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NO. 1028.

ARCHITECTURE

ENGINEERING

DECORATION

211 TREMONT ST.

CONSTRUCTION

BOSTON MASS.

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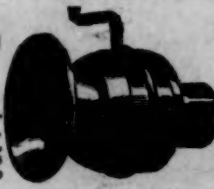
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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XLIX.

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SEPTEMBER 7, 1895.



SUMMARY:—

An Architect recovers Payment for Non-executed Work: Eastman vs. Kings County, N. Y.—English Architectural Journals on Hunt and Richardson.—Death of Henry G. Harrison, Architect.—Death of Gabriel Auguste Ancelot, Architect.—The Annual Conventions of the American Institute of Architects.—The Institute's Control over Chapter Membership.—Prizes for Essays on Profit-sharing.—Mineral Resources of Japan.—Relay Pumping at Chicago.	97
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WE have before mentioned the suit of Mr. R. B. Eastman, a Brooklyn architect, against Kings County, to recover some eighteen thousand dollars, as compensation for services rendered in the preparation of designs for a group of buildings,—asylums and similar structures, at the request of the Board of Charities. After the plans were made, the cost of carrying them out was found to be so great that the idea was abandoned, and the architect's services seem to have been forgotten. Mr. Eastman asked several times for payment, but was repulsed. On one occasion, as the story goes, the commissioners asked him where the plans were that he wanted to be paid for, saying that they had never heard of any such plans. As at that very moment, the plans were hanging on the walls of the commissioners' office, Mr. Eastman seems to have concluded that the Board did not mean to pay him, and, four years after he had done the work, he commenced suit against the County for compensation, claiming two and one-half per cent on the estimated cost of carrying the plans into execution. As he had still in his possession a letter from the Chairman of the Board requesting him to make the designs, and another letter from the same person acknowledging the receipt of the drawings, there could be no doubt of his employment; and Justice Cullen, before whom the case was heard, decided that his claim was just and reasonable in every particular, and directed him to present the bill for payment to the Board of Supervisors. If they should refuse to pay it, the judge told Mr. Eastman to apply for a writ of mandamus to compel payment. The counsel for the Supervisors, however, advised them not to resist payment; and the bill was accordingly accepted, audited and paid, with interest. So far as Mr. Eastman is concerned, the final payment of the bill in full is certainly to be regarded as a gratifying testimony to the fairness and moderation of his demands, and the profession will see in the decision an evidence of the growing appreciation, by the Courts and the public, of the rights of architects.

THE foreign architectural journals devote a good deal of space to the late R. M. Hunt, whose death they regard as a loss to the art of the world. The *Builder*, particularly, gives an excellent account of his work in his native country, and of the influence that he has had over American architecture. As compared with Richardson, it considers that the latter was more original, and had, for the time, a greater influence; but it thinks that the Richardsonian style is going out of fashion, while that favored by Mr. Hunt, which was simply an intelligent application of French work, seems to gain in favor among American architects.

TO a certain extent, this comparison is a good one; but Richardson was, for some years, a member of the School of Fine-Arts, in Paris, and, like Hunt, worked for years in the office of a French Government architect; so that his training was as purely French as that of Hunt; and the difference in the way in which the two men developed their work was dependent, partly on their individual characters, and partly—much more, we think, than is generally supposed—on the influence of their patrons in the School. Richardson was a pupil of André, and no one, who knows the work of both, can help thinking that André, with Richardson's opportunities, would have done similar things. André's designs are full of "bigness," and "stuff," as Richardson used to call it: he delighted in a series of great round arches, such as Richardson afterwards was so fond of building; and, like Richardson, he loved something new, picturesque and striking, so far as picturesqueness and novelty could be obtained within the rather narrow limits of orthodox French design. With such ideas of roundness, massiveness and stability fixed in his mind by his master, it is not strange that Richardson, who had a very great knowledge of architectural precedent, and was familiar with the Romanesque received at the School of Fine-Arts as the proper style for ecclesiastical buildings, should have found in a development of that style his best expression; and his merit lies not so much in having, as the *Builder* says, tried to originate a new style, as in the skill and resource with which he adapted to new conditions one that he had been taught. Hunt's master, Lefuel, was an artist of very different stamp from André. He was ingenious and original in his combinations, but was quite satisfied with what antiquity and the Renaissance could furnish him in the way of precedents, without any of the yearnings for the ideal which characterized André. Hunt's earlier buildings in this country, such as the Lenox Library, and certain houses in New York, show the same characteristics; but Hunt was so constantly in communication with France, which he loved as a second mother-country, that the newest Parisian fashions in architecture were soon reflected in his work. A few years after his career in New York began, the Neo-Grec fever, introduced by Labrousse and his coterie, began to rage in France, and Hunt was soon inoculated, the Brimmer houses in Boston, the Osborne house in New York, and certain tombs and monuments, being his principal contributions to the new style. After this short-lived epidemic had passed away, he took up the style in which his best work was done—the French Late Gothic, or rather, Transition. Whether this was suggested to him by what he had seen in Paris, we do not know. The style has been used in Paris of late years in several instances, with great cleverness; but Hunt seems to have found an artistic satisfaction in it, similar to that which Richardson found in his Hispano-Auvergnat Romanesque, and he used its picturesque outlines, and contrasts of delicate detail and massive wall, with the most brilliant success. It is probably on the beautiful buildings in this style, such as the Vanderbilt and Golet houses, that his public fame will mainly rest; but the profession will remember him as being, perhaps above all other American architects, a man who did everything well. Whether he had to design a Neo-Grec gravestone or a pedestal for a statue, consisting of a block of granite, with a few mouldings on it; a wooden house, a Broadway store, a hospital, a public library, a brick hotel or a marble palace, the result was always not only interesting and well studied, but impressed with that peculiar stamp which distinguished it in a moment from the work of all other architects.

MR. HENRY G. HARRISON, an architect once of considerable distinction in New York, died a short time ago, at the age of eighty-two. Although he designed a considerable number of important buildings in New York, including the Woman's Hospital, and the Manhattan Market, which was, at the time of its erection, one of the wonders of the town, he became particularly prominent through his connection with the magnificent schemes which the late A. T. Stewart attempted to carry out at Garden City, Long Island. Mr. Stewart had an idea that a great rural city, so to speak, could be established around a nucleus of fine public buildings, and he entrusted Mr. Harrison with the designing of the buildings. Of these, the principal was to be a cathedral, and the cathedral

was really built and dedicated, but, of the other intended structures for public use, we believe that none was carried out, except certain school buildings. The cathedral, however, was, and still remains, a fine and costly structure, which will perpetuate, as it was intended to do, the memory of its founder, and, we hope, of its architect.

M. GABRIEL AUGUSTE ANCELOT, a distinguished French architect, and recently Professor in the Paris School of Fine Arts, died recently in Paris. He gained the Prize of Rome in 1851, and was elected to the Institute of France in 1892. His most important work is the new Museum of Arts and Manufactures.

IF Mr. Corthell's mathematical deductions can be held to be prophetic, the star of empire will have stopped moving westward before very long and have fixed its permanent home, about 1920, over Chicago, with its possible seven and three-quarter millions of inhabitants. When that time comes, it will probably be much easier than now for the American Institute of Architects holding an annual convention at St. Louis to secure a large number of attending members. Still, as a large number of present members will hardly feel in 1920 like taking the long trip from the Atlantic seaboard to the Mississippi Valley—even if means of transport are made wonderfully more expeditious and comfortable—it is worth while for Eastern architects to begin to lay their plans now so as to be able to attend the meetings that are to be held in St. Louis, October 15, 16 and 17. We do not know as yet what matters of importance are likely to come up for consideration, but these meetings are always liable to develop something which demands proper treatment, and proper treatment can hardly be had unless proper persons are present to handle it. For our own part, we rather favor the representation of Chapters by authorized delegations, with powers limited to the control of such matters as had been announced, for discussion at the annual meeting, at a sufficiently early date to enable the Chapters to discuss them and reach a primary decision on them before the questions should be laid before the general conclave. Few things are more exasperating than to observe how matters of importance have been brought before past conventions and disposed of by chance, either with or without the pretence of consideration. The constitution leaves the disposal of all matters at the discretion of those who happen to be present at the annual meetings, and yet the presence of members is an affair of the purest chance. Year after year the great proportion of the attendants at these meetings are found to be regular attendants, with a small admixture of new members and some who are willing to put in an appearance because the meeting happens to be held in their town of residence. If regular attendance were due in all cases to real interest in the proceedings, then a most admirable practice is in vogue; but we fancy that it is rather more the effect of mere habit than of real interest. Attendance at the meetings is by too many looked on as merely an incident of the annual vacation and as offering a chance of acquiring personal knowledge of a new and unstudied locality, and the considerate action on matters brought before the convention is held to be a very secondary matter. The men of influence and weight who are nominally in attendance are generally the men who are put on committees and are busied with committee work at the very time when their presence on the floor as debaters would be of most value, and many a matter is disposed of without discussion simply because those whom chance has brought together are timid and afraid of their own voices, are uninformed as to the bearings of the matter for want of previous discussion by their local Chapters, or are absolutely indifferent to the whole matter. Annual meetings, constituted as they have been in the past, with chance membership, are a mistake and are liable to do the same sort of mischief that is done by annual legislatures, and we believe it is a common and devout aspiration that legislatures of all kinds might be called together at less frequent intervals.

ONE of the matters that will probably come up for treatment is to determine whether or no the Institute shall recede from the position which it took, almost without the semblance of discussion, in its attempt to establish a closer control over Chapter membership. The ill-considered action that was taken was at once resented in several directions.

Amongst others the Boston Chapter refused to accept the conditions the Institute sought to impose, so that by strict interpretation there has been, we suppose, no Boston Chapter of the Institute during the current year, although the older body, the Boston Society of Architects—of which the Boston Chapter is an outgrowth—has been more active than ever, and the fact that it has been able to employ itself usefully is due to the fact that it can set its annual dues at any figure it pleases, instead of limiting them to the small sum that the Institute has attempted to fix as a maximum.

