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WE are much pleased to learn that the Trustees of the American Institute of Architects have decided to send to every member of the Institute a copy of our "open-letter" of April 5. The Secretary states that this action is taken "to obtain from individual members of the A. I. A., expressions of opinion on the general subject of competitions, and the best method of treating so difficult a subject." On the receipt of replies, which "it is hoped will be numerous,"—to do what we can to assure this is the object of our present mention of the matter—"the Trustees will be in a better position to express some formal opinion on the matter." Thus it seems that the prospect of accomplishing something definite at or before the next annual convention of the Institute is steadily improving. We trust, however, that the Trustees will not feel compelled, either by the condition of their treasury or the constitution of their association, to limit their *plébiscite* to members of the Institute, who, however numerous and influential they may be, are not the only parties interested in the matter, and are not even a majority of them. We should be glad to find the Trustees managing their trust in this instance in the most liberal spirit possible, and we will gladly co-operate with them to the extent of our power by giving their action and its result all the publicity we can, and will place at their disposal our own private lists of architects' addresses which may possibly be more full and correct than those at present in the archives of the Secretary's office.

IT may be taken for granted that the matter of the conduct of competitions will be one of the subjects of discussion at the convention in the autumn, and it seems to us that another very desirable topic might be the ways and means of extending the usefulness of the Institute, not solely in the way of an increase of membership, which we think should, and would, follow a reform which should make the Institute a more vital factor in the professional life of this country. This might be effected, we think, by attacking the prejudices that now exist against what should be a most useful as well as ornamental body of men, whose very existence is an unquestioned benefit to all architects whether they are members or not. These prejudices are chiefly three. First: That it is sectional—perhaps "urban" would be a better word—in its composition and operation. This can be best counteracted by fostering the development of chapters everywhere, and taking measures to make isolated members feel that they are welcome and useful units of a useful whole. Second: That it is to all intents a trades-union. This sentiment is, we believe, a not uncommon one, and one that acts most actively against the growth of the association; moreover, it is largely ineradicable, as any association held together by, and acting under a code of fixed laws, however liberal they may be, will always lie open to this charge, par-

ticularly when the matter of *res pecuniæ* forms one of the most important subjects regulated by such code. The most practicable cure for this lies, we think, in the interpolation of the single word "minimum" in the Institute schedule of charges, so that the Institute shall appear before the public as *recommending* a series of *minimum* charges, and not as a body insisting on a fixed charge, thus leaving each member to regulate his own charges according to the special case under treatment,—charging more or less than the stated rate as the circumstances bear him out, or his personal reputation will warrant. This should be followed by expunging from the by-laws everything that has even a remote semblance of a punitive nature as applied to the question of commissions. Third: That to be a member secures an ornamental honor and not a practical benefit; that the member receives no real *quid pro quo*, and that his fees are simply money wasted. A cure for this allegation can be found in making of the Board of Trustees a more actively useful body than it now is. We know how much it now does for the profession, and without reward,—and it is not a small or unimportant work; but we believe that it, or a working sub-committee, can do much more. One of its most important functions is the acting as referee on questions submitted to it by members—and non-members, also—where there are in doubt matters of professional conduct, matters of construction, or questions of legal liability or redress. As at present constituted, the Board is unquestionably competent to cope with questions of the first two classes, but when it comes to matters of law it is not as strong as it should be, when the number of legal conundrums submitted to it is taken into consideration. As a means of mitigating the third cause of complaint, we suggest, therefore, that the Board should take to itself a thoroughly competent legal adviser, who shall attend all its meetings, and shall then and there discuss such questions of law as may have been presented, and shall then furnish a written *preliminary* opinion, citing similar cases, which shall be filed in the archives, and a copy sent to the applicant for advice. As the services of a competent lawyer would imply a considerable salary, a regular but moderate tariff could be arranged for questions which called for legal advice: the payment of these fees would serve to diminish the sum to be paid out of the Institute treasury. Did the profession once know that reliable and prompt answers could be had in this way, and at less cost to members than to non-members, we feel sure that it would tend to remove the third cause of complaint, to increase the membership, and to make the Institute itself a more respected and more practically useful body than it now—we regret to say it—generally is considered to be.

AN important dispute is now in progress in New York, between the master-plumbers and their journeymen, for both of whom we wish a speedy and an amicable settlement of their differences. As reported in the daily papers, the beginning of the trouble came from the discharge of a man who had been working in one of the best shops in the city. The man's comrades decided, from the evidence which they had, that there was not sufficient reason for his discharge; and called upon their employer to reinstate him; which he refused to do. The usual means of coercion was then applied, as it seems to us rather hastily; and all the union workmen were called out from the shop. The master's association, provoked by this assault, met to defend their rights, attacked in the person of one member, and ordered a general lock-out of union men from all the shops in the city. At the present writing both sides remain firm; but there is far too much good sense and good feeling among the plumbers, both employers and employed, to permit the misunderstanding to continue long. As we have often said, there is no part of the trades-union practices upon which we look with so much respect as upon the rule, which nearly all of them follow conscientiously, of defending the members of each union against real or imaginary injustice. That two or three thousand men, in a city so active and unsentimental as New York should deprive themselves voluntarily of the wages of a week or two, amounting perhaps to fifty or sixty dollars apiece, for the sole purpose of forcing an employer to take back one of his men, may be an evidence of want of prudence, but it certainly indicates a loyalty and humanity which are worthy of our sympathy. It is characteristic of the intelligence of the New York journeymen plumbers that, foreseeing the annoyance which

the public would suffer from the total abandonment of work by the men in the trade, they made arrangements, as soon as the lock-out was announced, for keeping four shops open in various parts of the city on their own account; so that necessary work could be done at a moment's notice. If the men who manage them carry out their own ideas as to the proper mode of conducting them, about which we know something, the work in which these union shops are concerned will be well done; and we cannot help wishing that the lock-out might last just long enough to show the people of the city how men who practise a trade for the love of it, and not primarily to make money, would carry it on if they could do as they liked.

THE subject of placing telegraph and telephone wires underground still continues to occupy the attention of electricians and statesmen in various parts of the country. In New York a law has been passed requiring all telegraph, telephone and electric-light wires in use in cities having a population of more than half a million, to be put underground on or before Nov. 1, 1885. By some singular carelessness in drawing up the bill, no penalty is provided for disobedience, and no clause is inserted repealing the present statutes, which expressly authorize the stringing of such wires on poles above ground; so that, unless the law should be amended, the electrical companies can probably resist its enforcement with success. In addition to this, a little reflection will show, as the General Manager of the Metropolitan Telephone and Telegraph Company has already pointed out, that in order to bury all the wires of all the corporations, as the statute requires, within seventeen months, nearly all the principal streets in New York would have to be blockaded during the greater part of that time. To run one or two telephone cables through iron pipes under a portion of Franklin Street, in Boston, occupied several days, during which half of that wide street was closed; and the construction of the much more complicated permanent conduits which would be necessary to provide for lateral connections, together with the various manholes, crossings and so on, for the thirty or forty public and private telegraph, telephone, stock-indicator, messenger, general news and electric-light systems, which already crowd the New York streets above ground, would be the task of many months, even if circumstances admitted of beginning it at once. We have before spoken of the interminable blockades and annoyances to which the New York streets must be given up from the day that small subterranean conduits, which must be reached from the surface, are allowed to run at random beneath the pavement; and desirable as it is to have the wires taken out of the way of the firemen, we cannot feel much confidence that anything less than an almost complete reconstruction of the principal thoroughfares will accomplish the end successfully and permanently.

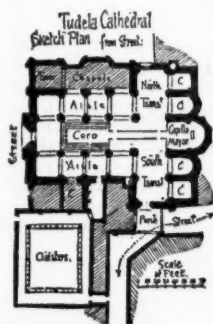
MEANWHILE the unreasoning attacks which are constantly made on the companies which own the wires do harm, rather than good, since they seldom result in anything except the temporary persecution of some particular corporation by municipal officials, who, having cut down a few poles, and interrupted public business for a day or two, quietly retreat, and leave the engineers to put their property back again where it was before, and by keeping the managers of the telephone and telegraph companies always in fear of some new absurdity, prevent them from extending their service, and hamper both them and the public in their work. The New York telephone companies already refuse to make contracts of any kind for service extending beyond November, 1885, not knowing whether they may not, after that date, be compelled to discontinue all private lines, by reason of the prohibitory cost of running single wires below ground. As the *Evening Post* shows, the same cause, if the Daly bill should be enforced, would at once put an end to the operation of the messenger-call system which has reached so great an extension in New York, and even the auxiliary offices of the great telegraph companies, which are now scattered throughout the city, much to the advantage of those who use the telegraph, would be generally closed, so that an expedition to one of the half-dozen main offices would be the necessary preliminary to sending a despatch. There can be little doubt that the public inconvenience so caused would soon compel the abandonment of the law; but the struggle which must precede this result is much to be deprecated.

OF course, to us, as architects, the obstruction to travel and business which would be caused by burying the wires seems more important than it would to the fire-engineers, who think first of the difficulty of placing ladders against buildings surrounded by a net-work of wires; but looking at the matter even with their eyes it does not seem impracticable to cure the evils of which they complain without flying to others at least as great. It is now very common, where several telephone wires run through a street, to twist them together in a cable, and to suspend this from the poles, instead of the network of separate wires which it replaces. The advantage of this, in lessening the obstruction to placing fire-ladders, is obvious enough, and it is not very evident why the same system should not be extended, so as to include the wires of different companies. It would hardly do, with our present means of insulation, to twist telegraph, telephone, and electric-light wires together in a single cable, but all telegraph wires might be put together, as well as all telephone lines, and probably all electric-light wires, and if the hundreds of wires which darken the sky in lower Broadway could be combined into three stout cables, even overhead, a great point would be gained. For sustaining these cables, again, it does not seem to be absolutely necessary to erect poles. The poles have the advantage of situation in the public street, where the agents of the companies can use them without trespassing on private property; but in case of necessity even telegraph workmen have been known to overcome their scruples about intrusion, and if the owners of buildings can be persuaded or coerced into allowing frames, loaded with scores of wires, to be bolted down to their roofs, it could not be very difficult, especially with a little legislative help, to obtain sufficient support for cables from the roofs or cornices along the streets, without any help from poles. We do not see why some such arrangement as this might not obviate many, if not most, of the difficulties now complained of. Two or three cables added to the cornice-moulding of the Broadway buildings, or laid over the roofs, would incommode neither the owners and tenants, nor the firemen who might be called to them; the wires in them, with a little skill in arrangement, could be as well insulated, and quite as readily kept in order, as by the present method; while so far as we can judge, the whole pole system might in this way be abolished, without resource to the worse than questionable expedient of putting the wires below the surface of the streets, as the streets are now constructed.

SOME of our readers probably know that the Turkish-bath has recently come into rather extensive use for curing the ailments of horses, and a few private stables, if we are not mistaken, as well as several belonging to corporations, are now fitted with complete horse-baths. A recent number of the *Builder* gives the plan of such an establishment just added to the stables of the Great Northern Railway Company, which shows a compact group of three rooms; one, serving both as a reception-room and as a place for the final douche, being about fifteen feet wide and twenty-four feet long, while the two hot rooms, opening out of the reception-room, are each somewhat less than twelve feet wide, by the same length as the other. Hot air is supplied to the two smaller rooms from a "stokery" outside, and ventilating shafts remove it as fast as vitiated. Both these rooms are separated from the reception-room by double doors, to prevent loss of heat, and an opening over which a curtain is hung, connects the two. The first warm room, a "tepidarium," is kept at a temperature of about one hundred and forty degrees Fahrenheit; while the second room, a "calidarium," is kept at one hundred and sixty or one hundred and seventy degrees. The reception-room is warmed only by the heat which escapes from the other two. The horses upon treatment are first rubbed down in the reception-room, and then led into the "tepidarium," where they stay until they are accustomed to the heat; and are then, if their case seems to need it, taken into the "calidarium," where they stay until sufficient perspiration has taken place. From this room, they return directly into the reception-room where they are bathed according to the judgment of the attendant in charge. As horses are naturally thin-skinned, and liable to the disorders which proceed from a checked perspiration, it may readily be imagined that the Turkish-bath, by its powerful action in opening the pores of the skin, might be of great use in treating them; and it is said that a firm of carriers in London has had such a bath in operation for more than eleven years, treating during that time about twenty horses a week.

SPANISH ARCHITECTURE.¹—XVII.

TUDELA. — ZARAGOZA.



ing, always new, scenes of valley and mountain stretching for miles and leagues away, I feel an elation and pride in the achievements of human intellect. This particular section of railway and the country through which it passes afford a notable example. From the foot of the cliff along which we roll, great broad valleys trend down and away to other mountains opposite, with higher peaks backing them against the clouds, and streams and rivers glistening between; and our winding course gives us views toward almost all points of the compass, at different times, while the whole series is punctuated with periods of darkness—as effective as a pause of utter silence in a great chorus—when we plunge into tunnels for a few minutes, to emerge again upon another noble view.

So we escape from the dry Castilian plains, and passing the "divide" descend by the ravines of a tributary of the Ebro into the valley of that river at Miranda. Thence the railway follows the Ebro round many a bend at the feet of hills which enclose it, while conspicuous crags are noted now on the left, and now on the right, to remind one of the circuitous path which nature has compelled. Lozono and Castejon gradually introduce milder landscapes; and Tudela, the goal of this journey, is found in the lowlands where the Ebro and Queylo meet. It is an ancient city, not a large one, having something less than ten thousand inhabitants, but it has an air of civilization and energy in advance of many of its bigger sisters. Its Gothic cathedral, too, is small, but admirably good: it is of the twelfth century, simple and unaffected in design, and pure in style, so that it is dignified and cathedral-like in spite of its small size. Its plan is simply a nave and aisle of four bays each—transepts projecting one bay beyond the aisles, and terminated eastward by five chapels, all small, the central one being, of course, the *capilla mayor*. Externally the edifice has been very much built-in by houses, etc., and the streets about it are narrow; and further, there have been, as usual, many disfigurements by changes and repairs since its first erection. The doorways are the most noteworthy external features, and they are extremely fine. The largest, at the western end of the nave, has eight orders or arches resting upon sixteen beautifully-carved capitals, of which the following are the subjects:—

On the northern jamb (the left as one looks at it) are: 1. The creation of the angels; 2. The creation of the earth and stars; 3. The creation of the trees; 4. The creation of birds and beasts; 5. The creation of Adam; 6. The creation of Eve; 7. The fall of mankind; 8. Eve sleeping and the serpent mocking her. On the right hand, or southern jamb, the capitals are: 9. The expulsion from Eden; 10. Adam and Eve working; 11. Cain and Abel sacrificing; 12. Cain killing Abel; 13. God cursing Cain; 14. Cain fleeing; 15. The entry into the ark; 16. Abraham's sacrifice.

Nos. 1 and 9 are the inner, and Nos. 8 and 16 the outer of the series. Besides these capitals, which are carved with much skill and love, and with less grotesqueness than is unintentionally displayed in some work of this age, there is elaborate sculpture and carving upon the arches, representing on one side the joys of heaven, and on the other the tortures of hell, and numerous angels and saints. This door has a tympanum filled in as if for carving, but it is not so finished. The south doorway of the transept is a smaller round-arched opening of three orders, all liberally carved with delicate conventional treatment, as may be seen by the illustration; the spacing-out of the detail is very irregular, the arch-stones being so in the first instance, and then the ornament being generally drawn so that the joints are dividing lines of the pattern. Very few modern designers would dare work with such freedom, yet it is certain that if this same design were repeated with uniformity and modern precision it would sink considerably in artistic merit. It is a lesson.

The capitals are also sculptured. On the left the subjects are: 1. (the inner one) St. Peter walking on the sea; 2. Jesus and Mary Magdalen; 3. The charge of the keys to St. Peter. On the right is: 4. The doubting of St. Thomas; 5. The walk to Emmaus; 6. The supper at Emmaus.

There is a somewhat similar sculptured doorway to the north transept, having the baptism of Christ; Herod's feast; the head of St. John brought in; St. Martin giving away his cloak; Christ and two angels, and St. Nicholas restoring the children to life, illustrated in its stone-work. The arch is pointed in this instance, and carved

with foliage, which is more undercut, and being more exposed has suffered some decay.

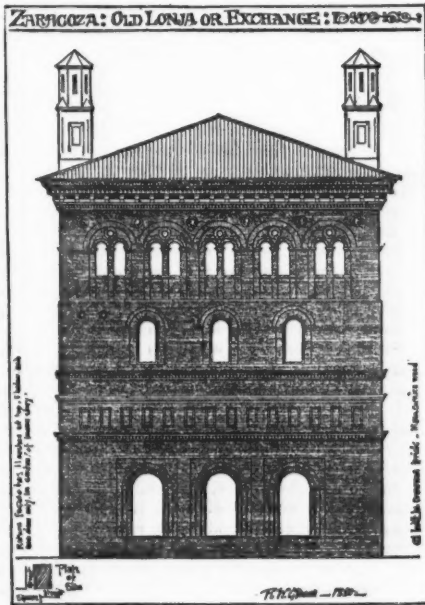
The interior of the cathedral is extremely dark, most of the windows being blocked with masonry,—only a few small geometrical piercings being made.

Its massive and simply-moulded arches are supported upon well-grouped shafts and strong pillars, with finely-carved capitals. The soffits of the main arches are very broad, and as the whole building is modest in size, shafts of corresponding dimensions would have seriously dwarfed its height. But the clever device of putting a pair of shafts under each broad arch gives ample support, and a beautiful expression of both size and power. The whole of this old work is well proportioned and satisfying. There is no triforium, and perhaps in its omission a littleness of effect is avoided, but the relieving shadows and contrasting forms are somewhat missed. The view of the interior is taken from just within the south transept door, the nave on the left and chapels on the right. This example is a typical one of the Spanish Gothic advanced one period from that at Salamanca (already described), and though, perhaps, rather severe for some purposes in modern art, yet generally a very valuable style. There is a beautiful and richly-ornamented cloister, but I was unable to get access to it because the door (apparently hardly ever opened) was blocked with a vast pile of furniture and pictures.

The little church of Sta. Clara has, as a sign of its former value, a good west doorway of a style somewhat similar to that of the cathedral, with shafts and arches enriched with carving, but all concealed behind a commonplace porch of later brickwork. Inside, the capitals of the vaulting-shafts are all that appear of what was once, no doubt, a fine little church.

Tudela has another of those picturesque stone bridges, a mixture of round and pointed arches, with sharp abutment piers. The river is broad, and the shadows of its well-wooded banks look refreshing in the heated landscape. All around the city are small walls and other defences, mostly of brick, with loop-holes for rifles,—modern works of the Carlist war-times; and in addition to the ancient castle upon the hill there is on the other side of the town an old-looking brick tower, a two-storied octagon, with loop-holes, and battlements, and trenches, and out-works, small, and, of course, powerless against artillery, but doubtless a strong rifle outpost if cannon were not expected. All the gates, too, and the railway station had been hastily fortified in a similar manner, and there seemed to be no intention of removing these disagreeable reminders of troubles passed away.

From Tudela I went to Zaragoza, a city of far more importance and pretension, boasting two cathedrals, besides numerous churches, and theatres, and schools, and cafés and other luxuries of civilization in abundance. I arrived late one midsummer evening, and crossing the bridge from the suburb where the station stands, by bright moonlight, I was struck with the singular Oriental style of beauty of the scene. The great Cathedral del Pilar upon the river bank looked exceedingly picturesque in the half light, the glazed colored tiles which by day appear crude and raw glistened with subdued yet rich effect, and the smooth-flowing broad stream reflecting all the pinnacles and domes, and the old rugged bridge in mysterious shadows looked more like a Venetian or Turkish than Spanish picture. Zaragoza proved to be a very interesting city. It still lives with a vitality which stimulates improvements, a matter for congratulation in Spain, although its antiquities must suffer for it. It is a place having much individuality in many respects; strong, independent, antique, and possessed of a rich history, and a proud love of it. Established before the Romans came, and deriving its present name from the title *Cæsarea Augusta*, acquired before the birth of Christ, it boasts a career of centuries of importance. The Moors captured it in the eighth century, and lost it in the twelfth after a siege of five years. The two cathedrals are of great size and wealth, and are sumptuously furnished and appointed, but have little of good art to demand notice. The oldest, called the "Sen" (or See), is a strange medley of styles and works of no style. Externally there is a piece



¹ By Robert W. Gibson, Travelling Student of the Royal Academy. Continued from page 280, No. 442.

of Moorsque-looking walling with arcades and interlacings in brick-work, and many strings, and bands, and diaper patterns in tile and brick, which are very interesting. The lantern of late geometric Gothic merits notice. Inside there are five aisles and chapels (no clerestory), all in late Gothic, with wretched Renaissance fittings. Here and there a tomb or an altar is noticeable, but I found nothing which tempted me to sketch.

The other cathedral is called "del Pilar," because it contains the very pillar upon which the Virgin descended from heaven, and which is enshrined amid great magnificence of rich marbles and alabaster within. This edifice is externally a great pile of masonry crowned with a jumbled crowd of crudely-colored little domes, and internally a vast gaudy Corinthian Renaissance temple.

Of very different character (though of nearly the same period) is the old *Lonja* or exchange hall by. This is a building of plain brown brick, without much pretension, and quite devoid of the meretricious garnishings which mar most of the Spanish Renaissance. Its effect is most excellent, and its character is so exactly that of a modern commercial building that I made careful notes and drawings of it. It stands at a corner with the shorter front to the principal street. The other front is composed of a greater number of the same features. The freedom of the spacing out of each story or stage with regard to those above or below it is noticeable. The proportions are evidently carefully studied, and the value of breadth of effect in masses of plain wall well understood. The cornice is of wood, the roof of carved tile; the bricks are small, and with a thick joint.

SANITARY PLUMBING.—XXIV.

SOIL AND DRAIN PIPES: GENERAL CONSIDERATIONS.

HAVING shown simple ways in which offensive or dangerous gases may be securely trapped-off and debarred from entering the house through the various fixtures at their points of connection with the waste and soil pipes, it now remains to provide against a possibility of leakage in the drain-pipes themselves, for if these are unreliable and badly jointed all our pains with traps and fixtures will be of little use.

The term "soil-pipe" is, by custom, applied to the perpendicular portion of the main waste-pipe. The horizontal part is called the "drain-pipe." We have to consider:

- I. The material and methods of jointing.
- II. The size, thickness, and weight of the pipes.
- III. The general arrangement, including trapping and thorough ventilation.

I. THE MATERIAL AND METHODS OF JOINTING.

The material for our pipes naturally forms the first subject for consideration, inasmuch as upon it their proportions, treatment and arrangement in a great measure depend.

By far the most suitable material yet discovered for soil and house-drain pipes is iron, and the most important matter connected with its use is the formation of the joints between the separate pieces.

Lead has been almost entirely abandoned in this country for soil and drain pipes, on account of its want of strength and rigidity; its comparatively high cost; its liability to be perforated by vermin, nails, or corrosion; and of the greater time and labor required to make the joints. Large lead pipes often sag of their own weight and tear away at their points of support. The action of alternating hot and cold water also produces a destructive effect upon the material. In England lead soil-pipes are still used, but it is not customary to use the soil-pipe for the conveyance of all kinds of waste, and hot water from lavatories and sinks is carried into separate pipes, so that the material as used abroad is less objectionable.

S. Stevens Hellyer, the well-known and popular English writer on sanitary plumbing, says, in speaking of the question as to the material most suitable for soil-pipes: "This may seem a curious question to ask of plumbers—as well ask a shoemaker of what material should boots and shoes be made! Everybody knows that the latter would say 'There's nothing like leather,' as the former is sure to say 'There's nothing like lead.' . . . Allowing experience to be my schoolmaster, I answer *lead*, especially for our climate." Mr. Hellyer claims the following points of superiority for lead: its greater smoothness; greater resistance to corrosion; greater ductility for bending to suit the various positions it has to occupy; more perfect jointing; greater adaptability for connecting with branch wastes; and greater compactness, which allows it to be placed in slots or niches smaller than those which are required for iron. He admits the following objections: its deterioration under alterations of temperature which tend to work it until it breaks; its sagging; its expensiveness; its liability to be perforated by rats or carpenters' nails; its greater weight; and the requirement of greater skill in making the joints.

The advantages which Mr. Hellyer claims for lead have within late years lost their force. Improved methods of protecting and jointing other materials have placed them in these respects far ahead of lead, as will be shown hereafter. White enamel is now applied as an inner coat to cast-iron in such a manner as to render the inner surface as smooth as that of new lead. But in use lead soon loses its smoothness; the sewage adheres to the surfaces of the pipe to a greater or less

extent and roughens it, in time, with a hard deposit of greater or less thickness according to the usage of the pipe, so that the difference in smoothness at the outset in favor of lead as compared with an iron pipe, properly coated, is of small consequence after a few years' use. The numerous cast bends and fittings now made and adapted to every possible turn or angle liable to be encountered in arranging the pipe renders the ductility of the lead pipe no longer of any advantage. Finally, other and more suitable materials are now jointed in such a manner as to render them quite as compact as the lead pipe.

Stone and brick drains cannot be effectively flushed, on account of the roughness of their interior surfaces. Moreover, they are porous to a certain extent, and the cement with which they are laid is always more or less pervious to water.

Wooden drains soon decompose and leak, and when made of plank must be of such a section that scouring is impossible.

Copper is easily corroded by the acids of sewage and decomposition, and it is, moreover, too expensive when made heavy enough for the purpose.

Zinc, tin, and galvanized-iron are totally unsuitable, and not to be considered for a moment. In the worst kind of so-called "Gerry buildings" they are, however, occasionally used.

Cast-iron is the material which in this country for the last twenty years has been most generally used. It has in this time proved itself to be a most reliable and excellent material for soil-pipes. It is light, cheap, stiff and strong, and it corrodes so slowly that, if of the proper thickness and quality of iron, and properly cast, coated and put together, it will last as long as the house. The inconveniences at present attending its use are not inherent in the nature of the material. As now made, the pipes are often cast of uneven thickness, and they are always improperly jointed. Neither defect is necessary.

The experiments of M. Gaudin, made in 1851, show the maximum rate of loss by rust of uncoated cast-iron pipe exposed to the action of clean, fresh water on both sides to be a little over an eighth of an inch per century. His experiments extended over a period of thirteen years. With the present methods of protecting iron, its life can be very greatly prolonged; indeed, even the use of the ordinary bituminous coating (coal-tar pitch) has proved, when it is properly applied to be able to keep the pipe quite intact for twenty years. The life of a soil-pipe, even when quite thin and uncoated, has been found by experience to be so great that it is not unreasonable to suppose that the greasy matters contained in sewage serve to protect the pipe in a measure from the water and from the corrosive action of the acid components of the sewage.

Cast-iron is brittle, but when iron of the proper softness and quality is used, and when the castings are of the requisite strength and thickness, its brittleness ceases to be an objection, since, if made thick enough to suitably perform its other functions, the pipe is amply tough and strong for ordinary plumbing practice. If it can be shown that, by any means, cast-iron pipes can be made of uniform thickness throughout, and be perfectly jointed, so as to stand water, gas, and steam under pressure, and this without the aid of skilled labor in any part of their manufacture or use, it will be evident that for soil and drain pipes nothing will be left to desire.

Wrought-iron is smoother, denser and tougher than cast-iron, and can be tightly jointed by threading. Within the last few years it has been used quite largely for soil and drain pipes. Wrought-iron, when exposed uncoated to clean, fresh water, will rust quicker than cast-iron under the same conditions. On this ground many persons have opposed the use of wrought-iron for the conveyance of sewage; but since the discovery of the new processes of protecting iron from the influence of rust, and in view of the extreme slowness of its action, especially when covered with the slimy deposits which coat the inner walls of our drains, this argument against the use of wrought-iron seems to lose much of its force. The question of the relative durability of cast and wrought iron, when used for the conveyance of sewage, can only be answered by experience, and up to the present time the data are insufficient to enable us to form an opinion. This much, however, must be admitted, that there is nothing in our experience, so far as it has gone, with wrought-iron in such usage, which would indicate that the material is not in this particular entirely satisfactory. The subject of wrought-iron will be further considered under the heading of "Screw Joints."

JOINTS.

Equally important with the question of the material is the manner in which the several parts are put together, inasmuch as upon this depends not only the safety of the work, but also, in a measure, the choice of the material itself. The question of *joining* or *coupling* the pipe will therefore next be considered.

Classification of Requirements.

An ideal joint for waste-pipes should possess the following characteristics:—

- (1) It should be water, gas and steam tight, even under heavy pressure.
- (2) It should be unaffected by the expansion and contraction of the pipes.
- (3) It should be capable of resisting severe jars and strains, both compressive and tensile, such as are occasioned by its own weight and by settlement and movement in the building.
- (4) It should require neither skilled labor nor machinery in its manufacture or in its jointing.

¹ Continued from page 271, No. 441.

(5) It should be of such a form and nature as to admit of its being as easily taken apart for repairs or alterations as it is put together, and this without damage to any part.

(6) Its form and construction should be such as to allow it to be made and put together rapidly, to follow easily the irregular contour of the construction, and to be used immediately after fixing in place.

(7) It should require no caulking or hammering, which is liable to fracture the pipe or its lining.

(8) It should be so formed that any imperfection either in the materials used or in the manner of putting them together can be easily detected at a glance from without, without expert aid, since only in this way can the owner be protected against accident or fraud.

(9) It should be compact enough to enable it to be put together and used in contracted spaces and slots.

(10) It should cause no obstruction to the waterway, and leave no space or pocket for the deposit of sediment.

(11) It should be simple, durable, indestructible, economical, and unobjectionable in appearance.

A pipe-joint which shall answer the above desiderata would evidently be suitable for water, gas and other fluids under pressure, as well as for drains. To obtain such a joint has long been the study of engineers; but the use of cast-iron for house plumbing is of comparatively modern date, and the peculiar conditions of such use have developed new needs and been instrumental in suggesting new methods. The ordinary flanged joint secured by bolts, as used by engineers for gas, steam and water pipes, is unsuitable for plumbing purposes, on account of the restrictions it presents in obtaining the proper directions in the various bends and branches used in piping a house. At every point slight variations of direction are required to avoid the beams and other members of construction, and to meet the different fixtures at the proper angle. The steam-fitter's flanged joint has not the flexibility which allows a piece of piping to be turned slightly on its axis in this or that direction before fixing, as is necessary. Hence the ordinary bell-and-spigot joint, caulked with lead, was substituted for the flanged joint in plumbing. It enabled the plumber to cant the pipe in any direction, or to revolve it on its axis to conform with the irregularities of the construction and fit every contour. But this joint is in every other respect the most barbarous, expensive and unscientific device imaginable, and it is difficult to understand how it can have acquired the popularity it has. Only one of the new conditions imposed by plumbing has been met in this device: the condition of flexibility in arrangement, as already described. But this condition has been met only at the sacrifice of others equally if not more important. The caulked joint is neither tight nor permanent; it cannot be made to resist water or gas under pressure, and it is soon destroyed by alternations of heat and cold in the pipes, such as is often produced by the passage through them of hot water or steam. It is expensive both in time and material. It requires expert labor to adjust, but defies expert labor to take it apart again without more or less destruction of the piping. Even the process of putting together involves a hammering which endangers the integrity of the pipe, and the most experienced and careful workman often cracks it in the process. The safe use of white enamelled pipe is out of the question with the caulked joint, because the jarring produced by the caulking tool cracks the enamel.

The general use of cast-iron pipe in plumbing is, as before said, only about twenty years old, and this is perhaps sufficient to explain why no greater success has been attained in solving the problem imposed by the new conditions. However this may be, it is now believed that a solution has been reached and a joint devised which answers all the eleven requirements enumerated in our table. How far we are justified in entertaining this belief must be determined from what follows.

STAIRCASES.¹—III.

ECCLESIASTICAL ARCHITECTURE IN FRANCE.



GARÇONNE ANIENS CATH.
FRANCE

IN ecclesiastical structures the staircases were frequently of a most ingenious description. There are two exquisite examples of circular stairs in open stone-work cages in the north and south-west towers of the cathedral church of Notre Dame, at Paris. These stairs—erected in the beginning of the thirteenth-century—measure internally only about 4 feet 6 inches in diameter. They are inclosed by two superposed tiers of moulded mullions—the upper tier resting on the ends of the steps—arched between with trefoil arches stepped to suit the rake of the stair, and the whole crowned with an ornamental pierced balcony. Staircases thus constructed, both in wood and stone, for placing two apartments in communication were common both in ecclesiastical and domestic architecture and were thus made for light, and owing to their position, being almost much exposed to view. In the north tower of the west front of the Cathedral is a small circular staircase, 5 feet in internal diameter, of almost similar construction, but having circular pillars in place of mullions, the bases resting directly on the top of the steps, and the caps supporting the ends of those immediately over. Another may be seen in the Cathedral of Rheims. In 1460 we find a straight-flighted staircase, erected by Archbishop Cardinal d'Etoutville in the north transept of the Cathedral of Notre Dame, Rouen, which is remarkable for a peculiarly delicate pierced balustrade. Later we would select the elaborate circular stone stair leading to the organ-loft in the Church of Saint Maclou, Rouen, erected in 1512, with its buttresses covered with niches and figures, and its Flamboyant, raking, pierced, tracery cage the whole height, forming a unique construction of the richest character. One of similar date is to be found in a house near the Cathedral of Strasburg, "executed with the utmost precision of constructive skill, exuberant in fancy and decoration, and a most elaborate effort of taste and construction."² Of the Renaissance period we have the staircase in the church at Gisors.³ Its raking entablatures supported by pilasters, and the filling-in by double-bellied balusters, show clearly the complete change which the Italian influence had everywhere produced in the architecture of the country. The staircase-turrets attached to towers were made larger and more important than in England. The stair leading to the tower of St. Romain, Rouen Cathedral, is a notable example. The turret is 14 feet square, and 80 feet high, with an octagonal spire upwards of 50 feet in height. The turrets were also more generally placed against the face of the wall, as in the circular turret at Langeais (Indre et Loire), in Chartres, Coutances, and Noyon Cathedrals. Sometimes they were placed prominently on an external angle, as in the church of Senlis,⁴ and the nearly isolated circular turret at the abbey church of St. Leu d'Esserent (Oise). Inside the turret of St. Romain there is an interesting spiral timber stair, inclosed in a cage of posts, similar to those which we have been noticing as constructed of stone, and which had the usual solid steps found in mediæval staircases. Each step carried a piece of the newel, and the whole was kept rigid by a longitudinal iron rod passing through the centre, and firmly secured at top and bottom. Latterly, however, this system of construction was abandoned in favor of a central post in one piece, the whole height, into which the steps were tenoned. These solid newels had the handrail frequently worked on, and they were often richly ornamented. Probably the two oldest wood stairs in existence are those in the Sainte Chapelle in Paris, constructed in the thirteenth century.

ITALY.

Italy during the Middle Ages was in a high state of civilization. Subdivided into numerous petty Republics it was being constantly tormented by internecine warfare. Its nobles sought protection in erecting castles—like those of the Guelphs and Ghibelines in Siena and Florence—within the protection of the city walls, which accounts for their great number, proximity, and height. Having acquired wealth by trading, and being naturally proud and ostentatious, they erected castles of colossal magnitude and strength. The buildings generally surrounded an internal court-yard, from which access to the loggias, and from thence to the principal apartments of the first floor was obtained by an imposing outside staircase, such as we see in Arnolfo's Palazzo del Podestà at Florence, erected in the latter half of the thirteenth century. The climatic conditions in Italy were more favorable for open staircases than in northern countries; we, therefore, find them in very general use in conjunction with open balconies—as in the Piazza Pellegrini, Viterbo—which screened from the sun, and sheltered from the shower. The staircases in court-yards were generally situated alongside a wall, and were supported on pillars and arches increasing in height with the inclination of the steps, or on a solid substructure. Sometimes they were without covering, at other times with a raking roof, as in the Broletto or Town Hall of Bergamo, and occasionally with a groined ceiling beneath, as in the court-yard of the Palazzo Scaligeri, Verona. This roof was generally supported on pillars and arches, with a pillared balustrade between the pedestals. In buildings of all sizes these outside staircases were much used. They were artistically treated, and formed picturesque and pleasing adjuncts to many a dwelling of otherwise humble pretensions. Viterbo had many such. The well-known example at the house known as the Palazetto may be cited, the steps of which are profiled outwardly, and carried on a bold arch, with a richly-corbelled balustrade. In public buildings access to the principal floor by a bold effective outside staircase was common. Such we see in the Palace of the Popes at Orvieto, the Palazzo del Comune at Gubbio, and many others. The value of these and of wide flights of steps such as we find in Assisi and Lucca in giving an air of imposing dignity to a building was fully appreciated. The staircases in the picturesque Gothic palaces of Venice were protected "by exquisitely carved parapets, like those of the outer balconies, with lions or grotesque heads set on the angles, and with true projecting balconies on their landing places."⁵ In the single examples given by Street⁶—that in the Casa Goldoni—the ends of the steps are panelled and supported on pointed brick arches, the balustrade being formed of round pillars, separated at intervals by square pedestals (the survival of Classic forms), and coped with a broad, ornamented handrail. Unaltered Gothic interiors are seldom to be met with, besides Gothic architecture never got thoroughly acclimatized on the classic soil of Italy. Classic architecture was indigenous, and whenever an able exponent of the Renaissance arose,

¹ Paper (by Mr. T. Anson) read before the Royal Institute of British Architects.

² Illustrated in Nash's "Continental Sketches."

³ See *Building News*, Dec. 17, 1875.

⁴ Ruskin's "Stones of Venice," Vol. II., p. 279.

⁵ Street's "Brick and Marble Architecture of Italy."

¹ The Institute Prize Essay, 1884, by Thomas Purves Marwick, A. R. I. B. A., published in the *Building News*. Continued from page 292, No. 443.

Gothic surrendered without a struggle to the conqueror. It is to this Renaissance in Italy, therefore — that most lovable of all lovable epochs in the history of art — we turn to now with pleasure and expectancy. In general plan the typical Italian *palazzo* was simply the ancient arrangement of one of the larger Roman houses modelled to suit modern requirements. The buildings formed a hollow square or occupied but three sides of the open central *cortile*, which paralleled the atrium, or rather the peristylum, of the Greeks and Romans. The same pictorial eye governed the disposition for securing charming vistas and distant effects, as in the House of Pansa; the same symmetrical and geometrical rules seem to have regulated the system of planning. In ancient times, however, the principal apartments were relegated to the ground floor — both in town and country houses — while in the Middle Ages and Renaissance times these were as invariably on the first floor. This was, probably, as much owing to the miasma from the ground as to the confined situations. The staircases, therefore, of the one were never developed, were "cabined, cribbed, and confined," of the other spacious, magnificent, and inviting. In position there was possibly little difference. In the fifteenth and sixteenth century *palazzo* we usually enter through a vaulted vestibule; large, with pillars and arches carrying the superstructure; leading from the public street into the *cortile*, around which the buildings are grouped. At the entrance end was a vaulted arcade, which frequently formed an arcaded cloister right round, from off which, either to the right or left, opened the principal staircase. A fountain in the centre of the marble-paved court, and an opening in the far end from which was seen the distant garden, where were placed marble statues and fountains of sparkling waters skilfully disposed, formed a most attractive and charming perspective. Ascending the staircase we obtain from the upper loggia another pictorial view, and, in fact, the whole system of planning the vestibules, *cortiles*, and staircases seemed to be that of artists arranging points from which a spectator might view pleasing effects. They were made the chief features in all plans. The natural gradation of effect would have led one to expect that they were but the introduction to something more imposing and magnificent. This unfortunately was not always so. The subtle genius of creative power which distinguished the Cinque Cento period, followed by the academic formality of Bramante's school, was succeeded by a desire for novelty, for capricious and unconstructive forms without beauty, which advancing skill had rendered easy of realization, and which gradually sapped the true art instincts of a noble people. The architects of the time fed the debased appetite thus created. They parodied in erratic forms — in the staircase as elsewhere — the works of their more gifted predecessors. The simplicity of form in combination with grandeur of effect which characterized the primary and secondary epochs of the Renaissance was abandoned for broken effects more in sympathy with other architectural features. All strained after novelty, and in their staircases they secured it by landings of contrary flexure, by vulgar, unshapely decorative features, and by a superabundance of richness far removed from the simplicity and purity of the Cinque-centisti. Classification into groups may be the best method of considering the distinguishing features which characterized the Renaissance staircases in Italy.

I. The most common type of stair we meet with is that wherein both ends of the steps are supported by solid walls. Such we have in Bramante's Palazzo Giraud, at Rome; Sansovino's Library of St. Mark, at Venice; Alberti's Palazzo Rucellai, at Florence, and endless other examples. This form was simply that which Vespasian had used in the palmy days of the Roman Empire, and the remains of which were still to be found amid the Classic ruins of the Imperial City. Their construction we have previously had occasion to consider; their form, while possessing many advantages, had also some disadvantages. The raking flights prevented the introduction of windows which would have destroyed the external symmetry and repose, and thus we find blind ones introduced, and an eternal *petit coud* formed at one end lighting the mid-landing, as in Ammannati's Palazzo Neroni, Sangallo's Farnese and Palma Palazzi, the Palazzo Muti-Papazzuri, and many others. The raking soffit required careful and judicious treatment; while a want of lightness and openness prevailed, and persons ascending or descending could not see each other until they suddenly met on the landings. The usual treatment consisted of pilasters and arches crossing at the landings in which the raking cylindrical arched soffit was made to butt. On the landings niches and statues were introduced, and each quarter space had a domical vaulted ceiling. At the start, three or four of the steps were slightly separated from the rest so as to break the effect of a direct ascent, and the whole stairs were formed of steps usually 14 inches or 15 inches to 24 inches broad, with a low rise, and of single blocks of marble. The walls gave ample scope for subdivision; the panels thus formed were often filled with frescoes above the marble dado, and the arched ceiling was either decorated thus — as we see in the Palaces of Genoa — or by elaborate stucco-work.

II. The remarkable invention of the open-newelled staircase by Nicola, of Pisa (1205-78), in the campanile of San Nicola, of Pisa, marks the introduction of an important era in the history of staircases. "Externally this building has eight sides, but its form within is circular, with a spiral staircase ascending to the open loggia at the summit; within the stairs a free space is left, in the manner of a well, while on every fourth stair are placed marble columns supporting arches, which follow the spiral line. The roof of the staircase being supported on these arches, the ascent is of such sort that the spectator at the foot sees all who go up; those who are ascending see those remaining below; while he who stands in the midway can see both those above and those below."¹ Bramante — (1444-1514) who led off the Roman phase of the Renaissance — utilized this idea of Nicola's at the commencement of the sixteenth century in the circular staircase of the Belvedere of Pope Julius II. The ascent is by an inclined plane of five revolutions, carried on continuous cylindric vaulting, which rests next the open wall on eight columns in each tier composed of the orders: thus for the first time skilfully superimposed. The open newel recommended itself at that time on various grounds. It could be surrounded by apartments, and yet

receive sufficient light from the top, while it gave a picturesque and free view of the construction. Though slow to break with the old form, these open-newelled stairs commanded, during the sixteenth and subsequent centuries, a considerable measure of favor. Pillars or columns, with raking arches to support the wide steps, or placed sufficiently close to carry a lintel, were invariably placed next the newel in early examples. Latterly these were abandoned for the geometrical stair, pure and simple as we have it by Palladio. In the Gruicani Palace at Rome, by poor Baldassarre Peruzzi (1481-1536) there is an open stair square in form. In Gio Antonio de Rossi's Palais Altieri (1670) it is oblong. The elliptic stair (33' x 30'), by Francesco Borromini in the Palais Barberini is a later well-known example, and with its five tiers of coupled columns presents a thoroughly pictorial ensemble. While approaching still nearer the architecture of to-day is Morelli's magnificent staircase in the Palais Braschi (34' x 46'), with its sixteen columns of red Oriental granite carrying the raking arches supporting the step.

III. Another group we would select for illustration are staircases in successive continuous flights, such as we have in the Palazzo Spada (c. 1570), Rome, by Giulio Mazzoni: in the Regia Zecca, Venice; and in Bernini's (1598-1680) noble Scala Regia at the Vatican. In this latter example, the bounding walls narrow 10 feet towards the farther extremity, thus enhancing and prolonging the perspective effect and increasing the apparent length on approach (a capricious trick Borromini copied in his perspectively arranged colonnade tapering to half its entrance width in the Palazzo Spada). The marble flights of steps are flanked on each side by a stately colonnade, the lower of marble Ionic columns each in one piece, and the upper of pilasters, the proportions being simply colossal. Algardi's stucco ornamentation enriches it, and with its other decorations it altogether forms one of the most striking and beautiful staircases in existence. Except for the purpose of attaining a moderate height, for special pomp, or ceremonious occasions, this form of staircase is not to be recommended.

IV. Staircases having three flights, one central ascending flight branching to right and left, or vice versa, are also sufficiently numerous to warrant special mention. Leading off the right-hand side of the magnificently decorated hall in the Scuola di San Rocco, at Venice, is one by Antonio Scarpagnino of handsome proportions (41' x 46'), and superbly decorated with frescoes by Titian and Tintoretto. One of somewhat similar dimensions by Scamozzi, and of imposing character, is that in the Nuova Fabbrica of the same city. While, as a last example may be cited the staircase of the great Palazzo Doria, at Genoa. Here the stair is placed at the farther end of the *cortile*, and looking through the vestibule, and the arcaded court with its bright light to the staircase beyond, shows us how carefully studied a grand effect was by the architects of the Renaissance.

V. Circular staircases were not much used except for ecclesiastical and subsidiary purposes, where the amount of space was the primary consideration. That at Vignola's Palace of Caprarola, however, and the one in the Palazzo Minelli, at Venice, with its seven tiers of winding, open, raking arcades, forming the cage-like enclosure we have elsewhere noticed, and with its pillared balustrade running between, shows how pleasing, and even beautiful, the form could be treated. The one in Vignola's Villa di Papa Giulio, with its pillared newel is 18 feet in diameter. Palladio usually made them with a newel one half or one-third of the total diameter of the stair, and on a large scale, the disadvantages attending their use being thus minimized. We find elliptic staircases in Martinus Lunghi and Flaminio Ponzio's noted Palais Borghese. It measures 23' x 26', and is an open stair with columns next the newel. The one in the Ducal Palace at Genoa is a good example; while Palladio's elliptic staircases in Venice and Verona are all characterized by great simplicity, but are models for their convenient situation, their good proportions, and the ample sufficiency of light which everywhere prevails.

Of other remarkable staircases Italy has a superabundance of examples from which it is difficult to select. Venice possesses in Scarpagnino's Scala d'Oro of the Ducal Palace (1558) certainly one of the richest. Sansovino directed the decorations, while Alessandro Vittoria (1525-1608) executed the stucco-work, and John Baptist Franco the paintings. All combined to cover it with a mass of gorgeous elaboration absolutely unparalleled by any other in existence. In plan it belongs to the first group described, the steps being about 14 feet wide, supported on an arched ceiling. Antonio Bregno's Scala dei Giganti in the court adjoining — so called from Sansovino's semi-colossal statues of Mars and Neptune which decorate its summit — is a magnificent specimen of an outside staircase. It is composed of two successive flights having an intermediate landing, is about 11 feet wide, and incrustated with the choicest marbles. The parapets and steps are covered with delicate carving, and inlaid with ornaments of lead that give the effect of lace or fine embroidery.² Another imposing double flight of steps is that by Michael Angelo, in front of the Senatorial Palace on the Place of the Capitol at Rome. Sansovino's noble library of St. Mark has a large and magnificent staircase situated immediately off the portico in front of the shops. It measures about 21' x 47', is on the most generally used plan, and decorated in stucco by Vittoria. In the steep streets of the once famed maritime Republic of Genoa (La Superba), Galeazzo Alessio (1500-72) and others erected during the sixteenth century many skilfully planned and effective staircases. In the vestibules were handsome flights of steps in one, two, and even three widths, making up the difference in the levels. These, with the *cortile* and staircase beyond, formed in many cases a truly poetic group, which makes Genoa more celebrated in this respect than any other city in Italy.³ Here is the Lescari, with its staircase vault beautifully decorated with arabesques; the Palace of the University, with its noble staircase; the Balbi Palace staircase, of vast size; Orsolino's staircase in the Hospital for Incurables; that in the small Brignole Palace; the great spiral marble staircase of the Palazzo Durazzo, and many others which it is impossible even to mention. While this can be said of Genoa alone, how can we hope to touch on a tithe of the noble staircases scattered over this Land of Art. Of Sangallo's staircase in the Sistine Chapel, which Vasari characterizes by saying "that nothing better has ever been seen either among ancients or moderns," of Bramante's staircase in the Palazzo Publico at

¹ Vasari's "Lives of the Painters," Vol. I.

² Clocquard.

³ See Gauthier's "Genoa," Paris, 1830-32.

Bologna (1504), of Flaminio Ponzio's in the Quirinal Palace, Vincenzo Dotto's in the Palazzo Capitanale at Padua, Balthazar Longhena's in the convent of San Giorgio Maggiore (1678), of Martino Longhi's in the Palazzo Rospoli (with its one hundred and fifteen steps of white marble, each 2' x 10'), all possess marked beauty and power, and give but a savor of the wealth of beautiful staircases which make Italy the Land of Staircases *par excellence*. Certainly for monumental and dignified effect, for costly materials, for size, and for magnificence they stand out unrivalled. We cannot repeat them, it is true, but in works of a palatial character, nor can we even employ the principles of plan in domestic architecture without destroying that privacy, convenience and comfort which we of to-day so much desiderate; but they can teach us many lessons we may acquire with advantage. Much of the effect on the spectator is due to the enormous dimensions given. The Farnese Palace stair is 28' x 73'; that in Carlo Maderno's Malta Palace, with its marble walls and rich stucco ceilings, 49' x 65'; in Ferdinando Fugo's Palais Corsini, 45' x 72'; while those in the work-house at Genoa and in the stupendous unfinished Royal Palace at Caserta, Naples, by Luigi Vanvitelli (1700-73) are no less than 63' x 115' and 85' x 163' respectively.

Double staircases are not often met with, but in an early portion of the sixteenth century Bramante's assistant, Antonio di San Gallo (1470-1546), constructed one leading to a well at Orvieto, for Pope Clement VII. The animals going for water descended by one incline, and, after taking in their load, ascended by the other without turning, coming out at a different and opposite door to that by which they entered. Light was derived by openings formed into the centre space. Milizia mentions a similar construction at Turin. The idea in these cases was undoubtedly borrowed from France, and we will notice them under that heading. Scamozzi (died 1616) mentions one by Pietro del Boyo and John Cossin, "where two persons, one ascending and the other descending, never meet."

The method of ascending to the belfry-stage of Italian campanili is generally by a stair in the thickness of the surrounding walls. The campanile on the Piazza of St. Mark, the lower portion of which was built in the twelfth century, is ascended by an inclined plane which winds round the tower between the outer and an inner wall. The passage roof is arched and receives light from the outside, arched openings being also inserted in the interior well of the tower. The brick campanile Chiesa della Madonna dell'Orto is also ascended by an inclined plane, winding round the interior eight times before reaching the summit. Mr. Street, in his "*Brick and Marble Architecture of Italy*," says "no such excrecence as a stair-turret was ever used." The staircases of humbler buildings than those hitherto noticed scarcely call for special analysis. We find them situated off the open vestibule, simple in construction, easy of ascent, attractive in appearance, of marble or stone, and unfailingly with an air of spacious comfort.

THE RENAISSANCE IN FRANCE.

It is necessary, in order to follow some sort of chronological sequence, that we return to the latter end of the reign of Louis XII. The influence of Italian art began to affect French architecture long previous to the accession of François Premier, as we have already noted. To the reign of this unequalled patron of the fine arts, however, was due its complete mastery and the consequent Italianizing of the palaces and *maisons de plaisance* of France. This was essentially the chateau-building epoch. The era of noble ecclesiastical architecture had passed away. The amalgamation of the *ogival tertiary* with the incoming current of revived Classic art produced for a time that rich, hybrid, Burgundian admixture which formed so peculiar a feature of the period. The Renaissance wave which swept over the country, on its way to the shores of England, simply ornamented with pilasters, mouldings, and other details peculiar to Italy the essential features of the French plan. The chateau remained a chateau, but with a new costume; the staircase, also, but they remained in plan essentially the same as in previous centuries, with no similarity to those coeval examples erecting on every side in the military republics of Italy.

On the north side of the court-yard of Blois there stands an open octagonal staircase¹ erected by Francis in 1525, which stands out pre-eminent amongst the few existing examples we can cite of the extreme elegance, richness and refined detail which characterized this, the outstanding feature of the domestic architecture of mediæval France. Externally it consists of two tiers of richly-decorated angled pilasters connected by flat open arches, with an ornamental raking balustrade following the angle of inclination of the spiral steps—filled with the salamander and cyphers of the king and other royal personages—running between the pillars. The whole, with a rich cornice having gargoyles at the angles, and crowned with an open gallery. The structural ground-work is Gothic, the details Italian. The interior, like the exterior, is richly decorated, the walls and newel covered with niches and enrichments, while all the carving and details are of the most exquisitely delicate description. Open staircases like this formed but another of the many beautiful features incidental to the staircase architecture of these times. The staircase of the Cardinal de Longueville in the Chateau Châteaudun, erected early in the sixteenth century, is another charming specimen. The Chateau Châteaubriant (1524) has also an open staircase. In the porch beneath the chapel of the Hôtel de Cluny is one with a

moulded circled string-course carrying the ends of the steps, and surmounted by a rich traceried balcony; while another still more beautiful on the same principle, but with a double tier of balustrading, is in the court of the Hôtel Chambellan at Dijon. Twelve miles from Blois—along the valley of the Loire, that "garden of France"—stands another immense monument commenced in 1526 by "*le Père de lettres*." In the colossal Chateau de Chambord,² rising high out of the central pile with its forest of towers, chimneys and dormers, is another staircase equally celebrated. Its internal diameter is 30 feet, and contains a double stair winding round a hollow ten-foot newel, which ceases at the terrace level, the newel containing a smaller stair ascending to the highest part. Rising above the terrace it is surmounted by a cycle of pillars supporting a gallery, having flying buttresses, and carrying a graceful cupola crowned with a gigantic *fleur-de-lis*, from which the tower derives its name of the "*Tour de la Fleur-de-Lis*." Both the exterior and interior are lightly ornamented with niches, pilasters, carved salamanders and the emblems and initials of royalty. Here, also, in the interior angles of the court-yard stand two elegant staircases somewhat resembling that at Blois surrounded by open colonnades. These double stairs were peculiarly French features, and were in common use. They were of simple construction. The entrance was by separate doors, and the steps commenced at opposite points, so that ascent and descent could be performed by separate parties without meeting except at the different floors, and without seeing each other except in some cases through the openings of an internal cage, which contained a newel service-stair deriving its light from its circumambient principle. They were in use in France, constructed both of wood and stone, two centuries before this one at Chambord.³ Suaval⁴ describes one in the Church of the Bernardins in Paris, which was begun in 1336, and others in the Saint Mederic Church of the same city, dating about the end of the fifteenth century. A large newel was essential to the circular plan owing to the necessity for the radiating steps preserving a convenient width of tread next it. In very large examples it was thus made hollow, either to contain the subsidiary stair or to serve some other useful purpose; in the old Louvre it was a room. It was often made to serve as an access to intermediate floors by a passage running through it, while in Glamis Castle in Scotland, we find it used as a well. The Chateau de Madrid,⁵ designed by Pierre Gadier, was also erected by Francis about 1540. Here the stairs were formed in plain, square, projecting towers, used externally to relieve and group the rich arched bays of this magnificent Renaissance work which ran between them. La Muette was another chateau on a smaller scale, the principal stair consisting of straight flights and winders on both sides of a central passage and intermediate landing, which not only thus gave access to the three flats of great halls, but, by the centre landing, to the five floors of apartments. The royal chateau alone numbered about a score. We can imagine the number and magnificence of those built by the Court and nobility. In 1530 Francis formed the Italian band of artists, who constituted the School of Fontainebleau, of which Francesco Primaticcio, of Bologna (1490-1570), was the leading member. In 1564 Philibert de l'Orme (died 1570) erected the monumental Renaissance staircase with its elegant cupola in the clock-pavillion of the Tuileries. We see towards the middle of the sixteenth century Italian art thus indisputably master of the French field, a field it has occupied—barring occasional defections—with credit and honor to the present day. The staircases were now but adapted reproductions of those we have described under "Italy," and possessed few salient characteristics to occupy our attention. We would, therefore, simply name Fontaine's effective production at the Louvre, with its splendid array of marble pillars; the staircase which formed so grand an approach to the Chamber of Peers in the Palace of Luxembourg, which has also a range of columns supporting a barrel-vaulted roof; the well-known St. Cloud staircase of Mansart (died 1708), and that in the Hôtel du Cardinal Auvergne by Servandoni (died 1766). Many others might be noticed, but these are among the most prominent. We have arrived at a point that it will be more interesting to resume the broken thread of our narrative in our native land.

THE ILLUSTRATIONS.

CLUB-HOUSE OF THE UNION CLUB, CHICAGO, ILL. MESSRS. COBB & FROST, ARCHITECTS, CHICAGO, ILL. INTERIOR DECORATIONS BY MR. FRANK HILL SMITH, BOSTON, MASS.

FOR the first time, we believe, since the foundation of the *American Architect* we were compelled last week to send it out with less than its full complement of illustrations. In the haste attending the last work on the issue we believed the disaster was caused by ineradicable defects in the negatives of the Chicago Union Club-House furnished by the architects of that building. We are pleased to say, however, that time and care have succeeded in effacing so many of these defects that we think it worth while to publish these

¹ Designed by Pierre Trinquau.

² In Inigo Jones' copy of Palladio's book (which was freely annotated) the following occurs: "The stairs at Chambord I saw, being in France, and there are but two ways to ascend: ye small hath a wall, with windows cut out; but this, ye seems, was discoursed to Palladio, and he invented of himself these stairs."

³ "*History and Antiquities of the City of Paris*."

⁴ Now destroyed.

⁵ Restored by Louis Philippe, in 1845.

views to-day. A description of the building may be found in our last issue.

THE CLAFLIN BUILDING, BOSTON, MASS. MR. W. G. PRESTON, ARCHITECT, BOSTON, MASS.

TUDELA CATHEDRAL, SPAIN. SOUTH DOORWAY AND INTERIOR OF TRANSEPT LOOKING NORTH. SKETCHED BY MR. R. W. GIBSON, ARCHITECT, ALBANY, N. Y.

For description see article on "Spanish Architecture."

CHAPEL, CHAPTER-HOUSE AND CLOISTERS, UNIVERSITY OF THE SOUTH, SEWANEE, TENN. MR. W. H. WOOD, ARCHITECT, NEWARK, N. J.

THIS group of buildings will be begun this summer, the starting point being the chapter-house and bell-tower. The stone quarried on the site is to be used in the building, rock-faced ashlar for the exterior and tooled for the inside. The entire cost is expected to be about \$50,000.

HOUSE AT BAR HARBOR, ME. MR. W. R. EMERSON, ARCHITECT, BOSTON, MASS.

COMPETITIVE DESIGNS FOR THE GARFIELD MONUMENT, CLEVELAND, O.

WE reproduce a couple of the designs submitted in the recent competition, and next week will issue others. As the competition is as yet undecided, our correspondent was unable to furnish us with particulars, so we leave the designs to tell their own story.

THE RESTORATIONS OF CLASSICAL SCULPTURE IN THE MUSEUMS OF EUROPE.



