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ARCHITECTVRE

ENGINEERING

DECORATION

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CONTENTS.

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CONTENTS.

MAYOR GRANT, of New York, has thought of what appears to be a sensible scheme for providing room for the new city-hall and other public offices, which are greatly needed there. Various plans have been devised for arranging these offices, and two competitions have been held, with very small satisfaction to the architects who engaged in them; but nearly all the schemes, so far, have contemplated the placing of the new building on the City-hall Park. The Park is small, and would be reduced, by the addition of another large building to those already there, almost to nothing, so that the citizens who wish to preserve the area as a breathing-space, which is greatly needed in that part of New York, have protested loudly, and hitherto successfully, against the adoption of any of the plans. A proposition for condemning a tract of land on Broadway, near the Park, failed on account of the enormous expense involved, and the condition of the affair is now just what it was ten years ago. As a way out of the difficulty, Mayor Grant proposes that the ill-digested mass of scattered buildings which now occupies portions of the Park, including the old City-hall, the "new Court-house," with its incongrous extension, the Record Office and the old engine-house, shall be swept away, leaving a clear field, in the middle of which shall be erected a single structure, enclosing a quadrangle, and accommodating all the city and county offices now scattered through several buildings, and in a much more adequate manner. It is believed that all the room needed can be obtained in a building which will cover only thirty-six hundred square feet more than the separate buildings into which the same services are now inconveniently crowded, and the vast building, with its interior court, properly placed on such a site, would be a splendid ornament to the city, and would not very greatly detract from the value of the Park as a place for the circulation of fresh air. There is something startling, from a financial point-of-view, in the idea of pulling down the "new" Court-house, which was only built about twenty years ago, and cost six million dollars, to make room for another building; but architecture would not lose much by the change, although history might regret the disappearance of the principal monument of the rule of the Tweed Ring. This picturesque gang, as old New Yorkers will remember, made the Court-house a sluiceway through which the public money poured in streams into their pockets; and we imagine that the windows are yet to be seen where the three shades were hung, which would have cost ordinary citizens about four dollars apiece, but for which three hundred thousand dollars were paid out of the city treasury upon orders drawn, audited, signed and approved by the proper officials in the form prescribed by law.

THE most interesting event of the current week is to be found in the announcement that the Trustees of the Cathedral of St. John the Divine have decided to place the erection of the building in the hands of Messrs. Heins & LaFarge, the youngest and least experienced of the four competitors in the final competition. Fortunately youth and inexperience are not cardinal sins, but may even be, when united with natural ability and thorough acquired training, cardinal virtues. The choice, which for many reasons we consider the best that could be made under the circumstances, indicates one thing pretty clearly and it militates strongly against the ordinary practice of giving to the most successful and popular — and therefore the busiest — architect still further work to do. In the present case, starting with the assumption that the four competitors possessed equivalent capacities, the event has proved that the competitor whose attention was least distracted from the study of his problem by the imperative calls of a busy practice has carried off the prize. Messrs. Heins & LaFarge happened to be so situated that they could give more undivided and sustained attention to their problem than any of the others, the result being that their final drawings showed greater evidences of serious study and consequent improvement than did any of the others, and so seemed to give tokens of their intention and ability to still further better the work as it went on. Before the building is finished — perhaps even before it is begun — their youth and inexperience will have been cured. It may be interesting to note that out of the nine votes on the merits of the final drawings — all that our subscribers saw fit to send in response to our invitation — three were thrown for Heins & LaFarge, while five declared for Mr. Wood.

MR. JOHN BEVERLEY ROBINSON, in an interesting paper on "The Tall Office-buildings of New York," in a recent number of the *Engineering Magazine*, suggests, as a possible improvement in management, that some of the elevators in such buildings should run "express," making no stops between the ground-floor and perhaps the seventh or tenth or fifteenth story. It may interest architects to know that this arrangement has already been adopted in one or two of the high buildings in Boston, to the great relief of the tenants, and it will undoubtedly soon become universal for such structures. At present, the discomfort of the elevators is the great objection to the occupancy of offices in large and high buildings. No matter how large they may be, they are always crammed nearly to suffocation at the starting-point during the busy hours of the day, and, in addition to the heat and annoyance, they give admirable opportunities for pickpockets to ply their trade. Soon after starting, the load begins to be lightened; in fact, the number of stout and apparently active young men and boys who will wedge themselves into a crowded elevator, stand patiently for several minutes in the crush, and wedge themselves out again at the first stopping-place, rather than walk up one flight of stairs, would surprise the inexperienced observer; and, after traversing five or six stories, but a small portion of the original cargo is left. Under the new arrangement, the bank-messengers, the telegraph-boys, the fruit-women, the cigar-peddlers and the other portions of the numerous *clientèle* which appertains more properly to the large and densely populated banking or insurance offices on the lower floors have a set of elevators to themselves; while the lawyers, architects and engineers who occupy the upper rooms, and who number their visitors by tens where the bankers have their hundreds, can travel to and from their offices without having at every trip a telegraph-boy standing on their toes, and a broker's messenger trying their ribs with his elbow on each side. Another improvement, which is yet to come, will consist, we think, in an automatic stop for the elevator. Nothing is more tedious, clumsy and dangerous than the way in which an inexperienced boy stops and starts an elevator, particularly if he wishes to astonish the passengers by his skill. Often, he purposely fails to stop it entirely at the landing, expecting the passengers to leap in or out with sufficient agility to escape having their heads dashed against the top of the door, or their toes sheared off by the projecting nosing of the threshold. At other times he fails to pull the shipper-rope in time, and the elevator stops a foot or two above its proper place. This fault is corrected by a second jerk, which sends it as far in the opposite direction, and the correct position is only attained after

repeated trials, which the passengers watch with the characteristic meekness of Americans. All this dangerous and annoying ineffectiveness might be done away with by an automatic contrivance. The French once used a device by which an elevator could be stopped at any given story at will by pressing a knob, which caught a corresponding piece in the elevator, and acted through it on the shipper-rope. A contrivance of this sort would not answer for our swift-running elevators; but there would be no difficulty in arranging a contact-piece on the elevator, which, as it passed by a spring, held out by pressing a button at the landing, would transmit a current capable of closing the valve and stopping the elevator precisely at the required point. In the same way, pushing out the contact-piece from inside the car would also close the circuit and stop the movement exactly at the proper place. The starting might be effected by the ordinary shipper-rope, but it seems likely that even here an electrical device, with, perhaps, a small alarm-bell to warn passengers, would act more quickly and surely, and with far less effort on the part of the operator, and less distraction of his attention from what should be his chief care, the safety of his passengers, than the apparatus at present in use.

THERE must be some brave men and women in the service of the United States in Chicago, to judge by the accounts which reach us of the condition of the Federal building, in which are accommodated the Post-office, the Sub-Treasury, the Custom-house, the United States Courts, and other departments of the Government service for that city. The New York *Herald* informs us that "hardly a day passes" without the discovery of some new fracture, and daily inspections are made by the Government Superintendent of Construction, Mr. M. E. Bell, lately Supervising Architect of the Treasury Department. The *Herald* goes on to say that "the cracking of the ironwork under an unnatural strain is a familiar sound." The iron "cross-pieces" over the doors in three of the rooms "have fallen out in the last three weeks, and it was only a matter of luck that no employé was injured by the falling iron." One would say that a building in which the iron lintels over the doors flew out about once a week, narrowly escaping hitting the occupants on the head, had at least the premonitory symptoms of a dangerous condition, and it is not surprising to learn that "the employés are getting to be alarmed, and the timid ones are looking for other positions." The Chicago *Post* is quite sure that, although, as it says, the tile flooring, laid new last spring, now looks "like the billows of Lake Michigan when there is a strong breeze from the northwest," there is "no immediate danger"; but the life and accident insurance companies have refused to take any more risks at regular rates on the occupants of the building, and an important iron column broke the other day, while the water-supply pipes in the basement were torn apart months ago, flooding the mail matter stored there. Mr. Bell is convinced that the collapse of the whole affair is simply a question of time, and the newspapers amuse themselves by discussing whether it will fall all at once, or piecemeal. Meanwhile, it does not seem to occur to any one that it is an outrageous piece of cruelty to keep the poor clerks in constant terror of their lives, to say nothing of the real danger, which we believe to be very great. The catastrophe, in such cases, always comes before it is expected. People get used to seeing the cracks in the walls, and the "billows" in the floors, and do not notice the stealthy increase which finally overcomes the last effort of resistance of which the materials are capable; but the resistance is sure to be overcome in the end, and the momentum of the first serious rupture carries everything before it. There will be money enough to be spent in erecting the new building which is obviously needed, without increasing the appropriation to pay indemnity for the lives and limbs of ten or twelve hundred young men and women, crushed and maimed through the negligence of those who were bound to look out for their safety.

THE project for obtaining designs from sculptors for our new coinage appears to have come to nothing. All the designs submitted in competition were rejected, apparently with good reason, inasmuch as no artist of repute was tempted by the terms of the contest to take part in it, and the regular engraver of the Mint is to make the designs. Curiously, but perhaps naturally, the Director of the Mint seems to lay the poor success of his competition, not to the uninviting character of the terms proposed, but to the lack of artists in the country capable of doing such work; and he is said to have informed a reporter that the engraver of the Mint was "the only competent person to prepare these designs." If, as we suppose, the engraver is the same person who designed the present silver coinage, the Director will find that a good many people will disagree with him. However, it appears to be too late to do anything about the matter now, and we must content ourselves with observing what sort of work of the kind the English sculptors will turn out, and, perhaps, with trying to imagine the coins which St. Gaudens or Warner would have designed for us if they had had the opportunity. If any one wishes to assist his fancy on the latter point, let him turn to our heliotype illustration of the pedestal of the Farragut statue, in New York, to see what St. Gaudens can do in low relief; or find a photograph of one of Mr. Warner's sweet little portrait-sculptures, and compare it with the head on a five-cent piece.

THE *Scientific American* says that the great ship-builders, Messrs. James and George Thomson, of Glasgow, have modelled a steamer guaranteed to steam fast enough to cross the Atlantic, we suppose from New York to Queenstown, within five days. Like the "*Aurania*," and one or two others of the very fast Atlantic ships, the new one is to be comparatively short and stout in model, having a width of seventy feet, and length of six hundred and thirty, or nine times the width, while nearly all the present fast steamers have the length ten times the width. The engines are designed for thirty-three thousand indicated horse-power, which does not seem disproportionate for so large a ship, and will drive twin screws, twenty-two or twenty-three feet in diameter. A novelty, which may not commend itself to the passengers, consists in the provision of twelve machine-guns, to be mounted on the promenade deck. What these are for we cannot conceive. Against the guns of a man-of-war they would be about as useful as so many squirts; and, while they might be fired at boarding parties, the prospect that a party of men in row-boats would be able to overtake such a vessel, even if they were to undertake an attack upon it without the support of an iron-clad, which could sink it from a distance, long before they had rowed within range of the machine-guns, is very faint; while, from the point of view of the first-class passenger, there would be much more ground for apprehension in the possibility that the steerage passengers might some day take a fancy to seize the machine guns, and use them as an argument for persuading their more prosperous shipmates to share their valuables with them.

AN interesting competition is announced by the French Union Centrale des Arts Decoratifs. A prize of four hundred dollars is offered for the best design for a set of dining-room furniture, in wood, to be adapted to a room of not more than three hundred and thirty square feet of floor-space, and to cost complete not more than five hundred dollars. The room is supposed to have three or four openings, including doors and windows, and the number and character of the pieces composing the set are left to the competitors, except that there must not be less than twelve chairs, and there will naturally be a table. An estimate of cost must accompany the drawings, which must be at a scale of one-fifth the actual size. No copying of existing examples or designs is permitted, and even the servile imitation of a style already known is forbidden. With the geometrical drawings must be sent a sketch of the room, showing the arrangement of the pieces. Besides the furniture, a prize of two hundred dollars is offered for the best design for decorative fixtures for incandescent electric-lamps. A set of fixtures, suitable for a parlor covering about four hundred and forty square feet of floor-space, and about eleven feet high, must be designed, and shown by a sketch at one-tenth the actual size, and by geometrical drawings and details at the full size. In both cases, second and third, and possibly fourth prizes will be given, as may be determined by the jury. The drawings must be numbered, and a cipher, for each set, made on the face of each drawing, besides its number; and a letter, specifying the number of drawings in the set, must accompany them. The real name and address of the author must be written on the back of each sheet. The drawings to which prizes are awarded will remain the property of the Union Centrale, but will not be reproduced except by consent of their authors. All the designs must be in the hands of the Secretary of the Union Centrale des Arts Décoratifs, at Door No. 7, in the Palais de l'Industrie, Paris, on October 31, 1891.

ARCHITECTURE OF THE UNITED STATES.[1] — III.

PRIVATE ARCHITECTURE.

Fig. 1. Block of Houses, New York.

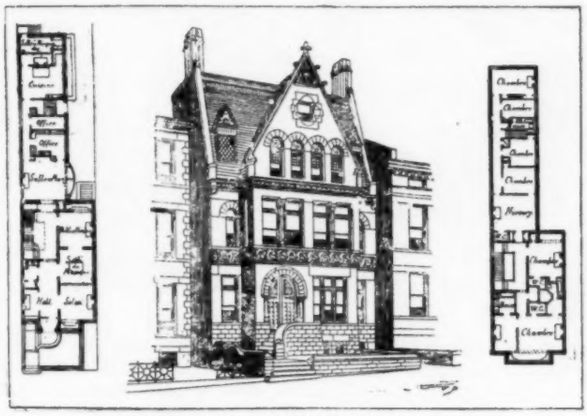


Fig. 2. House in Cincinnati, Ohio.

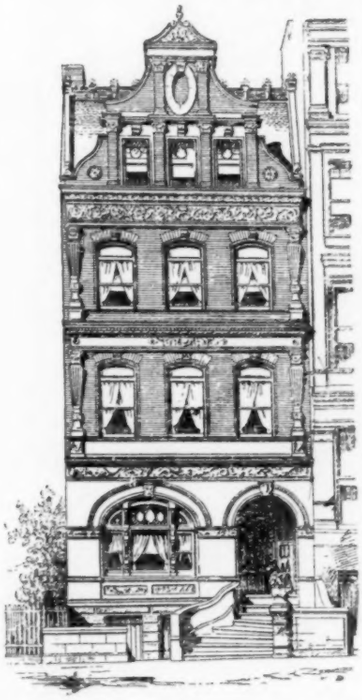


Fig. 3. House on Fifth Avenue, New York.

THE private architecture of the United States possesses all the qualities needed to attract and charm. It is varied, original, spirited and graceful, and it is rare that one encounters in it the stiffness that sometimes mars the civil structures. Even in cities, where the obligation to build in line and the question of joint ownership necessarily interfere with picturesque effects, American architects succeed, by means of

Fig. 4. Types of Porches.

Fig. 5. Types of Porches.

cleverly managed projections, gables, dormer-windows and balconies, in giving an individual character to their houses.

The block of New York residences, by Charles Romeyn,

Fig. 6. Types of Porches.

represented in Figure 1 shows how an architect can reconcile perfect symmetry with a pleasing variety of aspect.

The Cincinnati house by H. E. Siter, given in Figure 2, has not a broad façade; but by the fashion in which it is treated we are made to recognize the importance of the structure behind it. The plan, which is all in the length, in fact confirms this impression; it is very well disposed and initiates us into the arrangements for comfort that exist in American homes, — all the little corners and closets so convenient for family use.

Fig. 8. The Palazzo, St. Paul, Minn.

[1] From the French of M. Brincourt, in Planat's "*Encyclopédie de l'Architecture et de la Construction.*" Continued from No. 813, page 51.

A Norman influence is perceptible in these constructions. But it has disappeared in the narrow façade by Mr. Beers shown in Figure 3, and which is in the English Renaissance style; it is built of brick and stone.