THE new French Society of the Social Museum, having been presented with a gift of thirty thousand dollars, has decided to expend one-third of it in sending missions to study social matters abroad; one-third in prizes to deserving workingmen, and the remainder in opening two competitions for essays on certain questions relating to the improvement of the lot of working people. Two of these competitions are now announced. The first is for essays on Profit-sharing, and the second for essays on Workingmen's Benefit Associations. For the best essay on each of these subjects a prize of five thousand dollars will be given. Any person may compete for either or both prizes; but all essays submitted must be written in French. The essays on Profit-sharing must be submitted before December 31, 1896, and those on Workingmen's Benefit Associations before December 31, 1897. All papers must be delivered at the office of the Society of the Musée Social, 5 Rue Las-Cases, Paris.

WE are just beginning to appreciate in this country the resources and enterprise of Japan, which has been well called "the Great Britain of Asia." Like Great Britain, Japan possesses large deposits of coal, and has discovered how to utilize them, the annual production being not far from four million tons. Gold is found in moderate quantity, about half a million dollars being the usual annual output; silver is produced in somewhat larger quantity, while copper and lead are hardly worked at all, although mines of these metals exist. Unlike England, which has its mines of coal and iron almost side by side, Japan produces as yet very little iron. Sulphur is found in the volcanic region, and brought in considerable quantities to the market; and graphite and petroleum are produced on a commercial scale.

MR. JOHN P. BARRETT, the city electrician of Chicago, proposes to use the city electric-lighting plants for improving the water-supply. As every one knows, water for the city is drawn from Lake Michigan, and forced directly into the mains, under what is known as the Holly system, by pumps placed at various points, generally on the lake-front. As the city grows, and the network of pipes extends, these pumps have to force an increasing volume of water against an increasing friction. To a certain extent, the power of the pumps can be increased in proportion to the demand on them, but the limit of this increase is reached when the mains nearest to the pumps are no longer capable of resisting safely the pressure of the water which the pumps force into them. At several of the pumping-stations this limit has already been reached, but the supply is inadequate in the remoter portions of the territory dependent on these stations, and will be still more deficient in the territory still further away, which is being rapidly covered with buildings. In this emergency, Mr. Barrett suggests that, instead of laying new mains, and increasing the power of the main pumps, it might be possible to use electric-pumps, placed at various points, toward the circumference of the network of mains, as relays, arranging them in such a way that they would draw the water, under a comparatively feeble head, from the mains on one side, and force it out, under a much higher pressure, into the mains on the other side, thus reinforcing to any desired extent the head in the mains in the districts which now complain of an inadequate pressure. As the principal consumption of water is in the daytime, while lights are needed mostly at night, he thinks that the engines and dynamos at the lighting-stations could be utilized during the day for pumping, without detriment to their capacity for furnishing light at night. As the City of Chicago owns four lighting-stations, and can get power from several private corporations, it would be easy to make the experiment, and the City Engineering Department is working out the details of a scheme for trying it.



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A SERIES OF FIREPROOFING TESTS.



Culver House, Brighton, N. Y.

DURING the early spring of 1895, a number of test-houses were erected in the basement and first story of a new fireproof building in process of erection on Boylston Street, in the City of Boston, for the purpose of making a comparison of the value of different materials for fire resistance only.

The tests were made three months later, under the direction of Mr. F. E. Cabot, Superintendent of Boston Board of Underwriters, in the presence of Capt. John S. Damrell, Commissioner of Buildings for the City of Boston, and his chief Inspector, Mr. M. W. Fitzsimmons.

The tests were instituted by Mr. Willard T. Sears, for the purpose of obtaining accurate data in determining the value of several different systems of fire-resisting construction presented to him for adoption in buildings that he was designing for various uses, viz.: An appraiser's warehouse, 70' x 150', seven stories high, to be occupied by the United States Government. A warehouse 60' x 200', six stories high, for mercantile purposes. A store and office-building, 50' x 125', six stories high. An apartment-house, 106' x 90', eight stories high.

It will be observed that the character of these buildings admitted of a considerable variation in the strength of construction to be used, and the object of the investigation was not only to obtain the lightest construction suitable to meet the requirements for strength and stability, but also to determine fire-resisting qualities that would allow everything of a combustible nature in any room or portion of a building in which a fire might occur, to burn out without the fire extending to other portions of the building.

The result of these tests has demonstrated the fact that, where proper care is taken to fill all air-spaces and holes in the different stories, especially where the floors join walls and partitions, and where pipes and wires pass through them, a building is practically safe from fire extending beyond the room in which it was ignited, and, in an office-building, apartment-house and buildings of like character, if the fire were to be allowed to burn out the contents of the room without water being thrown upon the fire, less damage would probably result than if water were thrown upon the hot plastered concrete, which might crack and become loosened from the metal lathing, and cause damage in adjoining rooms.

One side of each of these houses was built against one of the party-walls of the building, which was given a coat of King's Windsor dry mortar, to prevent the fires from scaling the brickwork. The other three walls, floors and roof were constructed of the material to be tested.

For future reference, these test-houses were numbered 1, 2, 3, 4, 5, 6, 7. Numbers 1, 2, 3, 4 and 5 measured 4' 6" x 8' 6", and were 8' high; these were located in the basement.

An opening 2' x 3' was left at one end of each to admit fuel, and at the opposite end a connection with each was made to 8" x 12" flues of the building to carry off the smoke.

The roofs of these houses were built between, and supported by the first-floor beams of the building, and were virtually floors.

The two houses erected on the first or ground-floor were numbered 6 and 7, and were each 4' 6" x 8' 6". They were 11' high, and were built of wood.

As in the basement houses, each was provided with an opening at one end, 2' x 3', for the admission of fuel, and was connected by 8" x 12" smoke-flues of the building.

These houses differed in their construction as follows:

No. 1.—Erected by the New Jersey Wire Cloth Company, according to the Robeling system of construction. Steel studs, 2½" x ¾", placed 16" on centres, were fastened securely to the basement floor and to the ceiling; these were covered on both sides with stiffened wire-lath of their manufacture, and the house was then plastered within and without with two coats of King's Windsor dry mortar.

The roof was constructed of stiffened wire-lath, sprung between the first-floor beams in the form of an arch, which was covered with a concrete of broken stone, sand and cement. This was levelled-off flush with the tops of the floor-beams, giving practically a concrete arch of the depth of the beams (12") at the springing, and

4" deep at the crown; wire-lath was also carried beneath the lower flanges of the floor-beams, and the whole ceiling below was plastered with two coats of King's Windsor dry mortar.

No. 2.—The walls of this house were built by the Eastern Expanded Metal Company: Strips of wood, 2" x ¼", placed 16" on centres with ordinary stove-pipe iron applied to the 2" faces, secured at floor and ceiling (the office of the wood strips being to furnish a simple means of securing the metal lath, ordinary iron staples being used). They were then covered inside and outside with Expanded Metal Lathing, and plastered within and without with two coats of King's Windsor dry mortar.

The roof of this house was built by the New Jersey Steel and Iron Company, and is known as the "Metropolitan Floor." Cables of twisted galvanized iron wires were stretched between the roof-beams, and fastened to the top flanges by means of a hook of No. 12 copper wire. These cables passed under ¾" round iron rods, placed between the beams midway of the span, which gave them a belly-truss form, and kept them taut while the plaster concrete was being applied.

Flat level forms of wood were placed beneath these cables (about 3" below the top flanges). The lower portions of the webs and bottom flanges of the beams were covered with wire netting, so as to form ceiling-beams when finished.

Upon and around these forms, a composition of plaster-of-Paris and wood chips was poured, and levelled off 1" above the top of the beams. The constructional iron was thus entirely covered with not less than 1" of the composition. When it became thoroughly set, the wood forms were removed. The ceiling was left unplastered below.

No. 3.—This house was built throughout by the Eastern Expanded Metal Co. The walls were of steel channel bars, studs ¾" x ¾" placed 12" apart, secured at floor and ceiling, and covered with Expanded Metal Lathing, and were plastered within and without with two coats of King's Windsor dry mortar, embedding both stud-ding and lath in a solid body of plaster.

The roof was built in two sections: The whole area was first covered with Expanded Metal sprung between the beams in the form of an arch. This was covered with a concrete of cinders, gravel and cement, levelled off 2" above the floor-beams, giving a concrete arch about 5" deep at the crown. One section was plastered directly upon the underside of the arch. In the other section, ¾" x ¾" steel channel bars were secured to the lower flanges of the roof-beams and covered below with Expanded Metal. This was then plastered, giving a flat ceiling.

No. 4.—The walls of this house were built by the Clinton Wire Cloth Co.: Studding of ¾" x ¾" steel bars, placed 16" apart secured to the beam flanges, and covered on the outside with Clinton Wire Cloth of ¼" mesh. The two end walls were additionally covered on the inside with wire cloth, and the building was plastered throughout with two coats of King's Windsor dry mortar.

The roof of this house was what is known as the "Eureka Floor," constructed as follows:

Wood centres of 2" plank were placed 2' on centres between the roof-beams, resting upon the lower flanges.

The tops of these centres were level and flush with the tops of the beams; the underside was cut in the form of an arch leaving 3" of wood at the crown. The underside edges of the wood centres were bevelled off to ¾" thickness, and Clinton Wire Cloth stapled to them. A concrete of gravel, sand and cement was filled-in and levelled off flush with the tops of the floor-beams and centres.

These centres gave nailings for the wood floor above. The ceiling below was plastered with two coats of King's Windsor dry mortar.

No. 5.—was built by the David McIntosh Co., of hollow, porous terra-cotta blocks 3" thick, laid-up in common mortar, and plastered on both sides with two coats of King's Windsor dry mortar.

The roof was built of 12" hollow porous terra-cotta floor-blocks, plastered below and covered on top with 2" concrete, in which were embedded 2" x 4" bevelled strips to form nailings for wood floors.

No. 6.—The floor was of wood joists 2" x 12" set 16" on centres, upon which was placed, first a rough floor of ¾" matched pine floor boards, 6" wide, then two thicknesses of building-paper, and last a finished maple floor ¾" thick.

These floor-joists were lathed and plastered on the underside to represent a ceiling of a lower room. Upon this floor were erected walls or partitions of 2" x 4" studs, placed 16" on centres, lathed with wood laths and plastered in the usual way, King's Windsor dry mortar being used. The roof was constructed in the same manner as the floor.

No. 7.—A floor of 3" pine plank splined together, was laid directly upon steel I-beams 5 feet apart; upon this was laid a double thickness of building paper, and then a ¾" finished floor of maple.

