so-called rustication of stones in which each joint is moulded, and borders are carried around the edges of the stones; the wall may also be stratified by projections and mouldings. The surface patterns upon the stones should be small in scale and even in tone.

FLOOR TREATMENT. Floor patterns should be in one level plane, giving no impression by form, tone or colour of depression or projection. For this reason strong contrasts of tones, unless in very small scale, should be avoided, as should also all marked impressions of overlap, interlace or embossing. As many of the Oriental patterns are entirely free from these qualities they are peculiarly adaptable to floor designs.

In cases where the floor is entire it requires its principal ornament around its edge as a border to define it from the wall. Manifestly a floor should not appear to sink or to be depressed at its centre; on the contrary, it is better to have the impression of its being crowned at the centre; and as dark tones retreat, the border, rather than the centre of the floor, should be the darker either in tone or by amount of detail.

As the floor is under foot, and as all ornament is less noticeable below than above the eye, elaborate systems of floor decoration are labor thrown away; the true purpose of the decoration of a floor being that of a foil to the remainder of the room. The ornament, therefore, should be less conspicuous and smaller in scale than that on the walls, and as the floor is seen more in perspective than either the walls or the ceiling, involved or complicated designs upon it become confused; simple geometric systems of planning being much more satisfactory.

WALL TREATMENT. In the decoration of a wall the usual effect of horizontal bands or zones is to lower the wall and to lengthen it; and this fact more than any other tends to determine the number and proportion of the subdivisions. It is evident that the narrow zones should be toward the top to avoid the appearance of overpowering weight upon and consequent compression of the lower zones, and the same reasoning causes lighter tones and detail at the top than at the bottom. The introduction of minor zones, such as superdados, subfriezes, etc., which appear in Victorian English decoration, is unnecessary and confusing.

The main point of definition being at the base and cornice, each advances rather than retreats, and the base being below the eye receives slight attention, while the cornices become elaborate. The strength of detail, of tone, and of scale diminishes upward to avoid heaviness at the top of the wall; this should not be overlooked.

PANELS. The further treatment of walls between the openings is forced into a panelled treatment of greater or less scale; and the wall with the greater number of openings sets the scale for the plain wall with fewer. The panelled treatment may be simple fields with borders as at Pompeii; or divided with pilasters and columns, as in Renaissance interiors; or have marked perpendicular treatment, as in the chateaux on the Loire; the surface may advance and retreat and become most elaborate in modelling and colour; but always the openings and the spaces between them set the scale. It will therefore be found that as these openings are usually higher than they are wide, unless there be a very much greater area of wall than opening, perpendicular rather than horizontal treatment is applicable to most walls of interiors; the exception being when windows are so grouped that the width of the group exceeds its height, and when openings are insignificant.

THE CORNICE, uninterrupted by openings, defines the wall from the ceiling, and therefore projects at a greater or less angle. At times it is coved, carrying the wall surface over into the ceiling surface, in which case the cove is the dominant of the group of mouldings forming the cornice. If the ceiling is enriched the cornice becomes heavier in proportion to the enrichment upon the ceiling, unless the latter be frankly of panelled beams which are carried on the top of the wall, in which case the cornice is not necessary.

As the cornice is in most cases a group of mouldings, and therefore band ornament, it can be treated as a band or belt, while the frieze below it, equally uninterrupted by openings, becomes an excellent field for either contiuous ornament or specialized ornament at regular intervals on axes. Cornices break naturally around projections, but it is superfluous to break them on the runs between projections except to define some axis strongly. Cornices immediately above openings require sufficient depth to appear as supporting beams spanning the opening.

CEILINGS. The decoration of ceilings depends very largely upon the importance of the room and its purpose. Usually small rooms require little ornament upon the ceiling. Rooms are naturally of two classes—those which are merely backgrounds for the furniture,

&c., within the room, and those which are complete in themselves and require but few accessories; to the latter type belong the more highly ornamented walls and ceilings. The flat ceilings in one plane are practically large panels defined by the walls, and require panel treatment, *i. e.*, with borders or with centre motives, or both, care being taken that the centre of the ceiling does not appear lower than the sides. To avoid this effect the centre ornament should not have either too much projection, too large a scale or too strong a tone; and it is advisable to have the design of the border more vigorous than that of the centre.

Darker tones in the ceiling than in the walls produce the effect of a heavy ceiling, for which reason, unless there are strong supporting motives in the ceiling, such as beams from wall to wall or rich projecting divisions between panels forming a framework apparently capable of self-support, it is well to have the tone of the ceiling lighter than the wall. This is also dependent upon the apparent carrying capacity of the wall, for walls with deep reveals, indicating thickness, or with high broad surfaces, which also apparently necessitate thickness, or with pilastered or columned treatment, can carry heavier and richer ceilings than thin walls or walls pierced with numerous openings.

BORDERS ON FLAT CEILINGS come immediately in contact with the upper part of the wall, and if undefined from it by cornice lines require careful harmony or treatment with the design upon the wall, having similar intervals of repeat; in fact, the top of the wall, the cornice and the border of the ceiling should always be designed together, not as separate designs. Corners of ceilings, contrary to those of floors, are adaptable points of interest for ornament, though liable to disturb the scale

BEAMS in ceilings must be manifestly deep enough. and of proper intervals apart to carry the floor or roof above; the spaces between the beams becoming panels, subject to panel treatment. Alternation of beams, cross beams and framework patterns produce coffered ceilings of the richest type, the coffers being recessed to greater or less depth at will, and treated in the same or different tones from the framework, which takes the form of a geometric pattern extending over the entire ceiling and dividing it into panels of various shapes. When the framework becomes delicate and of slight projection, it is advisable to keep the tones of the frame and the panel near to each other; the heavier framework allowing greater contrast of tone and colour. Upon the framework, ornament is naturally placed at the juncture of the pieces of frame. Each piece of frame is a band and can be treated as such.

VAULTED CEILINGS are based on arch construction, and the lines of intersection of the arches are the salient lines of ornament, being bands, or borders, or ribs, strongest in their centre lines, and with ornament either in repose or following the lines upward. The spaces between these lines become panels of many forms, the ornament upon them being subordinate in scale or tone to the construction lines; and it is inadvisable to subdivide these panels excepting by some geometric framework or lattice of less strength than the arch lines.

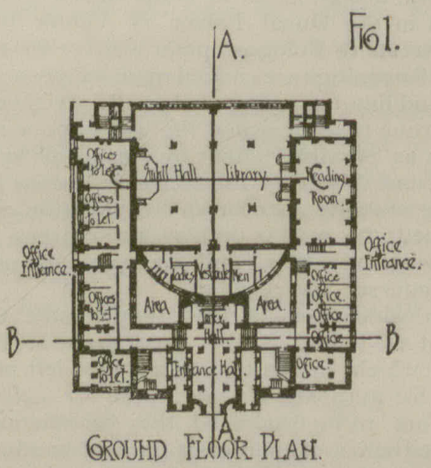
At the points where the arch lines group, rich ornament can properly be placed, such as caps or corbels at the base of the lines; and bosses, rosettes, knots, pendants, &c., at the crown. Parallel bands as borders or arch lines, whether of mouldings or of flat decoration, apparently strengthen the construction; while exceedingly heavy centres in the panels apparently weaken it. Single vaulted ceilings, such as those spanned by barrel-vaults, can be heavily coffered; but all cofferings of ceilings of interlacing arches requires lighter treatment to avoid violating the apparent strength of the rib lines. The tympana left by the barrel-vaults at the end walls of the room are of unique shape and capable of specialized treatment of great interest. Vaulted ceilings do not require a continuous cornice below them, sections of the cornice forming caps or corbels at the points where the arch lines meet the perpendicular walls being sufficient.

PENDANTS. Ceilings with hanging forms or pendants, as at Troyes or at Rosslyn Chapel, and stalactite ceilings, as at the Alhambra, need a strong initial background surface, manifestly capable not only of supporting itself but also all forms hung upon it; and as an arch over a span can unquestionably carry more than a beam over the same span, the ceilings are best when the background is an arched or vaulted form: in fact, pendants from a flat ceiling should be associated with a strong framework pattern upon the ceiling. In all cases numerous small pendants or stalactites are more agreeable than a few large or apparently heavy ones; and the construction scheme should be carefully worked out in the mass before the detail is applied. The form of the pendants should decrease downwards and partake of the character of hanging forms, not of mere masses fastened as a deadweight upon the surface. It is not usual to find such forms at a point of departure for chandeliers, etc., from the midst of a plain surface; and in most cases they are unsatisfactory, the tubing or rods of such fixtures appearing lighter when piercing the heart of a flat ornament, such as a rose or circle. The Oriental stalactite ceilings are extremely interesting; they are built of a series of carefully related units, each of which does its work in supporting those about it.

Pendants from keystones can be heavier than at other points, for obvious reasons.—*The Builders' Journal and Architectural Record.*

AXIAL PLANNING.

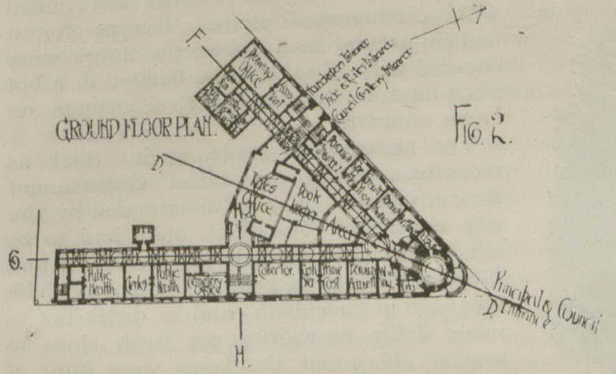
It is often said by foreign critics that English architecture lacks the element of study which is so pronounced a characteristic of Continental work. Unfortunately, there is a good deal of truth in this, and to a large extent it is undoubtedly due to our neglect of certain great principles, amongst which that of axial planning is one of the most prominent. Tracing back



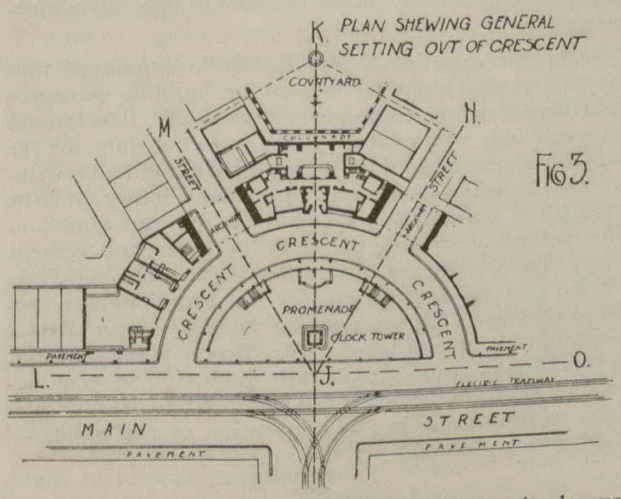
the history of architecture throughout all ages, it is found that this principle predominates, not in one period, but in all, where great schemes are concerned. In the Egyptian works it is in strong evidence, the great temples of Thebes being all arranged with an axial corridor and carefully managed minor axes. The Greek temples are similar, and not the temples alone, but the general building schemes of which they formed a part. Roman work, as we know, is based upon the Greek, in this as in most other respects, and the Renaissance was based upon the Roman. All this is a natural sequence; but the Gothic spirit is so utterly different from that which permeates all Classic types, that it might have been thought that this principle would not govern the great building of the Gothic period; yet the churches at least have the same central axial arrangement as have the Basilicas of Rome or the temples of Greece and Egypt, though, upon military grounds, the castles are differently planned.

