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CONTENTS.

IT is probable that two or three hundred young men, high-school pupils, freshmen in colleges or technical schools, or persons with somewhat undefined aspirations after the fine arts, are now, or will be soon, contemplating the advisability of directing their studies with the view of adopting architecture as their future profession, and it may be of advantage to them to correct some of the ridiculous notions about the practice of architecture which are disseminated by the newspapers. Among the small journalists, particularly, whose mouths water at the thought of any supposed "plum," strange notions are current in regard to the income of architects. Not long ago, an article went the rounds of the press, informing the public that a large number of architects, including the principal ones in all the more important cities, enjoyed incomes from their practice amounting to about fifty thousand dollars a year. This absurd statement has probably had the effect of turning hundreds of young men, who in some other business might have been happy and prosperous, to the study of a profession for which they have no aptitude, and which has no attraction for them beyond its supposed emoluments, and in which, unless they are wise enough to abandon it as soon as they see their mistake, they will spend a life of discomfort, privation and regret. The fact is that architecture is now not only a crowded profession, in which such employment as there is must be shared among a great many competent persons, but the work required of an architect is far more detailed than ever before. Unlike a lawyer, who, if he is employed for important interests, may often get a ten-thousand-dollar fee for half an hour's work, without any outlay whatever, an architect entrusted with a large commission must employ many draughtsmen, pay heavy office expenses, and, very probably, expend a large amount of money in consulting specialists, during two or three years, in order to get his work done, and the share of his five per cent commission which remains to him at the end of the transaction is a very small one. In many cases it is a minus quantity, for hundreds of commissions for fussy clients are carried out by architects at an actual loss, even allowing nothing for their own time and skill. Moreover, in the case of large commissions, the outlay usually increases in a greater ratio than the receipts, while a tolerable capital is necessary to furnish the money required to meet the office expenses until payments on account of commission are due. Many an architect with a large practice has an average income less than that of his principal draughtsman, and he incurs grave pecuniary responsibilities from which his assistants are free. We should be sorry to deter any one with a sincere love of the art, and sufficient application to master it thoroughly, from devoting himself to the practice of architecture, but if any youth, or any parent, imagines that this profession furnishes an opportunity for making more money, with less labor or risk, than others, he had better make inquiries of those who have tried it.

ONE effect of the elevator-accident in the American Tract Society Building in New York has been to call attention to the inconveniences, not to say defects, of the system of using very high pressures in the cylinders of hydraulic elevators. Most of our professional readers know that the reputation of hydraulic passenger-elevators was made with machines employing a cylinder-pressure varying from one hundred pounds to about one hundred and fifty pounds to the square inch. These elevators were so smooth in operation, so economical and safe, that they had practically superseded all other machines for passenger service, when the electric-elevator, after many trials and improvements, began to compete with them. The builders of hydraulic elevators, partly to meet this new competition, and partly to save space in the high office-buildings, in which the room occupied by the elevator-plant is a serious item, designed systems in which small cylinders and tanks could be used, increasing the pressure to compensate for the loss in size. The first of these high-pressure plants was designed, if we recollect rightly, for a cylinder-pressure of about seven hundred and fifty pounds to the square inch. This has, so far as we know, worked successfully for several years, and more recent ones have carried still higher strains. The normal cylinder-pressure in the American Tract Society's Building is said to have been one thousand pounds per square inch, but it is reported that there was a good deal of trouble about it, and that repairs were constantly necessary. To people who know much of building matters, this will not seem strange, for it is well known that in steam or water plants the strain on valves and other apparatus is far more destructive at high pressures; but it has hardly been realized before that this rapid deterioration might become dangerous to passengers using the elevators. Whether it will be possible to change the system, so that such delicate mechanisms as elevator valves can be safely operated under such enormous pressures, remains to be seen, but it seems not at all improbable that the occasion for the adoption of the system may be removed, by the abandonment of the practice of carrying buildings to immoderate heights.

DR. DÖRPFELD, in one of his recent lectures in this country, expressed the opinion that the latest archæological explorations in Greece, richly rewarded as they have been, instead of exhausting the field, have, as yet, barely made a beginning in the work of bringing to light what Greece has to offer in the way of archæological information. So far as the Classical period of Greece is concerned, Delphi, Olympia and the cities of Asia Minor have still much to show, but the greatest discoveries are probably to be made in the ruins of the prehistoric period, at Mycenæ, Argos, Medeia, Orchomenos, and other places. The remains of ancient Argos, which, according to the legend, was built by seven one-eyed giants from Asia, have hardly been touched, and, after the discovery of the body of Agamemnon amid the ashes of his palace at Mycenæ, it would be hard to say that the bones of Jason, if not, indeed, the talking prow of the Argo may not be exhumed in the more ancient city, which, even in historical times, showed the tomb of Ariadne. It seems to be settled that the inhabitants of Argolis at the Homeric period were ignorant of the use of writing, thus confirming the ancient tradition, that the poems of Homer were not written, but handed down by verbal repetition for many generations before they were committed to writing; and everything that can be learned about the people who have for three thousand years been regarded as demigods and heroes is doubly interesting, not only as an addition to the legends which have made Jason and Medea, Orpheus, Æsculapius, Theseus, Castor and Pollux, Admetus and Atalanta, and the other Argonauts, nearly as familiar to us as they were to the Roman youths two thousand years ago, and to the Greeks a thousand years earlier still, but as a contribution to the early history of the human race.

AFTER Mycenæ and Argos, Colchis, Crete and the Hyperborean land have been thoroughly explored, the skeleton of the Minotaur recovered and reconstructed, specimens of the dragon's teeth which failed to vegetate transferred from the soil of Colchis to the shelves of our museums, and the Golden Fleece electrotyped and exhibited in fac-simile in New

York, steps should certainly be taken to investigate the relics of much more remote antiquity than that to which these objects belong which are within our reach. According to Dr. Dörpfeld, the Troy of Homer, before the walls of which the gods fought side by side with men, was the sixth city which had been built on the same site, five others having passed through their era of existence, from the time of their foundation to that of their desertion and decay, before the Troy which came to an end through the folly of Leda's daughter was founded. The town which succeeded Homer's Troy on the same site had a career of more than a thousand years' duration; and supposing those which preceded it to have flourished for about the same length of time, the earliest would date from about 7000 B. C. Dr. Hilprecht's researches in Mesopotamia show that it is quite probable that there may have been a coast city at that period in a situation so favorable as that of Troy, and the question is not now whether there could have been any civilization then, but what was the civilization which in all probability existed. How did people look, talk and behave six thousand years before the Trojan War? That is a subject on which we have already some light, and the more we learn about it, the more interesting it is likely to become.

THE death of Sir Benjamin Ward Richardson, better known as Dr. B. W. Richardson, removes from the world of hygiene and social science a very prominent figure. For some thirty years Dr. Richardson had devoted himself to the investigation of subjects of public interest, connected with the prevention of disease, and the preservation of health in the community, and his bright and earnest style of putting his observations into shape for publication was of great value in calling attention to them, and impressing them on the memory. Many people will remember his address before the Social Science Congress in 1875, describing the imaginary City of Hygeia, which called out, perhaps, more discussion than any other essay on social science ever published. Besides being a sanitarian of great accomplishments, he was an earnest friend of temperance and physical culture, and at the time of his death, although he was nearly seventy years old, was President of the Society of Cyclists, as well as of the Medical Society of London.

AT the recent Convention of the National Association of Building Inspectors, in Buffalo, a good deal was said, and undoubtedly with reason, about the unsatisfactory character of the relations between inspectors and architects. The speakers did not reproach the architects in the least, but only regretted a condition of affairs for which, as it seems to us, the architects are to a certain extent to blame. There is no question that the inspectors, without exception, simply try to the best of their ability to carry out the laws which it is their duty to enforce. It is quite possible that the laws may be in some respects unreasonable or oppressive, but the inspectors have not made the laws. Indeed, in some cases, the architects have had a good deal more to do with their composition than the inspectors, and they should be the last to complain if they find the enforcement inconvenient. Wherever inspectors are allowed any latitude in the interpretation of the statutes, we believe that they are always found reasonable and considerate, and architects who will show the same qualities are not likely to quarrel with them. Moreover, as architects will readily confess, the plans which they present for their permits very often show obvious violations of the building-laws, to which, of course, their attention must be called by official disapproval. Annoying as it is to the architect to have to modify his drawings, it would do no harm to remember that the trouble could almost always have been avoided by referring to the building-laws while they were being made, and that an overworked superintendent of plans has quite as much reason to grumble at being obliged to spend his time in noting defects due to pure inattention to the requirements of the statute on the part of the architect as the latter has to growl over delay and annoyance caused by oversights which might, perhaps, later, involve him in serious trouble if the inspector's timely warning did not enable him to remedy them. We are far from saying that the building-laws of our cities are all that they should be, and we think that too little discretion is given in them to architects and inspectors; but the best way to make them more elastic, less complicated, and easier of enforcement is to have the architects and inspectors work together for that end, instead of pulling at cross-purposes, as they are inclined to do now, to the great inconvenience of both.

M. CHARLES LUCAS, in his search for incidents relating to the great architects of the past, has come across some letters in the Memoirs of Saint-Simon about the younger Mansart. This great artist, whose family name was Hardouin, was the son of an obscure painter. He was, however, on his mother's side, grand-nephew of François Mansart, and the latter, taking a fancy to him, taught him drawing and construction, and found employment for him on the King's building work. On the death of the older Mansart, Jules Hardouin took his name, and succeeded to his favor with the King. The latter seems to have found him a judicious and useful person, for he not only made him a Royal Councillor and General Superintendent of the Royal Buildings, Gardens, Tapestries and Manufactures, but created him Count of Sagonne, Baron of Jouy, and Seigneur of various other places. To help him in his work, he took into partnership his brother-in-law, Robert de Cotte, who succeeded him as Architect to the King, and was himself succeeded by L'Assurance, who had for many years worked for Mansart and de Cotte as head draughtsman.

SO much prosperity excited the malignity of Saint-Simon, and it is not impossible that the King's dismissal of Villacerf, to put Hardouin-Mansart in his place, added to his spite, for in one of his letters, which M. Lucas quotes in *La Construction Moderne*, he describes Mansart as "a tall, handsome man, of the lowest origin, but with natural wit, which he used in such a way as to please those whom he met, but without being able to conceal the clownishness of his original condition." Saint-Simon says that he was only a mason's apprentice and stone-cutter before he succeeded in getting into the good graces of his grand-uncle, and that his advancement as an architect was due to his address in attracting the attention of the King and the great lords, and not to his skill in his profession, of which, as he says, he was quite ignorant. "De Cotte," says Saint-Simon, "knew no more of architecture than his brother-in-law, and they got their plans and designs from a draughtsman named L'Assurance, whom they kept, as far as they could, under lock and key." M. Lucas points out that these slanders of Saint-Simon in regard to Mansart and de Cotte have long been disproved. As for the Marquis of Villacerf, who was removed to make room for Mansart, it is a matter of history that he was forced to resign his post in consequence of the rascalities of his chief clerk, Mesmin, and the King simply appointed Mansart to the place thus made vacant. As to the talent or skill of Mansart and de Cotte, and of their successor, L'Assurance, their works, some of which still remain, testify sufficiently. Mansart's works are too well known to specify in detail; de Cotte, whom the King thought possessed of sufficient skill to be made Director of the Royal Academy of Architecture, was the designer of the Golden Gallery of the Bank of France, still in excellent condition, and completed the celebrated chapel at Versailles, while L'Assurance, whose real name was Cailleteau, built the house now occupied by the Austrian Embassy, and in connection with Girardini, began what is now the Palace of the Elysée, the residence of the President of France.

THE project for building a tunnel under the East River, from New York to Brooklyn, after going through many vicissitudes, has taken what appears to be its final shape, and work on it is to be commenced at once. The company which is to construct the tunnel represents mainly the surface lines of street cars, although the President, Mr. Henning, was formerly Vice-President and General Manager of the Long Island Railroad Company. The tunnel itself will be far down town, extending from the neighborhood of the City Hall, in New York, to a point near the stores of the Brooklyn Warehouse Company, a distance of forty-seven hundred feet, so that passengers who now cross the river by the Fulton ferries can be transported across without leaving their cars. A contract has been made with Messrs. Sooysmith & Co. for the whole of the construction, and it is supposed that the tunnel will be opened for traffic in about eight months.

STABLES. — III.[1]

LOFT. — The usual custom is to build stables but one-story high with a pitch roof. This gives ample accommodation for the storage of hay and grain, besides allowing space for man's-room and for storage of sleighs during the summer time. There should be at least two gable ends in the loft, or, if conditions of design preclude such arrangement, there should be opportunity for ample cross ventilation and sufficient light. There should be an upper and under floor, the upper floor being matched and laid over a thickness of heavy building-paper to prevent the dust from sifting down through the floor. The stairs giving access to the loft are best taken from the carriage-room. They should never be taken directly from the stall-room. At least two bins for grain should be provided in some portion of the loft where the contents will empty by gravity towards the chutes leading into the stall-room. Each bin should have a capacity of about 50 bushels of grain. A bushel contains 2,150.42 cubic inches, or a trifle more than 1.2 cubic feet. Consequently, if the bins are made 3′ x 5′ x 3.6′, they will hold about 40 bushels each. This is assuming the bins are square-bottomed. The bottoms should, however, be sloped towards the centre with a rise of at least 6″ to the foot, and to make up for the loss, the bin had better be 3½′ x 6′, and 3′ 6″ deep in the centre. The bin should be constructed of matched ⅞″ boards and have hinged covers. If there is any liability of the stable being infested with rats, it is well to line the bins throughout with galvanized iron.