Upon this floor were erected walls or partitions of 3" pine plank splined together and covered on both sides with stiffened wire-lath lapped 2" at each joint. The roof was built of 3" pine plank splined together and covered on the underside with stiffened wire-lath. The whole building was then plastered with two coats of King's Windsor dry mortar.

On the day appointed for the testing, a careful examination of the houses was made before the fires were started.

No. 1, which had been plastered early in the spring, was found to be in bad condition, due, no doubt to the freezing of the plaster. Its representative objected to the fire-test being made, and it was therefore abandoned.

The walls of Nos. 2 and 3, which had stood directly beneath a light-shaft open to the weather, were found to be slightly damp, but otherwise all the houses were in good condition.

At 10 A. M. small fires were started in Nos. 2, 3, 4 and 5 for the purpose of starting draught. At 10.30 cord-wood was thrown upon all the fires, care being taken to distribute the fuel so that the flames should reach every part of the interior of the houses.

At 10.45 A. M. hot fires were burning in Nos. 3, 4 and 5 and by 11, in No. 2 also. The fires were kept at a great heat, and at a maximum intensity in each house for one hour, after which time fresh fuel was not added. No water was thrown upon the fires directly, or upon the houses.

Careful notes were taken of any change in the condition of the house during the firing, and after the fires had gone out a careful inspection was again made.

These notes were taken, and have been arranged in the form of a comparative table by Mr. H. W. Chamberlain, of Massachusetts Institute of Technology, as follows:

Test No.	Fire started.	Fire under good headway.	Action during test.	Condition at end of one hour.
2.	10.30 A. M.	11 A. M.	At 11.10 A. M. plaster dropped from brick party-wall.	Plaster on Expanded Metal intact. Brick party-wall scaled in a few places from action of fire.
3.	10.30 A. M.	10.45 A. M.	10.45 A. M. there was an explosion. It threw the plaster off Expanded Metal wall on inside near lower front corner, and from the brick party-wall. At 11 A. M. there was a second explosion, which threw the plaster from inside and outside of Expanded Metal wall near lower front corner, leaving a hole about 2" in diameter. A third explosion threw plaster from inside of Expanded Metal wall near the bottom.	Ceiling intact. Except on brick party-wall the plaster that was thrown off was the second coat. The metal was exposed where the explosion made a hole in the metal wall. The bricks scaled off the party-wall after the mortar came off.
4.	10.30 A. M.	10.45 A. M.	10.50 A. M. plaster dropped from brick party-wall.	Ceiling intact. Bricks on party-wall badly scaled by action of fire.
5.	10.30 A. M.	10.40 A. M.	10.50 A. M. explosion. Plaster dropped from brick party-wall, and part of the ceiling.	Brick party-wall badly scaled, tile ceiling sustained no injury. Plaster on side wall cracked, but still clung to the wall.

During the fire, the outside of the buildings in no case became too hot to bear the hand. The sides and ends of No. 2 and the side of No. 3 were hottest, as would be expected from the construction.

The top flanges of the floor-beams above houses Nos. 2 and 5 were cool all through the test. Those above No. 4 were warm, while those above No. 3 were fairly hot. On breaking open the sides of No. 2, it was found that the wood strips in the studding had been charred by the action of the fire to a depth varying from $\frac{1}{8}$ " to $\frac{1}{4}$ " deep, according to position in the walls. The tops of some of the studs were charred more than half way through. The floor centres of No. 4, on the other hand, were scarcely charred at all; in no case more than $\frac{1}{8}$ " deep, and in nearly all cases the wood had not been discolored.

The difference in expansion between the ironwork and the plaster seems to have been inappreciable, as in all cases the plaster adhered closely to the metal.

The explosions referred to may have been occasioned by gases formed by the great heat, or by dampness in the materials.

The action of the fire on test-house No. 6 was watched with considerable interest; it had been decided to let the fire burn here until it made its appearance on the outside. The fire was started at 11.45 A. M. The plaster dropped from the brick party-wall at 12 M. and from the laths on the rear end near the bottom at 12.05. The laths and studs were well on fire in the rear at 12.10 P. M., and at 12.20 plaster dropped from the ceiling and the wooden side walls. At 12.25 the whole building was thoroughly on fire within; the outside plastering was still intact, although too hot to bear the hand. Later, a crack began to open along the angle at the junction of the end and side walls, which increased steadily until 12.50 P. M., (an hour and five minutes from the time of starting the fire), when flames made their appearance through the crack, and water was immediately applied and the fire extinguished.

On breaking away the exterior plaster on the rear wall of the house, it was found that the laths behind it were all burned away to a height of six feet above the floor.

The studs were also badly burned. The sidewalks were in a similar condition.

The brick party-wall was badly scaled over its entire area. The top floor had been burned away in front near the firing-door, but the under floor was still sound; half way back, the top floor had not been burned through.

In No. 7 the fire was started at 12.27 P. M., and was well under way by 12.50. The plaster dropped from the brick party-wall at 12.55, but the plaster on the metal lathing was intact, but red hot.

At 1.25 P. M., two cracks appeared on the exterior of side wall, where the metal lath was lapped, but neither flames nor smoke had found its way through the house at 2.37 (two hours and ten minutes from the time of starting the fire). It was not thought expedient to carry the test farther, and several attempts were made to extinguish the fire in the walls by throwing water into the houses from hydrant, but owing to no attempt being made to remove the plaster from the party-walls and roof (which remained intact, except the cracks referred to), the planks continued to smoulder, protected by the plaster, for forty-eight hours longer, in spite of frequent applications of water upon the plaster.

When the building was torn down, it was found that the planks forming the sides were more than half consumed. The plaster, aside from the drenching it had received, was in good condition.

The top floor had been burned away about half-way back from the firing-door, the under plank floor remaining still sound.

The brick party-wall was badly scaled over its entire area, showing the intensity of the heat.

A question in regard to the comparative weights of the concrete materials used in the construction of the different roofs having been raised, it was decided to weigh a section of each.

The debris from the fires was removed from the houses, the roofs broken down, care being taken to preserve all the material that had entered into their construction, and it was then weighed on platform scales. The data thus gathered are tabulated below:

Test No.	Construction.	Area of section.	Total weight.	Weight per sq. ft.
1.	Robeling System.	18 sq. ft.	1,295 lbs.	72 lbs.
2.	Metropolitan system.	18 "	427 "	23.7 "
3.	Expanded Metal Co.'s System.	22.5 "	1,697 "	75.4 "
3a.	Same as No. 3 with additional flat ceiling.	22.5 "	1,814 "	80.6 "
4.	Eureka System.	20.25 "	1,648 "	81.3 "
5.	Porous hollow tile arch blocks covered with concrete 2" thick.	20.25 "	1,781 "	87.95 "

In considering this table it should be noted that all of the floors were plastered on the underside, and were concreted on top, ready to receive the wood floors. The plastering on No. 5 fell during the fire-test and was removed with the debris, and, consequently, not weighed with the other material; the weight of the 12" stud floor-beams is not included in the weight given above.

Completeness is not claimed for any of the above tests; it was thought, however, that the tests offered many valuable suggestions, and threw many new lights on the subject of fireproof construction.

SPANNING SPACES.

If we were asked what was the greatest and most momentous building problem that has been the motive of every great architectural style in the past, we should certainly answer it was the problem of spanning openings and covering spaces. Both these requirements, no doubt, arose contemporaneously, and both exercised a very marked influence on architecture, for it was the development of the former which gave the varieties of facial expression to buildings, and that of the latter which exercised so potent an effect on the plans and contour of structures of all ages. From the early trabeated or Greek expression to the latest invention or fancy of the Renaissance architect we have an inexhaustible variety of types, each one of which has swayed the destinies of a style. No professional reader will want examples. They are to be seen in every national style in which there has been a genuine growth, and in every historic building. No less has the mode of covering areas exercised an influence on style. The change from the flat to the arched roof is of interest. From the square Hall of Xerxes, which, according to Fergusson, covered 105,000 sq. ft., was larger than any Greek temple and was covered with a flat, wooden roof, supported by numerous pillars, in seven bays, to the Pelasgian tomb house at Mycenæ, which was circular, and 48 ft. in diameter, and was covered by an equilateral pointed vault, with horizontal layers of stones, this is a decided step in advance. Not that the real principle of the arch was unknown, for there are, upon the authority of Layard, Hoskins and others, chambers round the Egyptian pyramids roofed with stone and brick arches; but these constructions were of a limited kind, and the arch seems to have been confined to small tombs, or chambers or vaulted drains. The Pelasgian or Etrurian treasures or tombs had scarcely

any direct influence on style, for they were covered by earth, and not visible, and it has been shown that the horizontal-course system of arch construction was not confined to the Pelasgic races, but was adopted in India and Asia Minor. They, at least, prove that the principle of arch construction was known long before it was applied boldly as an architectural feature. The horizontal arch was quite safe so long as it was equally weighted externally by earth or by masonry; but it was reserved for the radiating principle of construction to accomplish the great feats which developed into typical forms of architecture. Step by step we see the progress made. First, the dome was made an external feature. From the round temple at Spalatro, or the Pantheon rotunda, whatever its age, to the beautiful temple of Minerva Medica at Rome, with its dome of 80 ft. diameter resting upon a polygon made up of circular niches or alcoves, there is a decided advance. The pendentive system is adopted at the angles, the arch is built on the radiating principle with ribs of tiles between, which is filled by lighter material, and the plan of concentrating the material of the arch at certain points supported by external buttresses is recognized. Circular or polygonal structures were thus the earliest development of the arch, as we find in many of the Roman temples and in the Christian baptisteries of a later age. Next we have the more complex circular church of St. Vitale, Ravenna, an octagonal structure of 110 ft. diameter, its inner dome of 50 ft. forming the clerestory above the sloping roofs of the octagon aisles and galleries. The builders here attempted to vault a space with the least thrust by using earthen pots instead of stone masonry, and this vault is brought down to the octagon, the angles being cut off by squinches. Here the vault is lightened and covered externally by a low timber-framed roof, being one of the first examples of the later vaulted construction. The vault was internal. It is not so skilful an example of vault construction as its Roman prototype, which visibly exposed the vault. There are no ribs to concentrate the thrust, no buttresses; but it shows that the problem was understood, and how economy of material and weight could be insured. The church of San Lorenzo, Milan, is a farther step; the dome is octagonal, 70 ft. in diameter, and externally the building is a square, with segmental recesses in its sides. From these and other Romanesque circular churches the development of the Byzantine style was easy. The problem was to obtain the largest area possible under the dome, and this was solved by the use of pendentives. To rest the dome on eight piers or an octagon had been accomplished, and it was next essayed to cover a square by a dome, or on four piers instead of eight. At Sta. Sophia this was done. A hemisphere, whose radius was half the diagonal of the square, the sides of which vertically cut the sphere, was the geometrical solution. The pendentives formed the four corners of the square, and descended to the springing of the vault. By this simple method a square space was roofed by a circular dome, the diameter of which was equal to the diagonal of the square, and great constructional advantages were secured at the same time, as the weight of the dome and its thrust were brought down by the four pendentives to the supporting piers. In the great church of Sta. Sophia, we observe a perfect development of the pendentive dome; the building, to its outer walls, which are rectangular, covers an area of about 70,000 sq. ft., equal to many of our cathedrals. To give length to the domical area, two semi-domes are added, east and west, of the same diameter, equal to the centre dome, and these latter in turn are extended by smaller semi-domes. By this assemblage of domes considerable apparent scale is given to the building. One large dome equal to the whole area covered by the central and semi-domes would have dwarfed everything by its great size and height. Thus it was reserved for the Byzantines to lift the dome bodily above the walls, and make it a dominating feature in the architecture. St. Mark's, Venice, is an important instance of this fact. The plan, a Greek cross, has five domes, one central over the crossing, and the others over each arm, and the whole area covered is 46,000 ft. These domes are semicircular, and have considerably stilted external domes, which emphasize them. Altogether, St. Mark's is an excellent example of the domination of arched forms, and its front of five deeply recessed semicircular portals, and its arched windows above, show to what an extent the arch was carried as an element in external architecture. The well-known church of St. Front, Perigueux, a Greek cross with five domes, resembling St. Mark's, illustrates the same treatment, but the cupolas are pointed.