ΒΕΝΟΥΣ ΜΙΛΟΥ ΚΑΙ ΓΑΡΙΦΑΛΗ «ΤΟΥΡΟ»
ΠΡΟΣ ΕΠΙΛΟΓΗΝ ΤΑΥΤΩΝ. ΣΚΕΤΣΜΑ.

where no repairs are made. This is the modern practice — not that it is of very recent origin, for it dates back three-score years and ten; but unfortunately it has only of late become general. The "Elgin marbles" have been let alone; no one has ever pieced out the Theseus with hands and feet, or tried to fit a head on the Ilissus, and yet they have been on exhibition in the British Museum for two generations of men. The Venus of Milo, although her pose is not unquestioned — both the placing of the base upon the pedestal, and the adjustment of the upper block forming the body to the lower one being matters of dispute,—has never been disguised by modern arms, and this statue has been in the Louvre for more than a half-century. Even in the Vatican, not the place to look for such restraint, the splendid draped statue in the long gallery (Museo Chiaramonti), generally known as a Niobide, remains headless and armless, although it was for nobody knows how long in private hands, and then in the Quirinal Garden. The Torso of the Belvedere and the so-called "Genius" in the Gallery of Statues will occur to every one who knows the Museum as being unrestored, although the one for three centuries and the other for a century have belonged to the Papal Museum. On the other hand, the practice in the Munich Glyptothek has always been complete restoration: arms, heads, helmets, feet, hands, and weapons are supplied to all comers to this museum, although it dates from within this nineteenth century, and the Ægina sculptures were not renovated until after Lord Elgin's plunder had been brought to England and purchased by the nation. With less thoroughness, this has been done almost everywhere. A very brief inspection of the Louvre is enough to decide for us what the fashion is there. With few exceptions, as above noted, the Vatican sculptures are always made complete, besides being cleaned in a way to make one uneasy and suspicious; for the traditions of that great Museum are neatness and elegance, with not too great observance of archaeological purity.

If all the famous ancient statues of Europe should be, by common consent of their curators, stripped this winter of their non-original parts, next summer's flight of tourists would be stupefied at the appearance of some of their pet admirations. The Laocoon would be found without the father's right arm, which is thrusting away from him a great fold of the serpent, as if it were the bight of a hawser, and with no more life in it than such a hempen loop as that; and the two sons would lack, the one his right arm, the other his right hand and wrist. The Discobolus in the Vatican would have no head; and the modern athlete, accustomed to fix his eye on the mark when he aims his quoit or ten-pin ball, would certainly not be the man to restore the statue with a head placed like the duplicate statue in the British Museum, nor yet to follow the other duplicate in the Palazzo Massimi, with head screwed around to look after the discus; nor yet to retain the present head, with eyes turned on the ground near the feet of the quoit-thrower. The Biga, or two-horse chariot, in the same hall, would have neither horses nor wheels, and might almost be taken for that which it was made to serve for once, an arm-chair. The Medici Venus would retain the stump of one arm, but almost no trace of the other; and assuredly the Tribune would seem less attractive to some travellers when its chief attraction to the Murray-guided tourist should be so changed from what Lord Byron saw and worshipped. Many hundred "Amazons" and "Cereses," and "nymphs," many hundred "Mercuries" and "Boxers" in all the great cities of Europe would be divested of their distinguishing attributes, and would be reduced to their essential nature of good or excellent classic sculpture, not easy to give proper names to, but none the worse for that. Many hundred heads, arms, and legs would be detached and left on hand, of which a very few, known to be ancient, though not hitherto in their right places on the bodies originally belonging to them, would still find places in the galleries; while the rest might be given to drawing-schools for models, for most of them are fairly good in anatomy.

The future is with the archaeologists, and a public opinion among those interested is developing itself, too strong for the lovers of neat and complete, though inauthentic sculpture. For years past no restorations more extensive than feet and fingers have been undertaken, and such as they will soon become impossible. And evidently this state of things is to be worked for and hoped for; for, in very truth, no man has any right to thrust himself in between the student and his original. Let us suppose, for instance, that the Venus of Milo had been restored, forty years ago, as a Victory, on the model of the noble bronze statue at Brescia. There would have been something to say for that design. A certain resemblance between the statues is not the least argument in its favor; but the strong convictions of those who see in the statue a part of a group would then have been disregarded, and not justifiably; for, although when action is necessary the responsible actor must know how to disregard the reasons which make against his adopted course of action; in such a case as this, no time can be set when action becomes necessary. Students were not agreed, forty years ago, as to the statue's original arms; they are not agreed now, they never will be agreed, unless the original arms should be found, rescued from that Turkish ship in which they sailed away from Melos. Now, in this case, as every one is accustomed to see the statue or representations of it, armless, few persons will object to its being left so. Probably any attempted restoration of the original would offend even the advocates of that theory which might be followed in making it. But consider the other famous Venus, the heroine of Byron's verse, the adored of so many generations of tourists — the Medici Venus at Florence. This statue is, no doubt, a work of inferior value; the writer of this can heartily agree with that shrewd Scotch sculptor in Florence, who says that when his ideal student's collection of first-hand casts of a hundred or two hundred masterpieces shall be made, the statue in question shall not be included. But still there is merit in it. The long row of marble ladies standing in the same attitude on the stylobate at Naples are none of them so good, although it was perhaps from them, or from some of them, that Bernini took the position of the arms and hands when he added them to the Florence beauty. The Venus of the Capitol, alone among the statues which are known to be in the same attitude, is the equal, or rather the superior of the Florence marble; and this work, unique in sculpturesque treatment, is almost alone in its perfect preservation. The Medici Venus, then, is neither the better nor the worse for all the uproar of three centuries, and is still worthy of a place where it can be properly seen, in spite of the scraping and polishing the marble has undergone. Obviously, then, the arms should be removed, and this our children will see done. A cast or a good copy will preserve for them the memory of their father's idol.

This is an instance of a fairly judicious restoration. But it is easy to name vile ones — inexcusable blunders, or, more often, reckless puttings-together; hasty attempts to avoid the supposed impropriety of leaving broken sculptures broken. Consider the valuable archaic female statue at Venice, with heavy plaited drapery, in the attitude, as if walking, so characteristic of very early Greek statues. Upon this headless statue some restorer has mounted a pert nymph's head of late style, with hair elaborately dressed in a lofty top-knot. Or, as an instance of a more important work of art spoiled in the same way, take the group at Naples, the Harmodius and Aristogeiton — fine work of an early epoch. The striking warrior has his own head, with short-curved, knotted hair; but his friend who accompanies him, ready to parry and to ward, has received the addition of

a head of much later time, good in itself, but of absurd appearance where it is, not merely its treatment being out of keeping, but its very pose and the action of the muscles of the neck contradicting the movement and purpose of the man. Or, what is to be said of the Farnese Bull of the same museum, "the largest piece of ancient sculpture in Italy," of which, as the principal figures are two young men, two women and the bull, there are of modern work the head of the bull, the whole of one woman, the upper half of the other, and more than half of the two young men?—a restoration nearly as thorough-going as the above-mentioned Biga. A colossal marble bull without a head, and some traces and indications of human figures around him, is what the Museum should show as its original work found in the Baths of Caracalla or elsewhere. A cast of the present group (which is a Renaissance design of spirit enough), and as many alternative restorations as room may be found for, or as sculptors of merit may propose may be set up near it for comparison.

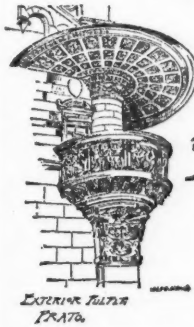
Some persons like the Barberini Faun better than perhaps the merit of that statue would justify; at all events they should study the figure without the modern legs, for the whole of one leg, and of the other all except some bits of the ancient marble inserted, are of yesterday. Take away, besides these the half of one arm, a part of the other, the nose, together with part of the lion-skin and supporting rock, and we have left a fine torso with only slightly-injured head, just as it was hurled from the high platform of Hadrian's mausoleum on some day of siege and storm, a more respectable work of art by far than Kronprinz Ludwig's purchase, patched up now for the third time, and with no more certainty than at first of being rightly restored. But of all restorations, reparations, and transmogrifications, that inflicted upon the "Cnidian Venus" of the Vatican is the most grotesque. This may be to others, as to the writer, the loveliest statue of very young, of budding womanhood in Europe. It stands in a niche on the left as one enters the "Hall of the Greek Cross" from the great stairs, and therefore can be looked at from one point of view only. The workmanship is Greek, the marble is Greek, the vase over which her drapery is thrown is Greek, and all the ancient work is just as near perfection as human handiwork, even in Greek sculpture, commonly reaches; but from the hips down the statue is hidden, wrapped up, "mummy-fashion," as Braun says in his guide-book, with metal-like drapery, and the right forearm and hand are restored in such fashion that the hand holds up this mass of clothing. What makes it the more inartistic is that the drapery thrown over the vase is complete in itself, so that two nearly equal masses of stuff are held up side by side. What makes it the more unlearned, the more unarchæological, is that the statue is named the Caidian Venus, *nemine contradicente*, on account of its resemblance to the medals which preserve for us some recollection of Praxiteles's famous work, and that that figure is undraped. When Italy comes to her own, we shall see this inestimable statue set upon a revolving pedestal, like her sister in the Capitol Museum, or at least put up in the middle of a room, as the Belvedere Torso is, and that without her stucco costume.

It should be remembered that the presence of clever and probable restorations, however acknowledged and however visible, is apt to mislead even the somewhat careful student. Writers who, like Mr. Symonds (to take a notable instance and a good one, for no such writer is more conscientious or more prudent), are accustomed to compare one art with another, or art with literature, in the search for light upon thought and upon human nature in classic times, are always in danger of reasoning from the completed statue or group, as if all parts of it were equally authentic. The ancient torso, with limbs and a nose of good modern work, accepted as a complete work of art by too many students during several generations, has become a complete work of art in the mind of the man who, at a distance, and recalling his strong impressions, seeks to draw from them conclusions and beliefs which will be based upon not quite trustworthy material. Even professedly archæological writers are misled in that way. Our books of examples give us, as authentic ancient work, much-restored statues; and even one of the latest, Mr. Murray's "Greek Sculpture before Phidias," will be found to give an illustration of the Harmodius and Aristogeiton of Naples with the wrongly-adjusted head described above, as if an original part of the statue to which it is attached. It will be said that a remedy for the mischief of restoration is found in giving an exact account of the restorations made. And this would be a good way if there were not a better: that is, the simple leaving them *not* made. Little by little the museums of Europe are coming into line, with more or less complete statements as to the mischief done. The Louvre has it in a little framed poster on each pedestal. The Capitol Museum, the Dresden Museum, and some others—alas, too few—have it clearly set forth in their catalogues. The Uffizzi catalogue has it, sometimes in the text, sometimes in a note, in such fashion that one is never sure whether to expect it when most needed. The catalogue of the Munich Glyptothek is the model one in this respect; every modern scrap is carefully indicated and described, and the judicious author has something to say by way of criticism of the more unfortunate instances of mistaken addition. But half the museums are without catalogues at present, leaving the student to imagine what fine ones his successors will have to guide them when their turn comes.

The Dresden Museum of Antiques in the Japanese Palace is not too admirable in the condition of its works of art; the German guide-books even agree as to the *ergänzt* condition of most of its sculptures. But its perhaps most valuable, certainly most curious

possession, the archaic Athene, with the heavily embroidered border hanging down the front of her *peplos* is unaltered. Two pedestals stand out in the room, well toward the windows; the one supports the original, a sadly broken and defective statue, though what remains is in good condition, neither defaced nor much discolored; the other holds up, for comparison with it, a restoration by Rauch: his conception of what the original must have been. This is what all must come to. No great museum can afford to go on much longer with its sham antiques, built up with a classical nucleus and a bewildering crowd of modern additions to confuse the student. The restored models will be based upon accurate casts of the original; as many different ones will be set up as seem worthy of consideration. Some museums will have them side by side with the original, for better comparison; others, with a sense of the higher dignity of the original, will relegate the studies of restoration to separate halls; and the catalogues will contain each modern sculptor's arguments for his own theory of what the original was when complete. But the marble itself shall have added to it neither nose nor finger, nor lip of vase, nor fold of drapery. If a limb is found broken off, and the edges fit perfectly, it may be attached, the catalogue calling attention to the repair. If a piece of a limb be found not capable of direct fitting into place, like the forearm and hand where the upper arm is lost, a metal bar may connect the member with the trunk at about its proper place. Where feet or legs (of a standing statue) are lost, the figure may be held at its proper height above the pedestal upon metal bars, or the pedestal may be shaped out, or may support a pilaster or block to do the same office. But no completing of the statue or of any part of it will be allowed, whether in marble or in plaster, wood, or papier-maché. — R. Sturgis, in the N. Y. Evening Post.

SIR EDMUND BECKETT AND THE INSTITUTE OF BRITISH ARCHITECTS.



THE following correspondence, which has passed between Sir Edmund Beckett and the Secretary of the Royal Institute of British Architects, has been published in the English architectural journals: 33 QUEEN ANNE ST., W., May 3, 1884. TO THE SECRETARY OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:— Dear Sir,—On returning here I find the annual report of your Council, and have read it, and it has confirmed the conclusions to which other things had been leading me as to the relations of the Honorable Associates to the real body of the Institute. I have for some time observed that your meetings are more and more occupied with discussions about the constitution and supposed professional interests of the R. I. B. A., and less and less with anything tending to advance architecture. According to your own calendar for this year, fifty per cent more meetings are devoted to what are simply trades-union discussions of your own than to reading and discussing architectural subjects; and those that have been read have been more uninteresting than I remember in any former year. One of your meetings yearly is occupied with utterly unprofitable speech-making on presenting the medal you obtained from the Queen for the advancement of architecture to some architect whose reputation is already made: the most foolish of all applications of prizes, and quite contrary to the object for which they were intended or adopted in all seats of learning, and even in scientific societies. In some of them, indeed, they have declined into mere personal compliments or conflicts, but in none have they so little of their original and proper use as in yours. The pending Government competition has already shown that you have simply wasted all the time that you have spent for years in inventing rules which you expect other people to regard in architectural competitions. "All rules of any architectural society" have been expressly repudiated by the Government, as they were before by the courts of law, and of course that example will be followed by all public bodies who are properly advised. It is singular, too, that the only suggestion of yours which the Government did accidentally adopt, viz., for one or more architects among the judges (which was nothing new) has produced or not prevented a result which some of your usual champions have been condemning strongly. And your declaration in support of that suggestion has not been signed by anything near a quarter of the architects of England, by your own showing. These are not remarkable successes after all the time you spent in obtaining them. Nor have you been more successful in educating the public as to the point of reversing their unanimous condemnation of the work on which, somehow or other, the Institute has been staking its credit for a long time, and doing all it can to glorify its author, who was your president. You seem unable to furnish the public with criticism, either in the way of praise or blame, in which it will concur the least. In short, the primary object of the Institute is becoming, more and more distinctly, to advance, not architecture, but architects; at least, if they put your letters after their names, which only a very small proportion of them do. You have a right to do so if you choose, as any other trade or professional society has; but the more you do, the more ought other people to stand aloof, and not to help you by pretending to be members of your body and concurring in your objects, while in fact we have nothing

at all to do with them. The Honorable Associates are a mere sham for every purpose except contributing about £220 a year to your finances and giving some appearance of weight to your proceedings by their names. Therefore I, at any rate, shall do so no more, but retire from what has always seemed to me a false position, since I was obliged by well-known circumstances to pay some attention to your proceedings. I am not surprised to see that our numbers are declining. With all personal respect for you and some other members of your body with whom I am acquainted, I remain,

Yours truly,
EDMD. BECKETT.

ROYAL INSTITUTE BRITISH ARCHITECTS, May 13, 1884.
Dear Sir Edmund, — Your letter was yesterday laid before the Council, and we are to inform you that, in accepting your resignation, they have added an expression of regret that you should so inadequately appreciate the aims and actions of the Royal Institute of British Architects as the terms of your letter convey. We are,
Yours faithfully,
J. MACVICAR ANDERSON, Hon. Sec.
W. H. WHITE, Sec.

THE WELLINGTON STATUE.

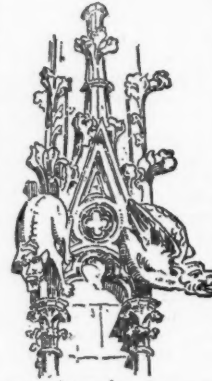


KNOCKER South Germany.
About 1500.

ON Monday morning, the 19th ult., the statue having been handed over to the military authorities, a number of artificers from the Arsenal were set to work erecting scaffolding and in punching off the heads of the rivets which held the head of the Duke to the body. On Wednesday morning the head with its cocked hat and plumes was deposited on the ground. A curious discovery was then made in the interior of the Duke's cocked hat, in the shape of a perfect bird's-nest. The nest had been built on the crown of the Duke's head, and entrance to it was effected from under the ends of the great plume at the point of the hat. The dimensions of the hat are 4 feet long by 1½ foot high, the plume measuring 3 feet across, and the head and hat weighing about half a ton. It was found by Colonel Close on inspection that the monument had been cast in a great many pieces, four of which were riveted together with bolts, the others being forged together at the foundry, and therefore not being capable of division without injury to the work. The four riveted portions were the head and body of the Duke, and the head and tail of the horse. Before these were divided it was necessary to find the position of the bolts from inside. A workman of medium size was hoisted for this purpose up to the neck, now bereft of the head, and he, with the greatest ease, slipped through the Duke's collar into the hollow bodies of the rider and the horse. He found plenty of room to stand up and walk about inside with freedom. The body of the Duke, he found, was joined a little below the sword-belt, the horse's head from the withers to a point above the breast-plate in front, and the tail at the crupper. Throughout the metal was not less in thickness than half-an-inch, in some places being as much as 2½ inches thick. The legs of the horse were solid, in order to support the weight of the statue, computed in all at 30 tons. The whole monument, with the exception of the plume, which is of copper, is made of gun-metal of rather inferior quality, being that of guns captured by the Duke in his various engagements. The workmen have since been engaged in cutting the serews which held the trunk of the Duke to the horse's back, and on Saturday it is believed that the work will have advanced sufficiently to allow of its being taken down. When this has been completed, the horse will be turned upside down and placed on its back on a specially constructed truck now being built at Woolwich Arsenal. This will have to bear a weight of over 18 tons. It will be fully a month before the monument is ready for starting for Aldershot, and it will be some time on the road, as a circuitous route will have to be taken to avoid weak bridges, hills, and archways. Mr. Boehm is busily engaged in modelling the new statue, but the work has not sufficiently advanced to permit inspection, though before it is cast it will be open to view. The spurs of the now partially-demolished statue, which were thought to have been lost, are in safe keeping at the Offices of the Board of Works. The statue will be re-erected outside the headquarters of the Aldershot garrison.—*The Architect.*

"Truth" AND THE ARCHITECTS ONCE MORE.—"I recently called attention," says London Truth, "to the fact of architects frequently obtaining a commission on goods supplied. It would seem, however, that architects have often themselves to give commissions. A letter from an architect to the solicitor of the Birkdale School Board was read at the meeting of the Board. The architect offered one and one-half per cent commission on any work given him. The solicitor submitted the letter to the clerk who replied to it." In his answer to this letter the architect says that he thought he was 'dealing with business men, and never expected such childish work,' and adds: 'I doubt if I am far wrong when I tell you that in ninety per cent of the cases in which an architect receives a commission from a solicitor, some return in some shape or other, is expected, if indeed not positively demanded.'

FOUNDATIONS IN QUICKSAND.



From AMIENS CATHEDRAL.
FRANCE. BUILDING NEWS.

MR. T. P. HOSEGOOD of the College of Practical Engineering, London, writes as follows to *Engineering*:—Mr. MacAlpine, the eminent American civil engineer, when last in this country addressed the pupils of this College in explanation of some of the expedients adopted by him in his prolonged and extensive practice. One of these was a mode employed at Albany in the preparation of the foundation for the capitol. The ground on which the structure is built consists of a rather soft blue clay, which suffers considerable compression from any heavy weight placed upon it: to obviate any disturbance from this cause Mr. MacAlpine first proposed to bore holes at equal distances in the clay, and to fill them up with sand, forming thereby sand-piles which were practically incompressible; but on further consideration it appeared to him that these piles might be dispensed with by taking the precaution to make the area of the foundation for every wall in the structure strictly proportionate to the weight which such foundations would have to sustain, so that the pressure per square inch of the foundations would be equal in every part; in such a case it was clear that though the building would sink somewhat, it would all sink equally, and so no damage would be done by the unequal settlement of the parts. This was the plan that was practically carried out, and it has been found to be in all respects successful.

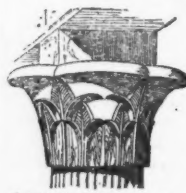
A still more difficult problem than this, however, is how to place a heavy structure on a quicksand which swallows up everything. It is well known that the beds of the Ganges and various other rivers in India are composed of quicksand, and the question arose in the construction of the East India Railway in what way a bridge could be carried across such a river, the bed of which is three miles wide.

The principal of this College, who was at the time one of the engineers of the railway, proposed a plan for the accomplishment of this object, which it may be useful to describe as a guide to others in similar cases.

The river, though 40 feet deep during the periodical floods dwindles to a small and shallow streams at other times of the year. The greater part of the bed is at such times dry, and the small stream of water which remains in the dry season can easily be diverted. It was proposed to run a row of sheet-piling of small depth and thickness across the river during the dry season, and another similar row 40 feet or 50 feet higher up the river forming a belt, say 50 feet wide from side to side on which belt the bridge was to be built. Perforated pipes were to be forced at short intervals into the quicksand, say to a depth of 30 feet or 40 feet, and through these pipes a solution of green vitriol was to be forced, which would convert the whole mass of quicksand to this depth into rock. There was a bill of green vitriol or iron barytes near at hand which could have been easily utilized for this purpose.

It appears to be a valuable suggestion, though so far little acted upon, to turn intractable soils into rock by the injection of an agglutination fluid, when the difficulty cannot otherwise be dealt with without great expense. Natural sandstones are thus formed by the infiltration of fluids containing either iron or lime, and probably a union of these substances would be preferable (as in Payne's process for preserving timber) to the use of either ingredients separately. The different fluids, however, in such case should be introduced through separate pipes, as if sent through the same pipes the openings would be promptly closed by the formation of sulphate of lime or gypsum.

THE DRY-PRESSING OF BRICKS.



CITIZEN'S DRY PRESSING MACHINE.
THE TRIPLEX & TAYLOR.

IT has been remarked that the manufacture of bricks out of wet brick-making clay involves a great expenditure of time and force; not only in preparing the rough clay for moulding, but also in the subsequent drying of the bricks. There are various disadvantages connected with this system of manufacture, the effects of which cannot be afterwards removed. Besides, there are the additional inconveniences of drying-places being necessary, of the dependence of working upon the weather, and of enforced inactivity during the winter. From these various grounds (the *Thonindustrie Zeitung* remarks) brick-makers have been long expressing a wish to be able to work the rough clay in a dry state, or in its natural condition of moisture, but the trials made in this direction do not seem to have produced results of an entirely satisfactory character, and eminent technical authorities have been forced to admit that the manufacture of serviceable bricks by the dry process is attended with important difficulties.

The relative failure of these experiments has been attributed to the description of presses used, and Herr von Mitzlaff expresses his

opinion (in the journal alluded to) that lever-presses are, as a rule, less suitable for the purpose indicated than hydraulic dry-presses; the reason being that the varying degrees of pressure required by each description of brick-making earth cannot be so easily regulated by the former method. This circumstance explains the fact that in some places favorable results have been obtained with lever-presses, while in others the contrary has been recorded. It is remarked that it is a common error to think that a very high pressure will always produce good bricks. On the contrary, different substances require various degrees of maximum pressure, and it is therefore necessary that machines of the description in question should be so constructed that their pressure can at all times be easily regulated.

There are some other points of importance referred to, viz:—

1. The speed with which the pressure is allowed to be exercised. According to observation, the nature of the material under treatment affects this question, and the machine should allow of its working in this respect being regulated.

2. The machine should have an appliance by means of which the air mixed with the raw material can easily escape during the pressing.

3. There must also be an appliance by which the material treated is brought to the press in as small pieces as possible, whether the same is dry or in its natural condition of moisture.

According to the statement of Herr von Mitzlaff improved hydraulic-presses have been placed in the Trotha-Sennowitz brick-works, and have produced results of an unexpectedly satisfactory character. The raw material is, even in winter, worked in the press, and the bricks are put at once into the ovens. The earth is reduced to small pieces, and mixed with the sand or other substance required. From the press the bricks are at once placed in the oven. In the first five weeks of these presses being in operation 400,000 bricks were made by relatively unskilled workmen.

The press consists of a table, which can be turned, in which there are six pairs of moulds. Of the latter two pairs are always being filled, two are under pressure, and two are being emptied of their contents. This process is automatic in its action. The press delivers twenty-six to thirty-two bricks per minute, according to the nature of the earth under treatment. Every brick is subjected to a double pressure, the first expelling of the air, and the second compressing the substance of the brick. There are besides two double-action pressure-pumps, and an accumulator connected with the machine. When once the pressure has been regulated it remains constant. About eight to ten horse-power is the amount of motive-power necessary.

The bricks produced have well-cut edges, and the lengthy process of drying in the air is avoided; the carrying on of manufacture being thus practicable at all seasons and in all weathers.

THE EFFLORESCENCE ON BRICKWORK.

ITHACA, N. Y., June 21, 1884.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—In my brief communication concerning efflorescence on brickwork, published in your issue of May 31st, supposing that your readers (at least those of them interested in this matter) would be familiar with the chemistry of the case, I omitted one or two words, the use of which might have prevented your more recent correspondent from failing to see the point I wished to make. Allow me to amend the second sentence of my note so that it may read as follows, the italicized words being interpolated to make my meaning clear. "The clay evidently contains some *insoluble* compound of soda, which, in the process of burning, is converted into *soluble* sulphate by sulphur existing in the coal-dust." Any one can now see, I think, that the coal-dust is the cause of the trouble.

I must object to your correspondent's attributing to me any such unscientific expression as "coal-dust combined with soda."

As to the remedy which he proposes, I beg leave to state that, whatever may be the case in Boston, in these rural districts muriatic acid will not "neutralize," or decompose, sulphate of soda, or sulphate of anything, as every chemist knows. Plain water will wash it off, as any body may ascertain by trying it.

I proposed to head off the trouble by removing its cause. Your correspondent's method of preventing it, by a coat of oil, from manifesting itself is an excellent one.

Yours truly,

CHAS. BARCOCK.

NOTES AND CLIPPINGS.

HOW TO MEASURE AN ALTITUDE EMPIRICALLY.—*Woods and Forests* (English) says: "Any person, however ill informed, might easily get at the exact height of a tree when the sun shines, or during bright moonlight, by marking two lines on the ground, three feet apart, and then placing in the ground on the line nearest to the sun a stick that shall stand exactly three feet out of the soil. When the end of the shadow of the stick exactly touches the furthest line, then also the shadow of the tree will be exactly in length the same measurement as its height. Of course in such a case the sun will be at an exact angle of 45°. Measurements of this character could be best effected in the summer, when the sun is powerful, has reached to a good height in the heavens, and when the trees are clothed with living green so as to cast a dense shadow. To many whom this idea may not have occurred, it might be made annually a matter of interest thus on warm summer days to take the height of prominent trees, and so to compare growth from year to year."

EXCAVATION AT AFROSIAD.—An ancient city, supposed to be the mythical Afrosiad of Arabian legend, has been partially excavated by Mr. Kretsovsky, of the Russian Archaeological Society. The site is near Samarcand, and shows alternate layers of moulds containing remains and dense clay containing deposits by water. The lowest layers show rude stone and clay utensils, but on the upper levels are found articles belonging to higher civilizations. "It is remarkable," says the *Athenaeum*, "that elegant glass articles are found at a great depth, while they disappear near the surface, evidencing a very early knowledge of the material and its subsequent disuse." The allusions to Afrosiad indicate an antiquity equal to the time of Moses.

HOW FANEUIL HALL WAS BUILT.—It may not be generally known that the almost idealized old "Cradle of Liberty," Faneuil Hall, was built through funds secured by lottery. The old building given to the city by Peter Faneuil was destroyed by fire in 1764, and as the town at that time regarded itself as too poor to rebuild, it was decided to make application to the General Court for authority to raise funds by lottery for the purpose. The authority was granted, and the lottery was established. The following is a copy of one of the successful tickets in the lottery that was held:—

Faneuil Hall Lottery, No. Five.

BOSTON, June, 1765.

The possessor of this ticket (No. 4095) is entitled to any prize drawn against said number in a lottery granted by an act of the General Court of the Province of Mass. Bay for the rebuilding Faneuil Hall subject to no deduction,

G. JOHN HANCOCK.

It was regarded as necessary, of course, that there should be no suspicion of dishonesty attaching itself to one of those in charge of the lottery, so John Hancock, then the most eminent merchant in Boston, was selected to have supervision of it. Fifteen per cent more tickets were issued than the prizes called for, but it was understood that no discount should be made on the prizes. The tickets that drew prizes were retained as vouchers while the blanks were destroyed. The above ticket was held by Lois Bleigh, and represented a prize drawn.—*Boston Traveller*.

THE BROADWAY UNDERGROUND RAILROAD SCHEME.—Although Governor Cleveland vetoed the Broadway Arcade Railroad bill, the projectors of the scheme for an underground railroad under the principal thoroughfare of this city have not abandoned their project entirely. Melville C. Smith, President of the Broadway Underground Railroad Company, at 115 Broadway, said recently to a reporter: "The old charter, which was purchased by myself and my associates in December, 1880, and the following winter, for a tunnel road, is undoubtedly available at the present time, and the money can be raised to build the road. The charter was extended by a bill which was signed by Governor Cornell, and it covers the route from the Battery under Broadway to Fifty-ninth Street, and thence north, with a branch under Madison Square and Madison Avenue to the Harlem River. This gives the company the right to excavate within eighteen inches of the sidewalk, and the company have also the right to put down as many tracks as the space will allow. It will not be as desirable to the public as the arcade, and of course, will confer far less advantage on property-holders along the route, as it gives no accommodation for way-travel. As, however, a few misguided property-owners have seen fit to contend against the better plan—by that I mean the arcade plan—the company must proceed with the tunnel under the old charter. The engineers are working at present to that end, and my lawyers are also contributing their skill to the scheme, which I trust will shortly be under way."—*The Iron Age*.

PNEUMATIC AND CHEMICAL EXTINGUISHERS.—A correspondent asks us to tell him the difference between a pneumatic extinguisher and a chemical extinguisher, the former not having yet been introduced in his locality. The chemical extinguisher is a metal tank in which there is a solution of soda. A quantity of acid is held in some convenient receptacle, generally a glass bottle inside the tank, which, being turned into the solution of soda, generates carbonic-acid gas by the mingling of the chemicals. A pressure is thus created which serves to project the liquid and the gas to a considerable distance. Carbonic-acid gas is a sure extinguisher of fire when applied in even moderate quantities. The pneumatic extinguisher consists of a similar tank, inside of which is a small air-chamber; into this inner chamber air is forced by a pump until it is compressed several atmospheres. The space surrounding the air-chamber is then filled with a chemical compound which, on being brought in contact with heat, evolves carbonic-acid gas. The pneumatic has an indicator that shows how much pressure there is in the air-chamber; when the machine is needed for service the air is permitted to escape from its confinement, and, being exceedingly elastic, exerts a pressure upon the compound sufficient to force it from the tank about the same distance a chemical can throw—thirty or forty feet. When these machines were first invented great difficulty was found in holding the air in the air-chamber, but this has been overcome; the gauge at all times indicates the amount of pressure, and so long as there is any it will, of course, project the stream. Water may be used instead of the compound if desired, but this is claimed to be far ahead of water in putting out fires. To state it briefly, the chemical extinguisher is dependent upon a gas generated within it for the pressure required to project a stream composed of fire-extinguishing chemicals; the pneumatic extinguisher depends upon compressed air, confined in an interior air-chamber, for a pressure with which to project either a chemical compound or plain water. Both kinds accomplish their purpose, which is to supply a small stream instantly for the extinguishment of incipient fires, and they have proved to be valuable auxiliaries to the other apparatus of fire departments. The same principle is applied to large machines, and nearly all the prominent fire departments have chemical engines which render excellent and important service. The pneumatic principle as applied to extinguishers is comparatively new, it being but five or six years since the first of them were introduced.—*The Fireman's Journal*.

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

- 300,343. PROTECTING PILES. — Jacob A. Camp, Sandusky, O.
 300,347. FIRE-ESCAPE. — Matthew C. Corrigan, Holyrood, Kans.
 300,350. GRAINING COMPOUND. — William Henry Dow, Burlington, Vt.
 300,374. WALL-PAPER, PAPER-BOARD, ETC. — Henry W. Johns, New York, N. Y.
 300,387. KEY-FASTENER. — Robt. T. Miller, Covington, Ky.
 300,388. VISE. — Alphonse Montant, New York, N. Y.
 300,393. LOCK. — Emery Parker, New Britain, Conn.
 300,395. FOLDING STAIRS. — Theodore Peterson, Boston, Mass.
 300,399. PLANE. — Solon R. and Arthur E. Rust, Pine Meadow, Conn.
 300,407. PILE-DRIVER. — Thomas Tanguay, New York, N. Y.
 300,423. TOOL FOR SPLITTING STONE. — Warren W. Wild, Lee, Mass.
 300,464. COMPOUND MATERIAL FOR THE MANUFACTURE OF SHEETS, BOARDS, BLOCKS, ARTIFICIAL WOOD, ETC. — Levi Haas, Chester, Pa.
 300,465. FIRE-ESCAPE. — Thomas Hale, Claydon, County of Suffolk, Eng.
 300,474. DOOR-HANGER. — Warren Ide, Medina, N. Y.
 300,498. FIRE-ESCAPE. — Howard Paddock and Herman Walter Miller, Albany, N. Y.
 300,499. DOOR-LATCH. — Henry Parkin, Albert Terrace Bow, and Charles James Reynolds, Downs Park Road, Clapton, County of Middlesex, England.
 300,521. TILE OR BRICK FOR FLOORS, ETC. — Thos. C. Smith, Brooklyn, N. Y.
 300,536. MEANS FOR UNITING WOOD. — Albert H. Walker, Brooklyn, N. Y.
 300,540. SUPPLY-VALVE FOR WATER-CLOSETS, ETC. — Henry Cory Weeden, Boston, Mass.
 300,541. SAFETY-CATCH FOR ELEVATORS. — Frank Arthur Weeks, Enniskillen, Ontario, Can.
 300,552-553. PLUG FOR BOWLS AND BATH-TUBS. — Jas. D. Bacon, Boston, Mass.
 300,556. BRICK-MACHINE. — Henry C. Barker, Sedalia, Mo.
 300,580. COMPOUND FOR THE MANUFACTURE OF ARTIFICIAL STONE. — Hermann Bening, New York, N. Y.
 300,582. WINDOW-SCREEN. — Nicholas J. Bishoprick, Brooklyn, N. Y.
 300,581. FIRE-PROOF BUILDING. — William H. Dolman, Brunswick, Me.
 300,589. COMPOUND AND SELF-ACTING PLUG-VALVE FOR WASH-BASINS. — Thomas P. Ford, Jr., Brooklyn, N. Y.
 300,607. ANNUNCIATOR. — Robert Josephus Hewett, St. Louis, Mo.
 300,622. FIRE-ESCAPE. — George W. Mickle, Amherstburg, Ontario, Can.
 300,626. DISINFECTING AND CLEANSING WATER-CLOSETS. — Charles F. Pike, Philadelphia, Pa.
 300,654. AREA-WINDOW PROTECTOR. — Joseph F. Smith, Pittsburgh, Pa.
 300,663. CHIMNEY-CAP. — David Clinton Trester, Anamosa, Iowa.
 300,677. ELEVATOR-GATE ATTACHMENT. — Isaac K. Beekman, Dubuque, Iowa.
 300,694. SASH-FASTENER. — Osborne R. Cook, Salem, O.
 300,717. WRENCH. — Frank Waldo Merriek, Sandusky, O.
 300,725. VENEER-PRESS. — Augustus Newell, Chicago, Ill.
 300,729. FIRE AND WATER PROOF COMPOUND. — Oscar F. Parsons, Eureka, Iowa.

SUMMARY OF THE WEEK.

Baltimore.

- CHURCH. — Frank E. Davis, architect, is preparing plans for the Methodist Protestant church and chapel, cor. Gilman St. and Lafayette Ave., of stone, 60' x 100'; style, Gothic; seating capacity, 500 each; and to cost, \$25,000.
 DWELLINGS. — Henry Brauns, architect, has prepared drawings for James Boyce, Esq., for 5 three-story brick dwellings, with Chest River stone and terra-cotta finish, to be built on Charles St., bet. Lanvale and Townsend Sts., on lot 85' x 120', and to cost, \$25,000.
 Francis White, Esq., is to have built a three-story brick and stone house, 45' x 100', on w s St. Paul St., near Chase St.; to cost, \$50,000; from designs by Charles L. Carson, architect.
 WAREHOUSE. — Jackson Holland, builder, is to build a five-story warehouse of brick and stone on Fayette St., near Liberty St., 29' x 100'; to cost, \$12,000; from designs by Frank E. Davis, architect.
 BUILDING PERMITS. — Since our last report twenty-one permits have been granted, the more important of which are the following: —
 Bridget Ward, three-story brick building, e s Hanover St., n First Ave.
 Jas. E. Clayton, three-story brick building in rear of Nos. 111 and 113, e s Gay St., bet. Front and High Sts.
 John J. Schafer, three-story brick building, w s Har-

ford Ave., near cor. Townsend St.; and 3 two-story brick buildings, n s Townsend St., w Harford Ave.
 Chas. H. Callis, 7 two-story brick buildings, w s Jefferson St., commencing n w cor. Castle St.; and 18 two-story brick buildings, w s Castle St., bet. Jefferson and McElerry sts.

Wm. Bahke, three-story brick building, w s Ann St., n Eager St.
 Thos. Fairley, 2 two-and-one-half-story brick building, e s Druid Hill Ave., bet. Dolphin and Lanvale Sts.

Peter Melce, three-story brick building, w s Bethel St., bet. Lancaster and Aliceanna Sts.

Boston.

BUILDING PERMITS. — Brick. — Washington St., cor. South May St., Ward 17, for L. R. Cutler, tenement, 30' x 40' and 40' x 80', five-story; tenement and stores, 45' x 40' and 50' x 93', five-story; tenement, 20' x 41' 30' and 30' x 86', five-story; F. A. Richardson, builder.
 Ball St., No. 6, Ward 19, for J. H. T. Adams, dwell., 18' 6" x 32', three-story flat; J. W. Coburn & Co., builders.

Ruggles St., No. 99, Ward 19, for J. H. T. Adams, dwell., 18' 6" x 32', three-story flat; Timothy Connelly, builder.

Parker St., No. 971, cor. Bieford St., Ward 22, for City of Boston, primary school, 74' 8" x 76' 8", two-story pitch; Woodbury & Leighton, builders.

Wood. — Taylor St., rear, near Water St., Ward 24, for Albert T. Stearns, mechanical, 37' 6" x 67' 6", two-story flat; A. T. Stearns Lumber Co., builders.

Engfield St., near Spring Park Ave., Ward 23, for Elizabeth Urban, dwell., 19' x 26', two-story pitch; Jacob Luppold, builder.

Adams St., cor. Chestnut Hill Ave., Ward 25, for Mabel C. Bucall, 2 dwells., 29' x 26' 6" and 32' x 42', two-story pitch; Jackson Dowling, builder.

Forest Hill Ave., rear, near Norfolk St., for N. Y. & N. E. R. R., passenger-station, 9' 6" x 29' 30", one-story pitch.

Adams St., cor. Pierce Ave., Ward 24, for A. C. Drake, dwell., 20' and 26' x 28', two-story pitch; A. C. Drake, builder.

Adams St., opposite Robinson St., Ward 24, for F. & W. Simpson, dwell., 30' x 32', two-story pitch; John Early & Son, builders.

Gold St., Nos. 180 and 182, Ward 1, for J. S. Hilliard, 2 dwells., 27' x 40', two-story flat.

Medford St., No. 109, Ward 3, for Edmund Keyes, storehouse and stable, 30' x 50', three-story flat.

West First St., No. 304, Ward 14, for Isabella K. Jarvis, storage, 22' x 43', one-story flat; Richardson & Hatch, builders.

Barker St., No. 292, rear, Ward 1, for Boston Dye-wood & Chemical Co., storage, 50' x 90', one-story flat; Leonard Pickering, builder.

Amory St., cor. Boylston St., Ward 23, for Boylston Congregational Church Society, church, 6' and 80' x 100', one-story pitch; Mead & Mason, builders.

James St., rear, Ward 18, for N. E. Conservatory of Music, storage, 35' x 50', one-story flat.

Maxwell St., near Milton Ave., Ward 23, for Millett H. Jackson, dwell., 27' 10" x 29' 5", two-story pitch; Millett H. Jackson, builder.

Keyes St., No. 57, Ward 23, for Ferdinand Kiley, stable, 15' x 18' and 15' x 18' 6", one-story pitch; Donald McDonald, builder.

Washington St., near Beach St., Ward 23, for Owen Mullen, dwell., 24' x 30', two-story pitch; Alexander Rogers, builder.

Whitney St., No. 34, Ward 22, for Patrick Nolan, carriage-shed, 16' x 16', one-story flat; Patrick Nolan, builder.

Roslin Ave., cor. Norfolk St., Ward 27, for Amos W. Staten, dwell., 20' x 28', two-story pitch; Swanson & Murray, builders.

Sayward St., near Birch St., Ward 20, for W. H. Sayward, 2 dwells., 16' x 22' and 28' x 34' and 16' x 19' and 20' x 36', two-story pitch; W. H. Sayward, builder.

Sheridan St., No. 41, Ward 23, for Thos. B. Hall, dwell., 24' x 30', two-story pitch; Black & Cox, builders.

Unnamed St., near Washington St., Ward 24, for Edward F. Dunham, dwell., 22' x 40', three-story flat; M. McLaughlin, builder.

Pratt St., near Linden St., Ward 25, for Isaac Pratt, Jr., dwell., 20' and 26' x 30', two-story pitch.

South St., cor. Skinner St., Ward 23, for W. A. Kingsbury, dwell., 18' x 22' and 22' x 30', two-story pitch; W. A. Kingsbury, builder.

Brooklyn.

BUILDING PERMITS. — Sullivan St., No. 66, e s, 200' n Richards St., three-story frame tenement, tin roof; cost, \$4,880; owner, Franklin W. Teller, 68 Sullivan St.; architect, John Smyth; builders, John Codey and Daniel J. Lynch.

Fifty-fifth St., e s, 325' 6" n Third Ave., 2 two-story and basement frame dwells., tin roofs; cost, for both, \$4,900; owner, Simon Stiner, 363 West Thirty-second St., New York; architects, Spencer Bros.; builders, J. Crouch and Spencer Bros.

Third St., w s, 100' n North Eighth St., three-story brick dwell., tin roof; cost, \$8,000; owner, Patrick Dalton, 381 Third St.; architect, Thos. F. Houghton; builder, John C. Leahy.

Coles St., No. 11, four-story brick store and tenement, tin roof; cost, \$7,000; owner, Mrs. M. J. Cameron, on premises; architect, Geo. Damen; builder, T. McQuinn.

Broadway, e s, 60' n Furman Ave., 2 three-story frame stores and dwells., tin roofs; cost, for both, \$7,250; owner, Lucas Bridenstine, 16 Grand St., New York; builder, Jacob Pirrung.

Hoyt St., e s, 25' s Warren St., 3 four-story stores and tenements, gravel roofs; cost, each, \$7,500; owner, L. Q. Buckley, 146 Sixteenth St.; architect, W. J. Coots; builders, Assip & Buckley.

Monroe St., s s, 475' s Tompkins Ave., 14 three-story brown-stone dwells., tin and slate roofs; cost, each, \$5,500; owner, etc., John F. Ryan, 187 Hewes St.

Twelfth St., s s, 200' e Fourth Ave., 3 two-story and basement brick dwells., tin roofs; cost, for all, \$11,000; owner, Chas. Hagedorn, Thirteenth St., bet. Fourth and Fifth Aves.; architect and builder, Edwin C. Squance.

Bushwick Ave., No. 105, three-story frame tenement, tin roof; cost, \$4,200; owner, Leopold Fritz, on premises; architect, F. Holmberg.

Flushing Ave., No. 1013, three-story frame store and tenement, tin roof; cost, \$4,300; owner and builder, Wm. Hellman, 47 Bogert St.; architect, Frank Holmberg.

Washington St., w s, 60' n Johnson St., four-story brick building for business purposes; cost, \$25,000; owners, T. A. & L. F. Newman, 305 Fulton St.; architect, John Mumford; builders, Cornelius Cameron and John Lee.

Gates Ave., n s, 165' e Marcy Ave., 3 four-story brick stores and flats, tin roofs, wooden cornices; cost, each, \$10,000; owner and builder, W. H. Aldrich, 1000 Fulton St.; architect, Robt. Dixon.

Stagg St., s s, 150' w Bushwick Ave., three-story frame tenement, tin roof; cost, \$3,300; owner, John Hoer, 225 Stagg St.; architect, E. Schrempf; builders, Caspar Wahler and C. Wieber.

Evergreen Ave., e s, 50' n Myrtle St., three-story frame tenement, tin roof; cost, \$4,200; owner and architect, George Schoener, 93 Myrtle St.; builders, Caspar Wahler and John Rueger.

Meeker Ave., No. 94, s s, three-story frame tenement, tin roof; cost, \$5,000; owner, Thomas Hunt, 88 Meeker Ave.; architects and carpenters, Sammis & Bedford; masons, Doyle & Brazil.

Devoe St., No. 239, n s, three-story frame dwell., tin roof, cost, \$4,500; owner, Cath. Lehr, on premises; architect, Th. Engelhardt; builders, Chas. Da-huken and John Schneider.

Debevoise St., No. 80, s s, 200' e Humboldt St., three-story frame tenement, tin roof; cost, \$3,500; owner, Henry Stock, 31 Debevoise St.; builder, Jos. Wagner.

Stockton St., Nos. 332-342, s s, 125' w Lewis Ave., 5 three-story frame tenements, tin roofs; cost, \$4,900 each; owner and builder, George Straub, 11 Lewis Ave.; architect, Th. Engelhardt.

Manhattan Ave., No. 153, w s, 95' s Norman Ave., three-story frame store and tenement, felt and gravel roof; cost, \$5,000; owner, Wm. Hind, 151 Manhattan Ave.; architect, Israel Pappas; builders, S. Harrison and John Falton.

Broadway, s e cor. Fourth St., six-story iron front store and factory, tin roof; cost, \$85,000; owner, Edward Smith; architect, W. H. Gaylor; builders, Lamb Bros. and Jenkins & Gillies.

Ewen St., s e cor. Stagg St., rear front on Stagg St., 2 four-story brick tenements, tin roofs; cost, each, \$13,000; owner, Mrs. S. M. Travis, cor. Ewen and Stagg Sts.; architect, Geo. P. Chappell; builder, W. J. Conway.

Seventeenth St., n s, 150' e Eighth Ave., 3 three-story brick tenements, tin or gravel roofs, wooden cornices; cost, each, \$5,000; owner, I. H. Herbert, 141 1/2 Monroe St.

George St., No. 22, s s, 225' e Evergreen Ave., three-story frame tenement, tin roof; cost, \$4,500; owner, John Geyer, 20 George St.; architect, Th. Engelhardt; builder, Wm. Hellman.

South Fourth St., s s, 100' e Fourth St., two-story and basement school, tin roof; cost, \$4,000; owner, St. Leonard's Academy, South Fourth St., near Fourth St.; architect, Thos. F. Houghton.

Trouman St., s s, 100' e Evergreen Ave., 2 three-story frame tenements, tin roofs; cost, \$4,600; owner and builder, M. Dechler, Evergreen Ave., near Jefferson St.; architect, J. Platte.

Van Brunt St., s w cor. William St., 3 four-story dwells., tin roofs; cost for all, \$25,000; owner, Mat-rild Livingston, 17 Broadway, New York; architect, Mortimer C. Merritt; builder, Ruel Van Brunt.

Twelfth St., s s, 450' e Seventh Ave., one-story brick electroplating establishment, iron roof; cost, about \$3,000; owner, etc., Ansonia Clock Co., Seventh Ave., cor. Twelfth St.

Ten Eyck St., n s, 54' e Bushwick Ave., two buildings, one as a kitchen and laundry, and the other as coroner's office, morgue, etc., and boiler-house, slate and tin roofs; cost, \$20,000; owner, St. Catherine's Hospital, Bushwick Ave., cor. Mauger St.; architect, Wm. Schiele; builder, Ulrich Maurer.

Lafayette Ave., s s, 370' e Broadway, two-story frame dwell., tin roof; cost, \$3,400; owner, Amalia Johun, 20 Suydam St.; architect, H. Vollweiler; builder, Samuel W. Post.

Sumner Ave., s w cor. Stockton St., three-story frame store and tenement, tin roof; cost, \$6,000; owner, Michael Jacobs, cor. Park and Sumner Aves.; architect, George R. Dietrick; builder, C. Dietrick.

River front, Warren St., Congress St., 2 five-story brick warehouses, gravel roofs; cost, each, \$25,000; owner, Jeremiah P. Robinson, 6 Montague Terrace.

Middleton St., n s, 175' w Broadway, 5 three-story frame tenements, tin roofs; cost, each, \$4,300; owner, Jakob Bossert, 233 Lynch St.; architect, J. Platte; builder, J. Auer.

ALTERATIONS. — Third St., No. 38, add two stories to extension, interior alterations, etc.; cost, \$4,000; owner, Mrs. Helen M. Oldner, 86 South Ninth St.; architect, E. F. Gaylor; builders, M. Smith and R. B. Ferguson.

Court St., No. 427, cor. Third Pl., four-story brick extension; cost, \$6,000; owner, Wm. H. Middendorf, on premises; architect, J. W. Bailey; builders, J. Cody and P. P. De Bow.

South Fifth St., No. 216, three-story brick extension, also interior alterations, etc.; cost, \$3,500; owner, Mrs. A. M. Griswold, on premises; architect, J. G. Glover; builder, not selected.

Clinton Ave., No. 232, three-story brick extension, tin and copper roof; cost, \$15,000; owner, Chas. Pratt, on premises; architects, Stargis & Brigham; builder, Morris Building Co.

Clinton Ave., No. 249, e s, between Willoughby and De Kalb Aves., two-story brick extension, tin roof; cost, \$3,500; owner, Frederick A. Schroeder, on premises; architect, W. A. Mundell; builders, C. Cameron and T. B. Jacobs.

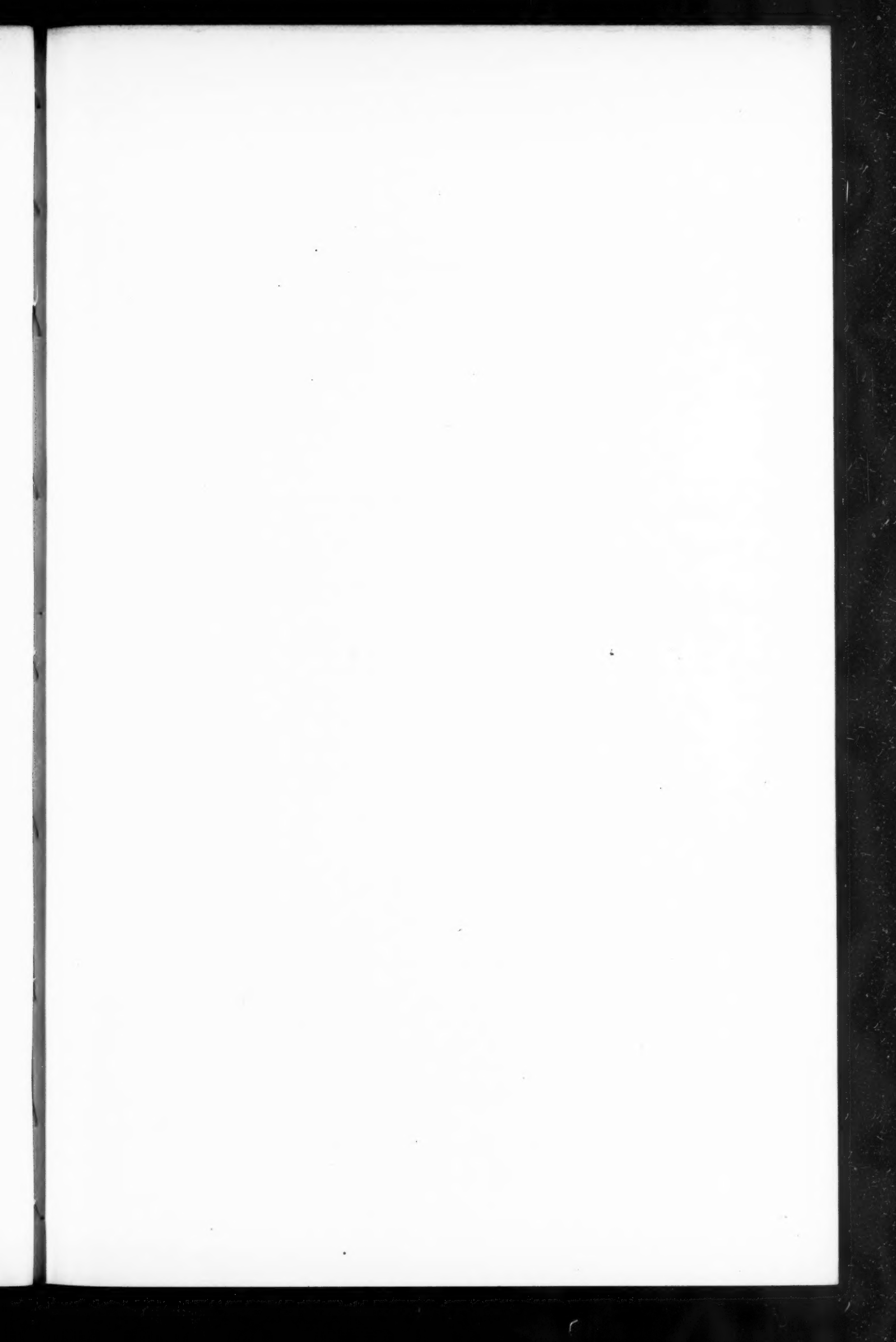
Chicago.

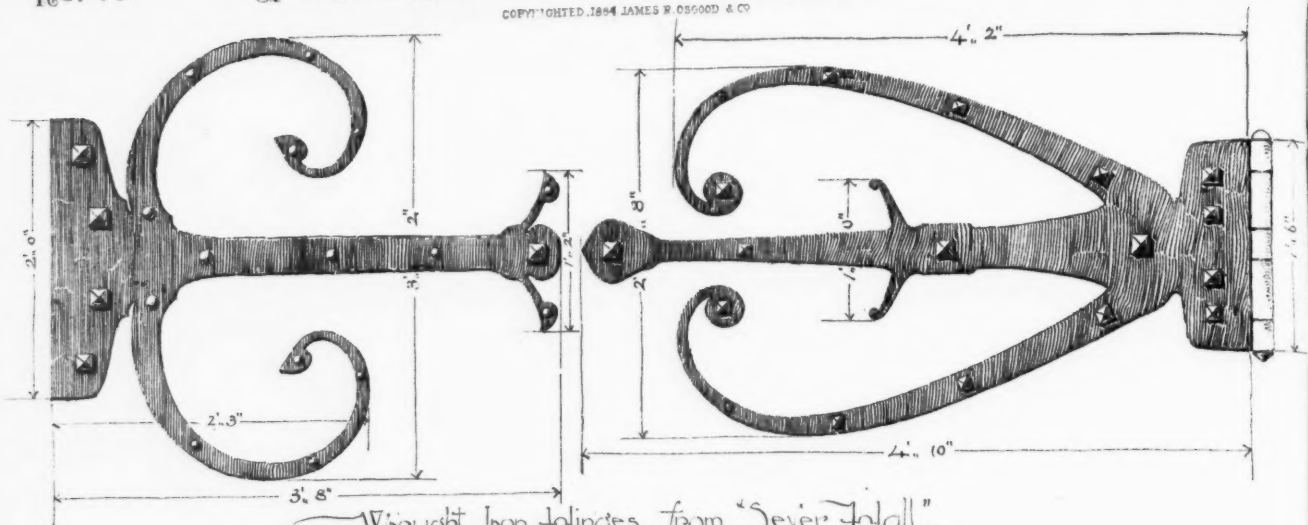
BUILDING PERMITS. — W. J. Ricker, 4 one-story cottages, Dashiell St.; cost, \$3,000.

W. J. Ricker, 4 one-story cottages; cost, \$3,000.

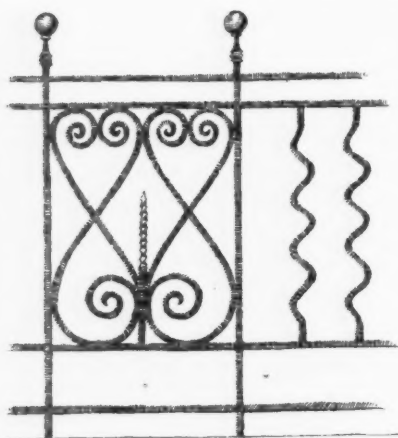
The Board of Education, four-story school-house, Rockwell St.; cost, \$14,000; architect, J. J. Flanders; builders, Peterson & Delaty.

Mrs. M. Rodgers, two-story dwell., 651 Taylor St.;

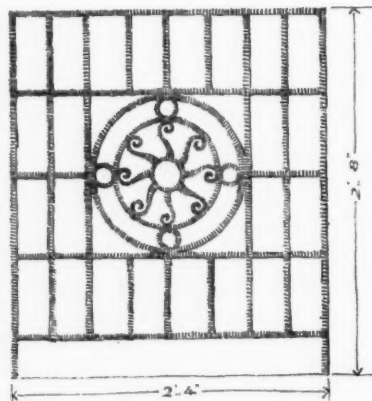




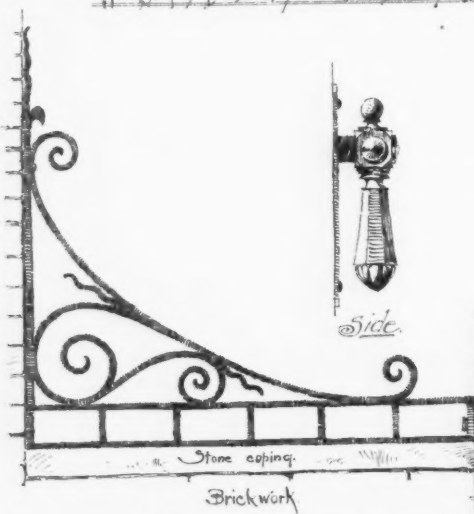
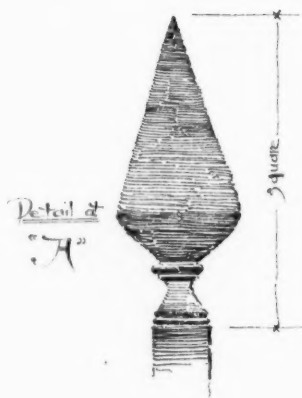
Wrought Iron hinges from "Sever Hall."
Harvard College, Cambridge.