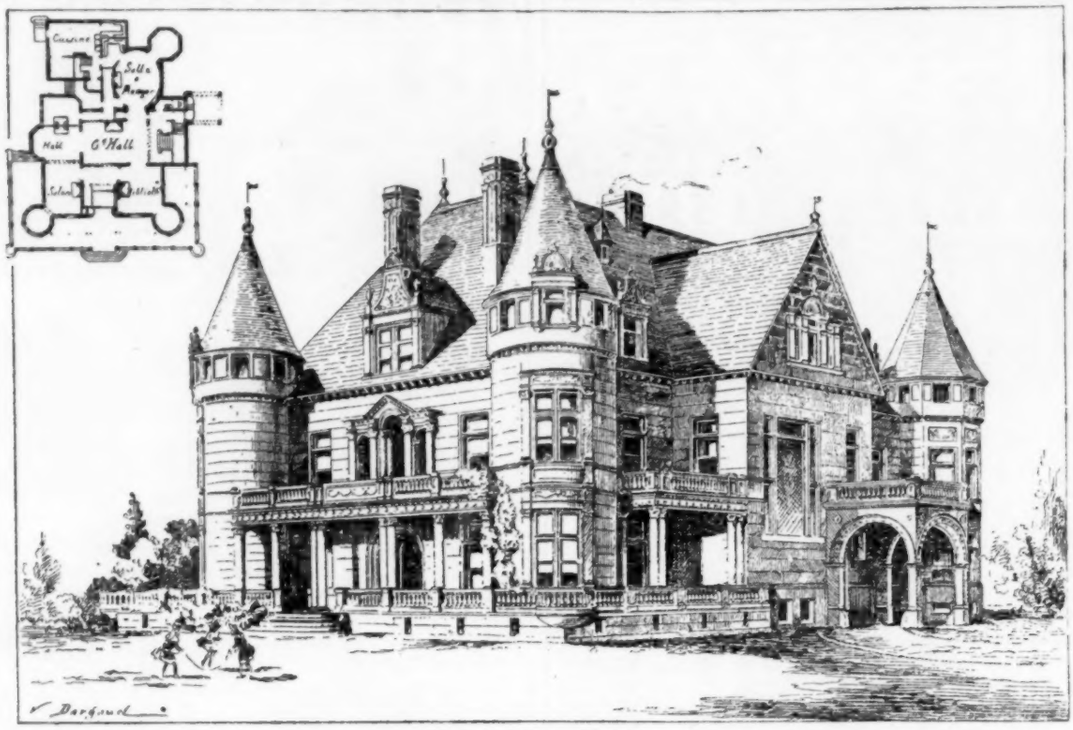


Fig. 7. House in Detroit, Mich.

When economy of space is no longer a desideratum, when the architect can spread out and give free rein to his fancy, he displays his suppleness to still better advantage. This suppleness is one of the qualities which American architects employ with much charm in their villas and cottages. The same elements — porches, broad roof and towers — are frequently repeated in them, but they are always varied and always possess an individual character. The porch, for example, which is an indispensable adjunct of every American dwelling, takes on forms of the most diverse grace (Figures 4, 5, 6).

Fig. 10. Private Mansion at Minneapolis.

Sometimes, especially in rather pretentious residences, it is true that confusion results from the undue care bestowed upon the silhouette and the production of picturesque effects; in the United States, as in France, there are certain favorite architectural elements, and it is the exception not to find towers and turrets on a house that is at all above the ordinary.

The residence, the plan and façade of which are given in Figure 7, is a quite characteristic example of dispositions lacking in unity and appearing somewhat incoherent at a first glance, but which, on the whole, furnish scope for pleasing and

varied interior arrangements. Messrs. Kamper & Scott are, however, open to criticism, for including so many circular apartments in this design; these are of little practical use and they are difficult to furnish. A few disproportioned details

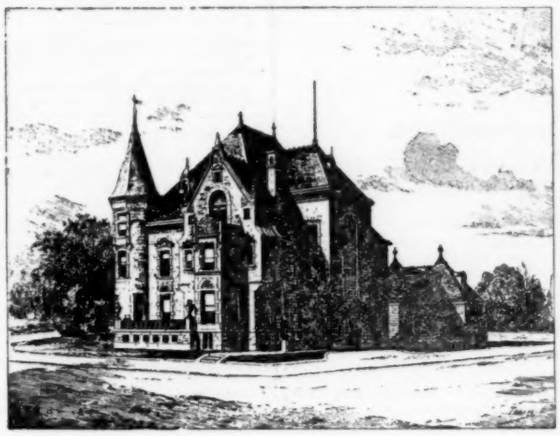


Fig. 9. House in Chicago.

may be detected on the façade and the dormer-window above the terrace seems heavy in comparison with the motive below. The general aspect has less character than in the house by Mr. Stem at St. Paul (Figure 8). Here we have a very interest-

Fig. 11. Dwelling at Pittsburgh, Pa.

ing type of American residence; it includes perhaps a pretty large number of round forms and projections, but it is free from the charge of confusion. The porch, with semicircular

Fig. 12. Dwelling at Erie, Pa.

arches resting on a short angle pillar, is strong without being heavy and the corbelled turret above this single point of support is possessed of both nobility and boldness.

The Chicago house, by Mr. Cudell (Figure 9), is also interesting notwithstanding the great mixture of styles. It furnishes another proof of the fondness of Americans for irregularity and spirited silhouettes. The effect of color is not disregarded. Messrs. G. W. & F. D. Orff have successfully studied this in a private mansion at Minneapolis (Figure 10). The construction is in blocks of pink and white stone alternated

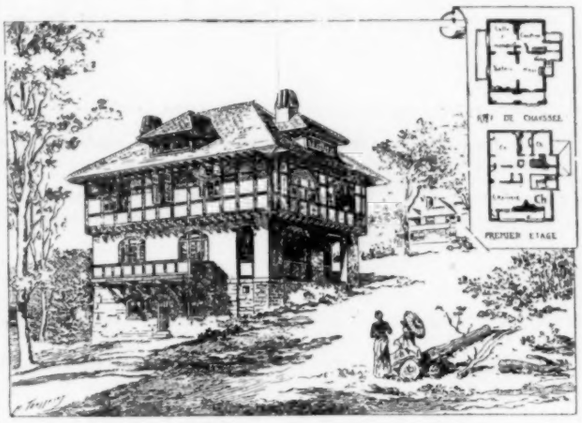


Fig. 13. House in Cincinnati, Ohio.

in a unique manner; it has a general nobility of mien which is still farther enhanced by the decoration.

The examples cited above give a tolerably accurate idea of handsome private residences in the United States. We might rank in the same category a charming house by Fraser at Pittsburgh, the façade of which is represented in Figure 11, and even the more modest one at Erie by Messrs. Green & Wicks, the plan of which is comparatively regular (Figure 12).

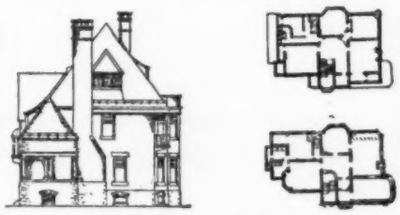


Fig. 14. House at York, Pa.

Turning to the simpler walks of life, we find in American cottages which have a more homelike grace than English cottages, extremely interesting architectural expressions. Nothing is left to chance, nothing is sacrificed to commonplaceness; in the apparently most ordinary interpretations there is always an individual sentiment of art and discrimination.

What could be simpler or more attractive than the wooden house shown in Figure 13? Built on a square plan and destitute of embellishments, it derives its gayety of aspect merely from the spirit with which the most inconsequential constructive elements are managed. The first story projecting over the ground-floor, the broad roof, the porch and the balcony above are sufficient to produce effects of light and shade and even of silhouette. It is simple art, but it is art.

Fig. 15. House at York, Pa.

The small house by Mr. Willis (Figures 14–15), although more studied effects are attempted here by lengthening the roofs — a disposition which American architects sometimes misuse — is also artistic.

To recapitulate, the architecture of the United States, made up from different schools and styles, and adapted to new and special needs by an essentially practical and industrious people, is full of instructiveness. Not feeling forced to follow traditions which are often incompatible with modern needs, the American architects are right in attempting merely to satisfy, as artistically as possible but also in the most practical way, the requirements of their present mode of life; and it is along that line that their productions may be studied with greatest profit.

M. BRINCOURT.

COMPARATIVE MUNICIPAL BUILDING LAWS. — I.

[*Note:* — In these tables bracketed letters invariably refer to preceding passages in the same column.]

Title of Department.	Executive Officers.	Staff.	Qualifications for Officials.
Boston : — Department of Building.	**Boston** : — Inspector of Buildings.	**Boston** : — Clerk, Assistant Inspectors.	**Boston** : — *Inspector and Assistants:* *a*, experienced architects, builders or mechanics. *b*, not engaged in other business. *c*, not interested in building contract.
Baltimore : —	**Baltimore** : — Inspector of Buildings.	**Baltimore** : — Clerk.	**Baltimore** : —
Brooklyn : — Department of Buildings.	**Brooklyn** : — Commissioner of Buildings.	**Brooklyn** : — Clerk, Superintendent of Buildings, Inspectors, Clerks.	**Brooklyn** : — *Inspectors:* practical masons and carpenters of five years' experience.
Charleston : —	**Charleston** : — City Assessor.	**Charleston** : —	**Charleston** : —
Chicago : — Department of Buildings.	**Chicago** : — Commissioner of Buildings.	**Chicago** : — Secretary, Inspectors, Assistant Inspectors, Inspector of Elevators.	**Chicago** : — *Commissioner:* experienced architect or builder. *Inspectors:* (*a*), (*b*), competent to perform all duties of the office.
Cincinnati : —	**Cincinnati** : — Inspector of Buildings.	**Cincinnati** : — Assistant Inspector, Inspector of Plumbing, 2 Deputy Inspectors, Clerk.	**Cincinnati** : — *Inspector of Buildings:* *d*, architect or builder; not interested in any other branch of the building business.
Cleveland : —	**Cleveland** : — Inspector of Buildings.	**Cleveland** : — Assistant Inspectors, 2 Deputy Inspectors.	**Cleveland** : — *Inspector of Buildings:* (*d*), shall devote his whole time to these duties.
Denver : — Department for the Inspection of Buildings.	**Denver** : — Inspector of Buildings.	**Denver** : — Clerk, Assistant Inspectors.	**Denver** : — *Inspectors:* able and experienced architects, builders or mechanics. Not employed or engaged as architect or builder in Colorado.
Detroit : — Fire Department.	**Detroit** : — Fire Marshal.	**Detroit** : — Board of Building Inspectors.	**Detroit** : —
District of Columbia : — Commissioners of District.	**District of Columbia** : — Inspector of Buildings.	**District of Columbia** : — Assistants.	**District of Columbia** : — *Inspector:* in business as architect or architect and builder for ten years. Not engaged in business as an architect or builder in the District.
Kansas City : — Building Department of the Board of Public Works.	**Kansas City** : — Superintendent of Buildings.	**Kansas City** : — Assistant Superintendent, Inspectors.	**Kansas City** : — [The Advisory Board: Superintendent of Buildings, City Engineer and Chief of Fire Department.]
Louisville : — Office of the Inspector of Buildings.	**Louisville** : — Inspector of Buildings.	**Louisville** : — 2 Assistants.	**Louisville** : — *Inspector*, if an architect, must not practise his profession.
Memphis : — Fire Department.	**Memphis** : — Inspector of Buildings.	**Memphis** : —	**Memphis** : *Building Inspector:* Fire-Marshal.
Milwaukee : —	**Milwaukee** : — Inspector of Buildings.	**Milwaukee** : —	**Milwaukee** : —
Minneapolis : — Department of Inspection of Buildings.	**Minneapolis** : — Inspector of Buildings.	**Minneapolis** : — 5 Assistants, Clerk.	**Minneapolis** : — *Inspector of Buildings:* a practical architect, builder or civil engineer of ten years' experience. *Assistants:* 2 carpenters, 1 mason, 1 plumber, 1 electrician. *f*, Inspector and assistants not to be engaged in any building business nor interested in any building contract.
Nashville : — Department of Buildings, Building Commissioners.[1]	**Nashville** : —Inspector of Buildings.	**Nashville** : —	**Nashville** : — *Inspector of Buildings:* a practical builder.
New Orleans : —	**New Orleans** : — City Surveyor.	**New Orleans** : —	**New Orleans** : —
Newark : —	**Newark** : — City Assessor.	**Newark** : —	**Newark** : —
New York : — Fire Department, Bureau of Inspection of Buildings.	**New York** : — Superintendent of Buildings, Board of Examiners: Superintendent of Buildings, *Chairman:* 1 member of N. Y. Chapter of Architects; 1 member of the Board of Underwriters; 2 members of the Mechanics' and Traders' Exchange; 1 member of the Society of Architectural Iron Manufacturers; 1 member of the Real Estate Owners and Builders' Association.	**New York** : — 2 Deputies, Inspectors, Clerks, Messengers, Assistants.	**New York** : — *Inspectors and Deputies:* competent architects or builders of ten years' experience. *Assistant Inspectors:* competent architects, civil engineers, masons, carpenters or iron-workers of ten years' service as such; of good character; write good hand and make clear reports; passed examination by board of examiners.
Omaha : — Board for the Inspection of Buildings (Superintendent of Buildings, City Engineer, Chief of Fire Department.)	**Omaha** : — Superintendent of Buildings.	**Omaha** : — Inspectors, Clerks.	**Omaha** : — *Superintendent and Inspectors:* See (*a*); (*b*); (*c*).
Philadelphia : — Board of Building Inspectors (7 Inspectors for 6 Districts).	**Philadelphia** : — Director of Public Safety.	**Philadelphia** : — Secretary, Deputy Inspectors.	**Philadelphia** : — *Board of Building Inspectors:* practical builders, bricklayers, stone-masons or carpenters.
Pittsburgh : — Department of Public Safety, Office of Building Inspector.	**Pittsburgh** : — Chief of the Department of Public Safety.	**Pittsburgh** : — Building Inspector, Assistant Inspector, Clerk.	**Pittsburgh** : — *Inspectors:* practical and experienced in and about the erection, construction and modification of buildings; have practical knowledge of all matters pertaining to strength and safety of buildings and of materials.
Providence : —	**Providence** : — Inspector of Buildings.	**Providence** : — Clerk.	**Providence** : —
St. Louis : —	**St. Louis** : — Commissioner of Public Buildings.	**St. Louis** : —	**St. Louis** : —
San Francisco : — Board of Fire Wardens: Chief Engineer of Fire Department, Assistant Chief Engineer, Assistant Engineers, Clerk of Department, Fire Marshal.	**San Francisco** : — Any member of the Board of Fire Wardens.	**San Francisco** : — District Engineers, Inspector of Plumbing and Drainage.	**San Francisco** : —
Wilmington : —	**Wilmington** : — Inspector of Buildings.	**Wilmington** : —	**Wilmington** : — *Building Inspector:* carpenter, brick-mason, architect or builder of seven years' experience, and not engaged in such business.

[1] Mayor, Chief of Fire Department, Chief of Police.

Duties of Officials.

Boston : — (Inspector of Buildings):
a. Keep a record of the business of the department.
b. Submit an annual report.
c. Perform duties required by laws governing steam-boilers.
d. Investigate fires and report.
e. Require plans and specifications of proposed constructions and alterations.
f. Grant permits[1] for same if according to law, and of proposed construction and material.
g. Examine as often as practicable all buildings being erected or altered.
h. Record violations of law.
i. Examine all buildings reported dangerous.
k. Make record of same.
l. Examine and decide upon buildings to be altered, and make record.

Baltimore : — (Inspector of Buildings):
Contract for construction and repair of municipal buildings in certain cases.
m. To have houses correctly numbered.
To regulate party or partition walls and fences, and record such judgments.
To examine hoistings and require compliance with law.

Brooklyn : — (Commissioner):
n. Control erection, alteration and repair of buildings.
o. Enforce the Building Law.
Appoint the Superintendent of Buildings and his assistants.
(*g*) at least once a week. (*h*) and report to the Common Council.
Ensure the safe storage of combustibles.
Twice a year, or oftener, have all buildings examined for the enforcement of ordinances and the prevention of dangers from unsafe flues, etc.
p. Keep record of permits and of structures.

Charleston : — (Assessor):
Keep a record in his office of the statements submitted to him of the specifications and plans of all structures erected, constructed or altered.

Chicago : — (Commissioner):
See (*a*); (*b*); (*c*); (*d*); (*i*); (*e*[1]); (*f*); (*h*); (*g*); (*o*); (*i*) and (*l*) by Inspectors.
At least once in six months have inspected all public schools, halls, churches, theatres, buildings used for commercial or manufacturing purposes, to determine the safety of building and elevators, the ventilation, means of egress, storage of combustibles, and report violations to Law Department.
q. Stop work when done in a reckless manner or contrary to ordinance.

Cincinnati : — (Inspector):
See (*b*); (*e*); (*f*); (*g*); (*o*); (*p*);
r. Make monthly report of fees received, etc.
s. Inspect buildings when notified to do so.

Cleveland : — (Inspector):
See (*b*); (*f*); (*g*); (*o*); (*r*); (*p*); (*s*).

Denver : — (Inspector):
See (*a*); (*b*); (*e*); (*f*); (*g*); (*h*); (*i*); (*l*).
Make safe all dangerous structures.
t. Remove imperfect brick of any kind, or other unsuitable building material.
u. Pass upon any question relative to construction or materials used in the erection, alteration or removal, and enforce the true intent of the law.

Detroit : — (Fire Marshal):
See (*f*); keep a record of fees.

