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WE print in another column the full text of "an act to provide for stability of construction and security against conflagration, panic, or other accident in theatres hereafter to be erected in the city of New York." This bill, the text of which was prepared by a committee of the New York Chapter of the American Institute of Architects, embodies all the most rigorous and exacting provisions suggested by experience in the construction and management of theatres, as regards their safety from fire and panic. Whatever may be its fate in the hands of the legislature of the State of New York, it is an important memorandum of progress, and will go far to redeem architects from the imputation of a willingness to sacrifice essentials to non-essentials, security to show, science to conventionalities. The profession, constrained by the exigencies of practice, has been compelled to devote the greater part of its energies and inventive powers to the problem of producing the largest results from the most inadequate means; this tendency to make a show at the expense of the more solid qualities of security has been a characteristic of the times, and architects can hardly be blamed, if, in the service of a public so disposed, they continue to build stud partitions and furred floors, and generally to make the best of the means placed at their disposal. Whenever the profession has had an opportunity to express itself with freedom, as in the papers on fire-proof and sanitary construction by Wight, Hatfield, Lienau, Clark, Pfeiffer, Derby, and others, and in the debates on these all-important topics at every annual convention of the Institute, and at nearly every stated meeting of the chapters, it certainly has not been found wanting in ingenuity, and in boldness of innovation. The bill now before the New York Legislature is the last and not the least of these expressions. It is rigorous and unsparing in its requirements, and if passed and enforced, as it deserves to be, it will not only accomplish the immediate and all-important object proposed, but, indirectly, will compel architecture to modify its conventional expressions in many respects, so as to suit the new conditions of structure. Thus the uncompromising requirement as to the use of "wrought-iron doors," even with the concession of double-battened wooden doors as an allowable substitute, suggests some fundamental change in the design of this important feature, wherever it occurs at the outlets, not only of the passage-ways, but of the boxes in the whole circuit of the auditorium wall; and the substitution of fire-proof material for all the inflammable wood-work which constitutes the greater part of the embellishment of the modern theatre, is another condition, which, if rightly used, must ultimately and legitimately result in a change of character in decorative detail. It is to be remembered that all these requirements, so hostile to the conventional forms of architecture, have been suggested by the very conservators of architectural traditions, and by them will be most loyally observed.

THE bill by its title refers only to the city of New York, but its first section seems more properly to contemplate a much wider field of usefulness in its application. It includes provisions, not only for the construction, but for the management of theatres, in order to obtain a greater immunity from danger by fire or panic, and the sixty-seventh section provides for daily police inspection and reports, which, with the penalties pre-

scribed, seem well devised to secure a rigid observance of the law in all its details. As regards construction, the leading features are specifications for the building of all partitions in brick; for closing all openings therein with wrought-iron doors; for the complete separation of the stage from the auditorium by a proscenium wall rising above the roof, with its stage opening closed daily by a wire screen; for making roof, ceiling, and floors of the auditorium fire-proof; for excluding from the building all steam boilers, lodging-rooms, workshops and storage; for the establishment of a fire-proof shaft over the stage with glazed openings for the ready escape of flames and smoke; for the protection of gaslights everywhere with wire screens; and for the establishment of reservoirs with stand-pipes, hose connections, steam and hand pumps within, and a hydrant outside. In respect to security from panic, we have elaborate provisions regulating the width and disposition of aisles, staircases, passages, and openings, and the character and arrangement of hand-rails and doors; also sections requiring the surrounding of the auditorium with an area for circulation and escape; the substitution of gradients for steps wherever the difference of level is slight; the securing of seats to the floor; a separate system of gas service for stage and auditorium; also a rigid limitation as to the number of the audience, the accumulation of rubbish, and the storage of properties; and requirements as to the presence of uniformed firemen at every performance, and the posting of regulations in conspicuous places. The papers on dramatic theatres which are appearing in the columns of the *American Architect* set forth more at large the ideal conditions of safety and comfort in such structures, and if this New York bill becomes a law it will not be long, perhaps, before we shall see these ideal conditions in process of realization throughout the country, and the insurance rates for this species of property very materially reduced. The next highest risk on the books of the underwriters is, we believe, on hotels. These should form the next subject for rigid legislative enactments, and we commend it to the consideration of the profession.

THE Building Acts which now apply to many of our large cities have materially changed the relations of architects and builders to the public in those localities. Formerly, if the architect enjoyed entire discretion, he was held, in theory at least, to complete accountability for his work; now, the departments of buildings assume a great part both of his discretion and of his responsibility. Every plan must have official approval, and all workmanship is under the supervision of inspectors, who are in some cases obliged to certify whether the building has been executed in accordance with the approved plans and specifications. It is a question whether, if the State takes upon itself the charge of directing construction, it cannot be held to the same accountability and suffer the same consequences in case of neglect of duty which would otherwise be visited upon the architects whose functions it assumes; and great as is the benefit which such laws confer upon a community in saving them from the malpractices of ignorant and incompetent constructors, a government which undertakes to act as supervising architect for its constituents should take pains to do its work thoroughly. Neither the efficiency nor the composition of our building departments is all that it might be. In Chicago the number of inspectors has been reduced from ten to four, and these are so employed in office work that the supervision of building operations amounts to nothing. In New York the superintendent is authorized to employ eighteen assistants, and these, on the whole, are efficient and intelligent, so that the department in that city forms an important factor in building operations. In Boston, the number of inspectors is now eight,—about half what it should be. Considering the number of buildings, new and old, among which these men are obliged to divide their attention, it is creditable to them that they make their authority felt to the extent that they do; but there is still room for improvement. Officers employed in so grave a duty should combine high theoretical with practical knowledge. Without theory an inspector is helpless outside of his own experience, and can neither judge of the merits of nor modes of work new to him, nor act with confidence in unforeseen contingencies. The comparatively enlightened and energetic New York department has recently employed experts to calculate the strength of the floors in existing warehouses and post a statement of the safe load in

conspicuous places. Every deputy inspector should be able to make such calculations at sight, and to apply them to trusses and iron-work as well as beams; he should be able to estimate the thrust of an arch or the load on a pier by the processes of mathematics, not by guess, and if he sees a building going up on a doubtful foundation, instead of saying, as a Boston inspector is said to have done, that "if it fell, he should not allow any more built so," he should be able to apply the proper tests at once. The best architects in England are glad to receive the appointment of district surveyors; there is a large field for honorable ambition in that direction here.

THE novelist, Miss Ramé, known as "Ouida," in a letter to the London *Times*, complains that the modern Italians are working more havoc in their quiet and undisturbed possession of their national antiquities than was ever wrought therein by any tumultuous incursions of Gauls or Goths. She charges them with having lost all sense of the beautiful and all reverence for art. We lately had occasion to speak in great anxiety of their meddlings with the precious work of Philippi Calendario, in the Ducal Palace at Venice. Now we learn that in the process of modernizing the capital of the world, and making it fit for the residence of the monarch of Italy, and for the seat of government of one of the great powers of Europe, the beautiful Ponte Sisto Fountain has been destroyed; the Farnesina Gardens have been broken up by the new embankment of the Tiber, and avenues three hundred years old have been wiped out. Monuments of venerable antiquity, landmarks in the history of civilization, are daily disappearing before the energy of petty Italian Haussmanns in nearly every municipality of Italy. The country is overrun with jobbers, it is said, and contracts are sold and resold until no one benefits save a few unscrupulous speculators. We fear that this picture is but a phase in the inevitable conflict between the modern spirit of progress which has arisen in Italy, doubtless to the great material advantage of mankind, and the spirit of veneration which prefers to dwell on the past, and to cherish its monuments at all hazards. Another phase of this conflict is the destruction of the Wren churches, the desecration of London Bridge, the levelling of the palace of the Tuileries, and the systematic smashing of duplicate bronzes and other *objets d'art* in the new excavations of Pompeii. These columns have borne witness from time to time that even in a country where all is new, and where there is no antiquity to breed archaeological sensitiveness, such marks of progress, if they do not arouse astonishment and dismay, are at least not contemplated with sympathy. But who shall draw the line aright between conservatism and progress?

A FIRM of billiard-table manufacturers in Manchester, England, have devised and carried out an ingenious scheme, by which, so far as their wares are concerned, they will be enabled to correct what Mr. Gladstone in his famous speech at Chester on Industrial Art termed a national "deficiency in that quality or habit which connects the sense of beauty with the production of works of utility." We commend this experiment to the consideration of manufacturers in this country who would disprove the assertion made in the same address that few of the industrial productions of America have any beauty at all. It is an experiment easily tried, one which will inevitably meet with a quick response from young architects, and bear a golden fruitage. The firm in question, Messrs. Orme & Son, by the offer of liberal premiums for designs of billiard-tables and marking-boards of various grades of cost, obtained about two hundred drawings in response. Prizes of corresponding grades were awarded by a committee composed of an artist of the local school of art, a Fellow of the Royal Institute of British Architects, and a well-known cabinet-maker; and a public exhibition of all the competitive designs was opened, with the understanding that if orders were received on any of the unsuccessful designs during the exhibition a commission of two and one half per cent would be paid, and if the drawings were allowed to remain permanently the manufacturers agreed to pay a similar commission on all tables made from them. Thus, at an expense of \$500, this firm has added to the attractions of its ware-rooms a gallery of drawings, which, in enlarging its resources of design, cannot fail to bring a handsome return in reputation and pecuniary profits. Any firm of cabinet-makers or any manufacturer in any department of industrial art who is willing to expend a few hundred

dollars in this manner will be rewarded by a collection of designs, among which a good proportion, we venture to say, will be far in advance of what is now generally accepted as good in the markets of the country. It seems to us an eminently intelligent and business-like transaction. There are plenty of young architects, fertile in design, otherwise inaccessible to manufacturers, who would respond to such an appeal with profitable enthusiasm.

By the terms of articles 1792 and 2270 in the *Code Civil* of France, the architect and contractor of any building are held personally responsible for any vices of construction which may be developed in the course of ten years from the date of its completion. We had occasion last week to consider the manner in which this strict but wholesome accountability of the architect was observed in a case where he allowed a precipitate client to fill in around floor beams with plaster before they were thoroughly dry, a proceeding which occasioned dry-rot and necessitated costly repairs. A correspondent of the *Builder* presents a later case covering the question as to the duration of time within which action may be taken against an architect for imperfect work. M. Parent was employed by the Comtesse de Béarn, in 1862, in the execution of various works about her château at Clèves. These works were completed in 1863, but in the course of the year 1873 grave defects manifested themselves, and in 1875, twelve years after the architect may be supposed to have dismissed the matter from his mind, he was arraigned as responsible for these defects. After argument, the Court of Appeals decided that the articles above alluded to referred only to the duration of the guarantee, but that proceedings could be held against the offender at any time within thirty years from the date of the discovery of the defect, if said discovery took place within ten years after the completion of the works. This decision has apparently established a new precedent, for according to previous decisions in the *Cour de Paris*, no action could be commenced after the expiration of the ten years. With such responsibilities it is not surprising that the amount of work done during the times even of the greatest French architects is so astonishingly small when compared with that accomplished by their brethren on the other side of the Channel. It would seem that the amount of personal supervision required to insure the architect or builder from ultimate pecuniary disaster would necessarily prevent any such extension of practice as is common in England and America, where cases are by no means rare in which the architect has never seen his work at all, and can never know what scamping has been covered up by specious finish. If practitioners among us were held to such rigid responsibilities as we have described, there are few who would not be haunted by the ghosts of old errors and oversights; few, we fear, who would not be compelled in their new work to exercise far greater care both in the designing and in the execution of it.

AMERICAN DRAMATIC THEATRES. VII.

THE grand division of the stage, with its various subdivisions, is the distinguishing feature of a theatre. Without it there would be only a hall of somewhat exceptional but very useful form. The stage adds the main attraction and the chief element of danger. It is a great workshop, in which many trades are daily carried on to produce the mimic scene and all the accessories of a modern play. The larger part of the material used is of a temporary and changeable character, and has to be quickly shifted from place to place and to be frequently altered, remodelled, and repaired, the combinations varying more or less with every new drama. It is for these reasons that metal has to be so sparingly used, on account of its weight and the time and expense required to modify it in any way. And this also has prevented the successful use of steam or other like mechanical power to replace manual labor for the shifting of scenes, etc.