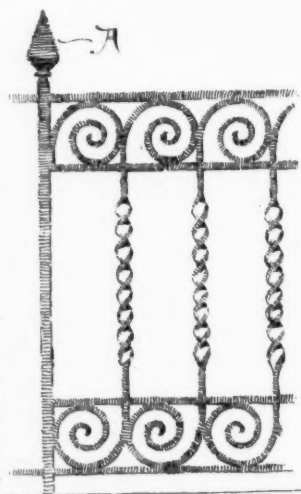
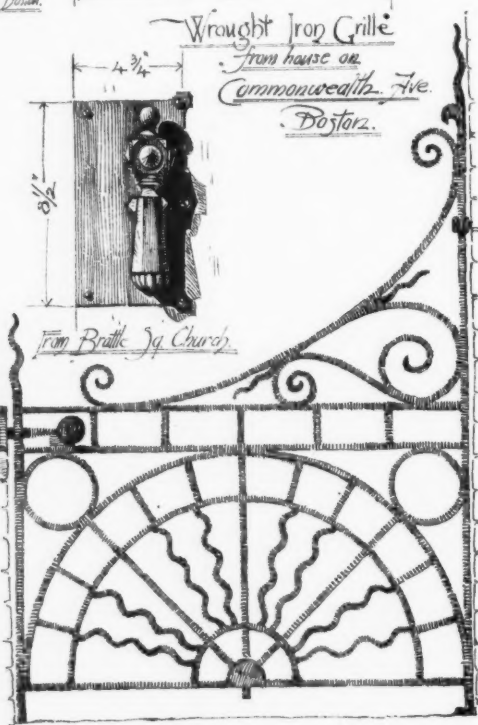
Wrought Iron Balustrade from House on Newbury St. Boston.



Wrought Iron Grille
from house on
Commonwealth Ave.
Boston.



Wrought Iron Gate &c.
from house
on Marlborough & Fairfield Sts.,
Boston.



Wrought Iron Balcony Rail
Commonwealth Ave.
Boston.

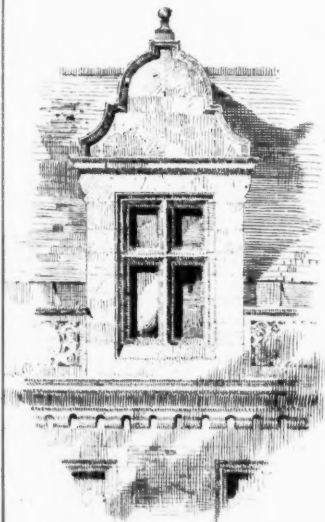
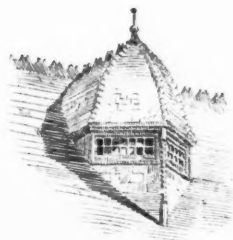
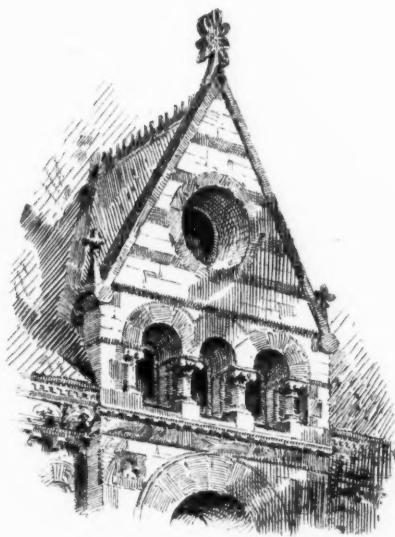
MAY 1st '83



Scraps of Ironwork from about Boston.

Measured and drawn by J. Sims Townbridge.

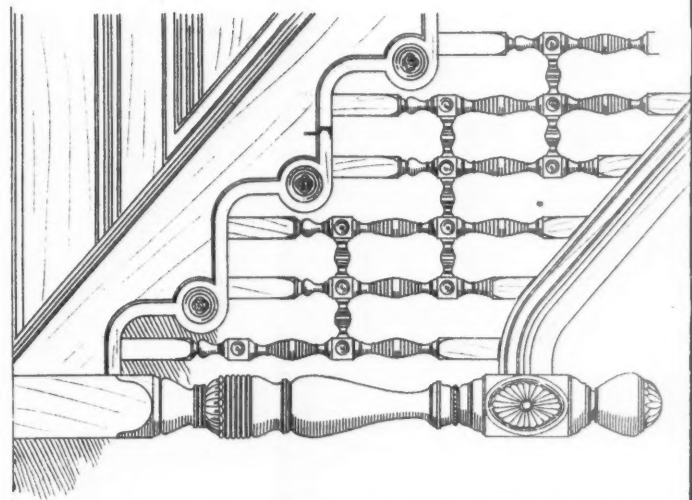
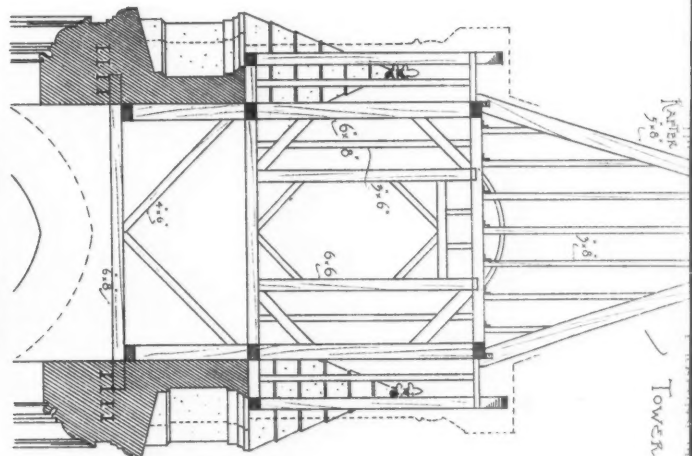
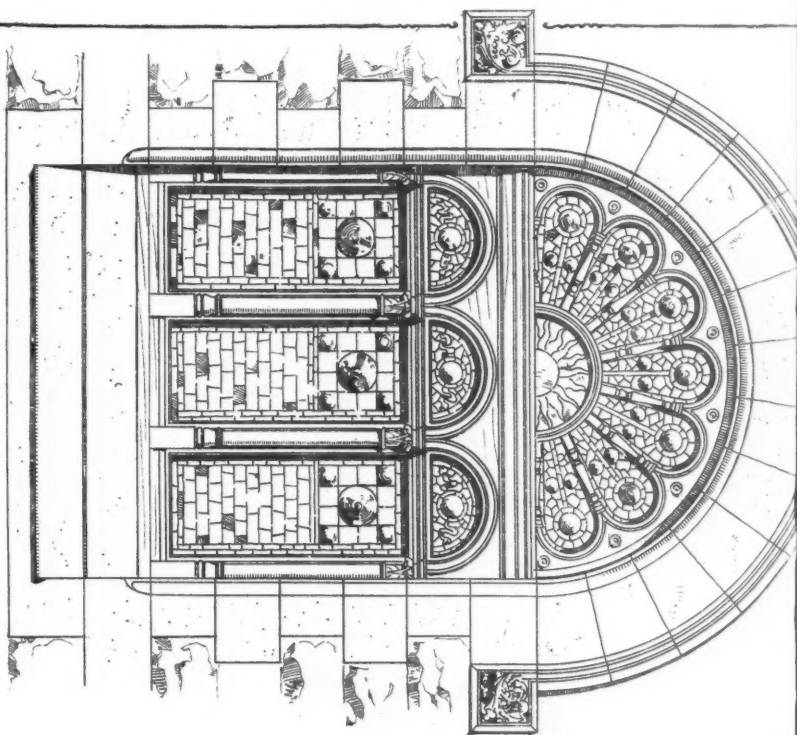




Some Boston Dormers



Sketches by
A. O. E. Kneer
A. T. O. S.



MADISON AVENUE M.E. CHURCH,

A Few Ends.

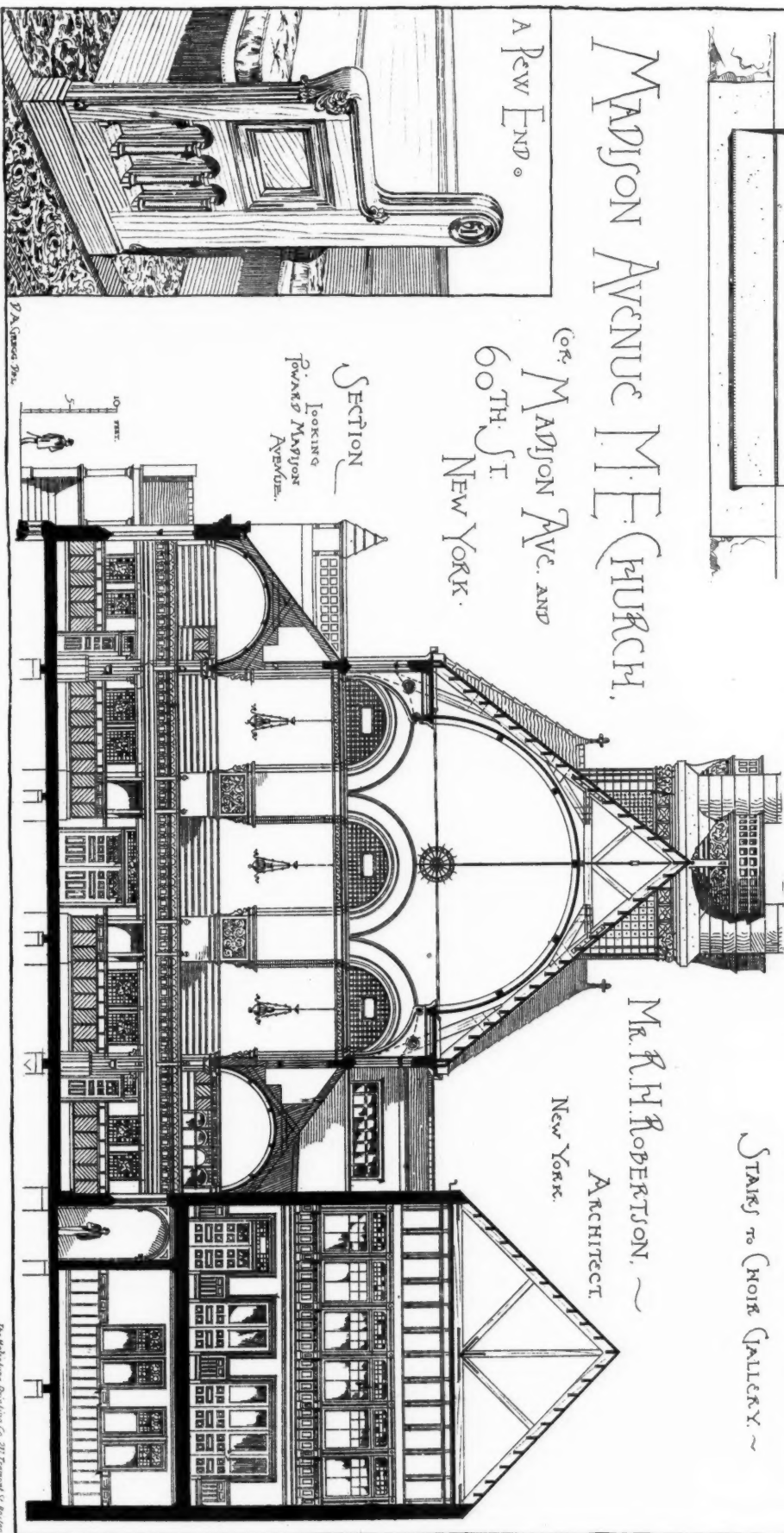
Cor. Madison Ave. and
60th St.
New York.

MR. R. H. ROBERTSON, ~
Architect
New York.

STAIRS TO CHOIR GALLERY ~

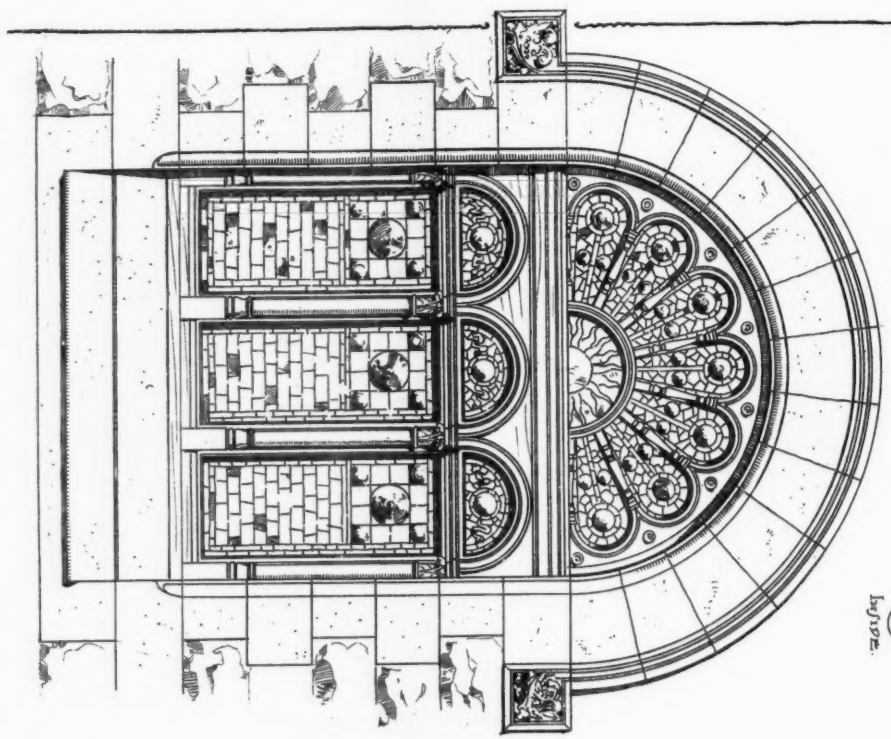
SECTION

Looking
Toward Madison
Avenue.

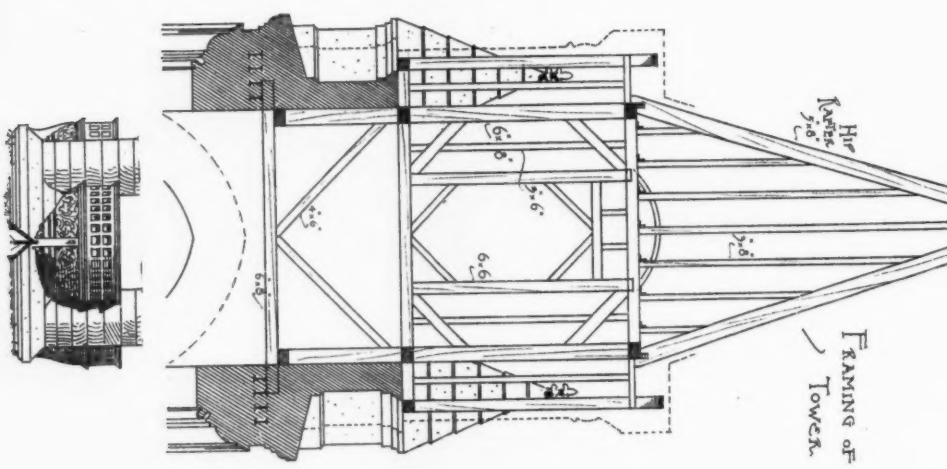


COPYRIGHTED 1883 JAMES R. DODD & CO.

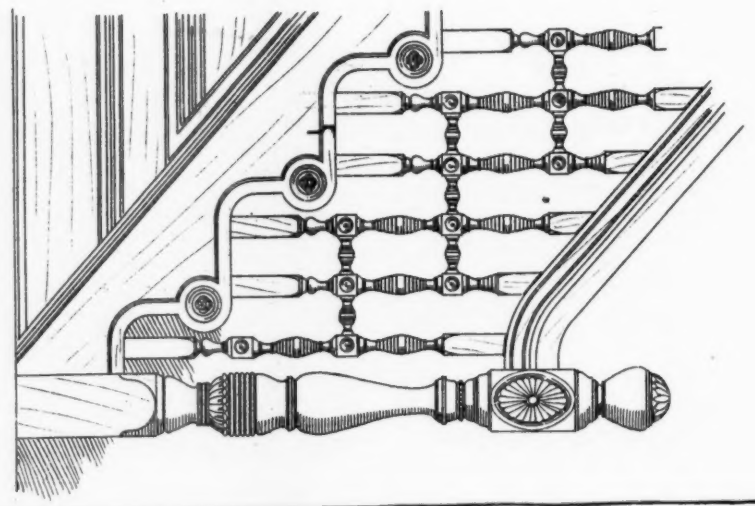
AILE WINDOWS, ON 60TH ST.

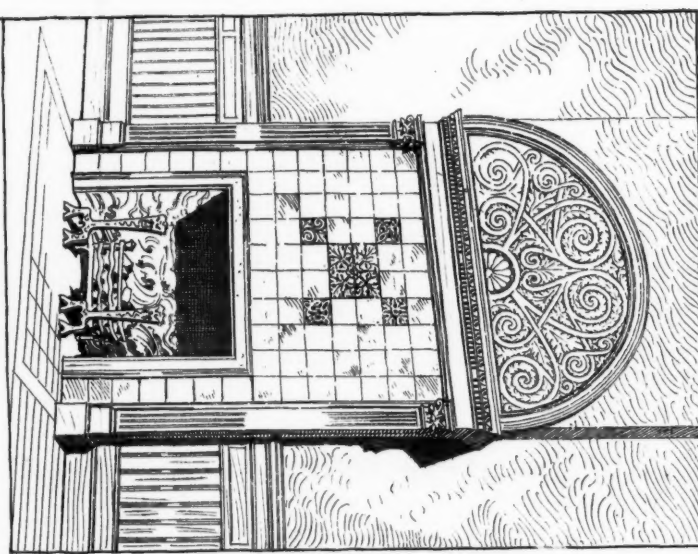


FRAMING OF
TOWER



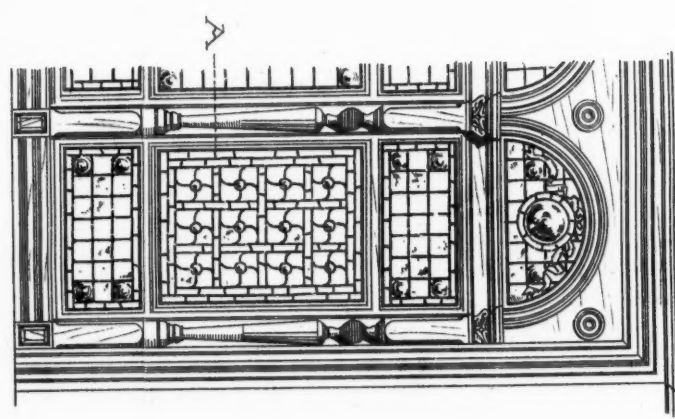
STAIRS TO MOIR GALLERY ~



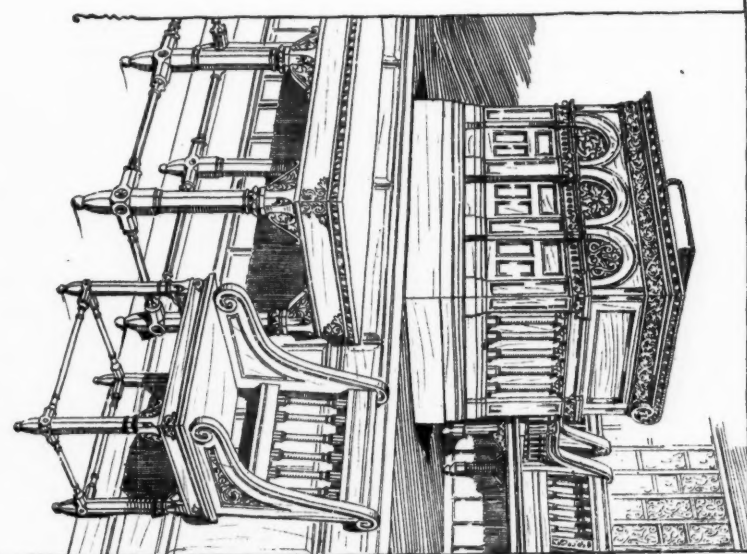


MANTEL IN SUNDAY SCHOOL ROOM.

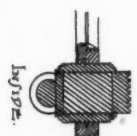
AVILE WINDOW, ON 60TH ST



INSIDE ELEVATION OF
CELESTIAL WINDOWS.

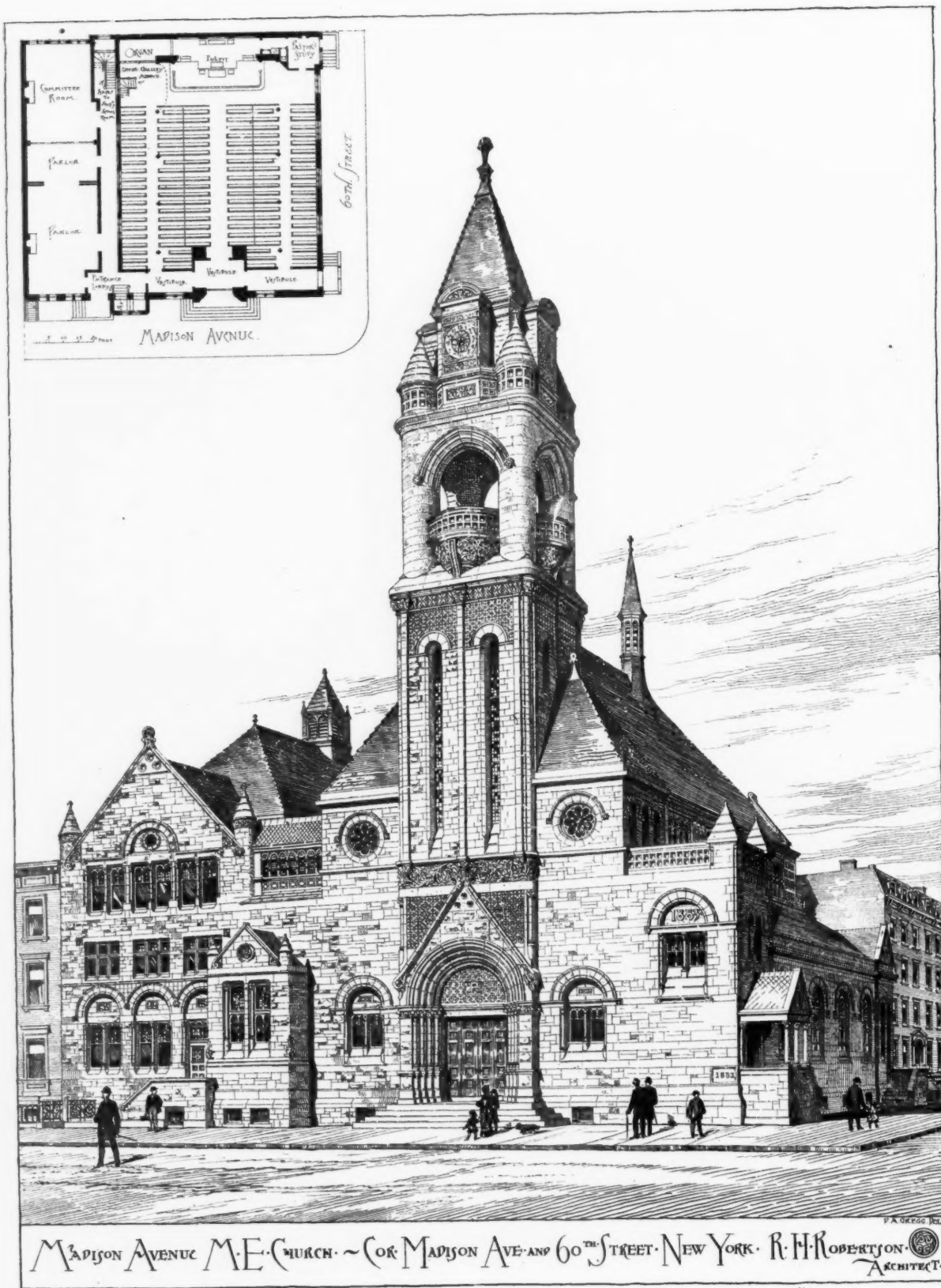


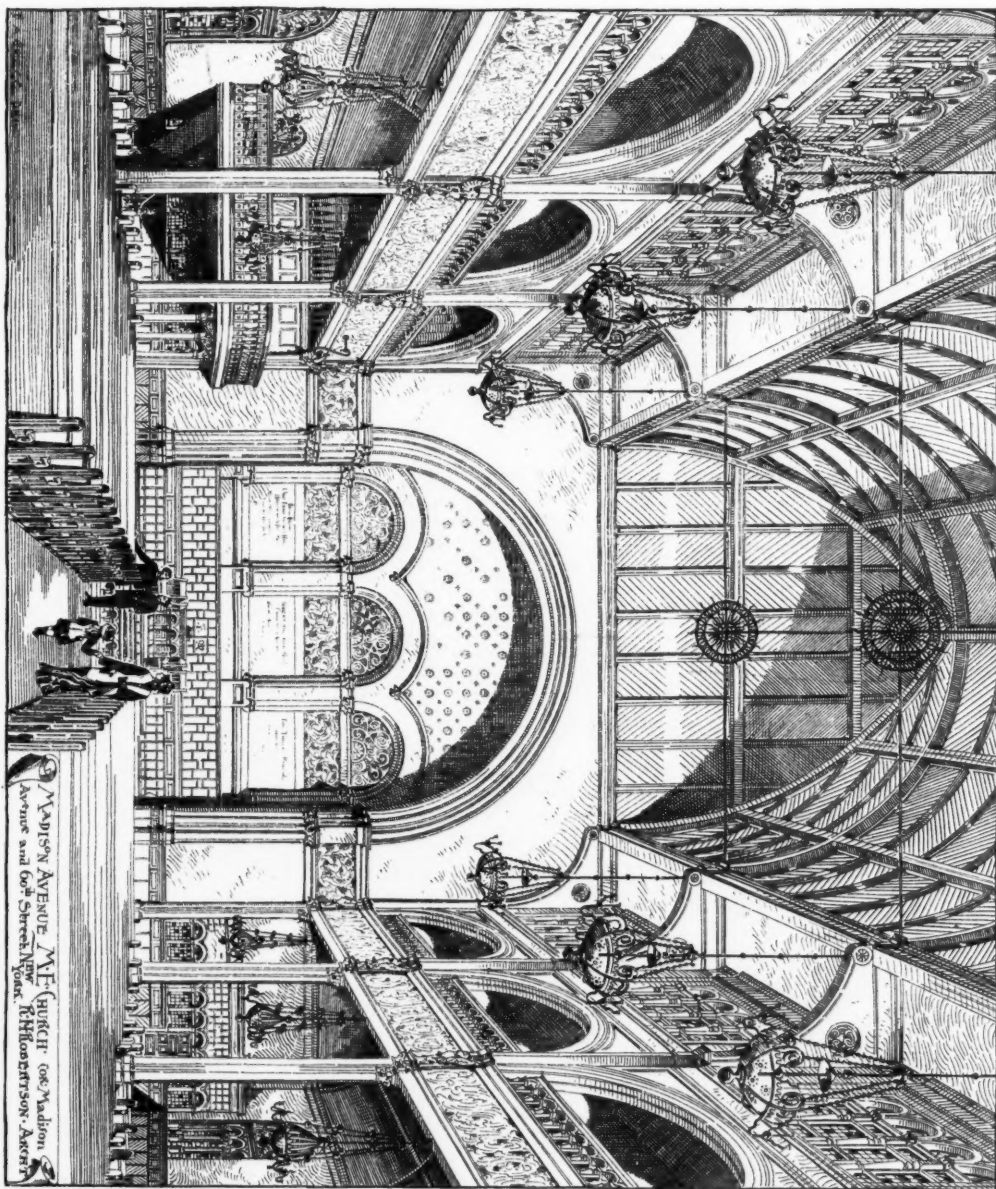
PLANT, AND ALTRAE FURNITURE.



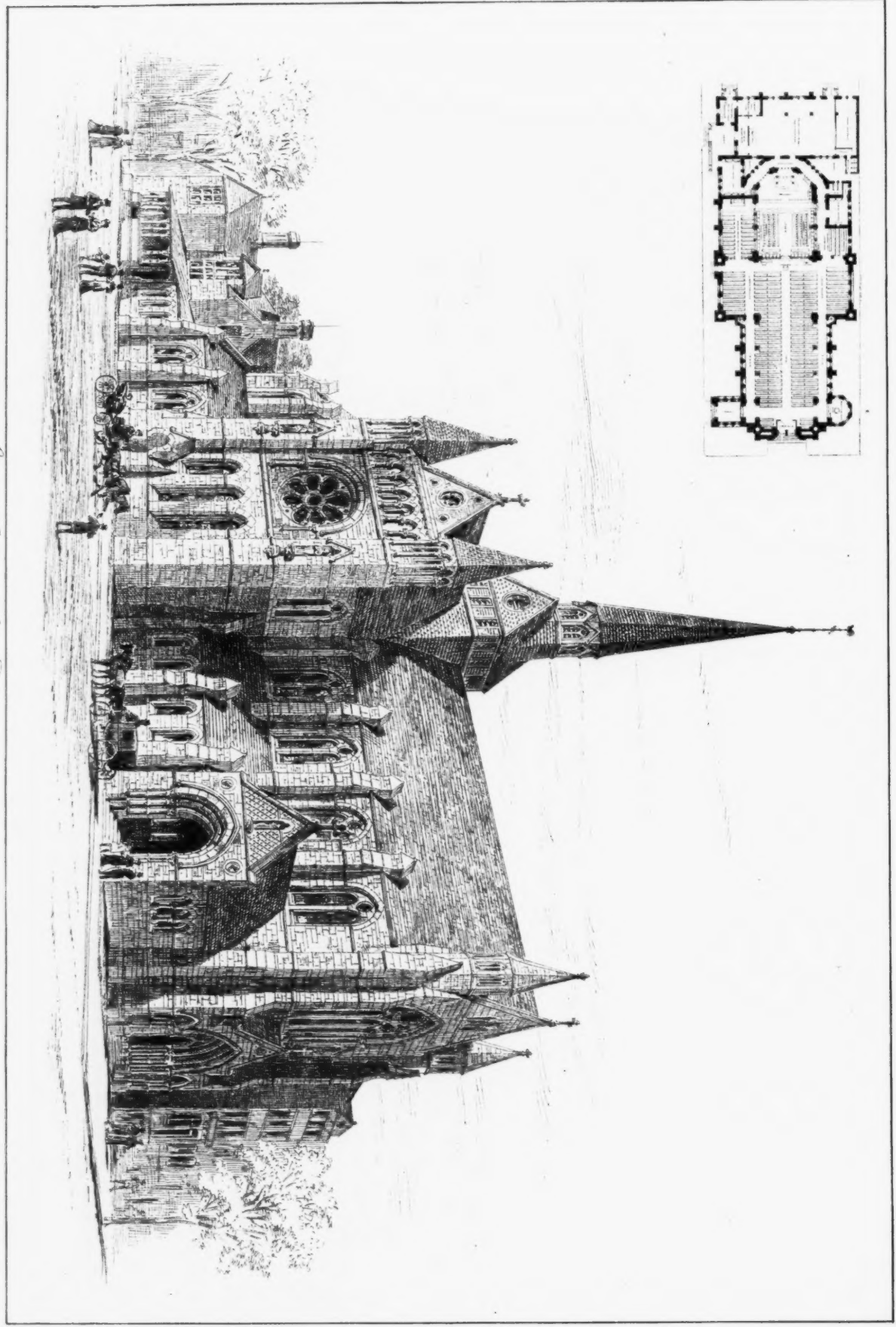
PLAN AT A.

FRAMING OF





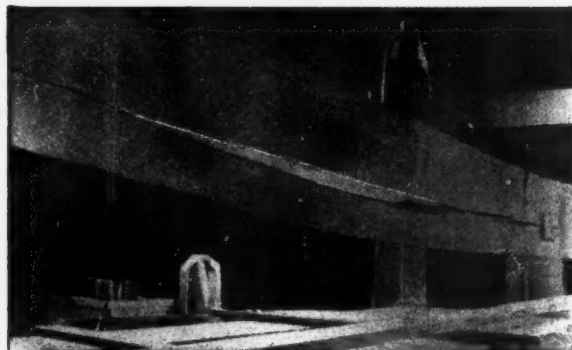
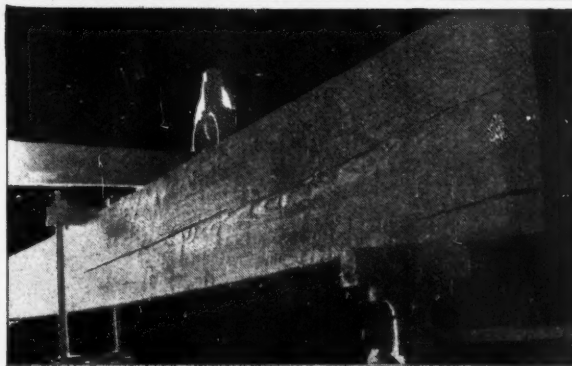
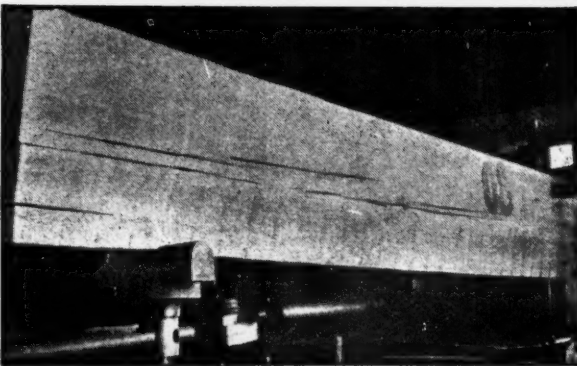
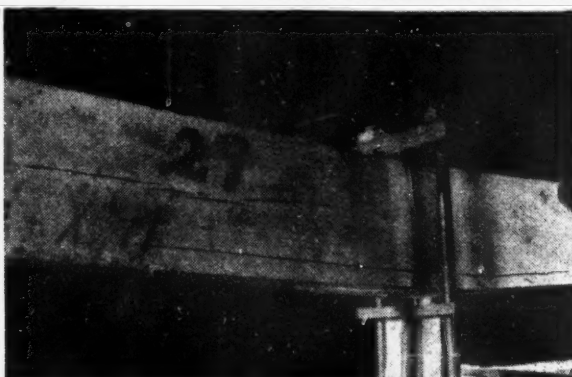
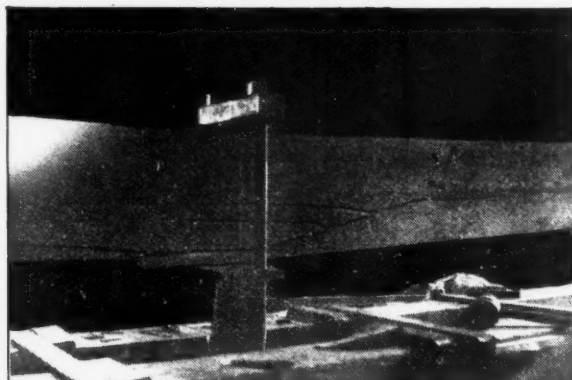
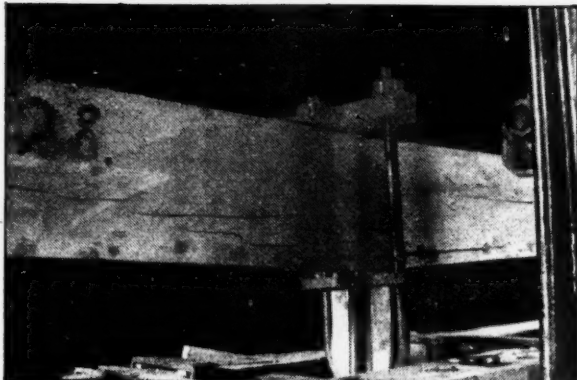
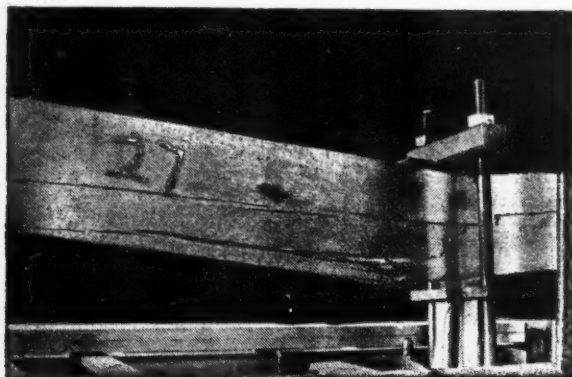
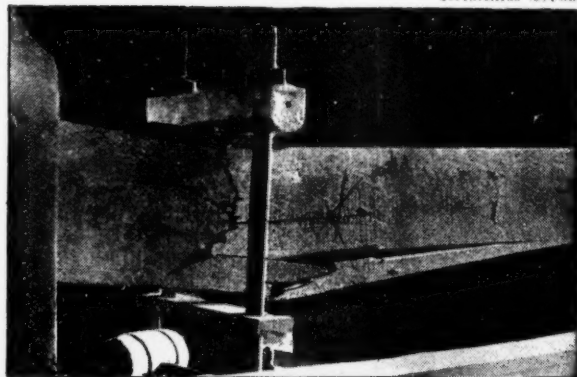
COPYRIGHT 1854 JAMES R. TOWNSEND & CO.



HOLY SEPULCHRE CHURCH AT BOSTON, MASS.
H. N. CONEDON, ARCHT. N.Y. 1853.

Engraved by J. R. Smith for J. R. Townsend & Co.

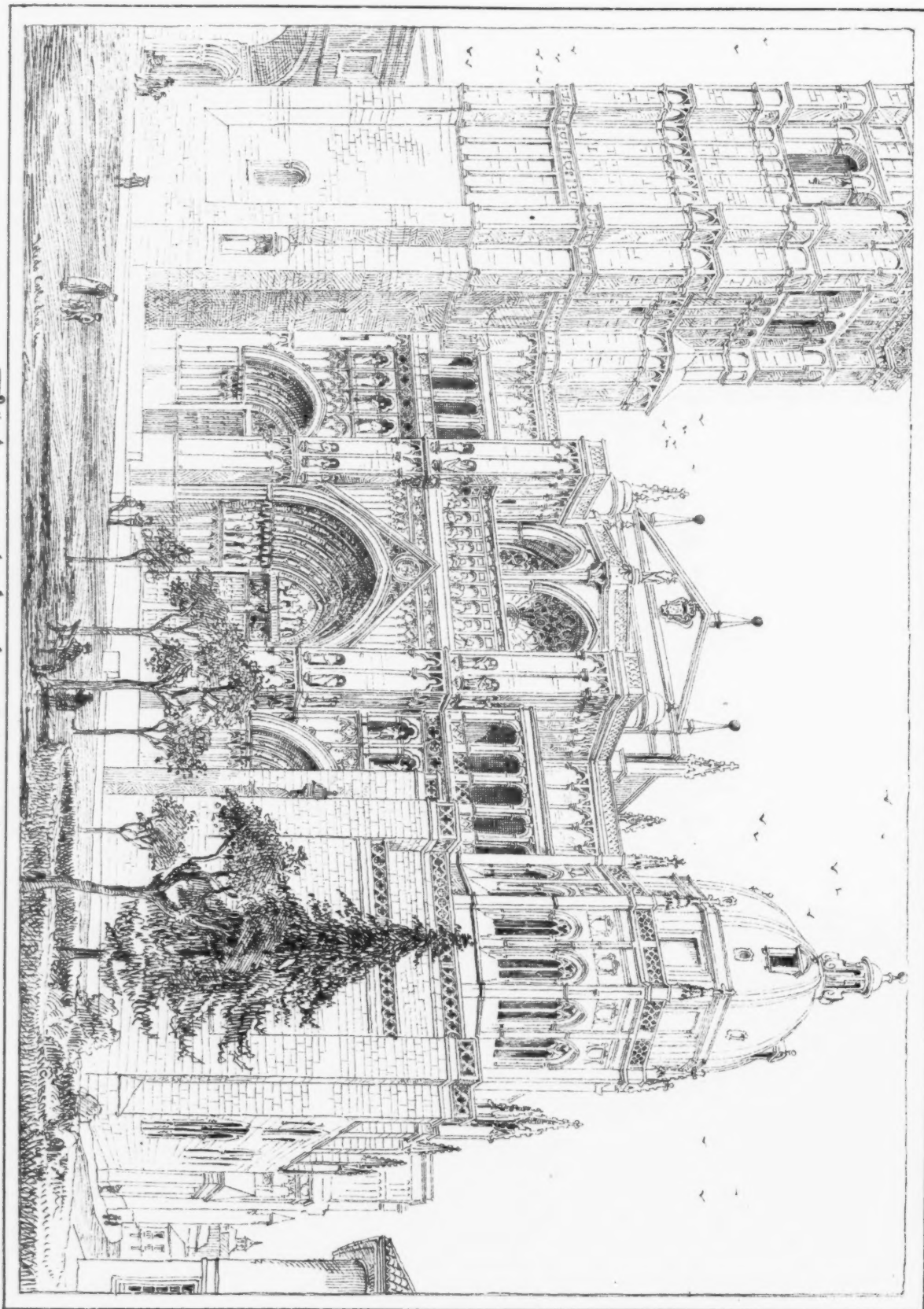
COPYRIGHTED 1884 JAMES P. OSGOOD & CO.

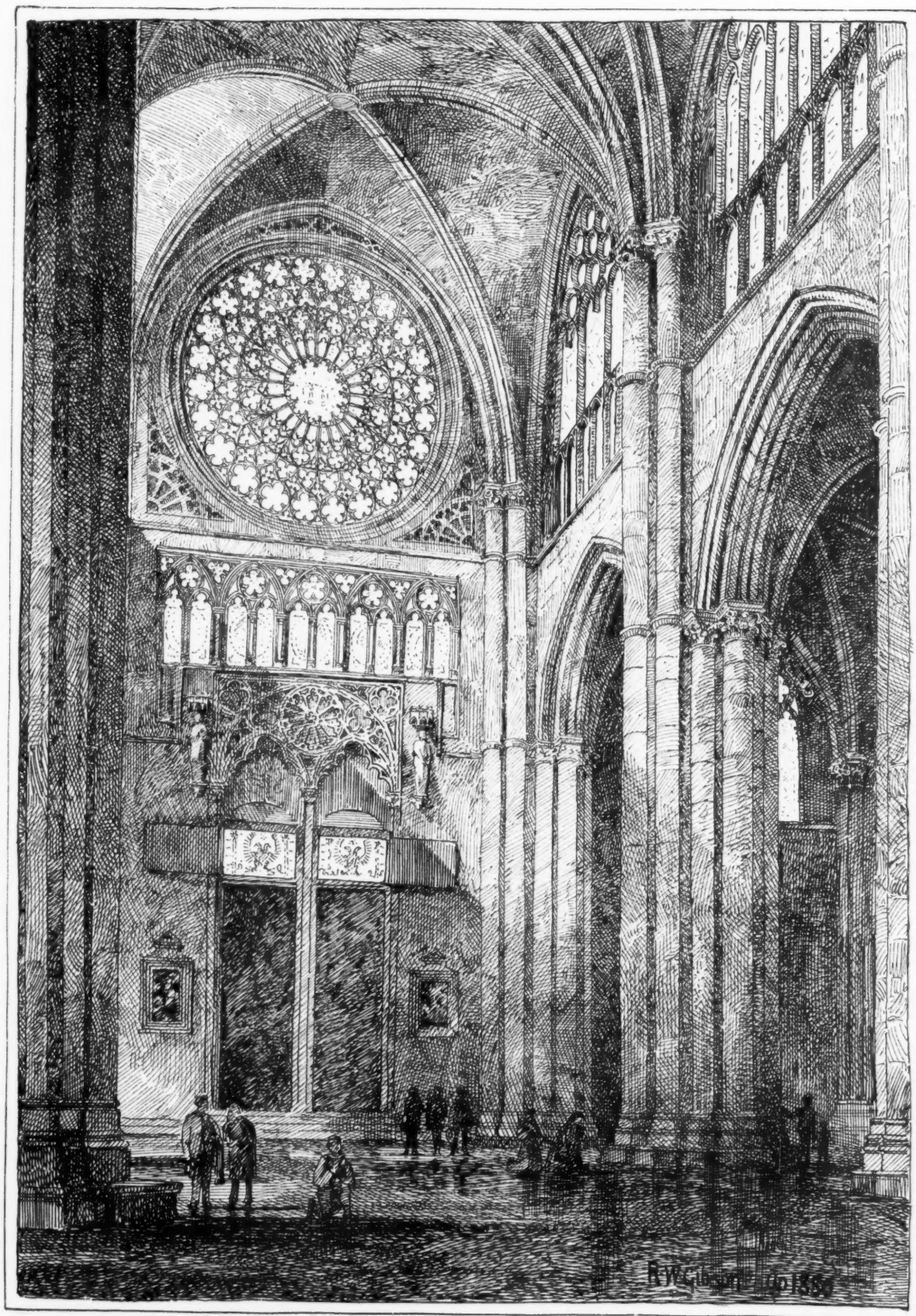


TRANSVERSE STRENGTH OF BEAMS. PLATE 5.

The Helotype Printing Co. 211 Tremont St. Boston.

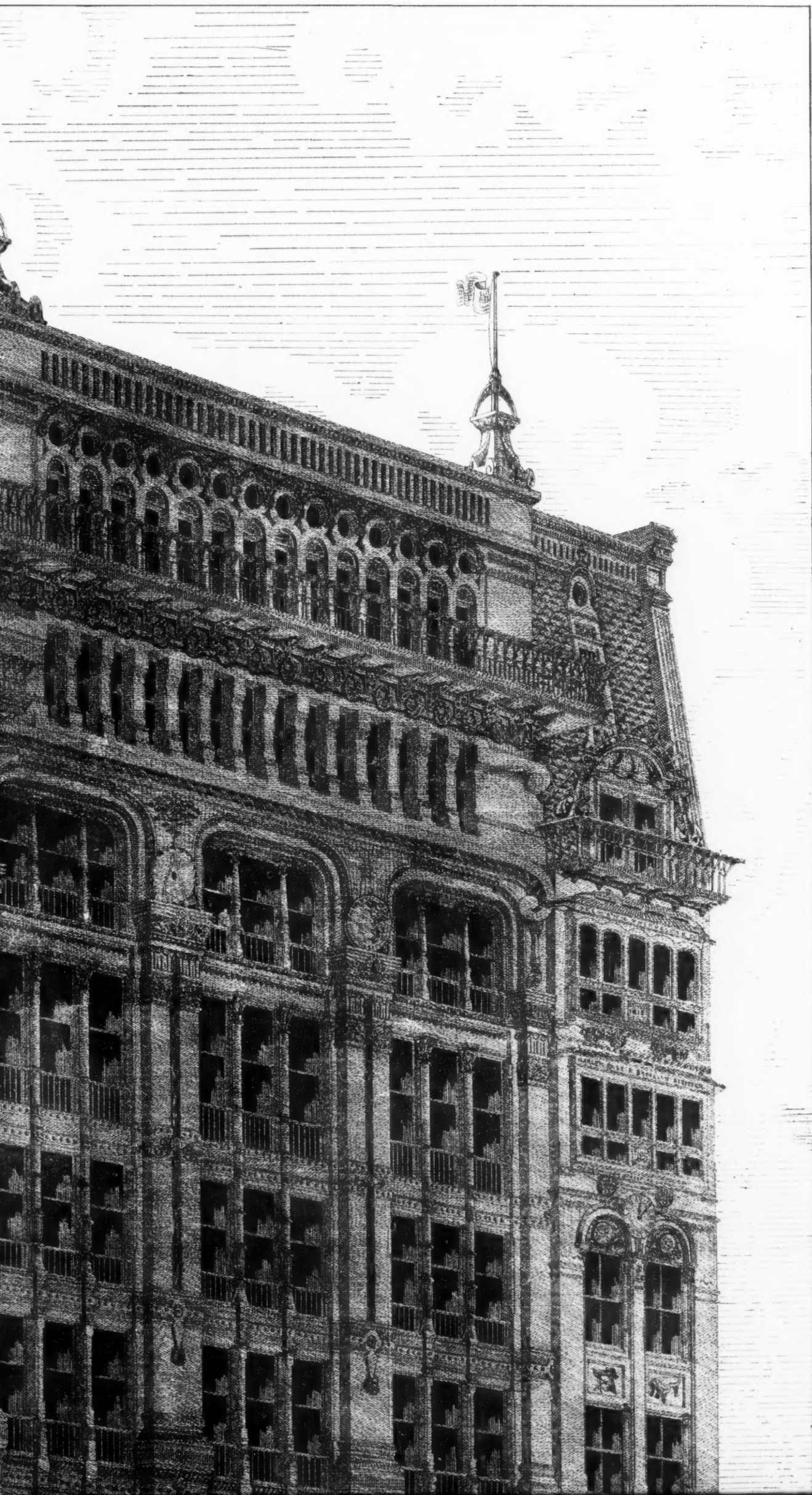
❖ Toledo Cathedral ❖ West Front ❖

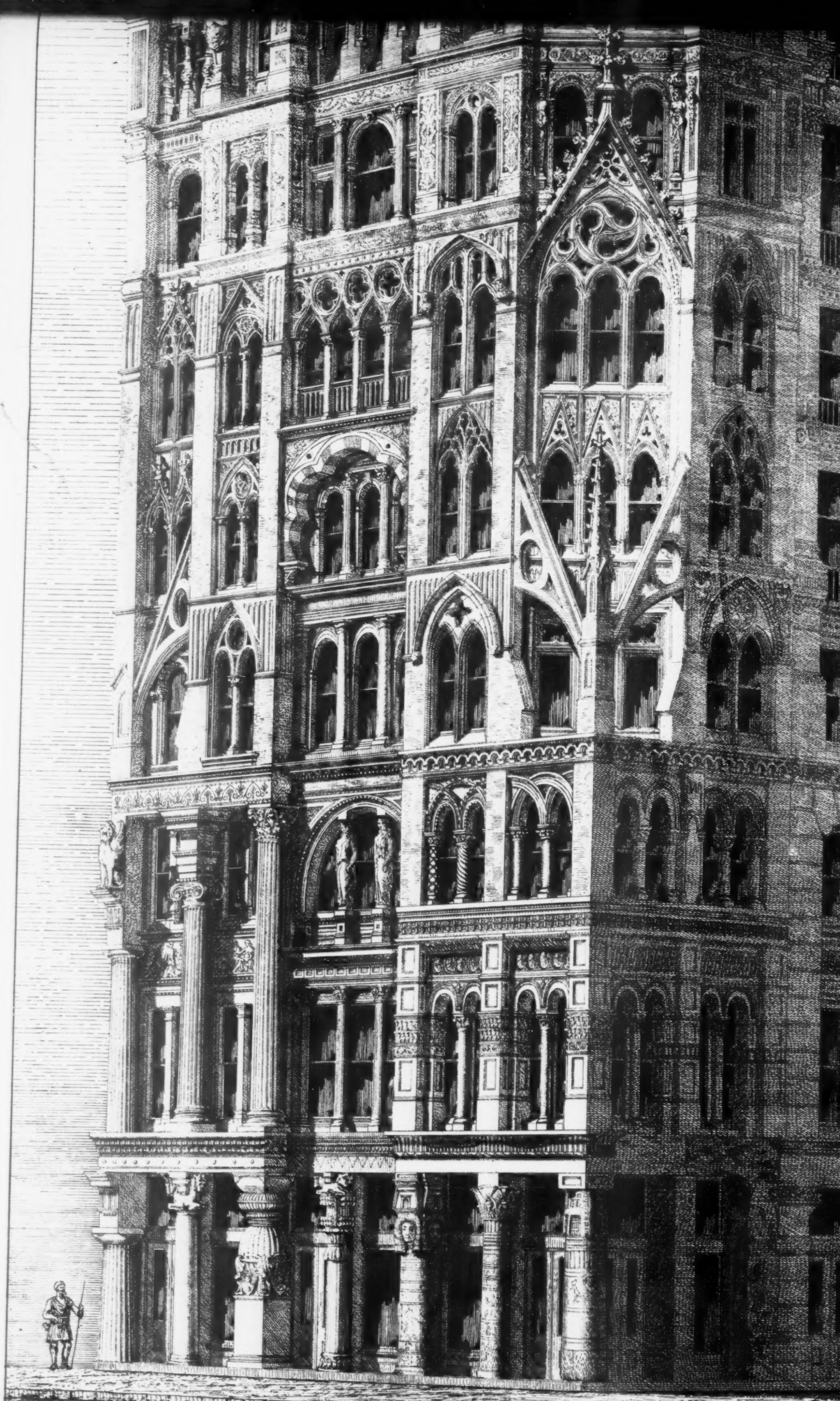




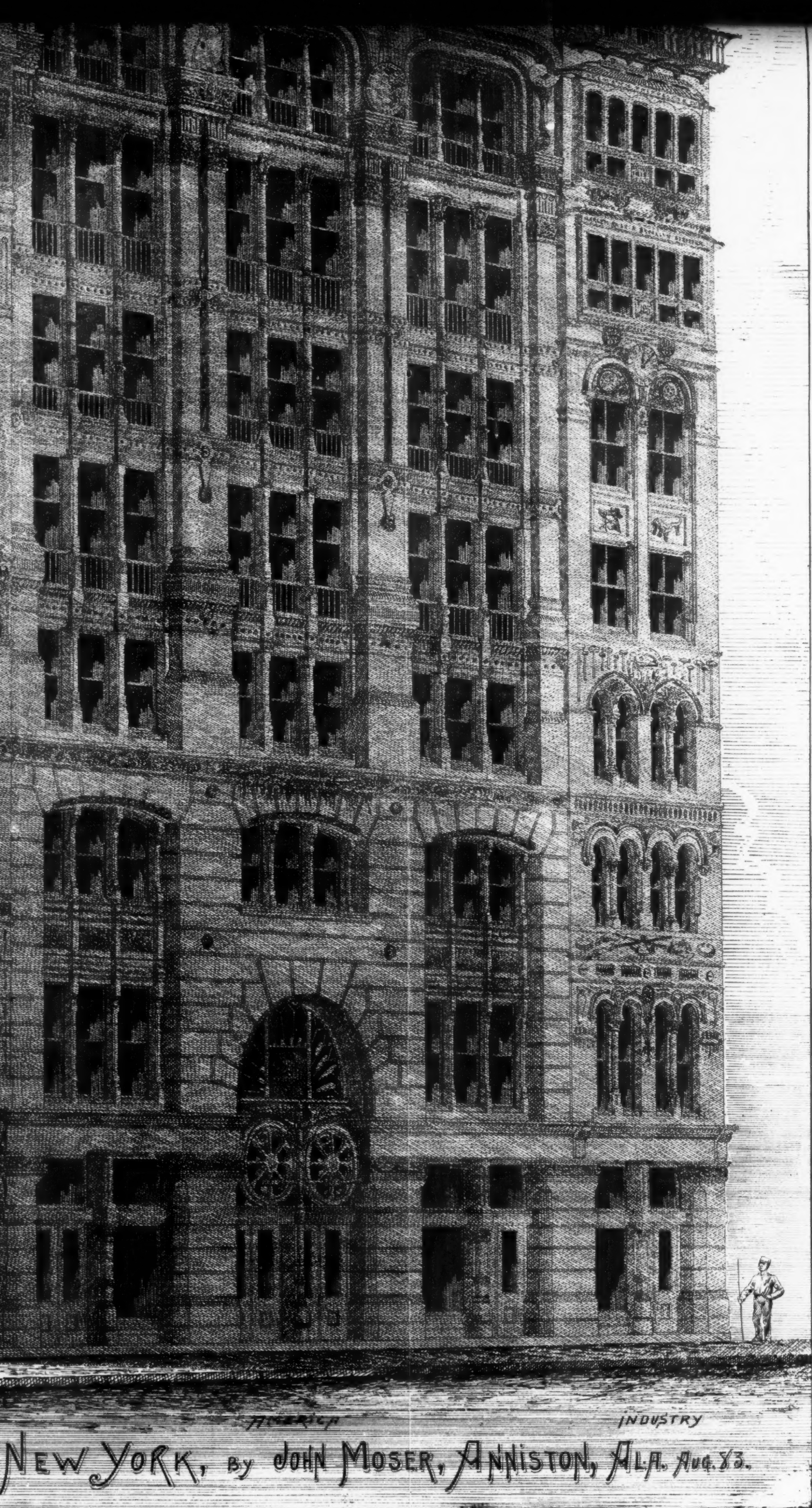
❖ Toledo Cathedral, Spain: West End of the Nave: ❖