District of Columbia : — (Inspector):
See (*a*); (*b*); (*e*); (*f*); (*g*); (*h*) (*i*); (*k*); (*l*); (*m*);
v. Power to make all construction and material conform to law.

Kansas City : — (Superintendent):
See (*e*); (*f*); (*g*); (*l*).
Make monthly report to the Comptroller of Permits and Fees.

Louisville : — (Inspector):
See (*e*); (*f*); (*l*); keep a record of elevators and their inspection; close condemned elevators; require fire-escapes as provided by law.

Memphis : — (Inspector):
See (*f*); (*l*); (*u*). Permit deviations from the law under certain conditions, and record such permits.

Milwaukee : — (*f*); require the sidewalk laid at the established grade before all new buildings.

Minneapolis : — (Inspector):
See (*a*); (*f*); (*g*); (*h*); (*i*); (*s*); (*u*);
Make complaint of all violations of the law to the Municipal Court.
w. Make a quarterly report.
Have supervision of all electrical work.

Nashville : — (Commissioners): Keep records of permits, etc.; (*b*); approve and furnish plans for fire-escapes.
(Inspector): See (*e*); (*d*); (*f*); (*g*); (*i*); (*o*);
Examine and approve plans for tenement-houses and hotels with regard to light, ventilation, materials, water-closets, drainage, height of rooms, etc.
Enforce laws regarding fire-escapes on factories; the means of egress, seating, etc., in public buildings.
Inspect hoistways, elevators, furnaces, kilns, etc.
Stop work where walls are carried up too rapidly or are not sufficiently braced.

New Orleans : — (City Surveyor):
See (*e*[2]); (*f*); (*i*); (*k*).

Newark : — (Fire Marshal):
See (*f*); keep a complete record of kind, style anduse of buildings erected.
Make monthly report of the same to the Common Council.

New York : — (Superintendent of Buildings):
See (*e*); (*f*[4]); (*u*); (*v*);
In certain cases modify the law, subject to Board of Examiners.

Omaha : — Duties of Officials (Superintendent):
See (*a*); (*e*); (*f*[5]); (*g*); (*h*); (*i*); (*k*); (*l*); (*q*); (*t*).

Philadelphia : — (Inspector):
See (*g*[3]) by himself or deputy.
x. See that all erection, construction and alteration is in a manner for security against fire and for safety of occupants, and according to law.
y. Furnish certificate to owner that building is built in conformity to law.

Pittsburgh : — (Building Inspector):
See (*b*); (*f*); (*g*); (*r*); (*s*); (*y*);
Make reports as desired by Chief of Department of Public Safety.
Notify Board of Assessors of buildings constructed.

Providence : — (Inspector):
See (*a*); (*b*); (*d*); (*g*); (*h*); (*i*); (*k*); (*o*); issue permits for stagings over sidewalks and for boilers in buildings. Report violations of ordinances to the City Solicitor.

St. Louis : — (Commissioner):
See (*a*); (*b*); (*d*); (*g*); (*e*); (*f*); (*l*); (*x*); (*y*); (*u*);
Inspect location of proposed structure.

San Francisco : — (Board of Fire Wardens):
See (*g*); (*s*); (*u*).
Modify law relating to alterations and the use of party-walls in certain cases, and make record of such modifications.
Make complaint in the Police Judges' Court of any violation of Building Law.

Wilmington : — (Inspector):
See (*a*); (*b*); (*f*); (*i*); (*g*); (*o*); (*v*); (*r*).
Alter buildings to conform to the law.

[1] *Designate in every permit for the erection of a new building the lowest grade at which the floor of the basement story shall be laid.*
[2] And of repairs.
[3] If such are used.
[4] Permits may be issued before the entire plans have been submitted.
[5] The duty of Inspector terminates when the walls are completed and enclosed.

When a Permit is Required.

Boston : — *a.* For all work upon any wall, structure or building, except necessary repairs. [*Exceptions:* structures belonging to the State or National Government.]

b. For the use of street.

c. For the erection of a steam boiler, engine or furnace for melting glass or metal.

Baltimore : — For the erection of a brick building. For the erection of a frame shed,[1] or of a frame bath-house supported on posts, columns or upon a brick building, or of a bay-window.

Brooklyn : — See (*a*).

Charleston : — *d.* For the erection, construction or alteration of any building or part of any building.

Chicago : — *e.* For the erection, construction or addition or material alteration of any building, except necessary repairs not affecting the construction of any external or party wall, chimney, stairs or the height of the building.

See (*b*).

Cincinnati : — *f.* For the erection, alteration or repair of any structure.

Cleveland : — See (*f*).

Denver : — See (*f*).

Detroit : — For the erection, alteration or repair of all buildings within the fire-limits.

District of Columbia : — See (*f*), including bay-windows and other projections, signs, engines, steam-boilers, furnaces, heating ranges, steps, areas, vaults, terraces, excavations, etc. [A permit is valid only for six months from issue. A permit may be omitted for minor interior repairs if in the judgment of the Inspector they will not affect the construction of the building.]

Kansas City : — For erecting, changing or altering any structure.
See (*b*).

Louisville : — See *g*. For the erection, construction or material alteration of any building.

Memphis : — See (*d*).

Milwaukee : — See (*g*).

Minneapolis : — For the erection, construction or material alteration or repair of any building. [*Exceptions:* structures erected by the State or National Government.] For the erection, construction, alteration or change of any electrical work or wiring.

Nashville : — To build, alter or repair a house; to build a furnace or to erect a steam-boiler; to heat buildings by steam or hot air; See (*b*).

New Orleans : — For the erection, construction, alteration, addition or repair, exceeding in value $500, of any building or part of a building.
Newark : — For the erection of a place of amusement, hall or public building. Any alteration of a building within the fire-limits. (Permits are valid for one year.)
New York : — See (*a*), *h*, excepting ordinary repairs, but these not to include the removal of any portion of a stone or brick wall, beam or support, or the change of any stairway.
Omaha : — See (*a*); (*b*); (*h*).

Philadelphia : — See (*d*).

Pittsburgh : — See (*d*).

Providence : — For stagings over sidewalks; for boilers in buildings.

St. Louis : — See (*b*); (*d*).

San Francisco : — To alter, change, repair, enlarge or build upon any wooden building within the fire-limits.
See (*e*).

Wilmington : — See (*d*).

[1] A frame shed shall not be lathed or plastered or cased with wood so as to be used as a habitation, nor more than 12 feet high, nor with a floor or loft above the ground-floor.

Preliminaries for Obtaining a Permit (or for Construction.

Boston : — *a.* Plans and specifications to be carefully examined by Inspector, as to strength and means of ingress and egress.
b. A copy of the plans and specifications for public buildings to be deposited in the office of the Inspector.
c. Examination by the Inspector of structures to be altered.
Baltimore : — *d.* Payment of fees.
For permits to erect wooden sheds and additions, application to the Inspector.
For permits to erect brick buildings, application to the Appeal Tax Court.
Brooklyn : — File at the Department of Buildings: drawings in full in ink. Specifications on blanks furnished, written in ink, with the names and residences of owners, architect and builder.
e. Statement of estimated cost. A certificate from the Commissioner.
Charleston : — Notice to the City Assessor, with a statement to him in writing of the specifications and plans.
Chicago : — Submit to the Commissioner of Buildings : —
f. Full specifications and plans of the proposed construction or alteration.
Also, a detailed statement giving : —
g. The location of the proposed work.
h. General dimensions, number and height of stories.
i. Dimensions of joists and timbers and distance apart.
j. Dimensions of supporting iron-work.
k. The purpose for which the building is designed.
l. Agreement signed by owner, agent or architect, that proposed structure shall conform to said documents and be in compliance with law.
See (*d*).
For a tenement or other place of habitation, or for alterations of any building, or of alteration of approved plans affecting light and ventilation, plans and specifications submitted to Health Commissioner for approval.
Cincinnati : — *a.* Application on blank furnished by the Inspector, with: (*f*) and a statement giving (*g*); (*k*); (*d*).
o. Agreement signed by the owner or owners, or their agent, that they will construct the building in compliance with law.
Cleveland : — Submit to the Inspector: (*f*), (*n*), stating name of street, house number, name of allotment (if on allotted land) and number of sub-lot (*o*). (*d.*)
(*Permits for repairs, alterations and additions may be issued without plans.*)
Denver : — See (*a*); (*b*), file plans and specifications with Inspector during construction.
File at office of Inspector, upon blanks there furnished, a detailed statement describing the nature of the improvement and its approximate cost.
See (*c*).
Detroit : — Apply to Fire-Marshal. Follow his reasonable directions as to size and location of chimneys, flues, protection of heating-pipes, etc., and in all arrangements used in creating heat for manufacturing. See (*d*).
District of Columbia : — See (*n*);
File in office of Inspector: Written permission of majority of residents and owners of property in square in which said building is to be erected, and of confronting side of opposite square (except for churches and places of instruction).
Furnish plans and specifications to file in the office of the Inspector.
For houses on alleys, arrangement made for water-supply and drainage.
A license for special business when the building is to be occupied by a business requiring such license. See (*d*).
Kansas City : — See (*a*); (*b*[1]);
Apply to Board of Public Works, giving (*c*); (*g*); (*h*); materials; probable time to be occupied in the erection; name of owner, architect and builder.
See (*d*); (*o*).
Louisville : — Submit to the Inspector or his assistant: (*f*); a detailed statement giving (*c*); See (*g*); (*h*); (*i*); (*j*); (*k*); (*d*) and (*l*).
[*Upon receiving a permit, obtain grade from City Engineer if street is not graded.*]
Memphis : — File with Inspector a complete copy of plans of proposed work for his approval ; See also (*c*).
Milwaukee : — *For all buildings within the Fire-Limits, and for all buildings costing more than* $2,500 *outside the Fire-Limits:* Submit to the Inspector (*f*); detailed statement giving (*g*); (*h*); (*i*); (*j*); (*k*); (*l*); (*d*).
For a building costing $2,500 *or less outside the Fire-Limits when no architect is employed:* The owner or agent shall furnish the Inspector with a statement showing the nature, dimensions and cost of such building. (*b*); (*d*).
Minneapolis : — *Outside the Fire-Limits:* File with Inspector of Buildings statement of location, dimensions, materials, manner of construction and estimated cost.
Within the Fire-Limits (for erection or material alteration): Also submit for his examination (*f*) and (*b*).
Nashville : — Written application to the Building Inspector, fully explaining proposed improvements; their estimated cost; the exact spot where they are to be made; estimated time for completion; business to be carried on therein.
New Orleans : — File with City Surveyor a copy of plans and specifications (when such are used), and a detailed statement in writing of owner's intentions; also, a statement of value of proposed construction, with names of owner or owners, and builder, and of the streets on which it is located.
Approval of City Surveyor and his certificate that lot is properly graded.
Newark : — *For a place of amusement, hall or public building:* Approval of plans and specifications by Committee on Fire Dept.; signature of Fire Marshal.
For alteration of buildings: Submit drawings showing building, before and after alteration with full description ; approval of Council ; signature of Fire Marshal.
Report beginning of actual operations to Fire Marshal for record.
New York : — File with the Superintendent of Buildings :
p, detailed statement in writing of the specifications.
q, complete copy of the plans of the proposed work.
r, written statement sworn to before a Notary Public or Commissioner of Deeds, giving name and residence of owner, or of the owner of the land and of every person interested in the proposed work as owner, lessee or representative. (This latter statement may be omitted at the discretion of the Superintendent.)
Approval of the Superintendent.
For the erection of any building on the wharves, piers or bulk-heads, the approval of the Board of Examiners.
Omaha : — Submit to the Superintendent of Buildings : — (*p*); (*q*); (*r*).
On blank furnished by the Superintendent, statement of, (*g*); (*h*); (*i*); (*j*); (*k*); thickness of walls, etc., also (*l*).
Philadelphia : — Written application to Building Inspector stating location, dimensions, different stories, manner and material of construction and cornice.
For places of worship, hotels, public halls, theatres or schools, submit to Inspector plans showing modes of egress ; approval of Building Inspectors.
Pittsburgh : — Written application to the Inspector of Buildings, stating location, dimensions, manner and materials of construction; approval of the Inspector: See also (**d**).
Providence : — *For the erection or alteration of external walls: When the structure is within* 10 *feet of the street line*, written application 15 days in advance to the Board of Aldermen, and 60 days in advance to the City Engineer.[2]
For excavations, application in writing, giving dimensions and purpose, with agreement signed.
St. Louis : — Application to Commissioner of Public Buildings, with plans, specifications and general drawings of structure, and written statement of proposed location, estimated or actual cost, and contract time for completion.
San Francisco : — File with the clerk of the Board of Supervisors (**f**). File copy of permit in the office of the Chief Engineer.
Wilmington : — Apply to Building Inspector. Give written statement of location, size, stories, time, manner, material and purpose of building. See (*c*).

[1] Including buildings to be used in whole or part as a public or private institution, school-house, church, theatre or public hall, or one of more than two stories when, above the second story, it is to be used as a factory or workshop, with accommodations for ten or more employés ; or as a hotel, apartment, boarding, lodging or tenement house having ten or more rooms above the second story.
[2] The City Engineer will give lines and grade.

Wooden Structures Allowed (*Outside Fire Limits there are no Restriction upon Wooden Construction Unless so Stated.*)