The main divisions of the stage proper are the floor, the sides of which are permanent, but the central part, in width and for a greater or less depth back of the curtain, is usually so framed as to be partially or entirely removable for the purpose of raising or lowering actors, scenery, or properties, during a performance. This floor, which is usually of 1½ inch hard pine, should slope towards the foot-lights with a pitch of about ⅓ of an inch to a foot. The English pitch is about one in twenty-four, which is a little too steep. This inclination is given to help the perspective effects of the scenery, to assist the ballet dancer, to give the audience a better view of the actor and his business, and for other minor reasons. Occasionally stage floors have been made level; of course, the manipulation of scenery is much facilitated by a level floor, especially in case of box scenes, as any piece may be set at any part of the stage without regard to height; but the general effect of the scene is impaired, and for perfect stage

setting the loss by this arrangement seems to overbalance the gain. On very small stages it may work well. Under the stage is the trap room, or mezzanine floor, which is generally from 6½ to 7 feet below the under side of the timbers of the main floor at the front, and is level. This floor is also removable where there is a sub-cellar under. The sub-cellar has depth enough to sink the whole of a scene below the stage floor, say from eighteen to twenty-five feet. Some of the smaller theatres, and very successful ones, have merely the trap-room; and now and then one intended for comedy purposes chiefly has not even that, but only a plain room, in which the scene is set with the aid of very simple machinery. Ghosts are going out of fashion; even Hamlet's father shuffles or stalks on and off at the wings instead of popping up like a "Jack in a box," or coming in through a fixed door in the proscenium, as of old.

There is a decided tendency, especially in the larger cities, to classify theatres — it being found from experience that a different stage, and even a different hall, is required for the lighter pieces, from what is needed for spectacular effects; and it is also found that plays of the latter class can be worked with less of the cumbersome and permanent machinery than was formerly considered essential.

Above the stage there are, on each side, one and sometimes two fly floors, or galleries, above the height of the wings, or side scenes, at a proper height, for working all the borders, drops, curtains, etc. These galleries vary in width, height above stage, and distance back from the sides of curtain opening, according to the relation of the dimensions of the different parts; all such measurements have to be determined to suit each particular case. If one were to settle the exact figures for a model arrangement of stage, the chances would be against his ever finding a case in which they could be employed without modification.

The flies are often connected across the back of the stage by the paint bridge, usually made stationary, but sometimes to hoist and lower, at the pleasure of the painter. It is better made stationary when practicable, the two vertical frames on which the scene is painted being adjustable at any height, in order to give the scenic artist a firm floor to work on. The luxury of a large paint-room, from which a full general view of a scene can be had and in which the artist can work in comfort and seclusion and with a good light, is seldom permitted in the smaller theatres. Most scenes are painted from a bridge, not over eight feet wide, by top light or gas-light, and are often not fairly seen in their entirety until displayed for the performance. In some cases, on account of lack of height, the larger cloths have to be painted in two sections, the finished part being folded to give room to work on the rest. Scene painting is an art requiring special and technical education. The ordinary artist would be entirely unsuccessful at it. It is done in distemper, that is, with water-colors mixed with size, on burlap, or linen canvas, the canvas being previously sized. The perspective effects are peculiar, the colors change very much in drying, and the effects of gas-light, colored and calcium lights, and other stage effects, have to be very thoroughly understood. To be a really successful scenic artist requires exceptional talent.

Crossing the whole centre of the stage above, usually at a height of forty feet or more, is the tie floor, or gridiron. This is of light joists, covered with slats about three or four inches apart and the same width. It is generally suspended by iron rods from the roof trusses and carries the drums and blocks for raising or lowering the curtains, drops, borders, etc., the lines for the purpose being manipulated by windlasses or otherwise in the flies.

It would be impossible within the limits of these articles to fully consider the subjects of stage machinery and scenery. It is enough to say, that while improvements are being constantly introduced by the many ingenious mechanics connected with our theatres, the tendency in small houses is towards simplification. Plays are written or rewritten to promote this change. Where a few years ago three pieces would be given in one evening, one of them at least with many changes of scene worked with the old-fashioned flats and wings, now a single comedy suffices, each act being one elaborate scene, realistic in the extreme, and prepared for the express purpose. The old hinged pattern of grooves was superseded by the "panorama," and these seem in a fair way to give place to drops and box scenes. The device of flats in two parts, the only too visible central vertical joint being emphasized by the dirty marks of scene-shifters' hands, is changed for the better to a single canvas on which the artist can paint a full landscape; and which, if the stage be high enough, can be hoisted flat, without injury from folding or rolling.

The prompter's position is usually on the right, facing the audience, but sometimes may be on the left. Under his immediate control, by means of speaking-tubes, bells, gas table, etc., should be all the working parts of the house. Near this position should be a room for the manager, convenient to both stage and hall and to a proscenium box, if there is such, and at the same time secluded from the reach of the bores by whom the busy occupant is sure to be besieged. A room for the smaller properties, in immediate use in the piece, should also be provided near this point. The accumulated stock of properties and the shop for making them should be outside the brick walls of stage, as should be the carpenter's shop and wardrobe also. By properties is meant everything movable on the stage, scenery excepted, from a pen to a wheelbarrow, — furniture being of course included.

On the ceiling, or under side of the roof, of the stage should be placed the net-work of perforated pipes known as a "factory sprink-

ler." The stop-cock of the main that supplies this system should be convenient to the prompter's position and conspicuously located, and to avoid accidents and damage from water should be enclosed in a wooden box with glass door always kept locked, and the use of the apparatus plainly printed upon it. It should be distinctly understood that a fire of sufficient magnitude to call for the use of the water should justify the destruction of the box. Fire on a stage always flashes to the roof, and when up among the borders, etc., is difficult to extinguish, or even to reach with the stream from an ordinary hose, which becomes divided into fine spray by the intervening cordage, battens, and canvas. No man in his senses would be foolhardy enough to climb to the top of a stage after a fire were once well started. The factory sprinkler is always ready at the point of greatest danger. In addition to this, and for ordinary use, there should be stand-pipes with water on and hose attached at every corner and at each level, besides the provision of ordinary chemical extinguishers, buckets of water, wet blankets, and axes. Of course, trained hands to use such implements constantly ready, and regular official inspections to make sure that they are kept up to the proper standard at all times, are absolutely essential to the safety of the public. The men detailed for this work should have no other duties to perform that could interfere with their work as firemen.

Over the stage there should be a large ventilator, the valves of which could be promptly opened to carry off the smoke, and this may also be utilized as a sky-light for lighting the stage. The framework should be of wood and as light as consistent with use, so that the heat of a sudden fire would break the glass and the flame consume the bars rapidly, to give the earliest free draught to the fire in order to draw it away from the curtain opening.

Separated from the stage by brick or other fire-proof walls should be the green-room, which must be as near as practicable to the prompter's position and on the stage level; two star dressing-rooms on the same level; rooms for the supers and ballet above and below; and the regular dressing-rooms for the company. A small room or studio should be provided for the scene-painter near the paint bridge. A retiring-room for the band should be located so that the tuning of instruments may not disturb the audience. Dressing-rooms for men and women should be kept apart, and if practicable be reached by different stairways. The stairways and all connecting passages should be cut off from any possible interruption from smoke or fire from the stage, and if practicable all dressing-rooms should have outside windows for light and air. Ample lavatory accommodations should of course be provided. The actors' quarters, in a large majority of theatres, mean and wretched to an extent little realized, constitute a serious obstacle to any efforts for the elevation of the player or his calling.

The ordinary gas meters as well as the gas supply for calcium lights should be outside the main walls of the building if practicable, as should be also the steam-heating apparatus; or if this is not possible they should be in fire-proof rooms by themselves.

It will be well if most of the surplus storage of material could be arranged for outside the walls, but for the necessary accumulation in constant use rooms should be provided enclosed by fire-resisting partitions and doors.

The heating and ventilation of theatres, although most important, does not differ materially from that of other public buildings, except that the power of the heat of the gas may be employed advantageously in various ways, or may be permitted to overheat and vitiate the air, as is too commonly done. So considerable is this heat, that the steam may be shut off in ordinary winter weather, soon after the doors are opened. The stage dressing-rooms require the usual and ordinary provision. The only real difficulty in regulating the warming and ventilation of the whole building lies in the change of conditions produced by raising and lowering the curtain.

After all, in the larger number of cases of public buildings that have a bad reputation for lack of ventilation, it will be found on investigation to result from bad management. Many very good devices have been rendered useless by neglect and mistaken economy. When the public demand sweet air as an essential part of all entertainments, they will get it, — and not till then.

J. A. F.

AN ACT

TO PROVIDE FOR STABILITY OF CONSTRUCTION AND SECURITY AGAINST CONFLAGRATION, PANIC, OR OTHER ACCIDENT IN THEATRES HEREAFTER TO BE ERRECTED IN THE CITY OF NEW YORK.¹

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

§ 1. Every theatre or opera-house or building intended to be used for theatrical or operatic purposes hereafter erected (in the State of New York), or which shall be altered to be used for such purposes, shall be built in compliance with the following regulations relating to its structure: And no building hereafter erected in this State for the aforesaid purposes shall be opened to the public until the same has been inspected and approved as conforming with the requirements of this act by the superintendent of buildings, or a person deputed for that purpose by the mayor of any city where there is no such official, and a certificate in writing of such inspection approved and signed by him is filed in the office of the superintendent of police for the said city; and in case any such building is opened or at-

¹ This bill, prepared by Messrs. Hunt, Dudley, and LeBrun, a committee of the N. Y. Chapter, A. I. A., is still before the State Legislature, although it was committed to the committee of the whole in February, 1877.

tempted to be opened before such certificate is filed as aforesaid, the said superintendent of police or other police authority of the city shall have power, and it shall be his duty, to forthwith close the same and prevent its opening till such certificate be filed.

§ 2. All the rules and regulations contained in this act, which relate to the management or use of any such theatre or opera-house after its construction, shall be faithfully applied and obeyed by all persons owning, leasing, or having the control of such premises, and all the powers now conferred by law on the superintendent of buildings shall extend to the enforcement of this provision.

§ 3. Every theatre, opera-house, or building hereafter erected, and intended to be used for theatrical or operatic purposes, shall have at least one front on the highway or public street, and in such front there shall be suitable means of entrance and exit for the audience.

§ 4. An open space or area shall be reserved for the evacuation of the theatre, and for service in case of fire or accident, on all sides of that portion of the building containing the auditorium and the stage not bordering on the public highway, or not contiguous to any stairway or rooms provided for the use of the audience. The said open space or area shall not be less than ten feet wide for theatres accommodating not more than one thousand persons, and it shall have one or more outlets on the highway toward the auditorium, which in the aggregate shall not be less than twenty feet in width. Similar independent outlets shall, in addition, be provided toward the stage. For other theatres, the width of the above mentioned open space and outlets shall be determined by the superintendent of buildings, or person deputed as aforesaid, according to the number of persons to be accommodated, taking into consideration also the height of the building.

§ 5. Each of the above-mentioned outlets shall be provided with a gate or gates opening outward, the full width of the outlet, which shall be set back from the line of the street, so that when opened they may not project beyond the street line. During any performance, said gates shall be kept opened by strong locks; at other times these gates may be closed and fastened by movable bolts or hooks. The above-mentioned open space and the outlets shall be kept free from any obstructions whatever.

§ 6. No superstructure shall be allowed over the above-mentioned outlets on the highway unless the same be built of fire-proof materials throughout.

§ 7. Gradients or inclined planes, the inclination not to exceed one in ten, shall be employed. When possible, to overcome any difference of level existing between said open space or area and the adjoining highway, any steps that may be absolutely required to overcome said difference of level must be located at the outlet on the highway.