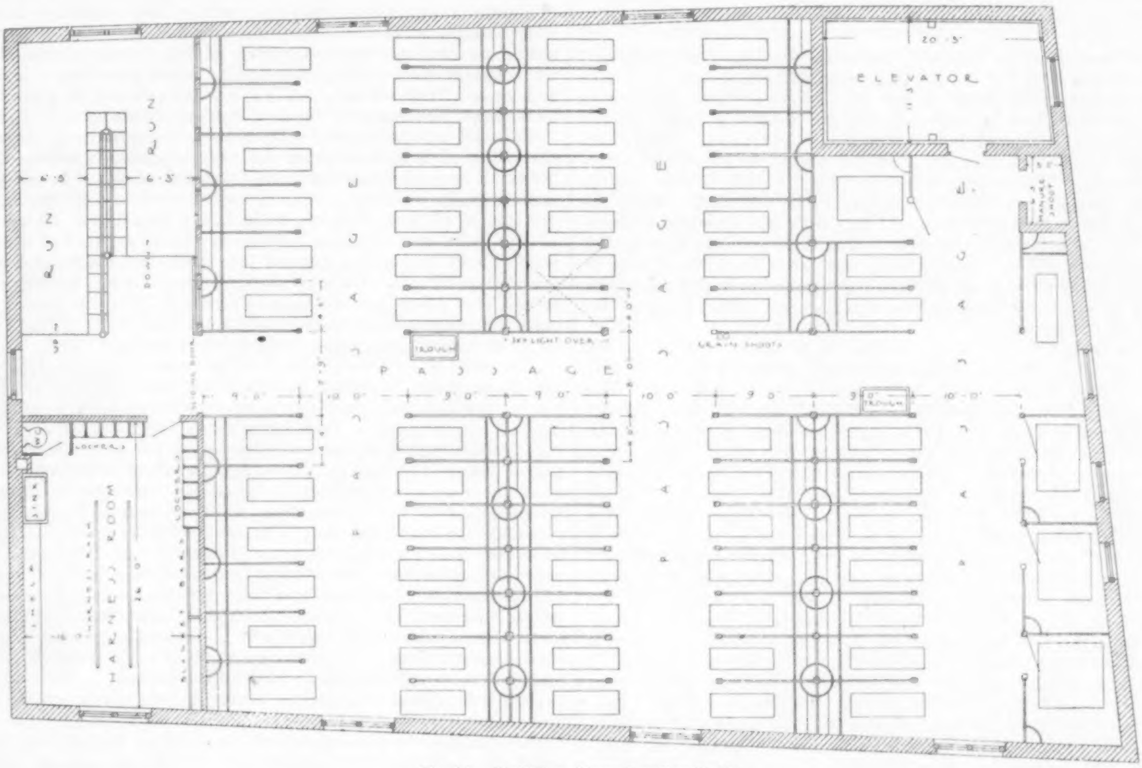

Fig. 10. Stall Plan of large Boarding Stable.

A hatchway is left in the floor over about the centre of the driving space of the carriage-room, this hatch being made 6′ square with double-hinged doors reinforced by strong cleats, and a movable rest in the centre. Directly above, in the roof, a strong iron ring is attached, to which tackle can be secured. Ordinarily a single block-and-fall is used. A better arrangement is to equip the stable with a sprocketed wheel-and-chain hoist, which will lift almost any required load without slipping and with relatively little personal exertion.

The loft should also be fitted with a triple row of long blanket-bars, and, if practicable, it is well to have these placed in a closet lined with cedar and fitted with dust-proof doors, so that furs and blankets can be safely left therein during the summer.

A man's-room with closet attached is usually a part of the fitting of a stable. It is customarily placed immediately over the harness-room and receives heat through a register in the side of the brick box, which below serves to enclose the heater in the harness-room, as previously explained.

LARGE STABLES.

The foregoing includes about all that need be considered in connection with the ordinary stables such as are built for the accommodation of from two to six or eight horses. There are every year being built in the large cities, stables for the large transportation companies and also for receiving horses to board, the accommodation running up sometimes as high as for two or three hundred horses in the same stable. There are a few special conditions to be considered in the arrangement of such structures.

These larger stables are always of masonry construction and are occasionally built with fireproof floors, though most of them are of the ordinary wooden construction. They are usually built in four stories, the first story receiving carriages, wagons, etc., over night, the second and third stories being occupied by the stalls, while the fourth story is used for storage and receiving of grain, hay, etc. A stable of this sort should always have a cellar under it and all floors should be made water-tight. In the first story, provision is made for an office and usually also for some room where teamsters, coachmen, etc., can wait while teams are being made ready; there should also be two sets of toilet-rooms. It is desirable to avoid columns in the first story so far as possible. This is not always practicable, however, and the spacing of columns is regulated very largely by the arrangement of the stalls in the upper stories, as the columns which carry the upper floors must of necessity coincide with the lines of the stalls. As usually built, the floor-beams have spans of from 28 to 30 feet, necessitating 4″ x 14″ hard-pine timbers, 12″ to 16″ on centres. The posts in first story should be provided with heavy cast-iron fenders on all sides to prevent the hubs from striking the columns. If wooden posts are used, they should further be protected by 3″ x 3″ x ⅜″ angles on each edge if square, or by a casing of wrought-iron if round, carried to a height of 6 feet. The carriage-wash should be 20 feet square, and should have immediately adjacent to it a trough not less than 24″ x 60″ and 16″ deep. There should be an overhead attachment for hose which will rotate to all points of the carriage-wash.

A stable of this description requires an elevator for hoisting grain, carriages and sick animals. The platform should be 9′ x 19′ and should have a lifting capacity of not less than 2 tons. The speed need not be more than 50 feet per minute. The openings into the elevator on the first and top story should be as large as the well will admit, but for the second and third stories ordinary 3′ x 7′ doors will answer. All the doors should be tinned on both sides, with rollers on the bottom, and the openings fitted with automatic gates. Where the arrangement of lot will permit, it is very desirable to have the elevator on the outside of the building, so that teams can drive directly onto the platform loaded with grain, etc., without interfering with the unhitching space in the first story.

Another special feature of a large stable is the arrangement for taking care of the manure. Commonly, it is pitched into a chute running the height of the building, terminating above a pit in the cellar. In large cities it is easy to contract to have manure removed without expense to the owner of the stable at intervals of not more than three days. Where the manure-pit is in the cellar, considerable nuisance is caused by being obliged to pitch the manure up on to the sidewalk, or main floor of stable, and thence into the wagons, and it is far better to have the manure receptacle located in the first story. The manure-vault or receiving-room should be built of brick

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throughout, with a brick floor covered with a heavy coating of Portland cement. The iron door giving access to it should be set up 16″ above the line of the first floor, and should not be less than 9′ high, so that the manure can be easily pitched from the chamber into a wagon. The size of the chamber will depend upon how often the manure is to be removed. In a general way, 100 horses will produce about a cord, or 128 cubic feet, of manure per day, the quantity of course varying with the kind of bedding and the frequency with which it is renewed. Leading directly from this manure-chamber there should be a brick chute, 24″ x 48″ inside, with walls not less than 8″ thick, extended to above the highest point of the roof and capped with a ventilating hood. In the second and third stories there should be an opening into this chute 3′ square, provided with an iron sill set flush with the floor level, and with a hinged iron door fitting as tightly as possible to the brickwork. In some cases, instead of an iron door a wooden slide is arranged, working up and down in grooves and counter-balanced by iron weights. The iron door is preferable.

An improvement upon the foregoing would be to have the floor of the manure-pit dished slightly and the walls lined throughout, including the walls of the chute above, with glazed brick. The whole could then be washed out clean with a hose, the water escaping through a trap placed in the floor of the manure-chamber, and closed ordinarily by an iron stopper. The writer does not know of such a construction ever having been used, however. Indeed, for that matter, except for reasons of economy, it would be far better that all the interior brickwork in a large stable should be faced with glazed brick or terra-cotta, but the cost would probably be prohibitive.

An arrangement for collecting manure was at one time suggested by the Boston Board of Health, and promised well, though the writer is not aware to what extent it has been adopted. The chamber in first story is made of a sufficient size to receive a large manure wagon, which is backed into position and left there. The chute from the upper stories is carried over to terminate above the centre of the wagon. The manure drops, therefore, directly into the wagon-box and does not have to be turned over to be removed. When the wagon is full it is drawn away and an empty one substituted therefor. The objection to this system is that more teaming is required, as the manure will not spread itself nor pack itself down, and in case of a heavy snow-storm or anything happening to the teamsters, there is no space for receiving surplus manure. The idea is an excellent one, however.

Access is had to the upper stories by horses, as well as by employés, by means of runs, which are usually arranged against a side wall, a narrow flight of steps being carried up on one side. The width required for the horses is from 5′ to 8′, while the steps for the men need not be more than 18″ wide. The pitch of the run is determined somewhat by the possibilities of the plan. Runs have been constructed and used without complaint, of which the pitch was as steep as 5″ to the foot. A better proportion, however, is 3″ or even 2½″ to the foot. The run is framed with heavy longitudinal timbers covered with 3″ plank, on which are nailed at intervals of 16″, 3″ or 4″ strips, crosswise with the run. Over this is spread a heavy bed of either scrap-leather or tan bark. Or, a better arrangement is to omit the wooden strips entirely and nail crosswise of the run sections of heavy rubber hose. Second-hand hose can be obtained from the fire-department for this purpose, and the hose is flattened out a good deal in wear, so that when it comes to the stable it is easily nailed into position and makes a very clean run, besides affording a good footing for the horses. This rubber is of course carried up only on the incline. If necessary, on account of arrangement, to make turns in the runs, which is usually the case, the platforms should be not less than 6′ wide at any point. The runs should start immediately adjoining the office in the first story, and at the head of the first run in the second story should be placed the harness-room.

The runs should be enclosed on the open side by a heavy railing of 1½″ steam-pipe thoroughly secured to the ceiling and to the side of the runs, and the well over the run should be carried up through the attic story, enclosed with windows and sheathed and provided with a skylight overhead. The stairs from third to fourth story can be carried up in the well.

The landings at the head of the run in each story should be not less than 10 feet square, and the open well at third-floor level should be protected by 6″ x 6″ hard-pine posts, spaced at intervals of not more than 3 feet and carried from floor to ceiling, a solid rail of 1¼″ sheathing being built between these posts to a height of five feet. It is well to enclose the run in second and third stories, separating the passages leading from the stalls from the platform at the head of the run by sliding doors and glazed partitions, thus preventing draughts on the horses.

Where space and considerations of cost will permit, a stable to accommodate one hundred horses or over should be provided with two runs located at opposite ends of the building, so that in case of fire, horses can be brought down from the upper story more expeditiously. There should also be a fire-escape on the exterior of the building, reaching from the ground to the fourth story, carried in a straight run from top to bottom without any turns, so that in case of fire, while horses are being led down the runs, the men can ascend by the fire-escape. This provision of a second run, however, has in practice seldom been made.

The question of heat in a large stable is largely regulated by the character of the occupancy, but in any case the office, the toilet-rooms, and the harness-room should be provided with enough radiating-surface to keep them comfortably warm in all weather. The portion occupied by stalls and upper story requires no heat at all. There should be in the first story not less than 350 feet of radiating-surface on the wall immediately adjoining the carriage-wash and 300 or 400 feet distributed at points. More than this means a waste, as the front doors are usually open in all weather and it is not possible to more than temper the air in extremely cold weather. The source of heat should be a hot-water system, the boiler being located in the basement and used also to temper the water for the carriage-wash and for the harness-room.

The harness-room, so called, is used practically as the workshop of the establishment. It should be located at the head of the first run, and for a stable to receive 100 horses should be 14′ x 20′, fitted with 8 wardrobes or coat-closets, a toilet-room and a 24″ x 48″ x 8″ enamelled-iron sink set up on legs and supplied with hot and cold water. Down the centre of the room there should be two lines of racks for use in cleaning harnesses, each consisting of a 4″ x 6″ hard-pine rail with rounded edges, 12 feet long, set up 5 feet from the floor on three 6″ x 6″ hard-pine posts, securely ironed to the floor. There should also be a cupboard for implements, a 10″ wide shelf along one side of the room, with a row of heavy brass hooks underneath, 6″ on centres, and space for about twenty lineal feet of triple blanket bars.

In arranging the stalls they can be put head to head, the individual stalls being from 4 to 4½ feet wide on centres and 9 feet long. The passages between the stalls should be not less than 10 feet wide, and if a central passage connecting all the rows is carried through the length of the building, this should be not less than 8 feet wide, and better 10 or 12 feet. A few box-stalls should be provided for sick horses, but two or three on a floor are sufficient.

The stall stories should be lighted by means of large windows at the end of each aisle between the rows of stalls, as well as by skylights; if necessary, carried down by means of wells to the central portion of the building. All of the windows should be protected by gratings of ¼″ iron, 2″ mesh, set in heavy iron frames on the inside of the windows. The end stalls in the rows against the brick walls should be sheathed against the brickwork the same height as the stall partitions. On each floor where stalls are arranged there should be a trough not less than 24″ x 36″ x 16″ deep, placed in the most central position, the floor underneath and for a width of 3 feet all around being dished and drained like a carriage-wash.

The stalls of a stable of this description are not essentially different from those described in connection with the smaller stables, except that on each stall-post a heavy harness-hook is usually arranged, the harness for each horse being hung thereon. This has the disadvantage of exposing the harness to the action of the ammoniacal fumes, but except in the highest-priced boarding-stables, it does not seem practicable to keep all the harnesses in a room by themselves, and the harness-room, so called, is used for storage, for cleaning the harnesses, etc. The harness-hooks on the stalls may be of any heavy wrought-iron or brass pattern, and some stablemen express a preference for wooden hooks, which consist of a 10″ or 12″ chestnut pin, driven-in from behind through a heavy iron socket, which is screwed to the post. A form of harness-hook is manufactured which is arranged with cords in such manner that after the harness is hung thereon, the whole can be lifted a distance of three or four feet, so as to be out of reach of the horses.

Figure 10 shows the arrangement of stalls in a stable which was built to receive 135 horses.