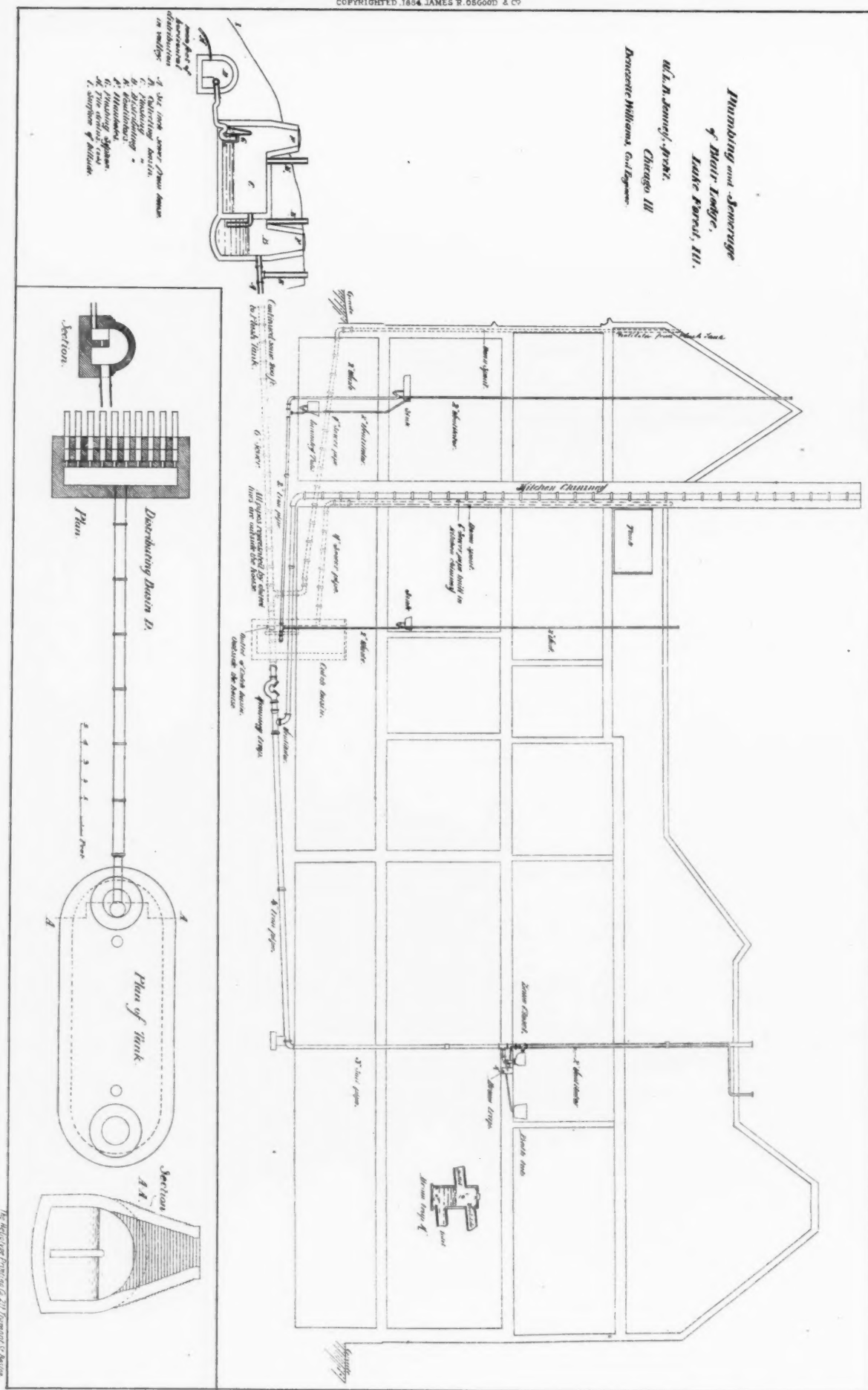


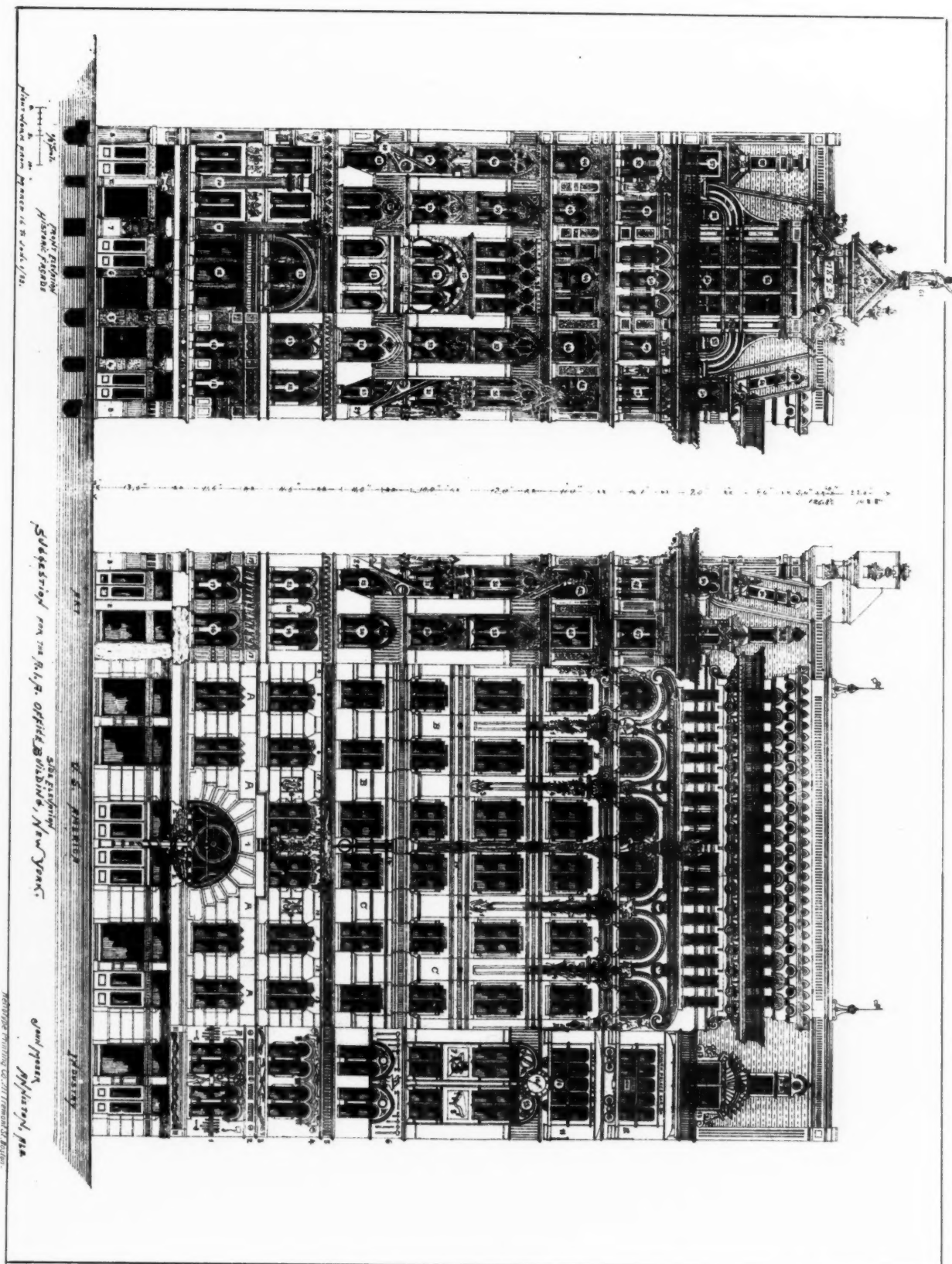
AMERICAN ARCH. FORM. OF THE FUTURE. HISTORIC FACADE. ART. SUGGESTION OF A FACADE FOR THE A. I. A. NEW



COPYRIGHTED 1884 JAMES R. OSGOOD & CO

*Punning and Sentences
of Their Lodges,
Tide Forest, Ill.
W. B. Jones, Pres.
Chicago Ill
Democratic Williams, Co. & Engle.*

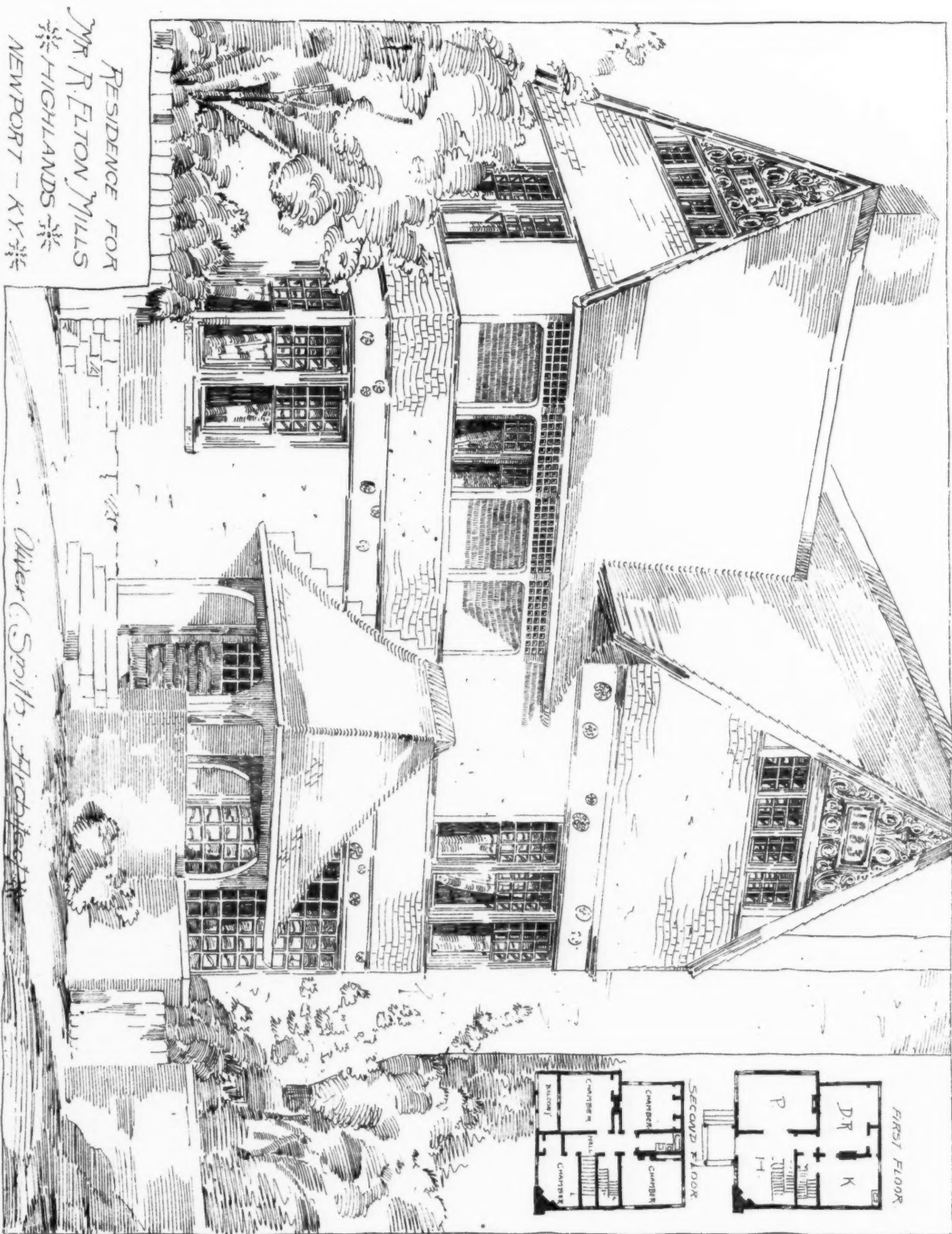




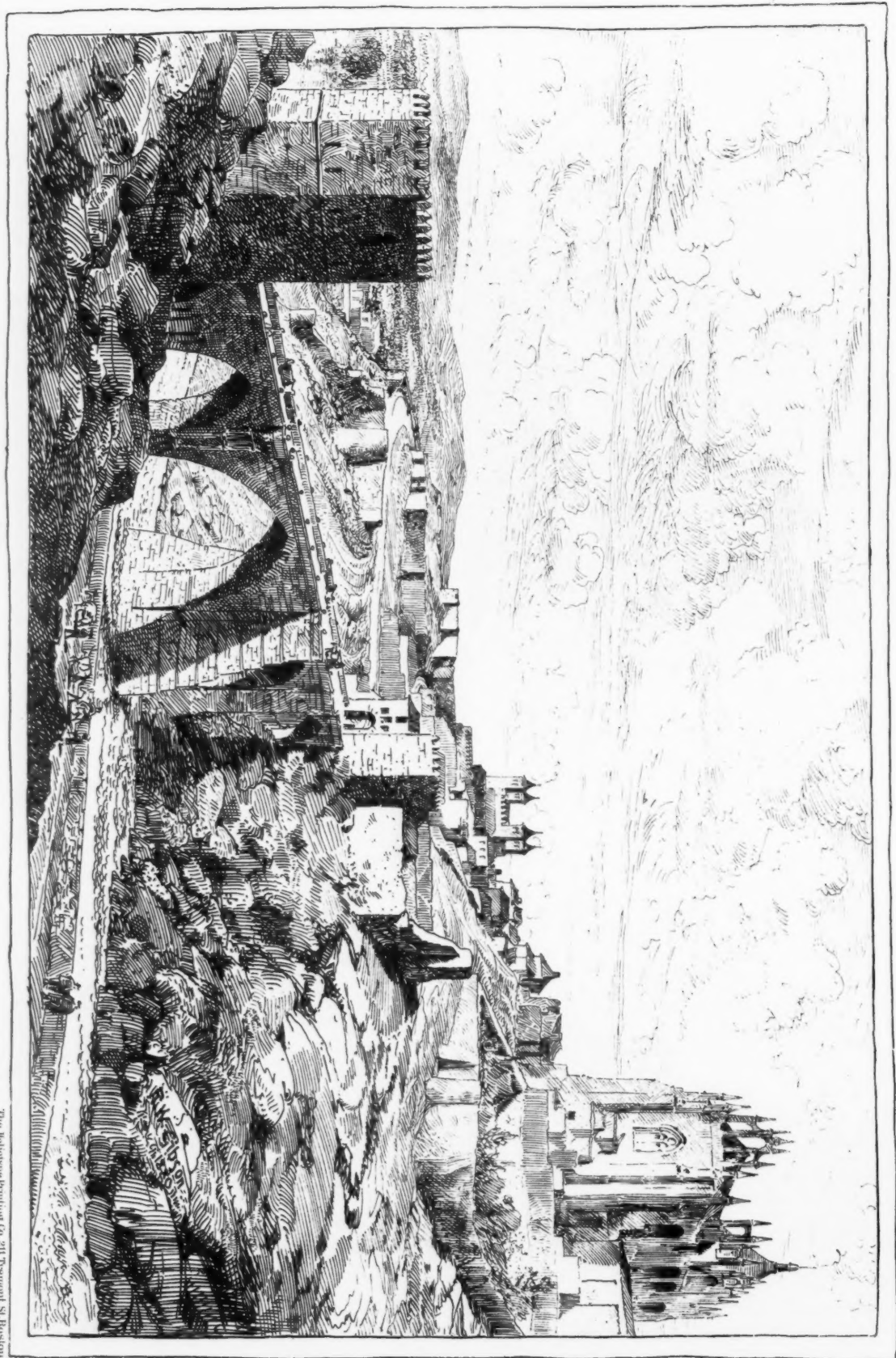
DESIGN FOR THE NEW ORLEANS COTTON EXCHANGE.

BY MAX SCHROFF ARCHITECT
NEW YORK.

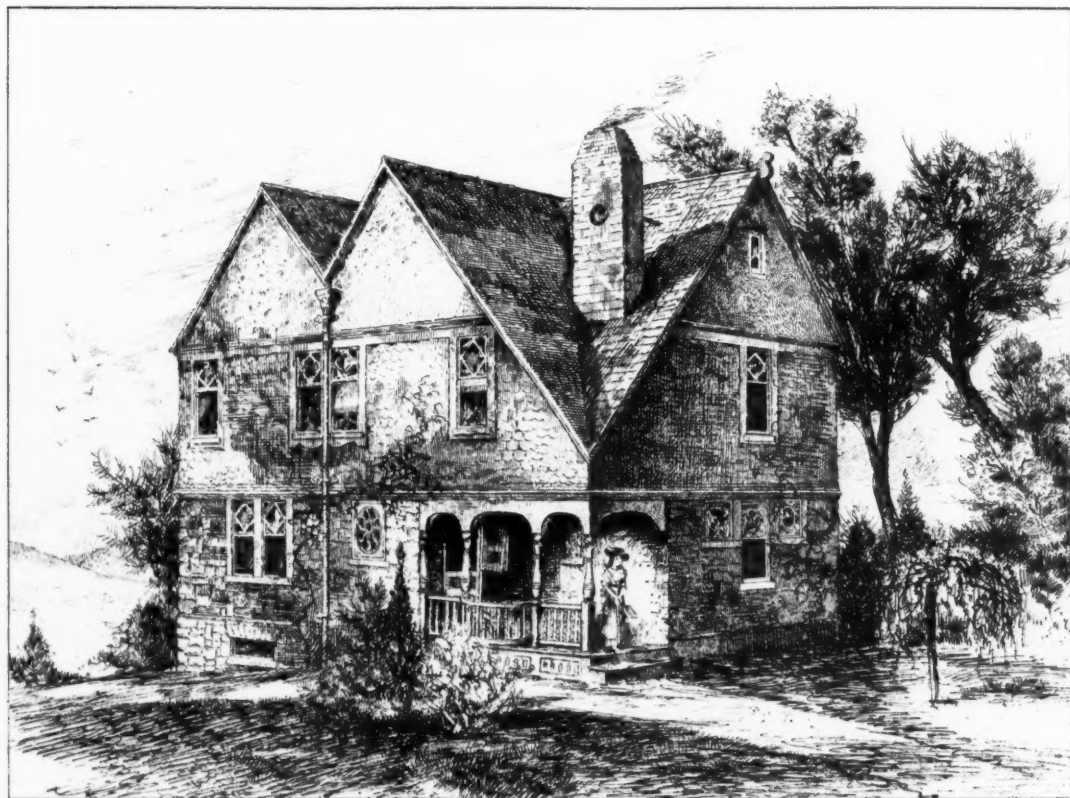




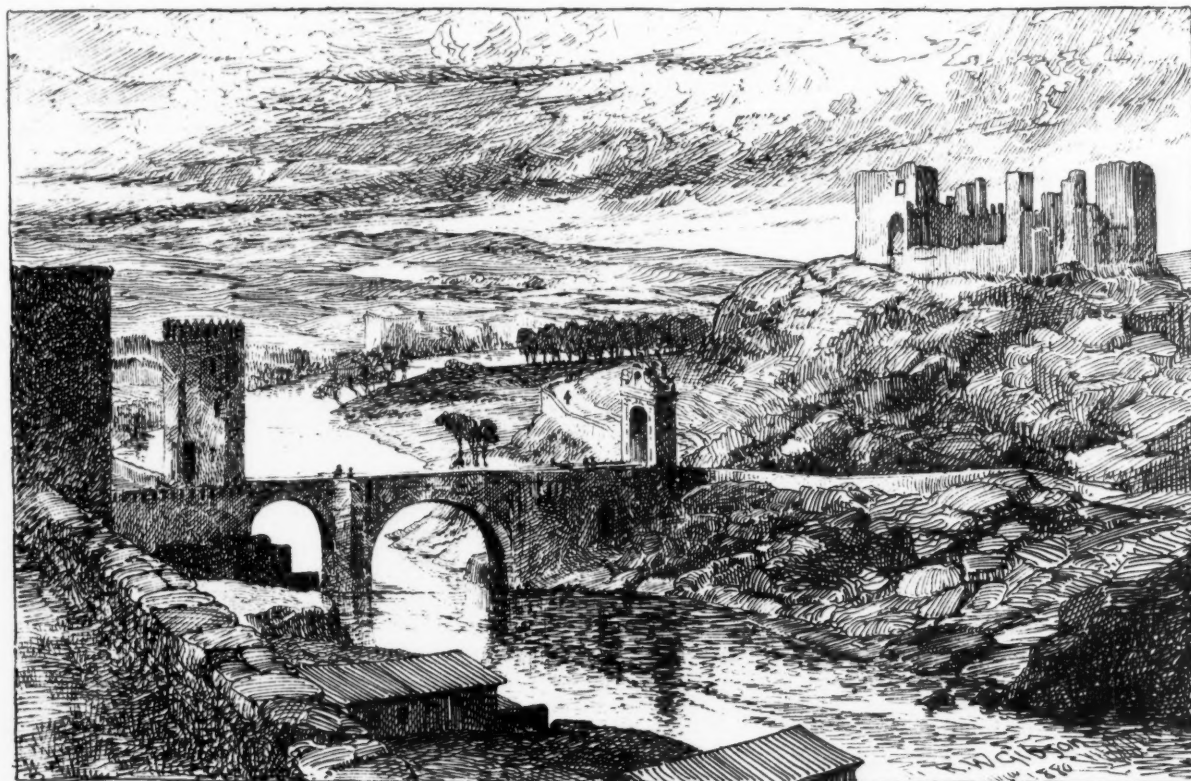
Leeds. Spain. Bridge San Martino and Church San Juan de los Reyes



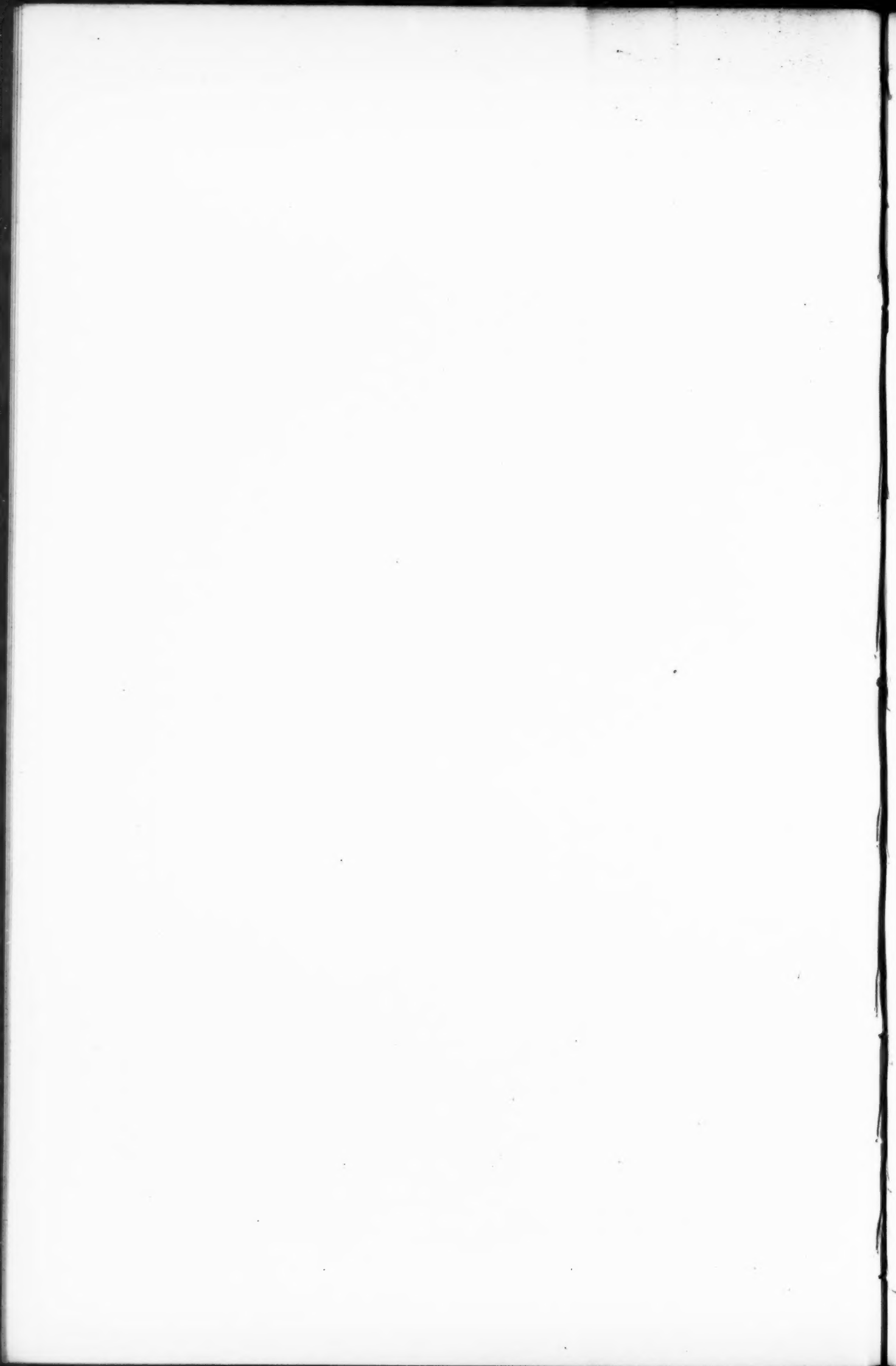
The Lithography Printing Co. 211 Tremont St. Boston.



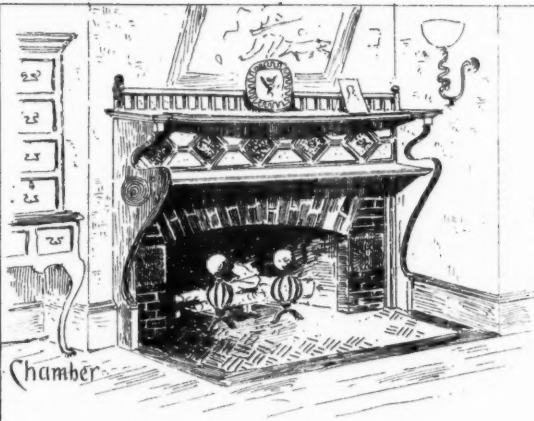
HOUSE DESIGNED FOR WOODBRIDGE, Esq., RIDGEFIELD, N.J., BY B. L. GILBERT, ARCHT., N.Y.



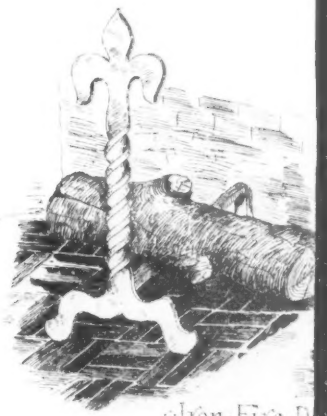
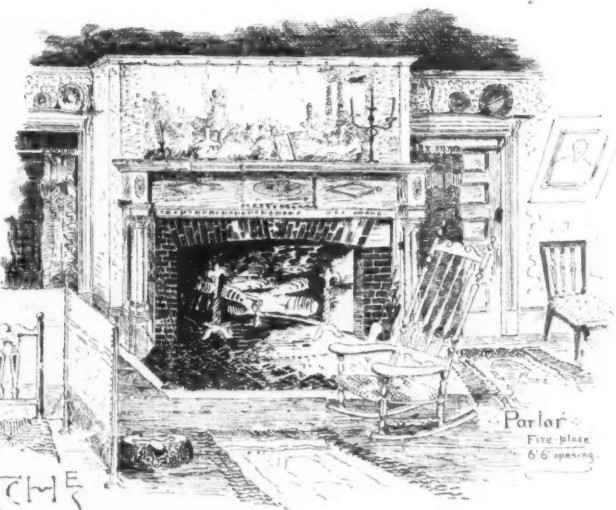
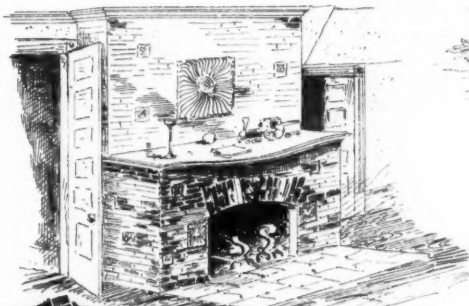
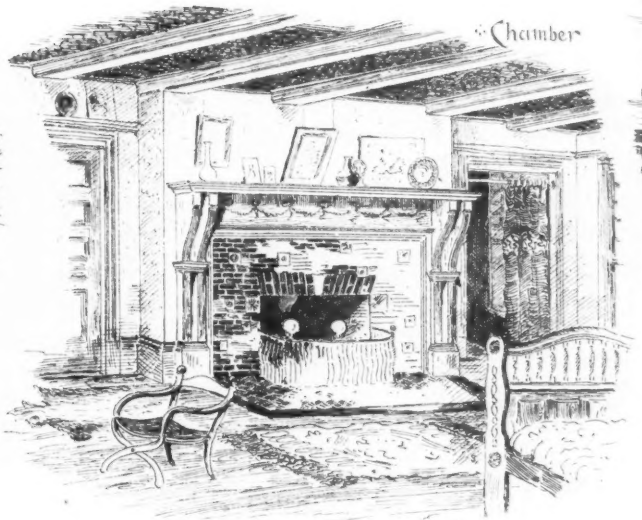
Toledo, Spain. Alcantara (the bridge) from the Walls of the City.



Copyrighted 1894 JAMES O. DUNN & CO.



Knocker



SKETCHES FROM

"SUNSET HALL"

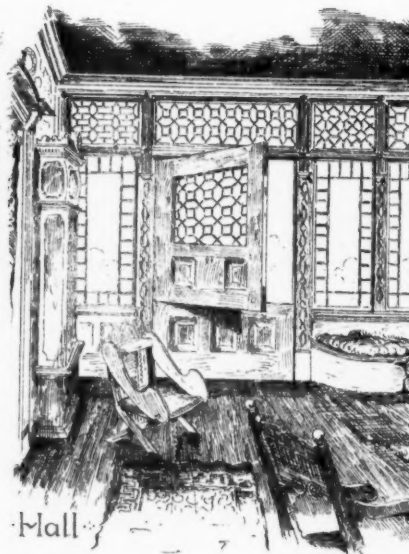
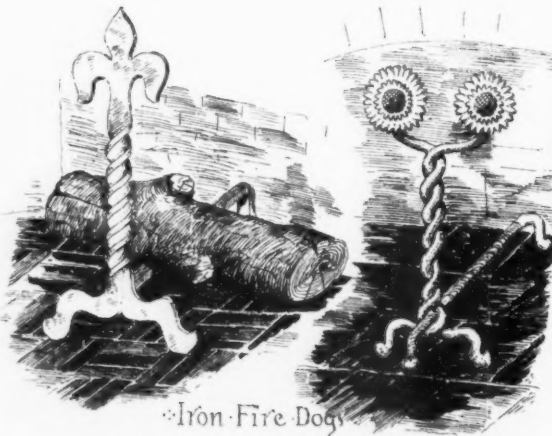
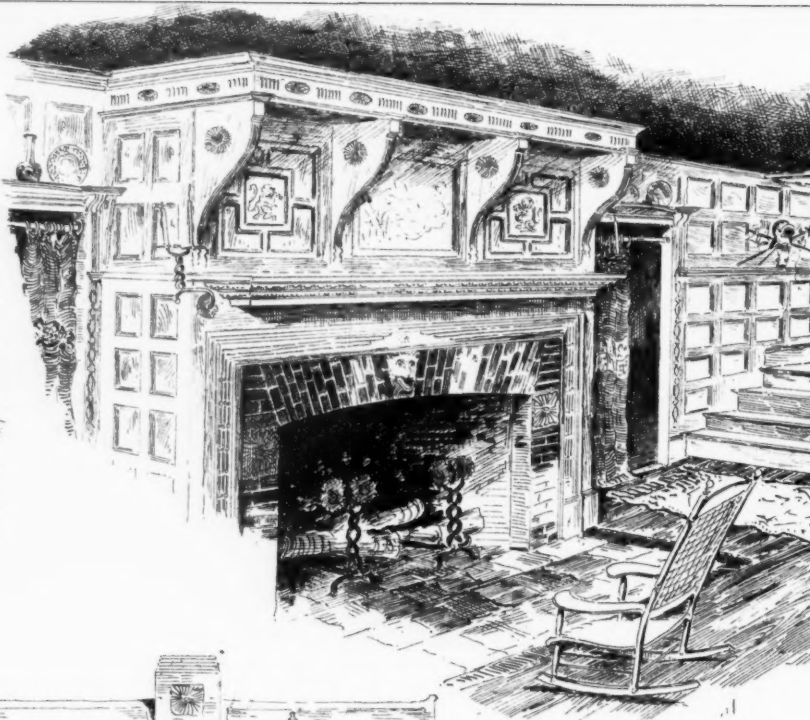
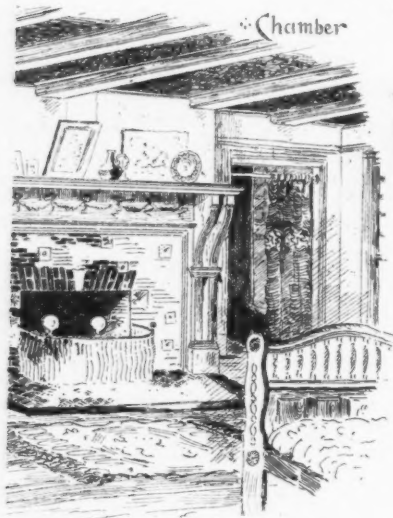
LAMB & RICH

Architects 48 B'Way N.Y.

Lawrence L. I.



The sketches are from all the metal work being and the furniture from and

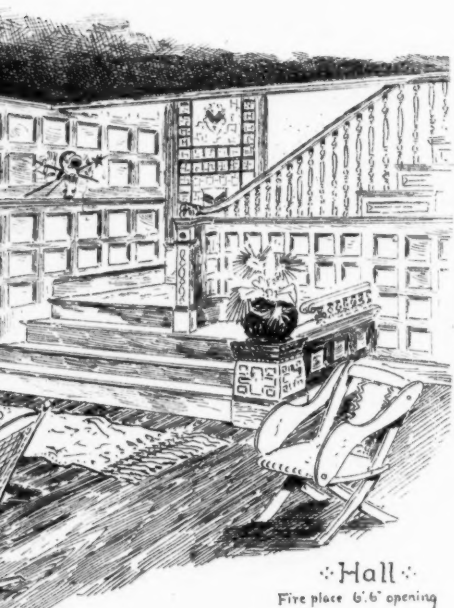


ALL

ce L. I.

The sketches are from the actual work, all the metal work being hammered work, and the furniture from antique models.

Mall

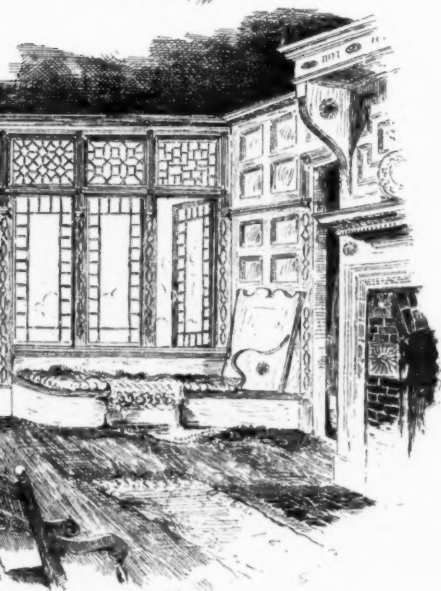


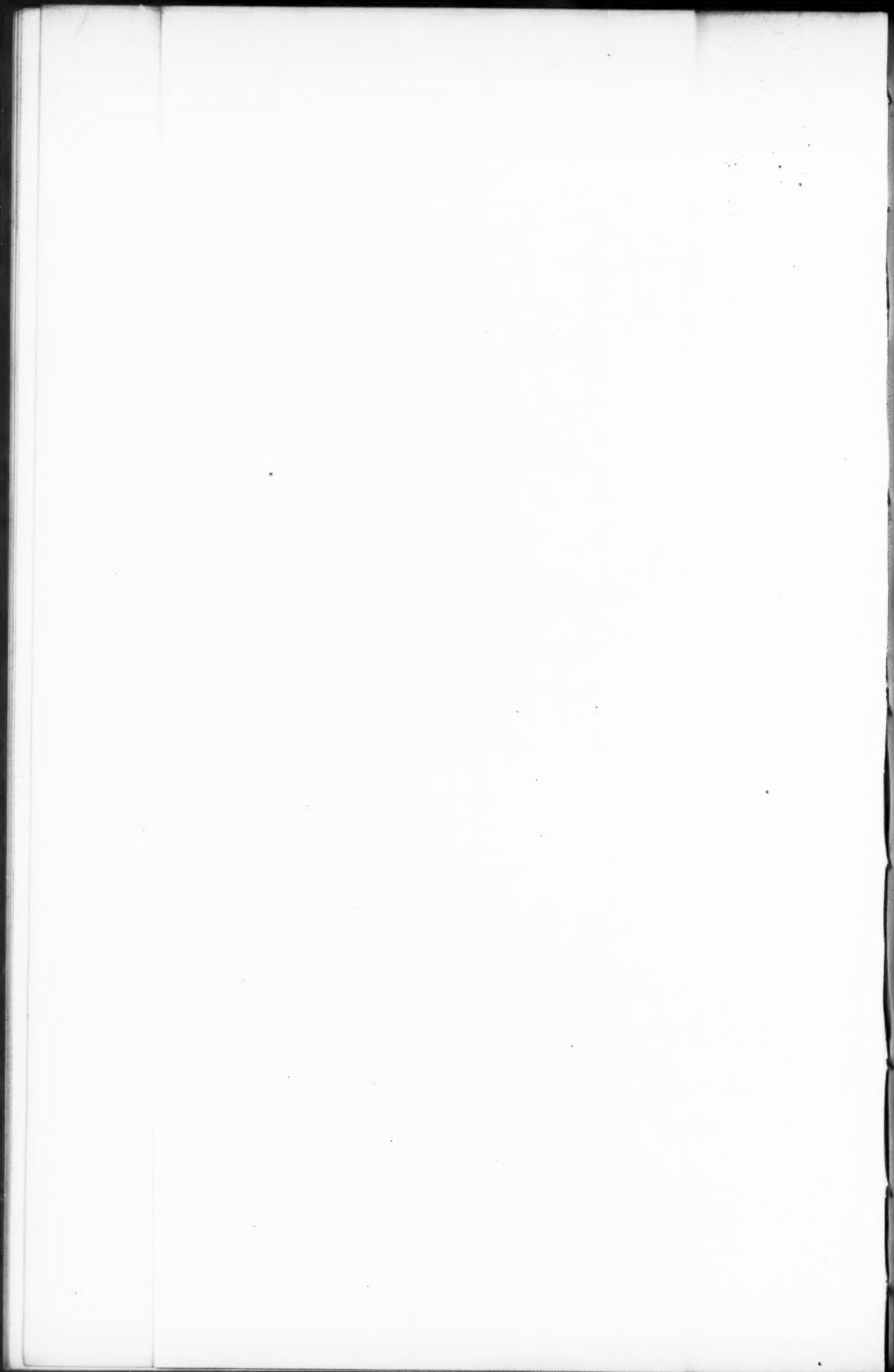
•Hall•
Fire place 6'6" opening

cutcheon •

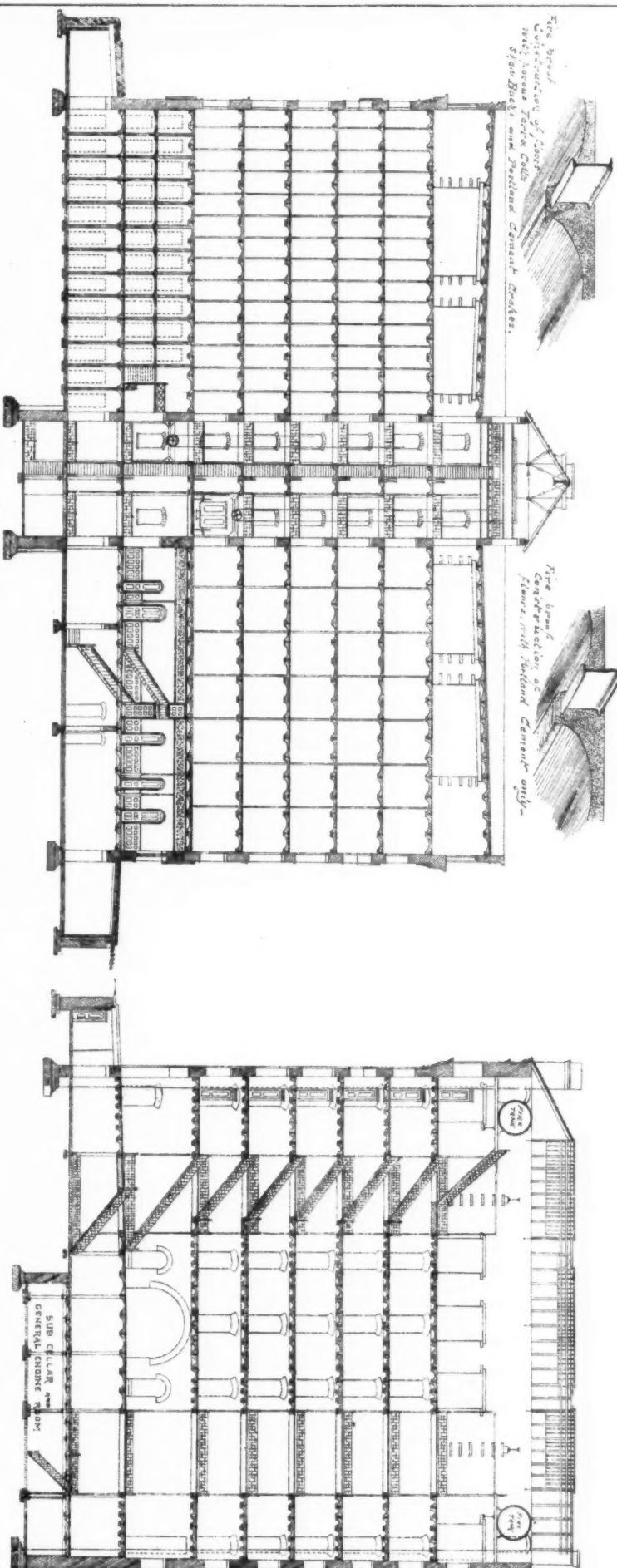


Nursery



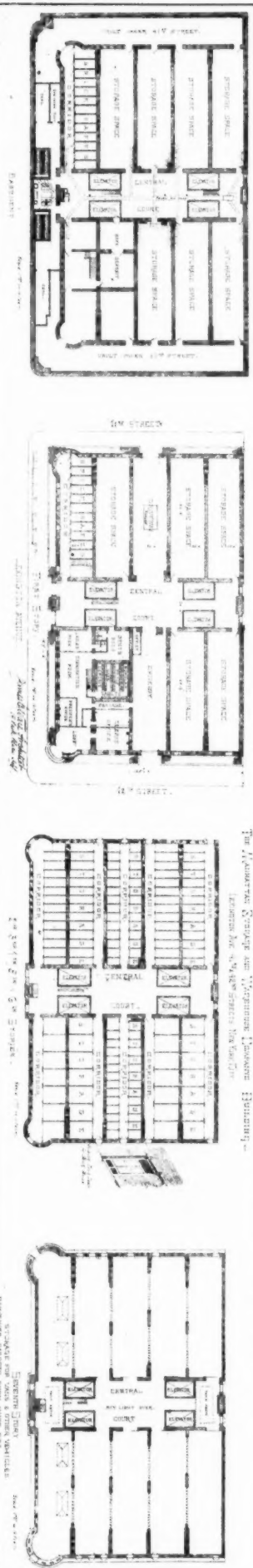


COPYRIGHTED 1894 JAMES H. BARNES



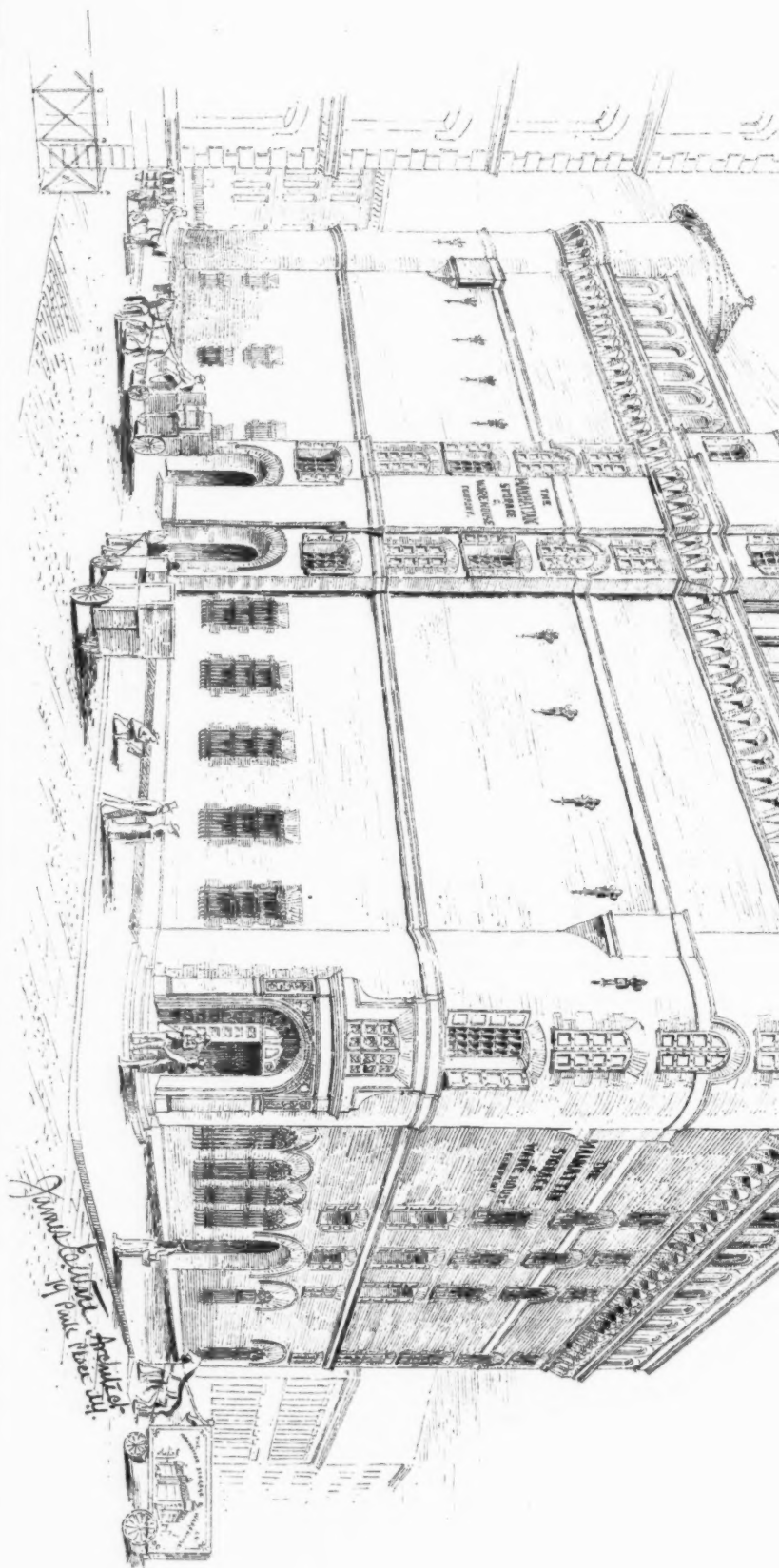
LONGITUDINAL SECTION

TRANSVERSE SECTION THROUGH CENTRE COURT.

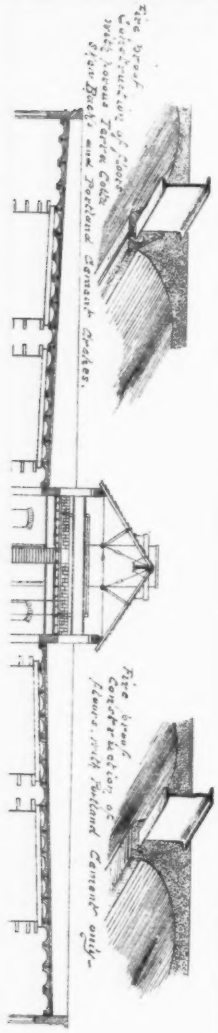


The Helldige Printing Co. Tremont St. Boston

COPYRIGHTED 1884 JAMES H. BEEGOOD & CO.

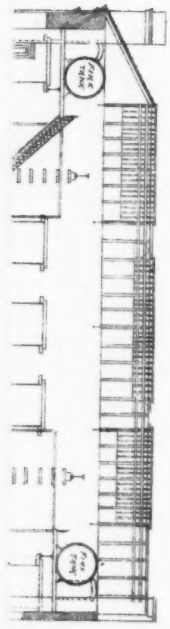


James H. Beegood, Architect



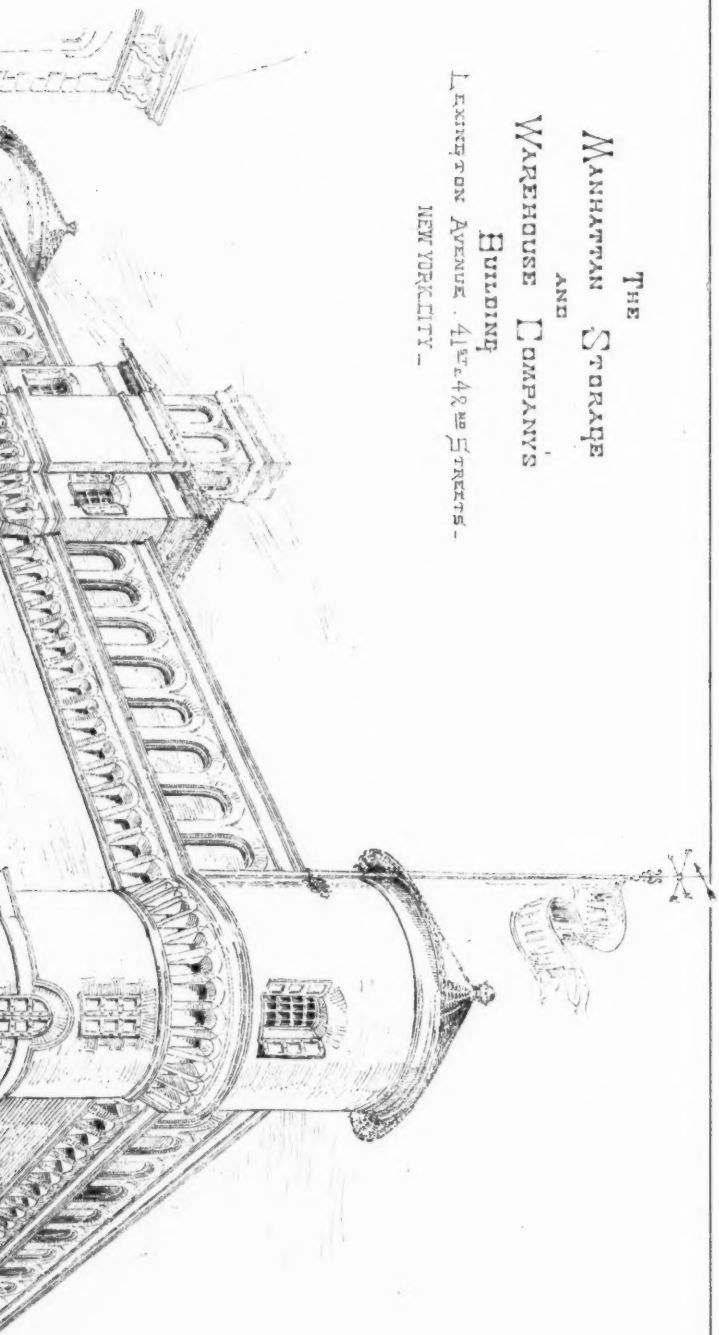
*The Great
Concentration of Power
by the New York & Havana
Steamship Co. and Portland
Steamship Co.*

*Five large
Concentrations of
Power, with Island
Cannons only.*

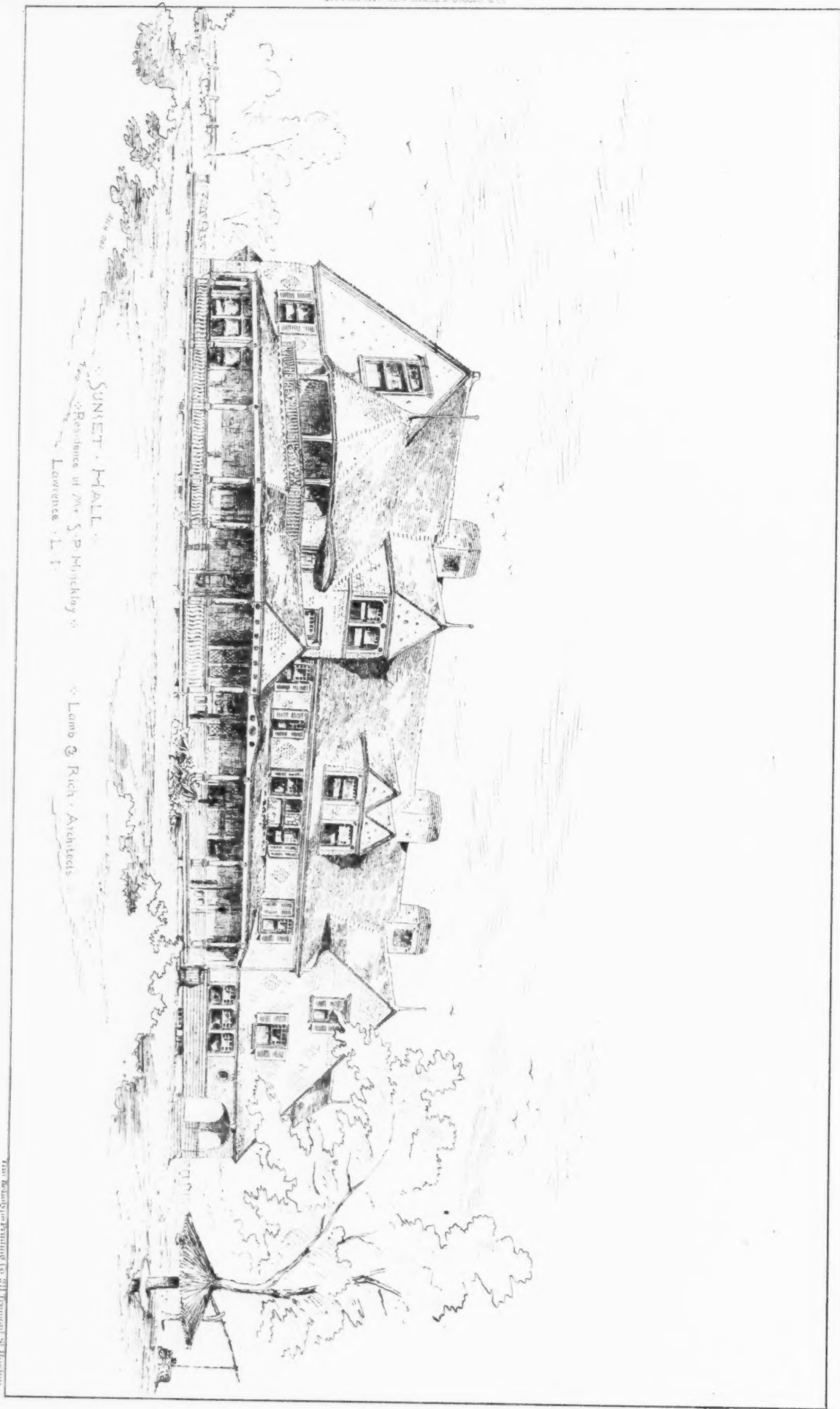


*Five large
Concentrations of
Power, with Island
Cannons only.*

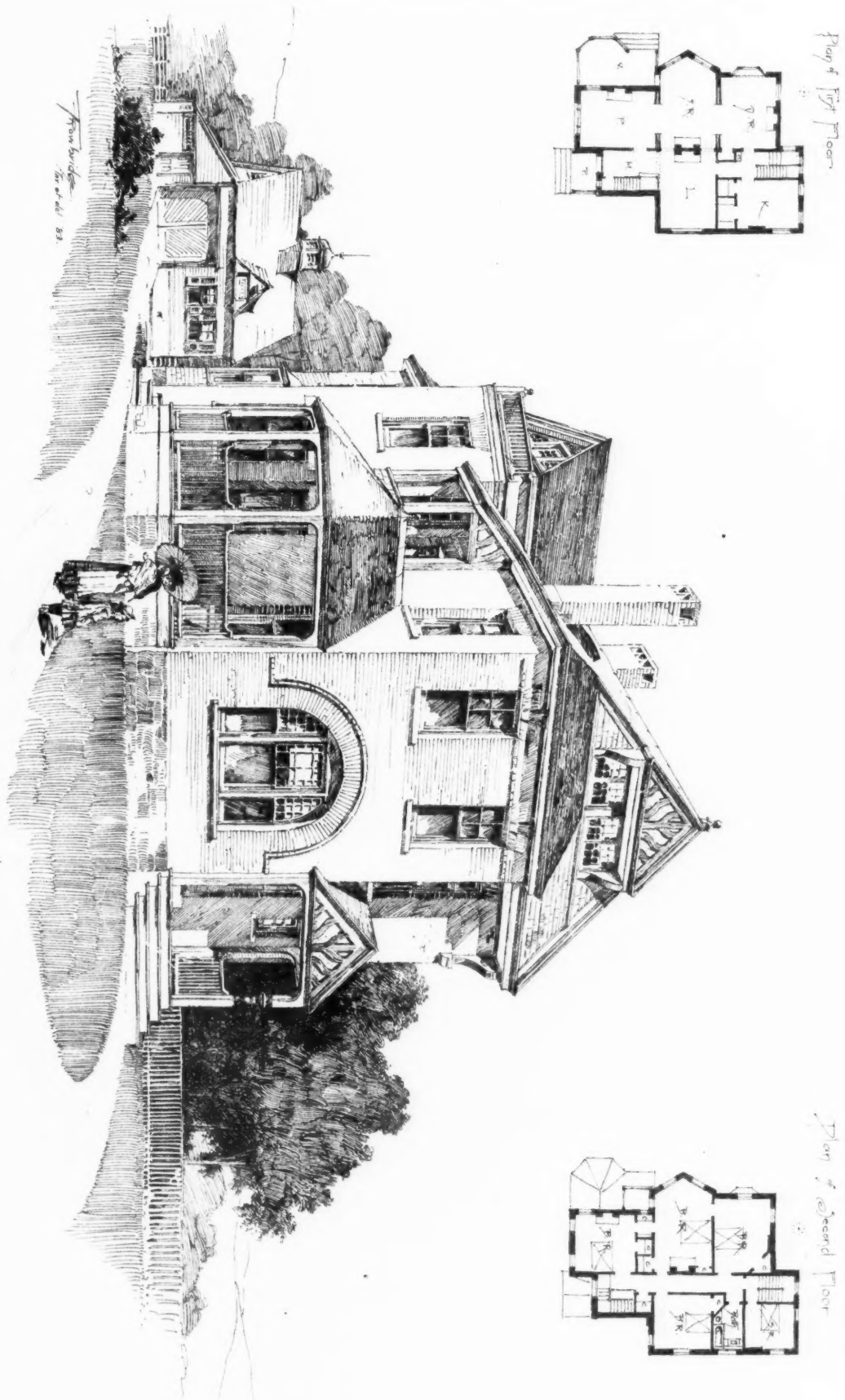
THE
MANHATTAN STORAGE
AND
WAREHOUSE COMPANY'S
BUILDING
LEXINGTON AVENUE, 41ST & 42ND STREETS.
NEW YORK CITY.



COPYRIGHTED BY JAMES H. DRACOTT & CO.



Engraved by J. H. Dracott & Co. for the Proprietors.

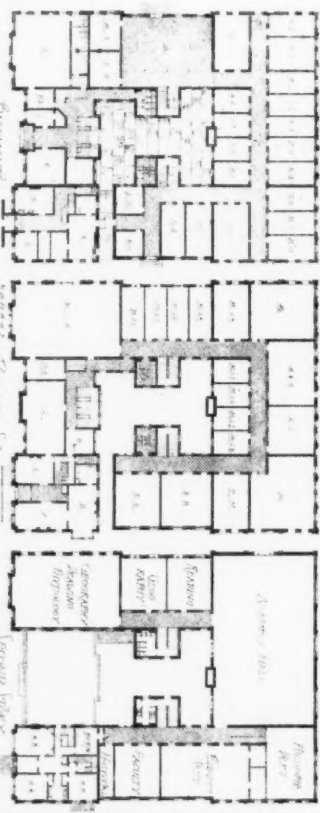


House for Mr. Geo. Kelley, Penn. Ind.

Wm. E. Anderson, Archt. Cincinnati, O.

The Helixtype Printing Co., Tremont St., Boston.

STATE NORMAL SCHOOL, ALBANY, N.Y.
Messrs. Ogden & Wright Architects.

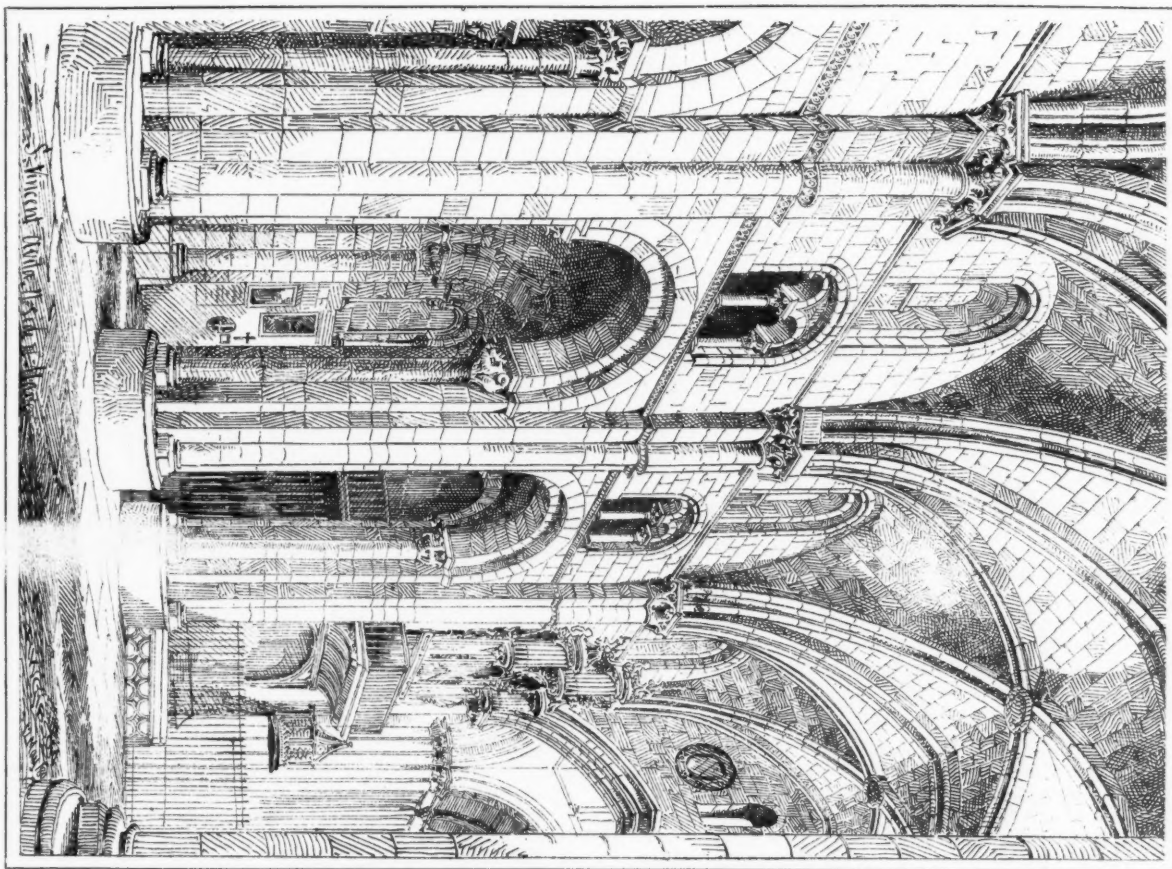


PLAN OF THE STATE NORMAL SCHOOL, ALBANY, N.Y.
The building is a large, multi-story structure with a prominent central tower and a wide, covered porch. It features numerous windows and decorative architectural elements. The school is situated on a lawn with trees in the background and foreground. The drawing is a detailed black and white engraving.