As Fergusson has shown, the pendentive dome system was thoroughly understood by the Indian builders, who managed to throw the weight of the dome internally, thus counteracting the thrust, and the Jaina architects adopted the Pelasgic or overlapping form of arch, and developed this principle in many ingenious ways. The Hindoos rejected the arch constructed of radiating stones, and in every case, constructive as well as decorative, employed the horizontal form. Gateways had a succession of brackets, one overlapping the other, and the bracket arch was common. In covering their spaces, the Hindoos first cut off the angles of the square by triangular stones; they next carried this a step farther for larger areas by using three tiers or courses of horizontal stones, the first tier cutting off the corners, the next similarly cutting off the corners of the diagonal square, and the last covering the opening. The area is thus quadrupled, as Fergusson shows. Again, the corner supporting pillars of the square are increased in number to twelve by placing pillars under the intersection of the diagonal with the outer square, and these are sometimes increased by adding external squares

on each face of the octagon. By this means a large area was covered by a series of squares with domes making a lozenge-shaped space, and giving a pleasing and varied plan. Fergusson points to St. Stephen's, Walbrook, as a building where this method has been carried out on Classical lines. The dome is carried on eight columns, with four more at the outer angles of the square, and with outer compartments. The Indian plan of roofing has not been followed by Western architects: that it has many beauties and possible applications to modern wants cannot be doubted.

We have alluded to the dome first; but contemporary with it is the Western method of roofing founded on Basilican models, and which culminated in our great mediæval churches, or as we see it in the cylindrical and pointed vaults of the South of France. The nave and side aisles are covered with round or pointed tunnel-vaults, though in the same province the pointed dome-roofed style appears, as at St. Front and at Angoulême. The barrel-vaulted roof was not visible externally—a characteristic which generally prevailed in the vaulted buildings of the Middle Ages. It formed an internal ceiling covered by an outer roof: it had to be resisted by thick walls and buttresses at intervals. When we consider that all arch and vault building arose from the necessity of using small materials in the covering of space, it was economical; but when an outer timber covering became really the roof, its function became more decorative. The introduction of the cross-vault was, however, an important advance, as it enabled the weight and thrust of the vault to be concentrated at four points, and therefore a larger space could be covered. It became in this way a rival to the cupola, and assumed an external expression by the use of buttresses and pinnacles at the points where the diagonal ribs meet. Another architectural feature that seemed to grow with the cross-vault was the gable. But it is chiefly as a method of spanning space that we now refer to the intersecting vault. The triple-vaulted aisles of our great cathedrals, and the greater widths spanned by five vaults on the Continent, show how this system adapted itself for the covering of large areas.

The lessons we draw from these older methods of covering space are twofold—constructional and architectural. With our improved facilities and materials we might employ domical construction more than we do. With the exception of the late Mr. Herbert Gribble's concrete cupolas and vault over the church of the Oratory, Brompton, and the introduction of concrete vaults by Mr. W. Emerson in a large Indian building, few instances are within our recollection. The advantage of being able to construct a dome of a thin crust of Portland-cement concrete *in situ*, without any thrust, light and strong, does not appear to have encouraged architects. Concrete and iron have been used in flat roofs and floors for many years; but architects seem unwilling, or are too timid, to employ the same materials on a large scale in roofing. Why the domical system of covering space has so little attraction for modern architects, it is difficult to say. We are not subject to earthquakes like many Eastern countries, where domes have always been used, of the horizontal kind, at least; therefore we cannot plead as an excuse its want of stability. The arched forms of spanning space we have spoken of were often the precursors of plan and style—at least, they suggested them;—but it is not so now. Covering space has now become a matter of cheapness and convenience, and the modern invention of the truss and iron girder, the third great system of spanning a void—the other two being the beam and the arch—has superseded these older and more constructional forms. The solid beam or lintel was limited to moderate spans, as it was simply the natural cohesion or tensile strength of stone or marble which had to be depended on; but when the truss was invented, or the "tie," as we see in the ordinary king-post roof, there was no limit to the covering power. It far excelled the arch or vault, which could only safely span 30 or 40 ft. The iron girder or truss in its many forms has made its way in modern architecture and any shaped plan or space can be spanned by it. It has no influence, like the former methods, on the architecture. This is why our modern "styles" are so characterless. Why insert an arch over a window, if an iron or concrete lintel will do as well? is the reasoning of the modern architect. The arch once influenced style, as we see in the noble Florentine example of Renaissance, the Riccardi Palace, in the Pitti, and in St. Mark's, Venice. Now, it is only introduced as an ornamental form to give variety, in the same manner that we see a domical ceiling of plaster cradled out from a tie-beam roof, a poor travesty of the constructed vault, or a dome serving an inner covering, like those of St. Vitale or St. Mark's, or St. Paul's. Why not again make the vault an independent structure and construct it of concrete? The Indian method of overlapping stones we have noticed suggests the possibility of constructing vaults without thrust, and of giving variety to interiors. The modern flat ceiling, with its girders and pillars, has nothing to suggest plan; any shaped room can be covered by it, it does not occupy height, and hence it has superseded other more architectural methods of covering span. The subject is one which deserves more attention from architects. Constructive vault-building appears to be a thing of the past. It is now imitational except for a few churches and important buildings, or is superseded by flat roofs, in which cheapness is the main consideration. Timber trusses, boarded or ceiled, are used almost entirely in our churches, because the walls need not be built so thick, and wider spans can be covered, requirements which appeal to the profession generally. There are, however, yet a few of our leading church architects who have

revived the vault of masonry, and have, to their credit, done a little to preserve the traditions of vault-building, and to keep that scientific branch of masonry from extinction.—*Building News.*



BUILDING ACTIVITY.—DRAINAGE.—A NEW RAILROAD.—THE LIBRARIES.

BUILDING was never more active in the City of New Orleans than it is to-day, and the activity seems to include nearly every class of building. Residences are going up, in great numbers, in all parts of the city, but more particularly in the newer portions on the outskirts. Many-storied mercantile and office-buildings are being erected down town. The new St. Charles Hotel is approaching completion upon the site of the old. A fine church edifice is in process of building on Canal Street and the new Pickwick Club-house is about to be begun.

At a public meeting recently held here, a speaker stated that the three subjects engaging the attention of public-spirited citizens in New Orleans, at the present time, were drainage, pavements and free wharves. The subject of drainage has risen to an important position, in the popular mind, spasmodically for many years, but without any very satisfactory results thus far. Many schemes have been tried and abandoned. Certain "drainage-machines" are landmarks in the swamps and canebrakes in the vicinity of the city, and these appear to be preserved as historic relics of abandoned drainage systems. The city is at present suffering another spasm of interest in the subject. Certain prominent streets, which had but recently resumed their accustomed condition, after having been torn up for the laying of electric-car tracks, are being again dug up (revealing a depth of filth and depravity over which it is astonishing that any people should consent to live), with the ultimate purpose of establishing an underground sewer system. It is understood that the drainage-machines will be called into use, and that the system is to find an outlet in Lake Borgne.

It has long been a matter of complaint that the port charges in this city are largely in excess of those of competing ports, to the great disadvantage of the commerce of the Crescent City. But while the public press is agitating the subject of free wharves, and while the various business exchanges are discussing it, a new railroad is being constructed which will contribute a powerful argument in favor of emancipating the wharves, and will also stimulate the growth of the city in a new direction, that is, towards the mouth of the river. This railroad is known as the New Orleans & Western. It is to cross the Mississippi River from the west at Avondale, beyond Southport; and to form a belt-line back of the city, between the river and Lake Pontchartrain; crossing the Illinois Central, the North Eastern and the Louisville & Nashville roads; and have its terminus at Battle Ground plantation—the historic field of General Jackson's military exploits—considerably below the city, in St. Bernard's parish. At this terminal point, the railroad has secured a mile of river-front and has begun the erection of wharves, elevators, compresses and storage-warehouses. Cotton, sugar, rice and, indeed, all the products of the Mississippi Valley, can be brought to these wharves, by the railroads connecting with this belt-line, and Battle Ground will be the centre of shipping interests in the near future.