There is no gainsaying the fact that the present is a Renaissance period, and it consequently follows that the principles which have been successfully applied to Classic architecture in the past should apply equally

well to that of the present day. In small works, particularly private houses, we generally plan upon a Gothic system, which has come down to us rather from the castle than from Ecclesiastical architecture. As a result, we build for convenience rather than for dignified effect, In all greater matters, on the other hand, we now adopt some phase of the Renaissance, and it would be well if we were to follow the Continental fashion of basing our plans upon an axial system. Now and again we find that this is done, and always with good effect. This has been shown in a few recent competitions. Mr. Gibson's plan for the Wesleyan



Methodist Hall (Fig. 1) has a central axial line, which is in the form of a corridor from the entrance doorway, until the pair of doors to the small hall and library are met, this axial arrangement being particularly noticeable in the entrance-hall At the junction of the entrance-hall and inner hall the axis is crossed by a secondary axis lettered B B, off which, however, things do not pair so completely as they do off the main axis. When the small hall and library are thrown into one, they form a hall which is again axial in its arrangement, with a wide nave and comparatively wide aisles, this axis C C crossing the major axis A A at right angles. The scheme is a simple one, of a type which may be traced back, as we have already said, to the



earliest times; but it is as applicable now as it always has been, and is as productive of good effect.

A further developed example is Messrs. Warwick and Hall's successful design for the Lambeth Municipal Offices (Fig. 2). This building occurs at a sharp angle, and the axis is obtained by bisecting this angle, the design being symmetrical, though not identical, on either side of it. The axial corridor only extends from the entrance to an inner hall, and there diverges to corridors on right and left, forming radial axes from the main axis. It will be seen that the major axis is lettered D D, and these two radial axes E F and E G. Of these E G is again crossed at right angles by another axis, H H, which serves to dominate the elevation to Brixton Hill, while a somewhat similar arrangement occurs on the other frontage. The idea of splitting the axis into two divergent axes is by means new; but it is used here with some ability, and in a manner which is highly instructive and well worthy of consideration. The plan is thereby rendered something quite different from the usual haphazard schemes submitted in English competitions.

A very similar idea dominated the design for a crescent by which the Tite prize was won in 1903 (Fig. 3). The plan shows a central axial line, J K, off which everything is symmetrically designed; but for the point J there radiate a series of axes J L, J M, J N, and J O passing down various streets clear of obstructions. This is again a case of divergence of axes or radiation, the whole effect being most perfectly visible from the point J; for it may be noted that one of the great advantages of axial arrangement from an architectural point of view is that of obtaining a series of vistas. Convenience is also secured, for it is always easy to find one's way about an axially planned building.

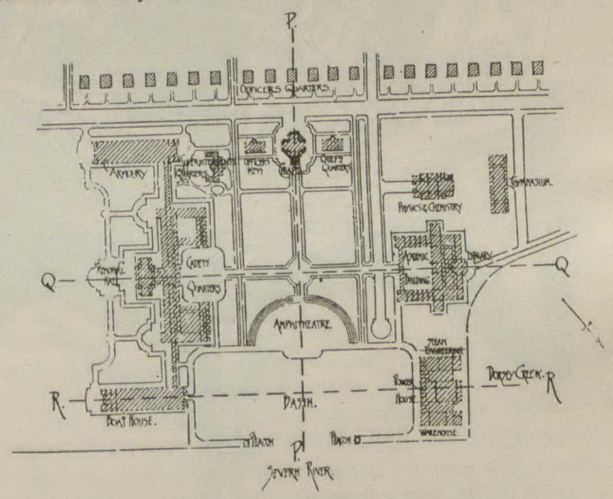
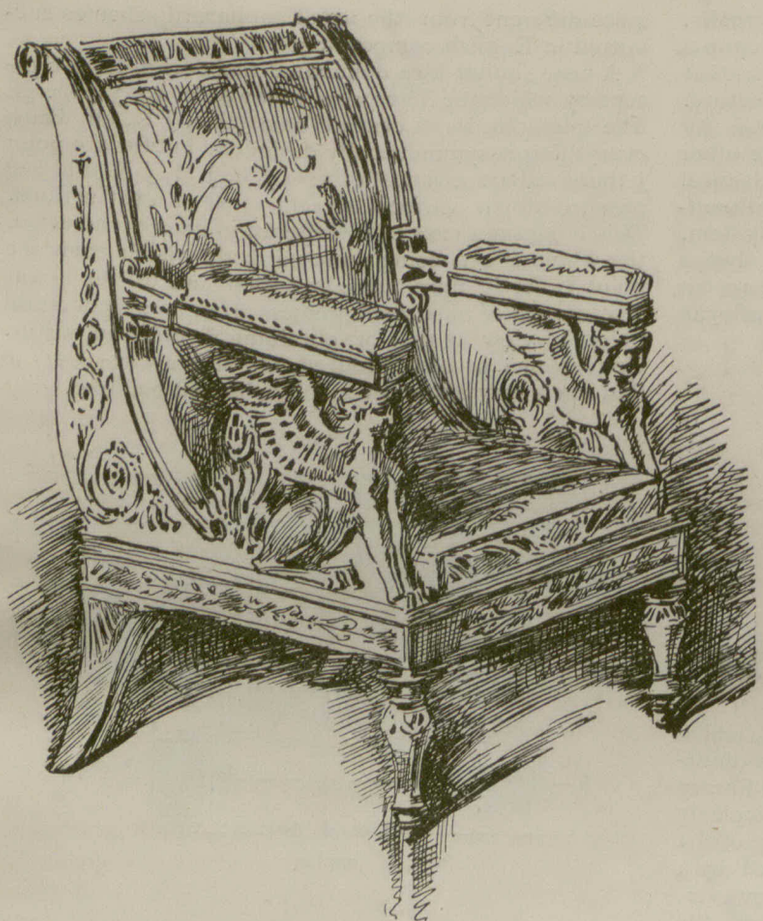


FIG. 4.

Although these English examples are sufficient to show that the principle of axiality is becoming recognized, yet there is none in which it is so perfectly developed as in Mr. Ernest Flagg's scheme for the United States Naval Academy at Annapolis, illustrated in Fig. 4. This is an almost perfect example of studied planning according to recognized rules and principles, and may be taken as being typical of modern French work, Mr. Flagg having been educated at the Ecole des Beaux Arts in Paris. The scheme is controlled by two axes P P and Q Q, which cross one another almost centrally at right angles, both of them being rather axial passages than axial lines throughout their whole extent. The planning is not entirely symmetrical off either of them, while each individual building has its own independent axis or series of axes. There is, for instance a supplementary axis, R.R., which passes through the boat-house, the basin, and the tower-house, but where it traverses the boat-house occurring only as one of the several minor axes of the cadets' quarters, which is planned as a hall off the great axis Q.Q., which serves likewise as the principal axis of the academy building. It would probably cause confusion rather than elucidation if all the many axes were shown upon this plan; but it will be seen that the adoption of axial arrangement, not only in each individual building, but in the relation of building to building, has led to directness and simplicity, and the production of admirable vistas, and this in spite of an irregular site, occasioned by the Dorsey Creek, which would have led many architects to have despaired of producing a formal architectural scheme.

In emphasizing so strongly the need for axial arrangement, if successful planning of big schemes is to result, it is not to be thought that this is the only element tending to success in this direction. It is, however, one of the most important, and one of the most neglected by English architects, while it is one of the first that is insisted upon by the great French masters of the art of planning. No more severe criticism can be passed by one of them than to tell his student that he does not yet know how to lay down an axis. On the other hand, English architects hardly understand this to be a leading necessity, being too much accustomed to deal with small and irregular buildings.



RIQUET (PAUL-EDMOND), *Etudes de meubles au chateau de Fontainebleau.*

A CONCRETE BUILDING IN LIVERPOOL.

The disposal of the clinker from refuse destructors in Liverpool has been a problem of considerable difficulty for many years. Nine years ago, when Mr. H. Percy Bouldnois was city engineer, be used this material as the aggregate for concrete for lintels, windows, sills, doors-steps and similar part dwellings of low cost, but recently his successor, Mr. J. A. Brodie has used the material in a reinforced concrete tenement house. It has been built to prove that satisfactory dwellings for low rentals can be constructed from what is practically a waste material.

About 50,000 tons of clinker are produced annually at Liverpool, and the cost of disposing of the portions not utilized is about 60 cents per ton. At present time, Mr. Brodies reports, about 15,000 ton are dumped at sea at an even higher cost. The portion of the clinker for which a use is found is mainly crushed for the aggregate in the concrete sidewalk slabs, of which 160,000 sq. yd. have been laid. Recently it has been used for the foundation of pavements and simalar works and in the manufacture of paving blocks for roadways carrying comparativetly light traffic. At the best, however, not over a third of the clinker can be put to use by these methods, and accordingly permission was obtained from the Local Government Board two years ago to put up a clinker concrete tenement house, reinforced with a little steel.

The building covers 234 sq. yd. of a plot having 413 sq. yd. It has three storeys, each with four tenements. Each tenement has a separate doorway and is self-contained, and the balconies by which the upper tenements are entered are reached by open stairs from the streets. Each tenement has a $15 \times 10\frac{1}{3}$ ft. living room, two bedrooms averaging $15\frac{1}{4} \times 7\frac{3}{4}$ ft. and 10 ft., a scullery and a toilet. Gas and water are piped into each tenement, and the living room contains a range and a food cupboard ventilated into the outer air. The bedrooms have grates. The roof is flat and fitted up as a playground and for drying clothes.

The construction of the building is wholly unlike anything attempted in the United States. The ceiling, the floor and each of the four sides are separate concrete slabs, weighing 1 to 11 tons and hauled to the site by a traction engine. The openings for doors, windows and fireplaces were made when the windows were manufactured, and mortices and tenons were left at the edges so that all parts would dovetail together. The joints were made with cement mortar, and two 1 in. bolts were used at each vertical joint to hold the parts together while the joint was setting. The balconies, stairs, parapet walls, and chimney tops were molded blocks, and the chimneys and ash chutes were lined with earthenware pipes. Except for a margin around each room, the floors were covered with ¾ in. boards, bedded in a hot pitch mixture and nailed to scantlings set in the concrete.