The Engraving is by J. R. Brown

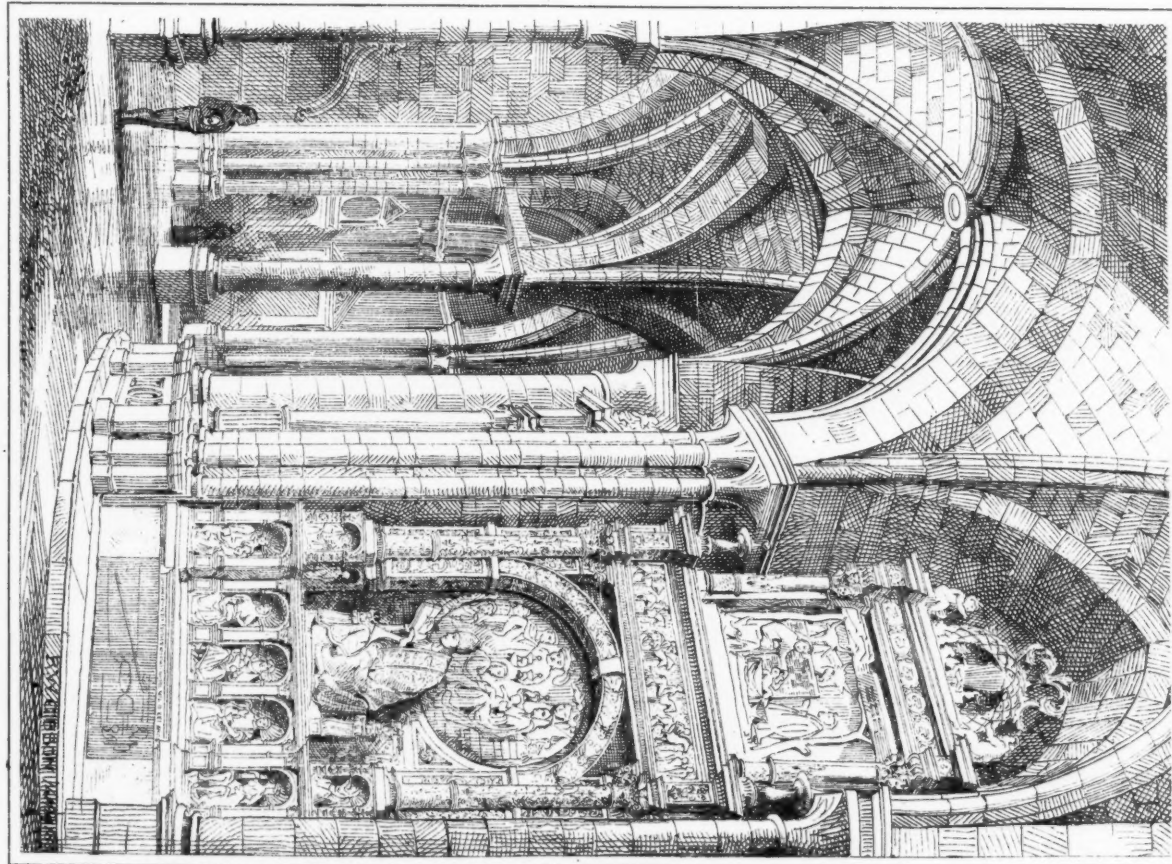
San Vincent, Bolivia-Spain. Title of Name:

California, Santa Barbara. Title of Name:

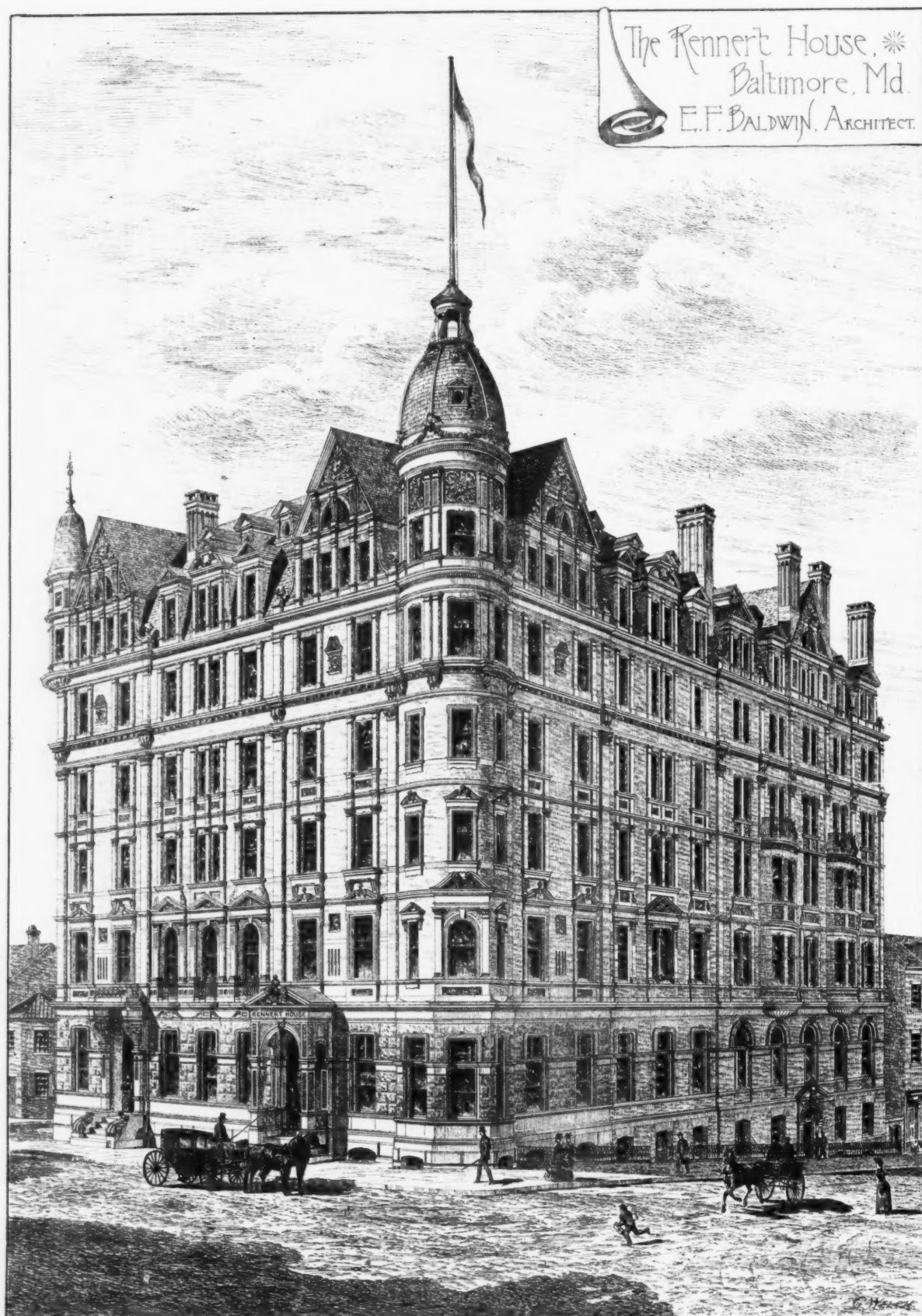


San Vincent Avila-Spain-Nave of Nave:

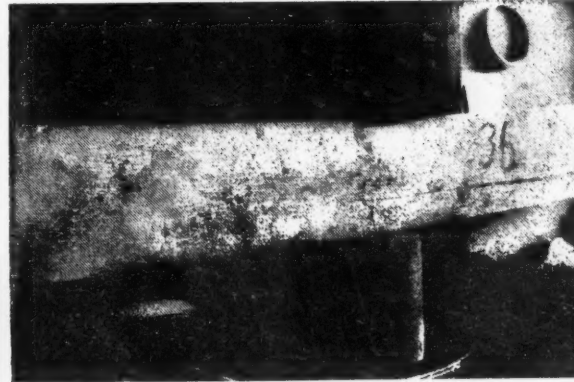
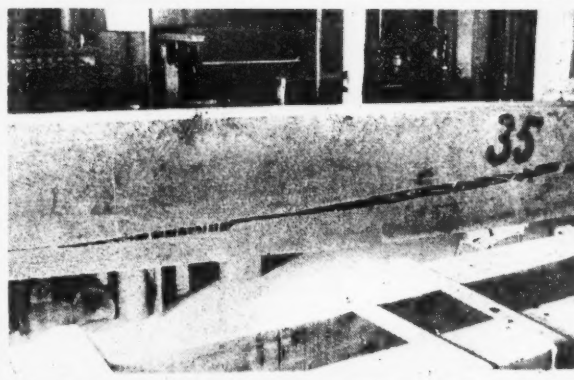
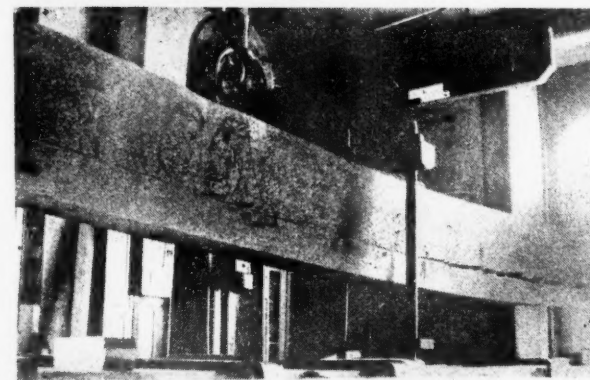
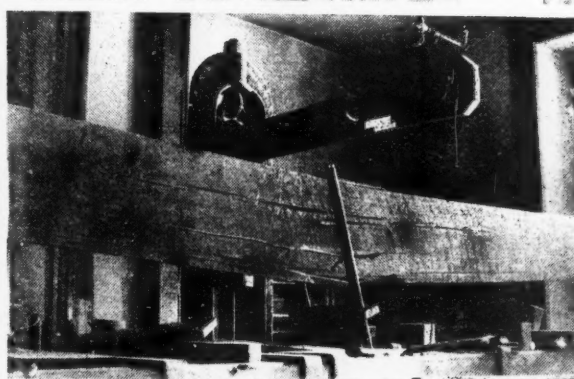
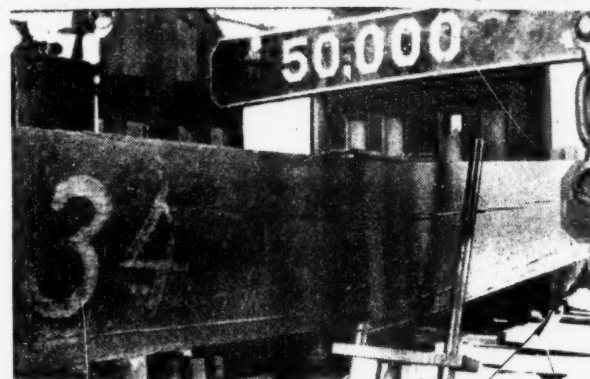
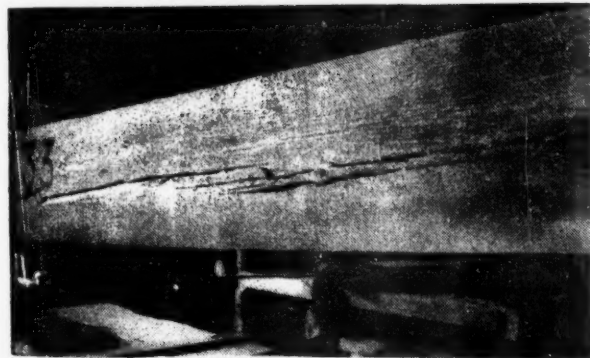
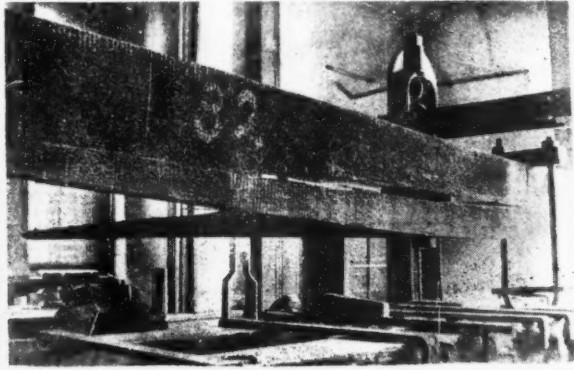
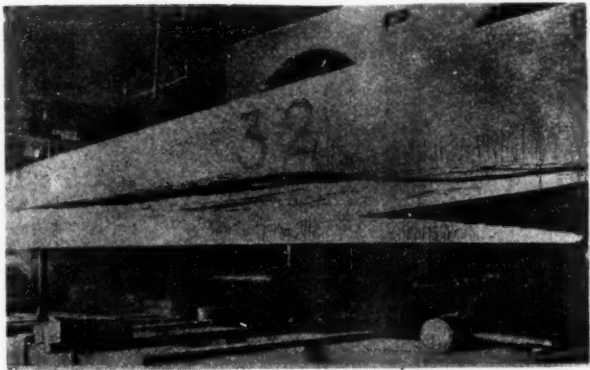
The Engraving is the property of the Architectural Record Co., 211 Broadway, New York.



Cathedral Avila-Spain: Aisle of Apse:

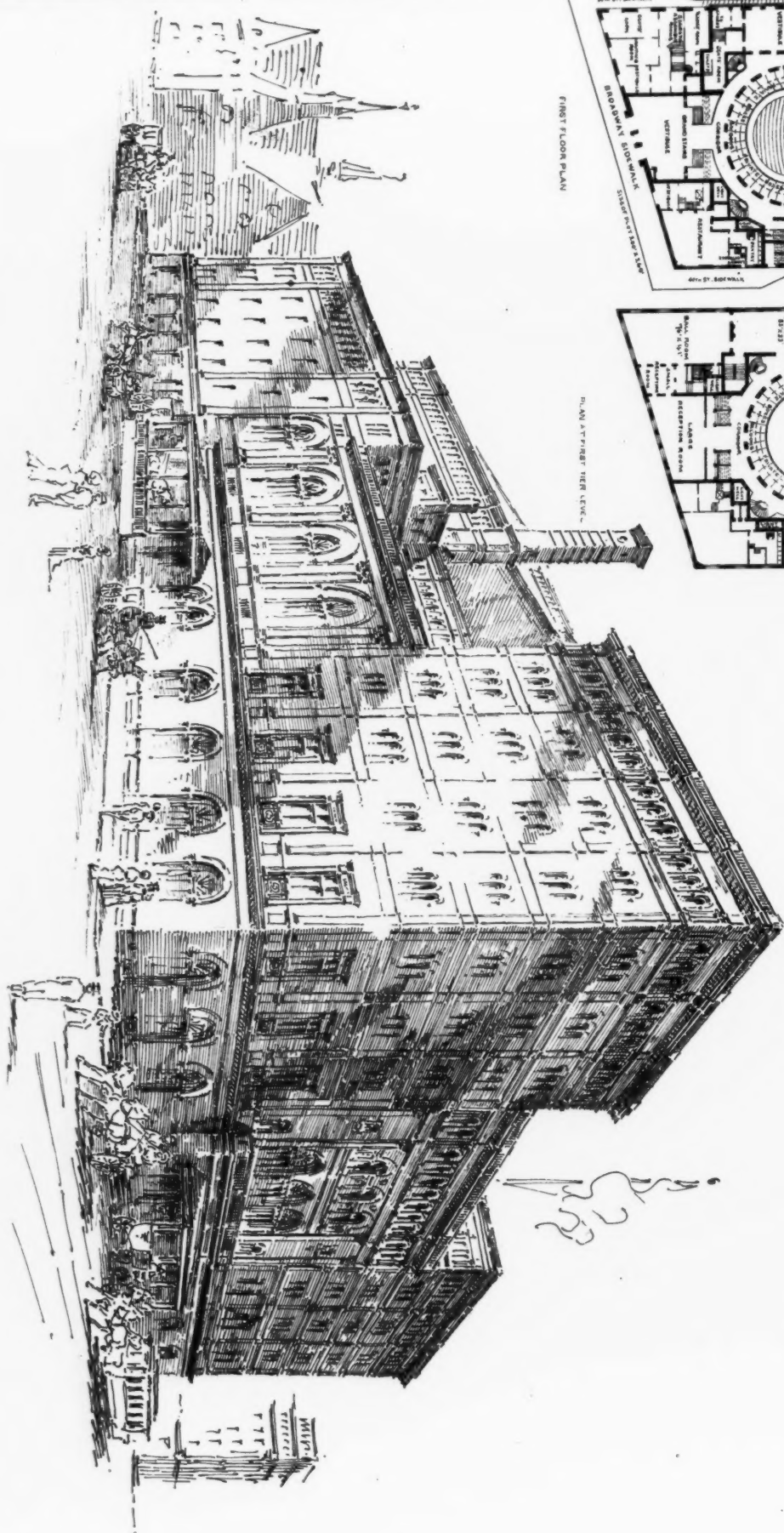


Copyright 1904 by The American Architect and Building News Co.



TRANSVERSE STRENGTH OF BEAMS. PLATE 6

The Heliotyp Printing Co. 211 Tremont St. Boston



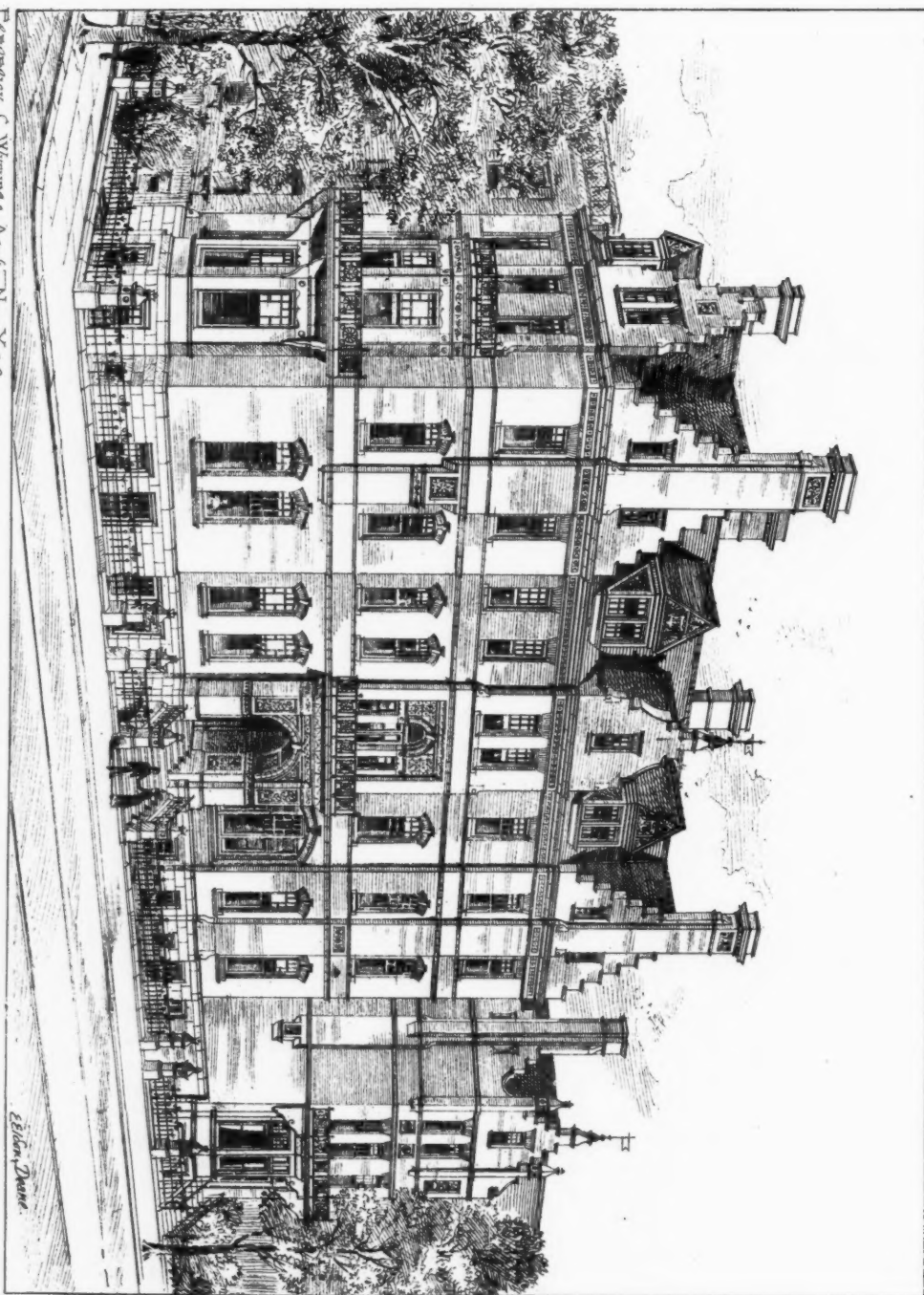
METROPOLITAN OPERA HOUSE.
BROADWAY AND 39TH ST. NEW YORK.
J. CLEVELAND ADY. ARCHT.



● A GROUP OF AMERICAN ARCHITECTS. ●

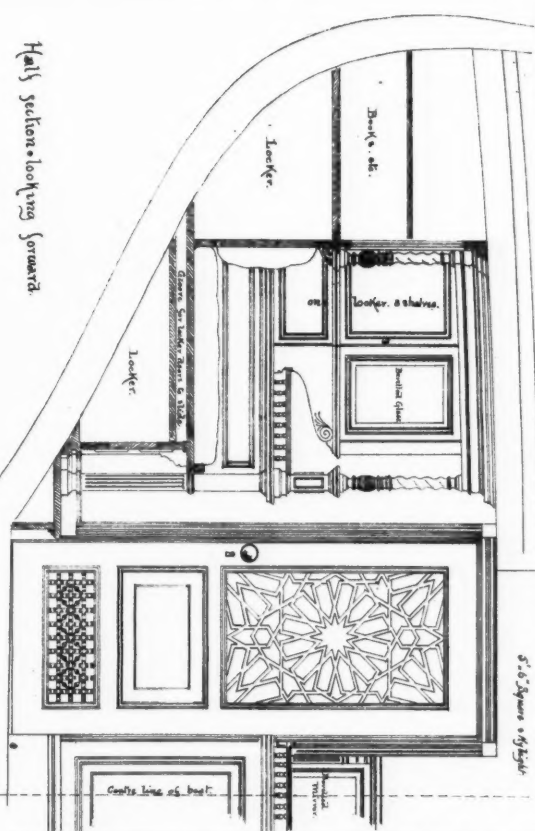
FREDRICK C. WITHERS, Architect, New York

RESIDENCE, EIGHTY-NINTH ST., FOR MR. JOHN F. WYLER



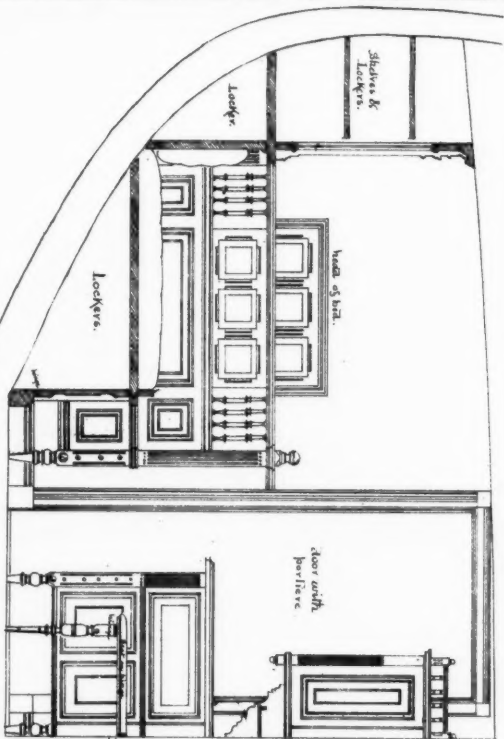
COPYRIGHTED 1884 JAMES R. ORSGOOD & CO

Half section looking forward

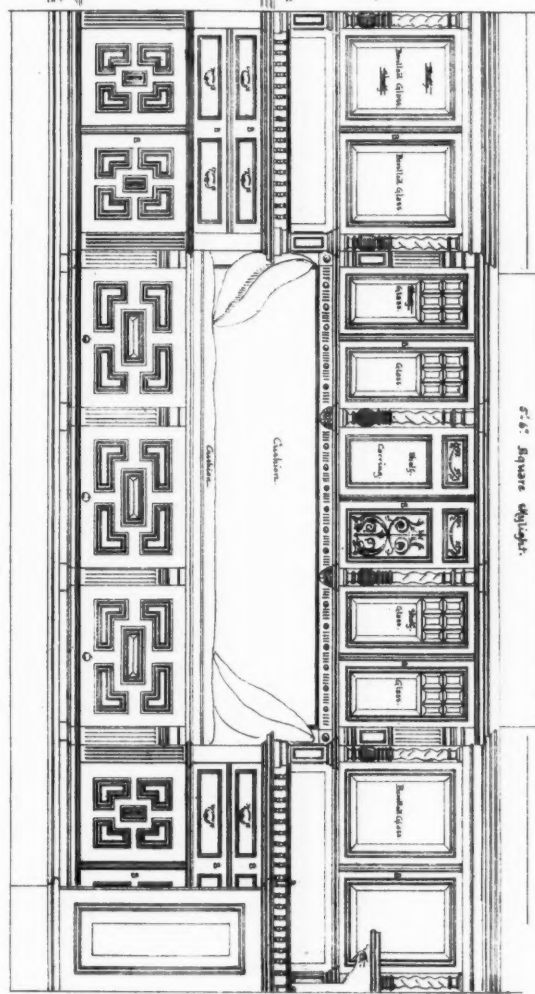


Inside, South of engine room.

Class Section of Stateroom



Front Elevation - longitudinal Section



All external parts to be of quarter oak, all inside fittings to be of pine. All hardware to be of bronze.

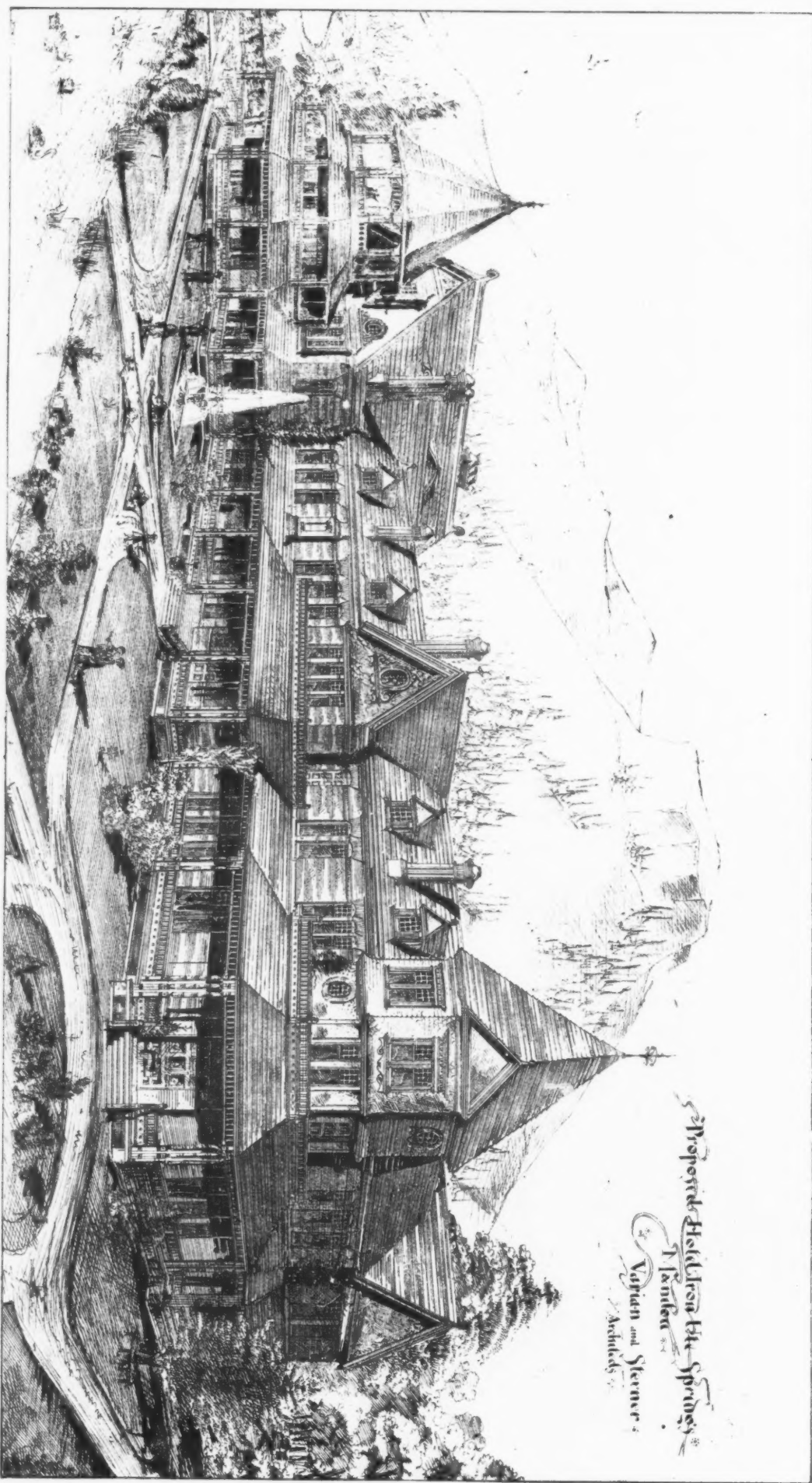
Slopes Water Tanks

See Heavy Beam E.P.

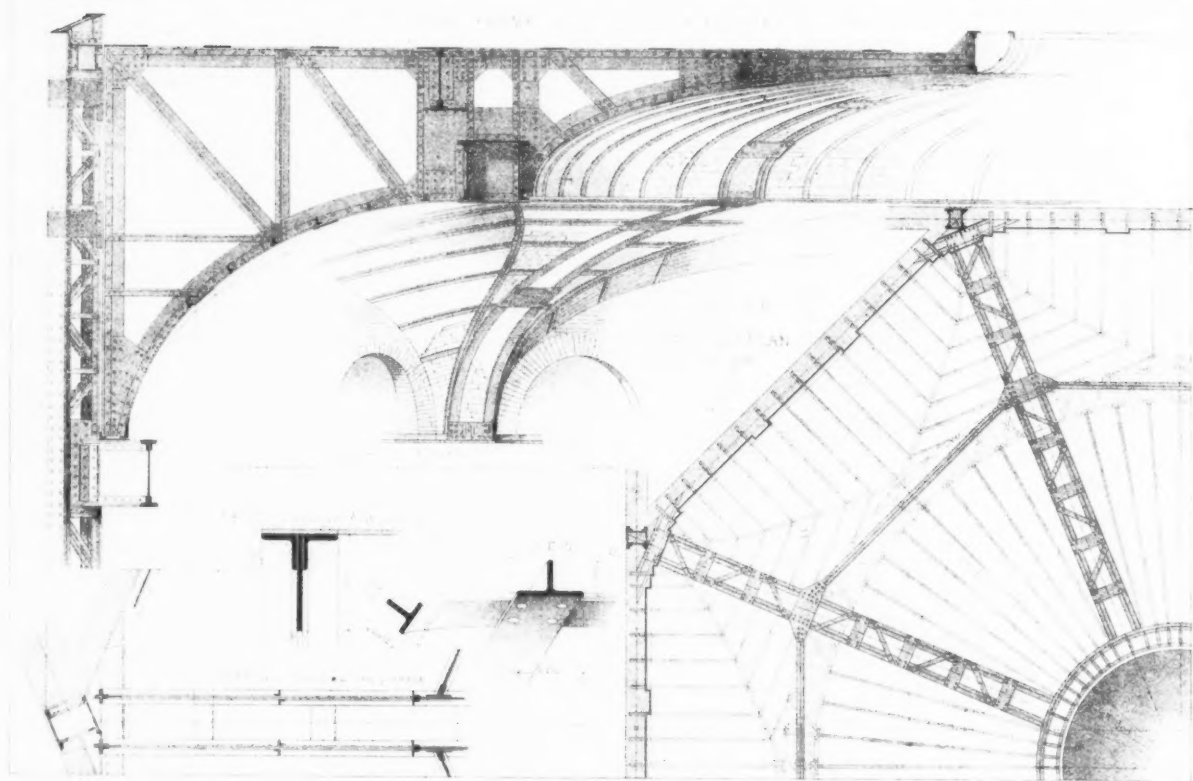
Inside, South of Engine

Engine & Exhaust Archipel & Interior Decorative

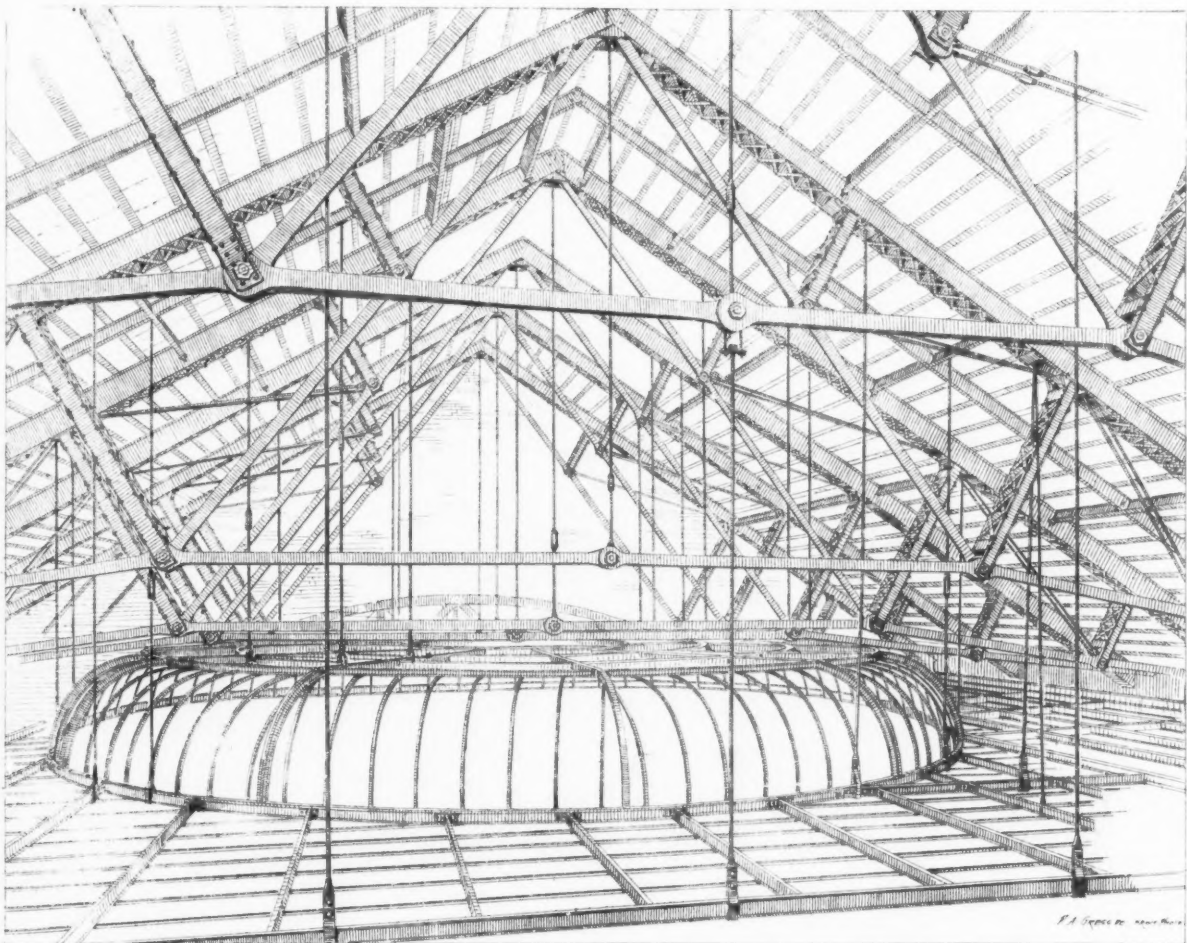
54 Devonshire St. Boston, Mass.



The Building facing to the Westward St. Louis

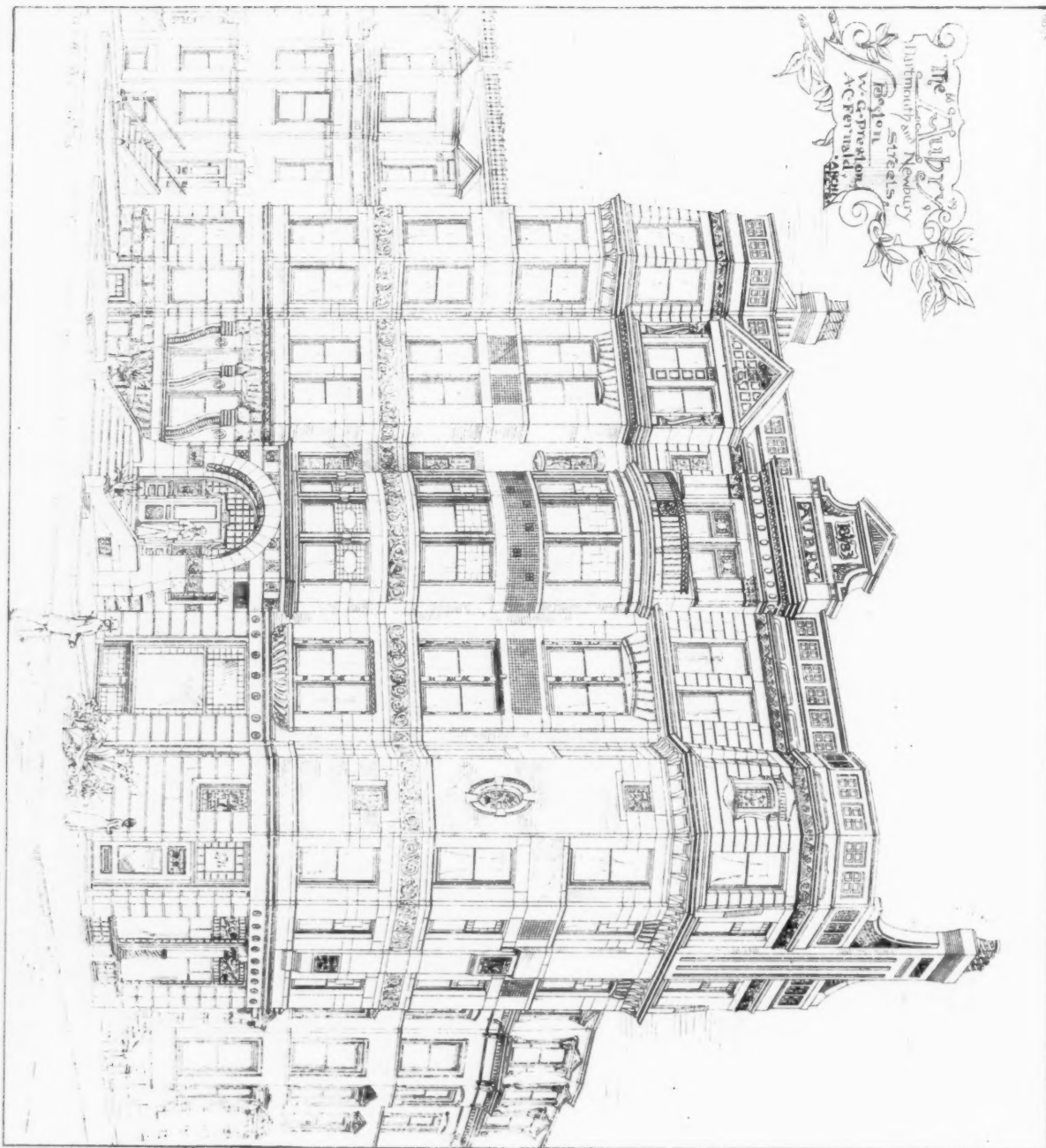


EDEN THEATRE



Roof and Ceiling Construction of the Metropolitan Opera House, Broadway 7th Av. 39-40th Sts New York. J.C. Cady, Architect

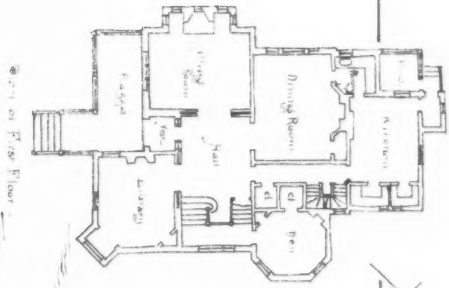
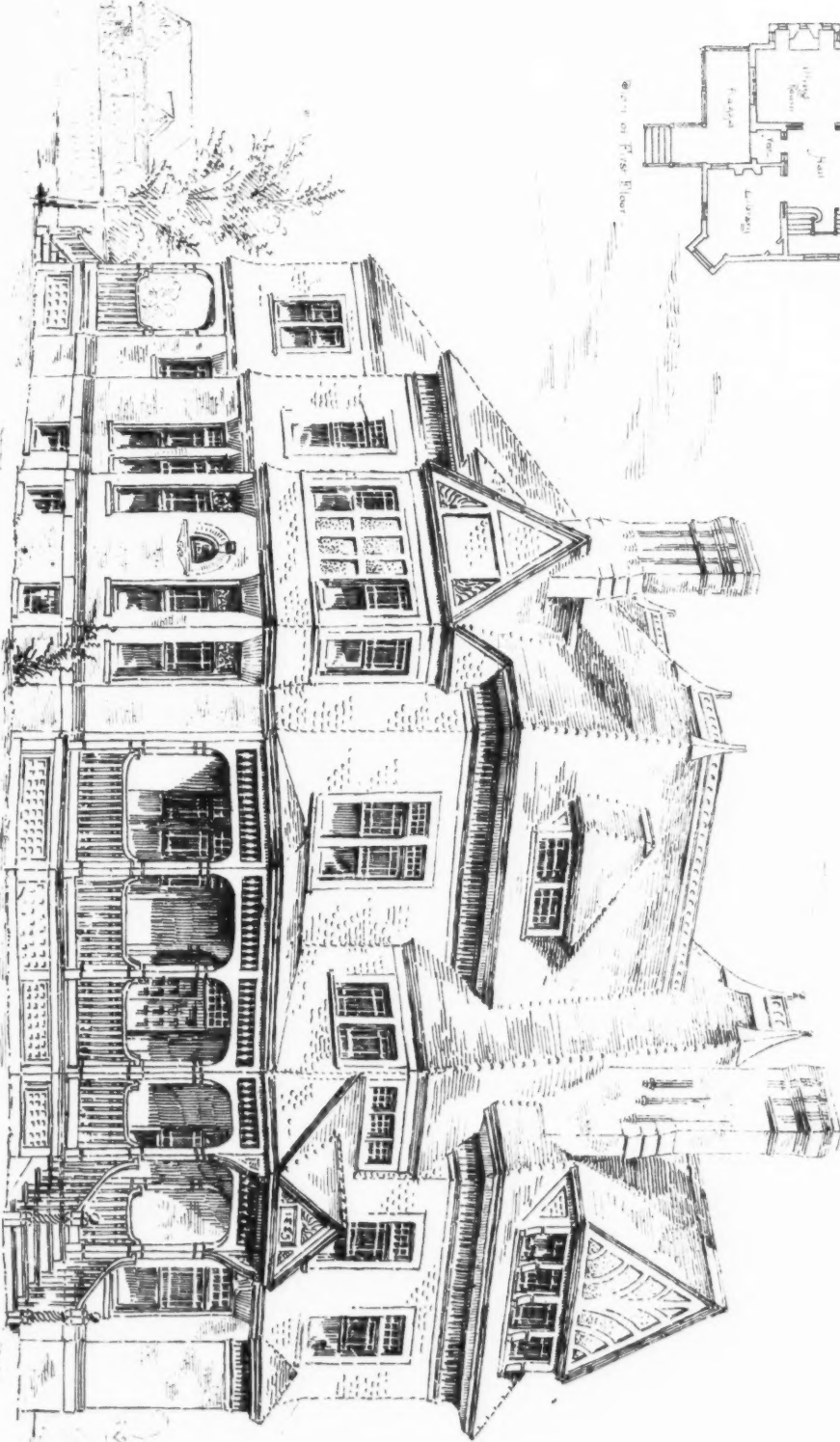
The Helotype Printing Co. Tremont St. Boston

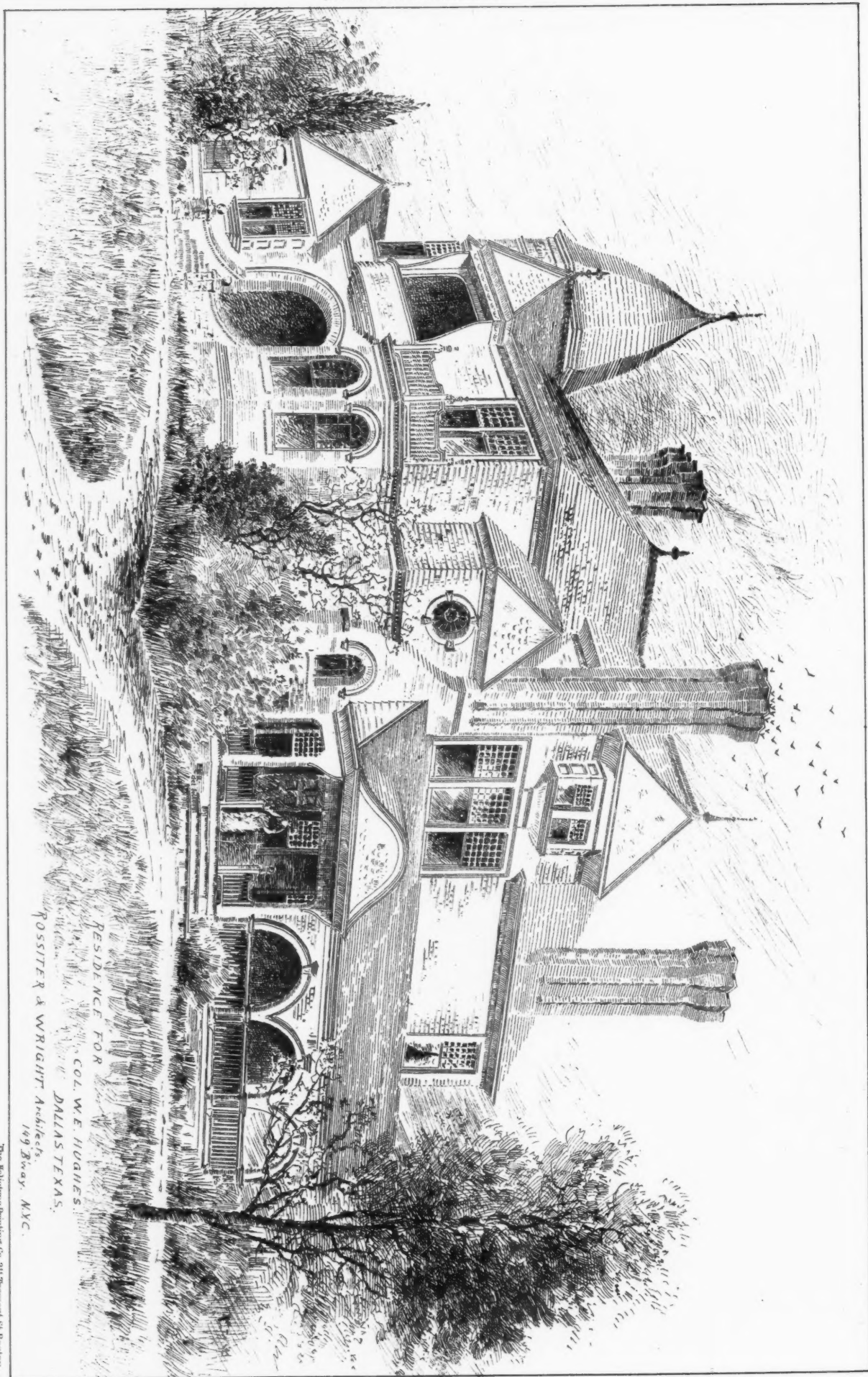


The building is located at 111 Broadway in Boston.

Residence of Wm. A. Prentiss Esq.

Worcester, Mass.
J. B. Tubbs Architect
1883



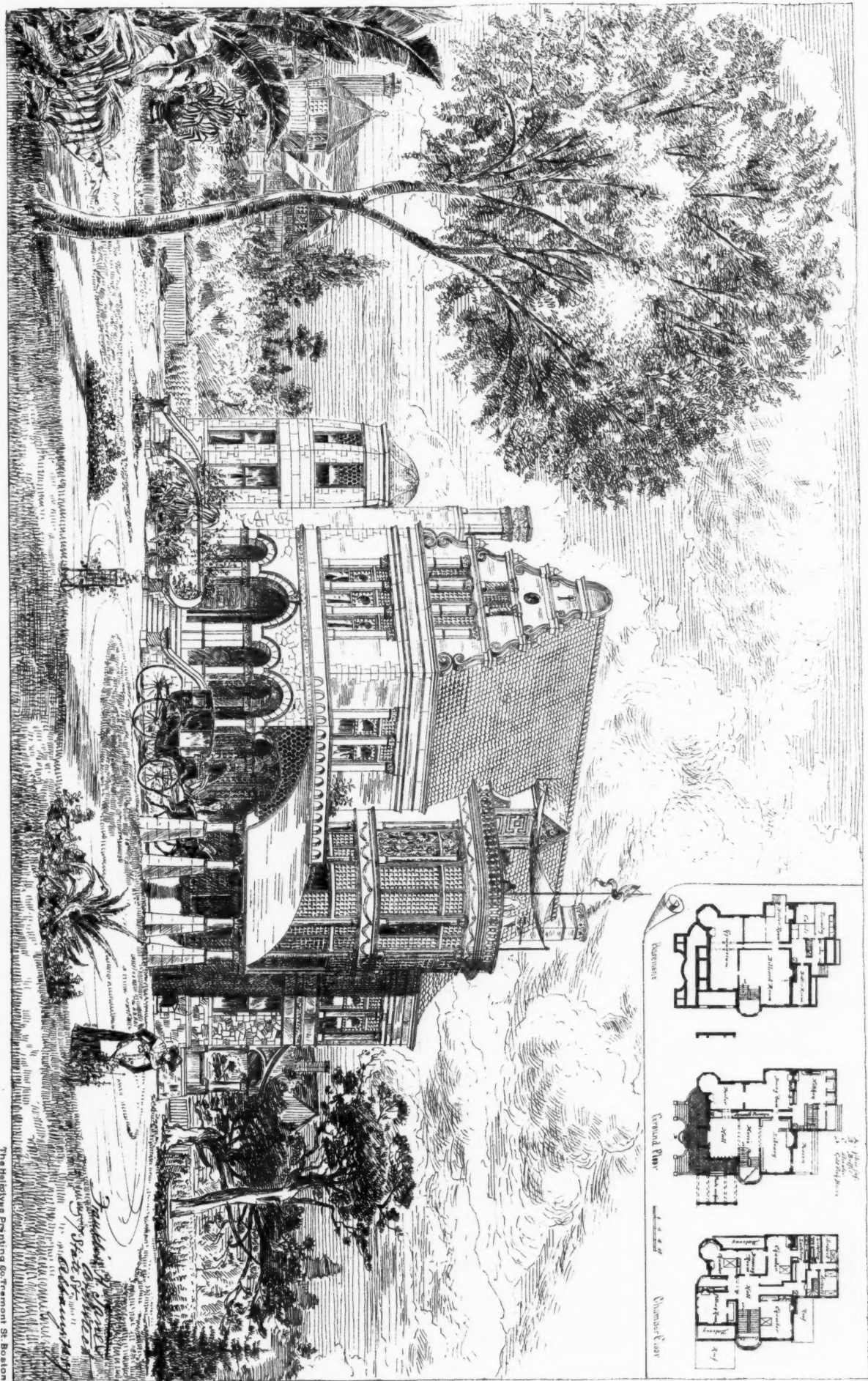


RESIDENCE FOR
COL. W. E. HUGHES,
DALLAS, TEXAS.
ROSSITER & WRIGHT, Architects,
149 Broadway, N.Y.C.

The Engraving Published by 211 Tremont St. Boston.

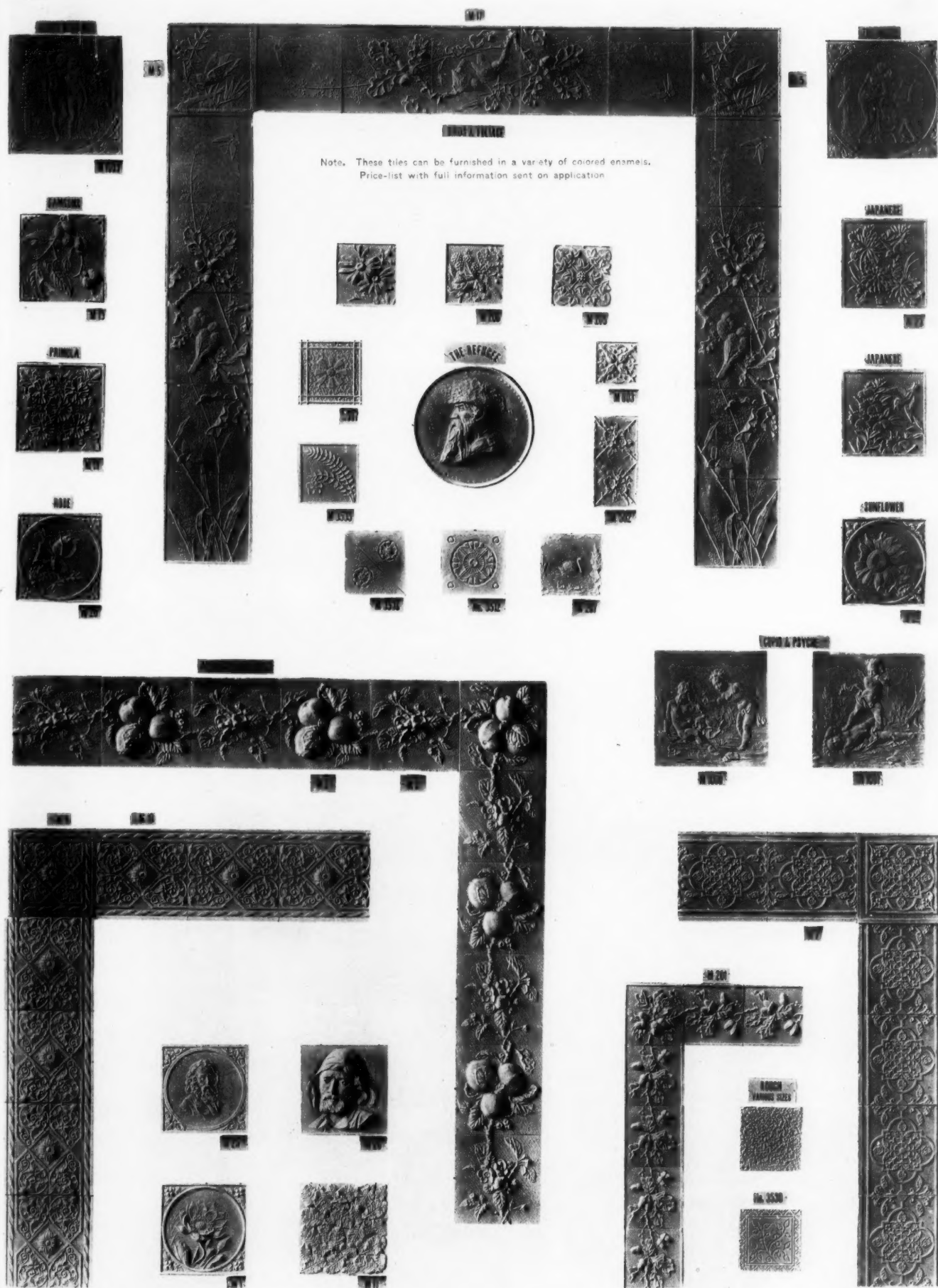
COPYRIGHTED 1884 JAMES R. OSGOOD & CO.

HOUSE AT OSWEGO, N.Y. - FRANKLIN H. JAMES, ARCHT. ALBANY, N.Y.



Theobalds Printing Co. Tremont St. Boston.





AMERICAN ART INDUSTRIES. — NO. II.

HIGH-ART MAJOLICA TILES FOR MANTEL FACINGS, ETC.

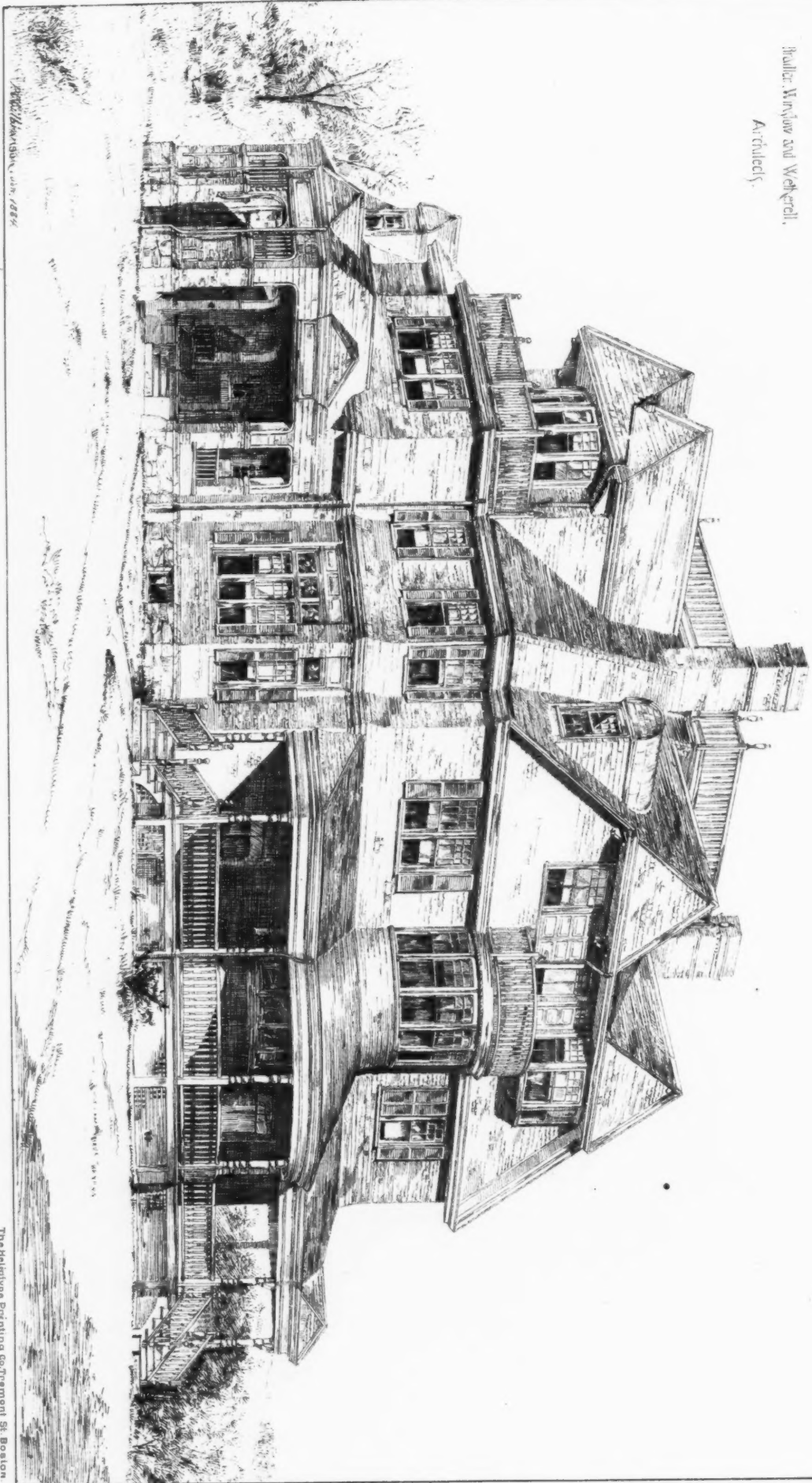
SCALE 1 1/2" = 1'.