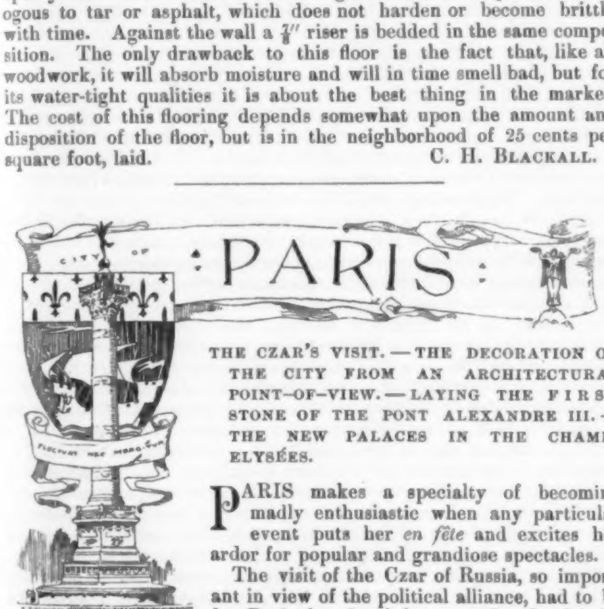
The drainage should be entirely exposed on the ceilings underneath the stalls, and the pipes should be not less than 4 inches in diameter nor more than 5 inches. The usual arrangement is to carry a single line of pipes longitudinally through the building, with branches each way to receive the drainings from the lines of stalls.

All of the floors in the second and third stories should be water-tight throughout.

The bins for grain in the upper story should be carried clear to the ceiling, with doors hung in sections to give access thereto. For a stable to receive 100 horses, there should be two bins about 14 feet square each. The bottom should be furred up so as to pitch 3 inches to the foot towards the centre, and the whole should be lined with galvanized-iron to keep out rats. The best location for grain-bins is near the centre of the building in such position that the metal chutes leading down to second and third stories shall be most accessible. A separate room should be provided for hay, which in a stable for 100 horses should not be less than 1,000 square feet in area. This should be lined with tin throughout on the walls and ceiling, and the floor should be laid over some form of fire-resisting medium, either one inch of plaster or some of the so-called fireproof papers. A fire in stables of this kind very often starts in the hay room.

Water-tight Floors.— There are several varieties of water-tight floors. If the construction is fireproof throughout, undoubtedly the best way is to level up the arches with Portland-cement concrete, having a thickness of not less than 3 inches at any point, and cover the whole with a thickness of 2″ natural-rock asphalt, laid hot and carried up at least 6 inches on the walls. Asphalt of itself is absolutely impermeable and it possesses a certain amount of elasticity. Unfortunately, however, it is very liable to be cracked by any unequal settlement or deflection, and in practice it is found very difficult to make and keep an asphalt floor perfectly water-tight. The writer has yet to see a single example of asphalt, or for that matter a concrete floor, which has remained tight for any great length of time. Concrete is sometimes used, but it is even more liable than asphalt to be cracked by deflections, and where conditions oblige the use of wood for construction, nothing has heretofore proved so satisfactory as some form of wood for waterproofing. For the first story of the stable, or where a great deal of water is not likely to be spilt on the floors, a certain amount of waterproofing can be obtained by laying, first, an under-floor of ⅞″ spruce boards, over this three thicknesses of heavy tar paper laid and mopped with hot tar, or, better yet, of Warren's natural asphalt paper laid and mopped with Warren's preparation, over this a 1⅛″ matched spruce plank floor, with an 1¼″ square-edged spruce finished floor for wearing. Very little water will get through a floor of this kind and the cost is much less than either asphalt or patented wood floorings. It will not, however, answer for stall floors, for if any urine at all works its way through wood, it will stain and look badly even if it does not actually leak. The most satisfactory form of wooden water-tight floor with which the writer is acquainted is that manufactured and laid by Dolbeare, of Boston. In this system a square-edged under-floor and a matched upper-floor, both of spruce, ⅞″ thick, are first laid over the timbers. On this is laid a course of heavy felting or building-paper, bedded and mopped in composition, and above this is the Dolbeare flooring, consisting of 3″ x 4″ seasoned pine strips, planed on all faces, rebated on the under edges, and laid with ¼″ open joints which are filled with fine gravel and a composition analogous to tar or asphalt, which does not harden or become brittle with time. Against the wall a ⅞″ riser is bedded in the same composition. The only drawback to this floor is the fact that, like all woodwork, it will absorb moisture and will in time smell bad, but for its water-tight qualities it is about the best thing in the market. The cost of this flooring depends somewhat upon the amount and disposition of the floor, but is in the neighborhood of 25 cents per square foot, laid.

C. H. BLACKALL.



THE CZAR'S VISIT. — THE DECORATION OF THE CITY FROM AN ARCHITECTURAL POINT-OF-VIEW. — LAYING THE FIRST STONE OF THE PONT ALEXANDRE III. — THE NEW PALACES IN THE CHAMPS ELYSÉES.

PARIS makes a specialty of becoming madly enthusiastic when any particular event puts her *en fête* and excites her ardor for popular and grandiose spectacles.

The visit of the Czar of Russia, so important in view of the political alliance, had to be for Paris the signal for an outbreak of indescribable enthusiasm. During the days that preceded the arrival of the imperial pair and during the term of their stay, which happily was marked by beautiful weather, there was a flow of unforgetable multitudes over the streets, adorned and illuminated as they never were before. Now that our spirits are abated and the feverishness calmed down, it may be possible to derive some instruction from what was done and the results that were achieved during the public festivities.

We have at Paris a certain number of monuments which we were vain enough to desire the Czar to visit. If these monuments are fine, it is doubtless because of their proportions, their details and the manner in which their voids and solids have been studied. If, then, we change these proportions, if we fill up some of the windows with flags, and if we hang from their balconies long and heavy festoons of drapery, we absolutely modify the aspect of the monument and completely destroy its *ensemble*. Such is the ordinary result of official decoration. The administration addresses itself to the decorators who, for their part, have but a single thought — to furnish the greatest possible number of masts and oriflammes for the streets, of trophies, flags and red velvet sprinkled with gilt for buildings. And the more of this sort of thing there is, the richer the effect ought to be. Since there is not always time enough to give to watching over everything, the contractors are usually left to their own devices.

That the bridges and quays should be decorated with masts and banners detaching themselves against the sky is a reasonable treatment; it breaks no line, but, on the contrary, creates new ones that are gay and sparkling. But the too great profusion of these masts in the streets really encumbers them and often interferes with wide and fine perspective vistas. The greater part of our buildings have during the fêtes been overloaded with heavy draperies that added nothing to their beauty. Did the Cathedral of Paris, for instance, need a heavy red background behind its admirable colonnade to show off its elegance and fineness? On the Place de la Concorde, which was very much decorated with pylons and flag-bearing masts, the architectural lines of the Garde Meuble and of the Ministère de la Marine, whose colonnades were very discretely decorated with trophies, produced a good effect of monumental grandeur. This was instructive, and it leads one to ask whether during public festivals a new impression from the point-of-view of decorative effect might not be sought in not overloading the *public* monuments and leaving to the private houses the task of lending gayety to the streets through their own decorations alone. The architecture of the public monuments could be all the better noted and would more easily affirm their own value. In any case, without carrying this idea to extremes, it seems that a little more sobriety in the decoration of public monuments would not prove a lack of good taste.

This bit of criticism put on record thus, it must be confessed that everything, of all kinds, that had to be created, was handled in the most charming manner. In the first place should be mentioned the pretty reception pavilion on the Ranelagh, near the Passy station, built in six days under the direction of M. Scellier de Gisors, architect. We will not attempt to chronicle the fêtes, as their details have been given in the newspapers, but there was one ceremony which, more than any other, had an interest for us because of its relation to the Exhibition of 1900, this was the laying of the first stone for the bridge that is to be built over the Seine on the axis of the Invalides. This bridge, of which the decorative treatment is not yet determined, will be 40 metres wide and consist of a single arch with a span of 110 metres.

On Wednesday, October 7, the first stone of this bridge, to which has been given the name of Alexandre III, was solemnly laid by the Emperor of Russia, in the presence of the Empress Alexandra Feodorowna, the President of the Republic and a vast multitude of onlookers. At the head of the bridge, whose extremities on either side of the river were marked by four handsome pylons, was erected an imperial tribune on the Cour-la-Reine, with *gradins* for the diplomatic corps, the senators and deputies. Upon either side of this central tribune, sheltered under vela and decorated with flowers, stretched two other tribunes for invited guests. On their arrival, the Czar and Czarina were received by the President of the Republic, then after the presentations and the playing of the Russian hymn and the Marseillaise — how many, many times these tunes were played during those three days! — their majesties advanced under a velum stretched over the quay. A chariot engarlanded with flowers then approached, bearing a block of granite that is to make part of the first pier of the bridge, and M. Boucher, Minister of Commerce, pronounced the following address to the Czar:

"*Sire*,— France has desired to dedicate to the memory of your august father one of the chief monuments of its capital. In the name of the Government, I come to beg your imperial majesties to sanction this act of homage on the part of an entire people and, in conjunction with Monsieur the President of the French Republic, lay the first stone of the Pont Alexandre III, which is to connect Paris with the Exposition of 1900. Your Majesties will thus give to the grand work of civilization and peace that we are about to undertake the high approval of the Emperor and the gracious patronage of the Empress."

After the usual custom, French and Russian coins of the mintage of 1896 and an account on parchment of the ceremonies were deposited in a cavity in the stone, and covered with a small slab, upon which, in turn, the Czar, the Czarina and the President spread cement taken from a bronze tray.

As soon as this portion of the ceremony was finished, from the other side of the river, which was covered with tribunes, set out a boat, bearing sixteen young girls clad in white, which made its way between double rows of decorated boats, bearing many military bands and covered with flowers. On reaching the hither side, these young girls, operatives of the better class, presented to the Czarina a magnificent vase of chiselled silver, set with caobochons and precious stones, and filled with flowers. This vase, which was exhibited at the Exposition of 1889, was designed by our *confrère*, M. Paul Sédille.

It is not possible for one who was not present to form a conception of the imposing character of this ceremonial. For us, it was the consummation of a most important act, the prologue, in fact, of our Exposition of 1900, the success of which was thus affirmed by this act of imperial collaboration. The actual work, a little retarded by the preparation for these fêtes and the festivals themselves, is about to enter on a stage of activity.

We have already mentioned the embarrassment there was in appointing as architect one of the prize-winners in the recent competition for the new palaces in the Champs Elysées. Since that time a solution has been reached which gives general satisfaction. The competitions for the smaller palace produced a more satisfactory result than did the one for the larger building, and accordingly the author of the first-prize design deserved to be entrusted with its execution. Now, it happened that M. Girault also competed for the larger palace, and a fourth prize was awarded to his design. Moreover, in the competition in 1895 for a general scheme for the treatment of the buildings for the Exposition of 1900, his design was awarded a first place because of its marked merit. These repeated successes of this young and distinguished architect — the only competitor honored with a prize in each of the three competitions — gave sure guaranty of his talent as a designer. It was inferred from this that such an artist as he had proved himself to be might be safely entrusted with the execution of both the palaces in the

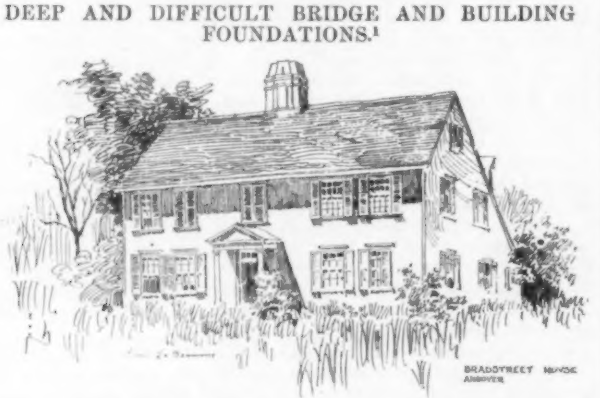
Champs Elysées, and to him has been awarded this onorous but glorious task.

M. Girault was born in 1851, and won the Grand Prix de Rome in 1880. Having carried off several medals in the Salons of 1884 and 1888, and at the Exposition of 1889, La Société Centrale, in 1893, bestowed on him its medal for private architecture. In addition to these facts, his being a member of the Conseil Général des Bâtiments Civils gave further pledge of his being a man of executive ability and experience.

His colleagues, chosen from the number of his competitors, are MM. Louvet, Deglane, Binet and Thomas. The first three are still young, M. Binet being only thirty years of age. M. Thomas, however, was born in 1847. For many years he has been architect to the Palais de l'Industrie, and has carried out the many transformations in that building required by the various exhibitions and competitions, so that his special experience of the requirements that must be satisfied make him a most valuable assistant. Both he and M. Deglane are Grands Prix men, while M. Louvet has been five times a "*logiste*," winning in 1885 and again in 1886 the Second Grand Prix. Such, then, are the workers. Now, what will be the results of their work?

The scheme is practically determined as to its *ensemble*, but much of the detail will be modified as the work progresses. We only fear one thing, that is, that the time at the disposal of the architects is so short that, in spite of their talent, they may not be able to bring to a successful issue so large and complicated an undertaking. They have undertaken to perform a real *tour de force* and perfection will be demanded in the result. Alas! justice was never intended to be accorded to architects, and already professional critics are at no loss for bitter words to pour out upon schemes of whose real features they are still in ignorance. There promises to be abundant and amusing discussion, and plenty of severe verdicts will be rendered with facile ease by those who think everything ill done that they do not themselves do, although, generally speaking, they are the very people who never do anything at all.

DEEP AND DIFFICULT BRIDGE AND BUILDING FOUNDATIONS.[1]



YOU are all doubtless familiar with the form of our iron and wooden caissons, and understand that as soon as we reach the bed-rock or the point of destination, whether it be of rock, clay or any other substance, the caisson has outlived its usefulness except the part called the roof, on which a monolith of concrete is used, which is the case in nearly every instance. This roof comes immediately between the concrete on which the masonry rests and the concrete used in filling the working-chamber, consequently, the less timber there is used in the roof, the less the compaction will be. Mr. George S. Morison in his system of caissons has reduced this to a minimum, as he has so arranged his plan that he forms an arch of concrete on a thin roof, thus doing away with the necessity of many courses of timber to sustain the weight of masonry, etc. . . .

After putting this caisson [for the bridge over the Harlem River in New York] in position, I was removed to 68 Broadway, and took charge of the pneumatic caissons put down to carry the Manhattan Life Insurance Building at the above number. We used under this building 15 steel caissons of various forms. Those were put down on an average of 50 feet below the grade of Broadway. We held up the Consolidated Exchange Building on one side, and immediately next north of us was a very old six-story building, and adjoining this was the heavy Title and Trust Building. So effective was the plan adopted to do this work that we did not even crack plaster in those surrounding buildings.