Boston : — *Within the Building Limits as follows:*
a. Sheds on wharves and market sheds, not exceeding 27′ high.
b. Sheds, temporary, for builder's use, not exceeding 27′ high.
c. Elevators for the storage of grain and coal.
d. All sheds and elevators, subject to approval of Inspector, to have exterior covered with incombustible material.
Without the Building Limits: All buildings except tenements or lodging-houses.
Baltimore : — *Within the Limits of Direct Taxation as follows:*
(b), without limit to size.
e. One-story privies not exceeding 5′ square. Bath-rooms projecting over yard.
Brooklyn : — *Within the Fire Limits as follows:*
Shade or frame buildings on piers (**d**), height of eaves, 20′; highest point, 25′ (every part at least 80′ from any other building).
(**e**), area, 100 sq. ft.; height, 15′. Ferry-houses, expressly permitted by Corporation.
Charleston : — *Within the Fire Limits:* No wooden building of any kind.
Chicago : — *Within the Fire Limits as follows:*
f. Sheds, maximum height, 12′; maximum area, 256 square feet.
(**e**) Maximum height, 12′; maximum area, 100 square feet.
g. (*Provided* (**e**) and (**f**) shall be separate structures; (**f**) not on front of lot, nor used for dwelling or business, and not more than one on the same lot.)
h. Shelter sheds, without enclosing walls or wooden floors, with incombustible roof supported on sufficient posts or piers; maximum height, 20′.
i. Elevator buildings, with first story of 20″ masonry, the exterior above masonry covered with incombustible envelope; all window sash and frames of iron, and protected by No. 14 gauge wire-netting, the meshes not larger than one-half inch; all openings provided with iron shutters.
j. Ice-houses, with walls and roofs covered with incombustible material; *i. e.*, iron, slate or 8″ brick walls, with proper masonry foundations.
Cincinnati : — *Within the Fire Limits:* Domestic buildings ; height, 12′.
See (**a**), maximum height, 15′.
See (**b**) maximum height, 15′; (**c**); (**d**);
See (**e**) not more than ten feet square or ten feet high.
k. Greenhouses.
l. Bridges, quays and wharves.
m. Exhibition buildings, etc., authorized by the city board of public affairs.
Cleveland : — *Within the Fire Limits as follows:*
See (**a**) and (**b**), maximum height, 12′. (**c**; **d**).
See (**e**), not more than 10′ square or 10′ high.
See (**k**); (**l**); (**m**), authorized by the Board of Improvements of the city.
Denver : — *Outside the inner Fire Limits:*
Dwellings may have wooden gables; when area of a dwelling does not exceed 1,500 sq. ft., and highest point not higher than 35′ from ground level, upper story and roof may be of wood, *provided* such building is not nearer than 2½′ to lot line, and not nearer than 5′ to a building of similar construction.
Detroit : — (**h**); *Within the Fire Limits:*
Fuel-sheds, covered with incombustible roofing; area, 150 sq. ft; height, 10′, 10′ or more from any other building; not more than one on same lot.
Grain elevators, with exterior walls of masonry 20″ thick to 3′ above grade line laid in cement; with walls above of 2″ x 6″ plank on side, and exterior covered with slate or metal; all window sashes of iron, and all openings provided with fireproof shutters. Wooden buildings damaged by fire less than 50 per cent.
District of Columbia : — *Within the Fire Limits as follows:*
(**a**) and (**b**), without limit to size, in coal, wood, lumber, stone or wagon yards.
Addition to a wooden building, two-story back L, maximum area 120 sq. ft.
Addition to a rear wooden building, one-st'y with maximum area 120 sq. ft.
Addition to a brick building, bath-room with maximum area 64 sq. ft.
Enclosed fuel-sheds, privies or open wagon-sheds, on rear of lot (if not less than 30′ from dwelling may have combustible roof); depth, 12′; height, 11′; length, 20′.
Kansas City : — *Within the Fire Limits as follows:*
(**b**), height not limited, (**c**); (**d**).
(**e**), maximum height, 10′; maximum area, 36 square feet.
n. Coal-sheds; maximum height, 10′; maximum area, 180 square feet.
(**e**) and (**n**) to be separate structures.
Louisville : — Wooden structures, height two stories or 28′; on rear of lot, not nearer than 2′ to lot line, and, if a flat roof, covered with metal. (**i**[3]); (**j**).
Memphis : — Any building less than 70′ high.
Milwaukee : — *Within the Fire Limits as follows:*
(**e**) maximum height, 12′; maximum area, 100 square feet.
(**f**) maximum height, 12′; maximum area, 256 square feet.
(**g**) Frame buildings sheathed with inch boards, and covered with not less than 4″ brickwork from the foundation or sill to the top of the roof, covered with incombustible material, and have a maximum height of 25′ from top of sill.
Minneapolis : — *Within the Fire Limits as follows:*
Sheds open on one or more sides without floor; the sides and roofs covered with fireproof material; maximum height 10′; maximum area 150 sq. ft.
Nashville : — (**h**); the maximum height 15′.
Between Broad and Line Streets: Coal-sheds and privies, with metal roofs; area, 10′ square; height, 12′; separate structures, not used dwellings or stores.
New Orleans : — (No restrictions.)
Newark : — *Within the Fire Limits as follows:*
Unenclosed one-story piazzas with 12″ posts. Two-story buildings attached to houses; depth, 12′; 8-inch masonry walls at end; shed, one side open, height 15′.
(**e**) maximum area, 100 square feet; maximum height, 15′.
New York : — Piazzas, balconies, bay or oriel windows on masonry piers or iron columns, width 8′, height 3′ above the second-story floor beams; roof covered with fireproof material, 8″ coped party-walls ; erected upon front or side of dwelling occupied by not more than one family.
(**f**), less than 15′ high; open one side, with incombustible roofing and sides.
(**e**); with incombustible roof; maximum area, 150 sq. ft.; maximum height, 8′.
Omaha : — *Within the Fire Limits as follows:*
(**b**), height not limited; grain elevators (subject to approval.) (**i**); (**f**), height, 10′; area, 100 sq. ft. (**e**) height, 10′; area, 36 sq. ft. (*e*) and (*f*) separate structures.
Philadelphia : — *Within the Fire Limits as follows:*
Bath-houses attached to brick dwellings (Party-walls of brick.). Coal-sheds.
(**e**) attached to dwellings.
Temporary sheds. (But not on wharves between Almond St. and Callowhill St.)
Pittsburgh : — *Within the Fire Limits as follows:*
Sheds, the maximum height 12′, the maximum area 200 square feet.
(**e**) the maximum height 12′, the maximum area 10′ square. Also (**g**)
Providence : — *Within the first building district as follows:*
Structures less than 20′ high at highest point; area, 2,500 sq. ft. Dwellings not more than 40′ high nor area more than 2,000 sq. ft., with sills on masonry walls, floors deafened with mortar; when within 5′ of party-line, wall on that side to be 7″ brick or 12″ stone; when within 10′ of party-line, to have wall on that side of such masonry, unless adjacent building has such wall, or is less than 18′ high; party-walls of such masonry when buildings join. Such structures allowed to area of 4,000 sq. ft., if framed walls are filled with brick from sill to roof. (*b*) (not exceeding 15′ high). (**e**.)
St. Louis : — *Within the Fire Limits as follows:*
Porches, stoops, piazzas, exterior stairways, sheds less than 20′ high, *etc.*, costing less than $100. (Permits not required.)
Frame dwellings, when all spaces between and around all portions of framework are solidly built up with 9′ brickwork, laid in mortar to top of rafters.
Frame sheds or stables with incombustible roof at rear of lot (upon petition of majority of the property-owners in the block) ; height, 16′; area, 700 sq. ft.
San Francisco : — *Within the Fire Limits as follows:*
(**e**), inside height 8′; for hotels and lodging-houses, maximum floor-area, 50 sq. ft.; for other buildings, maximum floor-area, 25 sq. ft.; roof and frame covered with incombustible material; not placed higher than third story.
Wilmington ; — (**b**) upon same lot as building or upon adjoining lot. Second-story bath-room or porch if first story is of brick; area 216 sq. ft. Kitchen one story high; area, 216 sq. ft. Mansards and gables covered with slate or metal, less than 65′ above the curb level. Other parts covered with metal according to the judgment of the inspector.

[3] Masonry 21½″ thick.

LOUIS PHILIPPE AND HIS ARCHITECT.

M. A. TERRADE narrates with much spirit, for the amusement of the readers of the *Revue Illustré*, the history of Nepveu, architect to the palace at Versailles, under Louis Philippe I, King of the French, as he desired to be called. Amongst the anecdotes, we find some charming ones which throw light on the characters of these two personages. The work begins in 1833. The château is upset from top to bottom. Work is going on with the utmost expedition, and the king follows everything with the greatest interest. Louis Philippe does not disdain to come two or three times a week to Versailles. He wishes to see everything. He is here and there, in the galleries, in the midst of the workmen. All of a sudden he will be found at the other end of the château looking after the finishing of the bit of work ordered a month before. He stimulates the ardor of every workman, causes all the plans to be shown him, makes changes in them himself, and comes back to some idea already abandoned, and sometimes isn't at all ashamed to put his royal foot in it.

The sovereign liked to come to the work like a private citizen, without escort. He loved nothing better than to make himself popular, and it was his special desire that in his presence the workman should continue going and coming without concerning themselves with him.

One day he asked a young workman if he was satisfied with his work at the château. "Yes, sire; all the more satisfied, since to-day is the first time that I work for myself. I finished my apprenticeship yesterday." "Is that so, my good fellow? Here is something to drink my health with," and the king put in his hands a five-franc piece.

It was absolutely forbidden to smoke on the work, as the king could not endure the odor of tobacco. Passing through a gallery one day, Louis Philippe stopped short, sniffed the air, and cried out at once, "Joinville is here," and sure enough, a few moments before the passage of the king, the prince, who had come unexpectedly, had crossed the gallery with a cigar in his mouth. Alone of all the children of the king, the Prince de Joinville had the privilege of smoking. His rank as a naval officer secured him this immunity.

After every visit the king entered the office of the architect to explain to him his ideas, his intentions, or the changes which he desired to have made. Very often he countermanded something that had been decided on, and these changes sometimes modified the plans already perfected in such a fashion that it was necessary to do them all over again.

The following anecdote, which is partly from St. Marc Girardin, is not out of place here. King Louis Philippe believed that he understood construction almost as well as, if not rather better than, an architect, and many of the people about him shared this opinion. M. Nepveu, however, was not always one of these, and opposed his sovereign's wishes without any hesitation. "But, M. Nepveu," said the king one day, out of patience with his contradictions, "you must understand that I have caused a great deal of building to be done." "And I, sire," said M. Nepveu, "have myself built a great deal." The king, having a fair share of humor, said nothing more during that day's visit to his architect. Nevertheless, as he did not like to leave dissatisfied any one for whom he had any real regard, he stopped a moment in one of the vestibules, while he tried to discover something to say to M. Nepveu, which would not start the discussion all over again, for the architect was just the man to begin again if the chance were offered. There was on the ceiling a painting which the king had seen a hundred times, but nevertheless he asked the architect to explain it to him. "Sire," said M. Nepveu, "it is an allegorical figure. It typifies what is called 'Perseverance' in a king, but 'Obstinacy' in a poor architect." These little discussions, as may be seen from this anecdote, often worried M. Nepveu, but he held his tongue as much as he could, not daring to criticise too openly; or at best he offered a suggestion, which was as a rule hardly heeded by the king, who was very prepossessed in favor of his own ideas. Once, apropos of some modifications suggested by his majesty, in spite of the objections of his architect, the latter being able to control his impatience no longer, stopped the king short, and said, "Sire, I don't meddle with your shop. Now give us a rest." The king stood thunderstruck, and could not discover a word to say. He seized his hat, and going out without speaking a word, entered his carriage and drove away. Left by himself, M. Nepveu realized the real weight and meaning of the words which he had spoken, and perceived that it was all up with him, in spite of the real friendship which the king entertained for him. For a few moments he remained absolutely paralyzed and incapable of doing anything. What could he do to qualify such an insult? All at once he thought of Madame Adelaide, that worthy and excellent woman whom everybody at that time was pleased to consider as the enlightened counsellor of the king, and to whom history has given the name "Egérie." To her he would go, and through her, perhaps, he might obtain the king's pardon. An hour after the king had left, M. Nepveu's carriage set out for the Tuileries. Arriving there about eight o'clock, he was at once admitted. Madame Adelaide addressing him first said, "Your visit does not take me by surprise, M. Nepveu. I quite expected it, and I offer you my compliments. Thanks to you, the king returned to-night to the Tuileries in such a rage as we had never seen him in before." "Ah, Madame," said M. Nepveu, "I am an unfortunate wretch, and have conducted myself towards his majesty like a veritable hod-carrier. Yes, yes, a hod-carrier. So, as I can't remain covered with such disgrace, I came to you, madame, to beg you to introduce me to his majesty, so that I may solicit my pardon." "M. Nepveu, as I told you, the king is very much displeased. I have just left him, and it is your better scheme, I think, to let his anger subside. Return to Versailles, and to-morrow write a letter of excuse. You know how much friendship I have for you. I will intercede in your favor, and I hope to be able to minimize this great insult. *Au revoir*, M. Nepveu, and next time be a little less out-spoken."

After his return home, the architect did what the king's sister had advised. He wrote to Louis Philippe a dignified letter, and, as it appeared, one very well expressed.

A fortnight passes. M. Nepveu hears nothing further from the king than if there were no longer a king in France; but at the château no one knew of the occurrence we have just recounted, and every day the contractors asked the architect to explain the king's absence, but he took good care to reply vaguely. He was only too certain of the reason for the king's absence, but he could not avoid the continual irritation of having the same question propounded to him every day. The situation continued another week, during the whole of which time M. Nepveu considered himself the most unfortunate man in all France. To lose his place was a secondary matter, but to lose the confidence of Louis Philippe was an overwhelming loss. The blackest forebodings haunted him, and the unfortunate man would have surely come to a most direful state if at length one of the guards on service at the court-yard entrance had not given notice of the approach of the king's carriage.

To descend and to run, rather than walk, to meet his majesty was the work of a moment, and with beating heart, he approached the carriage. Once there, M. Nepveu remained speechless in his turn, but the king, who saw how perplexed he was, descended from his carriage, and stretching out his hand to him, said, "M. Nepveu, I received your letter yesterday, and was enchanted with it, for with my own eyes I was able to discover how much more agreeable is your written than your spoken word."

This reproof was clever enough, but the response which the architect delivered in his ordinary nasal voice was no less clever. "Sire," he said, "excuse me, but I didn't write with my nose." A smile broke over the face of the king. He confessed himself disarmed, and Madame Adelaide carried to her credit one more good action. — *L'Emulation.*

STOPPING A COFFER-DAM LEAK.

A LETTER from Colonel O. M. Poe, U. S. Engineers, to the Cleveland *Marine Review*, gives an interesting account of the boring and ramming process by which the recent leak in the coffer-dam at the Sault Ste. Marie Canal was found and stopped. The letter says:

"The coffer-dam referred to consists of a clay wall having a minimum thickness of eight feet. This clay wall is supported on each side by a line of crib-work filled with stone, and therefore pervious to water. A portion of the dam extends from the west end of the north wall of the present lock up-stream along the middle of the canal for about 580 feet, and then turns squarely into the north bank of the canal. The leak occurred about 100 feet east of where this turn is made, and was situated entirely beneath the crib-work, the bottom of which, at the site of the leak, was 22½ feet below the surface of the water in the canal. The crib-work was not disturbed. At the deepest point the leak was at least four feet below the bottom of the crib, therefore 26½ feet below the level of the water in the canal, or about nine feet *lower than the level of the water in the river below the lock.*

"The rush of water underneath the dam was so great that bales of hay and gunny-sacks filled with clay thrown into the cavity were carried through. By driving sheet-piling on the down-stream side of the space from which the clay wall had been carried away, a sufficient obstacle was established to prevent hay in bales and clay in sacks from being washed through, and after some 2,000 sacks of clay had been thrown in it became possible to fill the gap with loose clay. But the leak still remained too large for the pumps to handle, and to further reduce it, as well as to get something into place more substantial than the sheet-piling which had been driven at first, timbers 12 inches square, sharpened to a chisel edge at the lower end, and shod with iron, to the extent of the ability of the entire blacksmith force at the Sault to manufacture, were driven with a 1,900-lbs. ram between the sheet-piling and the crib-work, until they could be driven no further, when it was assumed that they were in contact with the rock formation, and a note made of the depth to which they had gone. The clay wall was then loaded with heavy piles of stone to

compress it, and the result was a reduction of the leak to such a degree as to bring it easily within the control of the pumps, and nineteen days after the break the lock-pit was again empty of water. The volume of water in the pit was about 45,000,000 gallons, and this, in addition to the leakage, was handled by the pumps in less than seven days.

"Although the pumping capacity available was sufficient to easily keep the lock-pit empty, it was still very desirable that the leak should be entirely stopped, and it was believed that this could be done very soon after its exact location was ascertained. To find the crevice in the rock through which the water was passing, an iron rod was driven down through the clay wall, in front of and close to the timbers already referred to, until it would go no farther. The depth to which it penetrated was compared with the depth to which the timber had been driven, and the proper notes were made concerning any effect upon the muddiness of the leak. The rod was then withdrawn, moved laterally, an average distance of eight inches, and again driven to the rock. This operation was continued until at one place the rod went two and one-half feet deeper than at a distance of eight inches on either side of it. Here, then, was the crevice sought, and the next thing to be done was to fill it with clay or other water-tight material. It was nearly 30 feet below the top of the clay wall, and more than 26 feet below the level of the water in the canal. It was not practicable to excavate down to it, and no other mode than that known as 'stock-ramming' seemed available by which to put the clay 'where it would do the most good.'

"Stock-ramming consists simply in driving a tube of requisite diameter to such depth that its lower end will be at the point where it is desired to deposit the clay or other impervious material, and then forcing such material through it in such quantity as may be necessary. In this particular case the tube used is an iron pipe. An iron rod is used as a piston, and this piston is driven down by a pile-driver, the clay with which the pipe had been filled being forced out at the lower end. When the piston has reached the lower end of the pipe it is withdrawn, the pipe is again charged with clay, and the operation of forcing it out is repeated. This is continued until the clay rammed in forces upward the whole column of clay above it, when, as is obvious, the operation can be carried no farther.

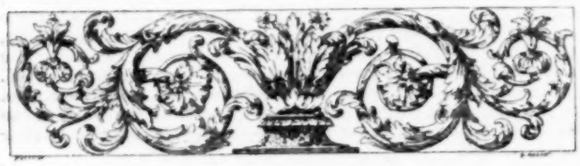
"The whole operation is a simple one, and resembles nothing else so much as stuffing sausages, which, I dare say, first suggested its use many years ago.

"The leak had been stopped before the ice had been gotten out of the canal. As soon as the canal could be cleared of ice, the movable dam was double-battened, the valves of the lock were opened, and for the first time since the completion of the present lock the water was drawn off from that portion of the canal below the movable dam. More than half the bottom was laid bare. The withdrawal of the water from the canal of course reduced the upper pressure upon the clay wall of the coffer-dam, and the mass of clay, 30 feet high, compressed under its own weight as much as 18 inches in the case of the new clay put in at the site of the leak.

"The successful manner in which this leak was dealt with greatly increases our confidence in our ability to control any which may occur in future, but it does not remove our anxiety. That will abide with us until we no longer need the dam. But we regard the dam as now better than ever before, and the experience gained will enable us, in case of any future leak, to apply the most efficient remedial measures in the shortest possible time.

"It was never supposed that a work like this could be carried on, under all the surrounding conditions, without great difficulty and many annoyances. But for the necessity of providing for navigation while the new work is in progress, the work would be simple enough. All the trouble we have thus far encountered has arisen from this necessity."