The slabs were made 14 in. thick as recommended by the Local Government Board, instead of 7 in. as intended by the city engineer. The thick slabs had to be left six to eight days in the molds before they could be moved safely. Some of them met with an accident, and in order not to incur delay by waiting for fresh slabs to season, about half the floors were built of concrete in place, carried by steel beams. The foundations consisted of concrete piers 12 ft. deep carrying flat arches on which the walls were supported. This construction was necessary because the building was erected on a site where a cellared structure formerly stood.

The building was estimated to cost $6,100 but about $20,000 was actually spent, owing to the unnecessary thickness of the walls, extra depth of foundations, troubles with molds, and needless expense for framing and scaffolds. Mr. Brodie is confident that similar buildings can be constructed at his original estimate which is considerably under the cost of like structures in brick.

From this experience Mr. Brodie is convinced that any size of slab likely to be used for building purposes in Liverpool can be made and erected safely. The largest yet made was 16×13 feet. Floor and roof slabs for the building were tested with heavy distributed loads without measurable deflection or appreciable injury, and the strength of the building seems to be beyond question. The method of jointing the slabs by bolts and cement mortar has proved entirely satisfactory. The buildings are particularly appropriate for low-rental homes, because they are fireproof and can be kept clean with a minimum amount of labor. Mr. Brodie points out that in this type of construction, any reduction in cost depends largely on the possibility of repetition of individual slabs without requiring any alteration of the molds.—*Engineering Record.*

COSTLY PUBLIC BUILDINGS.

The 75 chief cities of America have $100,000,000 invested in city halls. Philadelphia leads with a $27,000,000 city hall, and San Francisco follows with one worth $8,300,000.

After these cities come Boston, with a city hall representing $7,500,000; New York with one standing for $7,000,000, and Baltimore with a $5,000,000 structure and grounds. The value in each case is based upon the value of the city hall itself and the park or grounds surrounding it.

Every American city of more than 300,000 population has at least a million dollar city hall with the exception of New Orleans. St. Louis, Cincinnati and Detroit have buildings worth more than $2,000,000 each. Chicago falls $250,000 below that figure. Pittsburg and Milwaukee follow.—*Exchange.*

POSSIBILITIES IN HEATINC WITH HOT AIR.*

The primary object in all house heating apparatus is to fill the house with warm air, and in all systems the air is warmed by contact with heated surfaces, as air is absolutely transparent to radiant heat.

In heating with hot air, the air is heated by contact with hot surfaces in a central heating apparatus, and is then conveyed to the rooms. In heating with hot water or steam, the water is heated in the heating apparatus, conveyed to the rooms, and there used to heat the iron of the radiators, which in turn heat the air.

The difference between the two systems is, therefore, practically that in the hot air system, the air is heated by one central plant, while with hot water and steam the air is heated by a separate plant or sub-station in each room, which sub-station is heated from a central station.

It is not my purpose to disparage the system of heating the air by individual heating plants, but to show some of the possibilities in heating the air by a central plant, a system which, in my judgement, has been largely left to incompetent men, and has not received the attention and scientific study which it deserves.

That this system has been in a large proportion of cases unsatisfactory, I freely admit, but believe that the failures have been due to errors in construction or operation ane not to any inherent defect in the principles.

Heating the air by a central plant involves less expense in the installation, and this is a matter which demands consideration of the practical engineer. Economy in first cost is not everything, but it is something, and with probably ninety-nine out of one hundred people who have homes to heat, a very vital something. While a really first-class hot air plant cannot be installed at the prices commonly charged for inferior and inefficient ones, yet even such a plant costs less than a hot water or steam system. Economy of first cost is, therefore, a possibility in heating with hot air.

But economy of operation is not less important. The plant is paid for once, the fuel bill is a continuing expense and frequently amounts to more in a few years than the first cost of the plant. No system is economical which involves a continuous useless expense.

What are the specific facts in regard to cost of operation in heating with hot air?

A given amount of fuel will in perfect combustion set free a given amount of heat, no more and no less. The heat is in the fuel, not in furnace and boilers. No heating apparatus can add a single unit. The theoretically perfect plant would be one in which there was absolutely perfect combustion of the fuel and complete utilization of the heat released by this combustion, and on these two points depends the comparative economy of operation.

On the first point, completeness of combustion, while there is large difference in different apparatus, there is no essential difference between the two systems. The fuel can be burned as perfectly, and as large a proportion of the heat units contained in it be released, with one system as with the other. The issue is, therfore, narrowed to what becomes of the heat after it is released from the fuel.

Heat cannot be destroyed. Once produced, it must either be transformed into some other form of energy or continue as heat. In house heating, it may be practically said that all the heat released by combustion either goes towards heating the house, that is, to replacing that which has been lost by radiation and leakage through the walls and windows, or escapes up the chimney, having performed no more useful function than the creation of a draft.

The extent to which the heat produced is utilized can, therefore, be practically determined by ascertaining the per cent. which escapes to the chimney. The lower the temperature at which the waste products of combustion escape to the chimney (velocity of current being the same) the larger will be the per cent. utilized for heating the house aad consequently the greater the economy of operation. In other words, the extent to which the coollng of the products of combustion can be carried is the measure of the efficiency of any heating apparatus.

Let us see the theoretical limit to which the cooling can be carried, keeping in mind the fact that the theoretical limit can never be reached much less passed in practice.

The products of combustion are cooled by contact with metal which is cooled by contact with water or air. The theoretical limit of cooling is, therefore, the temperature of the air or water by which this cooling is accomplished.

With live steam, the possible minimum is the temperature of water boiling under normal atmospheric pressure, or 212 degrees.

With hot water, the possible minimum is the temperature of the water as it returns to the boiler from the radiators, usually 140 to 170 degrees.

With hot air, the possible minimum is the temperature of the cold air entering the furnace, anywhere from below zero to 70 degrees.

The theoretical limit of cooling and consequent theoretical economy in operation is, therefore, lower with hot water than with steam, and lower with hot air than with either hot water or steam.

It is, therefore, possible—theoretically—to heat with hot air more economically than with any other system.

But the advocates of the other systems will contend that while this may be so in theory, yet that in practice, owing to the greater power of water to absorb heat, it is otherwise, and that actually the exhaustion of the heat contained in the products of combustion is carried much further in both steam and hot water heating than it is in hot air heating.

In many cases, I admit the contention but in turn contend that the reason is to be found in the construction of the apparatus and not in the principal, and that it is entirely possible to so construct hot air apparatus, that the same difference in its favor, as compared with hot water and steam, will exhist in practice as is shown in theory.

A few days since I made a test with a hot air furnace, and found the temperature in the smoke pipe was 120 degrees, or at least 20 degrees lower than the theoretical minimum with hot water, and 92 degrees lower than the theoretical minimum with steam. Probably you will say that the fire was low. Judge for yourselves. At the time I took the temperature of the smoke pipe, the furnace was delivering over a thousand cubic feet of air a minute at a temperature of 210 degrees. And when this test was made, the temperatnre of the outside air was 80 degrees, or at least 40 degrees higher than would he usual in the use of the apparatus. It may safely be said, therefore, that in actual practice the cooling of the products of combustion in a hot air furnace, can be actually carried from 40 degrees to 120 degrees lower than the theoretical minimum with hot water and steam.

I think it, therefore, demonstrated, both by scientific deduction and practical test, that one of the possibilities in heating with hot air is the utilization of a larger per cent. of the heat contained in the fuel than can be secured by any other system.

In heating with hot air, however, there is an expenditure of heat which may perhaps be called waste, namely, the heat contained in the air which is forced out of the building by the pressure of the warm air that is being poured in.

But this loss of heat is due to the necessity for ventilation. A given amount of ventilation will involve the same loss of B. T. U. whatever the heating system may be.

It is true, with hot water or steam heat, it is possible to reduce the ventilation below the proper ratio and thus save heat. But this is equally possible with hot

* A paper by Mr. R. S. Thompson read before a meeting of Heating and Ventilating Engineers.

air, if the plant is so constructed that the amount of ventilation can be controlled.

It is true, that with hot air heating, ventilation can be carried to a point which will involve large loss, as I shall show hereafter. The same is true with hot water and steam. You can open the windows and crowd the fire.

But in either case, the loss is to be charged up to ventilation, or bad management, and not to the system of heating, and can be as well controlled under one system as another.

It is a possibility, in heating with hot air, to heat all the rooms in a house at the same time. I am compelled to admit that this is not always done in practice. I could not even dispute the statement that it is not often done, but I can demonstrate both theoretically and practically that it can be done, and that which can be done is a possibility.

The difficulty has not been in the principle, but in the apparatus, not in the gun but the man behind the gun.

If the amount of cold air that is supplied to the furnace is equal to the amount that can be forced through all the hot air pipes, if the construction of the furnace is such that this amount of air can pass through the casing and reach the hot air pipes, with velocity unreduced by friction, if the furnace has the necessary surface and the necessary arrangement of surface to heat all this air, if the size and form of the hot air pipes are such as will permit the passage of the required amount of air to each room, and if there is no serious "back pressure" in any room, the furnace will heat them all at the same time. For if enough air is being pressed through the furnace to supply all that can be carried by all the pipes, the pressure in the furnace will force this air through all these pipes, if the resistance due to friction and back pressure in the rooms is less than the pressure in the furnace. That is a simple matter of mathematical demonstration.

There are a great many " ifs " in that claim. Certainly. And it is the business of the heating engineer to look after those " ifs." If he can't do it, he has not yet mastered his profession.

These " ifs " cannot be met either by guesswork or by a set of hard and fast rules. They require a thorough scientific knowledge of the principles involved, a considerable amount of practical experience, and a liberal use of horse sense.

Air is compressible and elastic. It is subject to friction, inertia and momentum. The fact that two pipes have the same area is not proof that the same pressure will force the same amount of air through each. To get proportions correct, is not a simple or easy matter, but requires the exercise of brains and judgment.

It is possible in heating with hot air, to heat those rooms which are most exposed to the wind, or the windward side of large rooms. The course of heated air is subject to definite laws, and by the use of these laws, it can be controlled. But the man who would control it, must make himself familiar with these laws and not content himself with a lot of empirical formulas.

The cause of trouble in heating rooms exposed to the wind is that the air pressure on the outside by leakage produces air pressure in the room, and if the pressure in the room is greater than the pressure in the pipe, the greater will overcome the less. If the pressure of air on the outside is so great that the pressure of air in the pipe cannot force air out through the crevices around windows, and there is no outlet for the air, it will be impossible to force air into the room, and, consequently impossible to heat that room.

But the difficulty can be overcome by providing a proper outlet, of the proper size and in the proper location.