The Manhattan Building was planned by Kimball & Thompson, architects, of New York; and to those gentlemen is due the credit of adopting the pneumatic plan for sub-structure of buildings.

As before stated, the caissons were built of steel, and immediately on the roof-plate we started the brick pier, carrying this up to the required height, without any shield. We used in the construction of those piers 800 tons of steel, and to bring the tops of piers to a level of the cellar floor, over two million brick, set in Portland cement. We also removed 5,000 yards of excavation through that busy section of New York, and completed this work in ninety days, and this without accident. . . .

We have as yet said nothing about the freezing plan for our substructural work. This enables us to go beyond the possibilities of man's endurance under compressed-air. By this process, we can defy the flowing quicksand, water-bearing materials, or even water, and hold it absolutely rigid until such time as we have completed our work. There have been several shafts sunk by the Poetsch system in Europe, and one in this country.

The plan adopted to put down a shaft at the Chapin Mines, Iron Mountain, Michigan, was that of a boring down through the water-bearing quicksand to the solid rock, 104′, with a 10″ pipe.

Those pipes were put down through this sand and boulders by using a powerful jet on the inside of pipe. The pipe was held by a heavy frame in a vertical position, and on this frame was fastened a short section of the same size pipe with a large cog-wheel attached; in this were worked two pinions attached to the engine-shaft, employed to give the rotary motion needed. Boring down those pipes was quite a difficult work, owing to the large number of boulders bedded in the sand: while sinking the shaft we found and removed, among others, one which weighed over seventeen tons. We also had on the point of pipe a toothing of steel.

After those pipes had been jetted and bored down to solid rock, we then inserted in the 10″ pipe one of 8″ diameter, with a cap on the bottom end, and then withdrew the 10″ pipe, care being taken to make every joint in the 8″ pipe absolutely tight, as any leakage of the circulated non-freezing fluid into the sand on the outside would prevent the sand thus contaminated from freezing. After we had put in all the pipe needed to form the circle required, we put down the inside of each of the 8″ pipes, a smaller one for circulating purposes. This pipe was $1\frac{1}{2}$ inches in diameter, and was open at the bottom and connected at the top to a header, and this, with our circulating pump, was in turn connected with our fluid tank, containing our heat absorbent, which was composed of chloride of calcium in solution. This congeals at 35° C., or — 31° Fahr.

This we reduce to a very low temperature by the use of an ice-machine. We used for this work the Linde machine, which we charged with anhydrous ammonia; compressing this to a high pressure, then passing the ammonia through a coil of pipe submerged in a tank, into which we pumped cold water, delivering the water at the bottom of the tank and allowing this to overflow at the top, carrying with it the heat produced by compressed ammonia in the submerged coil, the length of pipe in coil being at 8,000 feet. After receiving this cold bath the ammonia passes to the expansion valve; when expanded it became intensely cold, somewhat changing its form from that of anhydrous to semi-gaseous. This passes then through another coil of pipe about eight thousand feet in length, which is submerged in an out-tank containing our cold-producing fluid. And after doing its work here it is conducted back to the ice-machine to be compressed over; and in this way kept circulating through the coils of cold-producing pipes. The cold fluid is then taken up by the circulating-pump and forced through the whole system of pipe in the ground, absorbing the latent heat. This fluid, being delivered at the bottom of the stand-pipe, raises that on the outside of the $1\frac{1}{2}$″ pipe; it is then conducted back and delivered again over the top of the tank for re-cooling. Our circulating-pump being attached to the bottom of the tank, we at all times get the coldest fluid. The difference of temperature of the fluid returning and going out is two degrees less. We had about fifteen thousand gallons of this fluid in pipes and tank, which we circulated through the system of pipes every thirty-three minutes. We regulated this flow into the stand-pipe by a system of valves. In this way I was enabled to get the same flow into each stand-pipe, consequently the same temperature in each. The frozen ground took the form of a cone. As soon as I found that the frozen ground between the pipes had become united, we started our excavation, going down 40 feet before I put any timber in. From tests made by myself down in the shaft during the progress of the work, I found the quicksand, when frozen, to be about equal to sandstone in strength, and required blasting to take out, using heavy charges of dynamite.

We found that, as the work went on, we could, and did, stop the freezing-machine for several hours at a time. This did not seem to injure it any; and after the work was complete, it took several weeks to get the frost out of the ground. After the ground was back to its normal temperature, there was not a particle of noticeable change in alignment of shaft.

I am confident this process must, in the near future, come more into use, as it only needs to be understood to be appreciated. . . .

Among the successful pile foundations put down in Chicago, I would mention that under the Illinois Central Depot at Twelfth Street, by our worthy president; the new Stock Exchange Building on La Salle Street, by General William Sooy Smith; the new Public Library, and others I need not mention, the results of which are clearly to be seen. . . .

One thing we should do, whether our foundation be pile, pneumatic, concrete, or any other form, let us do our best, and be willing to pay such prices that will enable the engineer or contractor to do just and honest work.

[1] Extracts from a paper by Mr. George E. Thomas, read May 6, 1896, before the Western Society of Engineers and published in the *Journal* of the Society.

In 1889, I was sent out to the extreme east of Maine, to put in a light-house in the Bay of Fundy, about a mile and a quarter from the main land, for the United States Government, at a place called Lubec. From the boring made previous to the contract being let, the Light-house Board concluded to build this house on a cylinder, 32 feet in diameter, and about forty-eight feet high; fill this with Portland-cement concrete, and on this build an iron shell for house, backing this with brick, set in Portland-cement mortar.

Specifications read something like this: There is 17 feet of water at low tide; the cylinder must be dredged down about five feet through soft mud and gravel to hard-pan; then put in 17 feet of submerged concrete; then pump water out of cylinder, and put in remaining concrete, bricking up water-tanks, etc.

Previous to putting in any concrete, I made a boring and found that there was not anything like hard-pan to be found there. I at once notified the engineer in charge that I did not think it safe to put the house up on such a soft bottom.

Major Stanton, who had charge of this district, came down to Lubec, and we made a thorough examination of the subsoil. This he found to be as represented by me. I made several borings, and put the bit down 96 feet, mostly through clay, with some gravel. After the Major had consulted with the Board at Washington, they concluded to have me drive piles on the inside of the cylinder. This was more easily talked about than done, there being a fluctuation of over twenty-four feet of tide, and a terribly rapid current, besides the storm and fog at that end of America, to contend with. However, with all those difficulties we put in over two hundred piles, a large number of them being 77 feet long when driven. These were made of two sections. After driving the first section, we sawed the butt off perfectly true, put a dowel in the head of this, and brought the point of the second section to meet this, taking care in our selection of these sections to have them as nearly uniform in size as possible; then bolting up and down the joints fish-plates of oak. The first thing to be done was to get a pile-driver and engine up on the top of the cylinder. This we did very successfully. Some days we would only drive one or two piles; then the sea would come up and break over us, compelling us to wait for better weather. But fortune favored us, and we finally completed this foundation. We also completed the whole structure.

During the progress of our pile-driving, I received instructions to test two of those piles, driven at a given distance from each other. This I did in such a way that there is no doubt of the result being correct.

We put a platform around the piles, and on this we loaded Kentledge or pig-iron, weighing every nail and scrap of timber and iron, so as to know exactly the carrying-capacity of those piles. Pile No. 1, 52 feet long, $16\frac{1}{2}$ inches in diameter at the butt, 8 inches point, had a penetration of 34 feet into the clay. This pile we loaded with 49,750 pounds of iron. There was no change or settlement from the 13th of the month to the 20th. For the next six days it settled very slightly. In the first twenty-four hours, $\frac{1}{8}''$; in the next twenty-four hours, $\frac{3}{32}''$ until it stopped on the sixth day. Pile No. 2 was driven the same day, and allowed to stand one week before loading. We then put on this one (keeping the other loaded) 65,585 pounds of iron. This one started down and went $4\frac{1}{2}$ inches in the first twenty-four hours, and in the next twenty-four hours only $\frac{1}{2}$ inch. I then reduced the load 1,173 pounds, the pile settling $\frac{7}{16}''$; and so, until I reduced the load on the third day 1,939 pounds. The piles still kept settling. I again took off 1,289 pounds. Thus, you see, I reduced the weight 4,400 pounds. After taking off this amount, the pile stopped settling, but it still left us an excess over the other pile of 15,835 pounds. This can be accounted for in this way: Pile No. 2 being 17 inches butt and $8\frac{1}{2}$ inches point, penetration was 2 feet greater.

I am satisfied the second pile settling was the means of taking the first one with it, as the settlement of the two piles stopped the same date. I am in favor of large piles, especially when they cannot be driven to rock or hard-pan. In this way we get a greater friction, consequently more carrying-capacity, but in every instance would advocate driving to hard bottom.

THIRTIETH ANNUAL CONVENTION, A. I. A.[1]—III.

DISCUSSION OF THE PAPERS ON INFLUENCE OF STEEL CONSTRUCTION, ETC.

MR. CARRÈRE: I am particularly impressed with some suggestions contained in Mr. Yost's paper in relation to supporting more masonry on the framework of high buildings than is necessary, especially in the construction of the exterior walls. It seems to me that if the supports of the building could be set far enough inside of the envelope to make it constructively a complete building, we could then have much more freedom in the designing of the envelope or façade. This suggestion seems to be very valuable.

It is rather surprising, in a way, that so much fault is found with the designing of these tall buildings, which are classed as failures, when we consider how little is said about the other class of buildings, especially as this high-building problem is one that can only be solved by degrees. This high-building problem is very important. The edifices are large, and are built so rapidly that sufficient opportunity for study is seldom afforded, and the improvement must be progressive with successive buildings, and, therefore, very gradual. An important feature, however, in connection with this work, one which is very far-reaching in its influence upon our work as a profession, is the establishment of general laws and municipal ordinances to govern the surroundings of these buildings.

The present conditions are the reverse of what they should be. The spaces and streets are narrow and contracted, and the problem for us to solve at once, as architects and artists — and which cannot be solved at all unless it is taken in hand promptly and before it is too late — consists in regulating these conditions of environment by legislation, and in this way bring about new conditions which will in a measure compensate for all the defects and shortcomings of the high buildings.

If our high buildings are designed (as has often been suggested) with the successive stories receding, the result would be practically a series of pyramids; but we are doing just the reverse of this, and by the projections, cornices and other similar features, we are making our buildings wider at the top than at the base, and our surrounding streets are fast becoming absolute cañons and dark passages.

These are the difficulties which we are now facing, difficulties which we can correct, at least in a measure, at once. Plate-glass and steel have come to stay, but they must be developed, and when they are fully developed we will have a number of buildings even higher than at present, and which will be absolutely permanent, and we ought to prevent their being erected under the present conditions of environment, which would become permanently unhealthy and unsightly conditions, and which would necessarily influence not only the health, but the character, habits and development of the population of our cities.

This problem I consider a very serious one, because it is subject to immediate improvement from every point-of-view, and it is one which is clearly within the range of influence of the architects.

It seems to me that a highly interesting and profitable discussion — perhaps at the next convention of the Institute — would be timely, dealing with the best means of meeting these conditions in an artistic and practical way.

MR. HALLBERG spoke of the questionable manner in which some high buildings are constructed. When a high steel-frame building is constructed, and, we will admit, of abundant strength and safety at the time of building, carries all exterior coverings, and these are of porous absorbent masonry, the vital question is: How long will such building remain safe? Dampness from rains readily penetrates to the supporting steel members, causing corrosion. How soon this action will so weaken the carrying members as to make them unable to support the enormous loads placed thereon no one can tell, but we all know that it is taking place, and in some instances with great rapidity, which will in time make such structures dangerous. All buildings should be constructed with sufficient walls or masonry to be self-supporting, and not carried by the steel posts as is the practice in some places. He liked the New York practice of building walls heavy enough to support themselves, and the floors only carried by the steel skeleton. He believed that the rule should be followed in other places.

MR. POST: Gentlemen, I believe that I am responsible for the first suggestion of steel-cage construction in building, some sixteen or eighteen years ago, in the Produce Exchange Building in New York, in which I built for the central court-yard wall a cage of cast and wrought iron with panels of brickwork, the precursor of the present steel cage; therefore, I think that I am justified in criticising, to a certain extent, the results and in saying a few words upon the subject.

We Americans are a queer people. We are subject to the rapid spread of mental epidemics. At the present time we are going through an epidemic of the steel cage,— I mean the steel cage where a skeleton is built and enclosed in the very smallest amount of masonry, in many instances, which can be made to cover it.

I was brought up as a civil engineer, and have always retained, while practising architecture, a large interest in engineering questions. I have made certain investigations with regard to the relative corrosion of cast-iron, wrought-iron and steel, which leads me to the conclusion, principally from the conditions of some good quality I-beams, which had been thrown aside in a rolling-mill, and exposed unpainted to the atmosphere for three or four years. I have been led to the conclusion that the corrosion of structural steel is to be looked for as a much more serious danger than the corrosion of iron; that it penetrates more deeply and will be more apt to seriously affect the structural efficiency of the material; therefore, I have absolutely declined personally to build any buildings with a steel cage enclosed with a minimum amount of masonry. Now, if you enclose a cage with a sufficient amount of masonry to furnish an adequate protection from the effect of rain and absorption of water from the outside or from the inside, and to afford an adequate protection from the danger of a great exterior conflagration — for I assume that any good fireproof building is safe against any interior conflagration of an ordinary character,— and if you build your building so safe against exterior conflagration that the expansion of material will not break your knee-braces or gusset-plates, or strain your connections so that they will become ultimately unsafe, you will find that in ordinary cases you have enough masonry to support itself

[1] Continued from No. 1089, page 46.

independent of the cage, provided the cage supports the floors and roof, and adequately braces the walls laterally.

I therefore submit to your consideration, if it is not better and more economical and more artistic to make your cage sufficiently strong to adequately support the floors and roof, to give it sufficient lateral stability to adequately take up all strains from winds and slight earthquake shocks, and to build self-supporting walls. If this is done, the columns and girders are protected from the atmosphere, they are protected from the influence of fire, and I believe that you will find the building will be cheaper and more readily built, and the capacity for architectural design will be infinitely increased. I see no reason why in our steel-cage buildings the walls should not look strong enough to support themselves.