UNITED STATES ENCAUSTIC TILE COMPANY, INDIANAPOLIS, IND.

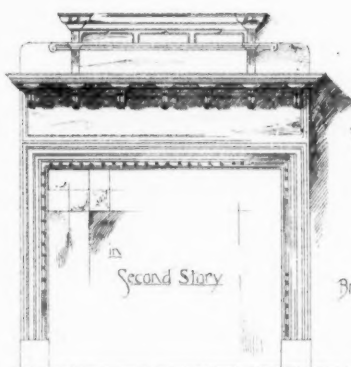
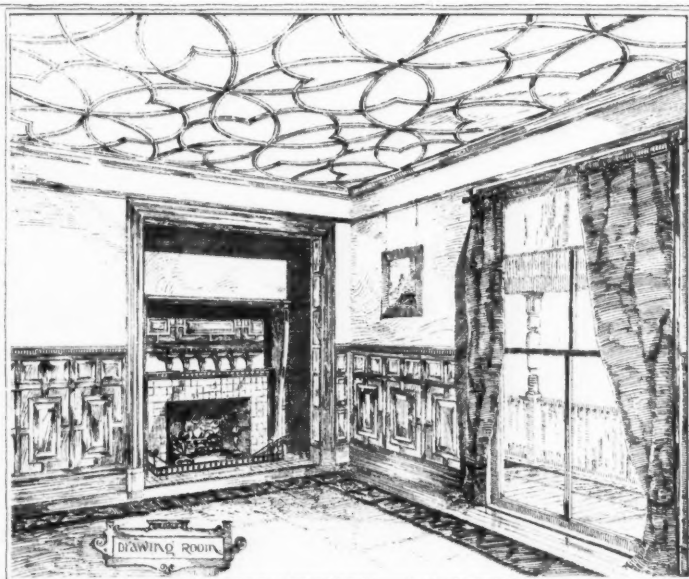
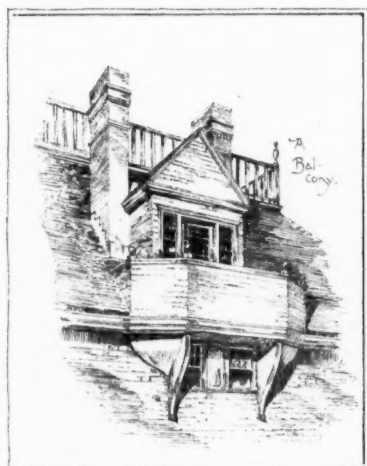
House for W. D. Forbes Esq.

Roxbury, Mass.

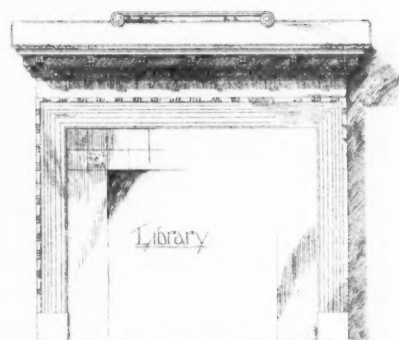
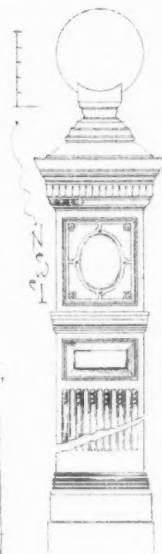
Walter W. Whitcomb and Wetherell,
Architects.



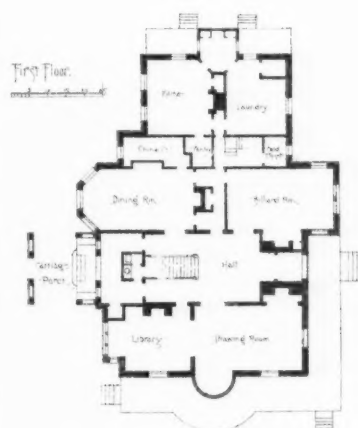
The Helotype Printing Co. Framed St. Boston



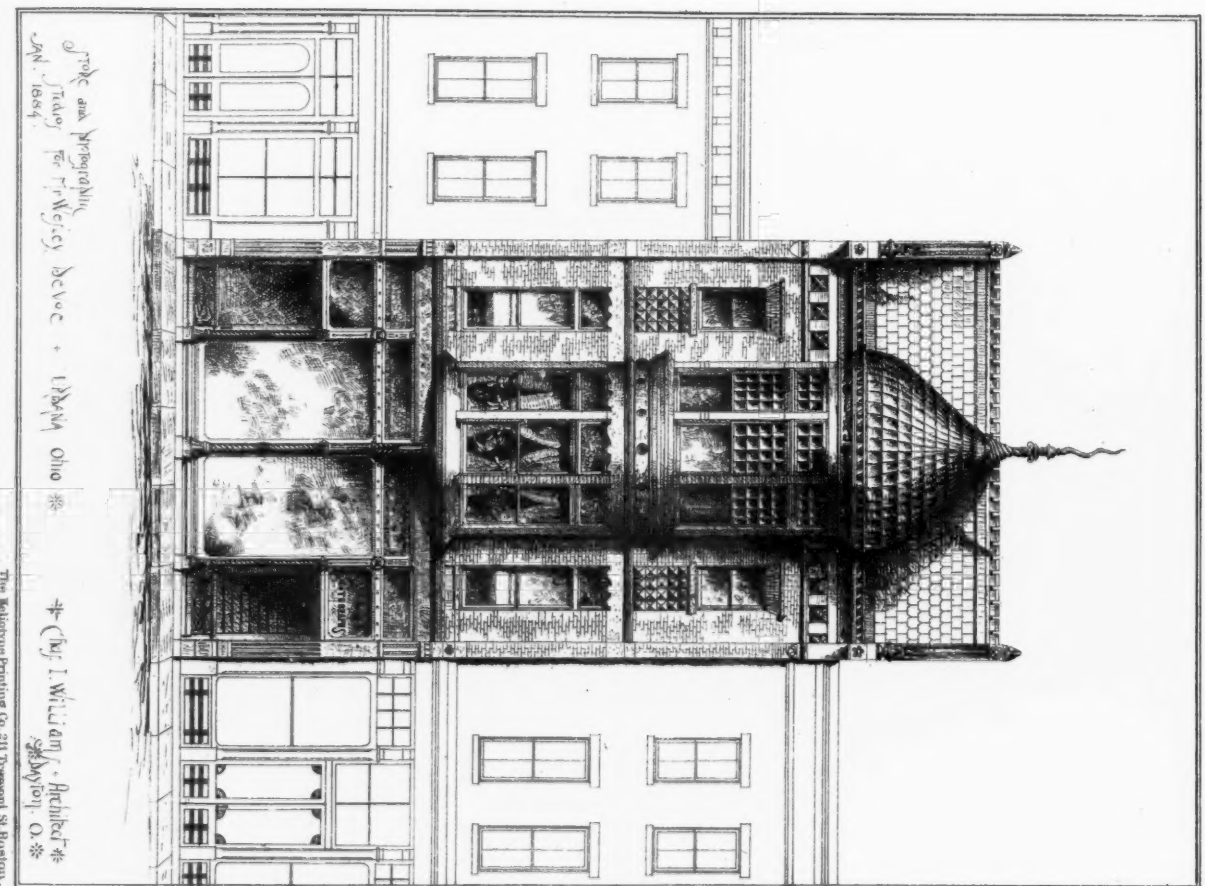
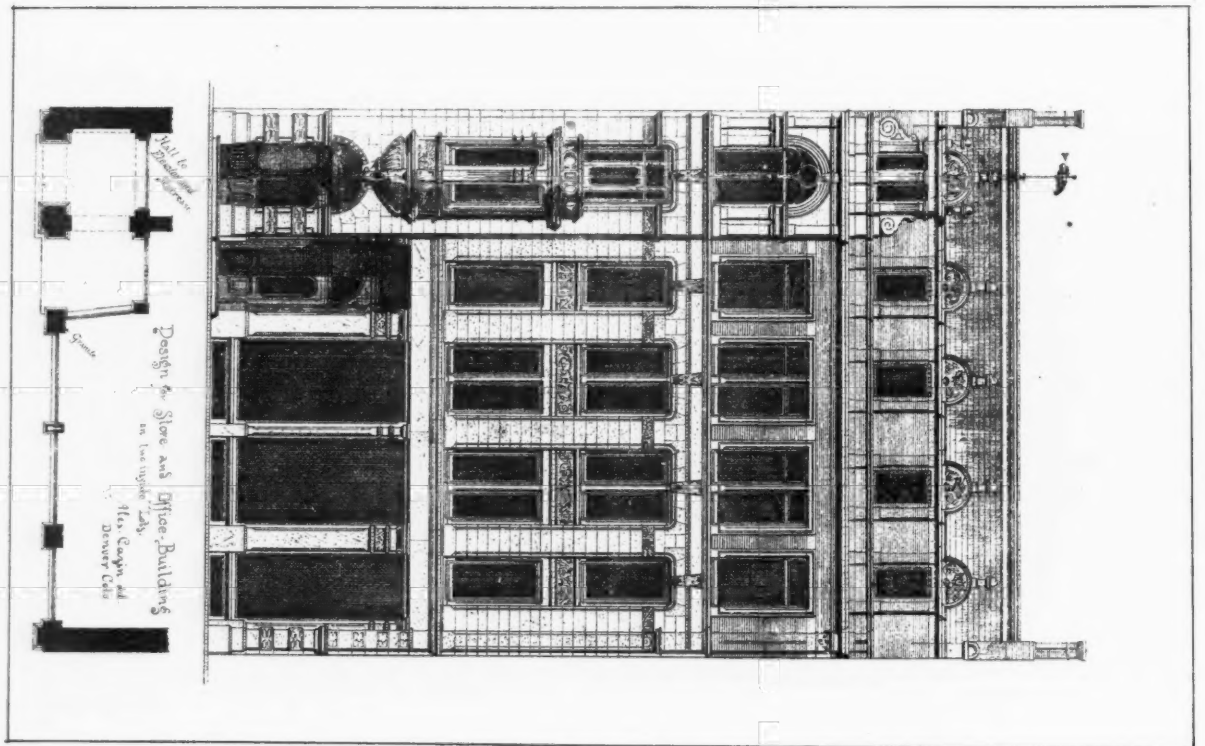
House for
W^m D Forbes, Esqre.,
Roxbury,
Mass.
Bradlee,
Winslow
& Wetherell,
Architects.



P. G. Gallivan, del. 1883



The Reliotype Printing Co. 211 Tremont St. Boston.



Store and Propaganda
 Store for Propaganda
 Apr. 1884.

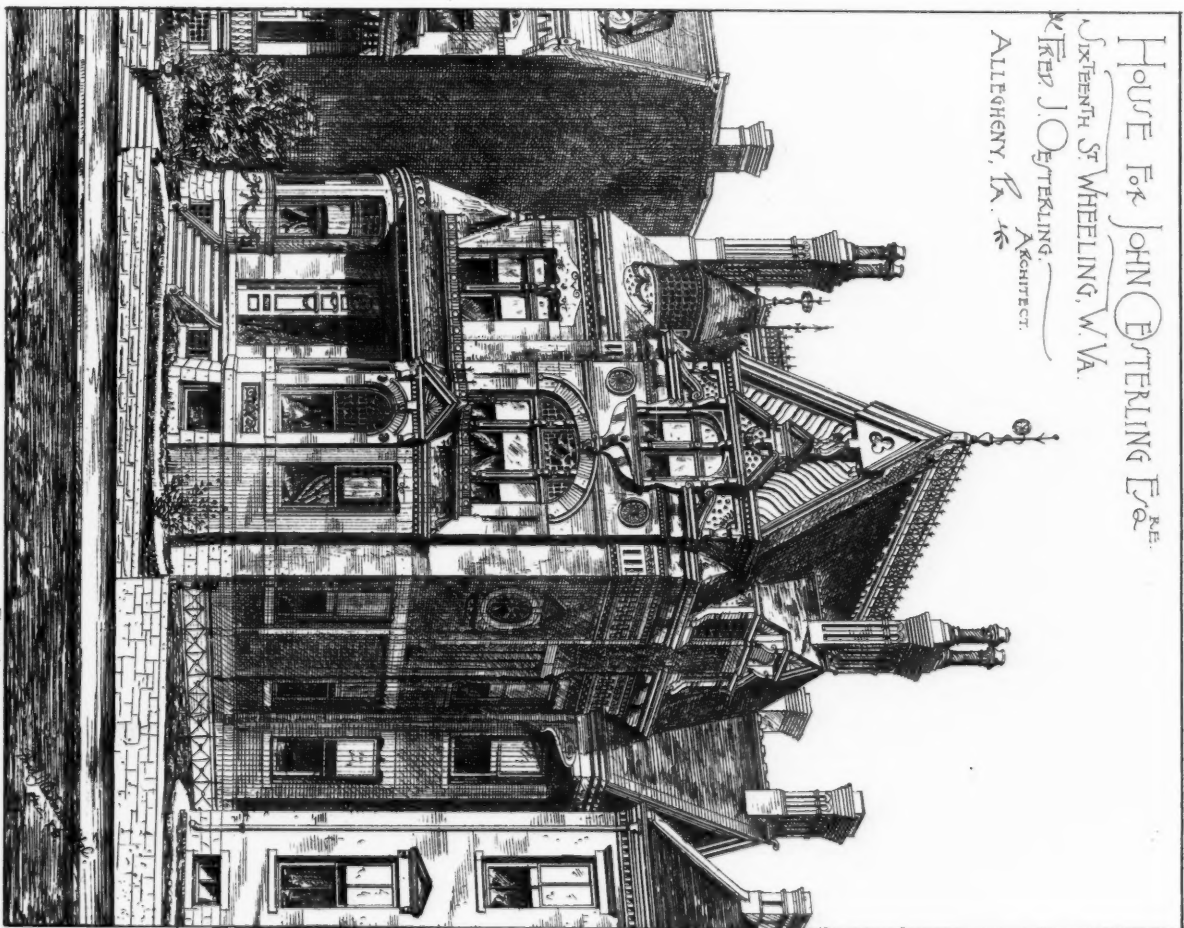
By J. B. Osgood, Architect
 J. B. Osgood, O.

The Kelsey Printing Co. 211 Tremont St. Boston.

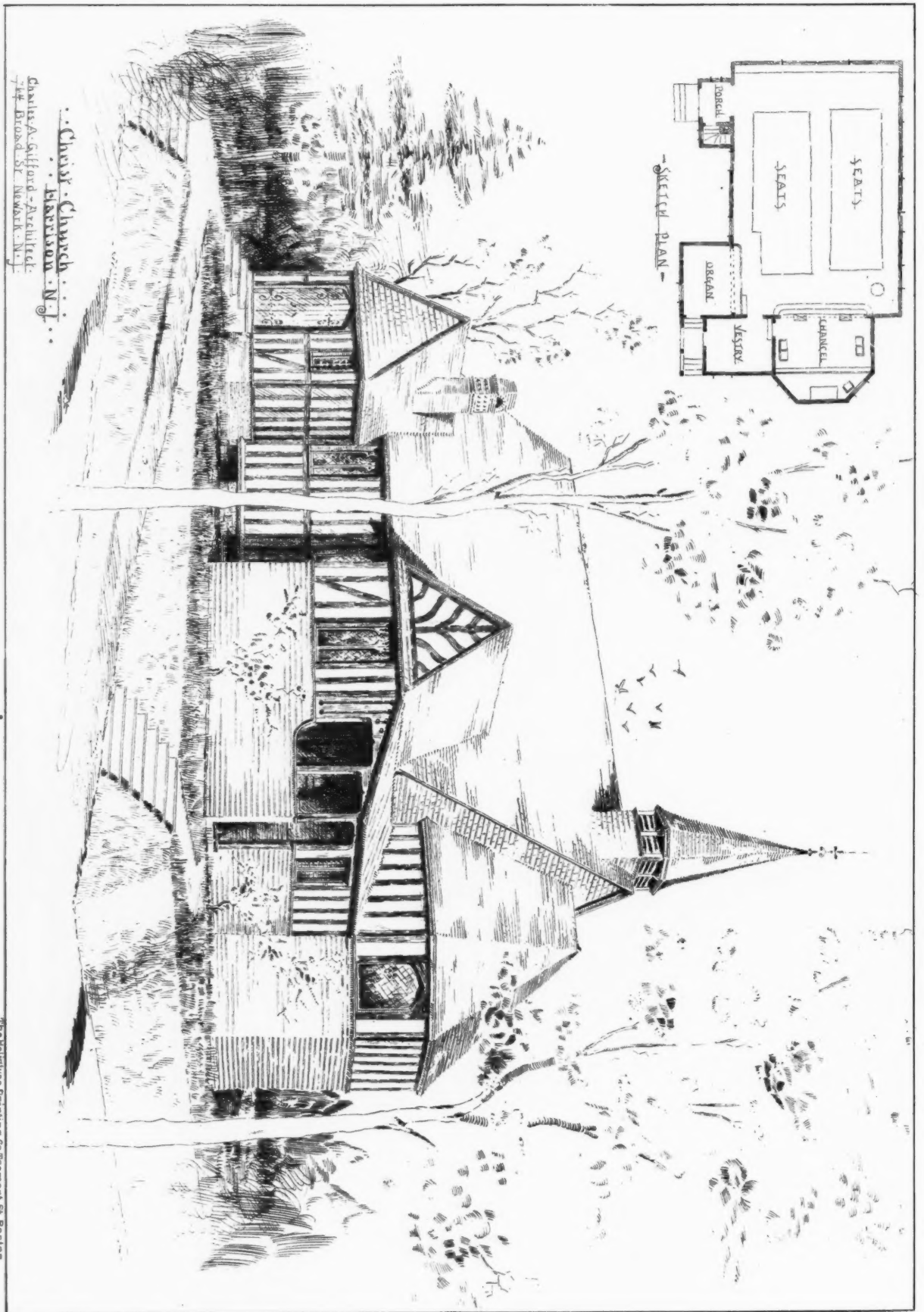
COPYRIGHTED 1884 JAMES R. OSGOOD & CO.



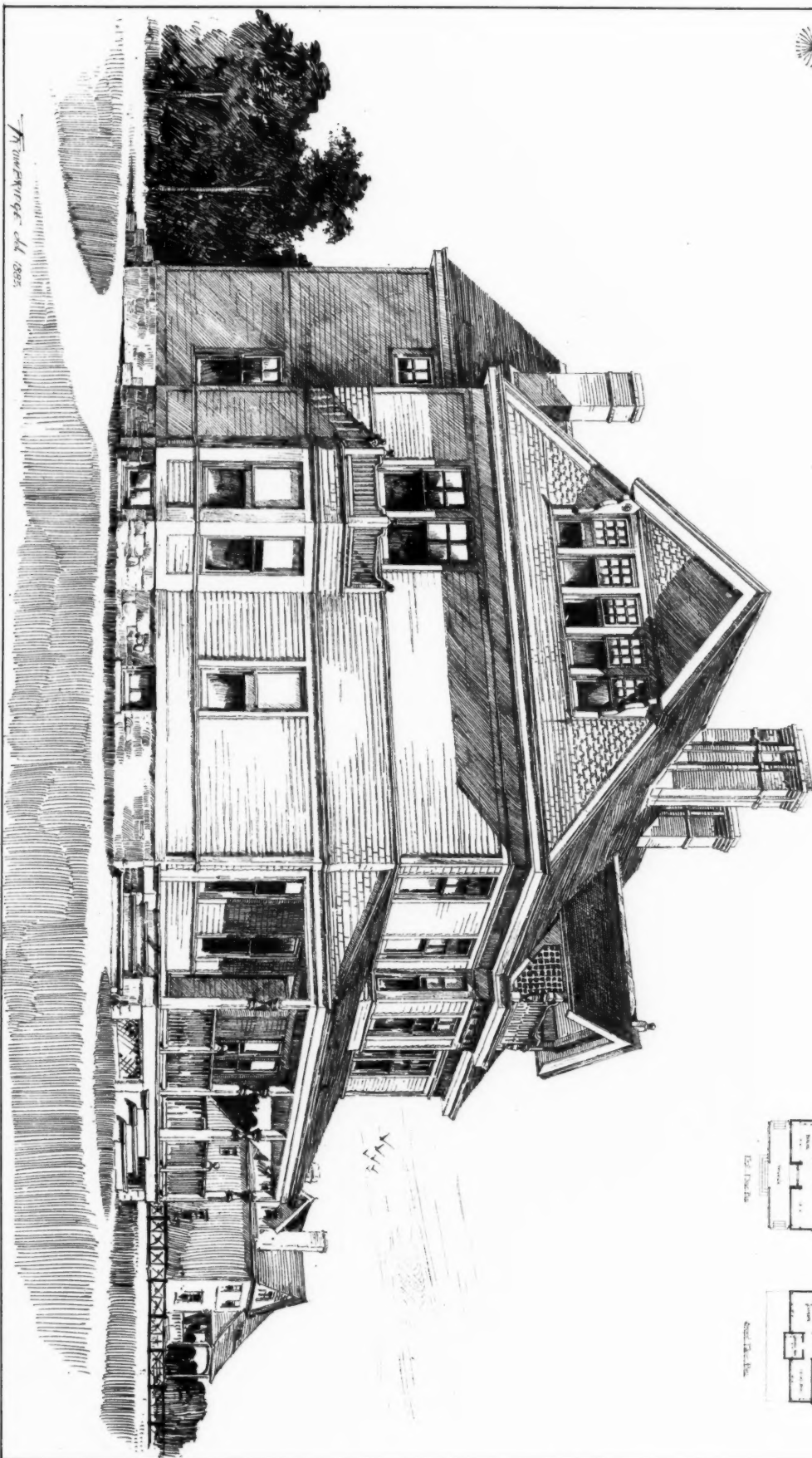
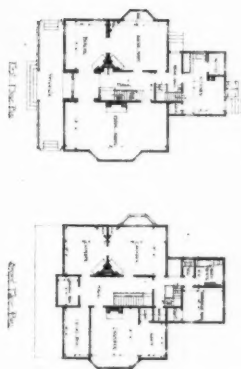
RESIDENCE of Geo. B. Swain Esq.
at Newark, N. J.
FALLS & BOTTICHER, ARCHITECT.
333 S. 3d ST. NEWARK, N. J.



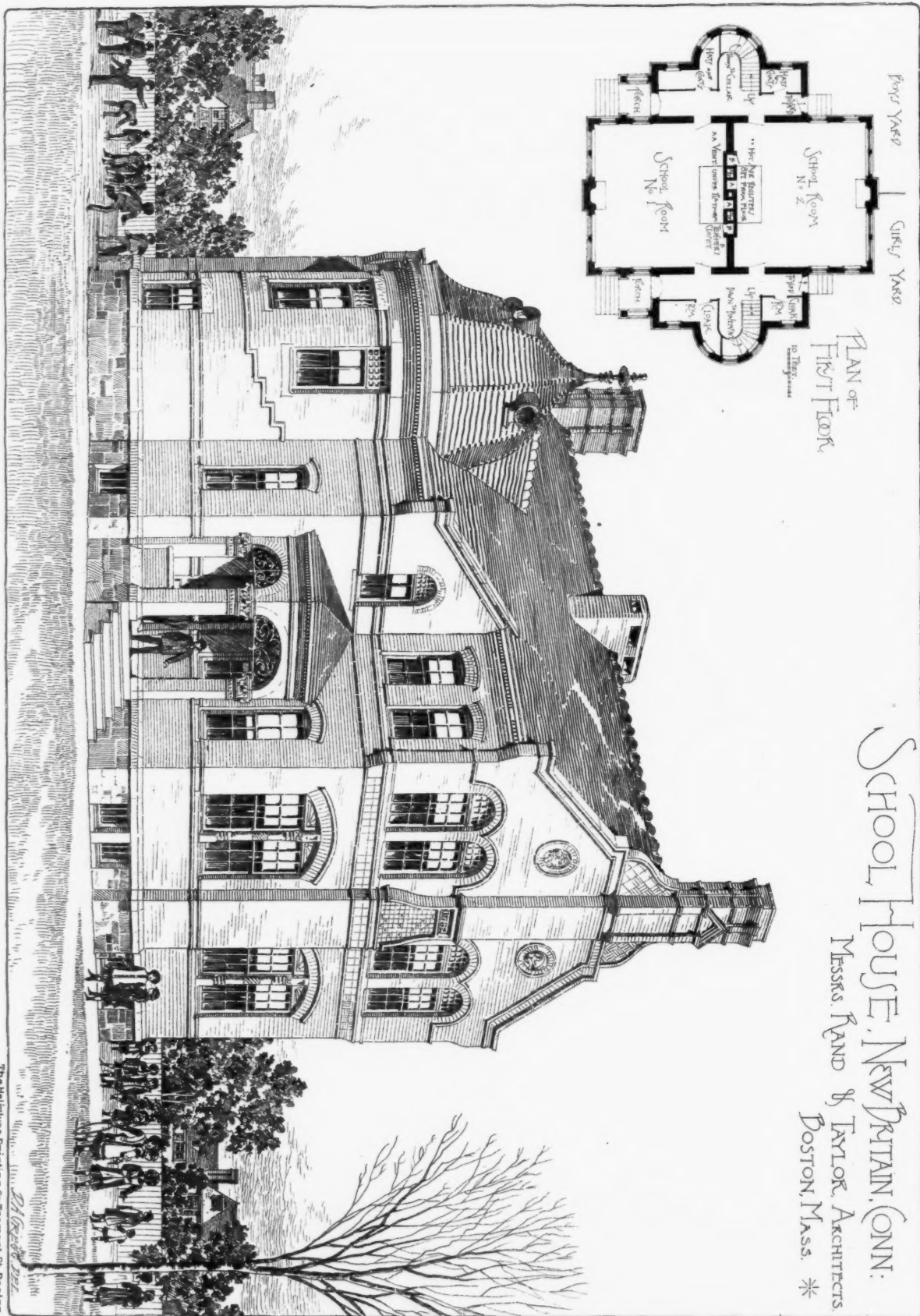
HOUSE for JOHN OSTERLING Esq.
SIXTEENTH ST. WHEELING, W. VA.
JAMES J. OSTERLING,
ARCHITECT.
ALLEGHENY, PA.



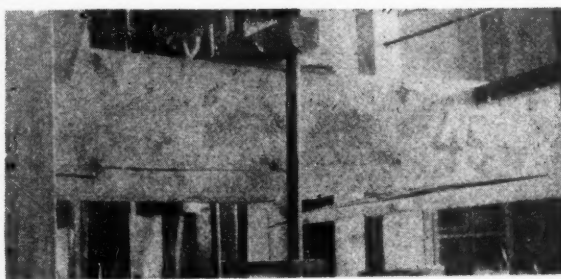
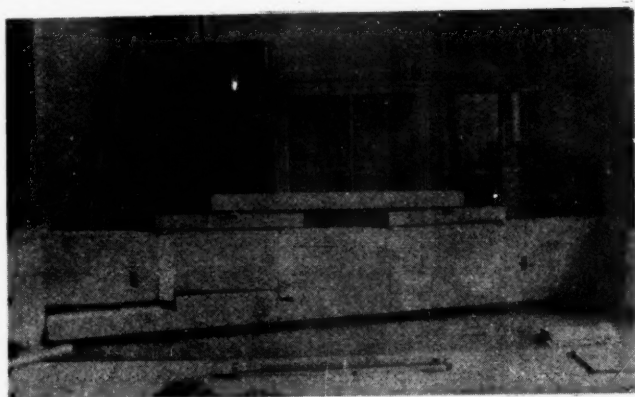
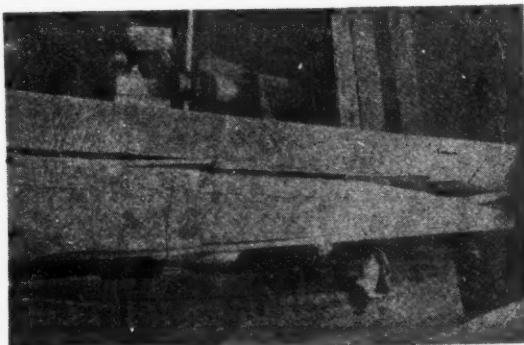
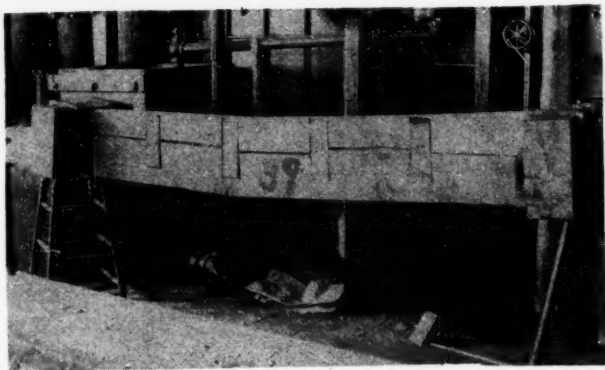
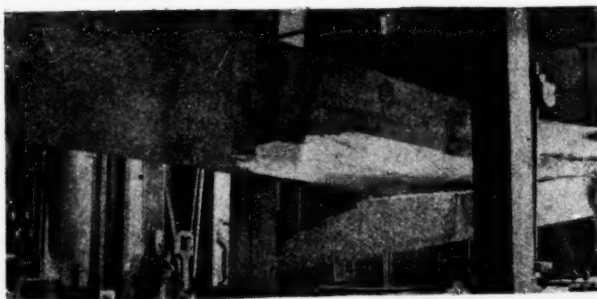
Residence of Ayler Street East
 Capt. Washington, C. O.
 Mr. E. Anderson Archt.
 (Memphis, O.)



—*Am. Architect*— Oct. 1883

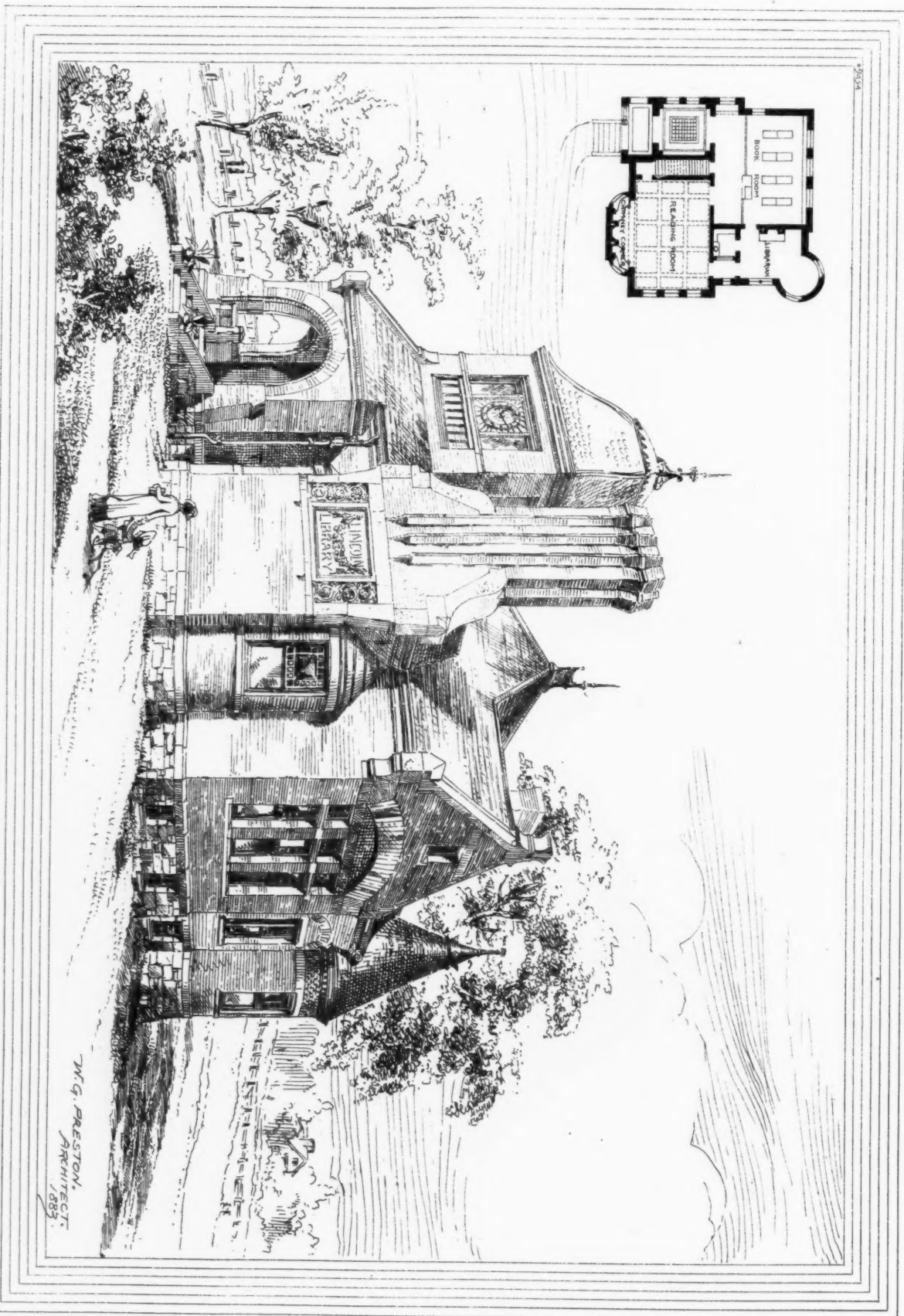


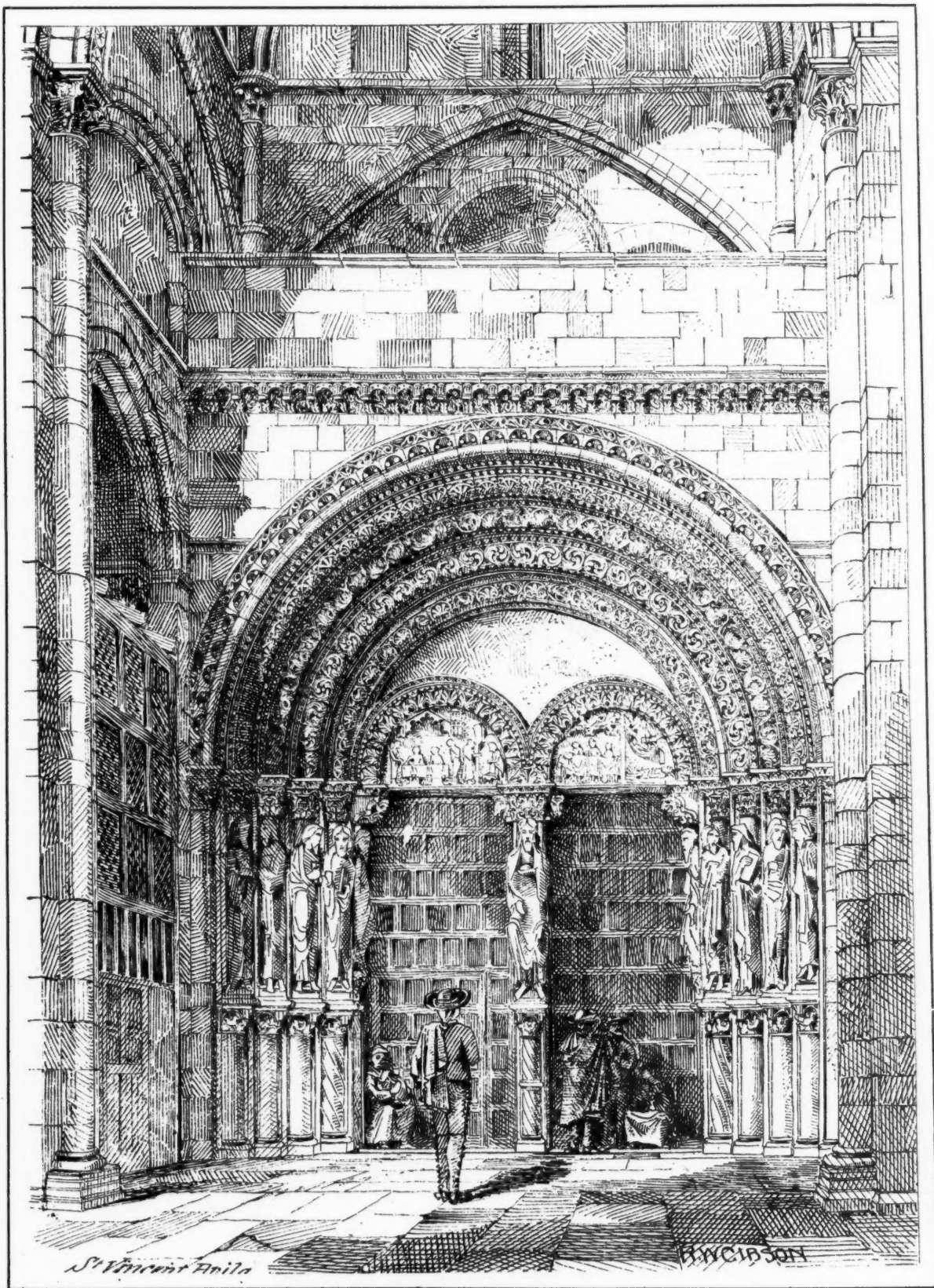
The Herald Printing Co. Tremont St. Boston.



The Relotype Printing Co. 211 Tremont St. Boston.

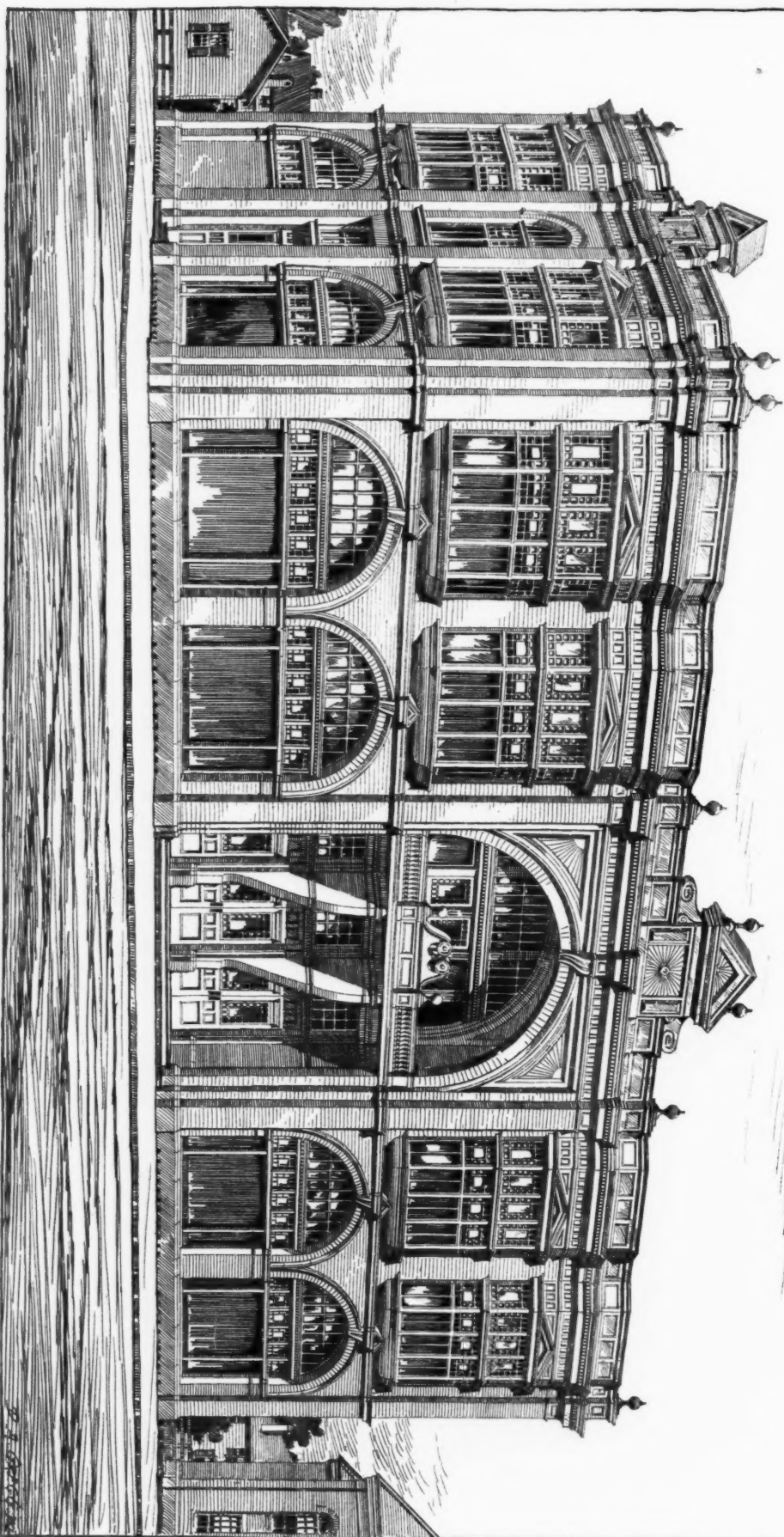
TRANSVERSE STRENGTH OF BEAMS. PLATE 7.





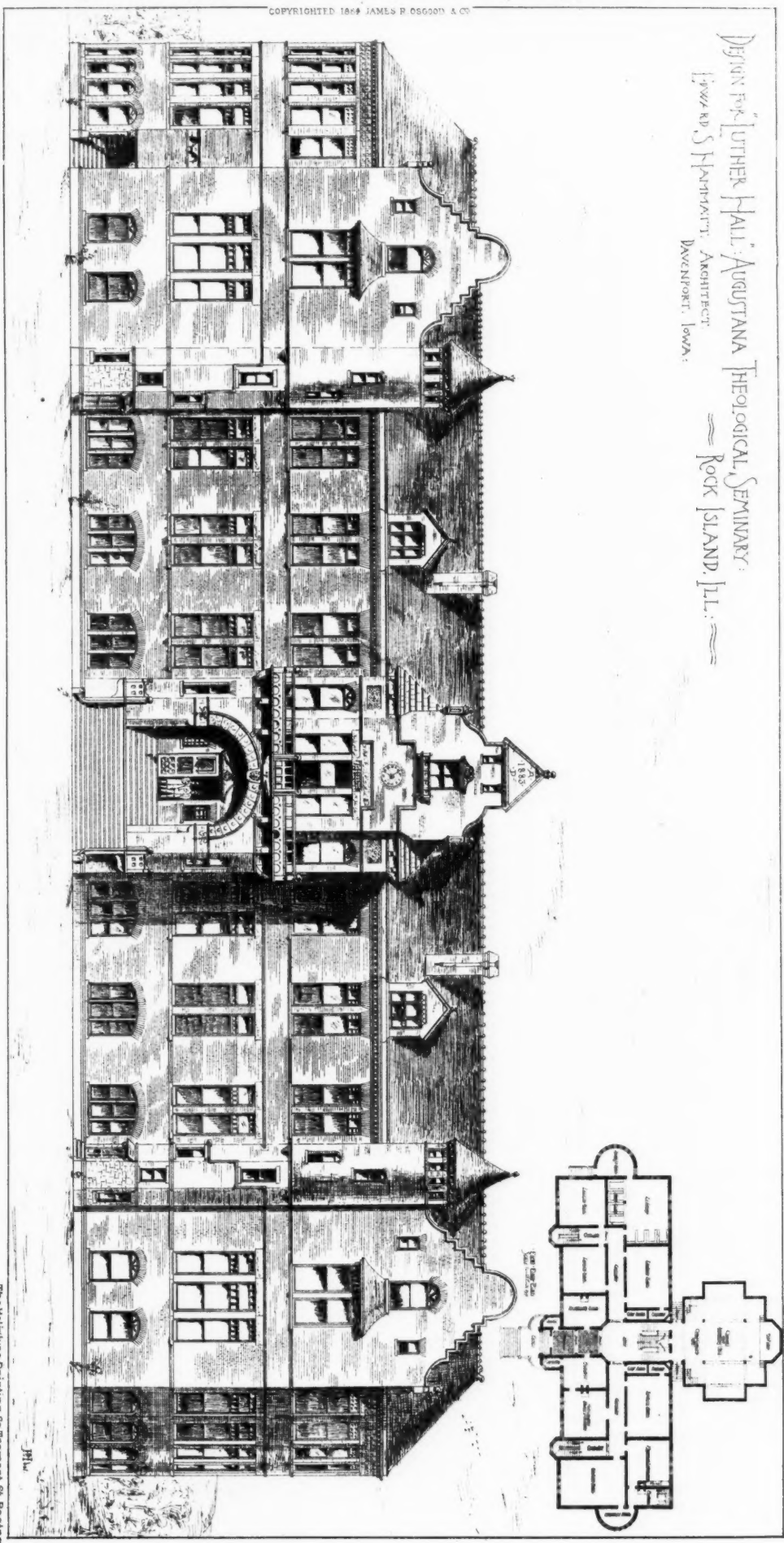
San Vincent Avila, Spain: West Doorway:

OF GOODY STORE, BUILT BY
MR. THOS. F. WRIGHT, 55 OLIVER STREET, BOSTON.
ACQUITTED



The Building Printing Co. 211 Tremont St. Boston.

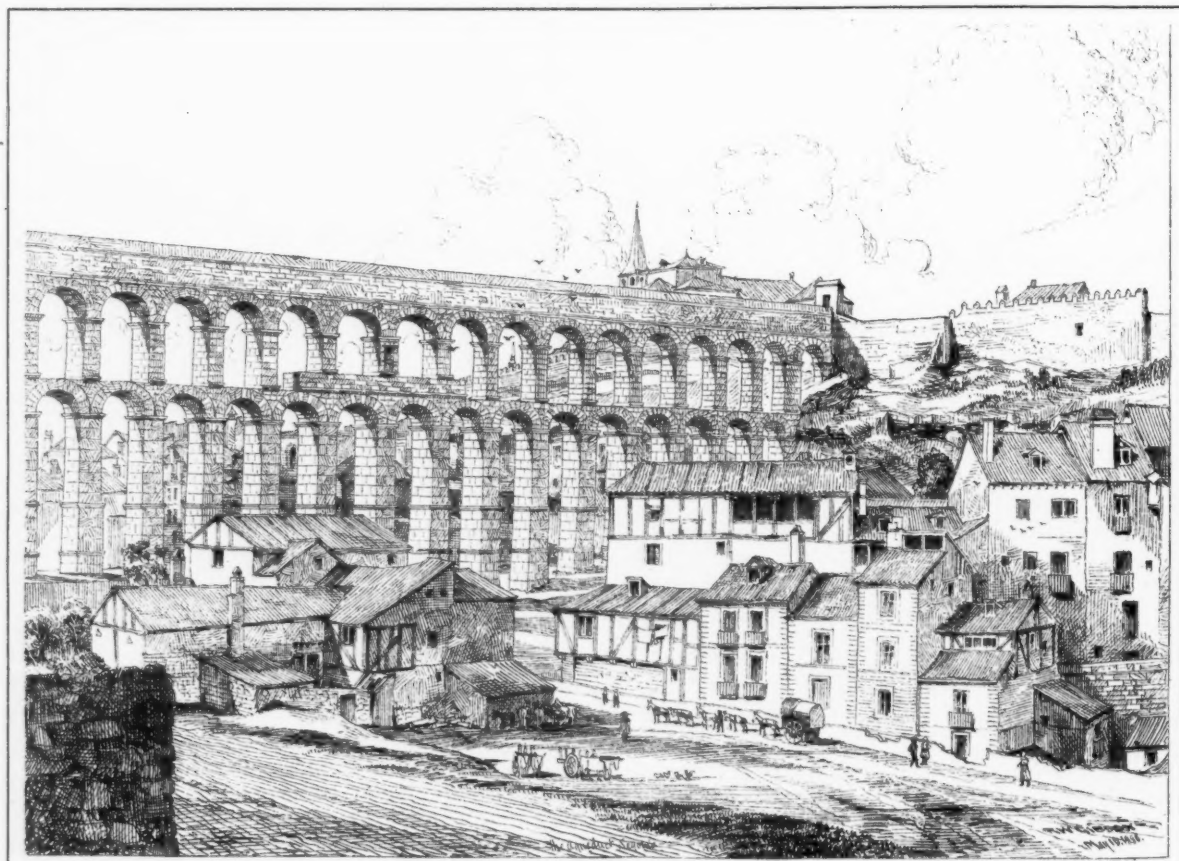
DESIGN FOR "LUTHER HALL," AUGUSTANA THEOLOGICAL SEMINARY:
 [FURNISH AND SUPPLEMENTARY ARCHITECT]
 DAVENPORT, IOWA:
 == ROCK ISLAND, ILL. ==





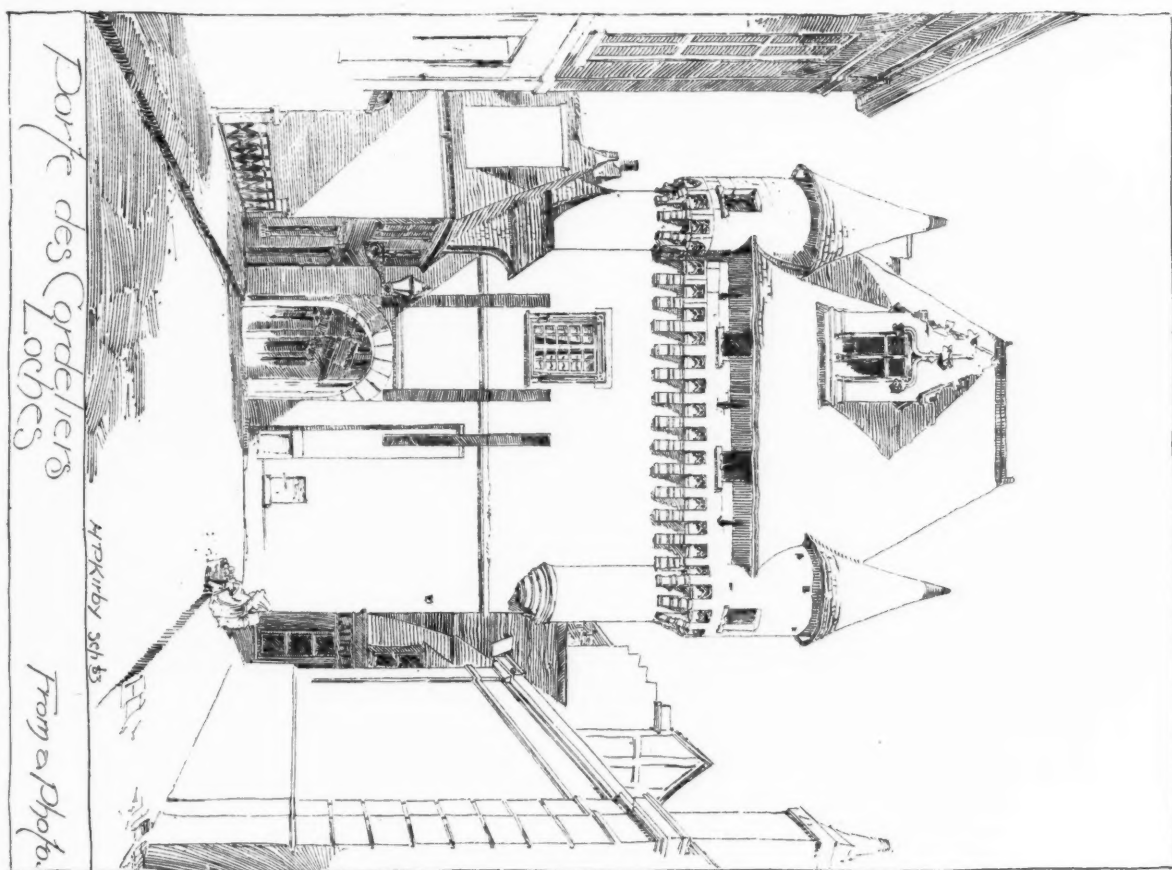
ESTABLE FOR
W. L. BUTLER ESQ
BROOKLYN, L. I.

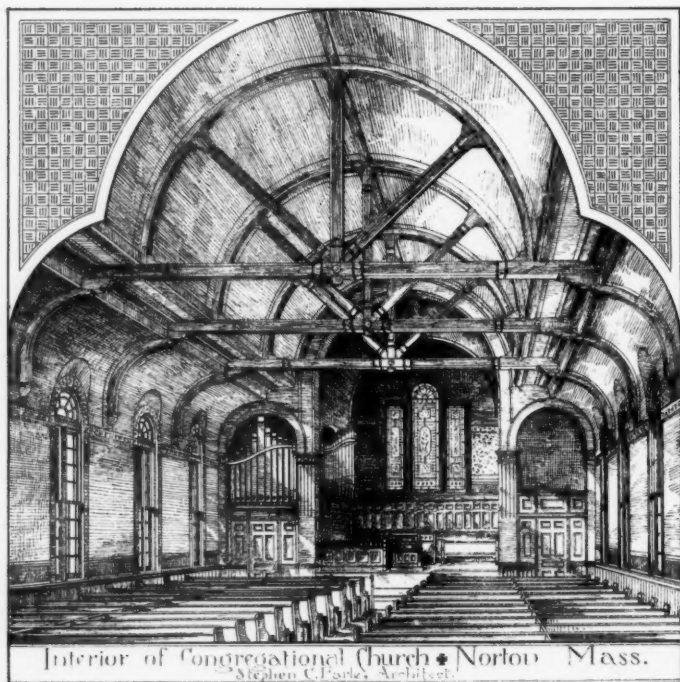
ROSSITER & WRIGHT Architects
149, Broadway, N.Y.C.



THE AQUEDUCT • SEGOVIA • SPAIN

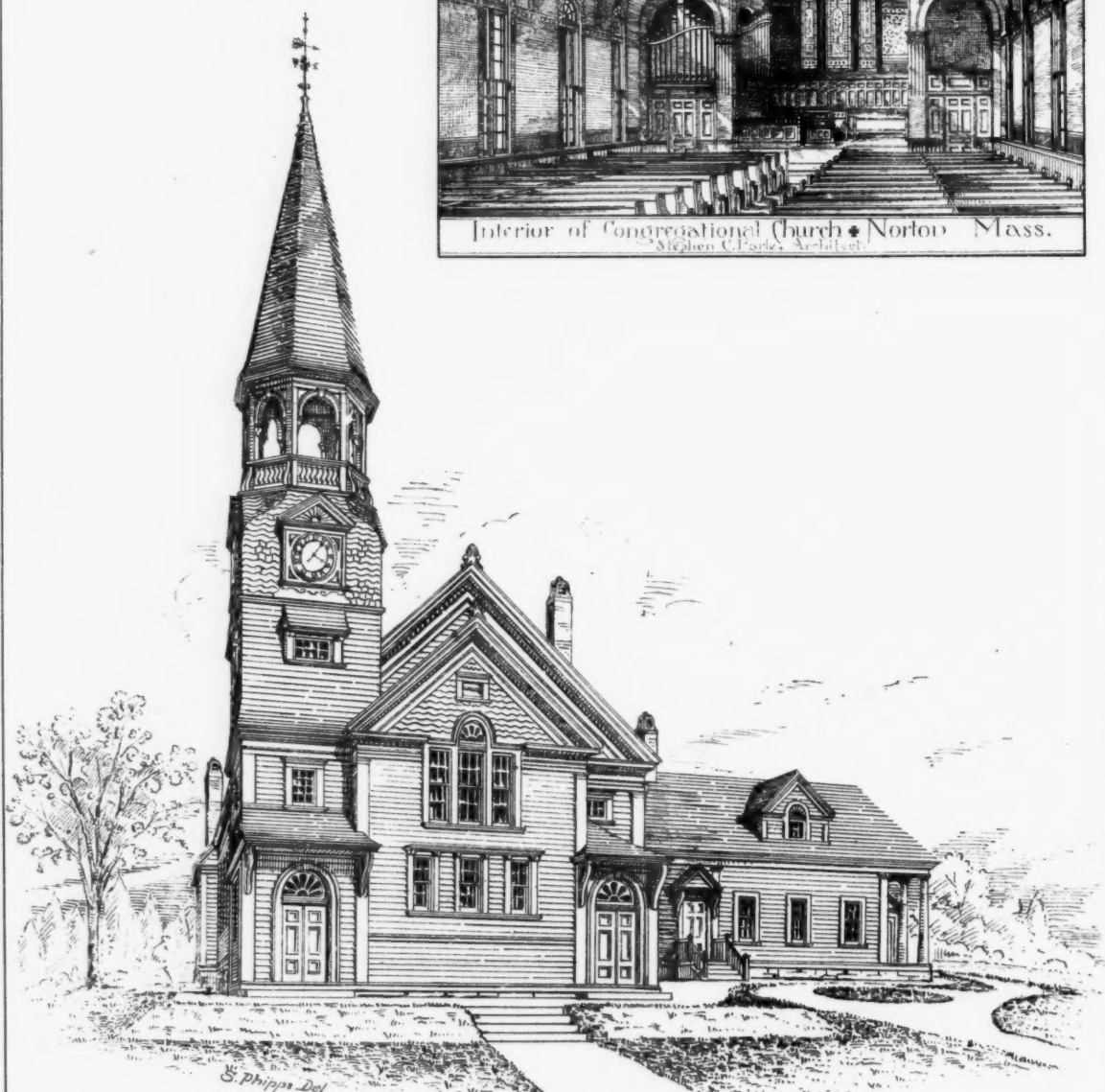
The Halotype Printing Co. Tremont St. Boston





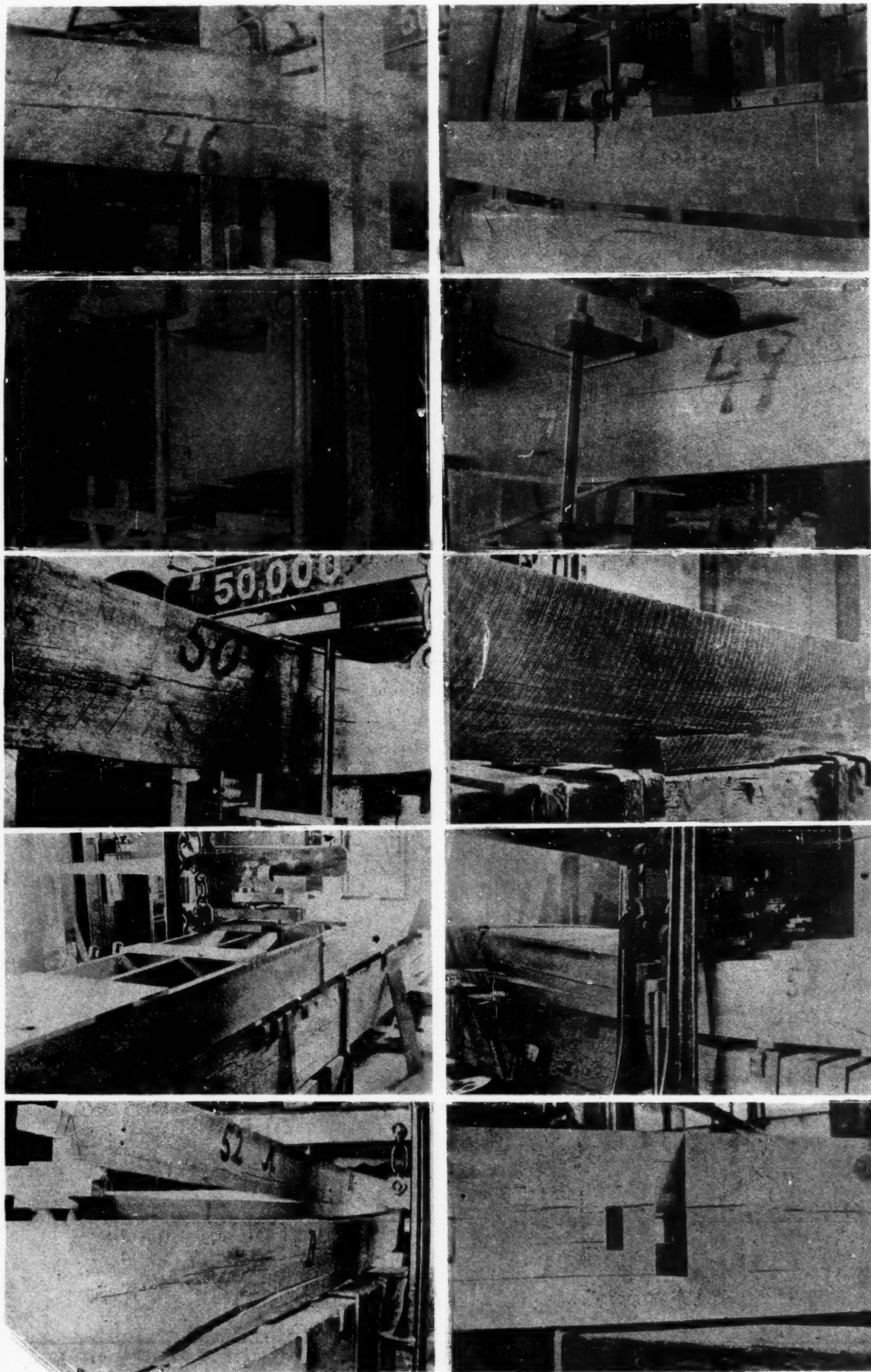
Interior of Congregational Church • Norton Mass.