Nothing has done so much to injure heating with hot air as the common idea that neither skill nor scientific knowledge is needed in connection with it. The system has been neglected by scientific men, and the work is frequently turned over to common mechanics. In many places, the carpenter is given the job of having the house piped, and he turns it over to whoever gets the contract for roofing and spouting. The average man who would not think of laying out a shoe closet in the house he is building, without consulting an architect, will give all the directions for putting in a furnace, determine its size, its location, the pipes and the registers. Then he expects the "furnace man" to put in the furnace on plans of the builders' selection, and guarantee the working of the plant.

And strangest of all, there are plenty of "furnace men" who will do it.

No wonder guarantees on the working of hot air furnaces are worth but little.

There is one point in connection with heating with hot air, to which I have already referred, in which there is a possibility of great waste of heat. This is over-ventilation.

Take a house in which the loss by radiation from walls is 80,000 B.T.U. per hour in zero weather.

To maintain the temperature by replacing this loss will require the use of 62,857 cubic feet of air per hour at a temperature of 140 degrees.

Supposing the family consists of six persons, the maximum requirement for ventilation would be 11,800 cubic feet per hour. In this case, we are using 51,057 cubic feet of air per hour in excess of the amount required for ventilation. If this air escapes at 70 degrees and has been heated from zero, it represents a loss of 64,963 B. T. U. or about eight pounds of coal per hour.

In my judgement, the remedy for this is to make provision for recirculating this excess of air.

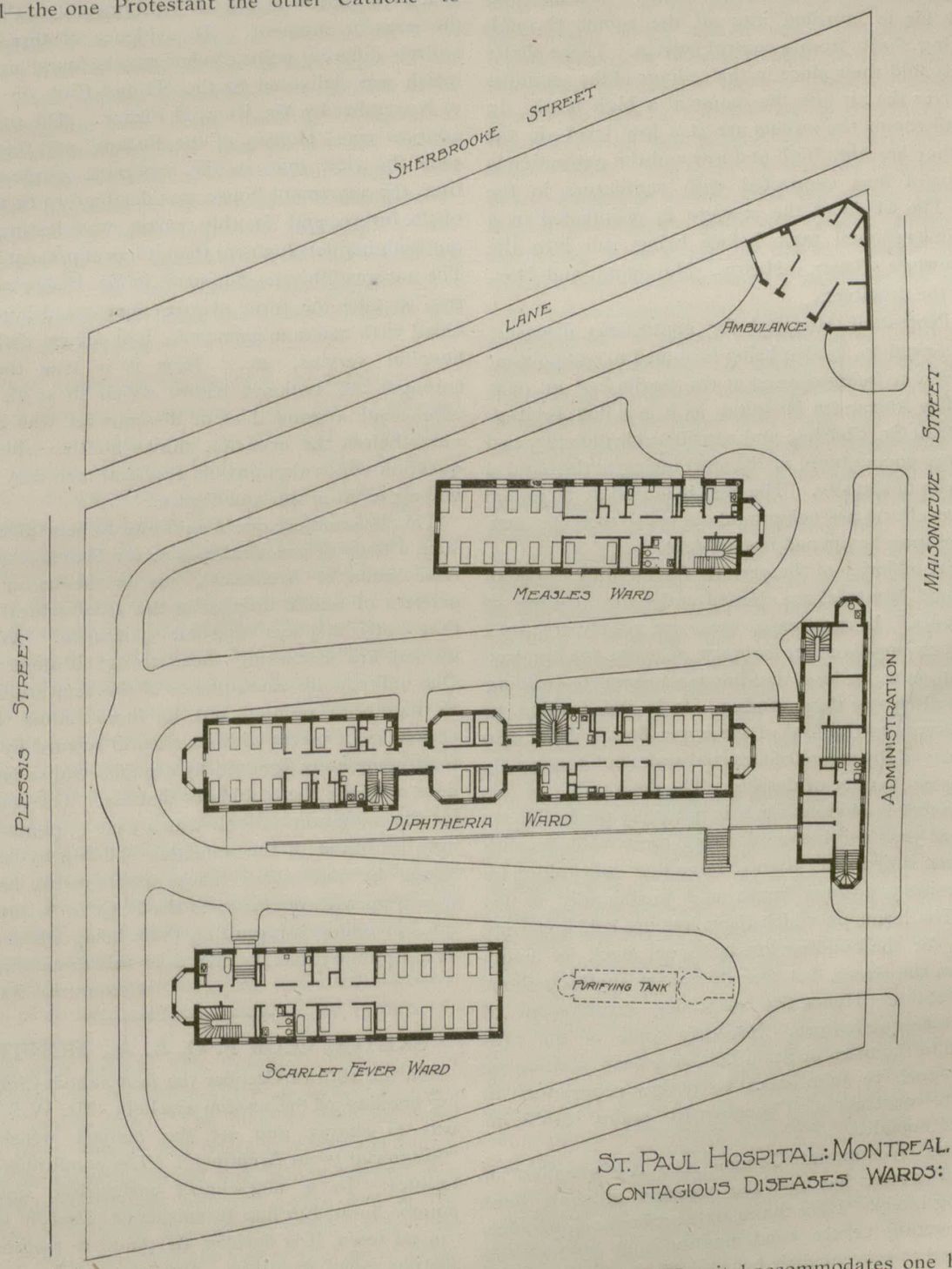
In replying after the discussion of this paper Mr. Thompson said further :—I want to tell you of a practical case I had two or three years ago, and which has been in operation two winters now. A man had a house upon the top of a hill. It was on the northwest corner, and faced northwest. The dimensions of the house were about 35 x 35. It had a kitchen at the back, was two storeys high, and on the northwest corner was a reception hall, about 16 feet square, which contained a window. The owner built a tower out on the northwest corner extending out beyond the corner of the hall, so that the hall from its extreme dimensions was 19 feet to the edge of the tower, and 20 feet to the edge of the tower respectively for the two inside walls. It had the regulation winding stairway leading to the upper storey. Five big windows were put in this tower and a glass door in front, and a window up in the stairway—a good place for the hot air to get out. The owner struggled along with the house for a good many years trying to heat it with stoves. Everybody told him that he could not heat it with hot air. There was a natural gas furnace in the cellar ; the basement was tight and had no ashes or coal in it. I set the furnace underneath as near the middle of the house as I could. I struck the four downstairs rooms in a group with four pipes close together. I gave the reception hall a 12 inch pipe, on a straight line ; then I put in the tower close to the window a 9 x 12 return flow register, which I opened into the basement ; I did not make any pipe connection. I did not put any registers in the basement. I fitted two other rooms in the same way. That left the hall with an automatic arrangement. All I had to tell him was, "keep your cellar reasonably closed up." That tower is always the warmest part of the house now. My observation is I can get the best heat in the place where I take the air from the floor.

I had a case of a church which had been a pretty hard problem. I had to put a hot air register at the entrance end of the church, and the only place I could get any ventilation register was in the stack under the steps of the pulpit that led into the ventilating stack. The first objection I had was from the preacher who insisted he was too hot.

We had to practically close up this register under the pulpit so as to stop taking air out.

MONTREAL NOTES.

The contagious diseases pavilions of the Hospital of Notre Dame, known under the name of St. Paul's Hospital, have now been formally opened. The consecration of the buildings by Archbishop Bruchesi took place on the 29th of October and for some days thereafter the buildings were thrown open to public inspection. They are situated close to Sherbooke Street on the east side of Lafontaine Park. This is one of two hospital—the one Protestant the other Catholic—to-



ST. PAUL HOSPITAL: MONTREAL.
CONTAGIOUS DISEASES WARDS:

wards which the city has undertaken to contribute during twenty five years an annual subsidy of fifteen thousand dollars each. The main building or new Hospital of Notre Dame proper is intended for general cases. This part of the work is still in course of erection whilst the contagious diseases portion of St. Paul's Hospital, standing on the opposite side of Maisonneuve Street, is now in operation. A tunnel under the street connects the two buildings. The main kitchen is in the basement of the general hospital. The buildings which are finished have a neat and cheerful appearance, with low pitched slated roofs overhanging broadly at the eaves in a picturesque way. The walls are faced with brick made of sand and lime which is having considerable vogue in Montreal just now. The brick is of a pleasant grey color, and is soft and pliable, though it is said to harden with time. In this case the surface has been diversified in places by the introduction of bricks of a darker tint in a not too worrying lattice pattern.

The St. Paul's Hospital accommodates one hundred patients and has cost $225,000. Diptheria, scarlet fever and measles alone are treated. The buildings have been finished with severe simplicity, and it has not been found possible with the means available to adopt a fireproof construction, a fact much to be regretted in an institution of the kind. In the Administrative building as well as in the various pavilions simplicity is the ideal striven for. The doors are flush panelled. There are no architraves and no mold-

ings anywhere. The floors generally are of birch. The walls even in the little operating rooms are entirely of hard plaster, with all angles rounded and the junctions with the floors effected by cavettos without fillet. A number of the private wards in the diptheria pavilion are separated from one another and from the corridor by glazed partitions for facility in supervision. The ward nurses' rooms adjoining the wards are in a similar manner arranged with glazed partitions between them and the wards. Warmed and purified air is impelled into all the rooms through ventilating shafts from a central system. These shafts generally find their place in the ceilings of the corridors and deliver the air into the rooms at a high level. In the small rooms the outlets are at a low level—in the larger they are both high and low and the extraction is by means of fans connected with ventilators in the roofs. The whole of the sewage is disinfected in a large underground tank before being run into the public sewage system. Messrs. Marchand and Haskell are the architects.

The Protestant Hospital for contagious diseases, above referred to, is also being hastened to completion, with a view to being opened at the beginning of next year. The Alexandra Hospital, as it is called, is situated at Point St. Charles, and considerable difficulty and delay were encountered at the start owing to the natural drawbacks of the site. The cost is stated at $250,000 and great efforts are being made in order that the new buildings may be opened free of debt.

A great majority of the permits for building issued in and around Montreal are classed under the heading of "tenements." In most cases these are merely erections of about twenty-five feet frontage on a site one hundred feet deep, more or less, and having a separate dwelling on each of two or three stories. It is the fashion to obtain access to the first of the upper floors, if not also to the second, by means of external stairs not necessarily of any great beauty of design. The desirability of this arrangement is obvious for it is naturally preferable to encumber your neighbours drawing-room windows with your front stair rather than to have that stair taking up space inside your own house and incidentally in his also. The terms on which these lots are sold generally provide for the building line being set back so many feet from the street, but they do not say anything about outside stairs. Hence the surprising development of this picturesque feature. Recently some of the proprietors in the town of St. Louis have been petitioning their Council to take steps to oblige proprietors in future to construct such houses with stairs inside instead of outside.