I may refer to the demand for the maximum glass surface, so prevalent in some sections, also as epidemic. What is the use of making a whole set of offices of plate-glass, when the tenant will put on blue and green and red and yellow shades to cut off his light and use only a portion of it? I do not speak feelingly in this matter, because in New York they do not demand it. They expect a proper and reasonable amount of light, but they do not demand that the whole building shall be of plate-glass, as seems to be the case from the character of the buildings I have seen in some other cities.

We have been considering the question of the development of style. I do not fear contradiction when I state that in the past the development of architecture has been a matter of natural selection and the survival of the fittest, the rejection of the incongruous, and it has extended, not through five or ten years, but through hundreds of years. Can we, with all our powers of invention, expect to jump in one or five or ten years into a style of architecture? Our great-great-great-grandchildren may have evolved a style of architecture which may be more eminently fitted to our style of construction than anything we have at the present day. All that we can do is to do the best we can with our present resources. In doing this, I think it is due to ourselves and our art that we do not attempt to accomplish these results by stretching out our cornices and columns to many times their proper height, or by playing any tricks with the recognized styles of architecture, because they have gone through the process of natural selection and have been developed. Let us do the best we can with our problem and struggle with it, and I think in the end we will achieve a reasonable success, and if we do not forget that precedent is valuable, success is much more sure than if we strive for the immediate originality.

Mr. O'Rourke: My interest in this subject impels me to say a few words upon it. My professional experience in the City of New York and the immediately surrounding country antedates that of any living architect practising in that city to-day, and while my practice has not been so extensive or lucrative, it has been rather broad, covering a wider professional field than that of most architects. I, therefore, have seen the birth and development of steel construction and take a great deal of interest in it and in the discussion of this subject. I think we ought to discuss and handle it as an accessory to architecture proper, for it has been truly said that all the arts, and I might add most of the sciences, too, are the handmaids of architecture.

Now, iron and steel construction, properly speaking, is an engineering problem rather than an architectural or artistic one, and ought to be so considered. The science of engineering, being eminently one of definition and exactitude, requires the most thorough mathematical training, whereas, in artistic design or treatment we can use our imagination, and while that imagination, in order to have good results, ought to be based upon a good artistic training, yet there is no necessary danger to the building in the exercise of the untrained imagination in its design merely. There is danger, however, of producing an incongruous or a bad design, and hence the necessity of the architect having a training in painting and sculpture and in art generally. But in steel and iron construction he requires the assistance of a thorough engineer in that specialty, as no architect can expect to be able to cover thoroughly and in detail such a wide field. The true theory, in my opinion, of architectural steel and iron construction is to consider it as an accessory rather than as an essential in architectural composition, and its true mission is to give additional rigidity and strength to architectural design when erected. My practice is to construct the walls as if I had no steel or iron in them. Every building designed under my supervision in Washington, for the Government or in my private practice, will be found to stand that test. The walls when built show neither steel nor iron construction. This construction is added for additional rigidity and strength, but in case every post rusted out, the building will stand just the same, with a reduced but still sufficient factor-of-safety. This in my opinion is the true way to construct a modern building.

Mr. Yost: I do not care to say anything upon the subject, except to make one suggestion in regard to the building of walls, whether they be built apart or supported on steel construction. They ought to be built so as to be able to support themselves in case of fire. Many will be surprised that a brick wall will expand with heat more than steel or iron. This is a thing to be thought of in building a wall of any considerable height, which is expected to stand a conflagration from the outside, like the Chicago fire. The wall needs something to hold it up, because the side next the fire expands more quickly than the other. The question of safety on that score should be taken into account in building walls two or three hundred feet high.

Mr. Stone: I wish to say one word and call especial attention to what Mr. Carrère says about the importance of the surroundings of high buildings, and the necessity of municipal legislation upon the subject. The limitation in the height of buildings should be dependent upon the amount of space in the streets, not on the value of the sites upon which they are built. For instance, on going to New York and looking about City-hall Park you will say, what an admirable space for high buildings, but one has only to go into the cañon behind the park to see the infelicity of putting the high buildings on narrow streets. If high buildings are to be built, cities should widen these narrow streets or open great squares. The expense would be great, but if abutting owners want to erect high buildings and secure grand architectural effects, they should pay the damages for opening up the squares devoted to them.

Mr. Post: The sole excuse for tall buildings is the enormous value of property. If it were not for the fact that it is so tremendously high, it might not be so useless to try to get property-holders to consent to widen the streets.

Mr. Carrère: The very fact, that the main reason for the erection of tall buildings is the immense value of the property upon which they are erected, may serve a purpose, as suggested by Mr. Stone. In the case of New York City, for instance, we all remember the competition for the City-hall, which was indeed a typical case. The new City-hall was to be crowded into the little park, surrounded by very tall buildings, thus destroying all possible prospect for a monumental or artistic effect. The present small building is not so much out of scale with the park, but the new building was to be about ten times as large, and it would have been so important that the surroundings would have been entirely inadequate, even without the high wall and overpowering background of tall buildings.

We made a careful study in our office, as a matter of curiosity, and found that by going three or four blocks farther up town, the city could condemn land which is practically valueless at present and is not paying taxes on its true value. It could condemn several blocks of land between Broadway and Centre Street, place the City-hall on Centre Street, and make a fine park in front of the City-hall, between the building and Broadway, and thus obtain a magnificent approach and vista, a new park, and surroundings commensurate with the problem.

The building itself would be just as central,— more so than in the present City-hall Park, as it would be in close proximity to the Tombs, Criminal Courts, Second and Third Avenue elevated roads, the Brooklyn Bridge, and many of the street-car lines.

These improvements would make all of the adjacent property so valuable that the increased valuation on the property and the increased taxes resulting therefrom, would create a sinking fund which in about thirty years would pay for the investment. This suggestion is in line with Mr. Stone's remarks.

New York, of course, is not so fortunate as some other cities, as many of the conditions are already fairly permanent, and the opportunities for such investments are not so easily found as in other cities; but there are many cities where a word of warning would be very timely, and I believe that they should be advised to foresee and plan such improvements.

An interesting illustration of what can be done, even in New York, can be seen in the case of the Waldorf Hotel. The Astors have erected a tremendous building on a part of a block extending from Fifth Avenue to Sixth Avenue,— which they own,— and they are now opening a new street, parallel with Fifth Avenue, in the rear of their hotel, from Thirty-fourth to Thirty-fifth Streets, thus placing their building on a square, surrounded by four streets, with ample light and ventilation; and on the west side of this new street they propose to erect a large office-building, on that part of the land which would have otherwise been in the centre of the block, and of little or no value.

They have thus secured a most desirable improvement purely as a matter of business, but which results most decidedly in a great benefit to the neighborhood, from an artistic standpoint as well.

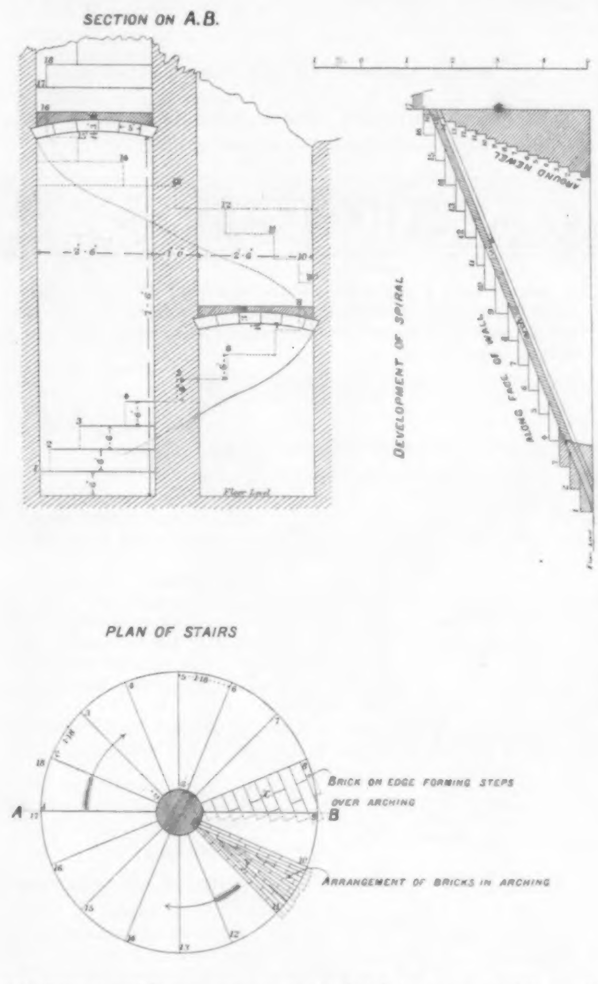
The centre of this entire block is at present devoted to back yards, or what might be termed a large interior court, and the land lies idle. It has occurred to them that the sacrifice of the necessary land for the opening of the new street will be more than balanced in value by the extra frontage obtained on this new street, and the utilization of land otherwise of little or no value.

If such problems were more freely discussed, it would result very soon in a more sensible method of building, and it might eventually result in beautifying and improving our streets, where we are now crowding and injuring our property.

Mr. Stone: I think the remark that the President has made is correct, but what gives value to these high buildings is the fact that they are isolated, that they are getting their light by being higher than the surrounding buildings. And so that is the thing which we, who are in the position, should warn the municipalities in which we live not to allow these high buildings to occupy every section of the city. What is going on in New York will simply defeat its own object, for in streets occupied solidly by high buildings the lower stories will have little value and, deprived of light on their sides, their rental value will be no greater than buildings of much less height.

BRICK SPIRAL STAIRS.

THE plate gives the needful details for building spiral stairs cheaply. One of the items, and a principal one, which goes to swell the cost of building brick spiral stairs is the necessity for centerings. The plate shows a method of building the stairs without any centering, and the reduction in cost effected makes a brick spiral staircase cheaper than one made with either iron, wood, or stone, and, for the purpose, equally as substantial. The method requires no skill whatever, and for simplicity of construction, expedition and smallness of



cost, there is nothing to come up to this brick in chunam[1] stair. The method customarily adopted in Madras is the following:

Taking a typical Madras brick in chunam spiral stair as an example, the dimensions would be:

Diameter of stair, wall to wall, inside	6′
Diameter of newel in centre	1′
Headway, *i. e.*, from top of step to intrados or arching overhead	7′ 1½″
Risers, each	6″
Tread at wall	1.18′
Tread at newel	0.2′

Having determined the rise and number of steps in the usual way, work is commenced by building up solid two or three steps, when the arch is then started by ordinary terrace bricks, 5″ x 3″ x 1″, in lime mortar (1½ parts slaked lime to 1 of clean river sand). The bricks are put edgewise flat against one another with their lengths in radii from the centre of the stair and are simply stuck on to one another by the aid of the mortar without any centering, after the manner pursued in Madras terrace roofing. On the plan of the stairs in the annexed plate the arrangement for arching by these thin terrace bricks is shown at *y*. A slight rise of 1½″ is given to the arch as shown in the section.

For the forming of the steps over this arching ordinary bricks are used, usually 9″ x 4½″ x 3″, trimmed to position and placed on edge, as at *x* in the plan.

The Madras bricklayer is very expert in building these stairs, and is satisfied if, after a reasonable time for the mortar to harden, the work should bear a load of 3 cwt. placed on a step and show no signs of giving. This will be found to approximate the breaking weight of a brick-in-mortar beam allowable in practice. With good materials, however, the steps will bear much heavier loads.

The following would be the relative approximate cost of different kinds of spiral stairs in Madras, and it will be seen at once how much cheaper the brick stairs are than iron, wood, or stone.

For a wooden stair, 3′ radius, per step	Rs. 4 8 0
Iron stair, each step 20 pounds, per step	" 3 2 0
Dressed stone, per step	" 4 0 0
Brick-work as described above, per step	" 0 15 0

The above rates include the newel, but not the outer wall surrounding and partly supporting the stair. — *J. M., in Indian Engineering.*

[1] A shell, or coral, lime mortar.

SOCIETIES

NEW YORK CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

THE New York Chapter of the American Institute of Architects held its annual meeting for the year 1896-1897 at its rooms, 156 Fifth Avenue, on Wednesday, November 11, 1896, President Upjohn in the chair.

The minutes of the last meeting and the annual reports of the Treasurer and of the Committee on Examinations were read and accepted; the annual report of the Executive Committee was as follows:

Your Executive Committee begs to state that since its last annual report it has held seven meetings.

Owing to conditions familiar to all, the year has been a hard one as regards finance and, doubtless on that account, several parties who had contemplated offering themselves as candidates for membership have suspended the preliminaries usual in such cases. It is also to be said that, at the beginning of the year, your Committee thought it advisable to make the formula of application which candidates are required to sign, somewhat more stringent in one of its provisions than previously.

The Chapter has lost one Practising Member, Mr. A. Page Brown, of San Francisco, by death, but this has been balanced by the acquisition of another, Mr. H. F. Kilburn, of New York City.

In your Secretary's recent report to the Thirtieth Convention of Institute at Nashville, in filling up the formula as to the membership in this Chapter, he thought it advisable to give the following information in regard to its Junior Membership:

"As questions on the relations of Chapter Members to the Institute are still in abeyance, the undersigned judges it opportune to state that though the names of a number of Junior Members are no longer found on the roll of the New York Chapter, they having been successively advanced to the Senior grade of professional membership, or having resigned on account of change of residence, or of occupation, or been dropped for non-payment of dues, twelve (12) names are retained of Juniors, of whose recent history or whereabouts he has not been kept apprised. He does not even know whether all or any of them are still living.

"What has transpired in the case of Juniors has been generally as follows: On a candidate being admitted to Junior Membership he has more or less frequented the Chapter quarters — sometimes quite sedulously for a considerable period — and read and copied from the books and periodicals in its library. After a while his attendance has diminished, although he has still, at intervals, come, sometimes applying to the undersigned for advice, and now and then, during emergencies, for apparently needful sympathy and assistance. Some of them have then drifted into other sections of the United States, or Canada, or elsewhere (and occasionally into other occupations), and after corresponding with the undersigned for a while have finally, amid new scenes and with presumably gathering cares and responsibilities, ceased their communications altogether, and the undersigned's knowledge of them has ended." The *Proceedings* of the Institute somewhere (perhaps those of fifteen or twenty years ago) show that the undersigned officially suggested some sort of regimen to meet such cases ("Roving Members" he called them) and to retain them, for their professional good, within the influence of the Institute, wherever located; but nothing came of his suggestion.