THE CARPENTER AND THE HOUSE.[1]



Rinceaux by P. A. du Cerceau. From Havard's "*Dictionnaire de l'Ameublement.*"

THINGS innumerable may be said in praise of the house. From the darkest ages each separate section of mankind emerges to our view ready furnished with its own special form of house, that has developed with its growth and expanded to its wants, fitting itself upon the family just as the garment is fitted upon the man. The house has made frozen regions habitable, the tropics it has made tolerable, and only under its shelter has civilization sprung up, blossomed and borne fruit. It has been the parent and the nurse of industries. Generations of craftsmen have lived and thriven by it, calling themselves its builders. More truly they might admit that it has built them; it created the carpenter. It has endowed him with axe and saw, chisel and plane — all the tools in his chest, for these were developed out of the demands of the house. Even yet it has not done for him all that is possible, but will conduct him onward and upward so long as civilization increases its demands upon the house, and finds its agent in the carpenter.

We might say much in praise of timber, of the beauty of its structure and the mystery of its growth. But timber, as the carpenter knows it, has finished life's history; it is practically dead, and, like the stone in the quarry, waits for the craftsman to raise it to a new life. Its various qualities, hardness, toughness, stiffness, durability, adapt it for all his requirements. You may build the whole house of timber — sole-piece, post and panel, bressummer, bracket, tie-beam, brace and shingled roof, dowel and pin, floor, ceiling, wainscotting, chimney and damper, door and hinge, lock and key. In addition to its utilitarian qualities, it possesses beauty of grain or pattern, brilliant color, and often a much-valued, delicate perfume. We shall see that a timber house can perhaps be made more interesting by art than another house, and the artist is the carpenter.

A timber house is quickly built, dries during construction, is damp-proof, if properly put together, heat and cold resisting, durable, if properly protected from the worm and from fire. But for these enemies it would be perfect — indeed, till they get the mastery over it, it is perfect. But for fire, and for careless construction and maintenance, we should now be in possession of a wooden domestic architecture, enriched with all the picturesqueness of the Mediæval period, developed with the changing taste and the growing wants of modern life, made interesting by the art which the carpenter, beyond other artists, seems to delight in exercising upon it. And, in spite of fire and decay, a very large proportion of the houses in our old towns still consist mainly of wood, the original fronts being only concealed by plaster or tiling. Though the outward exhibition of timber construction in towns is now practically forbidden, there is a good deal of scope for artistic carpentry in internal work, and in country places, where houses can be built on open sites and of moderate height, a timber house is often the best possible kind of building. It is comfortable, picturesque, popular. Enormous areas of country, where the sound of the axe is the first sign of civilization, and where timber is the only available material, are in charge of the English-speaking race. In some of the oldest countries also, timber has always been the chief building material. All the houses in the kingdom of Burmah are of wood. Indeed, it was illegal to build anything except a temple or palace of brick or stone; but, notwithstanding their privilege, both king and priest have built of wood, like the rest, and the wooden palaces and monasteries are the finest buildings in the country. What we learn from such old countries the press will transmit to the new, and anything said here may in a month be read in the backwoods.

We will not dispute about the origin of wooden architecture; it may have had different modes of development in different places. In many countries the early inhabitants found it safest to run out a wooden pier from the margin of a shallow lake, and then to build a wooden village upon piles, the water flowing below and around, and protecting them from danger. Such villages are still to be found, and traces of other modes of building are not wanting. Some of the most curious of these traces are found in early stone buildings, which show very clearly that they were copied from buildings of wood. Many persons think that the oldest temples of Greece show in their pillars, columns and entablatures and all their details, evidence of the posts and beams and roof-timbers of the wooden buildings from which they were originally copied. So when a carpenter makes a shop-front, with its pilasters and fascia and cornice, he may be only going back to the work of the original prehistoric carpenter who taught the mason to design a temple in marble. In the entrance-hall of the British Museum you may see a very ancient stone tomb from Asia Minor, somewhat in the form of a house, in which the timber-framing is copied even to the pins that held it together. The finest stone buildings in India are evidently copies of more ancient wooden ones. In the ruined cities of Central America it is the same; and in the oldest churches in this country, built before the Norman Conquest, the mason has used long stones, so as to imitate the sills and posts of the common buildings put up by the older carpenters before his own day.

I will now give a few examples of different kinds of houses made wholly or partly of wood. In the earliest times, before the invention of tools that would slit logs into thin slabs or boards, the log had to be used nearly round as it grows. Our own oak trees were fixed upright in the ground close together, and, when they could be cut with saw or adze, the inner side was made flat and the edges close-fitted. The round side, with its bark, was put outside, forming a picturesque and warm-looking wall — as we may see at the ancient church at Greenstead, near Epping, to this day. In countries where the fir or pine grows, naturally the common practice is to lay the logs horizontally upon each other to form the walls, halving them together at the corners of the house, and making them fit upon each other more or less closely, according to the importance of the building. In Switzerland and in Sweden this mode of building has been developed to a very high degree, so that there are no more picturesque houses in Europe than those which are known as Swiss châlets or cottages, but which are sometimes important houses carefully and even sumptuously designed. The mode of putting them together shows great simplicity. If you hold out your open hands so that the

[1] A lecture by Mr. T. Blashill, architect to the London County Council, delivered before the Carpenters' Company, and printed in the *Architect*.

fingers of each hand lie horizontally upon each other, and then thrust the tips of those of one hand between those of the other, this will roughly represent the arrangement of the logs in the angles of a building. To make the wooden walls weather-tight, the logs are halved where they cross, so that they drop down close upon each other, the logs used in dwelling-houses being first cut into plank about twelve inches by five. Where a cross wall joins an external wall several of the planks are run through to the outside so as to form an important feature in the design. A model of the Swedish mode of laying the timbers shows the upper surface of each, rounded to receive the hollowed timber that lies upon it, and, to make the construction stronger, stout pegs or dowels are used at intervals. The ends of the timbers project about six inches, and near the top of the house they are made to project more, so as to form enormous brackets that carry the roof. In a plainly-finished house the timbers appear to be wrought on the surface by the adze. In some modern houses where the wood has been neatly planed the effect is bad, and these never display the rich ornamentation of the old houses. A Swedish carpenter can produce with his adze a surface on the largest timbers that is hardly to be distinguished from a planed surface. These buildings are always picturesque. When they are of importance they are very highly ornamented. The faces of the planks, instead of being plain, are often wrought to a wavy section. Strings with dentil-courses or small running enrichments are often added, the windows are furnished with sliding or with lifting shutters in ornamental frames, long inscriptions in well-formed ornamental letters run across the front, and the effect is very rich and interesting. Each district in Switzerland has its own distinct style of architecture, so that there is very great variety. Sometimes the houses are covered with very small thin pieces of wood cut to a pattern, and over-lapping like weather tiling. And when a house of fir or pine has been exposed to the sun and weather for a century or more, it puts on a color varying from dark gray to reddish-brown that is exceedingly agreeable. The ordinary "Swiss cottage" put up in this country is quite a different thing, and the fanciful cottages or lodges so abundantly used in connection with French ornamental gardening are equally far removed from the original source of their inspiration. There is in Holland a passion for wooden suburban cottages, usually bright green in color and of an outline too grotesque to be forgotten while one is on this branch of the subject.

The very peculiar climate which we enjoy is unfavorable for the use of these soft woods in architecture. You may use them in very hot countries or in very cold countries, but not in a country where the weather is always changing and where warm moist days may be experienced at any time of the year. In the countries where these soft woods are used there is a summer when they are well protected by being kept intensely hot and dry, and a winter during which they are equally preserved by the frost. Such processes as Burnettizing and kyanizing might, perhaps, enable us to use these soft woods in exposed positions in this country, if the chemical solutions can be driven by atmospheric pressure far enough into their solid substance.

But the great source of timber for building purposes in this country has always been the oak, which does not readily lend itself to the kind of construction which I have described. It supplies a large number of long and short curved pieces and of short straight pieces, but not many long straight pieces. It is, therefore, best utilized in framings where the long sills and heads are few, and the posts and braces are numerous and of moderate length. Of this construction the old buildings in England, France and Germany comprise a great variety of beautiful examples. The panels may be filled-in with stone or brick, or may be lathed or wattled and plastered. There was until lately in Bishopsgate Street a very fine example known as Sir Paul Pindar's house, which is now at South Kensington, and is being repaired in order to be set up as an example of Mediæval London. I suppose everybody thought that the panels were of plaster, but they turn out to be of oak, three inches thick, carved with projecting ornament, so that the whole design was carpenter's work. When it is ready for view the construction will be a good object for study and criticism. There is a curious feature in the interior decoration of the windows. The larger mullions being at first plain and rough, they were afterwards covered with long strips of wood only a quarter of an inch in thickness, and covered all over with a pattern very slightly sunk. We cannot call this carpentry, but it seems to have been done under temptation and in order to conceal a defect.

As to interior decoration generally in our old houses, I can hardly do more than allude to the panelling, richly ornamented, which covered the walls of rooms fitted up in the sixteenth and seventeenth centuries. First, there were richly-moulded styles and rails without carved ornament, the panels being carved with the linen pattern or other designs in moderate relief. Then the panels became plain, and the carving was applied to the styles, either covering their whole surface or in enriched mouldings — the egg-and-tongue and the like. Or, in the richest work, the styles were formed into flat pilasters with Ionic caps, arches being formed over the panels. In remote districts we still find the rooms of farmhouses so covered, as in Westmoreland and in Herefordshire, where the yeomen and the small squires must have had their oak timber wrought by the local carpenters into the best kind of decoration that can be applied to a room where the windows are sufficiently large to illuminate the sober-colored wainscotting. In later times, when taste changed, this work was often painted white in so many coats that all the carving was concealed, or it was canvassed and papered and forgotten. But this could hardly be done with the more sumptuous fittings of the houses of the nobility and the great public halls, where we may sometimes find rooms fitted up in oak architecturally treated with detached columns and elaborate carvings of foliage standing out from the panels; and it was not likely to be done with woodwork where the panels had been relieved with rich patterns inlaid with ebony and white wood. There is now at South Kensington the whole of the wainscotting of a room in which the panels had been so treated, and it is noticeable that this room alone had been left untouched, though all the other wainscotting in the house was painted in the days when white was the fashionable color for a room. It is to be hoped that this work will be set up so as to show as a complete room, and not stuck in separate pieces against a wall, as is the case with the very beautiful and elaborate work from a house at Exeter that is for the present so exhibited.

Upon the whole, I think the panel is the proper place for the best class of ornament, rather than the styles and rails (though these also should be moderately ornamented) and that inlay is the work most generally adapted to this purpose. For the richest work of this class we may have to go to the old buildings of Italy, where elaborate schemes of decoration, including figure subjects, are carried out in proper colors. But many of our seventeenth-century buildings had very good examples of inlay on seats and in panels, besides a variety of different-colored materials in floors.

The woodwork of the houses of Saracenic or Mohammedan peoples is very beautiful. In the South Kensington Museum there are many specimens from Egypt and Asia Minor, such as house fronts, windows, doors, ceilings and rooms completely fitted up. Two years ago I had the opportunity of pointing out in this hall the extreme beauty of much of this work applied to doors, enriched with ebony, ivory and pearl in intricate patterns. Amongst the most attractive portions of the Paris Exhibition of 1889, was a reproduction of the architectural effect of a street in Cairo, the fronts of the houses being actual specimens of those generally found there. Beautiful as the effect of this architecture is in a picture, the sacrifice of everything else to the idea of seclusion renders it as a whole unsuitable for general use, at least in exteriors of houses, but it is full of suggestions for ornament in internal woodwork.

I am able, by the kindness of Mr. Purdon Clarke, to exhibit photographs illustrative of another most important style of wooden architecture, that which is practised over a great part of British India. Actual specimens of some of the most interesting features of these styles may be seen built up in the Indian section of the museum at South Kensington. The general construction is similar to that which prevails in our own ancient buildings, consisting of post and rail and panel. In India, however, a house is not intended to exclude the air, but to admit it, so that a thorough draught is produced. Therefore a house is furnished with verandas and balconies, having fronts either open or partly closed up with panels that are pierced so as to admit the air, while they exclude the sun. These pierced panels show an endless variety of the most beautiful geometrical patterns. The solid panels are covered with raised ornament, the styles and rails enclosing the panelling; the posts and all the horizontal timbers in the construction, the brackets and cornices are all covered with the most elaborate ornaments. Much of the wood has a delicate scent. The effect is a great deal too rich for our taste, but the general design is good, and if the ornament is good in itself there must be occasions when it is justifiable to use it even in this extreme profusion, as a contrast to the mass of bald, uninteresting buildings which are so easily excused.

I do not find in the wooden architecture of China or Japan anything that seems worthy of study with a view to imitation or as affording useful hints. It has been said that the Japanese carpenter does everything differently from the European carpenter. He draws his plane towards him when he is taking off a shaving, and he uses his hand-saw on a similar principle. In both countries the construction seems to be very flimsy and unscientific. Great use is made of the bamboo, in ways that are very interesting to observe but are not carpentry.

Slightness of construction may have its advantages. Japan is one of those countries where earthquakes are common. A building which is constructed of slight, flexible materials, very firmly bound together at the junctions of the different parts, will yield to an earthquake shock and be uninjured by it. But there is another mode of construction in common use with the same object. The Indian builder will construct the walls of his house by setting up a double framework; one frame being flush with the outer face of his external walls, and the other frame being set up inside it flush with the inner face, the timbers being about four inches square, and a space of about two feet being left between the two frames. It is like a mason's scaffold, and several short pieces like putlogs are run across and secured with pegs to the two frames, their ends showing both inside and outside. When he has constructed the ground-story he fills in solidly with brickwork the whole space occupied by the two frames and the distance that separates them, so that it is beyond the power of earthquakes to shake down a structure so firmly tied together. This construction would perhaps be suitable in New Zealand, where shocks of earthquake, generally slight, are so constantly occurring that they are hardly a matter for observation.

There is one other characteristic of the woodwork used in hot

climates at which I have hinted — its peculiar scent. We are familiar with the scent of cedarwood, but many other scented woods are employed where they can be obtained. The specimens at South Kensington in the Indian Museum can be practically tested by smell. In a Japanese house you are struck at once by the pervading scent. I own to a weakness for pure air, but if scented woods could be used in particular places sparingly and in variety, so as not to be oppressive, most people would probably be gratified by this addition to the interest of a house.

There is a corner of the South Kensington Museum which ought to be a paradise for the ambitious worker in wood. There and in the Indian section are displayed specimens of all the wealth of ornament that has been lavished by every artistic nation upon the ornamentation of the house. House-fronts, wall-linings, ceilings, doorways, every part to which enriched woodwork can be applied; carving, inlay, work in ebony and ivory and pearl. And, to go one step farther, in the same galleries are the most exquisite specimens of cabinetwork, placed as if to hint to the carpenter that he can emulate them if he likes. There is hardly one of them all that he is not quite capable of doing, and many of them would be better done by him with his knowledge of solid construction than by the men who actually put them together.

The student of old work and of materials used in carpentry will see that timber architecture differs materially from architecture in stone. It is not an architecture of column and entablature and arch and corbel, but of post and beam and flat ceiling and far-projecting bracket. Timber adapts itself to such features externally as verandas, projecting windows, covered balconies and dormers. In Nuremberg the dormer-windows are amongst the most conspicuous and interesting features of the domestic architecture. Instead of walls and balconies behind which snow lodges and gutters leak, we have in the finest examples of timber-construction, ornamental projecting floor-joists supported by enriched brackets, and carrying the beams of an upper story, so that one story overhangs another, and the eaves and barges overhang still more; each story being thus thoroughly protected from the weather. There are Indian examples in which a very small ground-story is made to carry a tall house, every floor of which projects beyond that below until at the top there is a spacious platform twice or thrice the area of the ground-plot. The illustrations of old Indian houses show the best examples of balconies and verandas; those from America show the present importance of those features. In some of our own colonies, as in South Africa and Australia, they appear to be indispensable, the sitting and working rooms being at certain seasons deserted for the verandas.

In European architecture, the angle-post is one of the finest features. Rising from its stone base, it curves out boldly, to support the overhanging corner of the second story, and is often richly panelled or carved with foliage, or even with some statue or group of figures. Many interesting examples will be seen in Mr. Corder's recent book on the angle-posts of Ipswich. There are amongst these examples of corner-posts, two which I have placed together for our instruction. One is a Corinthian capital which must have been carved with skill and pains from some book or architectural drawing for masonry; the other illustrates a little fable or story in which the fox, in his pulpit, is gravely preaching to attentive geese, while his companion captures one of the flock. Many times this same idea has been carved, but each man who did it has carried it out in his own way, fitting his group to the place it had to occupy. No doubt the carver who did this enjoyed the work much more than he could have enjoyed the carving of the capital; he was doing work of a much higher class. And certainly the generations with whom these carvings have been familiar sights have derived more pleasure from such a little bit of fancy as this — pleasure which would better bear repetition — than any they could get from out of all the Corinthian capitals in East Anglia.