The New Orleans people are not a book-reading people, so say the book-sellers and librarians. Yet the city has five libraries. The Howard Library is the best known, probably because of its central location and its exquisite building, designed by Richardson and executed by his successors. The State has a law library in the Law Department of Tulane University. The University has a library which it has removed to its new buildings near Audubon Park. It was formerly connected with the Fisk Library, which is now left somewhat lonesome in one of the deserted Tulane buildings. The city has a library in the City-hall, its chief treasure, apparently, being a superb copy of Napoleon III's "*History of Julius Caesar*," presented by the author, and carefully preserved under a glass globe. The City Library asserts the possession of eighteen thousand volumes, the Fisk Library fifteen thousand. It has been determined to consolidate these two libraries, and the city engineer has prepared plans for the conversion of the second floor of the City Court Building (on Camp Street, fronting on Lafayette Square, nearly opposite the City-hall) into a library and reading-room. The building has not the faintest suggestion of a home of literature in its exterior, and it is not claimed that its interior will embody the most modern ideas of library architecture. But the building is spacious and the arrangement will be economic, and both collections of books will be made more accessible to such as choose to avail themselves of them.

THE EMPIRE OF INDIA EXHIBITION, LONDON.



Arms of the First East India Company, from the Church of St. Matthias, Poplar.

ARCHITECTURALLY, the buildings erected for this show are very remarkable, especially in the treatment of stucco ornament, which is copied from genuine Indian examples. Nor are the painted buildings and landscapes to be despised, and taken as a whole, the effect of these against a clear blue sky (and we have had several this summer) is very striking. There is a fascination in white buildings in the sunlight—who does not remember the Portuguese Palace at the last Paris Exhibition! If the substances

with which they are constructed be only lath, plaster and white linen, the effect is none the less beautiful. We cannot have them in marble, so let us be content. Probably few visitors are discontented with the white curry-house and other buildings surrounding the lake in the Queen's Court; and when lighted up in the evening, it is really a charming picture, with the white and red turbaned Indians and the electric barges moving about. The mosque is an especially beautiful building, purporting to be of red sandstone, with a fine entrance and two minarets with domed tops.

But apart from the Exhibition as a show, it is well worth a visit, and a long one, to pore over the relics of the "old-world" Honorable East India Company. How few of us know the history of this! We have heard from childhood of East India-men—great three-masted ships, and of the Black Hole of Calcutta, and of Tipu Sultan, and of Lord Clive, and a hundred other things. But as to knowing anything about the constitution of the Company, alas, how ignorant we are! That dear, kindly, much-tried Charles Lamb was a clerk in the India House, is about the sum total of our knowledge.

Well, here is the great Clive's tent, and here also, are the shoes, the gloves, the finely damascened armor, a richly-jewelled jade dagger, and other relics of Tipu Sultan. A very interesting link with the past is the book of minutes of the meetings held by the Company from 1599-1603; and the first letter-book of the Company, extending from 1600-1619. The first of these books was reproduced in 1886 at the expense of the late Mr. Henry Stevens, of Vermont, U. S. A. A fine portrait lent by the Skinner's Company representing Sir Thomas Smythe, the first governor of the East India Company, hangs amongst other worthies of very inferior artistic value. Sir Thomas was also a leading member of the Virginia and Summers Islands Companies, and a promoter of Arctic navigation; besides being a member of the embassy sent by James I to Russia, in 1604. A large number of charters are shown, the first being an illuminated copy on vellum of the charter of James I, dated 1609, for engrossing which the Company made arrangements in January, 1610: it is a fine specimen of the calligraphy of the time. The original letter of James to the Shah of Persia in 1622 is no less interesting. Near this is a warrant of Cromwell's, for the repayment to the Company of its loan of £50,000 to the State.

A very curious relic of former times is a series of tally-sticks for the yearly payment of £10 for the quit-rent of the Island of Bombay which had fallen to the British Crown as part of the dowry of Charles II's Portuguese wife. These sticks were notched to represent the number of pounds, shillings and pence of a debt, before writing and arithmetical quantities were part of the general education of the people. Quoting from the account of these tally-sticks in the catalogue: "A narrow shaft of wood (generally box, willow, hazel, or other hard variety) was taken, and notches carefully cut on one side, or, if necessary, on two opposite sides, each ordinary notch representing one pound; shillings and pence could also be symbolized, while large notches stood for hundreds and thousands of pounds. The tally was next split down the middle for nearly its whole length, where a side cut released the smaller portion, leaving the rest of the tally provided with what may be described as a handle. The larger half, variously named the 'stalk' or 'counter-foil,' was delivered to the person paying in the money represented, for which it served as a formal receipt; the other part, known as the 'leaf' or 'foil,' was retained in official custody. In cases of doubt or dispute, or of allegation that the number of notches had been surreptitiously increased, the two pieces were fitted together, and their agreement (whence the expressive verb 'to tally') effectually settled the question." Another tally-stick represents a sum of money presented by the Company to Charles II of blessed memory. Oddly enough, and proving the conservatism of the British Government, this mode of reckoning is said to have been in force at the Exchequer as late as 1824.

Three pictures should be mentioned: that of Robert, Lord Clive, attributed to Dance; Lord Pigot, by Hogarth, and last, not least, a fine portrait, by the late Frank Holl, of Sir Henry Rawlinson, the last survivor of the Directors of the Company, who were appointed to the Council of India upon its formation in 1858.

Interesting relics of the past are the drawings of the old Poplar Chapel and the original East India House. Here it was that auctions of Indian and Chinese goods were held from time to time in the days when there was no Mr. Liberty to tempt our love of the beautiful. Poplar Chapel was started in 1646 for the use of seamen and others who worked in the district. The site was given by the East India Company, close to the almshouses they had erected fifteen years previously, as a hospital for the relief of such as had been or should be maimed or grow old in the Company's service. Later on they gave building materials and a liberal grant of money. The edifice was finished in 1654, repaired in 1721 and again in 1776, and lately has been encased in stone and dignified by the name of St. Matthias's Church. In 1806 the inhabitants of the almshouses were pensioned off, and the buildings pulled down, after the manner of Emanuel Hospital and other old foundations for the aged poor, which got into the hands of the Ecclesiastical Commissioners. The only part of the church which recalls the old Chapel is the moulding from the ceiling which supports the arms of the Company, the latter having probably been placed in position at the building of the chapel. They were assigned to the Company in 1601.

Other relics of the old time are some uniforms of the Madras artillery, with helmets almost identical in form with those worn by the French cuirassiers, and having the leopard-skin covering of the Empire period and the long red and black horsetail now in use. Tipu Sultan's walking-stick is a curiosity in being made from the upper jaw-bone of a sword-fish: it is gold mounted and was taken from the palace at the storming of Seringapatam. Attached to the portrait of Warren Hastings, by Sir T. Lawrence, there is a story that the painter gave orders that it was never to be touched. Consequently, we see it now as time and damp have made, or marred, it—cockled, mildewed and with one eye gone. It is in pastel, and, doubtless, Sir Thomas meant that it should not be wiped, or its surface touched, which has frequently been the fate of pastels; but its owners interpreted the order otherwise, and have so religiously carried it out, that it is questionable whether it is not too late to save the drawing. What excellent virtues are obedience and zeal! In the dress of the attendants—blue robes, trimmed with red ball-fringe, and cocked hats—we see the costume of the beaules of the old India House, now as defunct as the Company itself.

Some drawings of Brahmins in the act of prayer are exceedingly interesting, as they show the manifold actions of the hands during the Sundujah, or daily prayers. Naturally, the views of Madras and Bombay in 1799, original drawings of temples, mountain-passes and the like, are no less interesting when we compare them with photographs of the cities at the present time. What changes! and not always, as regards beauty, are the changes for the better. But, on the other hand, as regards peacefulness and contentment, the native races are probably better off now than at any time since the Portuguese, in the fifteenth century, called themselves "Lords of the Conquest, the Navigation and Commerce of the Eastern Seas." At any rate, those that are now here in London have an opportunity of seeing their rulers under the best possible conditions; and, doubtless, their estimate of the visitors to the Exhibition will be somewhat different from that formed of the ordinary Anglo-Indian, civil or military. We have no feelings here in England, Scotland or Ireland against the "colored" races; consequently, the native, from the Shahzada down to the driver of the delightful little Poonah bullocks, no larger than a dog, are made much of and feted to their hearts' content.

S. BEALE.



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

CENTRAL CONGREGATIONAL CHURCH, NEWTONVILLE, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

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HOUSE OF MRS. JOSEPHINE SCHMID, FIFTH AVE. AND 62D ST., NEW YORK, N. Y. MR. R. H. HUNT, ARCHITECT, NEW YORK, N. Y.

HOUSE AT BUFFALO, N. Y. MR. E. G. W. DIETRICH, ARCHITECT, NEW YORK, N. Y.

HOUSE FOR A. D. CLAFLIN, ESQ., NEWTON CENTRE, MASS. MR. S. J. BROWN, ARCHITECT, BOSTON, MASS.

PROPOSED HIGH SCHOOL, MIDDLETOWN, CONN. MR. F. R. COMSTOCK, ARCHITECT, HARTFORD, CONN.

STAIRCASE-HALL IN PROPOSED HOUSE FOR W. W. SMITH, ESQ., HARTFORD, CONN. MR. F. R. COMSTOCK, ARCHITECT, HARTFORD, CONN.

HOUSE AND STABLE FOR E. W. RICE, ESQ., SWAMPSCOTT, MASS. MESSRS. RAND & TAYLOR, ARCHITECTS, BOSTON, MASS.

[Additional Illustrations in the International Edition.]

INTERIOR OF THE CENTRAL CONGREGATIONAL CHURCH, NEWTONVILLE, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

[Gelatine Print.]

TOWER OF THE SAME CHURCH.

[Gelatine Print.]

MESSRS. THOS. COOK & SON'S COMMEMORATIVE BUILDING, LEICESTER, ENG. MESSRS. GODDARD, PAGET & GODDARD, ARCHITECTS.