In the Westmount Council also the question of "flatted" houses has been the occasion of some hard thinking lately. Here the apartment house as such has been meeting severe condemnation and by-laws are proposed to prevent their being built at all as being "unsightly and generally unsanitary." A resolution of the Council, on the 6th November, declared that flats or apartments where the number of cubic feet of air was insufficient are a public nuisance and dangerous to health, and that the town engineer should be directed not to grant to persons wishing to erect such buildings the proper sewer connections. Where the aggregate floor space of a building was greater than the superficial area of the lot on which it was erected the building should be considered a public nuisance. A notice of motion was given for changing the by-law on the subject.

The demand for department houses in the city of Montreal, however, is a very real one and cannot be repressed altogether in the manner such a resolution would suggest. The floor space allowed, according to the resolution, seems absurdly low, but there can be no doubt that the subject of the proper regulation of the apartment house is one of vital interest to the city at the present moment. An evidence of this from an entirely different point of view may be found in a lecture which was delivered to the Nomad Club on the 8th of November by Mr. Roswell Fisher. The title of the address was 'Homes of the Future,' and the lecturer took the view that, in the inevitable course of evolution, the apartment house was destined to be the home of the future, and, for this reason, was destined also to much higher development than it has at present reached. The nature of this development, in Mr. Fisher's opinion, was to take the form of large apartment houses provided wtth common gymnasia, ball rooms, club rooms, hospital service, etc. Now it is true that, even amongst the audience before which these views were expressed, a good deal of disapproval was met, but nevertheless the occasion shows another side to this question which thoughtful, practical men may be found willing to entertain and discuss.

This is a subject one would like to hear discussed by such a body of practical men as the Province of Quebec Association of Architects, but on this as on all other matters of public interest in the architectural domain, that body displays singular quiesence. Whilst all around are discussing these things it alone is dumb. One unfortunate consequence of this taciturnity is that, as has been pointed out in these notes on other occasions, it meets with its natural reward by being in turn completely ignored by a public whose interests it does not take the trouble to discuss. The competition for the mountain outlook was a case in point—another may be found in the amended building by-laws lately issued by the city. These amendments have been drawn up with reference to the P. Q. A. A., no suggestions or opinions regarding them being asked or given. What public interests then does this association serve?

CONCORDIA SALUS.

SKETCH CLUB P. Q. A. A., MONTREAL.

On the 18th of October the first Sketch Club Designing evening of the session was held. Mr. W.S. Maxwell was in charge and set the subject which was a "Memorial to an Architect". The conditions were as follows: "In a side-chapel measuring sixteen feet square, in an English Renaissance Church of a provincial town, it is desired to place a memorial to a distinguished architect. This memorial is to provide in some suitable manner an evident receptacle for the ashes of the Architect, whose body is supposed to have been cremated. The memorial is to be isolated from the wall." Two hours was the time allowed for the preparation of the sketches which the members handed to the Secretary before leaving the room.

At the club meeting on the evening of the 1st November the sketches were exhibited and the committee's award announced, Mr. McLaren's design being placed first. In the absence of Mr. Maxwell, who was ill

Mr. Archibald criticised the designs. After the criticism a number of lantern slides of recent and contemporary work was exhibited and remarked on by the meeting generally. The slides illustrated, amongst other buildings, Parliament Houses, London, England; the Law Courts; the British Museum; St. George's Hall and Walker Art Gallery, Liverpool; and a number of the works of John Belcher, R. Norman Shaw, T. Colcutt and others.

On the 25th October Mr. Alexander Wright spoke on the Renaissance Architecture of Italy, taking W. J. Anderson's History of the Subject as the basis of his remarks. The speaker summarized the contents of the book, illustrating each point from an independent standpoint and bringing into relief the author's special excellence in the criticism of architectural design. This was further impressed by the exhibition of a large number of slides of the most important buildings of the period treated of; Mr. Anderson's views being referred to in each case. At the close of the address some general discussion took place and a vote of thanks was accorded to the lecturer.

PROF. NOBBS ON DECORATIVE HERALDRY.

The club met, on the evening of the 8th of November, to listen to a discourse on Decorative Heraldry by Prof. Nobbs of McGill University. The Professor first gave a broad view of the subject, pointing out that heraldry holds a high place in Architectural decoration by reason of its lending significance, and thus giving life to ornament. Proportion rather than ornament is no doubt the first and great essential of all architectural design, in spite of what Mr. Ruskin has almost persuaded us to believe, but nevertheless ornament without significance is worse than useless. The two great sentiments expressed by decorative arts are, first, religious veneration, and second the mark of ownership by a person or a community. The latter is the sphere of decorative Heraldry.

The lecturer proceeded to point out how natural heraldry, as exemplified in the totem worship of savage tribes and in the composite symbolic figures of early civilizations, formed the basis of that scientific heraldry which reached its growth in the fourteenth century. The reason for this was the growth of a social system, with the family as a starting point, and of the ordered gradation of authority known as the feudal system.

The subject matter of heraldry is always closely associated with dress. The familiar term ' coat of arms ' applied to the group of shield, helmet and helmet crest implies this. The bend or diagonal band adorning many shields may have been derived and in particular cases certainly did originate in the fact of a man wearing a brilliantly coloured sword belt at the time of his performing the act for which he received the right to bear arms, and the fess or horizontal stripe across the middle of a shield may be taken similarly to represent a sash. What more frequently happened in later times, however, was that the bearings of the shield were transferred to the dress of the holder. Thus, in the fourteenth century, the idea of heraldry permeated all ornament and was developed with keen appreciation and artistic skill. A long period of deterioration in the quality of heraldric designing set in at the time when the shield and helmet began to be disused as defensive armour, and, though the science persisted, the artistic life went out of it. The revival of good heraldry at the present day was not at all due to persons proud of their right to bear arms but simply to the better decorative designers of the Victorian era, who saw the ornamental possibilities and the high artistic value of heraldry properly regulated.

As regards the present day ideas of how a coat of arms should be designed for architectural or any other decorative purpose, several mistaken notions are very widely spread which might be avoided by keeping in view the fact that there is a certain number of rules of good usage which should not be transgressed, yet within these there is considerable room for elasticity in the matter of design. The first of these common mistakes is to suppose that the coat of arms once drawn, the exact form and proportion of every part is inflexibly fixed. The shield for instance is never limited to any particular shape, with the single reservation that a gentleman's arms are usually portrayed on something with a real or fanciful resemblance to a shield whilst the arms which a lady bears in her own right are represented on a lozenge or diamond shaped background. A second common error is to suppose that the cross hatched or dotted backgrounds, which were really introduced by engravers as a means of indicating the color which they could not render otherwise, are some essential part of a coat of arms. They are on the contrary an ugly invention, and should be avoided in all good heraldary. A third mistake is to suppose that a crest is something that can be used apart. It is not a crest at all unless it is upon the helmet, and the helmet ought to appear only over the shield bearing the arms themselves. Fourthly it is common to suppose that the right to bear arms is inherent in persons bearing certain family names. If people do not know that they have the right to bear certain arms they should make enquiries of the heraldic authorities and not appropriate what belongs to others.

Coming to the question of designing coats of arms, Prof. Noble emphasized the point that the written description, or blazon as it is called, is the first essential thing to have. Examples of the same coat of arms vary according to the decorative requirements of the case, but in no case must the design contradict or fail to comply with the blazon.

Heraldic practice in regard to ordinary divisions of the shield, charges, augmentations of honour, marks of cadence, and marshalling was explained and illustrated by numerous diagrams in colour specially prepared for the occasion. Amongst other things the composition of the union jack was analysed. Helmets and their historical and decorative varieties were discussed, and, finally, a number of lantern slides were exhibited showing the application of heraldy in stone, wood, iron, stained glass, etc., and with this the lecturer brought his remarks to a close.

The lot purchased by the Toronto Builders Exchange, on the N. W. corner of Bay and Adelaide streets, Toronto, with the intention of erecting an office building on it, is to be sold again. An essential part of the scheme was to have been a bank which would undertake part of the cost of the building. But a canvass for stockholders was not sufficiently successful to warrant proceeding with the scheme and it has been abandoned. But some individual members of the Exchange, believing the lot in itself to be a good investment, have formed a syndicate to hold the lot for sale. The house now standing upon the lot is a survival of the earliest days of Toronto, when ploughshares were commoner than planes, and the most modern improvement was the substitution of horses for oxen.

—THE—

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Mr. J. C. Dumaresq, a leading architect of Halifax, Nova Scotia, was a recent visitor to Toronto and Montreal. He reports having had a busy season.

Mr. Edward Copping, who was engaged in the municipal inspection of buildings for Toronto for thirty one years, and has been a familiar figure to a generation of Toronto architects, has resigned. Mr. Copping has passed his seventieth year, and has not been actively engaged in the inspection of buildings for some time past.

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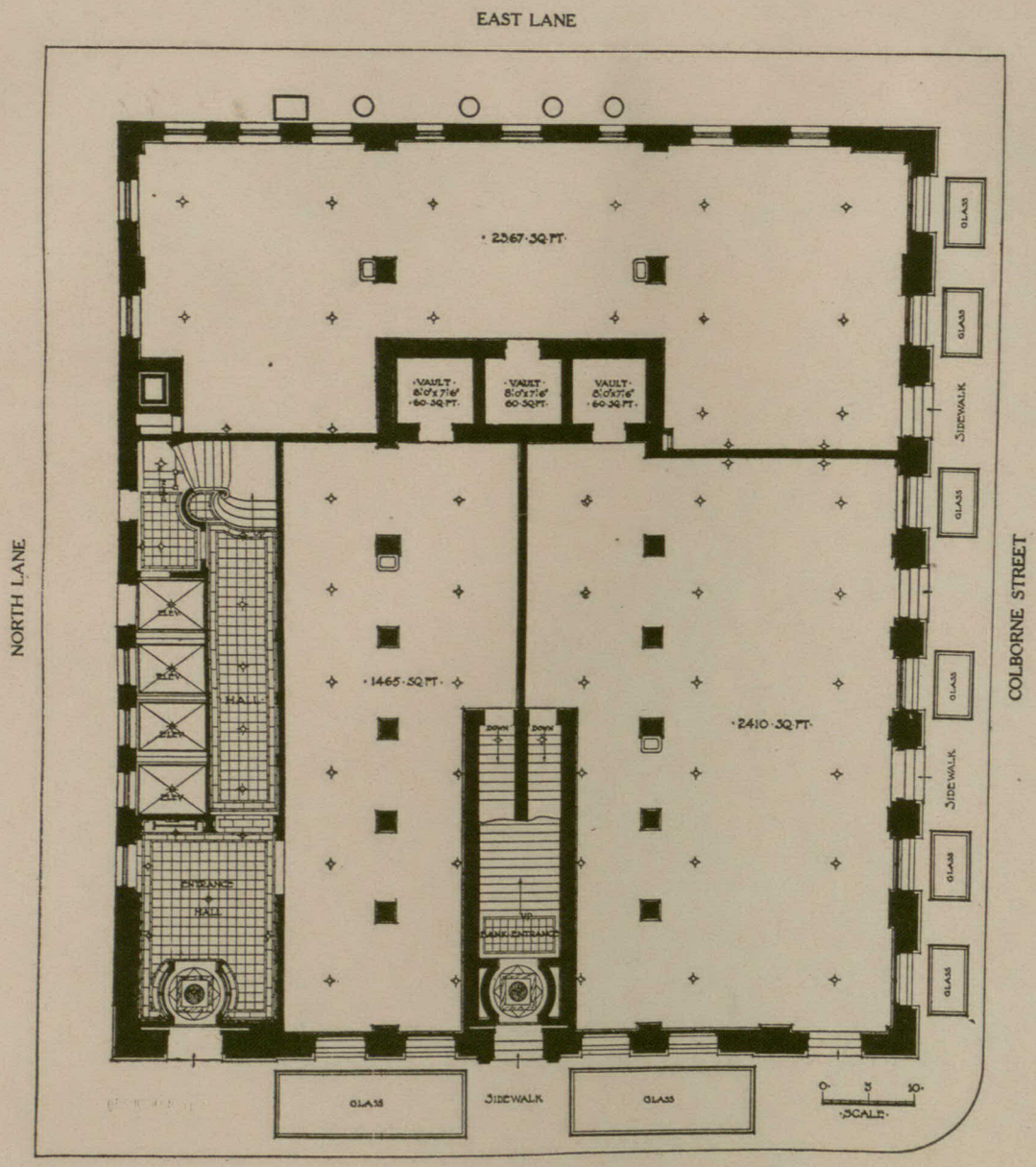