§ 8. No portion of any building hereafter erected, used or intended to be used for theatrical purposes, shall be occupied or used as a hotel, boarding or lodging house, or any factory, workshop, or manufactory, or for storage purposes, except as hereafter especially provided for. Said restriction relates not only to that portion of the building which contains the auditorium and the stage, but applies also to the entire structure in conjunction therewith.

§ 9. No workshops or storage room shall be allowed either above or below the auditorium or the stage.

§ 10. No workshops for carpentering, scenery making, scene painting, and decorating shall be allowed in any theatre, neither shall any theatre contain any depots or storage room for scenery or decorations not actually in use; any requirements for the said workshops or storage room must be provided for in a building distinct and apart from the theatre.

§ 11. Property rooms for the storage of furniture and other accessions, not including painted scenery and decorations, may be provided for on the premises, in which case the same must be separate from the theatre by a brick wall, and must be built of fire-proof materials.

§ 12. No store or room contained in the building can be let or used for carrying on any business dealing in hazardous or extra hazardous materials. No lodging accommodation, except for the janitor and the ticket seller, shall be allowed in any part of the building communicating with the auditorium.

§ 13. The exterior walls of all theatres shall be built of stone or brick, and any façade or front constructed of iron shall be backed with brick of such thickness as to make the walls, independent of the facing, conform as to thickness with the requirements of the building law.

§ 14. Interior walls of masonry, hereafter described, shall separate the auditorium from the stage, from the entrance vestibule, and any room or rooms over the same; also from any lobbies, corridors, refreshment or other rooms. Similar walls shall enclose all stairs and landings communicating with any entrance or exit; and shall also separate any actors' dressing-rooms from the stage.

§ 15. A fire-wall, to be built of stone or brick, shall separate the auditorium from the stage; and the same shall extend at least four feet above the roof, and shall be coped with stone or terra-cotta.

§ 16. Above the segment or flat arch spanning the stage opening, there shall be constructed a relieving arch. The intervening space between these arches may be filled in with hollow bricks, or other approved material, to diminish the load on the flat arch.

§ 17. The stage opening shall be provided with a metallic screen or curtain, consisting of a frame-work of wrought-iron, to which shall be firmly attached a netting of iron or copper wire, the wire to be not less than one eighth of one inch in thickness, and the meshes to be not over one inch. Said screen to be provided with a proper hoisting apparatus, made of incombustible material, also with a system of counter weights, made of incombustible material, and to have wrought-iron guides at the sides; when lowered it must rest directly upon the wall below and close all communication between the stage and the auditorium, excepting through one doorway in the middle, which shall be provided with a door of the same construction as the screen. The above-mentioned screen shall be lowered at the close of every performance, and shall so remain until the following performance or rehearsal.

§ 18. In addition to the stage opening, the fire-wall between the auditorium and the stage shall have doorways on both sides of the said opening at the level of every floor or gallery in that portion of the building which contains the auditorium, and all of said doorways shall be provided with wrought-iron doors on each side of the wall, which can be opened from either face at all times. Direct access to these doors shall be provided on both sides, and the same shall always be kept free from any incumbrance.

Wrought-iron ladders, securely fixed to the wall on the stage side, shall be provided to overcome any difference of level existing between the floor or galleries on the stage side of the fire-wall and those on the side of the auditorium.

§ 19. All walls separating the auditorium from any vestibule, refreshment or other rooms, also those enclosing the stair-cases, shall be built of brick or stone, and all doorways in said walls shall be provided with wrought-iron doors.

§ 20. All walls, floors, and partitions in that portion of the building which contains the auditorium, the entrance vestibule, or any room or passage devoted to the use of the audience, shall be constructed of fire-proof material.

§ 21. The wall separating the actors' dressing-rooms from the stage shall be built of brick, and the dressing-rooms themselves, together with any passage or corridor leading from the same to the stage, shall be constructed of brick or other fire-proof material, and all doorways in any of the said walls shall be provided with self-closing wrought-iron doors.

§ 22. Any wrought-iron doors called for in this act may be cased with wood, or double battened doors, as hereafter described, may be substituted for said wrought-iron doors, said double battened doors to be made of plank four inches in width and one inch in thickness, laid diagonally and fastened by wrought-iron nails clinched; hinges of wrought-iron to be fastened with wrought-iron rivets, and to be set in flush with wood-work of door; the eyes of hinges to be securely bolted, and the entire surface of the door to be perfectly smooth.

§ 23. No combustible material shall be used in the construction of the roof, and the trusses supporting the same shall be of iron. Large glazed openings shall be introduced in the roof over the stage, together with a large ventilating shaft constructed of iron, or other fire-proof material, which shall be closed at the bottom with glazed sashes made of combustible material.

§ 24. The ceiling of the auditorium, also all decorations and fixtures above or on the sides of the stage opening, shall be wholly made of fire-proof material.

§ 25. All stage scenery and decorations made of combustible material, and all wood-work on or about the stage, shall be saturated with some incombustible material, or otherwise rendered safe against fire to the satisfaction of the New York city fire department.

§ 26. All seats in the auditorium, excepting those contained in the boxes, shall be firmly secured to the floor, and no seat in the auditorium shall have more than six seats intervening between it and an aisle.

§ 27. All aisles in the auditorium shall have at least a width of twenty-two inches for every one hundred persons, or parts thereof, to be provided for; and no aisle shall be less than three feet six inches wide at its narrowest part, and, when possible, the same shall be increased in width, towards the exit, at least one inch for every five running feet, or part thereof.

§ 28. Every doorway of communication between aisles in the auditorium and any lobby, corridor, or passage shall have a clear opening of not less than the full width of the aisle leading to such doorway, and every doorway of communication between the auditorium and any lobby, corridor, or passage shall be provided with a wrought-iron door.

§ 29. The aggregate capacity of the lobbies, corridors, passages, and rooms for the use of the audience must, on each floor or gallery, be sufficient to contain the entire number to be accommodated on said floor or gallery, in the following ratio, viz.: Two hundred and fifty superficial feet of floor room to be allowed for every one hundred persons.

§ 30. Gradients or inclined planes, as herebefore described, shall be employed instead of steps, where possible, to overcome slight differences of level in or between aisles and passages.

§ 31. All inclosed passages, corridors, and staircases shall have on both sides a strong hand-rail, firmly secured to the wall, about three inches distant therefrom and about three feet above the floor or stairs.

§ 32. No passage leading to any stairway communicating with any entrance or exit shall be less than four feet in width in any part thereof.

§ 33. Every theatre accommodating three hundred persons shall have two exits at least; when accommodating five hundred persons, at least three exits shall be provided, and no doorway of exit or entrance for the use of the public shall be less than five feet in width, and for every additional one hundred persons or portion thereof to be accommodated in excess of five hundred, twenty inches additional width must be allowed; all doors of exit or entrance shall open outward and no such door shall be closed and locked during any representation or when the building is open to the public.

§ 34. Distinct and separate places of exit and entrance shall be provided for each gallery above the first. A common place of exit and entrance may serve for the main floor of the auditorium and the first gallery, provided its capacity be equal to the aggregate capacity of the outlets from the main floor and the said gallery.

§ 35. All stairs shall be constructed of fire-proof material throughout.

§ 36. Stairways serving for the exit of fifty people must, if straight, be at least four feet wide, and if curved or winding, five feet wide, and for every additional fifty people to be accommodated six inches must be added to their width.

§ 37. In no case shall the risers of any stairs exceed seven inches in height, nor shall the treads be less than eleven inches wide in straight stairs. In circular or winding stairs the width of the tread at the narrowest end shall not be less than seven inches.

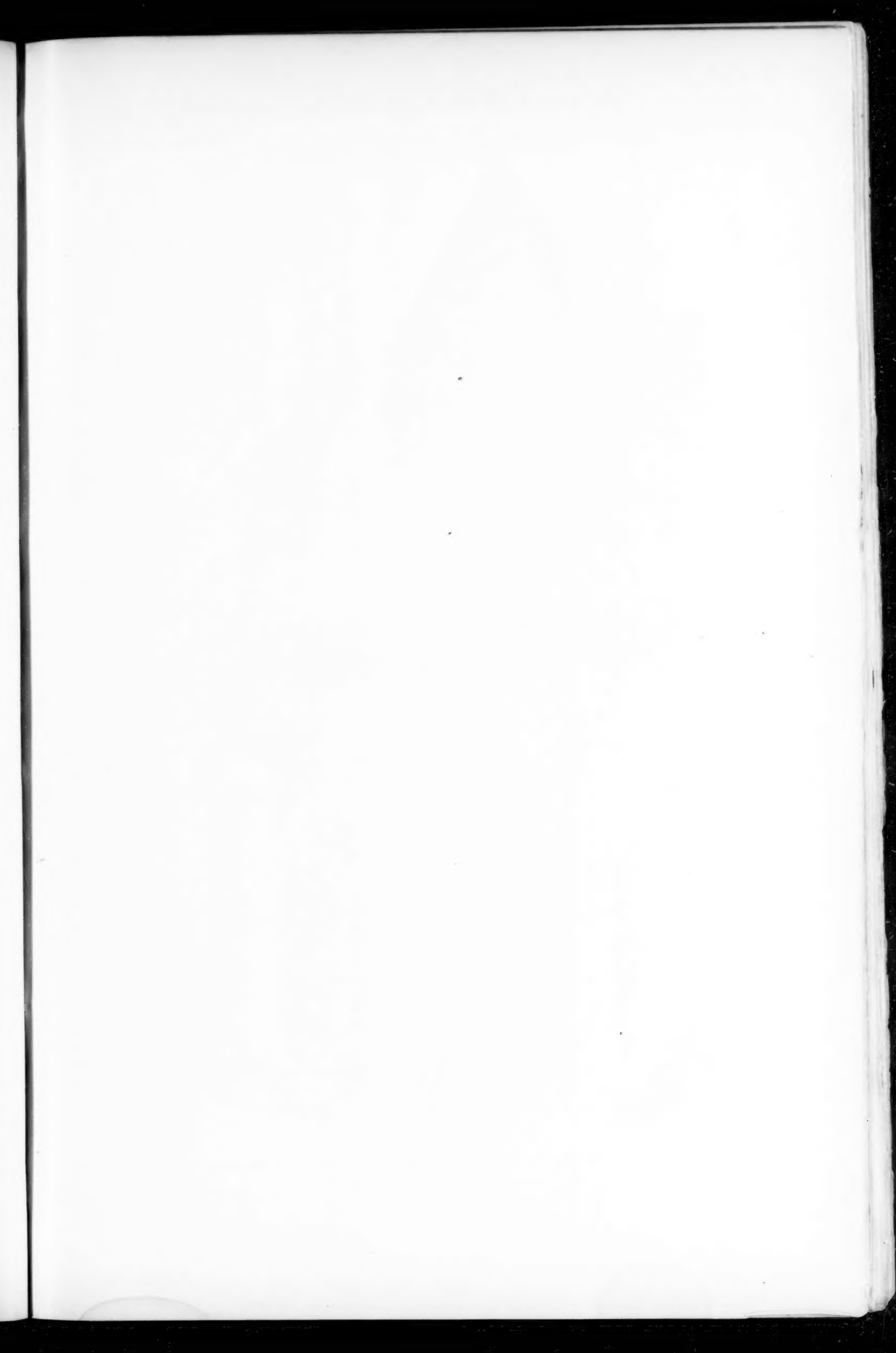
§ 38. At least two independent staircases, with direct exterior outlets, shall be provided for each gallery in the auditorium, and the same shall be located on opposite sides of said gallery.