TO meet the requirements of the increasing business of Thos. Cook & Son, and the Midland Railway Company, at Leicester, Mr. John M. Cook, the head of the firm of Thos. Cook & Son, resolved to erect premises to meet present needs, and to form, in the town of its birth, a monumental record of the origin and growth of the excursion system of the globe. The façade, in the style of Renaissance, is built entirely in buff terra-cotta and glazed faience. On the ground-floor, the left-hand side of the premises is to be used as the excursion, tourist and shipping office, and is furnished in teak from designs by the architects, carried out by Messrs. Perkins, Long & Tyler. The shop on the right-hand side will be occupied by Messrs. Clarke & Hodgson, printers and booksellers, whose predecessors have carried on business on the same site for a century. This building will contain the newly-established Church House; and also accommodate the Leicester Medical Society and the Leicester and Leicestershire Society of Architects. Here the professional libraries of these learned bodies will be placed, and their meetings will be held on the site rendered familiar by long usage. The terra-cotta and faience used externally have been prepared at the Burman-tofts Works, Leeds, where the detail designs of the architects have been carried out with great accuracy and much artistic spirit. The façade is divided by cornices into four stories. The teak joinery on the ground-floor is enclosed by richly decorated pilasters, adorned with figures emblematical of Europe, Asia, Africa and America. This is surmounted by a frieze and cornice, and all up to this level is constructed in glazed faience of rich and varied colors. On panels are recorded the names of some of the chief towns in all parts of the world in which Messrs. Cook & Son have established agencies. In the centre is a panel bearing the following inscription:—"Erected A. D. 1894, by John M. Cook, to commemorate the origin of the Excursion system of the world by Thomas Cook's special train from Leicester to Loughborough, July 5, 1841." The floor above this is lighted by four recessed and elliptic-arched windows balustraded on front.

DINING-ROOM, GREAT CUMBERLAND PLACE, LONDON, ENG.



BOSTON, MASS.—Summer Loan Exhibition; Gobelin Tapestries; Japanese Paintings; Line Engravings, Mezzotints, and Etchings by Rembrandt: at the Museum of Fine Arts.

NEW YORK, N. Y.—Twenty-eighth Semi-annual Exhibition: at the Metropolitan Museum of Art.

Summer Charities Loan Exhibition: at the American Art Association Galleries.



WOODEN PAVEMENTS.—Considerable difference of opinion being found to exist among experts as to the best kind of wood for use in street-paving, the Paris municipality has undertaken an experiment which will be watched with interest. The Faubourg Montmartre, one of the great arteries of the French capital, along which particularly heavy traffic passes all day long, is being repaired with no fewer than six different kinds of wood. These are pitch-pine, pine from the great swampy district in the south of France called the Landes, the inhabitants of which have to walk about on high stilts, teak, red karri, box and a particularly hard wood from Borneo. Each of these materials has particular qualities of its own, such as impenetrability, non-slipping surface and so forth. From time to time a committee of experts will visit the place, and draw up a report as to the substance which best stands the rough wear and tear.—*London Daily News*.

WINDOWS AND ROOMS. — It seems a self-evident proposition, yet one that is continually disregarded, says Aston Webb, that the size of the windows must be regulated by the size of the rooms that they are intended to light, yet nothing is more common than this example, where three windows all of the same size, "to preserve the uniformity of the elevation," as the speculative builder says, light three rooms of totally different sizes, the result being that one bedroom is fairly lighted, the other is very dark, while the dressing-room is so light that you hardly dare dress in it without the blind being drawn down, as you seem to be quite out in the open air. It is extremely difficult to lay down any law giving exact rules as to the proportion of lighting-space necessary for a given room — much depends, for instance, on the position of the light. In the well-known example of the Pantheon at Rome the building is amply lighted by a small circular opening in the roof. The cubic contents of this building are given at 1,934,460 cubic feet, and the area of the circular opening only 572 ft., or about one-third the amount required had the lighting been from the side. The rule said to have been adopted by Sir William Chambers is to add the depth and height of the room together, and an eighth of the result will give the width of window. Gwilt gives, as a general rule, 1 ft. super. of light in a vertical wall to every 100 cubic feet in the room. Robert Morris says that the superficial area of the window should equal the square root of the cubical contents of the room. This, however, though no doubt approximately true, must evidently be open to large variations according to the width of the street, and especially according to the aspect and the climate, and the exact size of certain windows to suit certain shaped rooms can only be learned by observation and experience. The matter is one of the greatest importance, and cannot be too carefully considered. It should also be borne in mind that certain rooms will require more lighting than others; a drawing-room more than a dining-room, a dressing-room more than a bedroom, and so on. And if this is carefully attended to (and, of course, taste and discrimination used), the elevation will be at least an honest and truthful one, and you will not find the principal windows on the ground-floor lighting, as is often the case, a cloak-room or a water-closet. — *Illustrated Carpenter and Builder.*

BAGATELLE. — An American syndicate is reported to have concluded the purchase of Bagatelle for the purpose of erecting a gigantic caravansary on the site of the lovely château constructed within the brief space of ninety days by the Comte d'Artois, afterward King Charles X, for the purpose of winning a wager from his sister-in-law, Queen Marie Antoinette. This château, overlooking the race-course of Longchamps, is a perfect bijou, and constitutes one of the most picturesque features of the Bois. Its disappearance would be little less than a crime, and it is not astonishing that the authorities should have been invoked to prevent the execution of this project. It is unlikely, however, that their protests will be of any avail, as the château and park of Bagatelle are the private property of the widowed Lady Wallace, who has a perfect right to do therewith as she likes, and who, in spite of being a French woman by birth, infinitely prefers London to Paris. Her husband, the late Sir Richard Wallace, was a brother of the fourth Marquis of Hertford, and merely refrained from using the name of Lord Richard Seymour, to which he was entitled, with a view of avoiding any ill-natured comment about the behavior of his mother, who had given birth to him while detained in Paris as an English hostage during the Napoleonic wars, and to whom, like Lord Hertford, he was passionately attached. When Lord Hertford died in Paris, in 1870, he left the whole of his vast fortune, including his priceless art collections and the château and estate of Bagatelle, to Richard Wallace as "a token of gratitude not alone for the loyalty which he has ever manifested toward me, but more particularly for his loving care and devotion to our mother." A couple of years later Richard Wallace was created a baronet by Queen Victoria, partly as a recognition of his munificent philanthropy, and partly, too, if the truth were known, as a token of her royal appreciation of his chivalrous regard for the fair name of his beautiful mother. — *N. Y. Tribune.*

OF INTEREST TO ART-COLLECTORS. — The Court of Rheims has just delivered judgment in a case of considerable interest to art collectors having dealings in France. The particulars of the case are as follows: Toward the end of 1893, M. Alvin Beaumont, a well-known painter and expert of Rheims, discovered a rather dirty old painting on copper in the shop of Madame Lapersonne, an art dealer, who called it a "religious painting." Having offered two Louis XV armchairs and a casket of the period of Francis I in exchange for it, the bargain was accepted and carried out. On removing the coat of dust and dirt on the painting, in the presence of Madame Lapersonne, M. Beaumont was not a little astonished, and the dealer disappointed, at the discovery that the painting was a genuine and remarkable "Visitation" by Rubens. Naturally, M. Beaumont refused to cancel the transaction, and the dealer brought an action against him. At the trial, counsel for M. Beaumont claimed that the case was one of treasure-trove, but the court held that, Madame Lapersonne having sold the picture as a "religious" subject, without specifying the name of the painter, the contingencies were equal on both sides. Had M. Beaumont, for instance, discovered his bargain to be mere rubbish after cleaning the painting, he would not, on that account, have been justified in claiming the cancelling of the transaction. The plaintiff's suit was, therefore, dismissed. — *Paris Correspondence London Standard.*

DENSITY OF MAHOGANY. — There is a remarkable difference in the density of mahogany as it comes to the cabinet-maker. A square foot of Cuban mahogany one inch thick weighs, on the average, six pounds; a like piece of San Domingo mahogany weighs four pounds, and a like piece of Mexican mahogany weighs two and one-half pounds. The difference in weight between old pieces of San Domingo mahogany taken from the wreck of antique furniture and a piece of seasoned new San Domingo mahogany is much less than might be expected. — *Chicago Inter-Ocean.*

WINE AS A FIRE-EXTINGUISHER. — At a large fire in San Francisco last June, when the water-supply gave out, the employés of the Lachman winery attached a long two-inch hose to an 18,000-gallon tank of claret wine that was perched upon a shed outside of the winery, and over an acre of lumber and dry roofs was drenched with wine. — *Exchange.*

THE ENGLISH TRADE-UNIONS. — The seventh annual report by the chief labor correspondent to the Board of Trade on the subject of trade-unions has been issued. The returns are for 1893, and it is noted that the early unwillingness of some of the unions to supply information as to their operation has now entirely disappeared. The number of unions from which accounts have been received was 687; the number of members at the end of the year was 1,270,789 (for 677 unions only). The year's income amounted to £1,996,971, and the expenditure to £2,246,515, reducing the funds in hand with which the year was begun from £1,902,397 to £1,653,068. 1893 was a bad year for these organizations, due chiefly to bad trade and a large number of trade disputes, chief among which was the prolonged dispute in the coal trade. — *S. James's Gazette.*

MASTER OR SERVANT? — A Newcastle bricklayer, who on the death of a relative had come into a fortune of a few hundred pounds, decided to set up as a master-builder; and, as a commencement, entered into a contract to erect a small villa. The building was started, but our friend soon found that an employer's life is not one of unalloyed bliss. An old friend chanced to pass the house one morning, and was astonished to find his mate of other days wielding the trowel once more, and superintending him and the other workmen was a strange foreman. The following conversation ensued:

"Why, Jack, lad! Hoo's this? Aa thowt ye was a gaffer noo!"
"Se aa is, man; se aa is. But aa syun fund aa wis ne use bossin' the men, se aa detarmined te gan to wark agyen mesel, and aa've hired yon chep to lyuk efter us." — *Scottish Nights.*

THE PRATER AND AUGARTEN, VIENNA. — It is announced that, on the occasion of the fiftieth anniversary of his accession to the throne, which takes place in 1898, the Emperor Francis Joseph intends to present the Prater and the Augarten to the City of Vienna. Negotiations with this object in view have already been entered into. The Prater is the famous summer resort and pleasure-ground of the Viennese, and is one of the first sights shown to visitors. The Augarten likewise is an extensive pleasure ground, situated in a densely populated portion of the city. It was owing to the generosity of the Emperor Joseph II that the Augarten was originally opened to the public, and on the entrance portal the dedication "To Mankind, from its venerator, the Emperor Joseph" is still conspicuous. One of the principal clauses in the contemplated deed of gift will be that both the Prater and the Augarten are for all time and in all circumstances to remain what they are now — namely, public recreation-grounds for the inhabitants of Vienna. — *London Times.*