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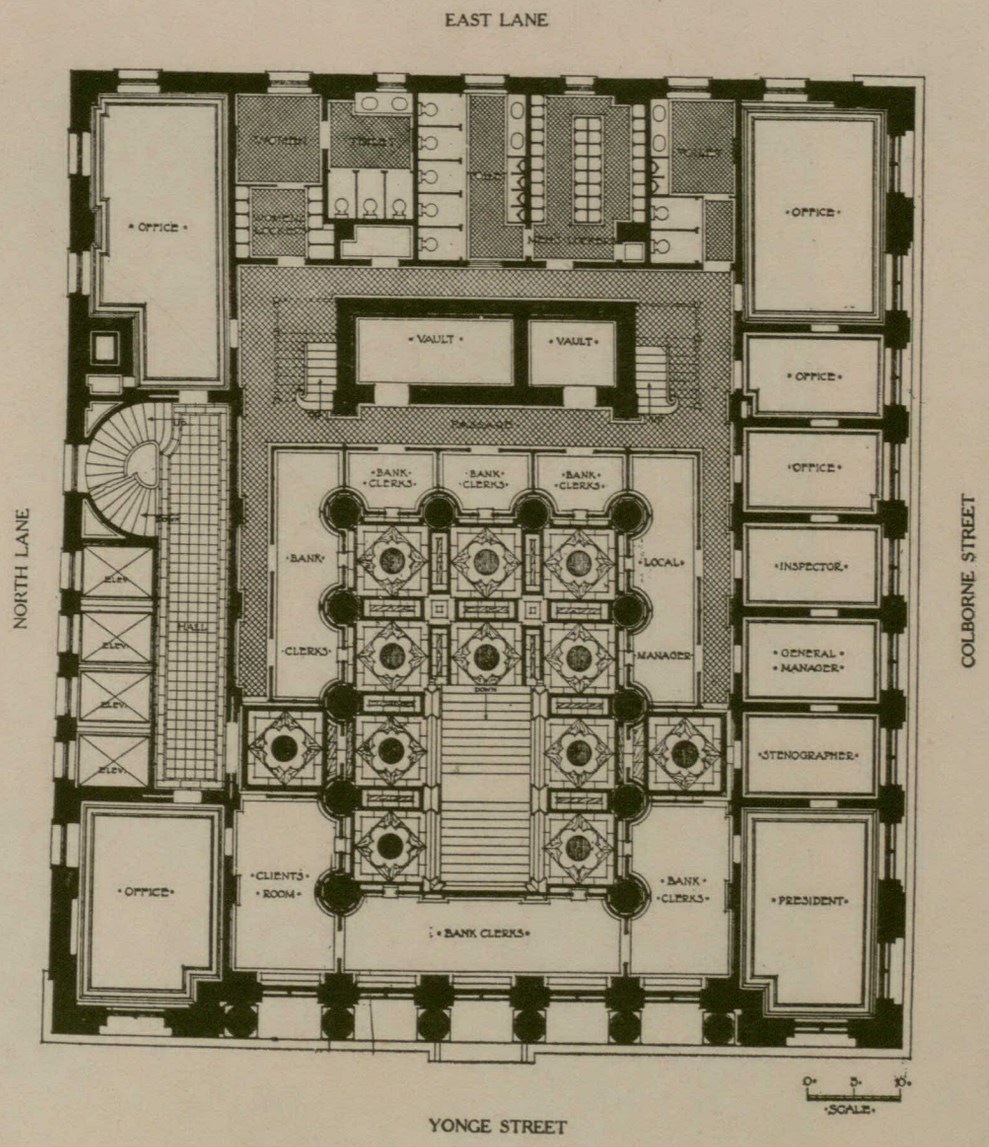
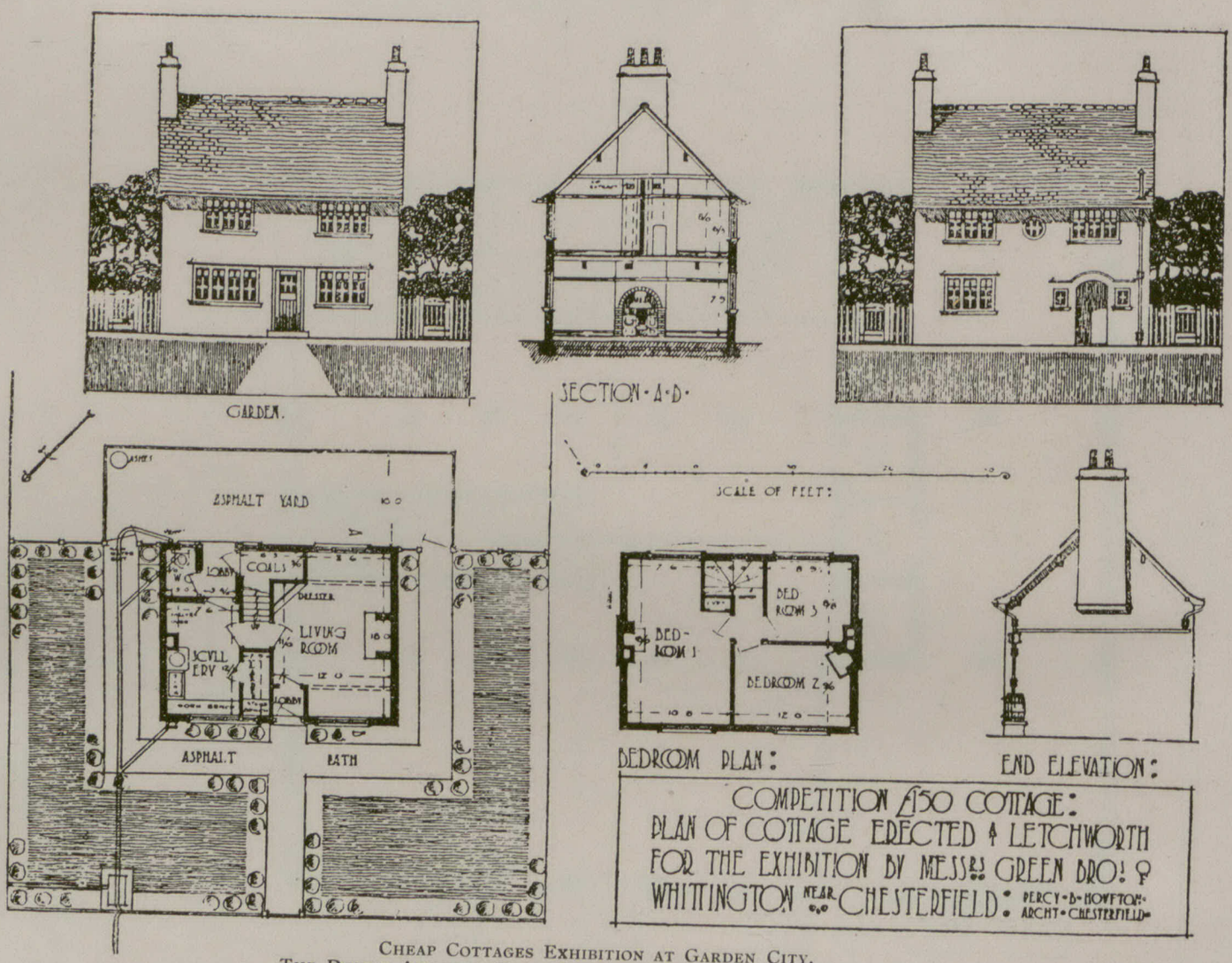


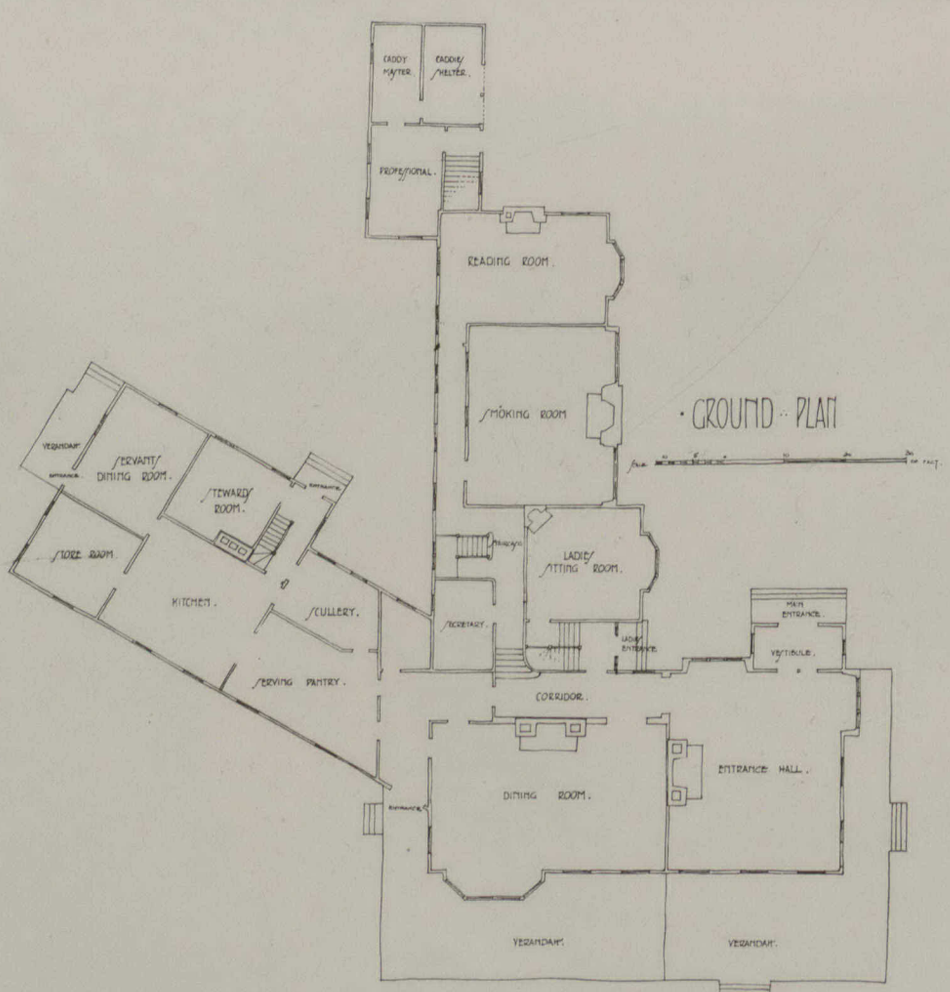
BANKING FLOOR.