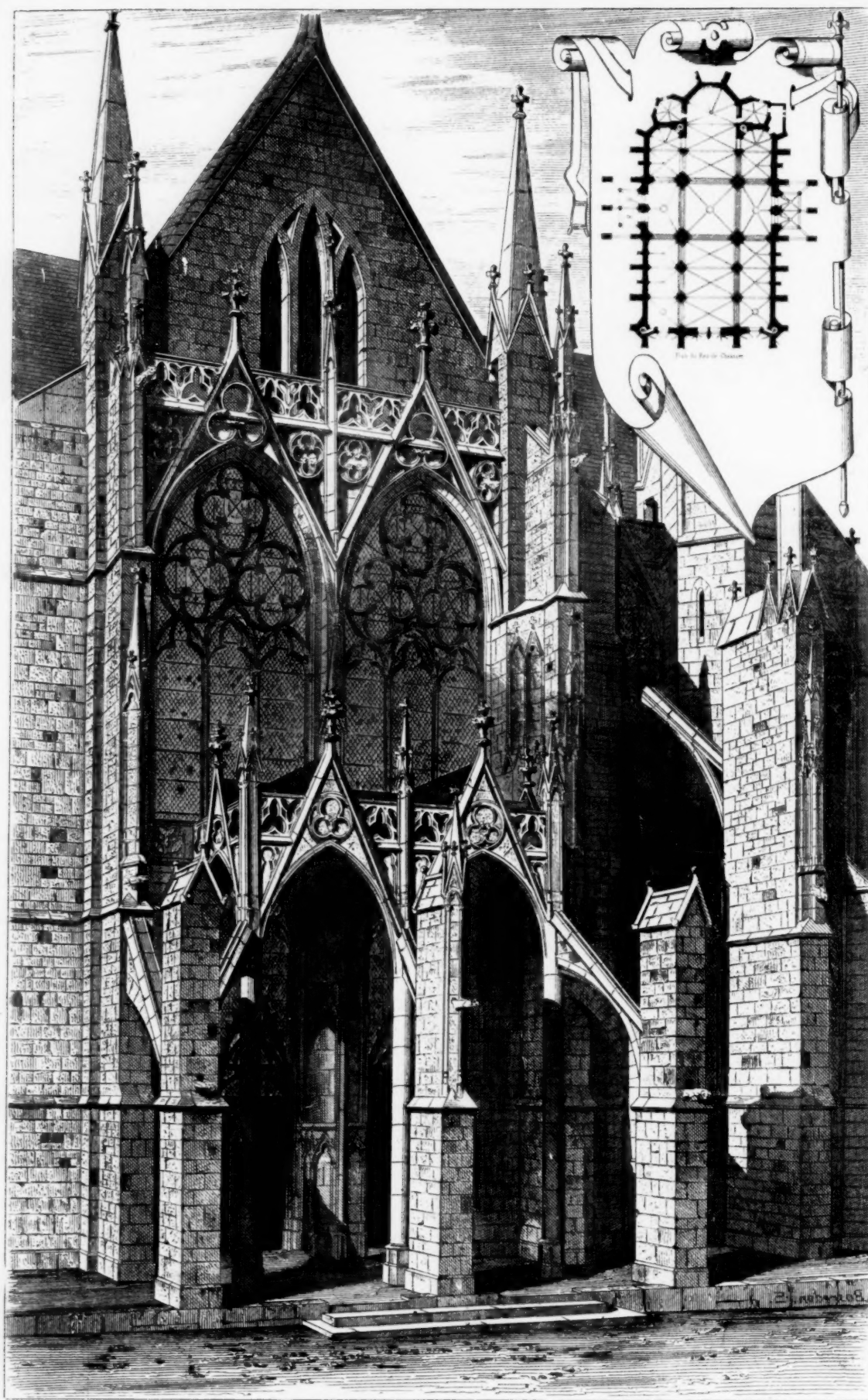
§ 39. At least two independent staircases, with direct exterior outlets, shall also be provided for the service of the stage, and shall be located on the opposite sides of the same.

§ 40. All stairways leading to the upper galleries of the auditorium shall be inclosed between walls of masonry on both sides.

§ 41. Stairs leading to the first or lower gallery may be left open on one side, in which case they must be constructed as hereafter provided for in similar stairs leading from the entrance hall to the main floor of the auditorium, but in no case shall stairs leading to any gallery be left open on both sides.

§ 42. Stairs leading from the entrance hall or vestibule to the main floor of the auditorium may be left open on one or both sides, provided the



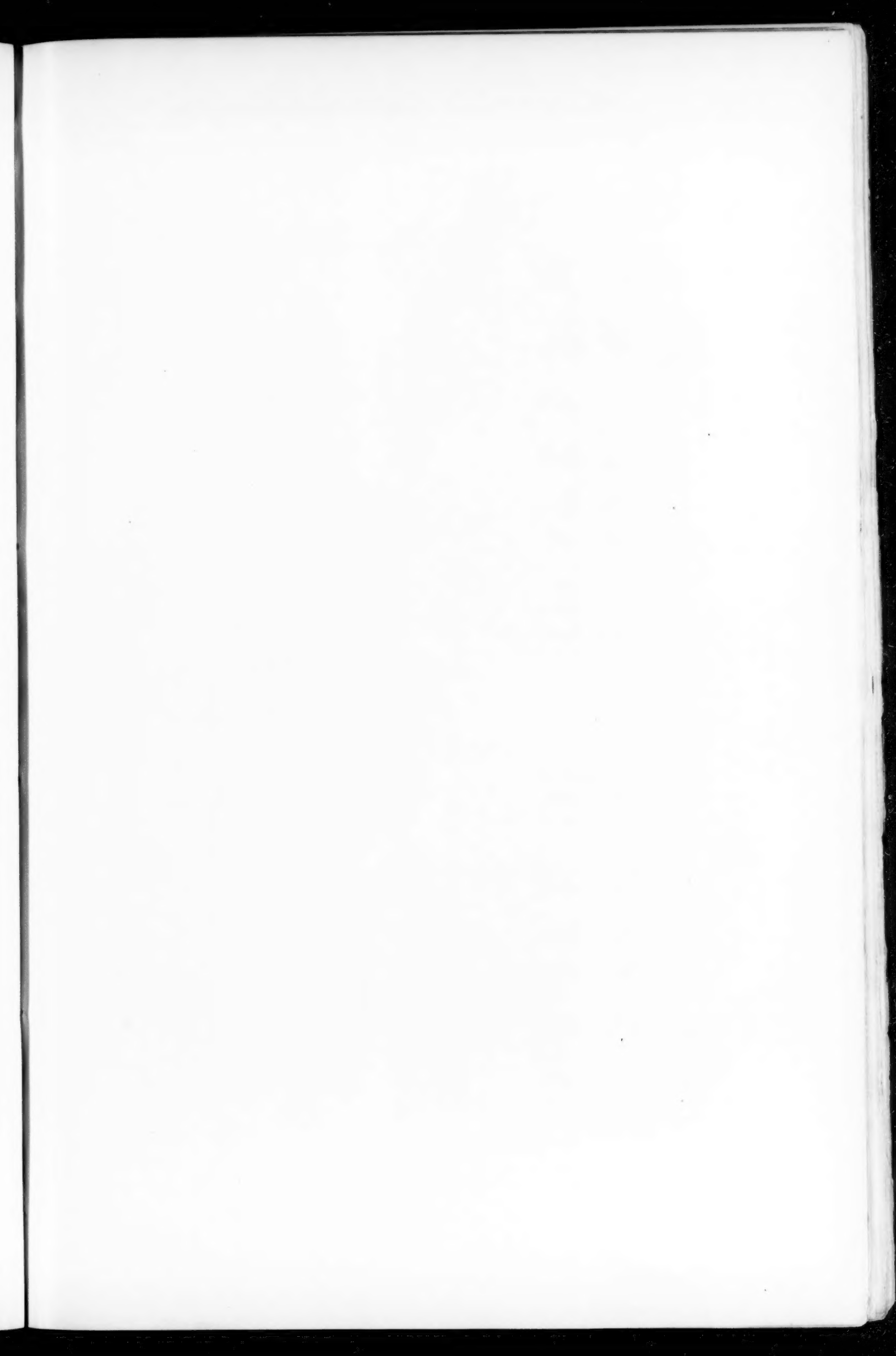


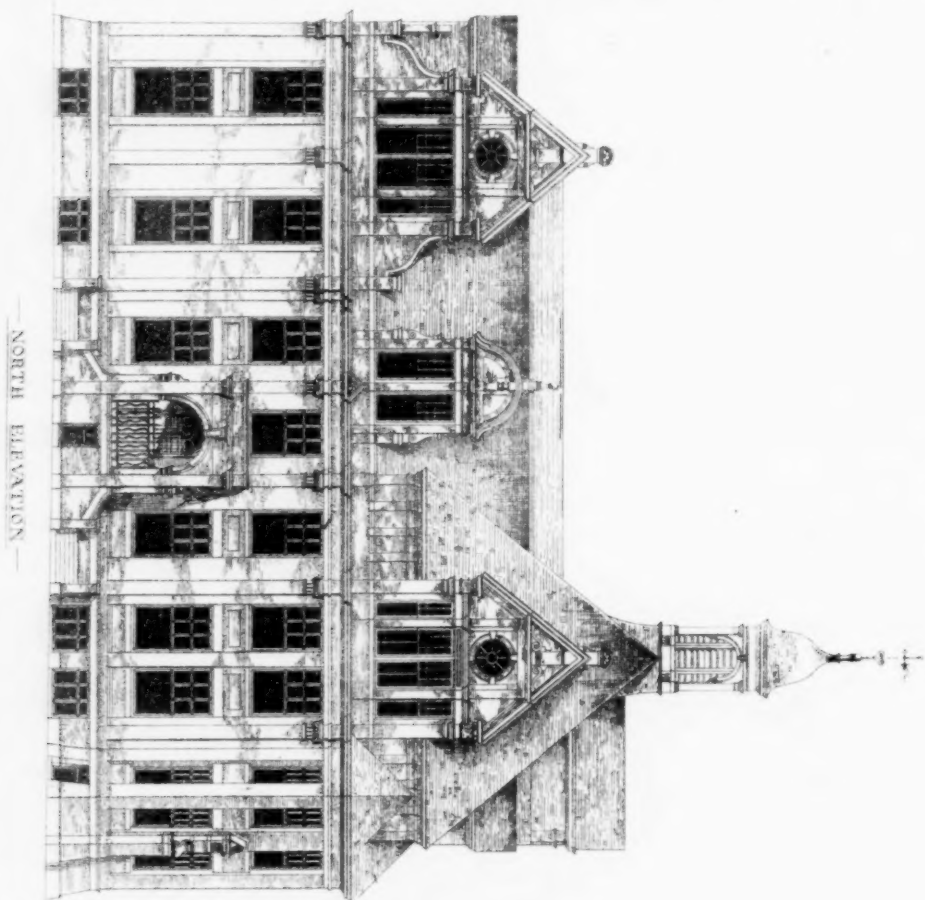
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MONITEUR DES ARCHITECTES.

LATERAL PORCH OF THE CHURCH OF ST. URBAIN, TROYES, FRANCE.