Besides the carving to the outside of the house, there is another decoration hardly less interesting. The finest timber houses in Germany and Switzerland often bear long inscriptions running across the front or over the door. These will give the names of the owner and his wife, perhaps of their parents, followed by some favorite motto, or a wish or a prayer, as, "This house stands in God's hands"; "May everything go happily with us"; "Heaven forbid that this house should be burnt." Such inscriptions are often highly decorative; they take off the baldness of the plain wall-surface, and they gratify the curiosity or appeal to the sentiment of the traveller who stops to read.

Both in and out of the house the brackets and struts are conspicuous and often highly decorative features, as may be seen in great variety in my illustrations of Indian, Swiss and Venetian examples.

Within the house, timber may be freely used. It is generally quiet in color, and there is no other material so agreeable to the touch. Compare marble, plaster, metal work with good woodwork. It is too frequently designed in imitation of stonework, Classic or Gothic, with columns and cornices and arches. It ought to be designed as a rule, in ordinary work, with simple panelling; or, in more important work, with panelling enriched with carving and inlay of richer materials; and the ceiling may very well be panelled in wood fixed under fire-resisting floors if the somewhat exaggerated objection to plaster should prevail. When I spoke here upon doors I noted the modern English habit of making them excessively thick — about half as thick again as Continental doors or old English doors of the same size; it is the same with panelled framing. I believe that if the wood is well selected, perfectly dry, and fixed in a dry house it will be less liable to go wrong, if it is rather thin. At South Kensington there is some framing with panels only a quarter of an inch thick that would yield to pressure till they touched the wall against which the wainscotting was fixed. All the fuss we make about allowing ample space and means of ventilation behind woodwork is due to the habit of using unsuitable materials imperfectly seasoned and fixed in buildings that have not had time to dry. Such spaces harbor dirt and vermin and produce foul air.

Referring now to modern work, a good deal of what is called half-timber building, has been done here without much attempt to advance the art beyond that which we see in the old examples. Although many country houses have been built in this manner, some being of considerable size and very carefully constructed, none seem to equal the best old buildings in the richness and the interest of their ornamentation. In America, from necessity or from choice, the construction of wooden houses may be said to be a living art. A "frame" house is usually enclosed with ordinary quartering covered first with close boarding or sheathing fixed diagonally, a layer of waterproof felt is next applied, and the house is finished with "clapboarding," which may be simple, feather-edged weather-boarding, or the boards may be carefully rebated over each other so as to make a close joint. Very often the boarding is made to look like ashlar work, so that the house seems to be built of stone. But in the most recent work the clapboarding is moulded and the walls are varied by the introduction of wooden shingling or ordinary framing with plaster panels. Every variety of veranda, balcony and dormer is used, sometimes in such profusion that there is hardly any plain walling left as a relief to the eye. These frame houses are a manufacture carried on upon the largest scale. The wooden shingles with which the roofs and sometimes the walls are covered are usually of cypress wood, and are produced by machinery which, in one mill alone, will cut three hundred thousand per day — enough to cover nearly seventy thousand superficial feet of roofing. A good-sized villa is usually finished within three months, and, in an emergency, has been finished in sixty days. These houses are known to have lasted for from one hundred to two hundred years, but it seems that fifty years is a fair average. The best shingled roofing I have seen, is in Southern Normandy, where the lower edges are carefully bevelled so as to produce a very neat finish, the color being a silver gray.

In this country weather-boarding is seldom used in good work, but it may easily be made ornamental. In many old wooden houses in the East End of London, the edges of the boards are run with a bead or a quarter-round moulding; on the Continent, it is very usual to see weather-boarding finished with an ogee on the lower edge and rebated at the back, the upper edge being splayed to a depth of about two inches and a half, and running behind the rebate. The whole width of some of the boards may be moulded, and these may be fixed alternately or at intervals, forming a very suitable decoration.

I began by showing how some of the most ancient architectural works in stone or marble had been copied from still more ancient works of carpentry. The great modern copyist is the plasterer. He copies impartially from mason and carpenter alike. Let us respect him in his proper place, for plaster is capable of very artistic treatment both in relief and in color decoration by means of incised work. But usually the great aim of the plasterer, who has to decorate his plain surfaces, is to make them imitate wood-panelling enriched with mouldings, colored to imitate dark oak, or, perhaps, cream-color with French gray and gold. I exhibit photographs of a dining-room and drawing-room that were so dealt with by very clever French artists many years ago. The imitation is good, though wood-panelling, handsomely carved, would be preferable. But, on the other hand, the cost of handsome wood-panelling would be so great that it would hardly ever be done. That is the real temptation to call in the plasterer, and it is worth some consideration.

The great obstacle to the use of good ornament in woodwork in situations to which it is adapted is its cost. As a rule, our carved work is too much elaborated and too much polished up. The good old carving is generally cut out boldly and quickly, and left somewhat in the rough. The workmanship is such that any one accustomed to the use of chisel and gouge and mallet could execute without special training of the hand. He would only need to study old examples and natural objects, and to possess some fancy or imagination of his own to enable him to make his work interesting as well as decorative. It is only in the very highest kind of work that great delicacy of finish is desirable: work executed in the finest materials, to be placed near the eye in buildings meant for very important uses. All ordinary work is quite within the reach of the carpenter, who has taken some pains to qualify himself for it; and the best work, most exquisitely finished, is not beyond his reach.

To put the matter plainly, I may venture to say that the least educated person in this hall is probably better educated than any of the men who designed and executed the beautiful old wordwork to which I have referred, and drawings of some of which I exhibit. As a rule, these must have been either master-carpenters or ordinary workmen paid by the day. If the work was done by contractors having more than one building in hand at one time, it is highly probable that those men were too much engaged in the business arrangements to do more than guarantee that the design should be appropriate to the purpose. Village journeymen carpenters

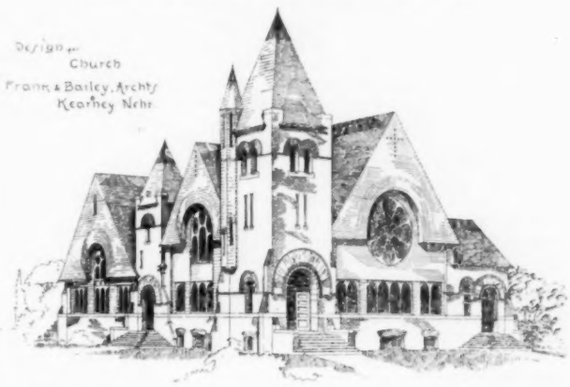
must have done the rest. The earlier part of the seventeenth century was a time when an immense quantity of good timber houses were being constructed. I will refer to a contract made in 1632 by John Abell, carpenter, who is credited with a great deal of this kind of work. He lived in a very secluded village in Herefordshire, and cannot have had much of a workshop. He contracted with Viscount Scudamore to cover the ruined church of Abbeydore with roofs "sufficient, stronge and hansome" and "firmely and decentlie" framed. I think this is the first recorded instance of a church restoration. He began by cutting down trees upon the estate for his ladders, windlasses and other engines, and went on to fell other timber with which to make his roofs, the contract price of 110*l.* being paid to him in instalments, as it might be now. Upon his tombstone he is styled "architector," a fine name then in use by master-workmen who designed as well as built. There is some probability that the old Town-hall at Leominister may be one of his works. The modern practice would be to call in an architect, from whose drawings everything would have to be done, with the result, in general, that such houses as were built by John Abell and his contemporaries could hardly be produced now. The stiffness and poverty of the pencil-lines, drawn to scale and by square, are reproduced in the building, and the carving that gives life to the old designs is too expensive for general use. I have known cases in which the builder has gone to great trouble in order to find clean, straight oak timber to suit the design as it was drawn out; but if he himself had been the designer, he would have used up the timber, crooked and crabbed, as he found it, and the effect would have been more characteristic and interesting. The carpenter who has to work with the architect should know something of detail and ornament as the architect knows it, and not merely the rules of construction. The architect should know more about practical carpentry, and, though he may be the designer of the whole, should feel able to leave more of the detail, which will give character and interest to the building, to the taste and skill of the man who has to carry it out.

Let us think what a precious possession is skill of hand, whether it is gift or grace or acquirement by patient labor. The man who possesses it stands on an altogether different basis from the man who merely possesses skill of tongue and of pen to talk and write about these things. He ought to make much more of such a possession. He must have got it through many of the gifts and most of the virtues which lead other men to eminence, and I am satisfied that it might, with the good-will of everybody else, conduct him farther and higher than it does. Perhaps the attention of the student in carpentry has been too exclusively directed to the dry rules of construction and fixing, which every man who possesses a little patience can learn, but which, beyond a certain point, can carry him no further. He might be encouraged to familiarize himself with beautiful and appropriate work, and try to equal it or to improve upon it. The Carpenter's Company have adopted this view in the establishment of classes for wood-carving, to which we must all wish success.

But I have, perhaps, said enough about carving and ornamental construction; it is so easy to illustrate that part of the subject by drawings that one is tempted to make it rather prominent. The carpenter is not only a constructor and one who adorns a house: he ought to understand the whole of the business arrangements by which a house is built, and everything relating to its occupation and use. He should understand his materials, and know what they cost in the rough, what they will cost to convert, and what he ought to charge for the finished job. He ought to know absolutely everything about the maintenance of the house, all that can happen to every part of it, for he will be the first man that will be fetched upon any emergency: it is he who will have to bear the first shock of any disaster, and to make the first suggestions as to a remedy. These are matters in which he cannot be excelled by any one else, and the means by which he makes himself competent in such matters are so many roads by which he can escape from the merely mechanical drudgery which has occupied too much of his time, and are means by which he may render himself less and less like a machine.

I will finish this lecture by trying to carry the consideration of our subject one step farther. Whether we are carpenters or not, the house is a profitable study. It contains within itself the germs of all other buildings. It was their birthplace, for church and school and lecture-hall and workshop had their origin in the house. To know now to design and construct and maintain a house down to the most minute detail is a good foundation for the study or the practice of any other branch of carpentry or building. To him who has these responsibilities, the house is a school where he may learn some of the finest lessons in carefulness, in foresight, in patience under provocation, in toleration of the follies of others and in a knowledge of his own. Take things at the best; every mischance that can pos-ibly happen to a building may reasonably be expected to happen during the construction of a house, and every whim that can enter the brain of man will start to view, while the client pores with dim understanding over the drawings or potters about the work. To extract from him painfully the idea that is in his mind when he has hardly any notion of it himself, to put it into shape, to introduce here and there, almost by stealth, the niceties of contrivance which he will never detect, the beauties which he will never appreciate, the little matters of comfort which, being there, he will overlook, but which, if forgotten, would gall him day by day; to foresee everything—all that may happen to the water, the drainage, the lighting, the possible leakages, the certain draughts—and, when all is done, to feel able to await with calmness the test of actual use, and the verdict of her who, after all, must be the final judge, is to have had a training that ought to count as a liberal education for architect or carpenter.

SOME USES OF COMPRESSED AIR.[1]



YOU may wonder why compressed air is thought of at all for transmission, as you have known in America that it has been thought to be a very wasteful manner of transmitting power, but the recent improvements that have been made in compressors have very much changed the condition of that mode of transmission and the fact that so much gain is possible by reheating the air indicates a cheap power which can be transmitted long distances, with economy, dispensing with long lines of shafting.

I myself think that electricity is the most perfect and economical method of transmitting power, but people are not ready to set aside their steam-engines and substitute electric-motors for them at once, They will take air that can be given to them in place of steam when they find that a handful of coal will very much increase the power of that air at their works and enable air-motors to be used close to the machines to be driven.

I was in one establishment at Birmingham where there were many houses united together that had been added one after another to form an establishment for making bedsteads. Formerly power was transmitted to each by shafting from a central engine—a very wasteful process—but when compressed air was put into Birmingham by Mr. Sturgeon and Prof. Lupton, this bedstead factory took this compressed air from the station, passed it through a coil boiler over an ordinary fire made of coke that is no larger than would be required to heat an ordinary dwelling-house, the fire tended by a boy. The air passing through this boiler is carried to engines and these engines run without any attention whatever. The engines are warm—the air is exhausted at a temperature a little above that of the outside air, not down to the freezing point, the pressure of air is at most only sixty or seventy pounds and they have something to work with that is like the steam used formerly to drive steam-engines. Cupolas are driven by a jet of high-pressure air in a jet blast; so are blacksmith forges in the same way, and so in all the different parts of the establishment, everything is done by compressed air and with absolute satisfaction.

In Paris it became popular at once because it is difficult to introduce steam into that city. Coal is very costly, the municipal regulations are against the use of steam; they are afraid of it. They are not afraid of compressed air. Having laid the pipes down for one purpose (that of operating clocks) it was an easy step to introduce it for other purposes. The establishment at which Mr. Popp is the head has more to do than at Birmingham. He is doing some part of the city lighting by electricity. Why doesn't he transmit the power by electricity? All I can say is that he don't do it. From his main station he transmits the compressed air to engines that drive the dynamos to light other parts of Paris. Mr. Popp sent me a very interesting communication a few days ago, saying that the government of Paris was very much concerned about stocking the city of Paris in case of another siege, and a large sum of money was voted by the government to have experiments tried in the various methods of keeping provisions in cooling chambers. Mr. Popp told them it wasn't worth while to be uneasy about that, and he invited the Secretary of War and others to the stations I had visited in Paris, where there may be about 10,000 horse-power generating compressed air. He said that by driving one-half of this machinery itself by compressed air instead of by steam, and building temporarily near this station cooling chambers to contain the provision, that at once cold air from the exhaust could be thrown into them to lower the temperature below the freezing point, and give them sufficient cooling capacity to carry the provisions for at least a six-months' siege of Paris, if not longer, without any great cost. The

[1] Extract from a paper on the "Utilization of Niagara Falls" read by Mr. Coleman Sellers before the Franklin Institute and published in the *Journal* of that Society.

very machinery that had been used to give power in peace, could in a state of siege when power wouldn't be wanted, at once be turned into another use, that of furnishing the means of keeping the provisions that were required to feed the population locked in by an invading army.

This use of compressed air for cooling purposes is an important item in favor of its use in large cities, and it is being considered by some of the other great cities of Europe, Berlin and other cities are now perfecting their organization for the erection of compressed-air establishments to supply power as it is supplied by water in London, by compressed air in Paris and Birmingham, and in a slight degree by steam in New York, but in very few places by electricity.

Compressed air has been quite successfully used on some of the tramways. One tramway that I visited at Chester, England, is an example of such a system of low-pressure compressed air. It is necessary to carry only fifty cubic feet of compressed air in each tram-car, as they can recharge without stopping. Whenever they want to take up a charge of compressed air they drop a plow blade which lifts up a cover plate with grooves on its lower side, the groove forms a guide connecting the car attachment with the device for letting in the compressed air. I have seen the tram-cars so arranged running at full speed, open the plate, take the charge, and shut the plate without any interruption. In Philadelphia the roads could be supplied with that system admirably, because it does not follow that the power must be transmitted over every foot of the line as it is by the trolley system of electricity, but each car carries the power from station to station compressed within its reservoirs and the car is not a helpless dead machine when off the track, but carries its power with it.

The development of compressed air at Niagara, you can understand, merits consideration when 50,000 horse-power, we are told on good authority, can be carried twenty miles distant through two pipes, each 26 inches in diameter, with a certainty that by increasing the pressure for the time being, one pipe alone might carry the entire amount while the other one would be under repair, so it is not so very costly, after all, to carry power by means of it, and people can use what they are accustomed to, an elastic gas similar to steam so that large and small steam engines now in existence can be operated as if by steam. This is what is inducing the company to be prepared to develop its work on the three lines: one of compressed air, one of electricity, and the other of developing it on the ground by separate wheels, but I would like all of you to think of this subject as mechanics, and to think of what is now being done in the present method of transmission, and how rapidly people's eyes are being opened to the necessity of some other mode of transmitting power. Electrical motors are now used to work 100-ton travelling-cranes and in comparison with square shaft driving are considered more economical. Electricity, too, is used to drive swing-cranes and drilling-machines. It lends itself to division in a manner that is wonderful in the extreme and permits better results than anything that can be conceived of, the only doubt is that the progress of invention is going on so rapidly that we are almost at a loss to know what particular line should be pursued in preference to others, and therefore the Cataract Construction Company proposes to proceed tentatively.

Before I quit the subject of compressed air, I will tell you of a man in England, Mr. J. Pearsall, who was one of those who presented plans to the Commission, and who says that the best way to generate the power by compressed air is to do it by an hydraulic ram. Pearsall is no visionary. He has already accomplished the result on a small scale. There is running in Pennsylvania one of his machines, and he has adopted the principle of the hydraulic ram with which you are all familiar and in place of the valve closed with a slam by the current he has introduced a set of valves driven by a separate power, thus doing away with the weak point of the ram system and made it perfectly and entirely feasible to compress air by the water, not by the weight of the fluid columns only, but by the impact of the water. Having obtained power by velocity, by properly operated valves he cushions the stream on the air, compressing it and driving it into the distributing mains.