THE TRADERS BANK OF CANADA BUILDING, TORONTO.



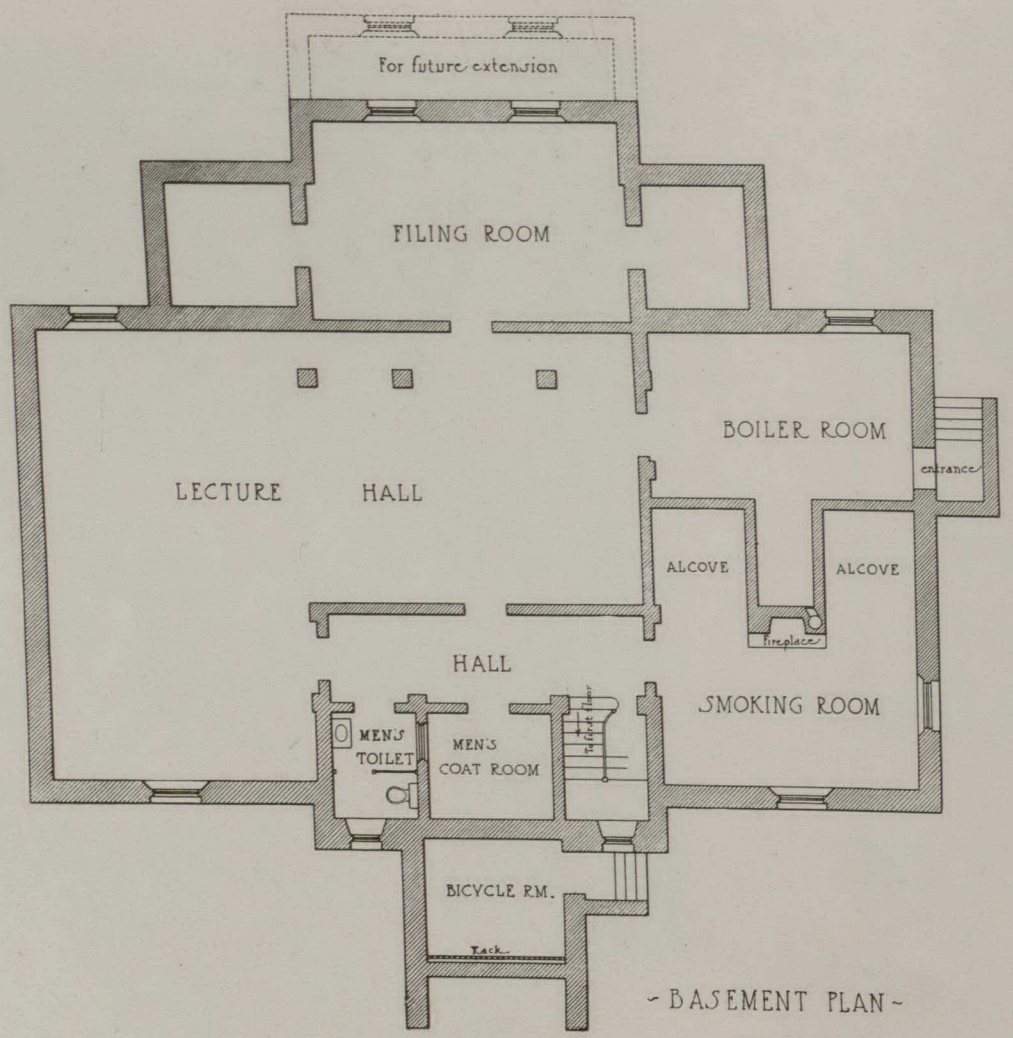
CHEAP COTTAGES EXHIBITION AT GARDEN CITY.
THE DESIGN AWARDED FIRST PRIZE, FOR A COTTAGE TO COST £150.

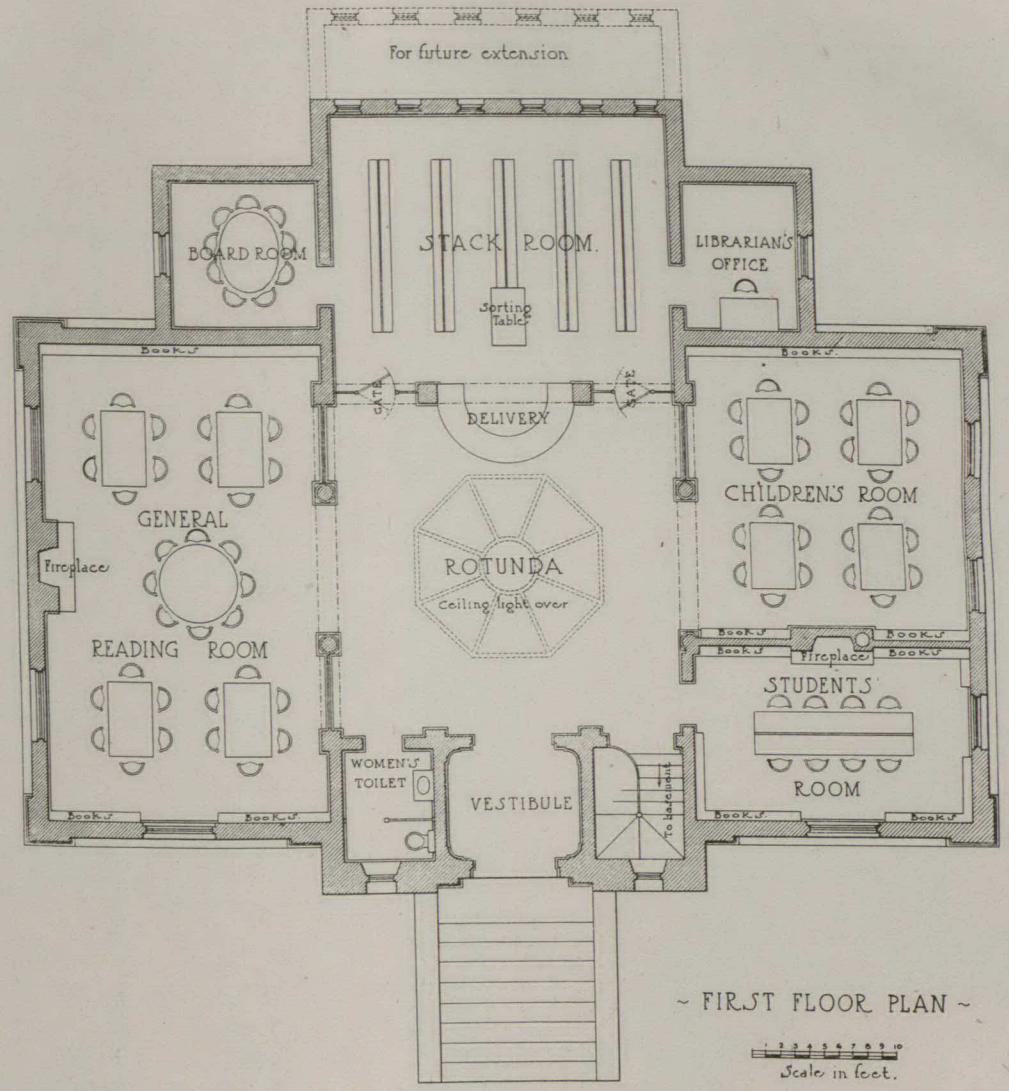
INTERIOR VIEW OF KITCHEN IN WESTERN COTTAGE OF MR. BAILLIE SCOTT'S PAIR.



GOLF CLUB, WINNIPEG.

MESSRS. DARLING & PEARSON, ARCHITECTS, TORONTO.