Your Committee have authorized your Treasurer to pay the annual dues, thirty dollars ($30), of the Chapter to the Fine Arts Federation, fifty dollars ($50) to the Treasurer of the General Committee of various bodies connected with the building-operations of the city, on the revision of the Building-laws initiated by the Superintendent of Buildings of the City, as the Chapter's share of clerical expenses, and ten dollars ($10) as its share of expenses of J. H. Pierce, delegate of the Associated Architectural Associations of the State of New York, in going to and from Albany to further the projected licensing of architects. The payments were promptly made.

Your Committee's last annual report stated its desire to secure illustrations of their work from members of the Chapter, for the adornment of the walls of its meeting and ante-rooms, and your Secretary has issued several times a circular-letter calling for such illustrations. It is only within a week or two, however, that the call has been honored by some half-dozen of the members: Messrs. McKim, Mead & White were the first to send in their examples, and next, Messrs. De Lemos & Cordes, and then Mr. R. H. Robertson, but your Committee hopes that their lead will be productive of like contributions from others, so that by the next meeting the walls will be completely covered with examples of the current designs of many of the most eminent practitioners of the metropolis.

The following ticket of Officers and Standing Committees for the calender year of 1897 was elected:

President, John M. Carrère; *Vice-Presidents*, R. H. Hunt and H. R. Marshall; *Secretary and Treasurer*, A. J. Bloor.

Executive Committee, E. H. Kendall and R. H. Hunt.

Committee on Library and Publications: Walter Cook, P. L. Le Brun and S. E. Gage.

Committee on Examinations: Napoleon Le Brun, R. M. Upjohn, A. J. Bloor, E. H. Kendall and R. W. Gibson.

The following ticket for the representation of the Chapter in the Council of the Fine Arts Federation was elected: *Representatives*, Chas. F. McKim, A. J. Bloor and H. R. Marshall; *Alternates*, A. W. Cordes, E. H. Kendall and W. R. Mead.

The Treasurer was requested to report to the Chapter on his views as to what economies, if any, could be practised, and as to what could be done to increase the Chapter revenue.

Messrs. Bloor, Carrère, Post, Gibson and Tryon were appointed a Special Committee of Consultation to report to the Chapter on the best means for increasing the efficiency of the Chapter.

Mr. Sturgis's gift of his "*European Architecture*" was accepted with cordial thanks, as was also the Secretary's gift of "*Five Sins of an Architect.*"

The meeting adjourned to the call of the Secretary.

A. J. BLOOR, *Secretary.*

THE ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

FIRST PARISH CHURCH, BROOKLINE, MASS. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

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

TRINITY MEMORIAL CHURCH, BINGHAMTON, N. Y. MESSRS. LACEY & BARTOO, ARCHITECTS, BINGHAMTON, N. Y.

THE exterior walls are of rock-faced Oxford blue stone and the roof is covered with red tile from the Celadon Terra-Cotta Co. The "Conosera" tile being the one used. The interior, including the trusses and ceiling, is finished in quartered-oak stained medium dark. The main aisle is tiled, as is also the chancel, and the altar is of white Caen stone executed by J. R. Lamb & Co., of New York. The cost of the entire structure will be about $50,000.

INTERIOR OF THE SAME.

A GROUP OF COTTAGES. MR. JOHN A. FOX, ARCHITECT, BOSTON, MASS.

A GROUP OF CHURCH DESIGNS. MR. J. A. SCHWEINFURTH, ARCHITECT, BOSTON, MASS.

COMPETITIVE DESIGN FOR CHRIST CHURCH, WALTHAM, MASS. MESSRS. CRAM, WENTWORTH & GOODHUE, ARCHITECTS, BOSTON, MASS.

IN this competition which was limited to these architects, Messrs. Hartwell, Richardson & Driver and Peabody & Stearns, the committee's choice fell on the design offered by the last-named firm.

[**The following named illustrations may be found by reference to our advertising pages.**]

DUMMER HOUSE, BYFIELD, MASS.

HOUSE ON ELM ST., NEW HAVEN, CONN. BUILT IN 1815.

A GROUP OF BELGIAN CHURCHES.

[**Additional Illustrations in the International Edition.**]

FRONT PORCH: FIRST PARISH CHURCH, BROOKLINE, MASS. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

[Gelatine Print.]

NORTH PORCH AND DOOR OF THE SAME CHURCH.

[Gelatine Print.]

COATS' MEMORIAL CHURCH, PAISLEY, SCOTLAND. MR. HIPPOLYTE J. BLANC, ARCHITECT.

THIS Baptist Church, built in 1894 as a memorial to Thomas Coats, the great thread manufacturer, by his family, is of red stone and cost about £100,000.

SOUTH TRANSEPT OF THE SAME CHURCH.

INTERIOR OF THE SAME CHURCH, LOOKING FROM ALTAR.

COMMUNICATIONS

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

ADJUSTABLE FACING.

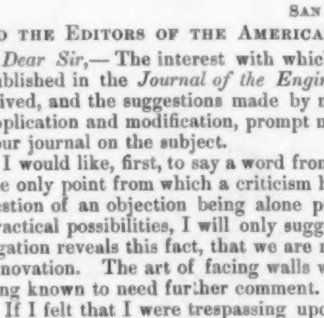
SAN FRANCISCO, CAL., Sept. 22, 1896.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sir,— The interest with which an article of mine, recently published in the *Journal of the Engineering Societies*, has been received, and the suggestions made by many architects concerning its application and modification, prompt me to add a few lines through your journal on the subject.

I would like, first, to say a word from the æsthetic side of the case, the only point from which a criticism has been suggested. This suggestion of an objection being alone put into the scales against the practical possibilities, I will only suggest that a more careful investigation reveals this fact, that we are not asked to take part in any innovation. The art of facing walls with costly stone has been too long known to need further comment.

If I felt that I were trespassing upon a precept, or were invading a forbidden ground, forbidden by any law of truth in architecture, I



A, B, C, D, E — 2½″ x 3″ x ¼″, angle.
F — 6″ I-beam.
G, H, J, K — Ordinary form of anchor.
I — Special form of carrier.
M — " " " "
L — " " " clamp.
N — " " " "
O — Plan of *G, H, J, K.*
P — Side view of *G, H, J, K.*
Q — Washers or wedges, for adjustment.
R — Open space.
S — Ashlar facing.
T — Architrave.
U — Frieze.
V — Bed-moulding.
W — Crown moulding.

believe that my own sense of right would be quite enough without a further suggestion from another to turn me from its further pursuit. While I recognize the fact that an unhappy interpretation *might* put the stamp of falsity upon this form of construction, I am still sure that this need not be, and I know now, after the fullest discussion, that it *will* not.

In fact, the light of the lamp of truth seems not to bring out a wrong. John Ruskin says, in "*Seven Lamps of Architecture,*" "but there is one form of architectural fiction which is so constant in the great periods that it needs respectful judgment. I mean the facing of brick with precious stone. It is well known that what is meant by a church being built of marble is, in nearly all cases, only that a veneering of marble has been fastened on the rough wall, built with certain projections to receive it, and that what appears to be massive stones are nothing more than external slabs. Now, it is evident that in this case the question of right is on the same ground as in that of gilding. If it be clearly understood that a marble facing does not pretend or imply a marble wall, there is no harm in it; and as it is also evident that when precious stones are used, it must become, not only an extravagant and vain increase of expense, but sometimes an actual impossibility, to obtain mass of them enough to build with, there is no resource but this of veneering; nor is there anything to be alleged against it on the head of durability, such work having been by experience found to last as long, and in as perfect condition, as any kind of masonry. It is, therefore, to be considered simply as an art of mosaic on a large scale, the ground being of brick, or any other material, and when lovely stones are to be obtained, it is a manner which should be thoroughly understood, and *often* practised."

The modern practical effort to minimize the weight of curtain-wall, and the consequent expense of the whole structure, has received too much consideration at the hands of the leading architects of to-day to make it even excusable to discuss at this time. I will only call attention to the fact that it is in this direction that I have had *my* aim, and in the individual consideration of the necessary element of a structural wall, I think will be found the highest form of construction.

These necessary elements I take to be strength and rigidity, fire-resistance and architectural character.

This theory applies with force to a modern steel-frame structure, enabling the free and independent handling of the three elements referred to. In an ordinary brick and masonry structure, the advantage of this separation is limited to a consideration of the advisability of treating separately the wall proper and the ashlar façade so as to effect security from unequal or unexpected settlement, protection against dampness, rapidity of construction, and economy in use of the more expensive material of façade. In the construction of a steel-frame building, we may add to these advantages the evident one of a general lightening up of the steel-work, consequent upon the limited weight of material of façade which it has to carry; a superior protection of the steelwork in the walls against fire, by means of the open space behind the facing, and the opportunity for a more independent prosecution of the work, which consequently enables the earlier completion of the building.

Public Library Building, Stockton, Cal.

After all, that which in this suggested form of construction seems a departure from modern usage is but directly in line with present methods, being merely a more frequent and positive interruption of the accumulating weight of the façade, thereby permitting the least thickness of masonry, the weight being transmitted to the structural wall by means of carriers and anchors, rather than at the floor beams, or sill beams. And, again, no credit rests, as an evolution of a new idea, on the feature of an independent facing. The carriers and anchors as used in the released form of construction are simply superior to the old way of building the wall and facing together.

The accompanying sketch shows a section of the main cornice of Public Library Building, at Stockton, Cal.

This building stands on a corner and it has exposed about 210 feet of frontage, the whole of which is white marble, on a light gray granite foundation-wall of 7 feet. The structural walls are of brick, 24 inches in thickness. The whole of the work on this building, except the finishing-coat of plaster, and the interior woodwork, was completed before the marble for the façade was delivered upon the ground. The whole cost of the exterior marble-work was less than $17,000, in which is included not less than $3,000 for carving, and the cost of six monolithic columns 16 feet in height. It was hardly thought possible to complete this building within the appropriated sum. This was safely done, however, and no uncertainty in the success of the method of construction has been suggested during its progression or since completion.

A comparative estimate of the amount of marble used in this work against what would have been necessary had the ordinary form of masonry construction been used, will show that less than one-third of such estimated amount was required. No difficulty was encountered in any part or feature of the work, unless it might have been the indisposition of the stone-setters to see their work laid out for them, course by course, to the top of the parapet-wall. In fact, the appropriation by the superintendent of the work, or an engineer, of the setting of all lines and levels of the stonework is a feature which has been noted by a number of architects, with satisfaction, a Boston gentleman making the remark to me, after fully understanding this possibility, that, could this be done, he should then feel as if the work were half set; and, indeed, the possibility of error, or uncertainty, is practically removed when carriers have been adjusted to exact alignment and plumb-line, and I will unhesitatingly state this as the proper plan to follow, in the use of this construction: to adjust and set, by an engineer, every line on the work, both of level and of plumb, to the figured drawings, before calling upon the stone-setter.

I will state that at one time during the progress of the work upon the Library Building, there were men at work at no less than eight different points, and on three different levels, and there was not, nor could there be, a discrepancy, or uncertainty, at any meeting-point. Every stone sent to the staging as correct in size was set without trimming, in fact, fitting and trimming were not known upon the staging. The only cutting known to have been done in the work of setting, was the small amount of channelling required for the carriers, and this work hardly occupied the time of one workman, and he not skilled.

When the difficulty of keeping to a level in every-day work is remembered (and who cannot remember in his own experience some perplexity thus encountered?), I think the avoidance of this one care may be appreciated. In the matter of settlement of an ordinary wall, and the uneven settlement in a composite wall, in the brickwork and stonework, some one has remarked that my estimate, quoting from the *Engineering Journal,* "Sometimes as much as $\frac{3}{4}$ inch in 10 feet" was too strong — that it *should* not be $\frac{1}{8}$ inch. Granting even this estimate, I was pleased to know that *all* settlement, or its effect, was removed in the construction of the Library Building, the walls being set and dry before the work of facing was begun.

More than usual care was taken in the construction of the Library Building, to keep the course lines of the brickwork level, but the irregularity of alignment of anchors was found to average $\frac{5}{8}$ inch, thus proving at once the impracticability of the proposed independent façade, without means of securing a perfect alignment. The same difficulty exists, although possibly not to so great a degree, in keeping a wall line plumb, and this is known to careful observers. This plumb-line is also set by the engineer, and made ready for the stone-setter from grade-line to cornice.

The advantage of preventing the penetration of moisture in a wall of the structure hardly needs discussion, while in our practice in the less formidable climate of the Western coast, we understand it; yet I confess, until I had been told by Eastern architects that they had seen rain driven through an ordinary wall, I should hardly have credited it. The absolute prevention of this danger may be assured.

Quite a little discussion has ensued upon the advisability of filling the open space behind the facing with some material calculated to preserve the desirable effect of this open space in the event of fire. I am, however, not yet convinced that a filling, even of a material expected to resist a great degree of heat, will have, so certainly, the effect of protecting the steel work, as the clear open space. I believe, as I have from the first, that the open space will more fully meet this question than the proposed filling. However, I will suggest that this filling, if used, be grouted into the space, and allowed to so set, forming practically an integral wall. This point, however, may be safely left, with many other modifications which may be made, to individual consideration. JOHN LOUIS PELTON.

NOTES AND CLIPPINGS.