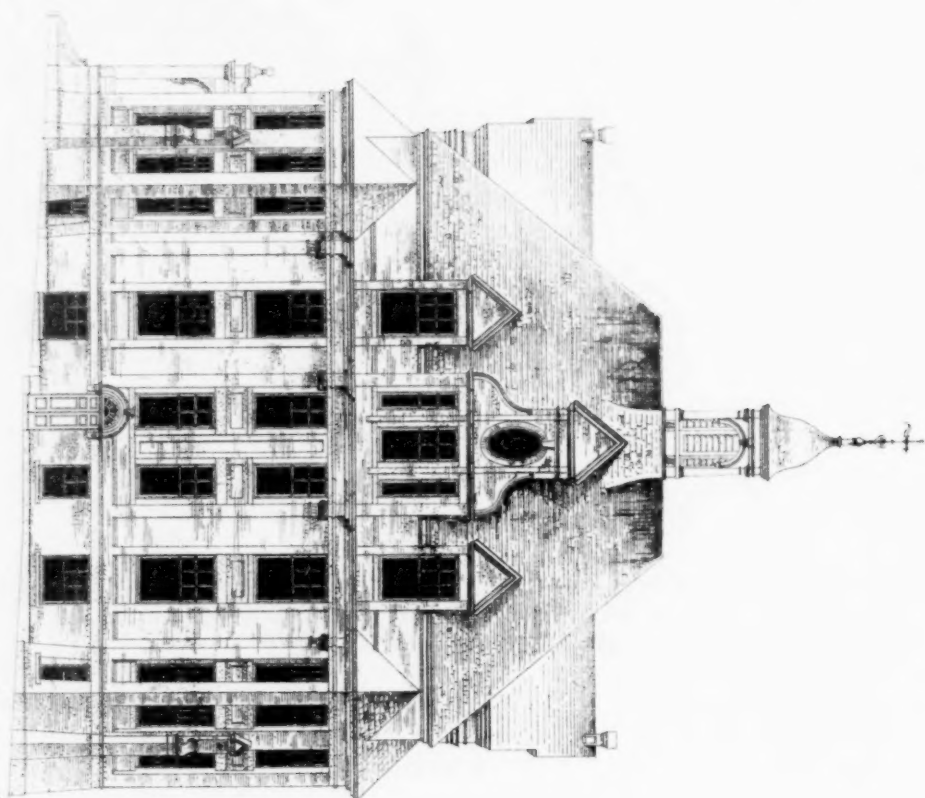
Drawn by MR. P. LORAIN, ARCHITECT.



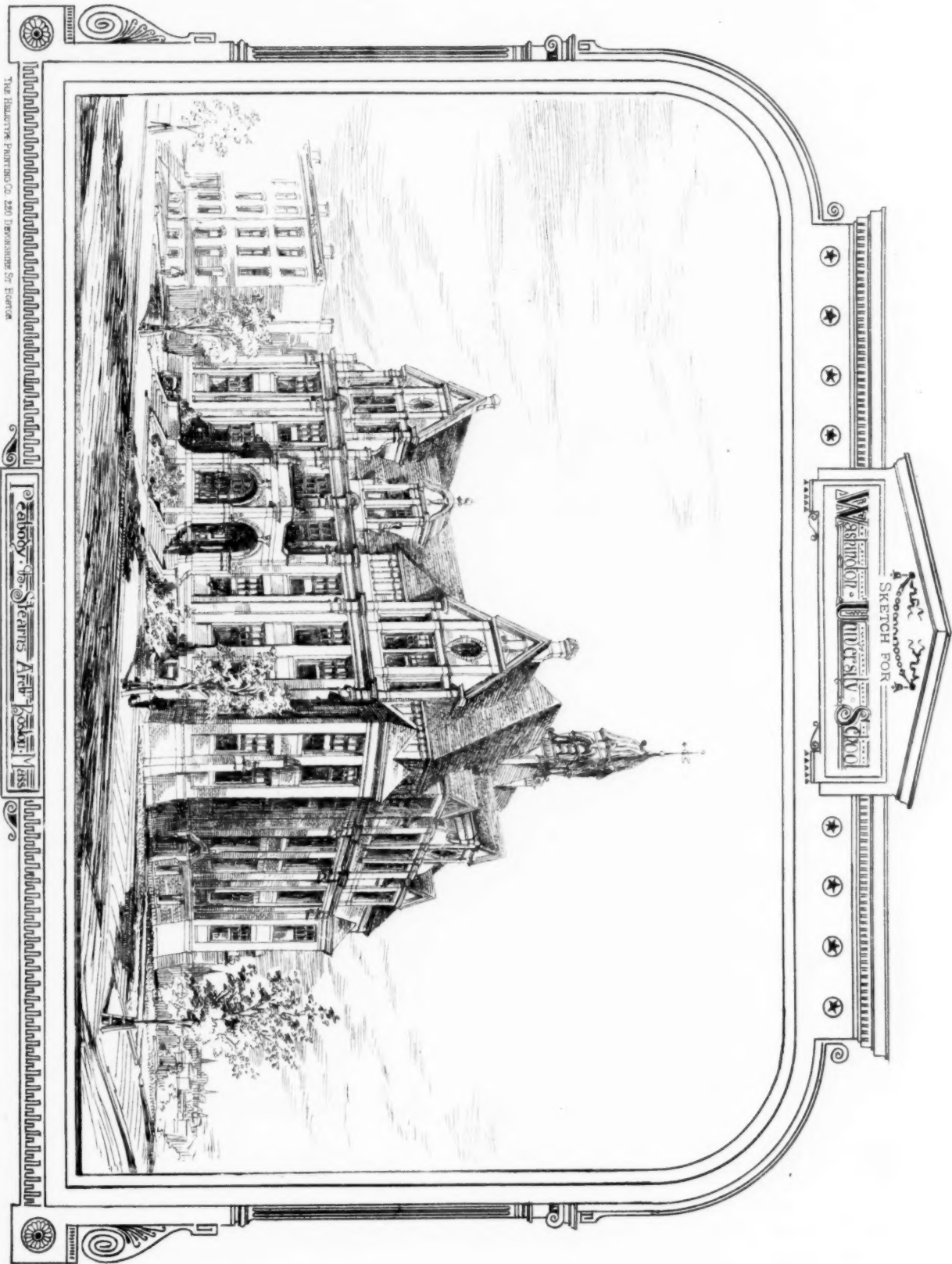


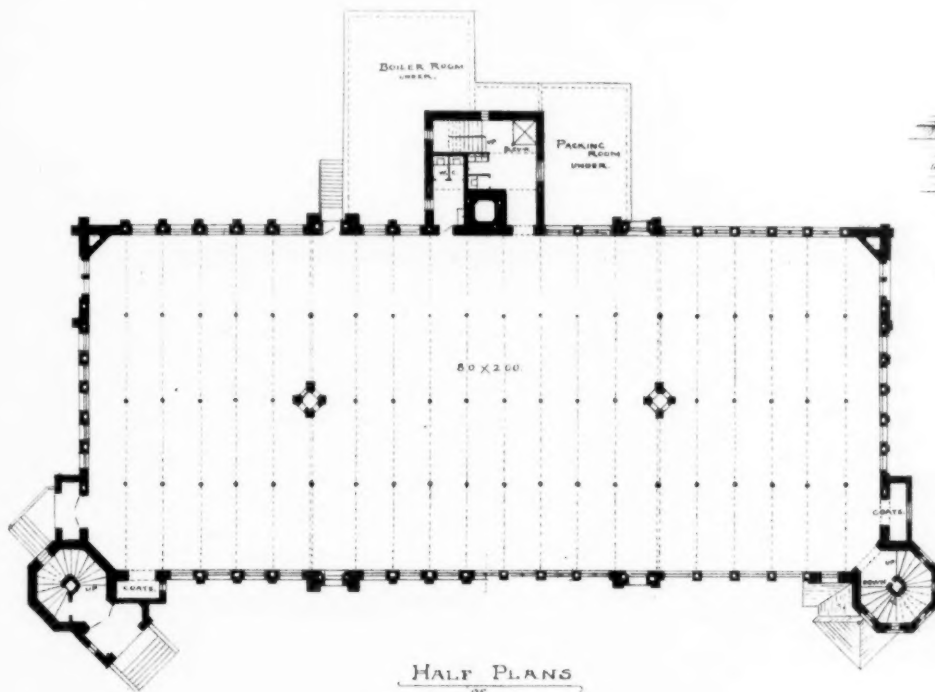
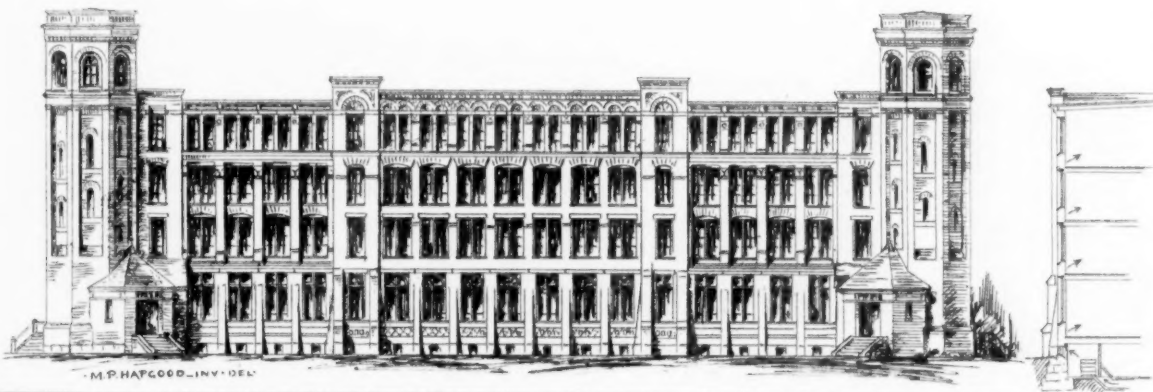
NORTH ELEVATION

SKETCH FOR WASHINGTON UNIVERSITY SCHOOL.



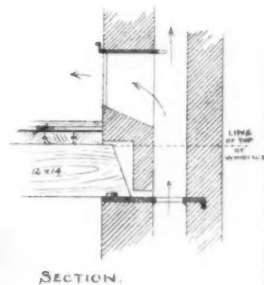
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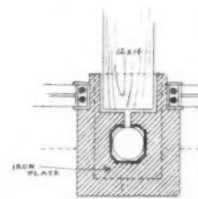


HALF PLANS
OF
FIRST AND SECOND FLOORS.

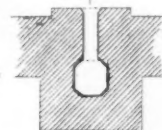
M. PHAPGOOD INV. ET DEL.
BOSTON, 1879.



SECTION.



PIER PLAN
AT CEILING.



PIER PLAN
AT FLOOR.

same be supported throughout on masonry or iron, and provided also that the end or ends of all steps, not built in or against a wall, have a strong balustrade firmly secured to said masonry or iron.

§ 43. When straight stairs return directly on themselves, a landing of the full width of both flights, without any steps, must be provided.

§ 44. Stairs turning at an angle must have a proper landing at said turn, introduced without winders.

§ 45. In stairs when two side flights connect with one main flight, no winders shall be introduced, and the width of the main flight shall at least be equal to the aggregate width of the side flights.

§ 46. Circular or winding stairs shall have proper landings introduced at convenient distances.

§ 47. All stairs over eight feet wide shall have, in addition to the above-mentioned hand-rails, a substantial railing, securely fixed in the middle of said stairs; an additional railing shall be introduced for each additional five feet in width of said stairs.

§ 48. Provision shall be made for the thorough ventilation of the auditorium, corridors, lobbies, refreshment and all other rooms intended for the use or accommodation of the audience.

§ 49. No stoves or open fires shall be allowed in any part of any theatre, except in the foyer or saloon and in the refreshment room. Nor shall any coils of pipe for heating purposes be permitted in the auditorium, or in any passage or corridor, unless the same be so introduced as to form no obstruction to the free circulation of the public.

§ 50. Any steam boiler which may be required for heating or other purposes shall be located outside of the building, and the space allotted to the same shall be enclosed by walls of masonry on all sides, and the ceiling shall be constructed of fire-proof material; doorways in said walls to have wrought-iron doors.

§ 51. Every theatre shall be provided with one or more steam pumps, with all the necessary appliances and of sufficient power to throw water on any part of the building. The capacity of said pump and appliances to be determined upon by the New York city fire department, whose approval also of any system to be employed must first be obtained in all cases. The said pump or pumps shall be located either in the cellar or on the ground floor in a suitable room which shall be separated from the theatre by brick walls; all doorways in said walls to have wrought-iron doors.

§ 52. Proper and sufficient reservoir or reservoirs, to be supplied with water from the street mains, shall be provided for the supply of the above-mentioned pump or pumps. There shall also be located, in or against the upper portion of the fire-wall between the stage and the auditorium, a reservoir which shall furnish an immediate supply of water to the stand-pipes and sprinklers hereafter described; and all of the above-mentioned reservoirs shall be kept constantly full.