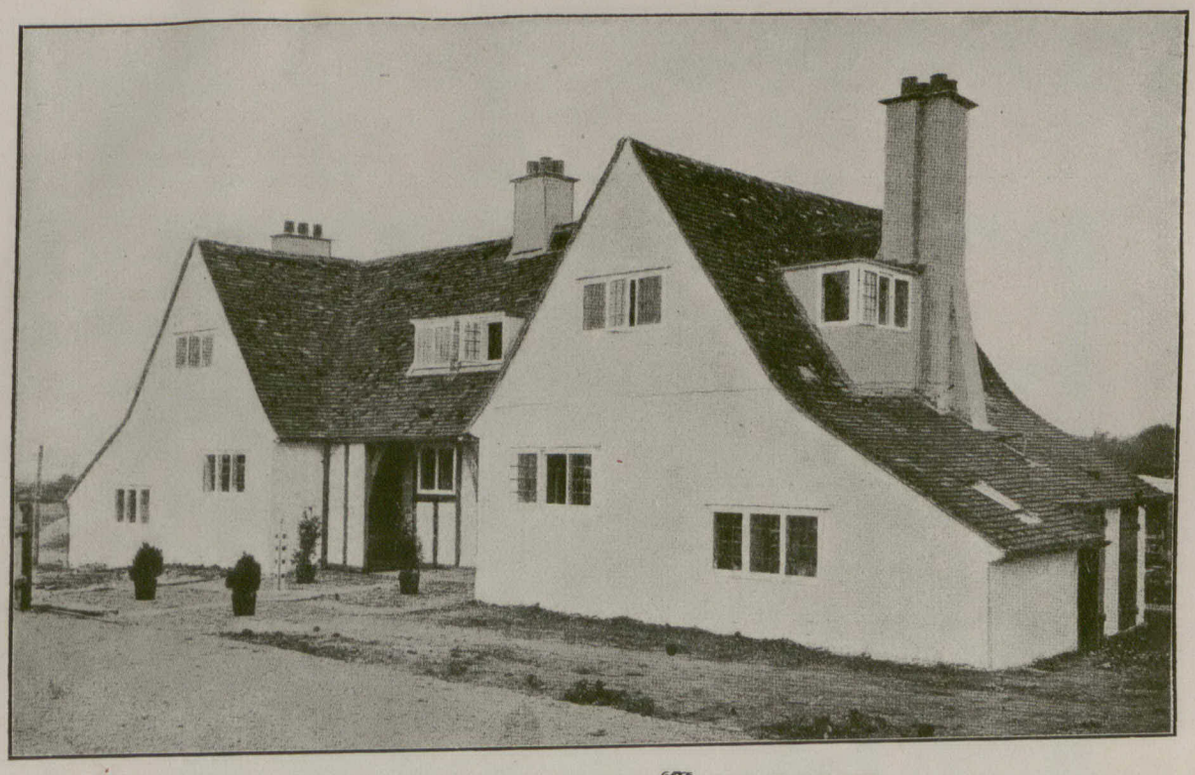


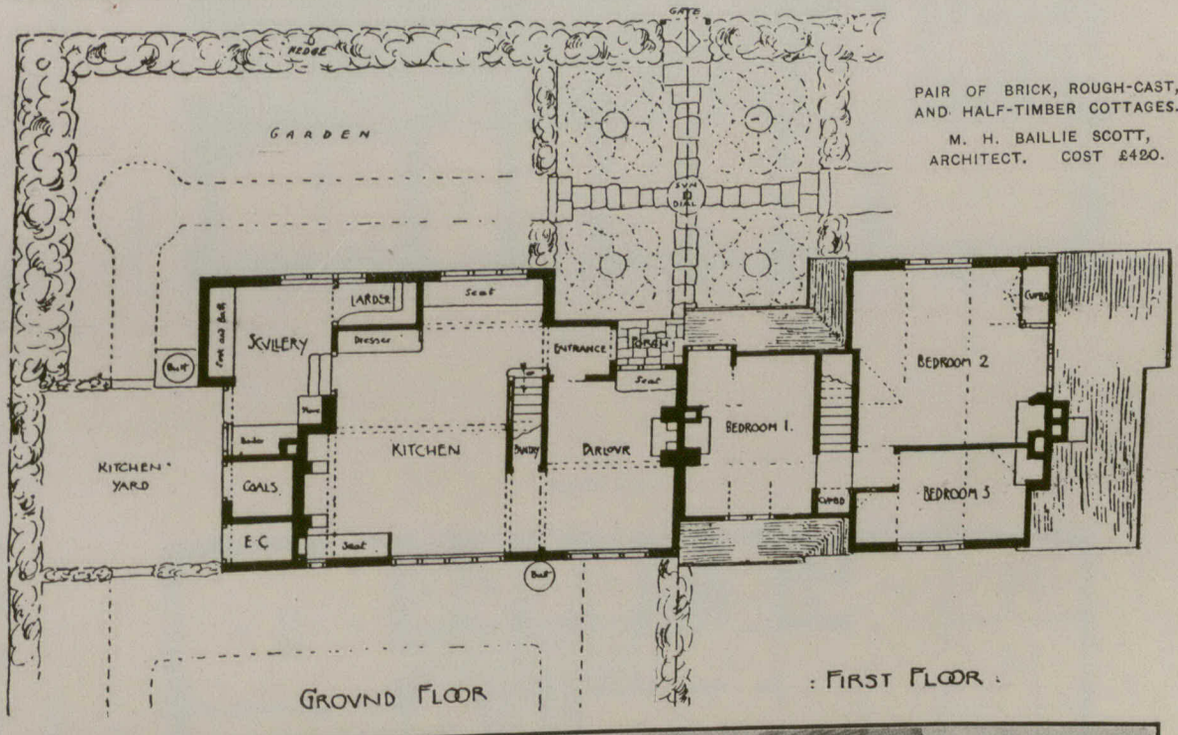


PUBLIC LIBRARY, SARNIA.

MR. M. R. BURROWES, ARCHITECT, SARNIA.

SUPPLEMENT TO
CANADIAN ARCHITECT AND BUILDER
NOVEMBER, 1905

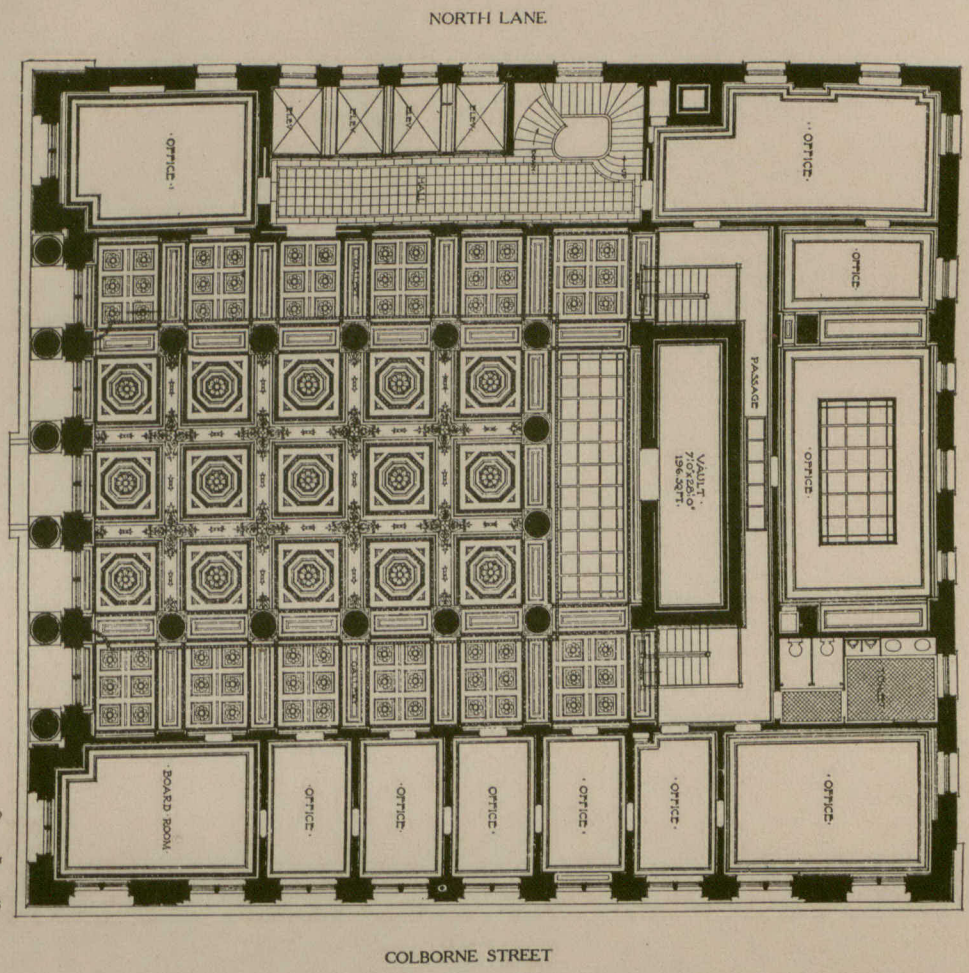




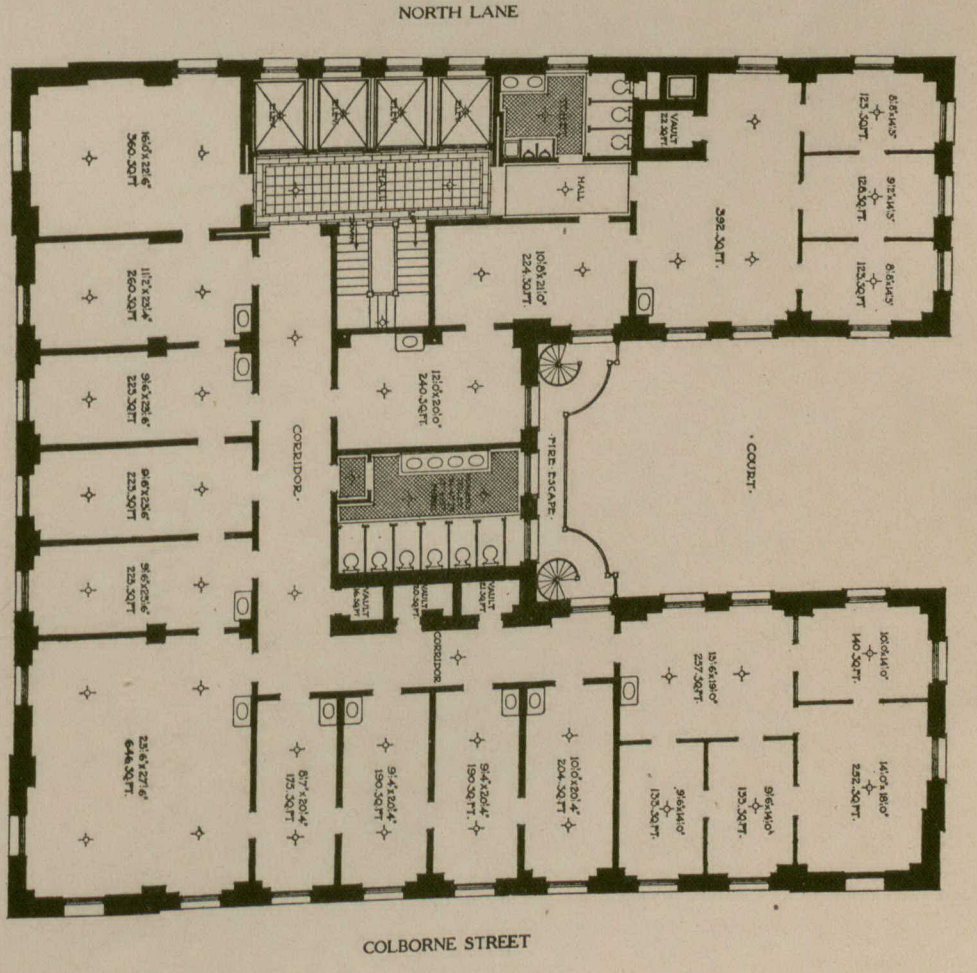
PAIR OF BRICK, ROUGH-CAST, AND HALF-TIMBER COTTAGES.

M. H. BAILLIE SCOTT, ARCHITECT. COST £420.

CHEAP COTTAGES EXHIBITION AT GARDEN CITY.—MR. BAILLIE SCOTT'S DESIGN.



GALLERY FLOOR OF BANK.



TYPICAL PLAN OF OFFICE FLOORS.

THE TRADERS BANK OF CANADA BUILDING, TORONTO.

SUPPLEMENT TO CANADIAN ARCHITECT AND BUILDER NOVEMBER, 1905

THE TRADERS BANK OF CANADA BUILDING, TORONTO.

SUPPLEMENT TO
CANADIAN ARCHITECT AND BUILDER
NOVEMBER, 1905

STRATHCONA HALL, MONTREAL.

MESSRS. FINLEY & SPENCE, ARCHITECTS, MONTREAL.

SUPPLEMENT TO
CANADIAN ARCHITECT AND BUILDER
NOVEMBER, 1905

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