MEASURING THE INTERIOR OF BUILDINGS. — A simple method of measuring heights in the interior of churches and other buildings consists in attaching a graduating string or tape to a small balloon such as is easily obtainable anywhere. This method might also be readily applied for measuring the height of caverns. — *Prometheus.*

Little Hope for the Goncourt Academy.—The realization of the philanthropic plans of the late Edmond de Goncourt seems to be fraught with difficulty. His scheme for the foundation of an academy, for the establishment of which he left his large fortune in trust to the novelist, Alphonse Daudet, and to Léon Hennique, has from the outset been regarded as impracticable, and appears now destined to become entirely impossible. In making his will Edmond de Goncourt expressly declared that he only bequeathed his fortune in trust for the foundation of a Goncourt Academy, on the lines of the French Academy, because his nearest relatives were exceedingly well off and plentifully endowed with the goods of this world. A claimant to the fortune, however, has appeared in the person of an indigent widow at Marseilles, named Mme. Adam, whose father, a man of the name of Guerin, was the only brother of Edmond de Goncourt's mother. The claimant is, therefore, the first cousin of the testator, and as such, his next of kin. Her husband was a merchant's clerk, who left her nothing at his death, and she has since supported her two daughters by giving lessons as a daily governess. Now, the entire will being based upon the false and erroneous supposition that the next of kin are in affluent circumstances, that in itself is sufficient to constitute a legal ground for contesting it, and this forms the first and foremost of the reasons put forward by Mme. Adam's lawyers for securing the injunction to prevent the executors from disposing of the property. But there are other grounds for contesting the will. It is expressly stipulated by French law that no property can be bequeathed to any organization or institution that is not already in existence, legally constituted and recognized by the State. The Goncourt Academy comes under this category. Another French law, namely, Clause 910 of the Civil Code, debars a testator from bequeathing the entirety of his property to any public or private institution or corporation as long as he has any living relatives, no matter whether they are of legitimate or illegitimate birth. This, therefore, constitutes a third ground for contesting the will. Moreover, Alphonse Daudet and his associate in the affair, who are recognized as trustees for the foundation of the academy, have been compelled to admit that its conception, as described in the will, is of such a hazy character as to render its realization upon the lines indicated by De Goncourt impracticable. They make this acknowledgment with all the more regret, as the bequest provides for an annuity of some $1,500 or $2,000 to each of the ten members of the projected academy. Should the various courts of appeal decide against the claimant, which is altogether improbable, she has, according to French law, the right to bring the matter in final resort before the Council of State, which will have to pronounce its opinion upon the affair before anything can be done. All this legal procedure will take, not months, but years, and, inasmuch as neither Daudet nor his fellow-trustee will care to risk the heavy legal expenses in connection with the affair, it is probable that the entire fortune will be quietly surrendered to the claimant, whose lawyers under the circumstances, have been well advised in recommending her to decline to agree to anything in the shape of a compromise.—*N. Y. Tribune.*

New York's 15,000 Hall-Bedrooms.—That which distinguishes this city from all others is the hall room. London has nothing like it, nor has Paris. They do not exist in Boston, or yet in Philadelphia. The typical New York house has five; there would be six but that the space for one has been appropriated by the bath-room. There are three hundred on each cross-town block. In a solid section extending from Washington Square to Fifty-ninth Street, and within the limited confines of Fifth and Sixth Avenues, there are, roughly estimated, fifteen thousand hall-bedrooms. Taking this as a unit of measurement, the alert mind can readily figure the hundreds of these coffin-like enclosures that rise tier on tier on Manhattan Island. The moral and social significance of the hall room is even more impressive. The manifest destiny of a New York house is that, sooner or later, it shall become a boarding-house. The history of block after block enforces this view. In that case, to the poor, the lonely, the forlorn, the hall room will fall. Of this the architect, the plumber, the gas-fitter, seem to have had prescience. The water-pipe ignores it; the slenderest rill of gas alone enters it; the steam-pipes hurry by it; the tin furnace-pipes go out of their way to avoid it. No register opens genially upon it. It has never known a flue of its own, or cheerful grate, or sullen stove. Even the range flue will stretch its warmth-giving length in any other part of the house in preference. In summer it is hot and stifling. In winter it is cold and cheerless. In all seasons it is either unventilated or swept by perilous draughts. It is the Pariah of the community of rooms, the Cinderella of the domestic roof.—*Mary Gay Humphreys in Scribner's.*

Inelastic Flooring.—A manufacturer says that the nature of the floor of the shop has a great deal to do with the amount of work that is got out of the operative staff. He was once struck by the difference in the apparent activity of two sets of men working on similar jobs at the vise in two rooms of a large shop. One was in an old building, and the other was in one of recent construction. In the former the men stood easily and naturally at their work, and showed no symptoms of a hankering for a seat on the bench, while in the latter the men were shifting their weight from one foot to the other, throwing one leg upon the bench at every opportunity, and showing every evidence of foot fatigue. The superintendent guessed that the difference was due to the floors upon which the two gangs were standing. In the old shop the floor was of wood, springy to a certain extent, and a poor conductor of heat. In the new shop it was of the most beautiful concrete, an excellent conductor of heat from the feet of the workman, and as unyielding as granite rock. So, the benches in the new shop were raised a couple of inches and each man was given a platform of wood that rested on two crosspieces at the end, and had a slight spring to it. The foot weariness disappeared almost at once, and no further trouble was experienced. Which shows that the prettiest floor is not always the best for the workman.—*San Francisco Chronicle.*

Ecclesiastical Wit.—Ecclesiastical wit and residences are often of a very high order. Few things have been better than Sydney Smith's famous recipe for the proposed wooden railing around St. Paul's: "If the Dean and Chapter would only put their heads together the thing would be done."—*London Standard.*

The Domes of St. Mark's, Venice.—The church of San Marco at Venice, built in the tenth century by order of Pietro Orseolo, the then doge, is decorated with five domes. One of these, placed in the centre of the church, is much larger than the others. Each dome is enclosed within four pieces of semi-cylindrical vaulting, together forming a square, in the angles of which are four corbels, which gather-in the circular base of each dome. The lower part of the dome is pierced with small windows. The interior is covered with mosaic, and the top of the dome is terminated with a finishing on which is a cross. In 1523 the doge, Andrea Gritti, caused the domes to be repaired, and Sansovino, the architect, restored in a great measure the supports, and placed (at about one-third of its height) a great circle of iron round the large dome to prevent its falling, a precaution which has been completely successful. The other domes are not so well preserved. In 1729 one of the smaller domes was in danger of falling from the decay which had taken place in a circular bond placed at the base of the dome. Stone was, however, substituted for the wooden bond, and a circle of iron placed without the dome near its base. In 1735 Andrew Tirali, the architect to the church, placed an iron circle round the dome which is near the great gate, on account of some small fractures which were then perceived.—*The Architect.*

The White House.—"There are a number of stories in circulation going to show why the Executive Mansion was called the White House, and by whom it was first called such," said a local historian, "but I think the best evidence tends to give that credit to James Madison, who was the fourth President, and who was driven out of the Executive Mansion when the British burned it in 1814. The Executive Mansion is built of freestone, which was quarried down on the Potomac River. The Capitol proper was constructed out of the same stone, though, of course, the wings for the Senate and House of Representatives are built of marble, with granite foundations. At the time the British burned the Executive Mansion they did a lot of other damage, and the country was pressed for money to repair the same. The walls of the mansion were but little damaged, other than being blackened by smoke. As I said, money was scarce, and Congress made an appropriation to have the outside of the house painted. White was selected as the best color. The Capitol was not painted for nearly twenty years afterward. Madison, in a letter to a personal and political friend, wrote: 'Come in and see me any time. You will always find me in at the White House.' The Executive Mansion may have been called the White House before that, but I have never been able to find any record of it. The letter from Madison had an important political bearing and was very extensively circulated. If, therefore, Madison did not officiate at the christening, he certainly took a prominent part in publishing the fact that the White House was forever, from that time, to be the name of the mansion. Up to that time the Executive Mansion, which is the legal name for it, was generally spoken of as the 'President's house.'"—*Washington Star.*

Boards of Appeal.—The resolution passed by the National Association of Builders at its Buffalo convention, advising local associations to agitate for the appointment in their several cities, of Boards of Appeal similar to that established in Boston, has, no doubt, created interest in the nature and functions of the Boston Board. Briefly it may be stated that an amendment to the building laws of Boston was passed two years ago, establishing a Board of Appeal consisting of three members—one appointed by the Mayor of the city, one by the Boston Chapter of the American Society of Architects and one by the Master Builders' Association, the Mayor having power to remove any member for malfeasance, incapacity or neglect of duty. The duties of the Board are to hear appeals from the decisions of the Inspector of Buildings, who is equivalent to the Superintendent of Buildings in New York City, and to construe the language of the decisions rendered by the Inspector whenever called upon to do so by any citizen of Boston in a prescribed form. The Board is endowed with discretionary powers in the matters of construction and the use of materials, and with the necessary authority to enter buildings, etc. Its decisions are final. It is in some respects like the Board of Examiners created under the New York building laws, but with enlarged responsibilities and more complete powers. The Board of Examiners is better constructed, in that it contains a wider experience, and consequently better judgment, and is more adapted to the requirements of New York City; but the idea of a competent body having authority to decide all disputes with the single head of the Department of Buildings is one that is quite worthy of consideration. The time for taking up this question is opportune, inasmuch as a new charter is being framed for Greater New York, and a representative and able committee is at work upon the revision of the building laws. There is one thing that might make busy men hesitate to give their time to this particular matter, and it is the current report that the form of Government which the Greater New York Commission will eventually recommend to the Legislature for the Department of Buildings, as well as for the other city departments, is the bi-partisan commission The Board of Appeal is said to be working very successfully in Boston, and that one of the causes of this success is that the method of its appointments takes it out of politics and provides for a thoroughly practical and efficient tribunal to whom all questions of doubt as to the construction of the law by the Inspector of Buildings may be referred. Undoubtedly a tribunal of this character is absolutely necessary to the satisfactory operation of the Department of Buildings, and this fact ought to be strongly impressed upon the Greater New York Commission and upon the Legislature.—*Record and Guide.*

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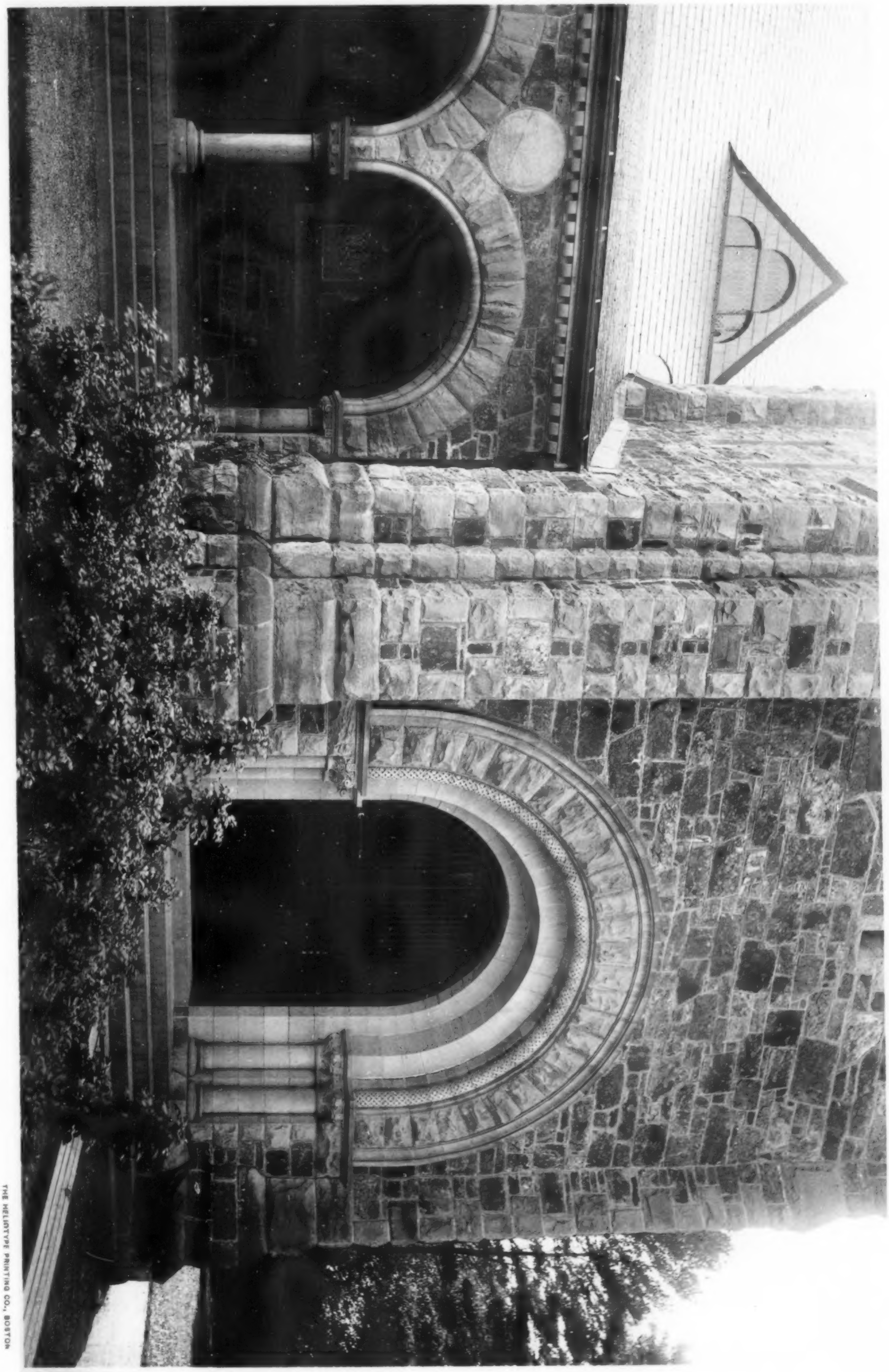