§ 53. Stand-pipes in connection with said pumping apparatus shall be provided with hose attachments on every floor and gallery as follows, viz.: One on each side of the auditorium; also one on each side of the stage, and at least one in the property room, if the same be contiguous to the theatre. Said stand-pipes shall be kept constantly filled with water and shall connect with a thorough system of perforated pipes or sprinklers to be provided both on the stage and in the auditorium.

§ 54. A proper and sufficient amount of hose shall be kept always attached to each hose attachment.

§ 55. There shall also be kept in readiness, for immediate use on the stage, buckets of water, hand pumps, or other portable fire-extinguishing apparatus.

§ 56. Outside of every theatre, street hydrants shall be located for the use of the fire engines, the number and location of the same to be determined by the New York city fire department.

§ 57. A sufficient number of competent firemen, authorized by the New York city fire department of the locality, shall always be in attendance in uniform during any theatrical representation or whenever the building is open to the public, the number in each case to be determined by the said fire department.

§ 58. Every portion of the building devoted to the uses or accommodation of the public, also all outlets leading to the highway, shall be well and properly lighted during every performance, and the same shall remain lighted until the entire audience has left the premises.

§ 59. Gas mains supplying any theatre shall have independent connections for the auditorium and the stage, and provision shall be made for shutting off the gas from the building on the outside.

§ 60. Where interior gas lights are not lighted by electricity, other suitable appliances, to be approved of by the superintendent of buildings or other official deputed as aforesaid, must be provided.

§ 61. Oil lamps or candles shall be kept lighted during every performance whenever the superintendent of buildings may direct, as a precaution against any panic in case of the gas being accidentally extinguished.

§ 62. All suspended or bracket lights surrounded by glass, in the auditorium or in any part of the building devoted to the public, shall be provided with a proper wire netting underneath. All lights in passages and corridors, and wherever deemed necessary by the superintendent of buildings, shall be protected with proper wire network. The foot-lights, in addition to the wire network, shall be protected by a strong wire guard not less than two feet distant. All stage lights shall have strong metal wire guards or screens, so constructed that any material in contact therewith shall be out of reach of the flame.

§ 63. Every theatre open to the public shall be immediately closed if the manager neglects for one day to keep the reservoirs filled with water, the pumps in order, and to provide a sufficient and proper force to attend to the same.

§ 64. The number of persons at any one time to be admitted in the auditorium in excess of the seating accommodation shall be limited by the superintendent of buildings or other person deputed as aforesaid.

§ 65. No rubbish shall be allowed to accumulate in any theatre, but the same shall be removed daily, about one hour before the audience be admitted.

§ 66. All employes of theatres shall be at their respective posts one hour before the audience is admitted, actors and members of the orchestra excepted.

§ 67. The superintendent of buildings, or other deputed as aforesaid, shall cause every theatre open to the public to be inspected and reported upon daily, said reports to be duly entered in writing and signed in a book

to be especially provided for that purpose in the office of the department of buildings or in mayor's office.

§ 68. In some conspicuous place on every gallery or floor the regulations for the protection of the public against fire or other accident shall be posted, together with a diagram or plan of said gallery or floor showing distinctly the modes of exit therefrom.

§ 69. All acts or parts of acts, the provisions of which are inconsistent with this act, are hereby repealed.

§ 70. If the regulations and provisions above described do not, for any reason, apply to and cover the entire structure of any building intended to be used and erected for the above purposes, any part thereof not subject to such provisions and regulations shall be erected and built, or altered, in conformity with any law or laws thereof in force relating thereto.

§ 71. This act shall take effect immediately.

THE ILLUSTRATIONS.

A SKETCH FOR THE SCHOOLS OF WASHINGTON UNIVERSITY, ST. LOUIS, MO. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

LATERAL PORCH OF THE CHURCH OF ST. URBAIN, AT TROYES, FRANCE.

This illustration, which is borrowed from *Le Moniteur des Architectes*, represents the south porch of the church which Pope Urbain IV. began to build in 1262 in honor of his native city—Troyes. Work on the building was hindered by the monks of the powerful abbey of Notre Dame aux Normains. For this and other reasons the church was never finished, and was consecrated only in 1389, although for more than a hundred years it had been as complete as it was when the work of restoration and repair, now going on, was begun two or three years ago. The church is held to be one of the finest examples of the architecture of the thirteenth century, although even the closest examination leaves still a doubt whether it does not belong after all to the fourteenth century. The dates, however, are incontestable. The plan indicates the general disposition of the church. The porch, which was to protect the entrances in the principal façade, was never built, nor was the façade itself after it had been carried as high as the tympanum of the doorway. A tile-covered lean-to protects that portion of the building from the assaults of weather; the side-doors were protected by porches of remarkable construction, as can be seen in the illustration, the thrust of the vaults being resisted by the three great isolated counterparts, which are so detached from the body of the porch as not to mar its effect. The disposition and size of the piers in the first bays of the aisles indicate that it was the intention of the unknown architect to flank his main façade by a tower on either hand, as well as to have a larger tower over the intersection of nave and transepts; this, no more than those, ever existed, though in place of it a wooden spire was built, but was so often injured by lightning that it was finally removed in 1761.

SKETCH FOR A MILL BUILDING BY MR. M. P. HAPGOOD, BOSTON.

This design is intended to suggest some improvements in the common methods of mill building as regards slow-burning construction, free egress in case of accident, resistance to vibration, lighting, heating, and ventilation. Slow combustion is assured by compliance with the ideas advanced by E. A. in this journal, and needs no description here. Egress from the upper three floors is provided through the two octagonal towers, containing broad stairs centring on a brick core which would be provided at each floor with fire apparatus, the tank-room occupying the upper story of the tower. Separate exits are provided for the first story. Vibration, which exists more or less in all mill buildings, is here resisted by anchoring double, heavy beams into the wall at one end, and at the other into the ventilating flue, which, presenting an angle to the line of vibration, would offer great resistance; in addition, the side piers would be heavily buttressed. The staircase towers also stiffen the walls considerably. By concentrating strength at a few points the windows can be grouped more closely, thus giving much more light than by the old arrangement of single windows. The building would be warmed and ventilated somewhat on the principles advocated some time since in this paper by the writer of School-House Ventilation. A space would be reserved around the basement walls for a heating chamber where steam-coils would be introduced from the boiler-room; the pressure required would be furnished by blowers. Evaporating pans would of course be supplied, and the moisture acquired from the walls would not injure the air. The currents of warm or cool air would be forced through the flues, placed at regular distances, thus drying the walls, preserving the ends of timbers, and issuing at each floor. These small, separate currents would cause no strong draught, but would insensibly warm and purify the room, and would escape through the two middle flues, which would be fitted with automatic hatches at each floor.

CORRESPONDENCE.

THE GIRALDA.—THE ALCAZAR.—THE CATHEDRAL

SEVILLE.

CHRONOLOGICALLY, the Moorish remains at Seville ought to have been described after those of Cordova, and before those of the Alhambra in my last letter; but this most fascinating of Spanish cities contains so many interesting monuments of different periods, and is so characteristic in itself, that a whole letter devoted to it will be none too much. Its chief monument is the immense cathedral,

whose crowning glory is the celebrated Giralda tower, built at the end of the twelfth century. The latter in solid grandeur has but one rival, — the tower of St. Mark at Venice. From the two great maritime countries of the Middle Ages these huge beacons signal across the Mediterranean the same note of power and magnificence. The Campanile of St. Mark, though of about the same proportions, has slightly the advantage in size, for which, however, the skilful decoration of the Moorish example more than compensates. The latter is forty-five feet square at the base, and up to the height of 185 feet is old Moorish work; but from this point rises a sixteenth century addition, ninety feet high, whose airy grace crowns not unworthily the solid shaft below. This solidity is cleverly accentuated and decorated by six stories of small but elaborately cusped and decorated windows. On each side of this central motive is a lofty compartment of mural cusped arcades in brick. These motives, in addition to their exquisite design, give scale to the gigantic mass, which thus escapes, with no loss of dignity, the boldness of St. Mark's. The tower takes its name from the weather-cock (*girar*, to revolve) which surmounts it in the form of a bronze statue of Faith, — hardly appropriate for a weather-cock, — which, though weighing 2,800 pounds, turns with every breeze. The early Moorish tower is supposed to have been crowned by four enormous brass balls. The ascent here, as at St. Mark's, is by thirty-five inclined planes, so that a horseman can ride to the top. The inclined plane is a Byzantine characteristic found in St. Sophia and Greek churches, where the ascent to the gallery set apart for women is by an inclined plane. Another peculiarity in the Giralda is that, reversing the usual plan, the walls grow thicker as they get higher, and finally close in like a conical vault, which seems intended to give increased stability.

Opposite the cathedral, at the corner of which stands the Giralda, is the royal palace or Alcazar, and, as its principal hall is of about the same date as the Giralda, it is better to examine it at once. The only façade of the Alcazar which has any architectural interest is reached after traversing several courts, and the visitor to the Paris Exhibition will at once recognize it as having supplied the *motif* of the Spanish façade there. It is light, elegant, and of nearly the same style as the Alhambra. The dainty little colonnettes of the galleries in the second story are of fine marble, and the walls are covered with gold and colors, and yet the general effect is not glaring. The Duc de Montpensier gave \$50,000 for the restoration of this façade, which, however, has been clumsily and carelessly done. The entrance to the great central court — Patio de las Doncellas — has lately been changed and complicated, and now one suddenly stumbles into it. Around it fifty-two slender marble columns, chiefly arranged in pairs, support the second story of the gallery. This upper story is Ionic, and appears absurd and paltry above the elegant arcades below, which are beautiful examples of the fourteenth century, and rival those of the Alhambra. The doors, which give access to the apartments opening from the court, are better preserved than those of the Alhambra, and are beautiful specimens of the inlaid work of the period. The celebrated Hall of the Ambassadors was so restored in 1569 that it is no longer a pure example of the best Moorish work, but it still retains its superb wooden dome with inlaid patterns, and the walls covered with stucco tracery, just as I described in my letter from the Alhambra. The azulejos, or tiles, in the dado are of the best period; but a restoration of the sixteenth century added Rococo balconies on each side and a frieze of portrait heads, which must be very valuable to the historian to reconcile the artist to the mutilation of this splendid hall. We must not complain, however, for our generation is responsible for a restoration of the color in the wall patterns, which is still more crude and false in tone than the more recent efforts at the Alhambra. It is a relief to pass from this glare of paint and gilding into the lovely little Patio de las Muñecas, whose dainty proportions and elaborate lace-work of delicate reliefs make it one of the most beautiful Moorish examples. Its present creamy whitewash is certainly more agreeable than anything short of the most perfect polychrome. It is very small, and the three stories of galleries surrounding it remind us that our hideous wells for light in city buildings have been and may be made a beautiful feature in themselves. After this there is a series of handsome halls, all of historical interest, unfortunately proved by the restorations introduced by different Spanish sovereigns who have lived there since they expelled the Moorish princes, down to Queen Isabella of our day. Unlike the Alhambra, the second story offers an important suite of rooms. Among them the most interesting is the tiny sixteenth century chapel, only 15 feet by 12. It is covered with cinque-cento tiles, and is counted the finest specimen of Christian decoration in Spain. Very fine are also the Arabian tiles in a hall near the garden, now used as a stable! The gardens themselves are laid out like those of Italy, with their faults and beauties. Quaint, pretty walks, ponds and water-works, tasteless grottoes and poor architecture; but criticism is disarmed by the brilliant sunlight and shadow which in this southern land is the leading decorative motif; and the works of men, good and bad, are alike but playthings for its powerful display.

A word to those who wish to make studies in the Alcazar. Unlike the Alhambra, permission is with difficulty obtained to work here, and can only be had on applying to the Intendant of the Palace at Madrid, and so the traveller, if coming from the north, will do well to apply when at Madrid.