Stephen C. Earle, Architect.



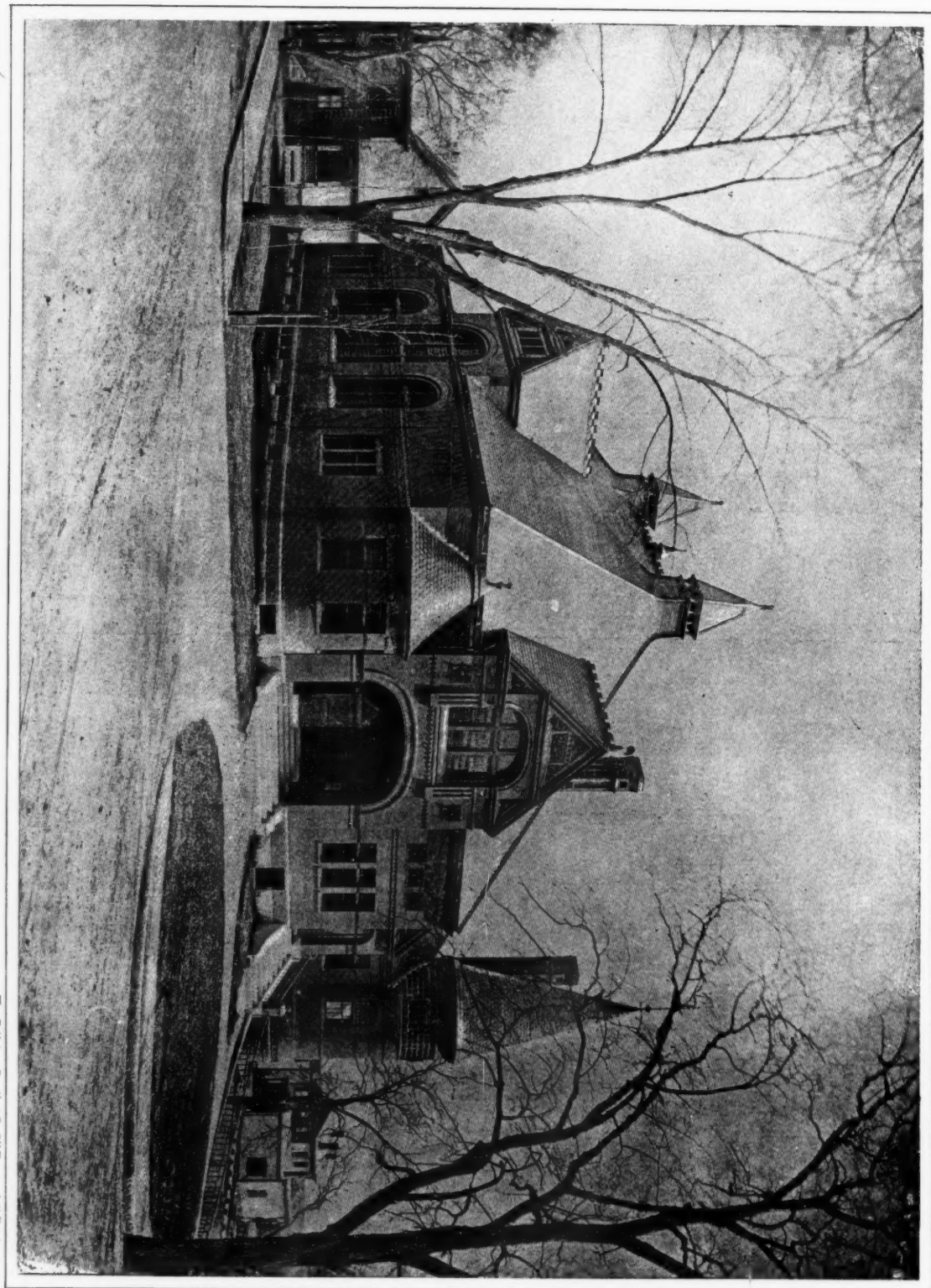
S. Phipps Del.

Congregational Church • Norton Mass.
Stephen C. Earle, Archt. Worcester Mass.



The Heliotype Printing Co. Boston.

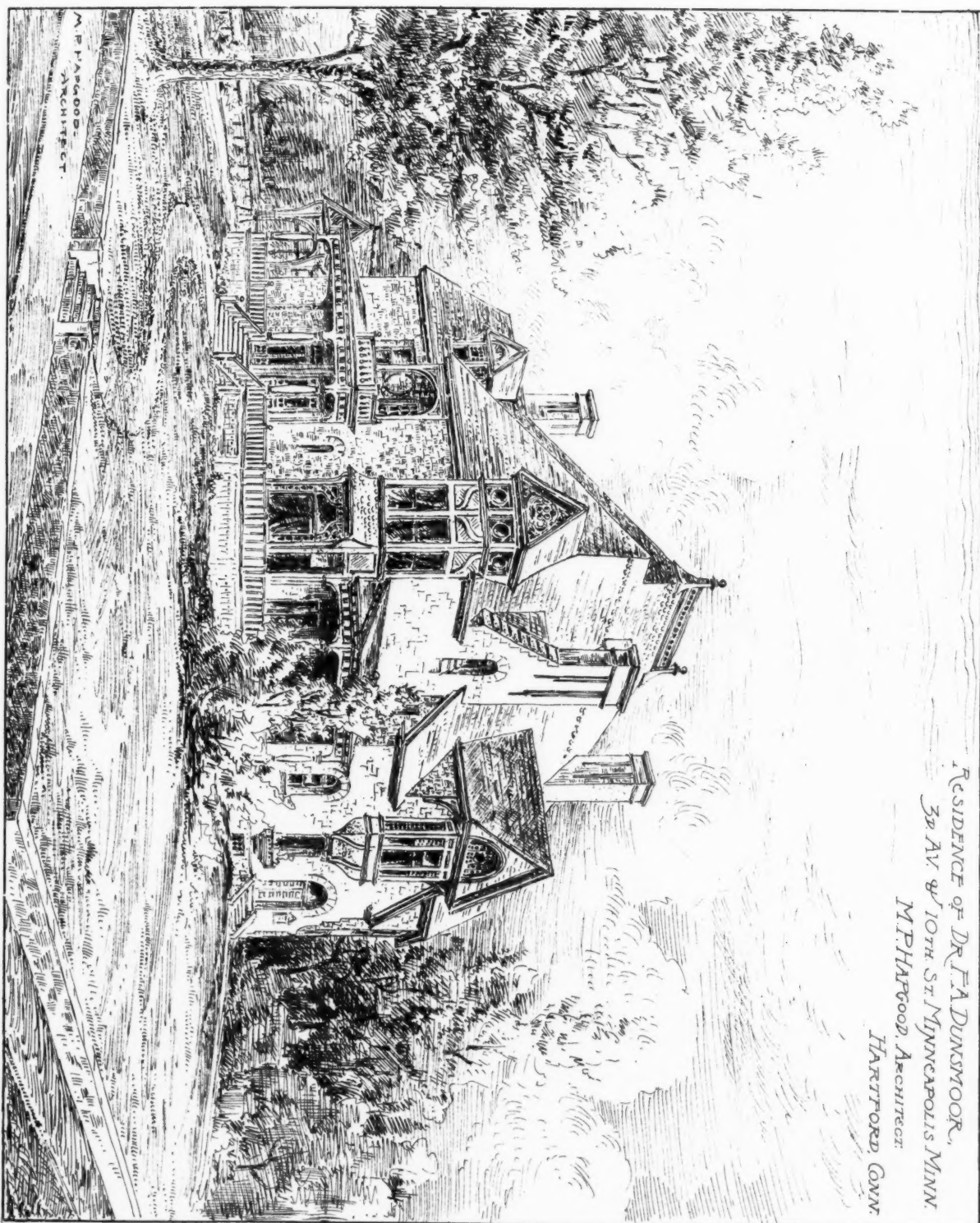
TRANSVERSE STRENGTH OF BEAMS. PLATE 8.

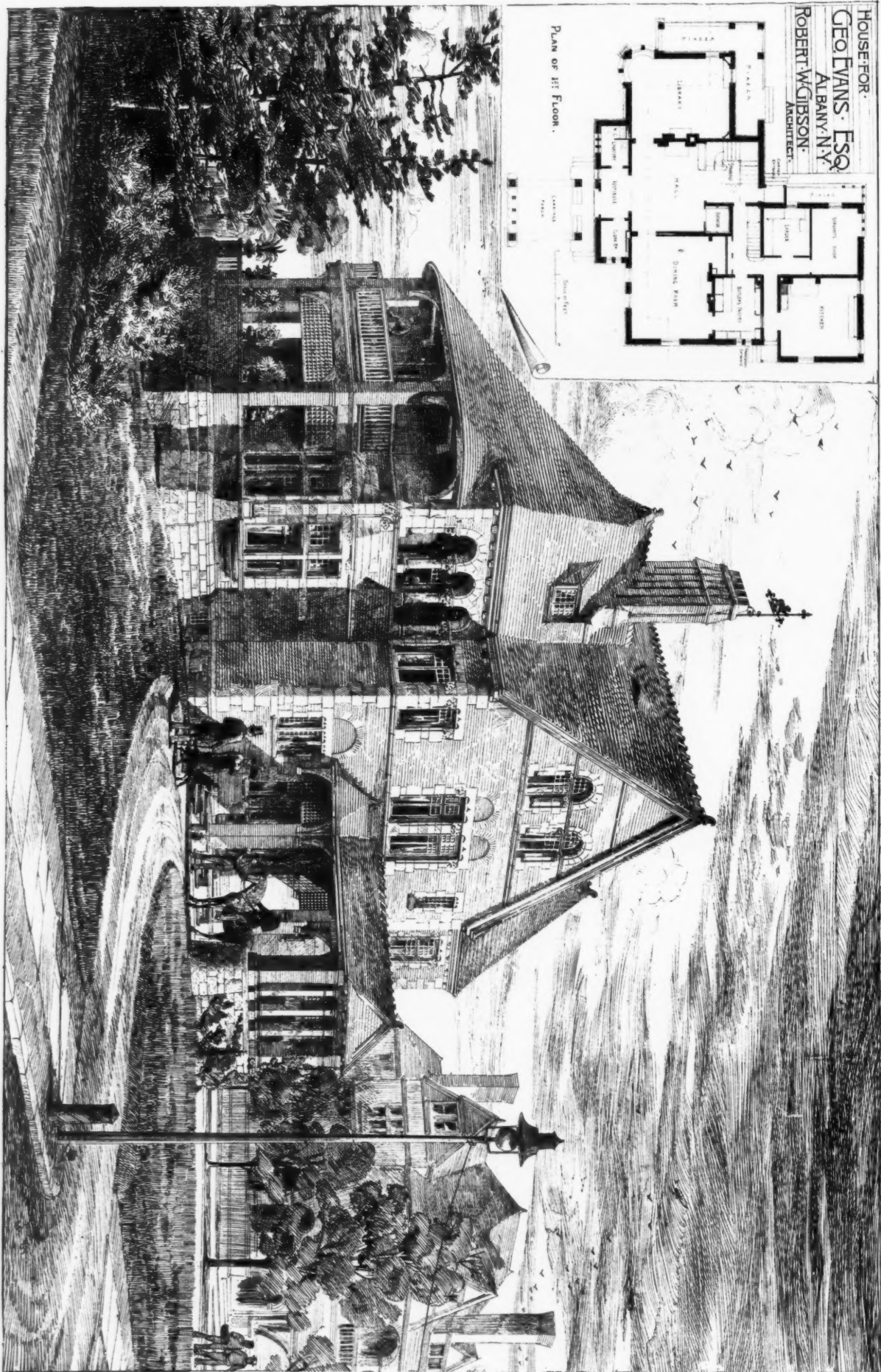


Town Hall, Belmont, Mass. H. H. Richardson, Architect, Boston.

The Bulfinch Printing Co. 211 Devon St. Boston.

RESIDENCE OF DR. F. A. DUNSMOOR,
32 AV. & 10TH ST. MINNEAPOLIS, MINN.
M. PHA GOOD, ARCHITECT.
HARTFORD, CONN.

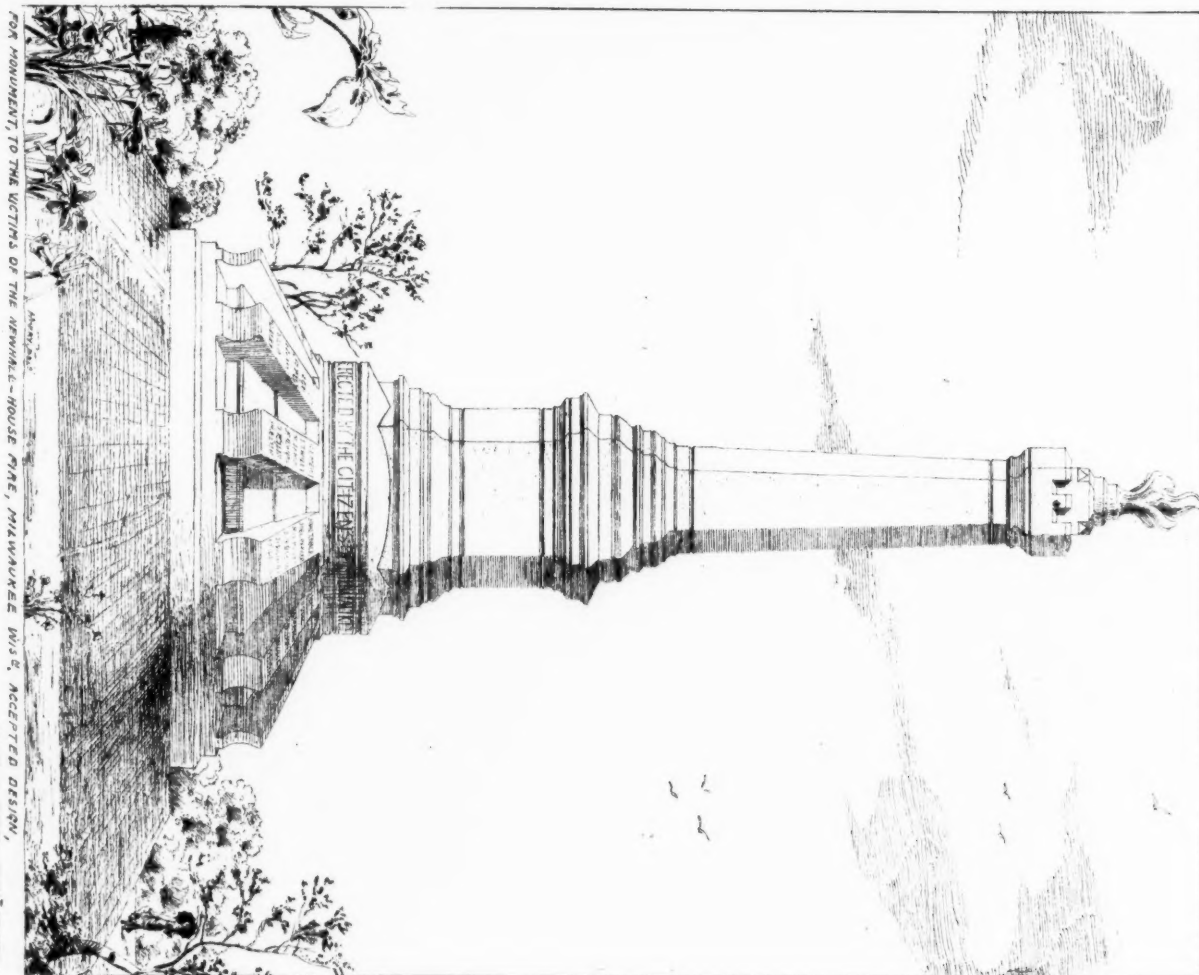




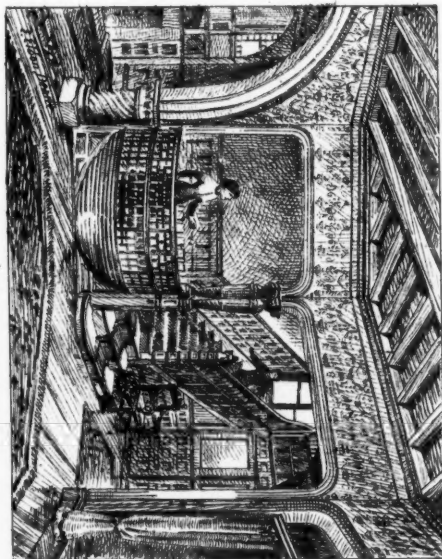
STABLE, FOR GEO. EVANS ESQ
ROBERT W. GIBSON, ALBANY, N.Y.
© ARCHITECT ©



The Engraving Pressing Co. 20 Tremont St. Boston

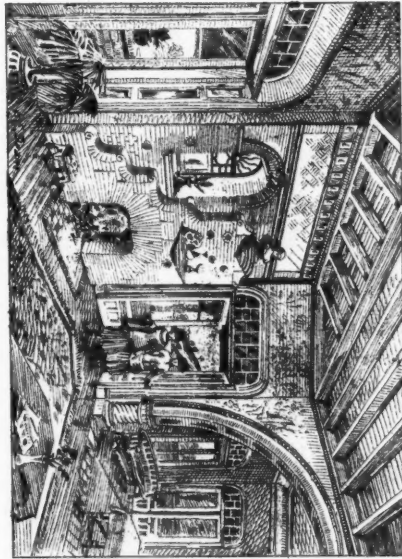


FOR MONUMENT, TO THE VICTIMS OF THE BURNING-HOUSE FIRE, MILWAUKEE WIS.
ACCEPTED DESIGN,
HENRY C. JENY, ARCHT. NEW YORK.



THE HALL - LOOKING TOWARD STAIRS

HOWE FOR WM. C. CASEY & CO.
TARRYTOWN HEIGHTS, NEW YORK.
HENRY RUTGER MARSHALL, ARCHT.
NEW YORK



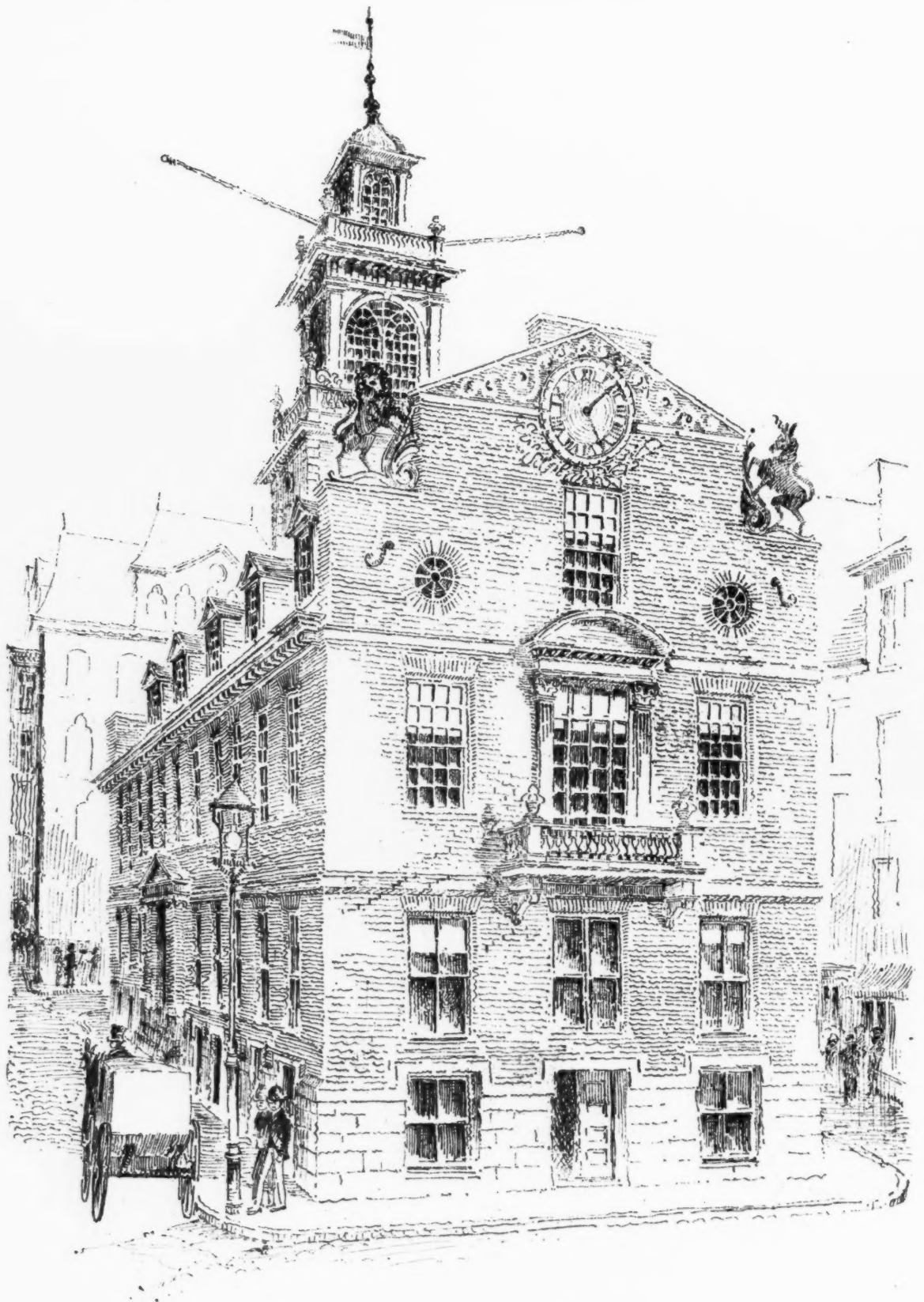
THE HALL - LOOKING TOWARD RIVER

HOWE FOR WM. C. CASEY & CO.
TARRYTOWN HEIGHTS, NEW YORK.
HENRY RUTGER MARSHALL, ARCHT.
NEW YORK

NORTH EAST VIEW



E. Eison, Deane

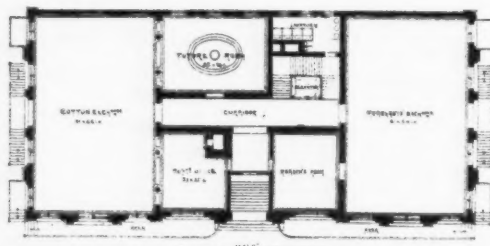


OLD STATE HOUSE BOSTON
H.T. Schlädermuhl. DEL.

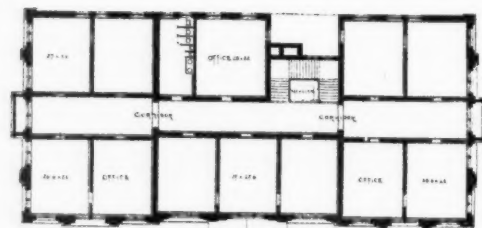


*Ever truly Yours
George Fuller*

After a photograph by ALLEN W. ROWELL, Boston



PLAN OF PRINCIPAL FLOOR

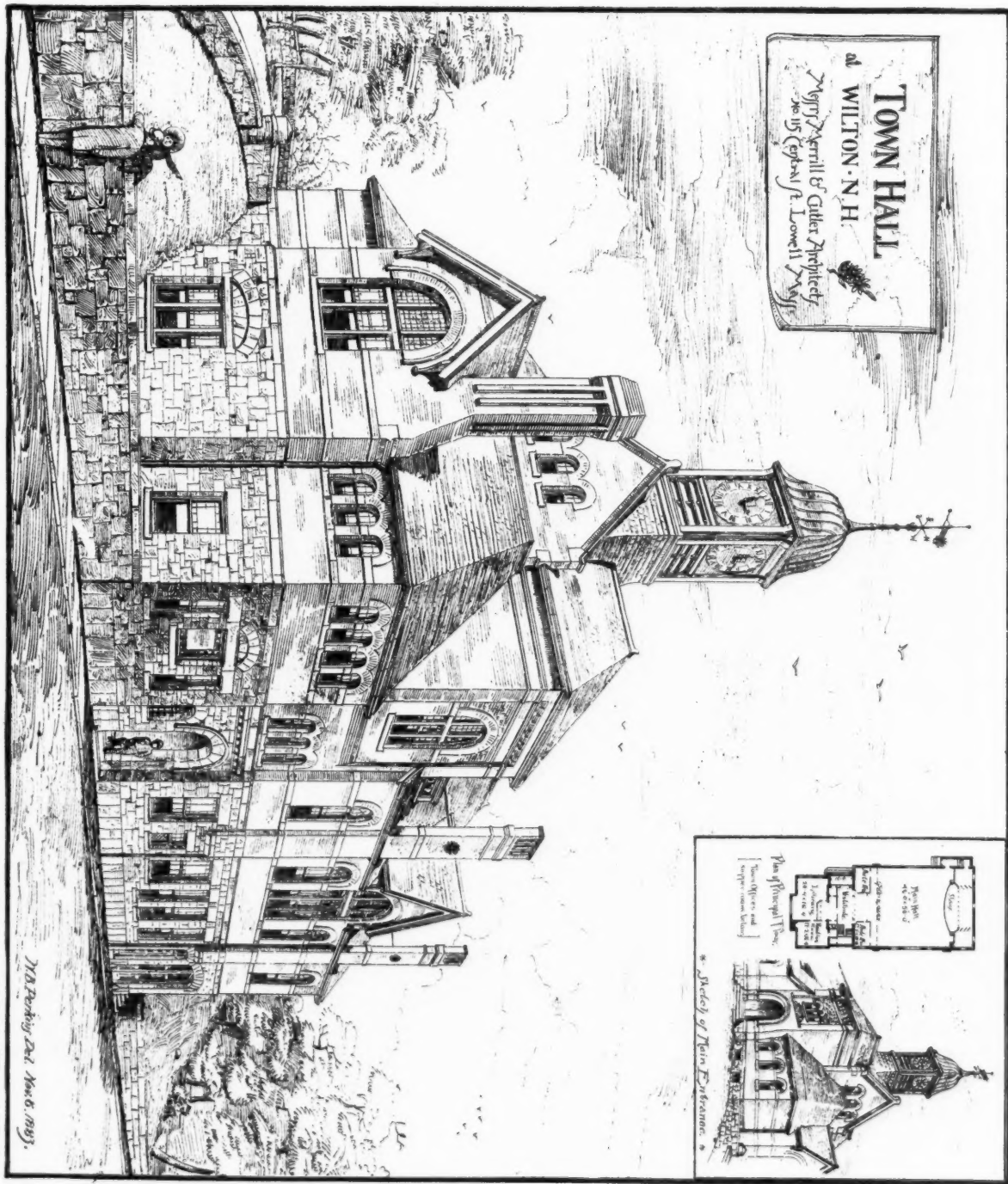


PLAN OF UPPER FLOOR

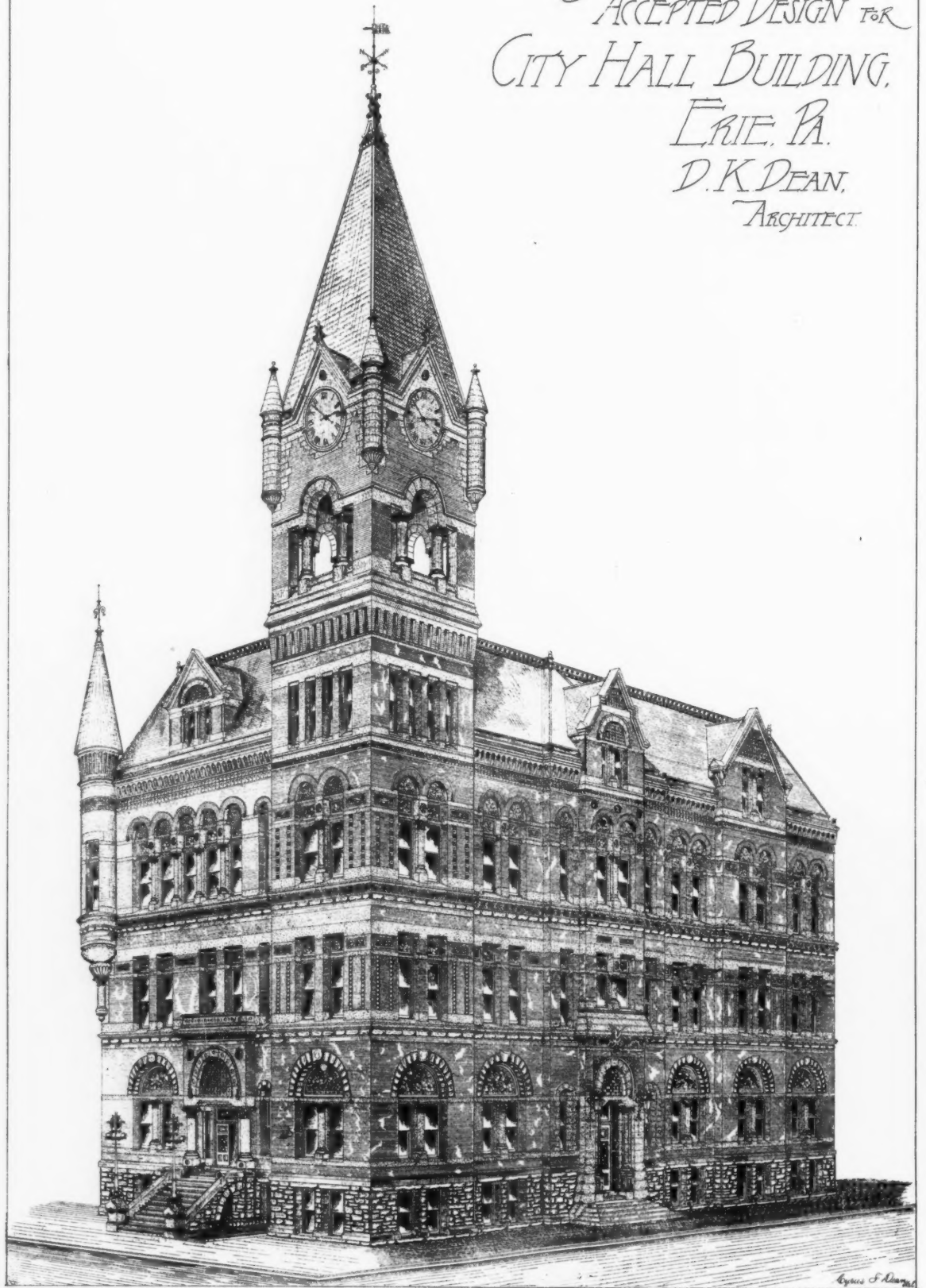


COTTON EXCHANGE - MEMPHIS - TENN.

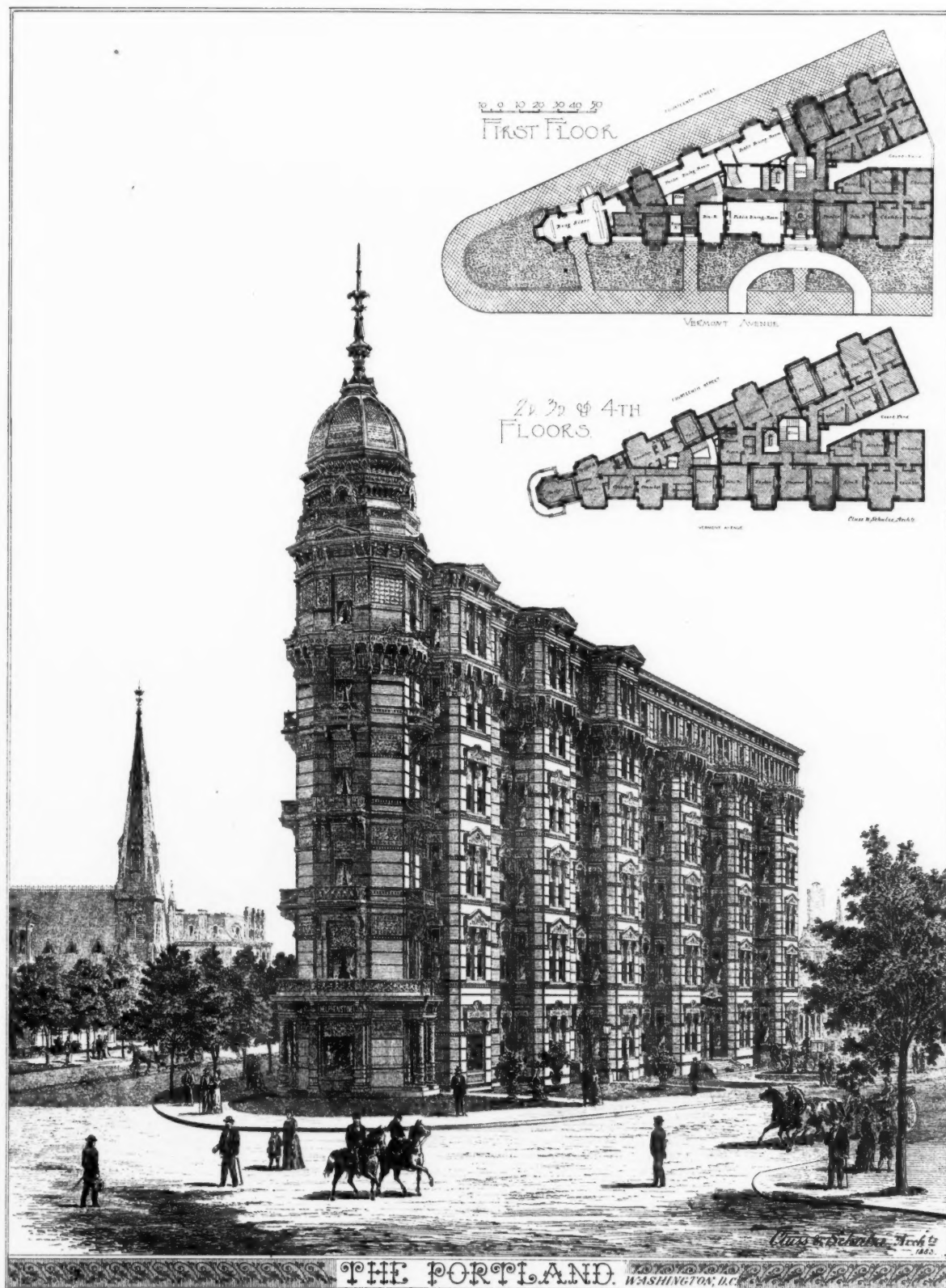
The Heliotype Printing Co. Tremont St. Boston.



ACCEPTED DESIGN FOR
CITY HALL BUILDING,
ERIE, PA.
D. K. DEAN,
ARCHITECT



The Helotype Printing Co. Tremont St. Boston.

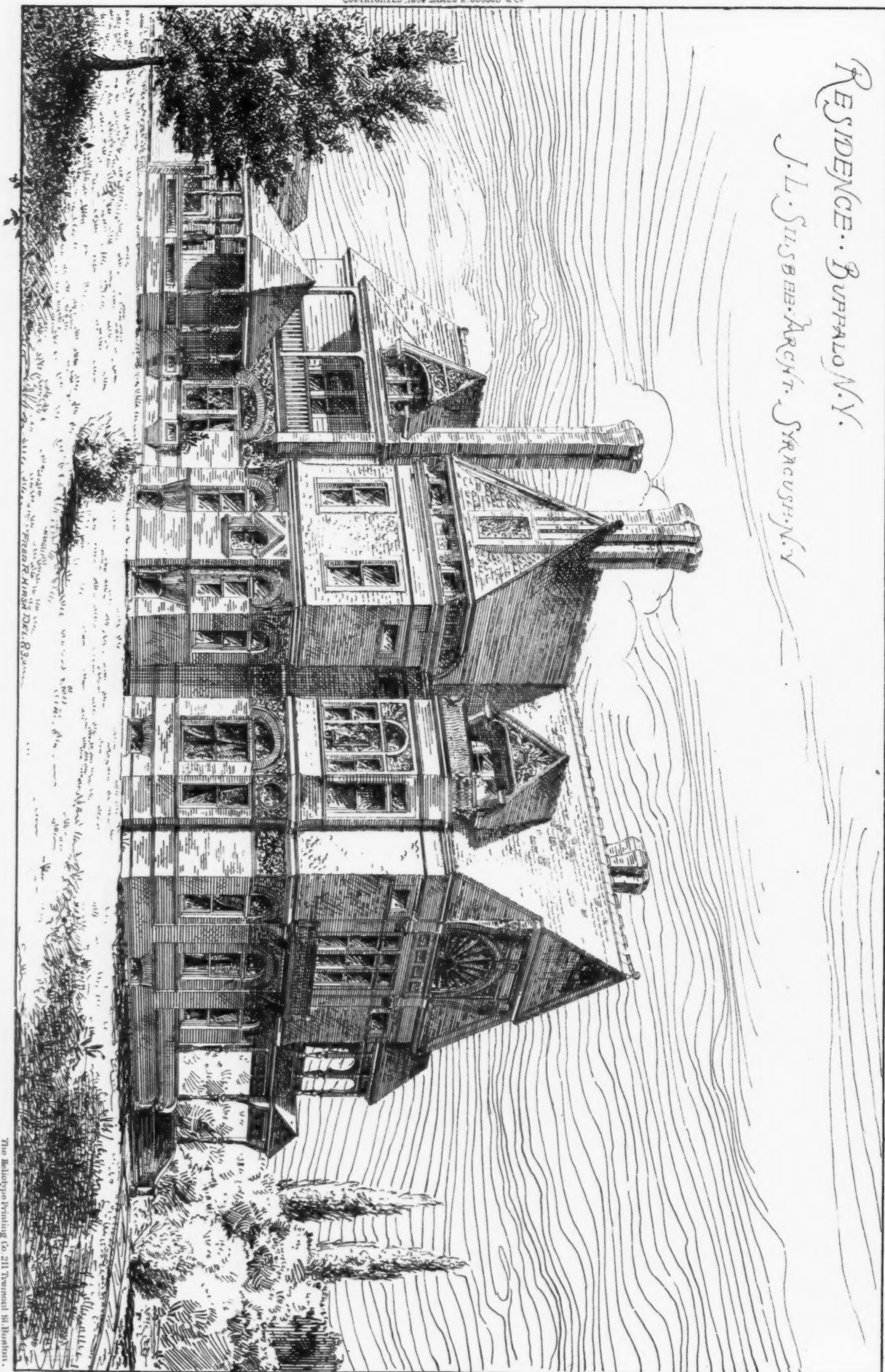


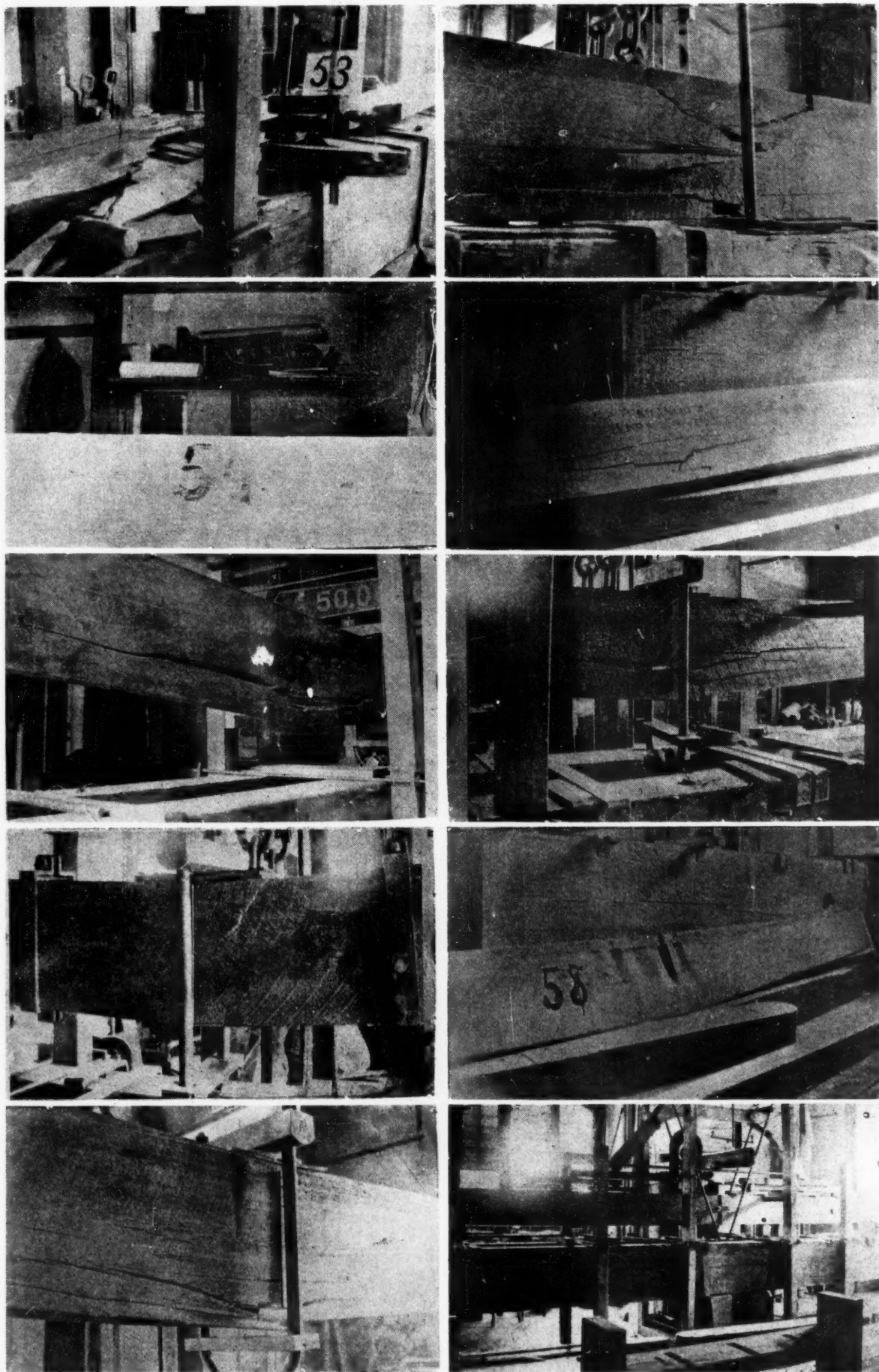
THE PORTLAND

WASHINGTON, D.C.

The Reliotype Printing Co. 211 Tremont St. Boston

RESIDENCE. BUFFALO, N.Y.
J. L. SUTHER ARCHT. SYRACUSE, N.Y.





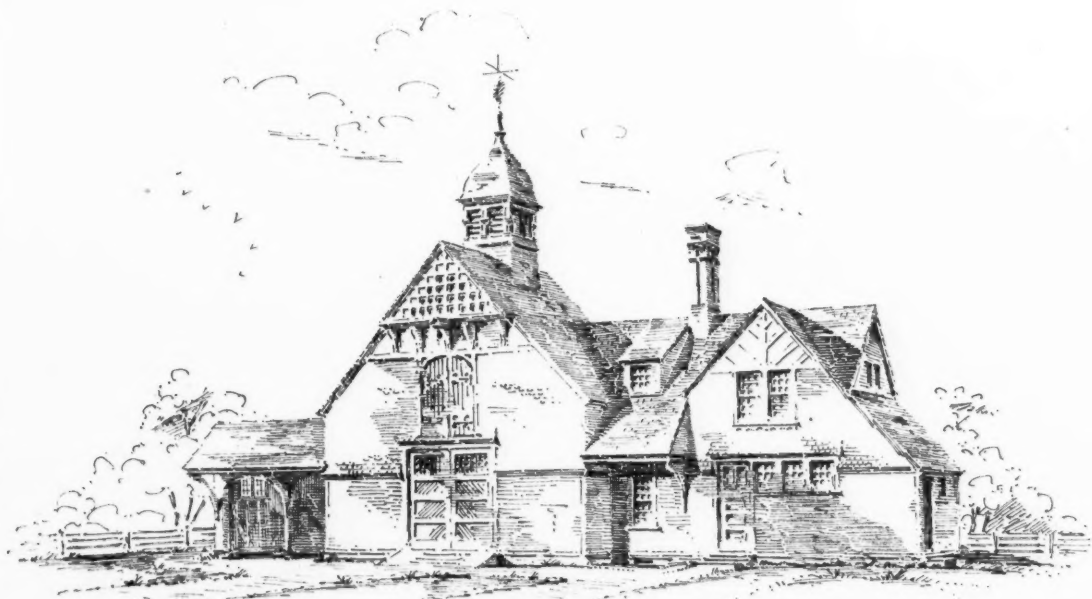
The Halotype Printing Co. Tremont St. Boston.

TRANSVERSE STRENGTH OF BEAMS, PLATE 9.



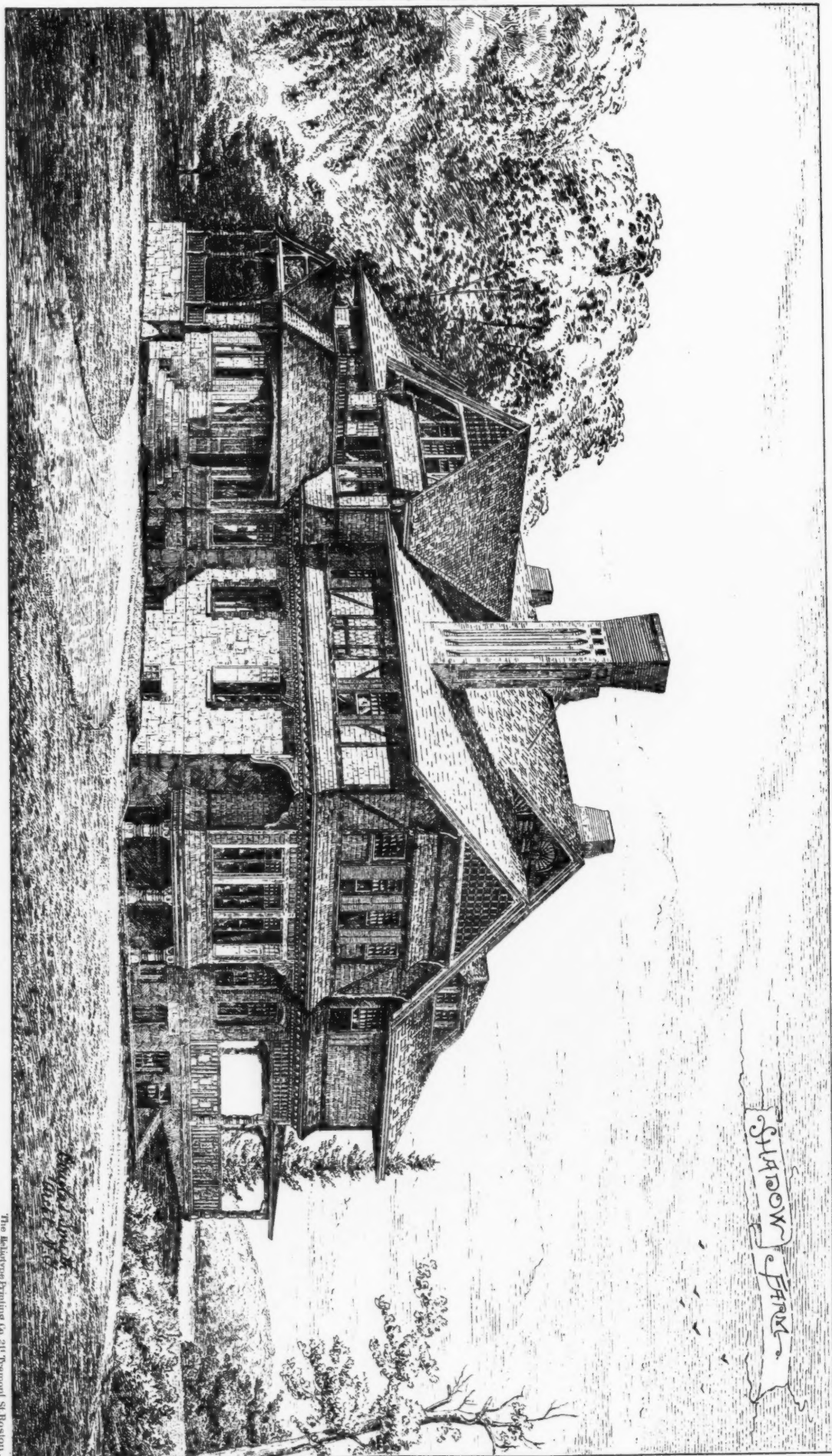
Old Brick Church, Isle of Wight Co. Va. Built 1632.

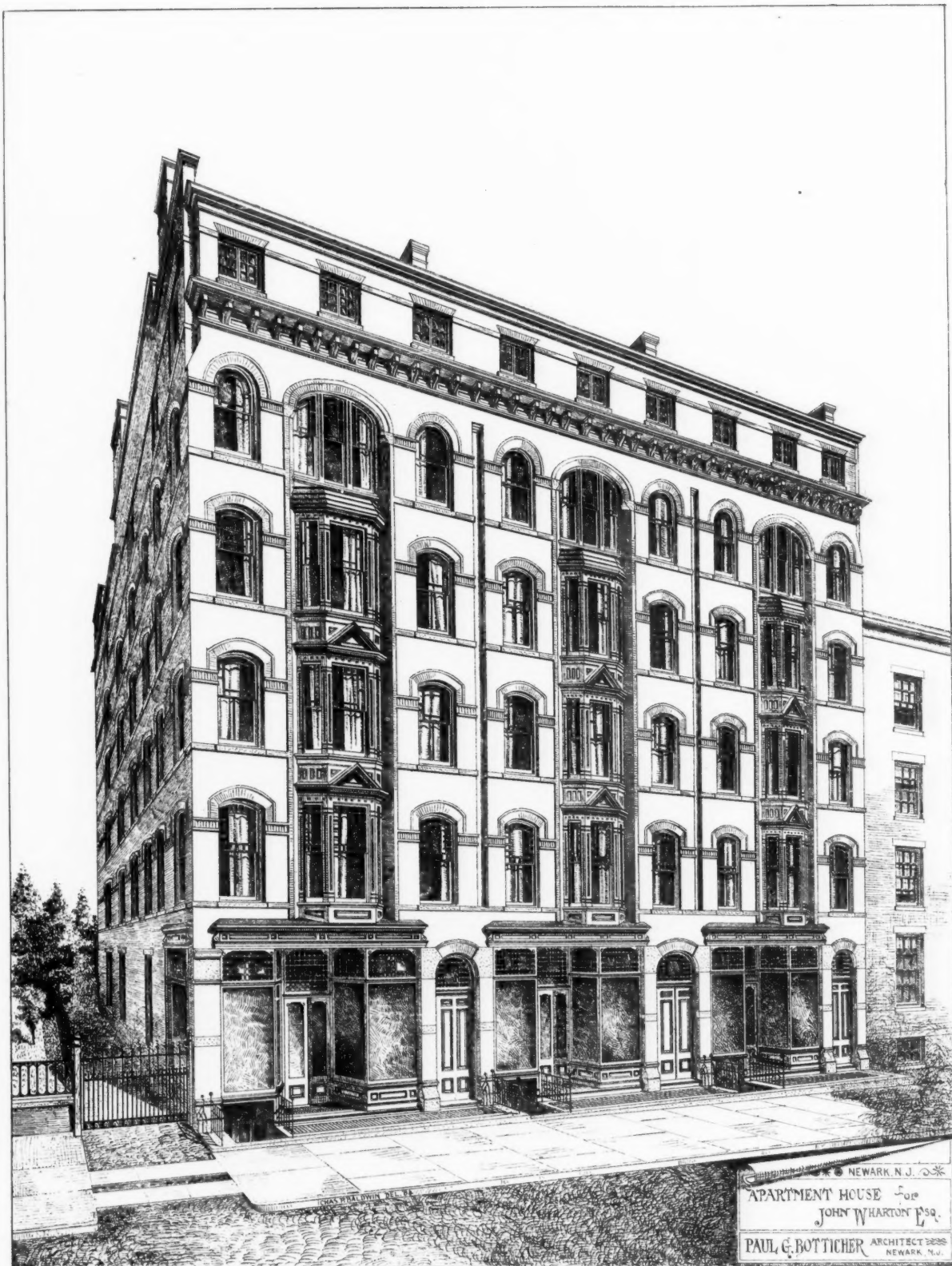
STABLE, FOR FRANCIS H. SLADE, ESQ.
LAWRENCE, L.I.
H.M. CONGDON, ARCHITECT, N.Y.



RESIDENCE OF FRANCIS H. SLADE, ESQ.
LAWRENCE, LONG ISLAND, N.Y.
H.M. CONGDON, ARCHITECT, N.Y., 1884.

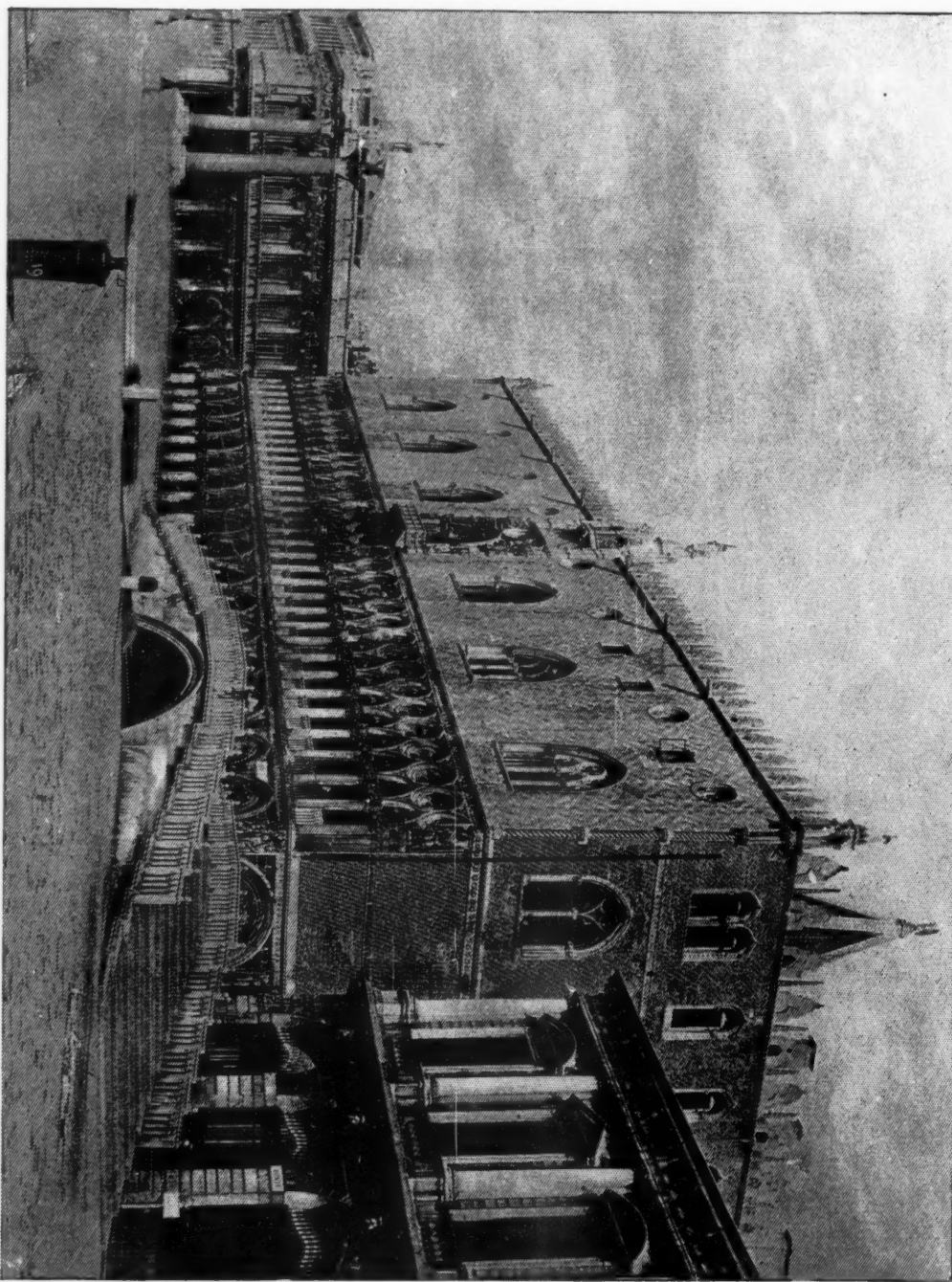




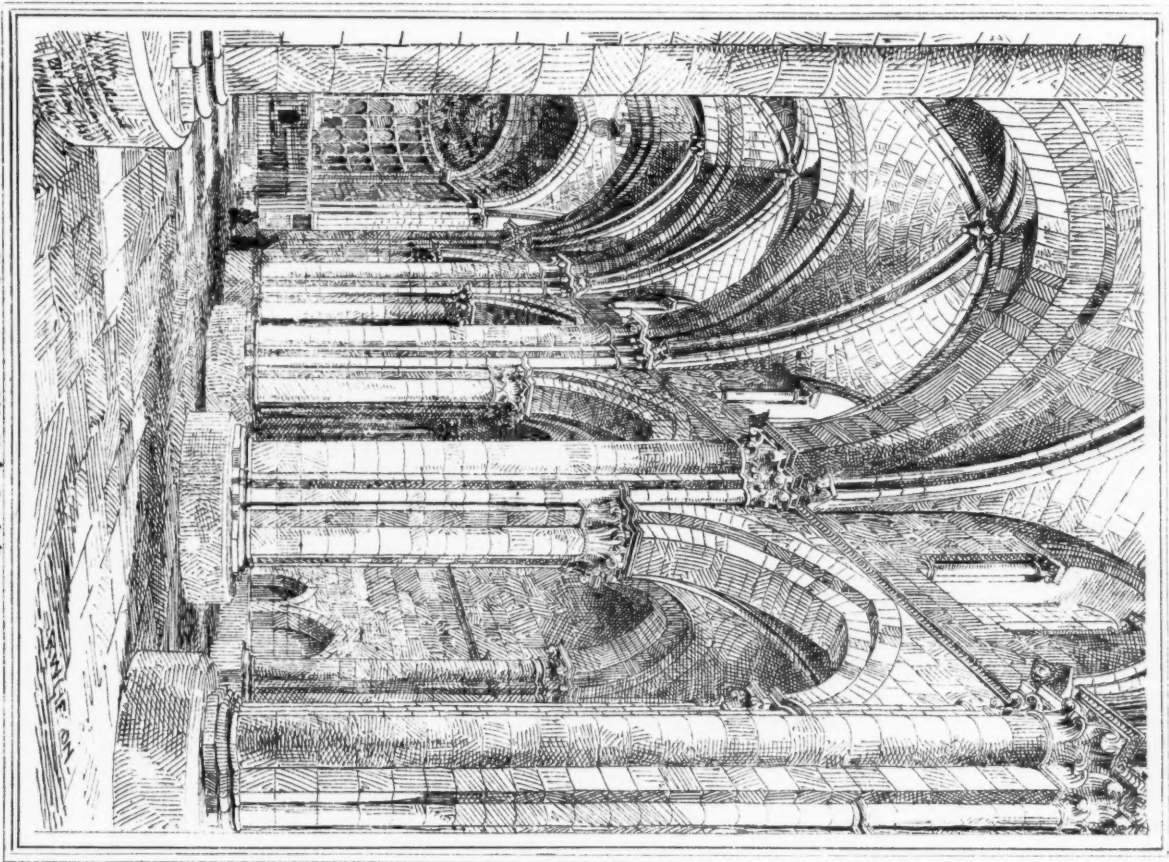


NEWARK, N. J.
APARTMENT HOUSE
JOHN WHARTON ESQ.
PAUL & BOTTICHER ARCHITECTS
NEWARK, N. J.