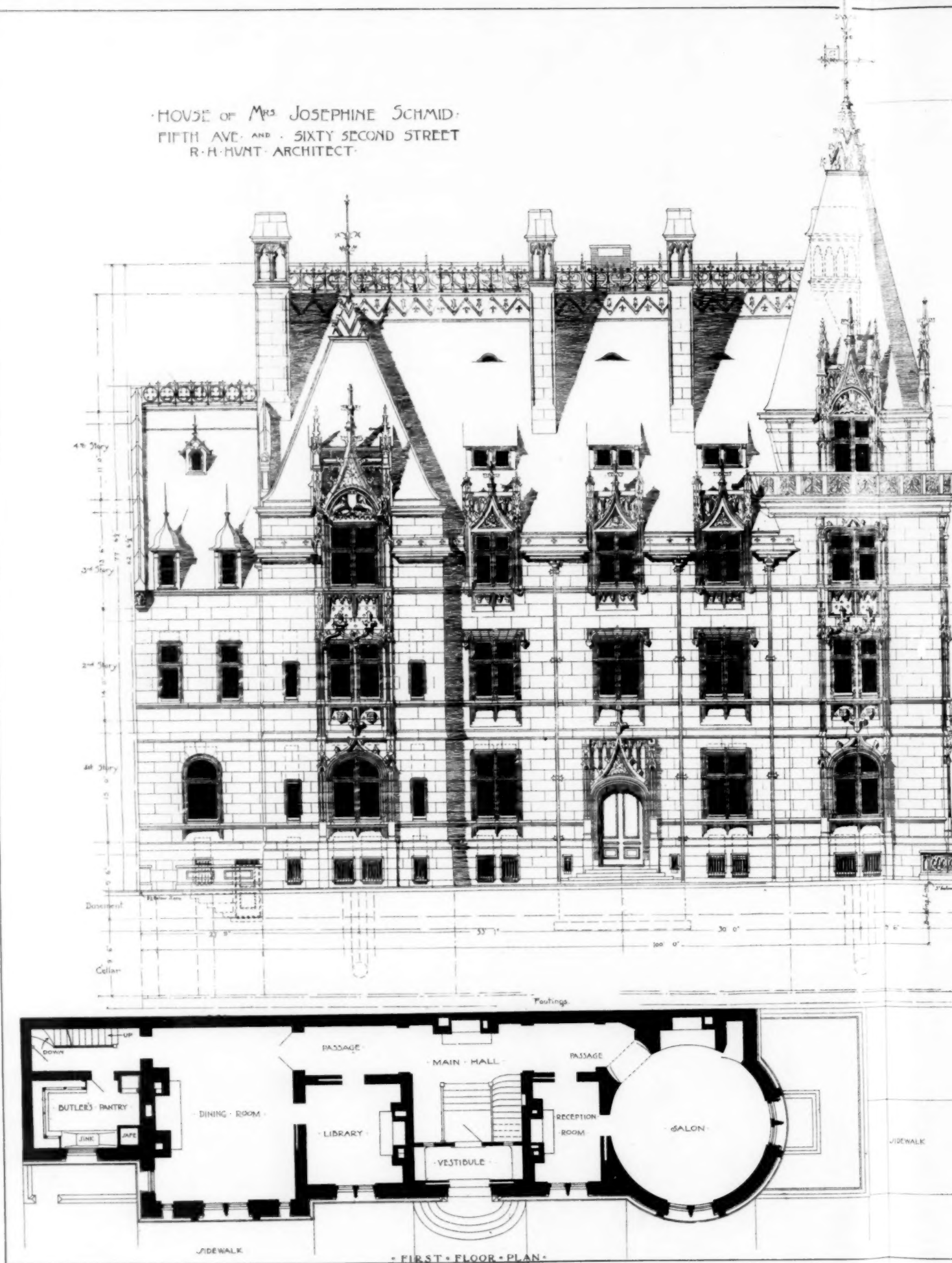
BIRCH-WOOD SPOOLS. — Practically all the wood used in making spools for thread in this country and Great Britain is cut in Maine forests, but so great is the amount of lumber required each year for the making of these seemingly insignificant articles that Maine will not be able to supply the raw material much longer. The spools are made of birch-wood, and the birch of the Maine forests is the best for the purpose. More than two million feet of lumber is shipped to Scotland every year for the use of the great thread manufactories there, and almost as much is supplied to domestic manufacturers. The business began in Maine twenty-five years ago, and land that was cut over at that time is now well covered with young trees, but not for twenty-five years more will this timber be fit to cut. Birch timber is becoming scarce, and it will not be many years before thread-makers will have to look elsewhere than to Maine for their spool-wood. While it takes fifty years for birch forests to renew themselves, the crop is considered a profitable one. — *Philadelphia Telegraph.*

DID VARRO INVENT ENGRAVING? — It is a very odd fact that we have no authenticated portrait of Cicero, says the *London Standard*. This will be surprising news to most people, for more busts and statues are assigned to him than to any "Roman of them all," excepting the Cæsars; but antiquarian critics reject them all nowadays. They may be true, but there is no evidence. We may feel a comfortable certainty, however, that the familiar face and figure are correct. Cicero would not be restrained by indolence or modesty from sitting as often as he was asked. Every gentleman who took pride in his library would have the great man's bust in its place among the other authors, for such was the fashion. There was another fashion of the kind much more interesting. We are used to class engravings among the modern arts. But the Romans had a method of inserting the likeness of a writer in his book, which, to say the least, served the purpose of engraving. Martial and Seneca and Cicero allude to it; the invaluable Pliny gives a clear statement, but he does not seem to have understood the process. "By some means or other," says he, "Marcus Varro introduced the portraits of seven hundred individuals in his numerous books, as he could not bear the idea that all trace of their features should be lost." These illustrations were reproduced somehow, for "not only did Varro confer immortality" upon the author's features, "but also he transmitted them to all parts of the earth, so that anywhere it might be possible to see them." Pliny calls this a "most blessed invention," and if it were not engraving, what could it have been? The learned have been inquiring and debating for three hundred years, but they will never agree. Any day, however, Herculaneum may yield some old papyrus which will decide the question.

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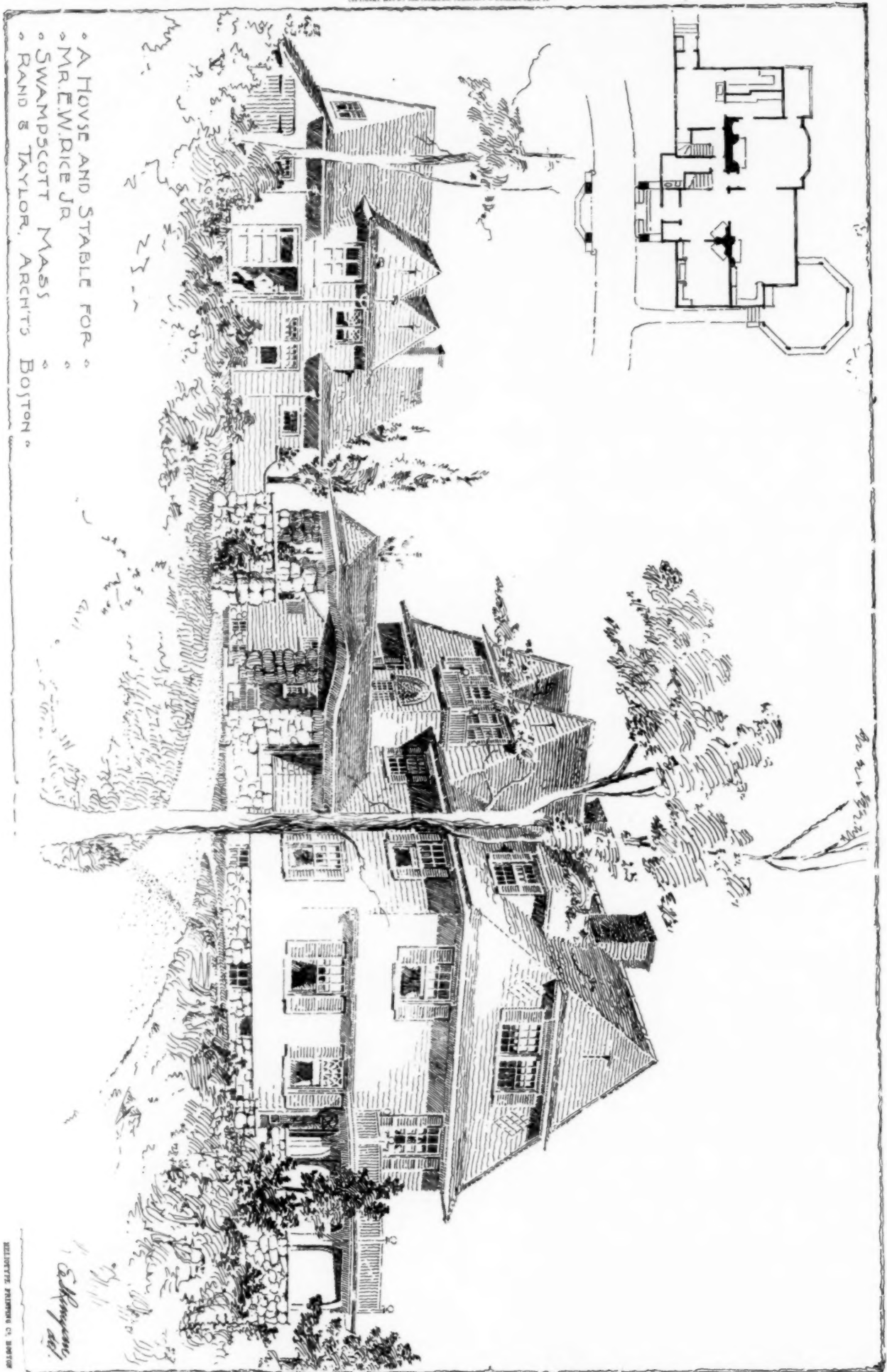
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HOUSE OF MRS. JOSEPHINE SCHMID.
FIFTH AVE. AND SIXTY SECOND STREET.
R. H. MONT ARCHITECT.