The Giralda tower stands at the corner of another of these de-

lightful Moorish courts filled with orange-trees, of which I wrote in my last letter. This court resembles that of Cordova in its walls of tapia and lofty horseshoe gateway, but in place of the former mosque, and following its walls, rises the immense cathedral built in the fifteenth century — the largest of mediæval Gothic cathedrals. It has several aisles, the two exterior ones blocked up by chapels. The central aisle or nave measures fifty-six feet from centre of piers, while the total width is 298 feet, with 415 feet for its length, to which must be added a noble Plateresque chapel in the rear. The nave is 145 feet high, and rises to 171 feet at the Cimbório or transept dome. Although the seven lofty walls, crowned with a half Moorish, half Renaissance ornament and flat roofs, externally suggest little of Gothic influence, except at the unfinished transept gable, the interior is no compromise, but frankly and magnificently Gothic. The vast majesty of its mighty piers and lofty vaults can only be compared to those at Milan; but here in the dim gray light there is a solemn simplicity wanting in the theatrical effect of the Italian interior. The aisles are divided into nine bays, and the transepts do not project in plan, but have the height and width of the nave. Here, as in all Spanish cathedrals, the choir is placed in the nave in front of the transept crossing, which thus separates it from the high altar, usually occupying the two corresponding bays behind the transept. As the choir is always walled in — and often the altar — the only place in which the people can at all assist in the service is in the transepts and the crossing, and so to keep open the communication between choir and altar there is a small passage railed off between them, an amazingly ugly device which betrays the incongruity of the whole arrangement. The unfortunate effect of thus blocking up the nave is familiar to us generally by the discussion in England in regard to the rood-screens, many of which have been removed from the cathedrals; but in Spain the result is worse, as the choir occupies a more central position in the nave. As in most of the Spanish cathedrals, the screens of sculptured stone and wrought-iron, the shrines and chapels, sacristies and dependencies form a wonderful museum of art, of which I have not the space to give even a *résumé*. Certain things, however, as typical of Spanish art, I must mention, such as the magnificent gilt *reja* or wrought-iron railing which rails off the choir from the transept crossing, and the one opposite enclosing the high altar. They are formed of lofty iron bars, simply tied together, but crowned by a large gilt design of figures; these are spirited, and often ingeniously arranged to present with the same outline different figures and subjects on opposite sides. They date from the first of the sixteenth century. In general, I may add that no country seems to me so rich in wrought-iron work as Spain, to which may be added the interest of seeing the things in place, instead of collected in museums. The vast retablo behind the high altar is a grand specimen of elaborate Gothic carving, with forty-four panels of figure-subjects, nearly life-size. Typical are also the great organ screens, which reach nearly to the roof on each side of the choir. They date from the end of the eighteenth century, in the Rococo or Churrigueresque (from the chief architect of that period) style, and like many works of that age of debased design, apart from their details, produce a fine effect by their fine proportions and sumptuous wealth of ornament. A striking characteristic of Spanish organs lies in placing a certain number of the pipes projecting horizontally, and the monotony of the perpendicular rows is varied with this bold fringe of trumpets. The effect in their sombre churches is startling, and, in a modified form, might help our own hackneyed designs.

I have hinted at the solemn gray light which pervades the vast building; the windows are so high that it is rare to see strong shafts of light anywhere; while there are fewer absolutely dark parts than in many other Spanish churches, this diffused twilight gives the solemn tranquillity which characterizes this cathedral, and which the Spaniards called "Grandeza," or solemn, just as they characterize that of Leon, the Elegant, while strength is peculiar to Santiago, and wealth to Toledo. There are ninety-three windows filled with glass, painted, I think, which is effective if not of extraordinary merit; the best was done by Flemings in the first half of the sixteenth century. Generally speaking, the colored glass in Spain is strong and effective, rather than pure or beautiful; yet in their peculiarly dark interiors the result is nearly always fine, and wins more admiration than finer glass often receives in other countries.

The many pictures, bas-reliefs, statues, etc., worthy of interest, in the side chapels, I must pass over, only remarking that the celebrated San Antonio of Murillo, which in 1874 was cut out of the canvas, and recovered for the Spanish Government by Mr. Schaus, in New York, has been cleverly sewed in again, and shows little or nothing to mark its trip to America. I am unwillingly forced, also, to content myself with the mere mention of the two beautiful Plateresque halls, the Sacristia Major and the Sala Capitular, designed by Diego de Riaño, about 1530. In these all the elegance of proportion and detail which characterize the Italian cinque-cento style is found on a far grander scale, while the ornaments and sculpture are more spirited and realistic than the cold arabesque of Italy. The bas-reliefs reminded me of Carpeaux's spirited figures. There is a concentration of ornamentation in opposition to plain broad surfaces surpassing the best French examples of this period, such as the chevet of St. Pierre at Caën, and the interior of the domes of this style are peculiarly light, and very judiciously decorated.

The Sala Capitular solves the difficult problem of arranging an elliptical plan, 50 by 34 feet, and does so with extreme elegance.

They both have beautiful marble pavements, as well as pictures by Murillo, while the Sacristia contains magnificent specimens of silversmith's work and gorgeous vestments. There is another smaller but exquisitely designed sacristy by this same Diego de Riaño, who was certainly an architect of the first rank. The great chapel behind the high altar is also a fine Plateresque example. Its dome has an ingenious arrangement of high bas-reliefs in panels, the lowest row having heads with the whole bust, and this is cut off in a higher circle of panels, and higher still the heads are on a smaller scale, which gives lightness to the dome.

At right angles to the cathedral is the Capilla Real, really a good-sized church. It was built only ten years after the death of Diego de Riaño, but its vulgarity shows how soon a decadence can set in after the loss of a master genius, if the art itself is no longer a spontaneous and truthful expression. In Spain, as in France, the revival of classic taste and details produced, when first grafted upon the light and truthful construction of Gothic architecture, a refined and elegant style, which was soon borne down before the tide of a vulgar and artificial period. The beautiful early Renaissance designs must, however, be laid to the credit of Gothic architects, for it may be said that this style lasted only during the life-time of a generation brought up in Gothic principles, which they continued under the new forms. As if to make a fair comparison of the two styles, there are in the chevet of a small church at Caén two chapels, side by side, the one late but very refined Gothic; the other, with exactly the same construction and dimensions, is Renaissance of the time of Francis I. They must have been built about the same time, and certainly show the same qualities in design. Each is extremely elegant, and one must be prejudiced to indicate a preference. If the character of our art requires us to ring the changes on previous styles, we might well have turned aside for a moment on our transit from Gothic to Queen Anne, to learn how classic refinement, when grafted on to the former, can produce something better than the distorted proportions and clumsy details of our last fashion. A fine example of an exterior design in this Plateresque style is found in the city hall, a large, imposing building, though it is not high, and has not the immense roofs which helped French architects so much in their designs. Its delicate mouldings and sculpture are beautiful; unfortunately they are restoring and adding to it, which will probably injure its future aspect.

Now that we have in some sort, guide-book in hand, reviewed these chief monuments, let us, on our way to some of the other many interesting buildings, join some of the lazy, happy painters who are rambling, in aimless enthusiasm, about these charming streets, which the modern Spanish school has immortalized, or which perhaps have immortalized it. At any rate, the heart of an artist can ask no more delicious effects than the splashes of sunshine which here and there invade the pale, cool shadows of these narrow, winding alleys, — for they are hardly streets, the most part too narrow for carriages. They are paved with large flags, kept as clean as a Dutch kitchen. The houses are universally whitewashed; but centuries of these washes seem to have given a soft tone, which, especially in the shadow, is peculiarly delicate. Iron bars defend all the windows, and generally rise, cage-like, from a narrow balcony which projects only enough to give place for flower-pots. All iron-work, gratings and gutters, is painted emerald green, as invariably as the convention for tinting engineers' drawings. This, with the red and blue flower-pots crowding the windows and balconies, brightly relieves the monotony of the white houses, many of which are flat-roofed, with parapets also covered with flowers. Imagine these simple flat walls — there is rarely an architectural feature on them — crowned with brilliant flower-pots, or the yellow and red tiles of the roof itself blooming with blossoming weeds; imagine these walls flecked with sunlight and soft shadows, relieved against a superb blue sky; and you have a fine study of sunlight at every step; and but a few more steps in any direction, and you will close the vista down the street by a Moorish tower, or a fantastic Rococo dome incrustated with the most brilliant of blue and green tiles. Then, for the foreground you will have hardly a minute to wait before a Murillo type of beggar, with his rich brown cloak, appears, or a knot of gypsies, or bright-kerchiefed peasants on their donkeys. When he first enters these narrow streets, a charming surprise awaits the stranger, which becomes, later, a never-ceasing source of pleasure to him. This is the glimpse into the interior courts of the houses through their open doors, — or rather doorways, for the doors themselves are replaced by delicate iron grillage, almost like cobwebs spun across the openings. Through these is seen the cool, marble-flagged court, with statues and palms, flowers and fountains; and here, in the warm evenings, the family gathers, quite indifferent to the gaze of the passers-by. It is a Moorish translation of the Pompeian courts, and one which yields nothing in romance and charm to the more classic life of a Glaucus. Of that life under the shadow of Vesuvius we know by ruins and fables; here one may enter into the living Eastern counterpart of it. The same gay, careless existence; the siesta and idling by day in the darkened rooms; all gayety and animation in the courts and streets by night. The courts of the poorest houses have their flower-pots; whilst those of the wealthy are surrounded by handsome arcades with palms and orange-trees, around a handsome fountain in the centre. The finest of these comparatively modern houses can, however, in no way rival the earlier ones. Thus, in a Moorish mansion belonging to the Duke of Alba there were

formerly eleven of these courts, nine fountains, and more than one hundred marble columns. Of this only a portion remains now; but that offers a splendid example of the earliest Moorish style, with a two-storied, richly decorated gallery about the great court, beautiful Artesonado ceilings and domes, and Persian tiles.

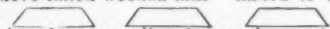
Better preserved than this, but less pure in style, is the Casa de Pilatos. It was built by a rich nobleman and patron of the arts, in the fifteenth century, — but as a close copy of the style of the preceding century; hence there is a strong mingling of Gothic influence in the details. Here, again, are superb wood-inlaid cupolas and ceilings. The Virgin's Chapel is a sumptuous example of this mingling of the Moorish and Gothic styles: its vaulting, for example, pure Gothic, and the walls covered with Moorish patterns. The staircase is magnificent, from the floor to its splendid dome covered with the finest blue and green tiles, in Persian patterns. There are two stories of magnificent rooms. Other houses there are which retain one or two rooms intact from the Saracen period; but these two are the finest.

As for the churches, they are inexhaustible; and, besides the large number mentioned in the guides, one comes upon many others attached to convents which are little known, and with difficulty visited. The interesting ones are chiefly of two periods. Those in which, after the conquest of the Moors, the exquisite art of the vanquished was applied to Christian building, and the great churches built in the sixteenth and seventeenth centuries. The former style is called *Mudejar*, and, though not very homogeneous, has many very beautiful characteristics. Fine brick towers, with cusped Moorish arcading, magnificent open roofs, with inlaid wood-work, rich tiles, etc., distinguish them. They are built with one simple nave and apse, the towers standing semi-detached. The other set of churches have nave, transept, central dome, and apse. The exteriors of the central dome and of the two smaller domes or towers, rising from the façade, are covered with bright glazed tiles, and incrustated with brilliant azulejos, — generally blue or green. As if this were not bright enough, the architectural lines are often picked out by red paint! Nothing but the intense brilliancy of the sky, the white houses, and green trees which shade the many little squares, could save these buildings from hopeless vulgarity; but their bold proportions, with strong effects of light and shade, make them appropriate to the blaze of color about them. Within they show an equally deplorable taste, but a most extraordinary skill in conceiving and executing *baroque* ornaments. The high altars here rise to the vault of the apse in one mass of gilding. Small pieces of looking-glass are introduced among the confusion of details and statuettes, which make a hardly more distinguishable mass than the honeycomb vaults of the Moors. All this is barbaric; but by its very sumptuous richness, and the skill with which the end sought is attained, it cannot fail to excite wonder, if not admiration. The wrought iron, generally gilt and painted, is really fine, and the organ screens (as I have previously hinted) most effective.