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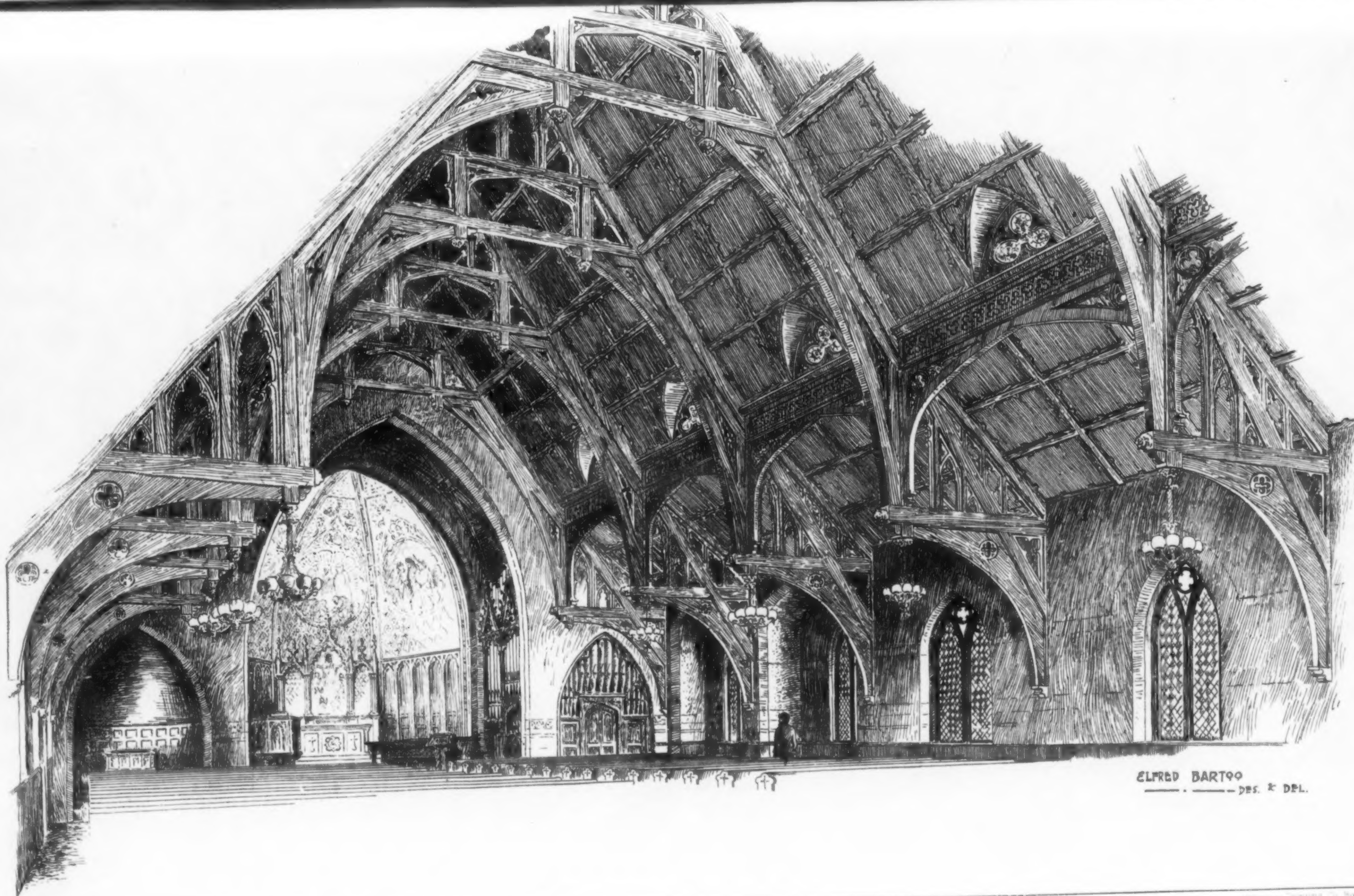
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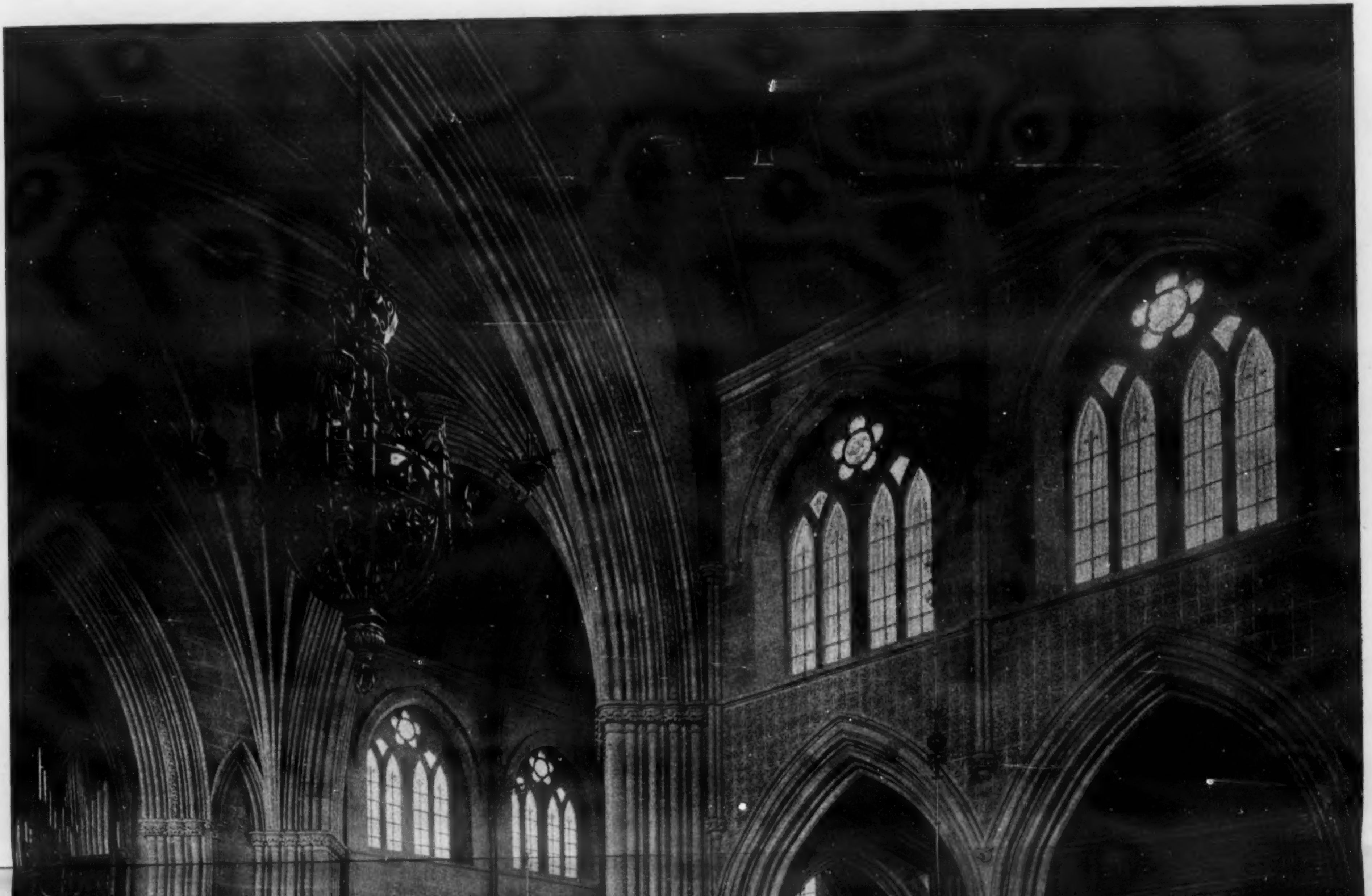

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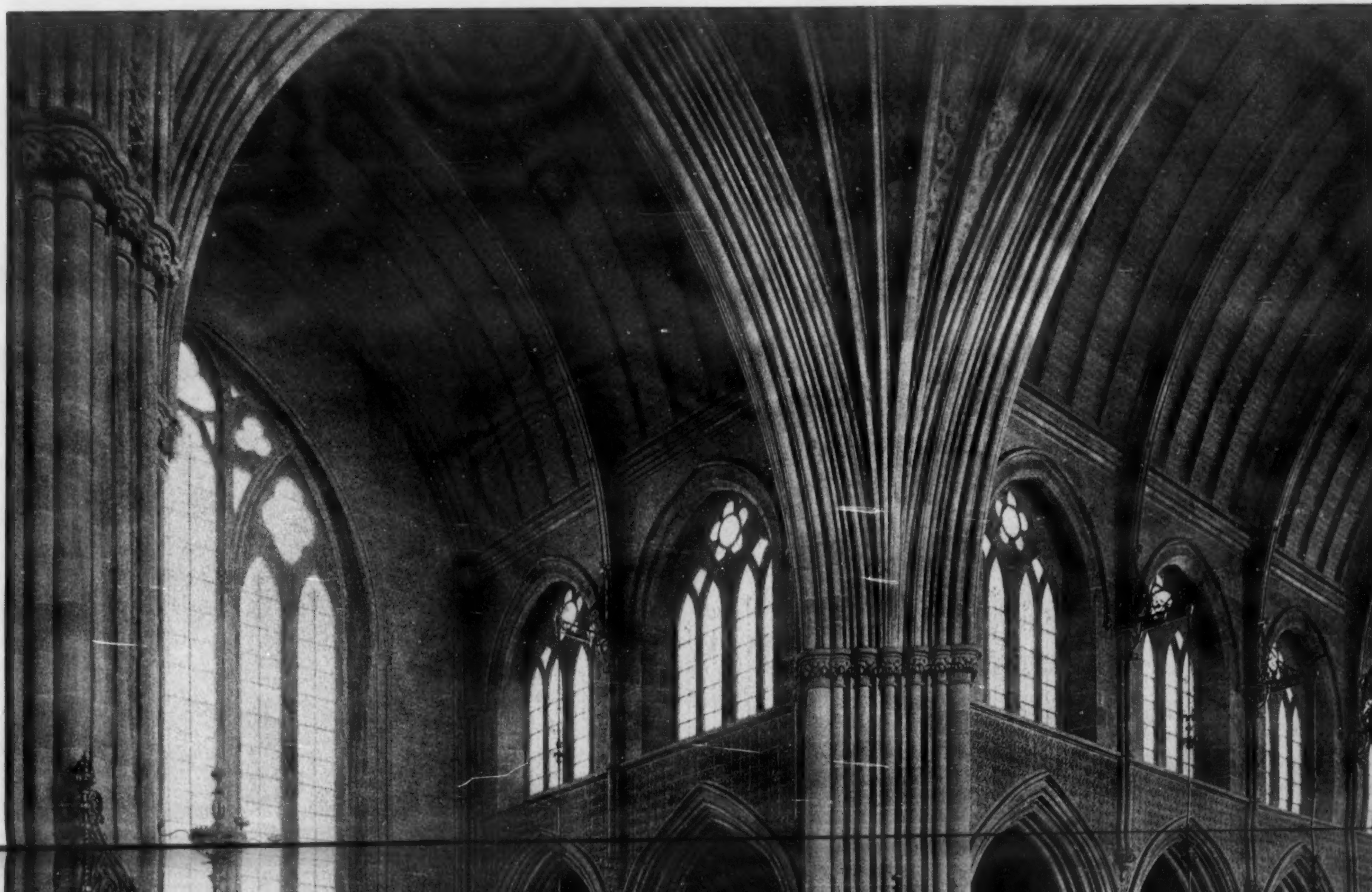

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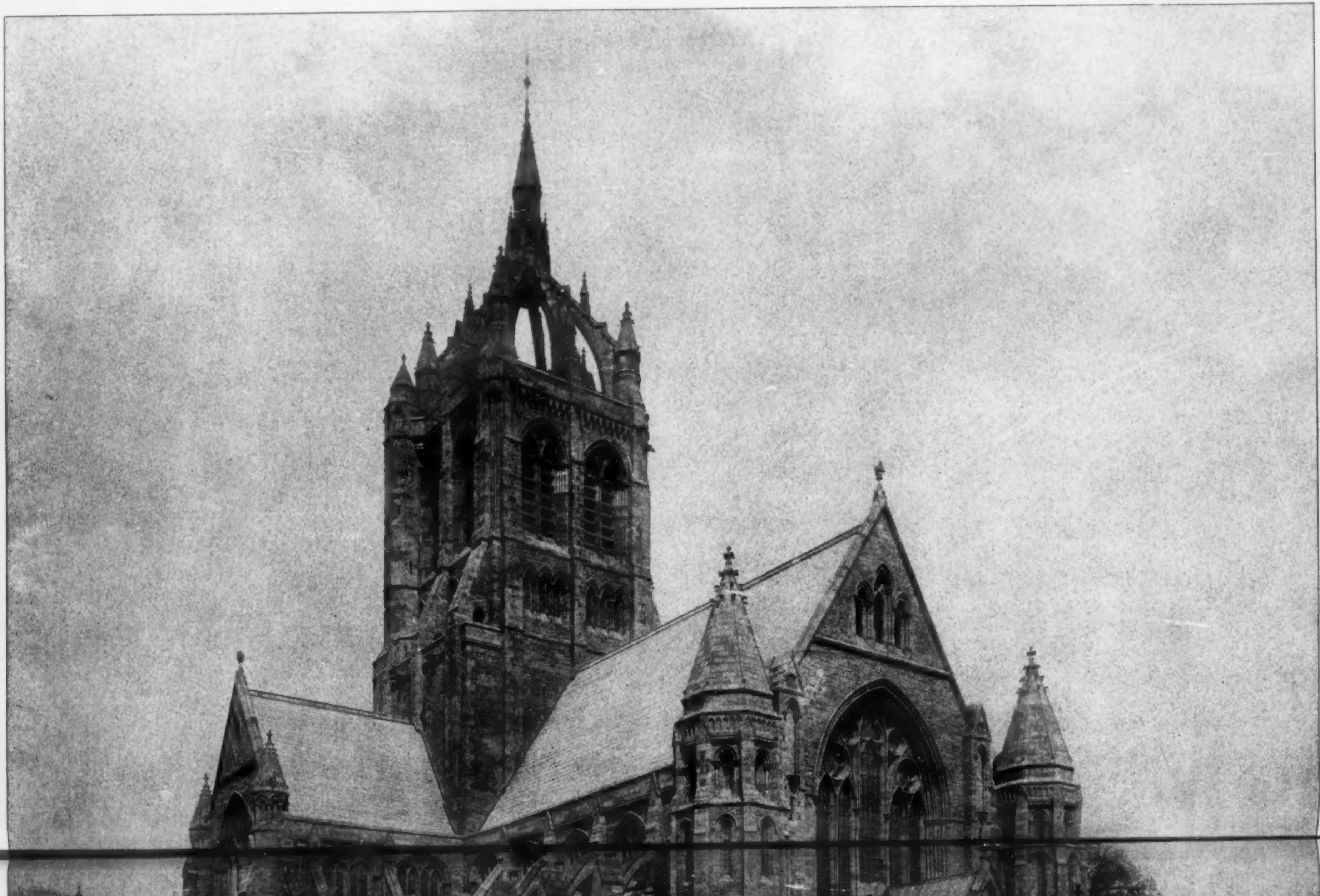

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