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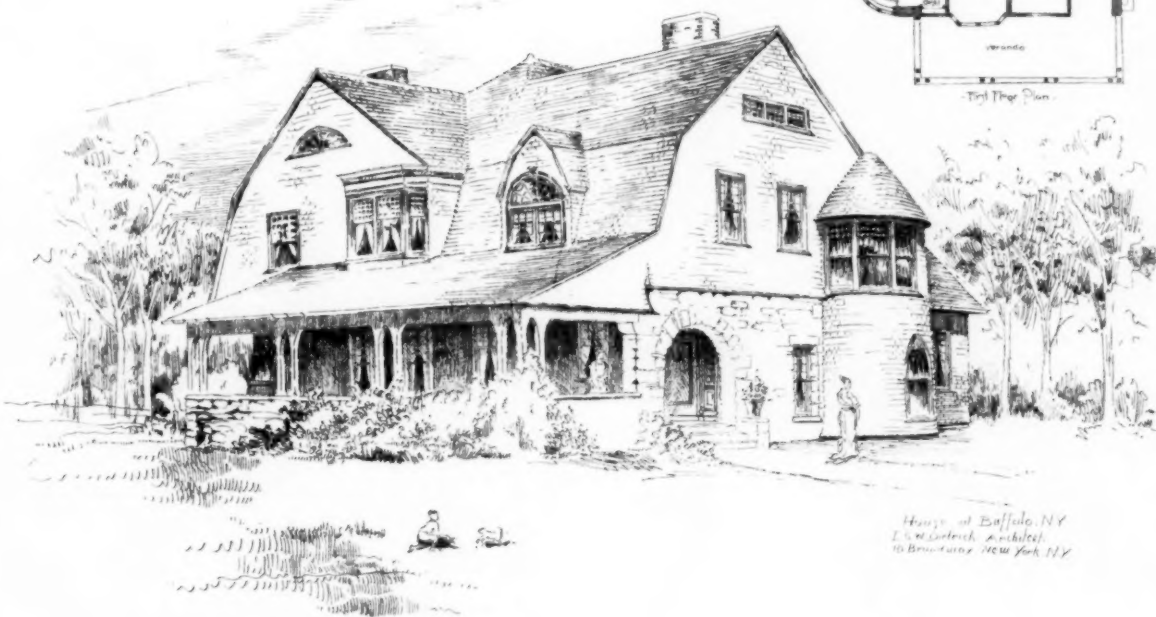
• A HOUSE AND STABLE FOR •
 • MR. E. W. RICE JR. •
 • SWAMPSCOTT, MASS. •
 • RAND & TAYLOR, ARCHT'S BOSTON. •

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HOUSE FOR A. D. CLAFLIN ESQ.
NEWTON CENTER, MASS.

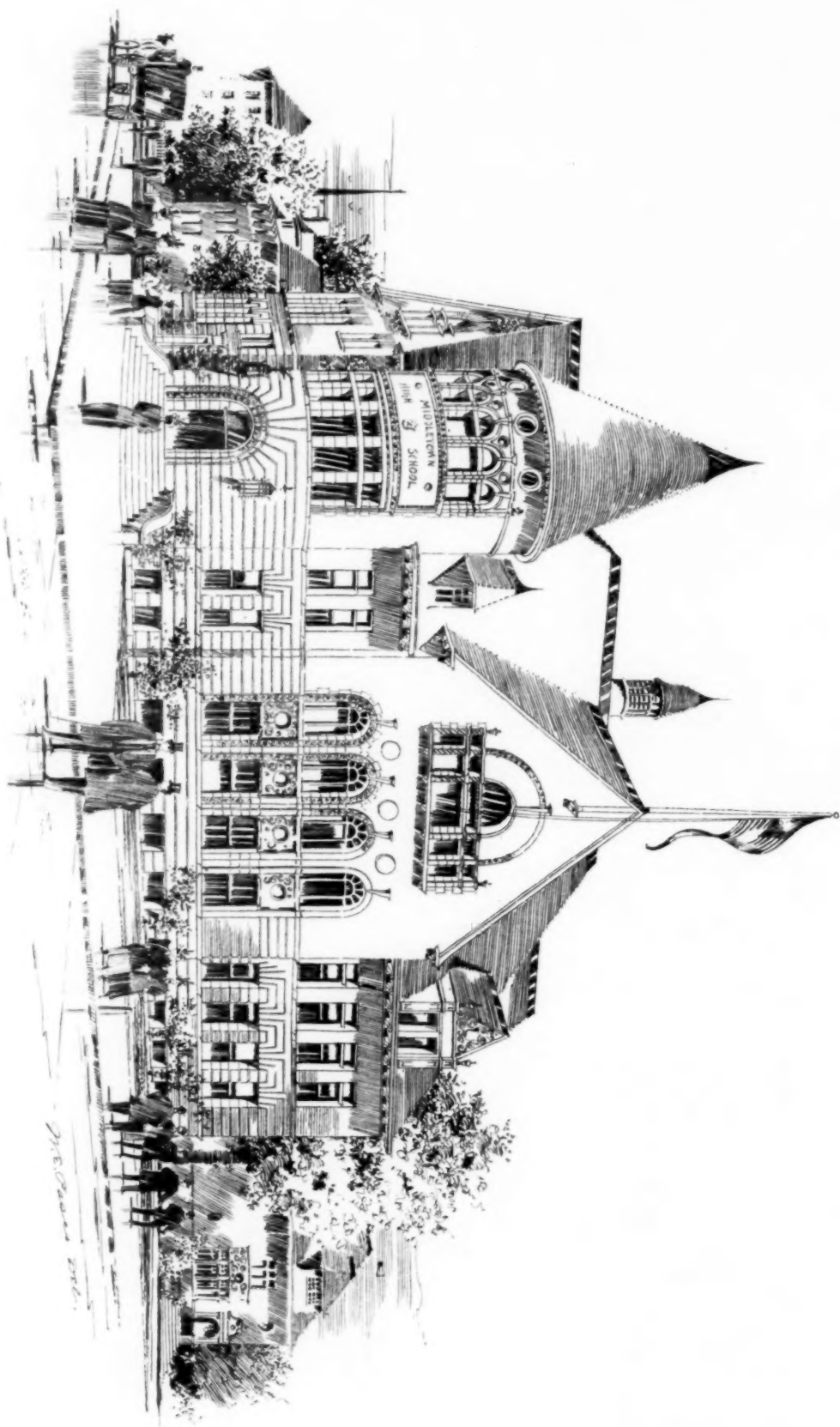


House at Buffalo, N.Y.
L. W. Gortch, Architect.
10 Broadway, New York, N.Y.

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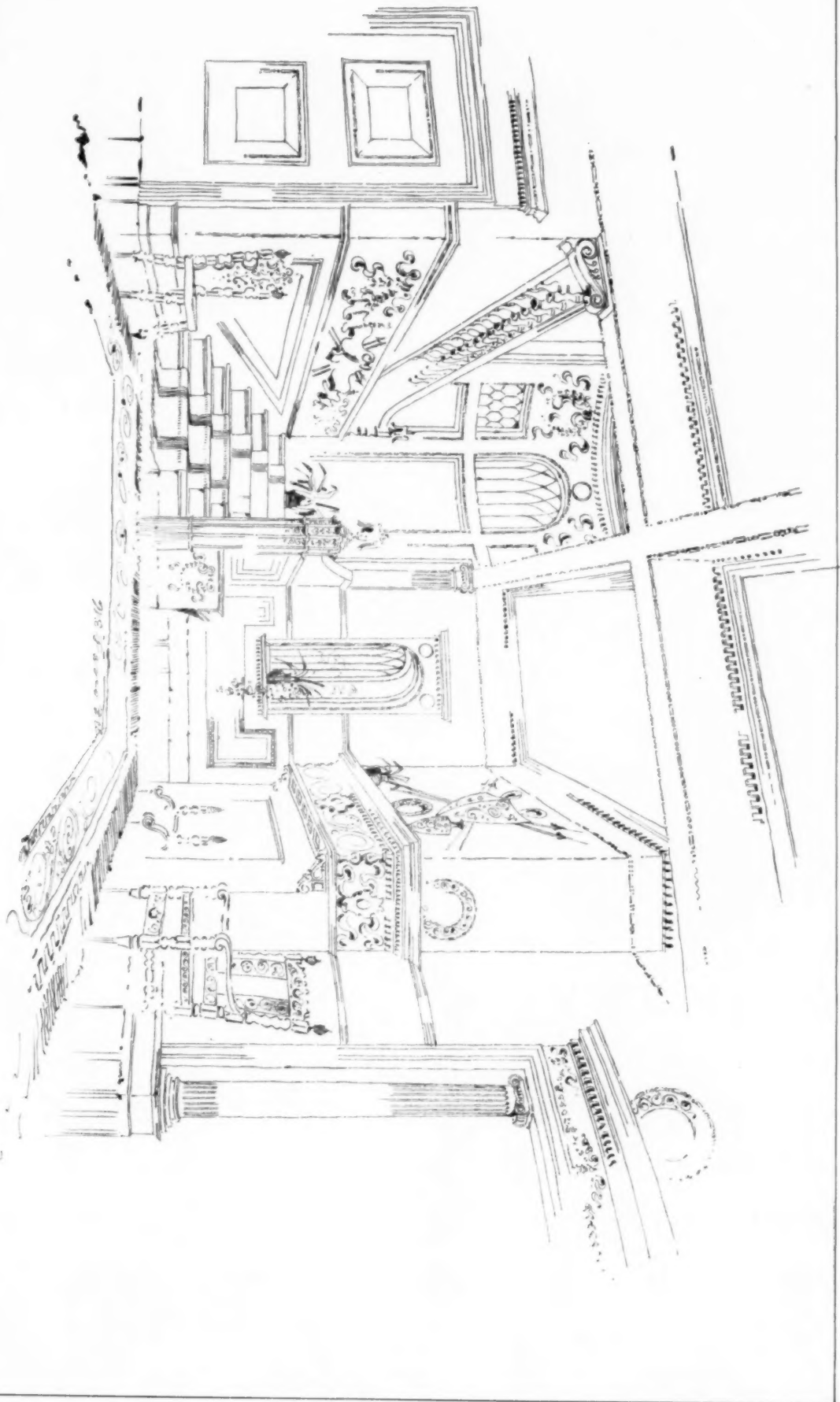
PROPOSED HIGH-SCHOOL BUILDING.
MIDDLETOWN.
CONN.
ALTERNATE DESIGN.

F. R. CONY STOCK.
HARTFORD.
ARCHITECT.
CONN.



DESIGNED BY F. R. CONY STOCK

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SKETCH OF STAIRCASE HALL
IN DRODDED HOUSE FOR
W.W. SMITH ESQ. HARTFORD CONN.
F.D. COMSTOCK ARCHITECT
HARTFORD CONN.