SLOW-BURNING CONSTRUCTION.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — I fear that the discussion with C. may have come to a lame and impotent conclusion in respect to the remedy for admitted evils, for reasons to be given presently. First, however, let me explain one point. We are so accustomed to speak of lath and plaster that I may have used the latter word where I meant *lime mortar*. We should not advise putting plaster of Paris (gypsum) on either wood or iron.

By enclosing wood in plastering, I have intended to mean covering a beam on three sides with lath and plastering, and on the top with a water-tight floor, so that no air could reach the beam except through one or the other; and also without much regard to the contact of the mortar. In other words, we advise the least possible furring or airspace behind the mortar, and in many cases mortar has been put on with what we call "dove-tailed wooden lath" nailed to the timber or ceiling, like this  with no furring whatever, so that the mortar lies close to the wood.

We can designate many floors laid in mortar in Rhode Island that have stood over thirty years; many beams protected with mortar and many roofs with shingles laid in mortar. The latter method we often advise both for safety from fire and to promote the durability of the shingles.

In respect to the use of three-inch plank for floors, I am at a loss to understand how there would be a waste of material in matching; on the contrary, I should expect a saving as compared to tonguing and grooving boards, because both the planks would be grooved and a spline inserted to match them. There would be no loss like that in making a tongue.

In respect to the dampness of hollow walls, we cannot feel assured, as the condition of the factory differs so much from that of the city warehouse; but since this discussion began, one of the buildings which I have designated as dangerous has been on fire, and the fire passed from the second to the upper story on the back side of the plastering of a *party-wall* from which it was furred off; it is safe to say that the damage was one hundred-fold what it would have been had the building been constructed in the factory fashion as to the *party-wall* only. In this building, as in many others, there was an expense incurred in outside decoration that would have paid the cost of safer inside construction ten times over.

C. alleges that the remedy may lie with the underwriters, and this is true. The mutual underwriters have applied the remedy with great success, but it is useless to expect a remedy to come from the present method of competitive underwriting under the stock system, for reasons that would take too much time and space to give.

Neither has the writer any great confidence in building acts or legislative interference. He must end as he began by saying that the money often expended in attempts to produce architectural effect in outside construction would have made buildings within his knowledge more fit for use and vastly safer if it had been in part devoted to better methods of inside construction.

All that is needed in the matter seems to be that many architects and builders shall be as well trained in the principles of slow-burning construction as a few of their number now are.

It can hardly be that the owners of property who are so willing to spend very large sums of money for architectural effect should be unwilling to consider the suggestions that may be made by architects for greater safety. I must still adhere to my belief that safety and economy can be as well combined in a city warehouse, school-house, or church as they have been in cotton factories; and as I know that this discussion has served as an incentive to several young students of architecture to study the factory problem, I hope you may soon have some designs for factories submitted to you that will meet these conditions and not be subject to the charge of "dreariness" in effect.

E. A.

PUBLICATION RECEIVED.

HYGIENE AND PUBLIC HEALTH. A Treatise. Edited by Albert H. Buck, M. D., American Editor of Ziemssen's Cyclopaedia of the Practice of Medicine; Instructor in Otology in the College of Physicians and Surgeons, New York; Aural Surgeon to the New York Eye and Ear Infirmary. Two vols. large octavo. New York: William Wood & Co. 1879.

NOTES OF EXPERIENCE AND INEXPERIENCE.

34. **STOVE.**—Perhaps Subscriber can induce his client to use one of Musgrave's slow-burning stoves. It would be expensive, as it would probably be necessary to import one from England; but it would prove economical of coal and afford agreeable heat.

Eds.

36. **INLAY ON MARBLE.**—It is desired to fill in sunk letters on a white marble monument with some black cement that will take a polished surface and not be affected by exposure to the weather. Will some one recommend a material?

R. B.

NOTES AND CLIPPINGS.

PROTECTING THEATRES AT MUNICH.—In connection with the various remarks on theatres in other parts of the paper, the following condensation of the theatre ordinance at Munich, which we copy from the *Fireman's Journal*, is of interest: Telegraph wires shall be fixed in the theatre building, to connect with the room in which the fire alarm apparatus is located. The proscenium, except its opening, shall be separated from the auditorium by reasonably thick and fire-proof walls. A metal curtain suspended from wire ropes shall close the opening of the proscenium, thus separating it from the auditorium, and shall only be raised during performances; great care shall be taken to have it at all times in suitable condition. The proscenium shall not be used as a store-room for scenery or other theatre articles, or the room above or below. No more scenery than is necessary for two scenes shall be placed in position. Exhibition of pyrotechny, rockets, etc., shall only be permitted when each piece of timber of the proscenium, and each article of decoration, has been rendered fire-proof. Wardrobes and green-rooms shall be located in such a position as not to interfere with the exit of the spectators, and the suspending of vestments in the passages is strictly forbidden. Should the ordinary doors be insufficient to afford a quick exit, others shall be provided and kept in readiness, and shall be marked to be such in large and plain letters; they shall, moreover, be closed only by a common bolt from the inside, easily reached and withdrawn by the hand. Store-rooms for decorations or any other articles shall not be situated within the auditorium, nor shall the lofts be used as such, but shall be kept in apartments separated by a wall from the theatre. The windows of green-rooms shall not have bars or net-work of iron; moreover, a sufficient amount of rope-ladders shall be provided and kept on hand, for immediate use, etc.

THE ALBERT MEMORIAL.—The late Sir George Gilbert Scott, architect, once said: "The Prince Consort Memorial (in Hyde Park) being my most prominent work, those who wish to traduce me will naturally select it for their attacks. I can only say that if this work is worthy of their contempt I am myself equally deserving of it, for it is the result of my highest and most enthusiastic efforts."

ELECTRIC LIGHTING FROM A DISTANCE.—On the evening of July 12, the Maxim electric light was put in operation on the tower of the Grand Union Hotel, Saratoga Springs, N. Y., with a view to test the extent of its illuminating powers. An open parabolic reflector was used—no lenses—and care was taken by Mr. Maxim to set the points of the carbons a little at one side of each other, and to adjust them to the exact focus of the reflector. When this was fairly accomplished the light was turned toward a spot in Ballston Spa, New York, 7½ miles distant, where, by previous arrangement, a group of several hundred persons were assembled to witness the experiment. So powerful was the light, so accurate the focusing and alignment, that the designated place in Ballston was instantly illuminated, so that ordinary print could be read, the time seen on watches, etc. The night was clear, still, and dark. The experiment was made at 9½ o'clock P. M. This is believed to be the greatest distance at which illumination of equal degree has been accomplished. — *Scientific American*.

WESLEYAN vs. CHURCHMAN.—A cause of interest to antiquaries and architects was tried at the recent assizes at Leeds before Lord Justice Bramwell and a special jury. A report of the trial is given in the *Eastern Morning News* of August 7. The plaintiffs were Messrs. Botterill, architects, of Hull, and the defendant was the Rev. R. Y. Whytehead, of Nunkeeling. At a few miles from Hull is the church of Skirlaugh, which is well known as a valuable example of architecture from its style, and from its having been but little added to or altered, and from its being dated. It has been noticed and illustrated by Britton, Pugin, and other writers. Some parts of it, especially the elaborate parapet and pinnacles of the tower, have become decayed, and accordingly it was decided, about a year ago, to restore it. A committee was appointed, and Mr. Botterill was chosen to carry out the repairs. The defendant, who lives in the neighborhood, being informed that considerable repairs were contemplated, and that the proposed architect had little or no experience in that kind of work, wrote a memorial to the committee requesting them to take care that no unnecessary demolition should take place, and that "the work be placed in skilful and experienced hands." This memorial was sent to various societies and individuals, and after having received numerous signatures was duly forwarded to the committee. Besides this the defendant wrote a private letter to the chief donors to the restoration fund with the same object, and stating that Mr. Botterill was "a Wesleyan who could show no experience in Church work." He wrote another letter of similar import to the vicar, which letter had been destroyed, but the contents of it had been transcribed from memory and were taken as evidence. The plaintiff in consequence brought an action against the defendant for libel. The main charge of libel was founded by the counsel for the plaintiff on the words "is a Wesleyan." The defendant urged that the plaintiff had what might be called "no experience in Church work," and called several witnesses to prove that the drawings made for the restoration were inaccurately copied from the old work, that the course proposed to be pursued was not necessary or desirable, and that the building would in consequence suffer from the plaintiff's treatment. The jury found that the two letters were libellous but that the memorial was not so, and gave a verdict for the plaintiff with £50 damages. — *Academy*.

VANDALISM.—A curious case of vandalism is reported from Madrid, where a priest who was summoned to shrove a dying man refused to grant him absolution until he had consented that two valuable paintings by Rubens, which the priest was pleased to consider immortal, should be burned. Upon what legal ground the heir of the deceased connoisseur has brought a suit against the priest for six thousand dollars is not stated, but it is little likely that in Catholic Spain the suit will go against the priest.

WHAT FIREMEN SAY ABOUT UNDERWRITING.—As to insurance tending to encourage the erection of cheap and unsubstantial buildings, the fact is so apparent that it needs no argument. Buildings, especially those designed for business purposes, are erected in the hope that they will prove a source of profit to the owner. A cheap and flimsy block, having a showy exterior and tawdry finish inside, will rent for quite as much as a building more substantially constructed and costing more money. If the owner had to take his own risk as to fire, he would make his building as nearly fire-proof as possible; but as the insurance companies, for a small premium, will insure the building for all, or even more, than it is worth, the owner naturally puts up the building that will be the most profitable and cost the least money. Hence we have those architectural abominations and fire-spreading agencies, mansard roofs, and modern structures wherein wood takes the place of brick or stone wherever possible. Insurance tends, also, to make property owners careless, and even reckless, as to their property, subjecting it to risks and hazardous exposures that they would not tolerate for a moment if they had to foot the bills in case of loss. In view of the facts in the matter, which are apparent to whoever looks for them, we repeat what we said before: It may well be questioned, then, as is now being done, whether fire insurance, as at present practised, is a blessing or a curse to the country. Properly managed, insurance is a great benefit, but of late the competition for business has been so great among the companies that it has certainly impaired, if it has not destroyed, their usefulness. — *The Fireman's Journal*.

BLACKBOARD PAINT.—The following is said to be a good recipe: One quart of shellac dissolved in alcohol, three ounces of pulverized pumice-stone, two ounces of pulverized rotten-stone, and four ounces of lampblack; mix the last three ingredients together, moisten a portion at a time with a little of the shellac and alcohol, grind as thoroughly as possible with a knife or spatula, after which pour in the remainder of the alcohol, stirring often to prevent settling. One quart will furnish two coats for eighty square feet of blackboard not previously painted. The preparation dries immediately, and the board may be used within an hour if necessary.

THE TRIPTYCH OF QUENTIN MATSYS.—The Belgian government has at length succeeded in buying from the Church of St. Peter, at Louvain, the celebrated triptych of Quentin Matsys, and this early Flemish painting will henceforward be preserved in the museum at Brussels. The townspeople wished to keep the painting in the town and tried to buy it so that it might be placed in the town-hall. The price actually paid was about forty thousand dollars.

MINERAL WOOL.—It is said that during the last two years the Pennsylvania Railroad Company has used about 117,000 pounds of mineral wool for deadening floors of passenger cars, 10,000 pounds for covering water pipes, 6,000 pounds for covering boilers in shops, and 12,000 pounds of superior quality for covering boilers in ferry boats, steam-tugs, etc.; the whole amount being enough, at an average thickness of two inches, to cover 32,000 square feet with a layer two inches thick.

SUNKEN TIMBER.—During the past summer a number of gangs of men have been employed in raising from the bed of the St. Lawrence, in the neighborhood of the Lachine Rapids, logs of white oak and black walnut which have sunk in consequence of the wrecking of drives and rafts during the last thirty or forty years. Some of the logs raised from the bottom of Longueville Bay are two feet in diameter and sixty feet long.