He has shown on a small scale that this can be done much more cheaply than by creating the power by water-wheels and compressing the air by costly compressive machinery, so that this may be looked at as one of the modes that will render the use of compressed air cheaper than electricity.

I have given you a brief outline of what is being done at Niagara, and I would like to tell you of many more interesting things seen in England, but I must call your attention to one difference of methods that prevails between engineers in Europe and in this country.

I found, go where I would on the continent of Europe and in England, that engineers were using the ordinary carpenter's slide-rule, usually the kind called the Gravet slide-rule, for doing all their calculating, while here few know anything about it at all. I began to inquire into this while in London, and found that they have some remarkable instruments for this purpose that are convenient to carry and useful in every way. With these instruments calculations are made without pen or pencil far more readily that you could possibly do them by the old-fashioned method. A celebrated engineer said that everybody should learn to calculate by the rules of arithmetic, but as soon as they got hold of a machine to do the work for them, they had better forget the rules learned at school. It would be well for young engineers to become accustomed to using these instruments, for it is easier to learn to use them while young than later in life.

I have in my pocket (producing the Boucher's calculator) a little instrument that looks like a watch, a calculating machine where the scales of the slide-rule are in a circle; one side of the instrument gives square roots and the other cubes, the logarithms and sines, etc. If now, you want to know the power of a certain engine, knowing its speed, mean effective pressure and dimensions, this little instrument will resolve the simple equation of

$$\frac{\text{area of piston} \times \text{mean pressure} \times \text{feet per minute}}{33{,}000}$$

by successive setting of the dial or pointer with an answer at the fixed index. It is done at once without any calculation, without any trouble, and without the possibility of a mistake.

There have been many forms of these instruments devised. In one the scale of logarithms is wound around a cylinder; such is the Fuller spiral calculator, representing an ordinary straight slide-rule eighty-two feet long and capable of being read to five or six figures.

If it has been worth while for me, at my time of life, to learn the use of these instruments, it is surely worth the time of you younger men, for I can assure you that things like this are not picked up as quickly after you have passed fifty as in earlier life, and it is well worth the effort required to master them.

CONCRETE WALLS AND PIERS.

MR. T. MARTIN says that some substances, such as pozzuolana — a volcanic production found chiefly in Italy — have, in consequence, apparently, of silicate of alumina being predominant in their composition, the property of giving hydraulic qualities to the rich or non-hydraulic limes. It is of these that the concrete is made which has long been used for marine works on the shores of the Mediterranean, and, indeed, the piers at some of the Italian ports have been constructed almost entirely of hydraulic concrete. The author had lately an opportunity of examining at Genoa the extension of one of the moles of the harbor, the inner side of which has a vertical wall. The latter was in process of being constructed under water entirely of pozzuolana concrete, simply thrown into the sea from baskets carried on men's heads, a boarding confining it to the shape of the wall. In a short period it set quite hard, so as to enable the upper part of the wall, which is of stone, to be built upon it. The outer side of the mole, which had been previously made, was formed by stones deposited "*à pierre perdue.*" Though the depth of the quay wall was not great, this shows the confidence which the Italian engineers have in concrete applied under water in a soft state. The piers of the new basin constructed by the Austrian government at Pola, in Istria, are also formed, in a similar manner, of concrete confined between rows of timber piling.

But perhaps the most striking application on a large scale of pozzuolana concrete is in the great mole which protects the port of Algiers. To form the mole, blocks of béton of immense size, so as to be immovable by the force of the sea, were employed. Some of these were formed *in situ*, by pouring the concrete into large timber cases without bottoms, sunk in the sea in the line of the mole. Other blocks of a smaller size, though upward of thirty tons in weight, were made on shore, being moulded in strong wooden boxes. After the béton had set, the boxes were removed, and the blocks were launched into the sea to find their own level. The béton for the blocks *in situ* was composed of one part of rich lime in paste, two parts of pozzuolana, and four parts of broken stone; that for the blocks made on shore was formed of one part of lime in paste, one part of pozzuolana, one part of sand, and three parts of broken stone. These blocks set sufficiently hard in twenty-four hours to resist the shocks of heavy seas, and the mole now stands firmly, instead of being, as it was when formed of loose blocks of stone in the time of the Moors, nearly destroyed every winter.

The French engineers have shown great boldness and skill in the application of béton, as exemplified in the Pont de l'Alma over the Seine, the arches of which, as well as the piers, are formed of rubble concrete, in the new graving dock at Toulon, before alluded to, and in the formation or protection of breakwaters by enormous artificial blocks of beton, as carried out at Marseilles, Cherbourg, La Ciotat, Cette, Vendres, Cassis and Algiers. A short time ago, when the author inspected the mole or breakwater which incloses the harbor of Marseilles, he found the huge rectangular concrete blocks, weighing upward of twenty tons each, by which its seaward side is protected on the "*pierre perdue*" principle, perfectly entire and sharp in their outline, though they have been exposed for many years to the action of the sea. Any one standing upon that mole, and witnessing in a gale the heavy seas breaking with tremendous force on these concrete masses and recoiling harmlessly, could have no doubt as to the efficiency of concrete as a constructive material.

Hydraulic concrete, to be effective, requires care and attention in its manipulation, and in the regulation of the proper proportions of its materials. Any failures must have arisen from inattention to these or similar points, as there is ample experience to show that, when properly made, every confidence may be placed in its strength and durability. Even where stone is abundant, this material may be often employed with economy and advantage, but where stone cannot be obtained, the importance of being able to form an effective substitute out of materials of so little value, and so widely distributed, can hardly be overrated. — *Scientific American.*

SOCIETIES

CLARK MEDAL COMPETITION.

THE competitors are supposed, in pursuance of their studies, to have visited Athens, either in person or in the study of books, cuts and photographs. It is assumed that they have made a special study of the Acropolis or of the remains or of the restoration of one of the structures found thereon, or of the detail of any part of the same.

The committee will receive in competition for the Clark medals, drawings or sketches, geometrical or perspective, of the Acropolis as a whole, or of any part of its structures, or of any detail or details of either of these in their present condition or of restoration according to standard authorities. The selection of a subject within the limits indicated, and the method of rendering to be left entirely to each competitor, the only condition being that there shall be two sheets of drawings, each measuring 18 x 28 mounted on stretchers and marked with a device; and that the work of each competitor shall be accompanied by a sealed envelope marked on the outside with his device and enclosing his name and address.

There will be a gold, a silver and a bronze medal.

The award will be based upon the degree of actual and critical knowledge displayed in the choice of the subject selected for illustration and in the mastery of the same shown in the drawings; as well as upon skill, taste and judgment in rendering.

It is the hope of the committee that there will be a lively interest in this problem, and that it may become the first of a series of kindred subjects which will become characteristic of the competitions for the Clark medal.

Drawings will be received until noon of October 1, at the office of Dankmar Adler, Auditorium Tower, Chicago.

DANKMAR ADLER,
HENRY IVES COBB,
N. CLIFFORD RICKER,
LORADO TAFT,
SAMUEL A. TREAT,
} *Committee.*

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSE FOR B. H. WARDER, ESQ., WASHINGTON, D. C. H. H. RICHARDSON, ARCHITECT.

[Gelatine Print issued with the International and Imperial Editions only.]

THE ERWIN HOME FOR WORTHY AND INDIGENT WOMEN, NEW BRITAIN, CONN. MESSRS. COOK, HAPGOOD & CO., ARCHITECTS, HARTFORD, CONN.

THE late Cornelius B. Erwin, of the Russell & Erwin Mfg. Co., left a large sum in the hands of the committee of the Congregational Church, of which he was a member, for the purpose of having a building put up which should be an actual home for such beneficiaries as the committee should approve, saying in his will: — "it being my object in establishing said Home to aid the really worthy and deserving poor, and not to encourage those who neither are, nor desire to be self-supporting." The architects have endeavored to carry out as closely as possible the desires of Mr. Erwin, and, instead of planning a large high structure having the appearance of an asylum, a low, rambling cluster of cottages has been arranged for, all under one roof, yet each little portion retaining its individuality.

The Domestic English style of architecture was selected as being the one best adapted for giving the desired picturesqueness and homelikeness so attractive to destitute and homeless women.

Most of the suites consist of two rooms, a living room and a chamber, with small cooking-stove, sink, pantry and closets complete. Some suites consist of three rooms and two are provided with fair-sized dining-rooms so that occupants may board if they choose instead of keeping house.

The first-story suites have separate entrances through shady porches. A broad corridor gives access to all the suites from three public entrances. These corridors are so designed as to have a cozy and homelike look not at all resembling the passages of a public institution. Pleasant window-seats are arranged where pretty outlooks are found and open fireplaces are set in available situations.

On the first floor of the tower is a spacious public parlor commanding an extensive prospect both south and west. A handsome mantel of hard wood surmounts a hospitable fireplace; while the doorway stands at the angle of the two main corridors. A door also connects with one of the larger dining-rooms.

The corridor walls are of brick and the floors are of slow-burning or mill construction so as to prevent the spread of fire as much as possible. The home is but two stories high with its main frontage to the south. Its sanitary arrangements are of the best and all conveniences are liberally arranged for. Steam heat is provided for the public portions and is arranged for connection with the private suites.

It will be seen that the key-note of the whole design is the furnishing of independent homes for worthy and indigent women. It is well-known that many poor but respectable people have a strong prejudice, even horror of anything which is suggestive of surveillance or a binding down to rules in an institution.

The main walls of the structure are now up. The contract for the whole work was let for $28,480.

OFFICE-BUILDING FOR JOHN F. BETZ, ESQ., PHILADELPHIA, PA. MR. W. H. DECKER, ARCHITECT, PHILADELPHIA, PA.

THIRTEEN stories, basement and cellar. 104′ 2″ front on Broad Street, 100′ 2″ front on South Penn Square, 194′ high from pavement to top of cornice. 220′ high from bottom of foundation to top of cornice, the bottom of foundations is 26′ deep below pavement. The street fronts of the basement, first and second stories to the top of the second story cornice will be of eastern granite, above the second story to the top of the cornice of the building will be faced with Green River limestone, the light-well in the centre of the building will be faced with white enamelled bricks, the east wall facing the Mint and the south wall above the Girard Building will be faced with buff bricks. The building will be fireproof throughout, no woodwork being used in the construction of any part of the structure. The style of architecture is modern Romanesque, elaborately ornamented. At the corner above the first story will be placed a cast bronze group of figures symbolizing Colombia encouraging the arts and trades; a cast bronze frieze in the cornice above the second-story windows extending around on both street fronts, with heads of all the presidents of the United States, beginning with George Washington at the eastern end of South Penn Square front, and ending with Benjamin Harrison at the south end of the Broad Street front, the term of each being indicated in the frieze. On a line with the eighth floor is to be placed a cast bronze statue of William Penn, standing on the corner column under a handsomely carved canopy. In appropriate locations are to be carved heads representing the different nationalities. There will be 304 offices in the building, all of ample size, especially arranged to give the greatest amount of light and air to each. All the offices will be finished in oak, with oak floors, the corridors will have floors laid with mosaic marble tile of neat designs; the main stairway from the basement to the top floor will be iron-finished bronze, the treads of the stairs will be mosaic marble tile inlaid in the iron. The vestibule of the central entrance on Broad Street will be finished with polished granite walls and ceiling. The boiler-room and dynamo-room will be located in the cellar and extending up to first-floor occupying part of the basement, the basement will be used for offices having easy access from each street; each office in the basement will have an ante-room under the street pavement, which will be lighted by illuminated-tile vault-lights in the pavement. The first story will have two large offices, the corner office will be the height of the first story only, the office on the south side of the corridor will be the height of two stories, with a balcony around the room at the level of the second floor, over the centre of this office will be a large iron-domed illuminated-tile skylight, lighted from the light well above; a large steel-lined vault will be located in this office. The second floor and all floors above will be used for offices. Three high-speed hydraulic elevators will be located in the centre of the building adjoining the main corridors, extending from the basement to top floor. On each floor at the end of each corridor will be located the lavatories for men and women of ample size and number. The entire building will be heated by steam, lighted by electricity and gas; in each store will be provided 300′ fire-hose hung on racks and coupled to the fire-pipe for immediate use. $1,500,000 is the estimated cost of the building when completed (without the ground). Mr. Allen D. Rorke is the contractor. The building will be ready for occupancy, June 1893.

COMPETITIVE DESIGN FOR THE BOARD OF TRADE BUILDING, MONTREAL, CANADA. MESSRS. ROTCH & TILDEN, ARCHITECTS, BOSTON, MASS.

[Additional Illustrations in the International Edition.]

HOUSE AT ROSCOFF (FINISTERE), FRANCE. M. A. THOMAS, ARCHITECT.

THE position of this house upon the cliffs fronting the Channel, led the architect, a former Grand Prize of Rome, to adopt a style and robustness of treatment which is not very common in such country houses.

SECTION OF THE SAME.

PLANS OF THE SAME.

COTTAGES, FORTINGALL, PERTHSHIRE, N. B. THE LATE J. MACLAREN, ARCHITECT.

POLICEMAN'S COTTAGE, FORTINGALL, PERTHSHIRE, N. B. THE LATE J. MACLAREN, ARCHITECT.

GLENLYON FARM-STEADING, FORTINGALL, PERTHSHIRE, N. B. THE LATE J. MACLAREN, ARCHITECT.

NEW WELSH PRESBYTERIAN CHURCH, RUTHIN, WALES. MR. T. G. WILLIAMS, ARCHITECT, LIVERPOOL, ENG.

The new Welsh Presbyterian Church and schoolroom just completed, occupies a commanding site in Well Street, Ruthin, and was formally opened on April 24. The buildings are constructed of limestone, with Denbigh stone dressings. The front portion of the church is circular on plan, having a radii of 27′, and measuring internally 54′ by 55′. Accommodation is provided for 550 persons.

The sittings are arranged in a circular-gallery form, with stepped aisles leading to the body sittings. The schoolroom is 24′ by 41′ 6″, and is at the rear of the church, having minister's vestry, lavatory and conveniences adjoining. A large room, 24′ by 54′, forms an upper schoolroom over.

BREWERY TAP FOR CITY OF LONDON BREWERY COMPANY.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

REPEATED BUILDING FROM THE SAME PLANS.

Boston, Mass., July 21, 1891.

To the Editors of the American Architect: —

Dear Sirs,—Kindly give your opinion in the following case:

I was employed by a prominent real-estate man in this city to make plans and specifications for four houses to be built in an adjoining town. The plans were paid for at a specified price, no superintendence being needed. There was no special agreement as to the plans being returned, but, when the houses were done, the party building the houses showed them to a friend, who also builds houses for sale. This friend wanted to build the same houses in another town, and the party to whom I sold the plans gave him the four sets of drawings to use. Hearing of the matter I wrote to the second party telling him if he used the drawings I should claim payment for them. I wrote him to preserve my rights. Have I any rights in the matter? Yours very truly, H. M.

[In this case, the architect's rights would depend on the interpretation which a court might put on his agreement with his first client. If it thought that he made an absolute sale of the plans, it might hold that the purchaser was entitled to do whatever he pleased with them: while, under the ordinary arrangement between an architect and his client, the rights of the latter in the plans would not, we think, be generally held to extend to handing them over to another person to build from. — Eds. American Architect.]

WHO KNOWS ABOUT CANVAS CEILINGS?

Chicago, Ill., July 17, 1891.

To the Editors of the American Architect: —

Dear Sirs, — Can you tell me where I could find a description of the process of preparing canvas or cotton cloth so that it is soft and pliable, and after being decorated can be applied to the wall by means of paste or white lead.

I have known of several ceilings which have been treated and decorated abroad, rolled up and sent over here to be put up, but so far have been unable to find out by what means the canvas retains its flexibility after being decorated. Subscriber.

NOTES AND CLIPPINGS

Reclamation of the Algerian Sahara by Wells. — The most remarkable example of reclamation by means of artesian well-water is found in the desert provinces or departments of Algeria under the French rule. The area, officially given, of French Algeria, is 184,465 square miles. The outlying portion is put at 135,000 square miles. In this total of over 329,415 square miles one-half belongs to the Sahara or desert. The European population in 1887 was about 250,000; the natives and naturalized were 3,328,549, making a total of 3,578,549. Cultivation by the means of flowing well-waters has been sedulously fostered by the French Colonial Government for both political and economic reasons. Such wells as a means of reclamation began systematically to be bored in 1857, the French Engineer, M. Jus, having demonstrated in 1856 that the desert was endowed with large supplies of underground water. The total number of wells that have been bored since that date in the departments of Algiers, Oran and Constantine is stated at 13,135. These wells range from 75 to 400 feet in depth, and the low pressure common to the majority of them forces the water over the small bored casings to a distance of about 2 feet above the ground. The waters are then collected in small ditches, which convey them to the vineyards, date-trees and fields of durra, millet, wheat, etc., which comprise the chief products. In all, about 12,000,000 acres have been reclaimed in this way. The government bores are at least 1-10 of the whole number. As an illustration of the reclamation brought about by this well-irrigation, the following figures from a report made in 1885 will be of value, but they relate solely to the cultivation of the grape for wine-making purposes. In the province of Algeria there are 60,322 acres; in Constantine, 25,021 acres; in Oran, 26,114. Under this species of cultivation Algeria is becoming a great wine-growing country. It sent to France during 11 months of 1886, 10,513,906 gallons of wine; and of cider in the same year, 219,277,124 gallons were made. The date-palm is the largest product of the desert oases proper. The total area under colonization or settled occupation in 1887 is given at 49,400,000 acres; under cultivation by irrigation in wheat, barley, oats, vines, olives, dates, tobacco, etc., at 17,041,133. The forest plantations cover 5,000,000 acres. — *From a Government Report by R. J. Hinton.*

Pile Driving by Jets. — At a meeting of the Engineers' Club of Philadelphia, in November, 1889, the Secretary presented, for Mr. Edward Hurst Brown, a description of the application of a water-jet to the driving of piles for the board walk at Atlantic City, N. J. The water was brought from the city water-supply in a 2-inch pipe, extending along the line of the work. To the end of this pipe (which was extended as the work progressed) was attached a 30-foot length of rubber fire-hose terminating in an ordinary brass nozzle about 4 feet long, with an opening of 1 1-4 inches. The piles were swung into position by a rough but light tripod, provided with block-and-fall, and steadied in place by the foreman, while one of the men held the nozzle of the hose vertically and close to the foot of the pile. Under the action of the jet, the pile was lowered into position almost as fast as the men could pay out the rope, the nozzle following it down. To drive a pile from 6 to 10 feet into the compact beach-sand required only from 30 seconds to 1 minute from the time the water was turned on the foot of the pile, until the pile was finally fixed in position, the hose withdrawn and the tripod removed. The instant the hose was withdrawn, the sand packed at once around the pile, holding it, apparently at least, as firmly as if driven by a ram in the usual way. Should a pile be driven too far, it is easily raised while the jet is on The jet process has been successfully used in other parts of New Jersey, in some places through coarse gravel with stones 8 to 10 inches in diameter, but in such cases, of course, the sinking is less rapid than in the beach-sand. When a city water-supply is not at hand, a steam force-pump is used. In sinking pipe-wells the pipe itself may be used for the jet, but the separate nozzle appears to be preferable.

A Gallic Find in Denmark. — An antiquarian find, which will excite interest all over Europe, has lately been made in Rœvemose peat bog, near Hobro in Jutland, Aalborg Amt. The objects are all of silver, the principal piece being a very large basin, on which have been fastened plates of silver hammered out with figures of men, women, and animals. The basin is twenty-six Danish inches in diameter, but scarcely eight inches high. One or two pieces are apparently wanting; but it is hoped they will turn up when the moss is minutely examined. The eye-holes of the figures are now empty, but had evidently been filled with colored glass. One of the plates, which is nearly seventeen inches long, shows warriors, with helmets and other ornaments. One figure is a god with a wheel at his side, and on another are two elephants. A third shows a horned god in a sitting posture with his legs crossed orientalwise.

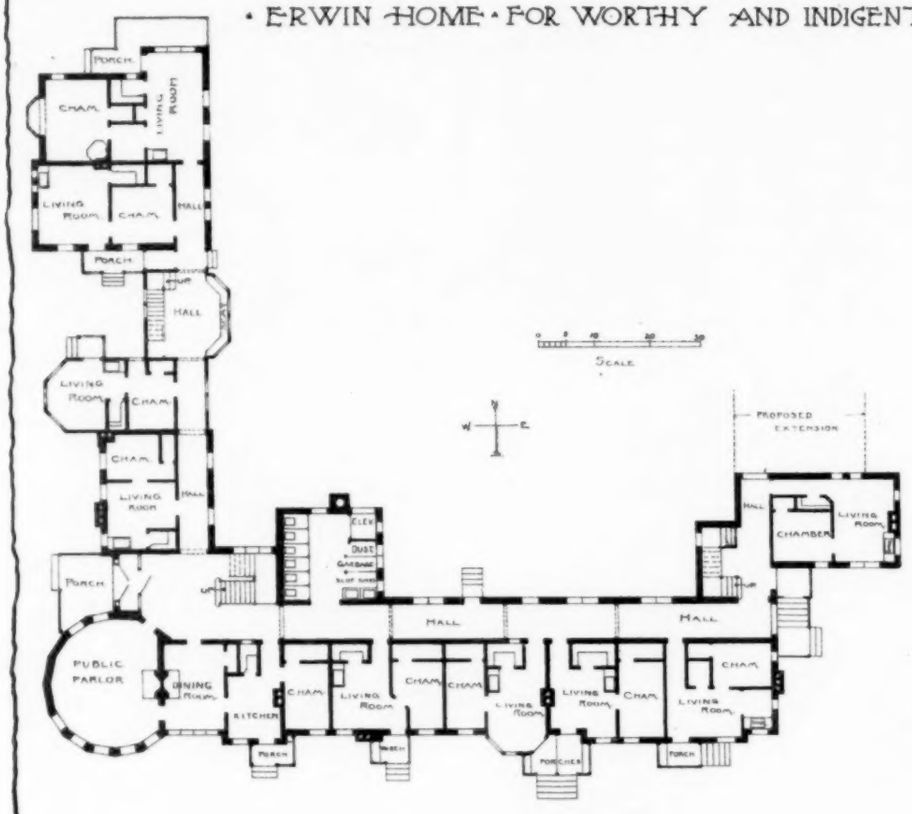
All these have apparently nothing to do with Northern mythology, as was at first supposed. The whole find has now reached the Danish National Museum, and we see that these pieces belong to the god-lore of the Gallic peoples. The god with the wheel, for instance, is the Gallic sun god. The whole is the work of a Gallic artist at that early period when the Roman and Gallic peoples first came in contact. Allowing time for these things to wander so far north, the date would seem to be, as regards Denmark, the first century before Christ. Other things belonging to this Gallic group have been found previously in this country. The total weight of precious metal hitherto exhumed is about twenty Danish pounds. — *The Academy.*

Hardening Plaster for Floors. — The following process comes from France for hardening plaster, so that it may be used for flooring, as wood and tile are at present. About six parts of good quality plaster are intimately mixed with one part of freshly-slaked white lime finely sifted. This mixture is then laid down as quickly as possible, care being taken that the trowel is not used on it for too long a time. The floor should then be allowed to become very dry, and afterwards be thoroughly saturated with sulphate of iron or zinc — the iron giving the strongest surface, the resistance to breaking being twenty times the strength of ordinary plaster. With sulphate of zinc the floor remains white, but when iron is used it becomes the color of rusted iron; but if linseed oil, boiled with litharge, be applied to the surface, it becomes of a beautiful mahogany color. Especially is this the case if a coat of copal varnish be added. — *Specialties.*

The Brick Roof of Mexico's Cathedral. — The great cathedral in the City of Mexico cost, it is said, $2,000,000. Its roofs are shingled with brick enough to pave a town of 10,000 people. Brick are the shingles of Mexico. They are fastened down with mortar and there is as much masonry on the top of every church and house as there is in its sides. — *Clayworker.*

S. J. Parkhill & Co., Printers, Boston.

ERWIN HOME · FOR WORTHY AND INDIGENT WOMEN ·



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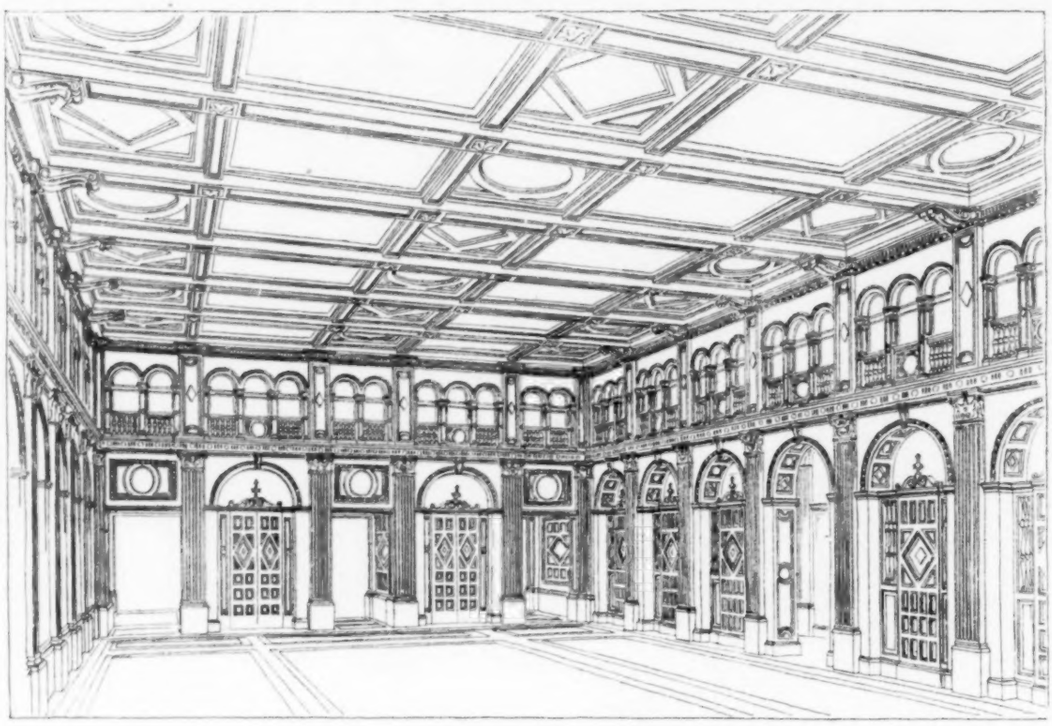

Perspective of Interior of Exchange Hall.

COMPETITIVE DESIGN FOR MONTREAL BOARD OF TRADE BLD'G.

ROTCH & TILDEN ARCH'TS, BOSTON, MASS.

HELIOTYPE PRINTING CO. BOSTON.

OFFICE BUILDING FOR MR JOHN F BETZ

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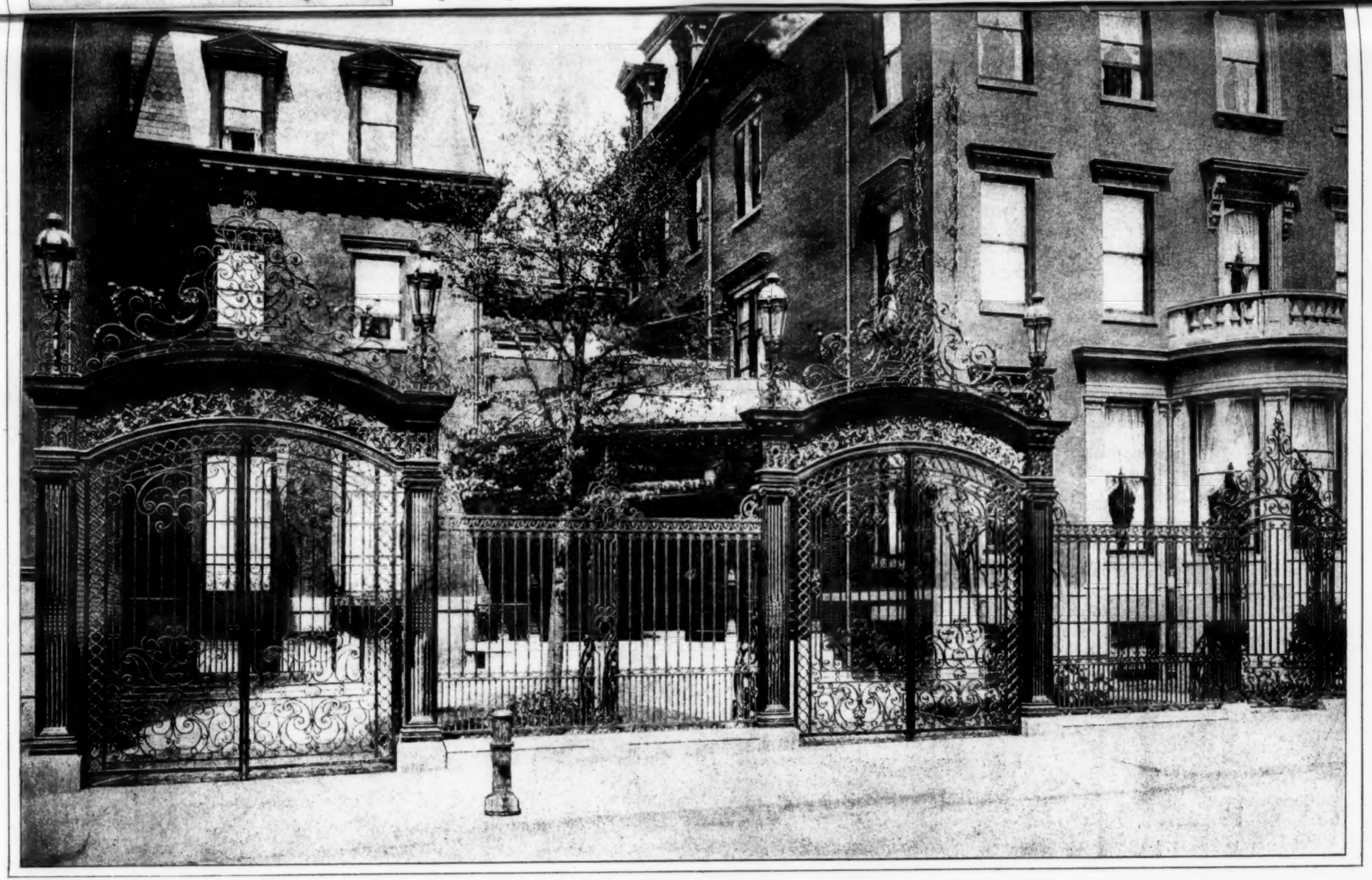

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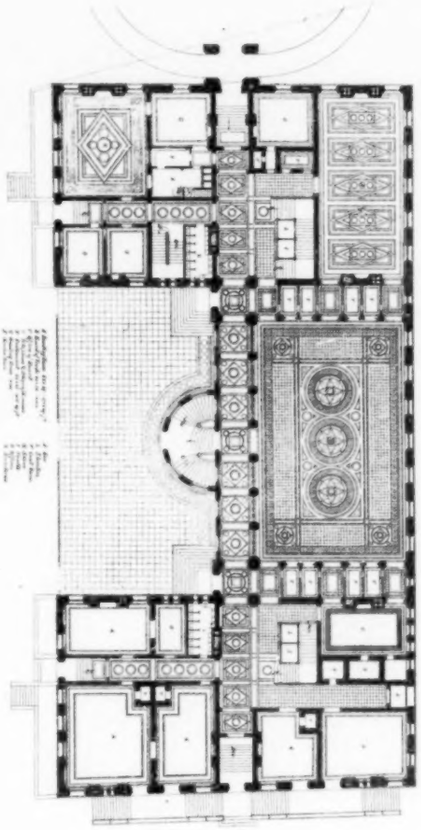
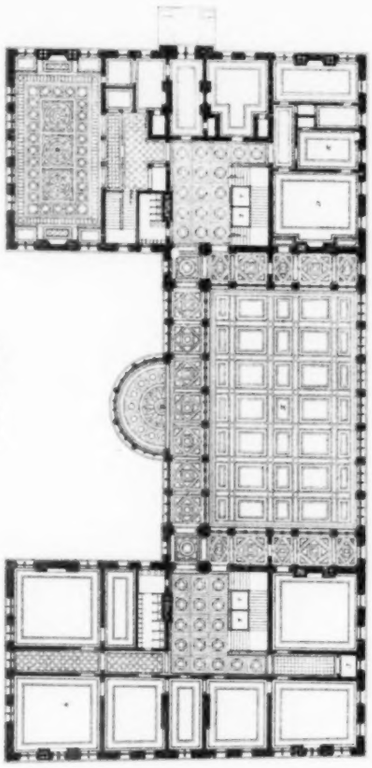


Ground Floor Plan



First Floor Plan

Second Floor Plan

Third & Fourth Floor

COMPETITIVE DESIGN FOR MONTREAL BOARD OF TRADE BLD'G.