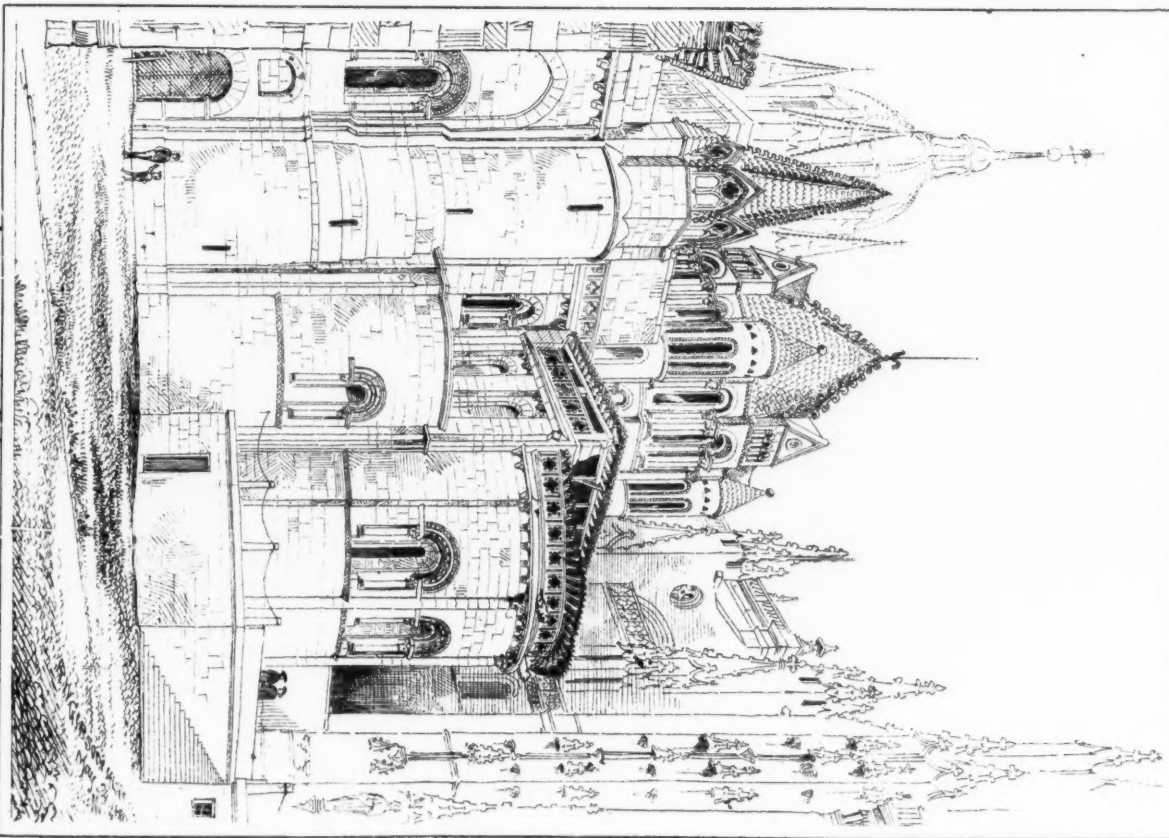
The Helotype Printing Co Tremont St. Boston.



THE DUCAL PALACE, VENICE, ITALY.



Salamanca Old Cathedral, Spain.

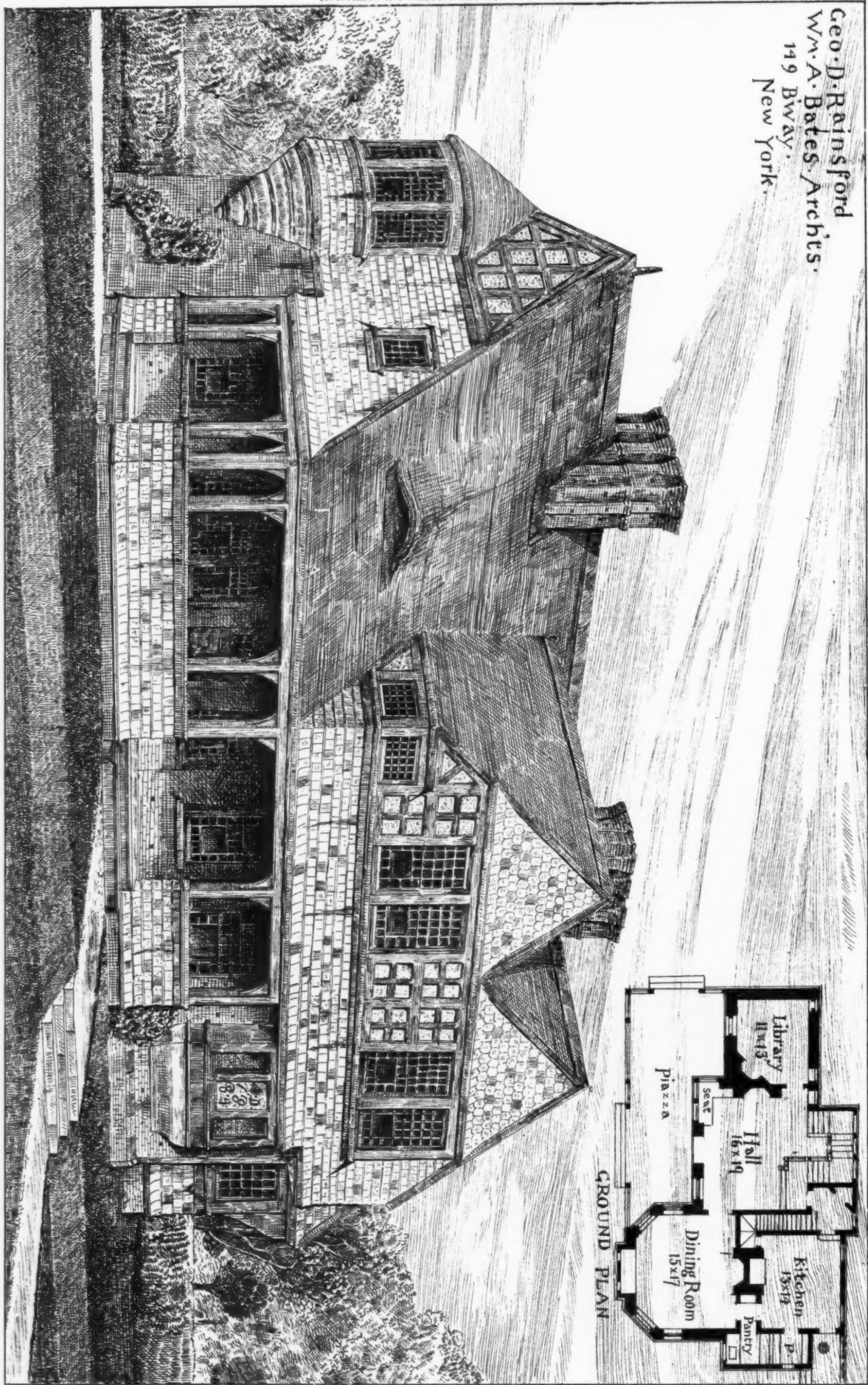


Salamanca Old Cathedral, Spain.

The Lithotype Printing Co. Boston.

Geo. D. Rainsford
Wm. A. Bates, Archts.
119 Broadway,
New York.

House in Cheyenne City Wyoming Ter. for Mr. Wm. Sturgis Jr.



CHAMBER OF COMMERCE BLD'G.

ATLANTA GA.

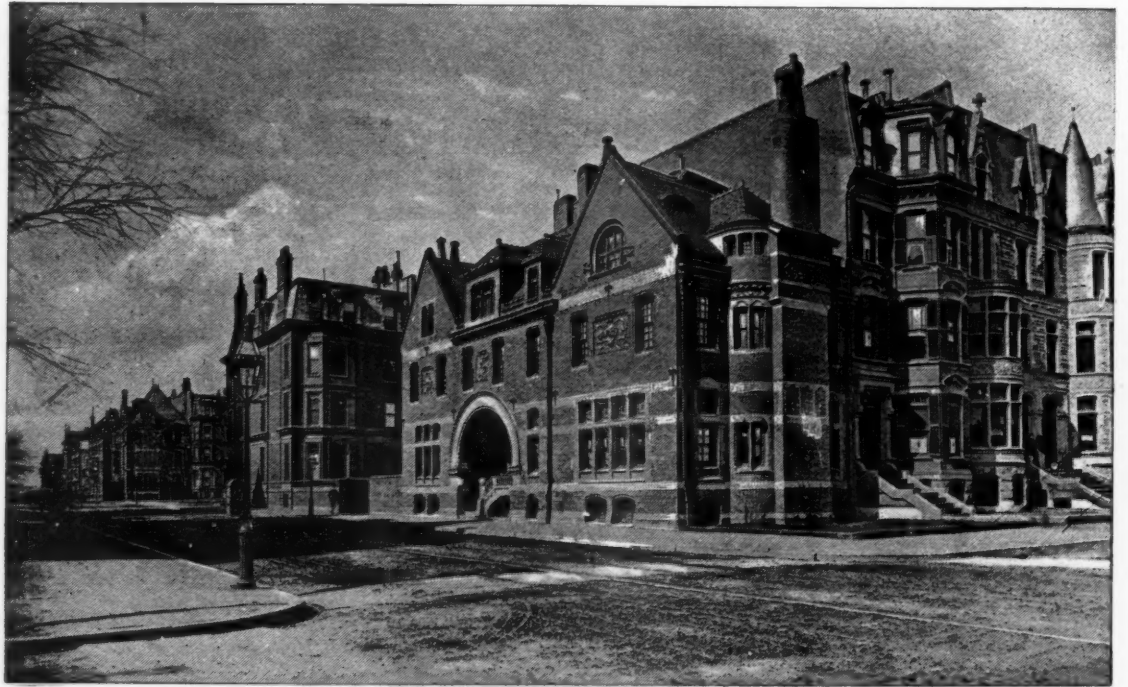
MESSRS. FAY & EICHBERG,

ARCHITECTS.



J. A. GREGG Del.

The Helotype Printing Co. Tremont St. Boston.

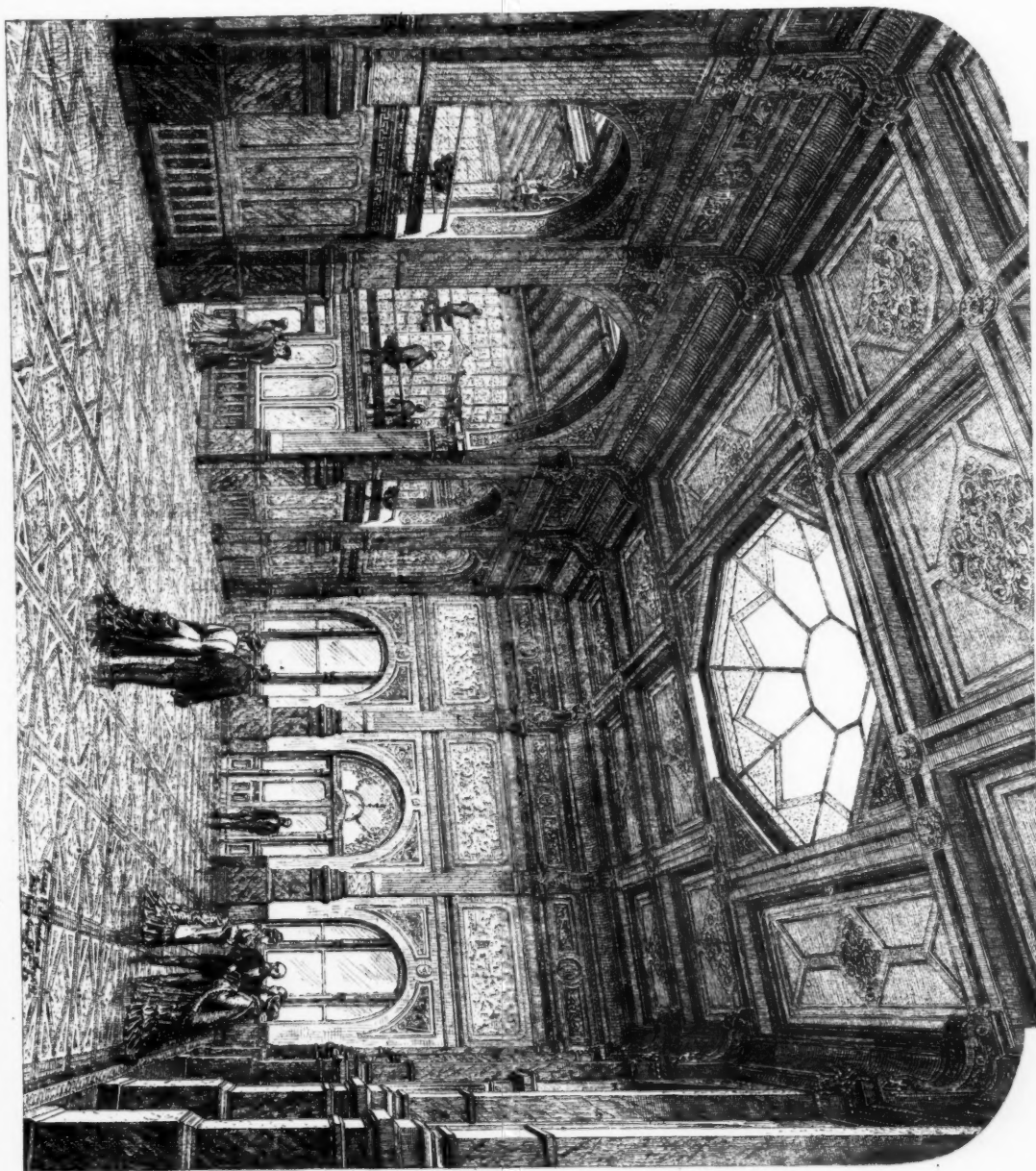


HOUSE ON CLARENDON ST. BOSTON, MASS.
G. H. RICHARDSON, ARCH'T. *



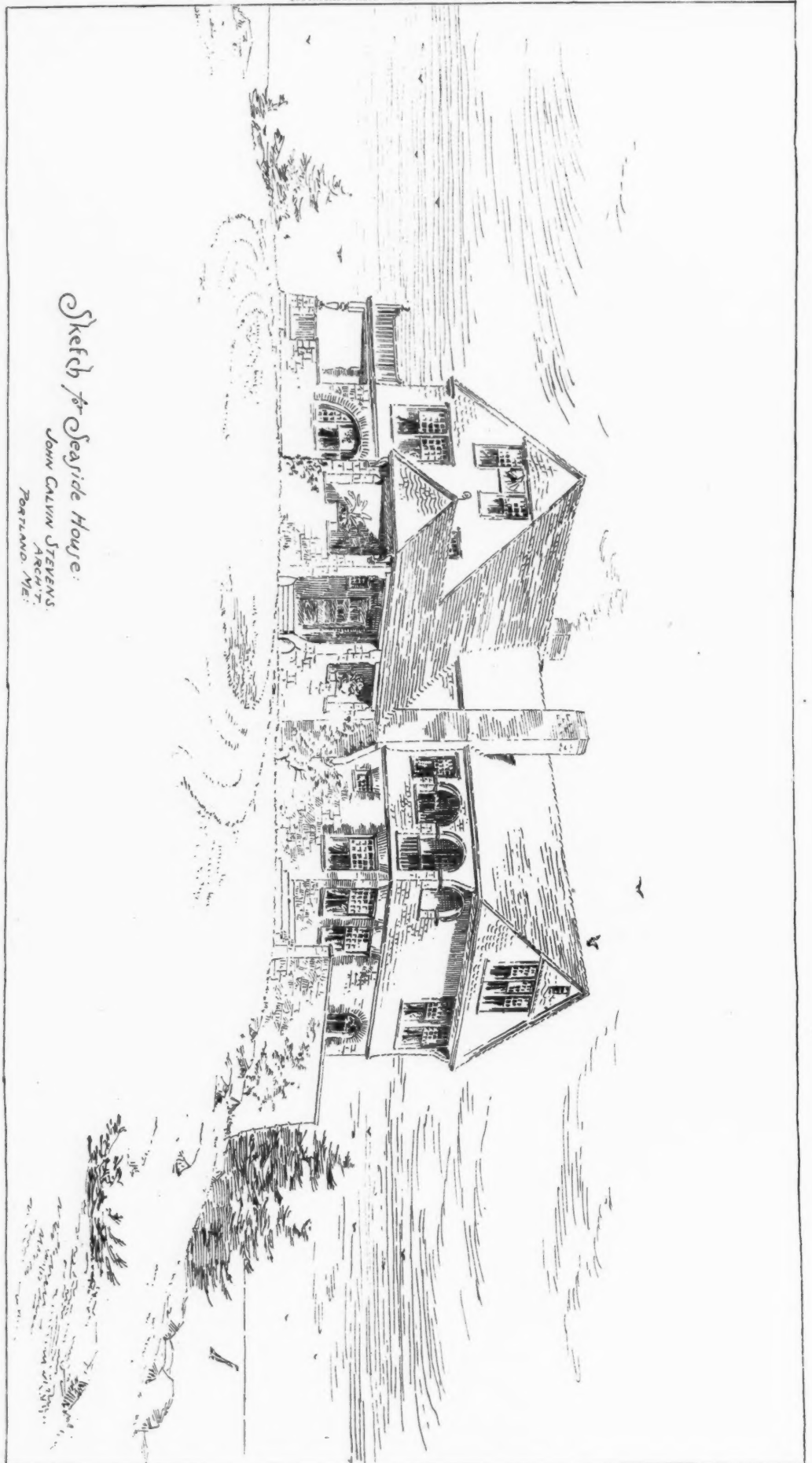
HOUSE, COR. COMMONWEALTH AVE AND CHESTER PARK, BOSTON, MASS.
* CARL FEHMER, ARCH'T. *

COPYRIGHTED 1884 BY JAMES F. OSGOOD & CO.



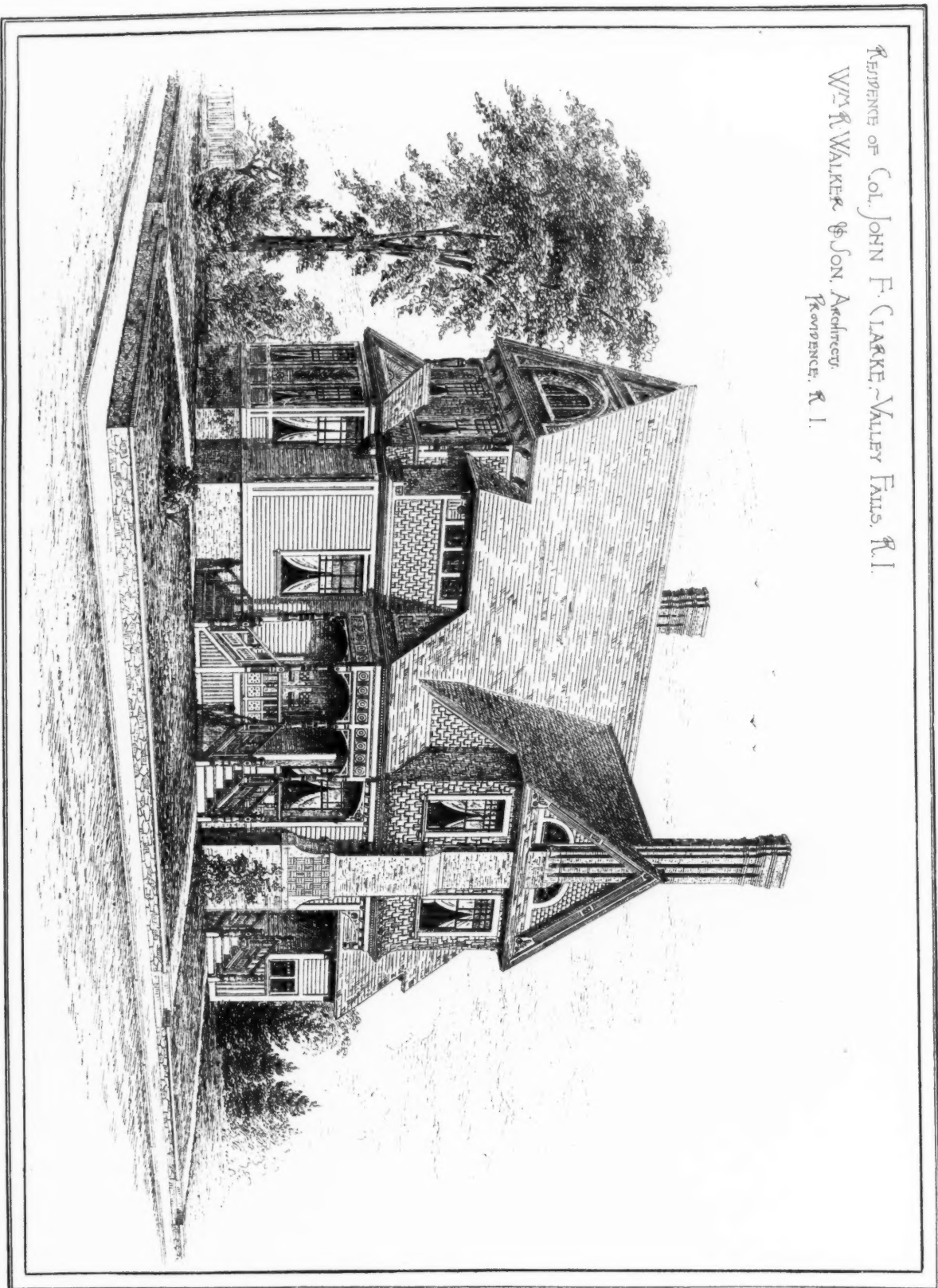
ENTRANCE HALL OF THE MODEL MUSEUM, U.S. PATENT OFFICE, WASHINGTON, D.C. * GUSS & SCHULTZ, ARCHITECTS

The Metropolitan Printing Co. 211 Tremont St. Boston.

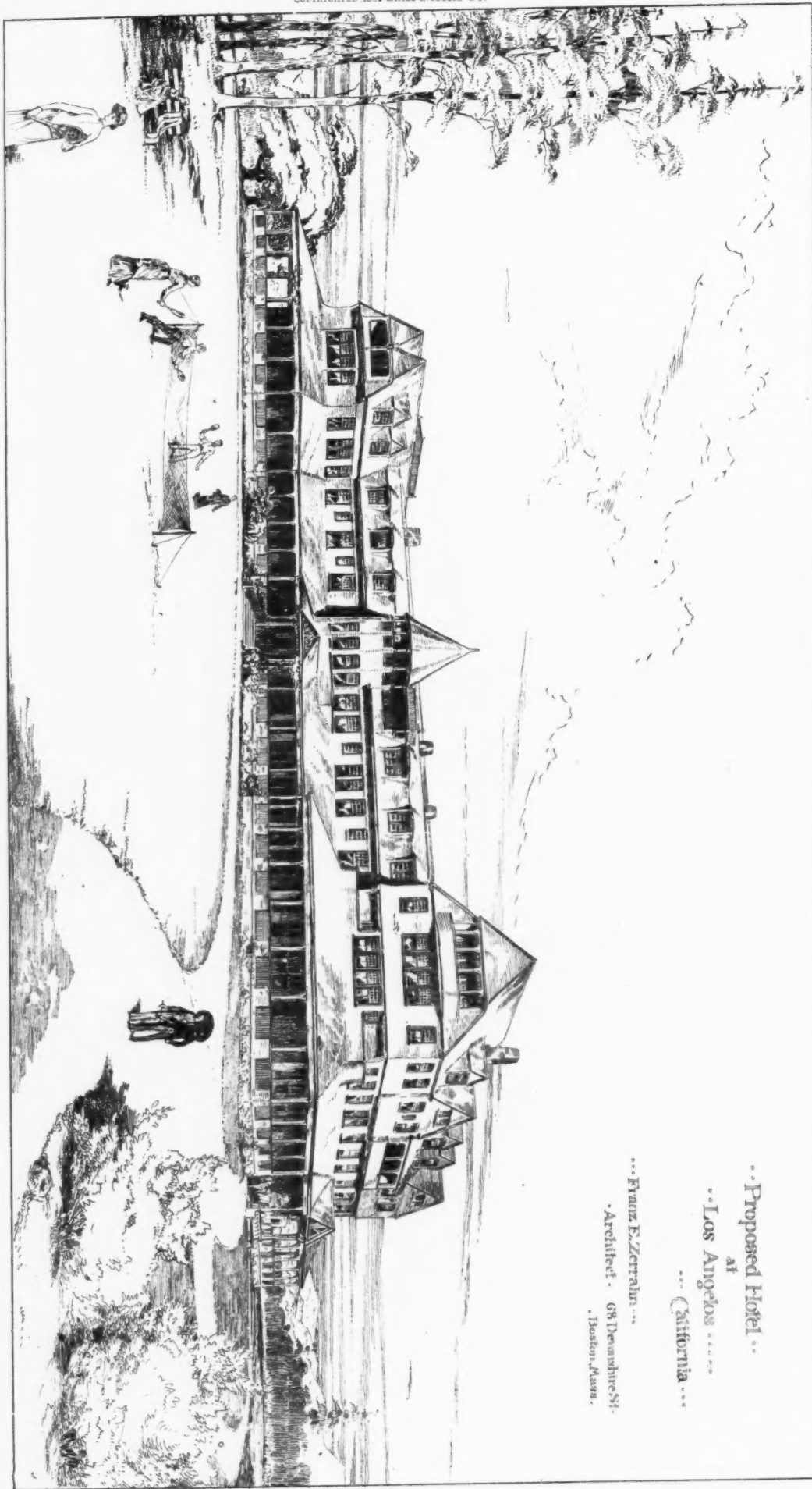


Sketch for Seaside House:
JOHN CALVIN STEVENS
ARCHT.
PORTLAND, ME.

RESIDENCE OF COL. JOHN F. CLARKE, VALLEY FALLS, N. Y.
Wm. R. Walker & Son, Architects,
Providence, R. I.

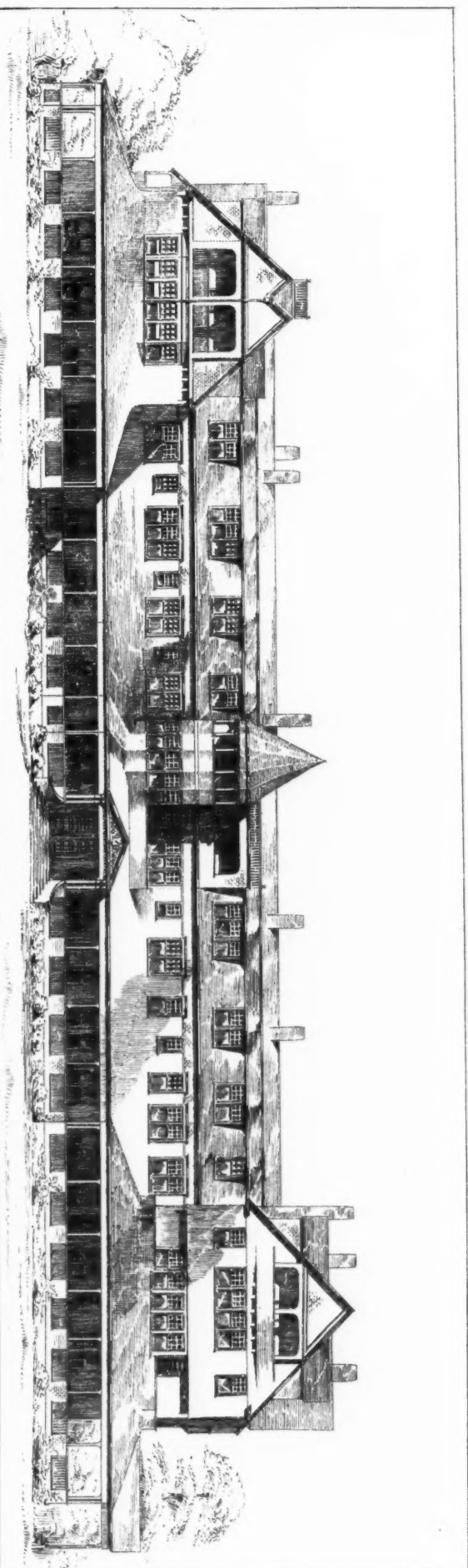


The Lithotype Printing Co. 211 Devon St. Boston.

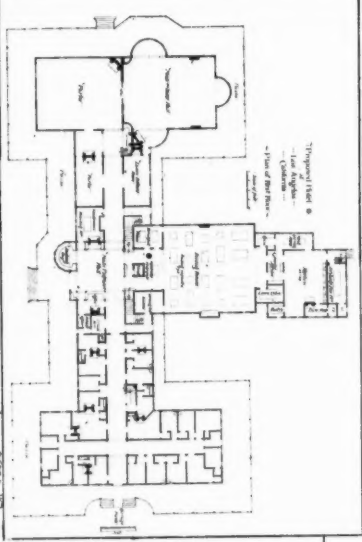


..Proposed Hotel..
 at
 ..Los Angeles...
 ...California...
 ...Franz E. Zerrahn...
 Architect. 68 Dearborn St.
 Boston, Mass.

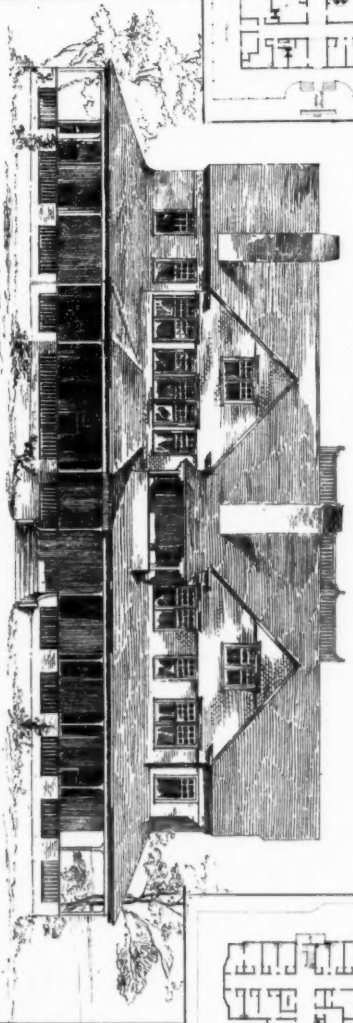
COPYRIGHTED 1884 BY JAMES P. OSGOOD & CO.



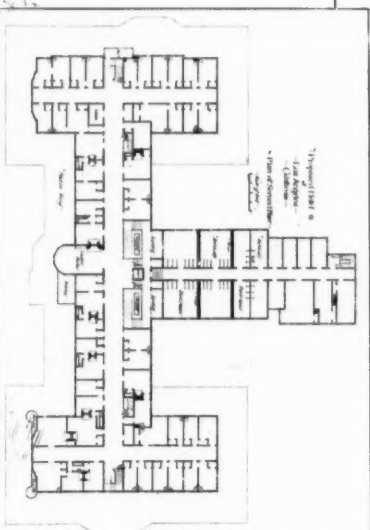
... Front Elevation ...



Proposed Hotel
at
Los Angeles
California



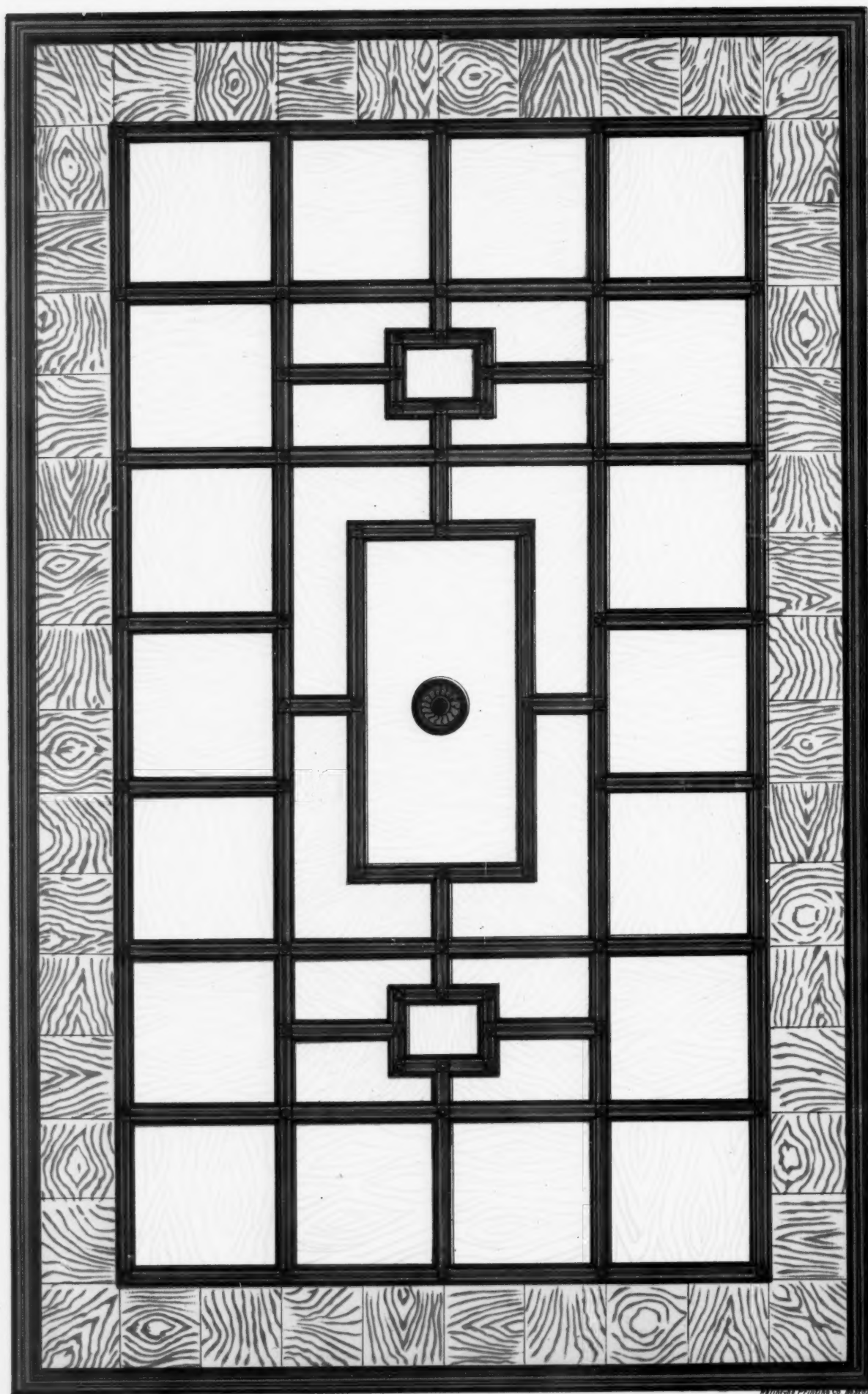
... End Elevation ...



Franz E. Zerrahn
Architect
68 Devonshire St.
Boston, Mass.

The Lithotype Printing Co. 211 Tremont St. Boston.

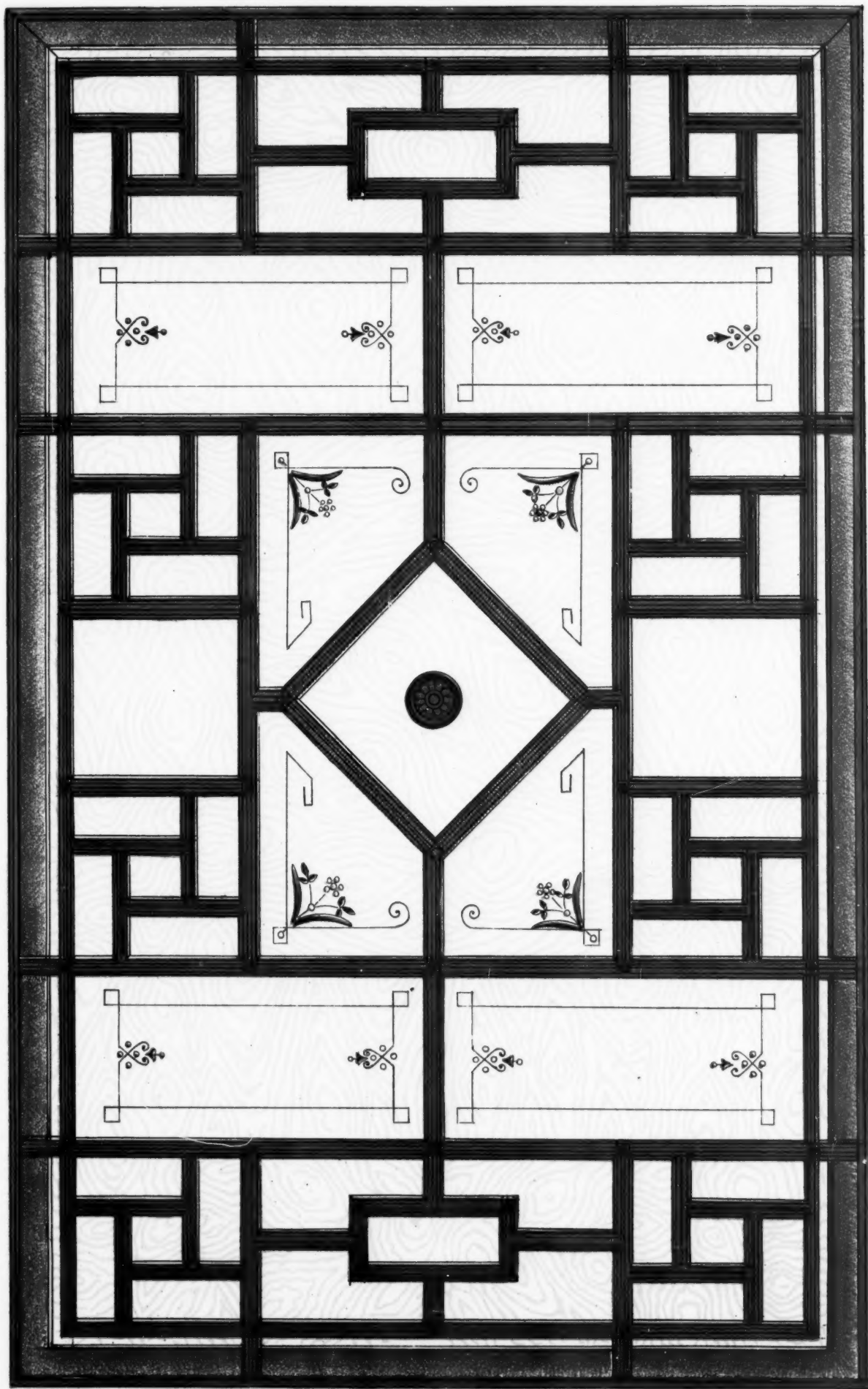
GARDNER & Co., 183 CANAL ST., N. Y.



* Dining Room Ceiling *

AMERICAN ART INDUSTRIES, No. III.

GARDNER & CO. 183 CANAL ST., N. Y.



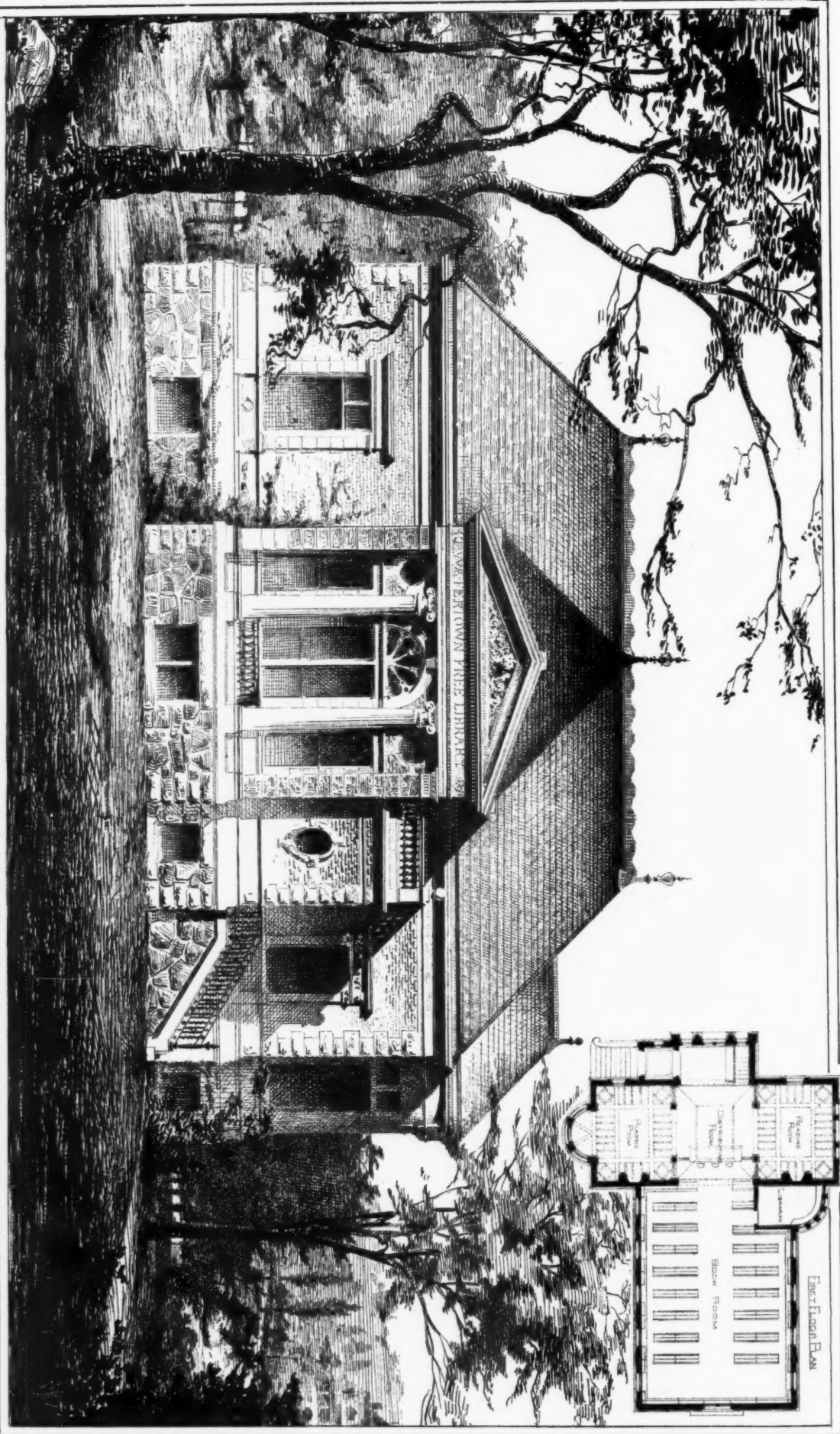
* Library Ceiling *
AMERICAN ART INDUSTRIES. No. III.

SHAW & HUNNEWELL,
ARCHITECTS,
17 CONGRESS ST. BOSTON.

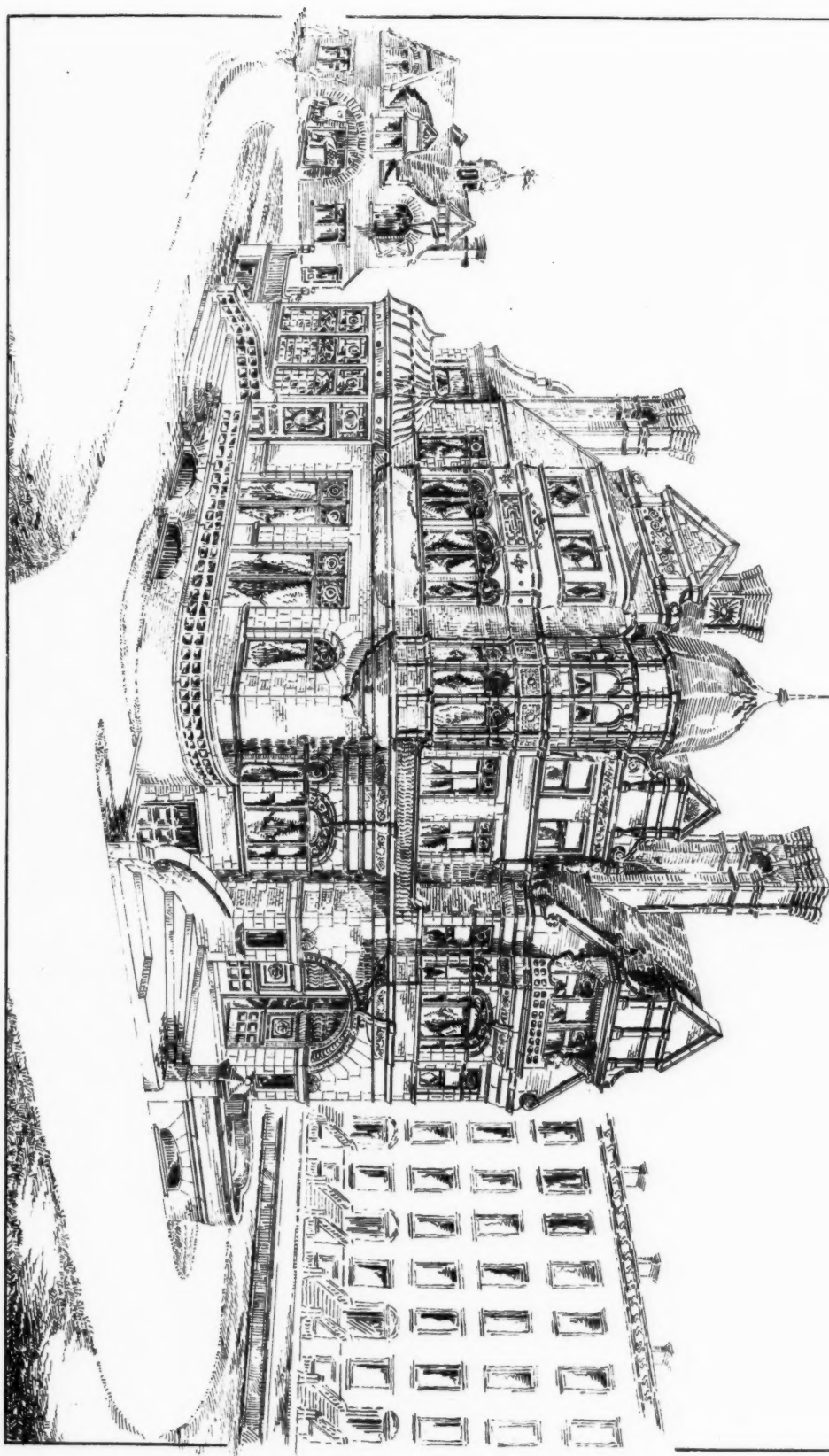
WATERTOWN FREE LIBRARY

Cos. S. Shaw
des.

The Knickerbocker Printing Co. 211 Tremont St. Boston.

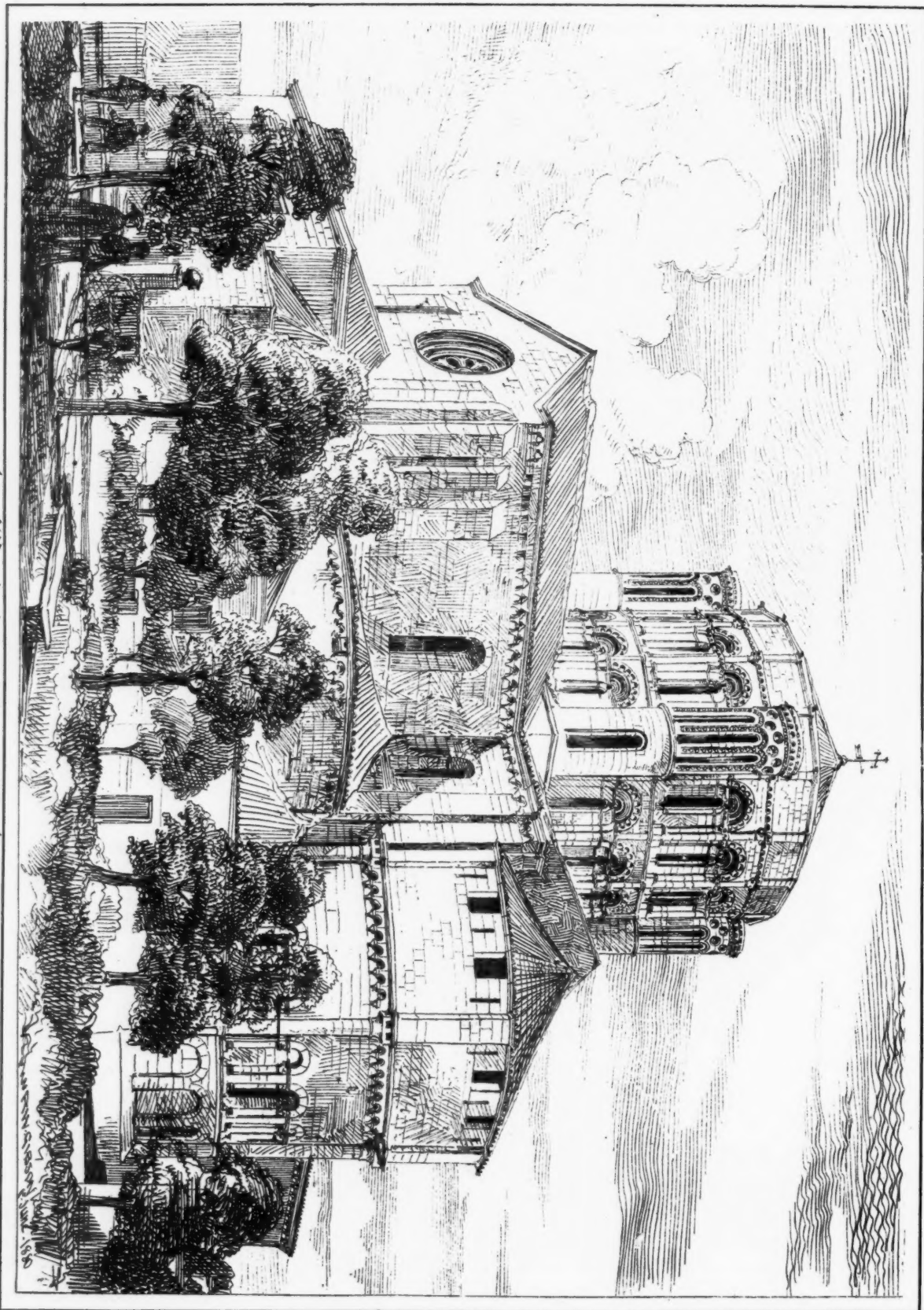


NEW RESIDENT AND STABLE.
WEST BOULEVARD, NEW YORK CITY.
GILBERT AND THORNTON ARCHTS. N.Y.

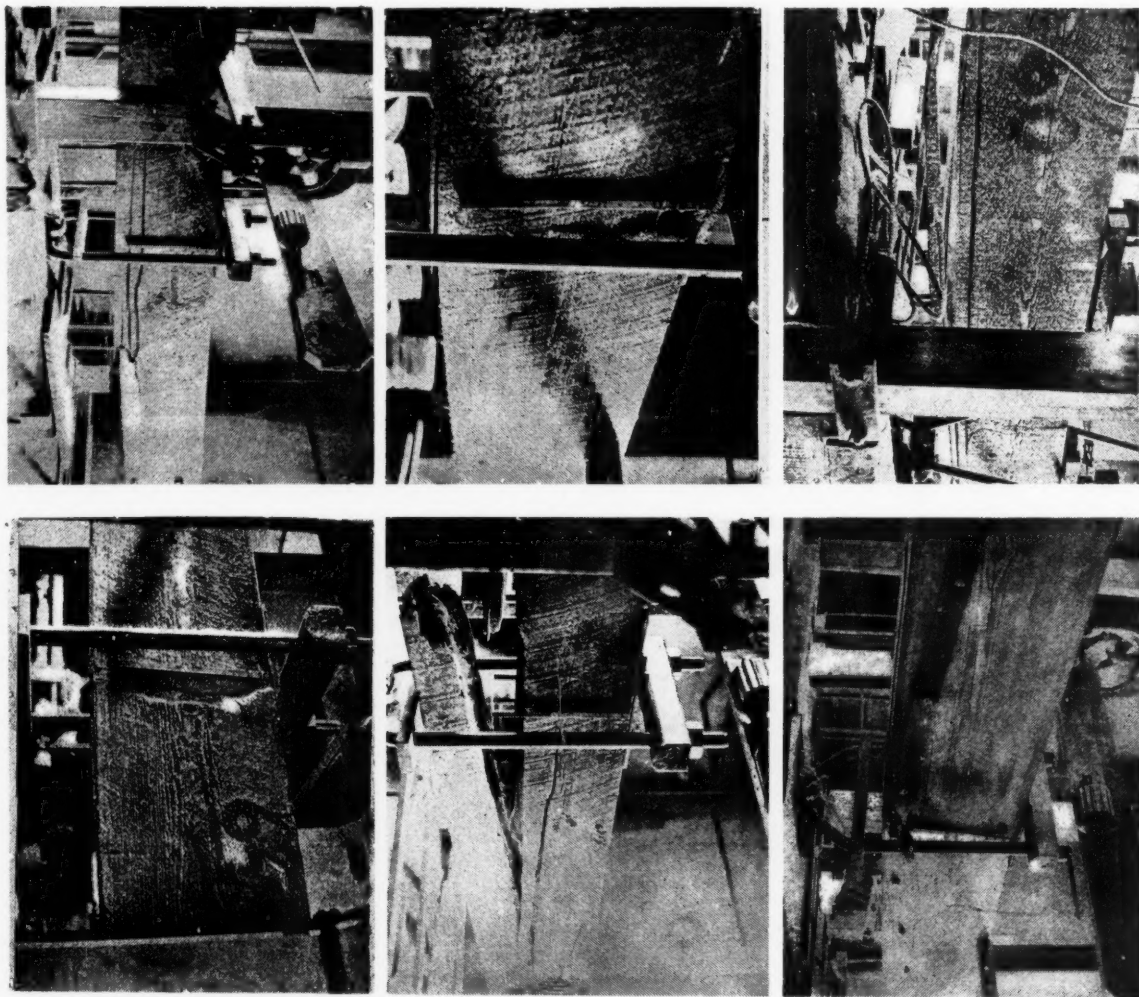


La Collegiata : Toro : Spain.

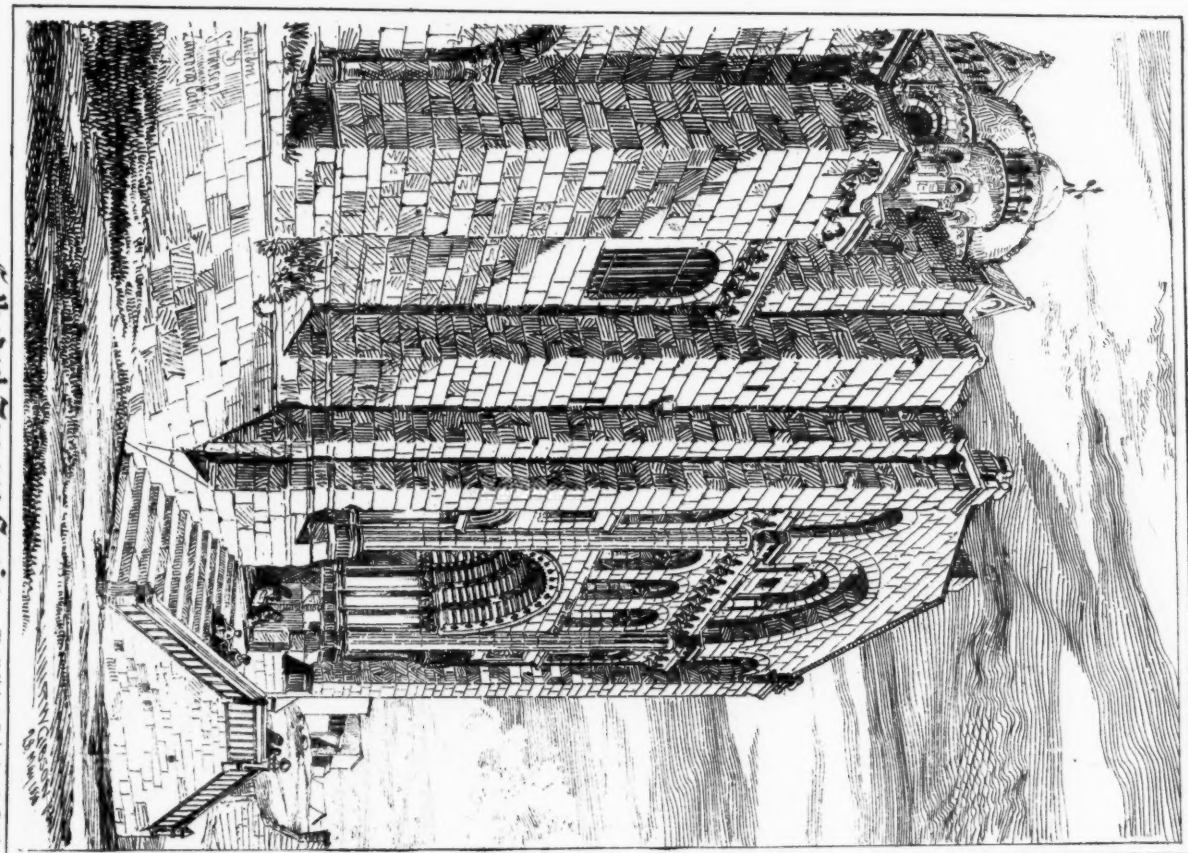
The Engraving Co. 211 Tremont St. Boston.



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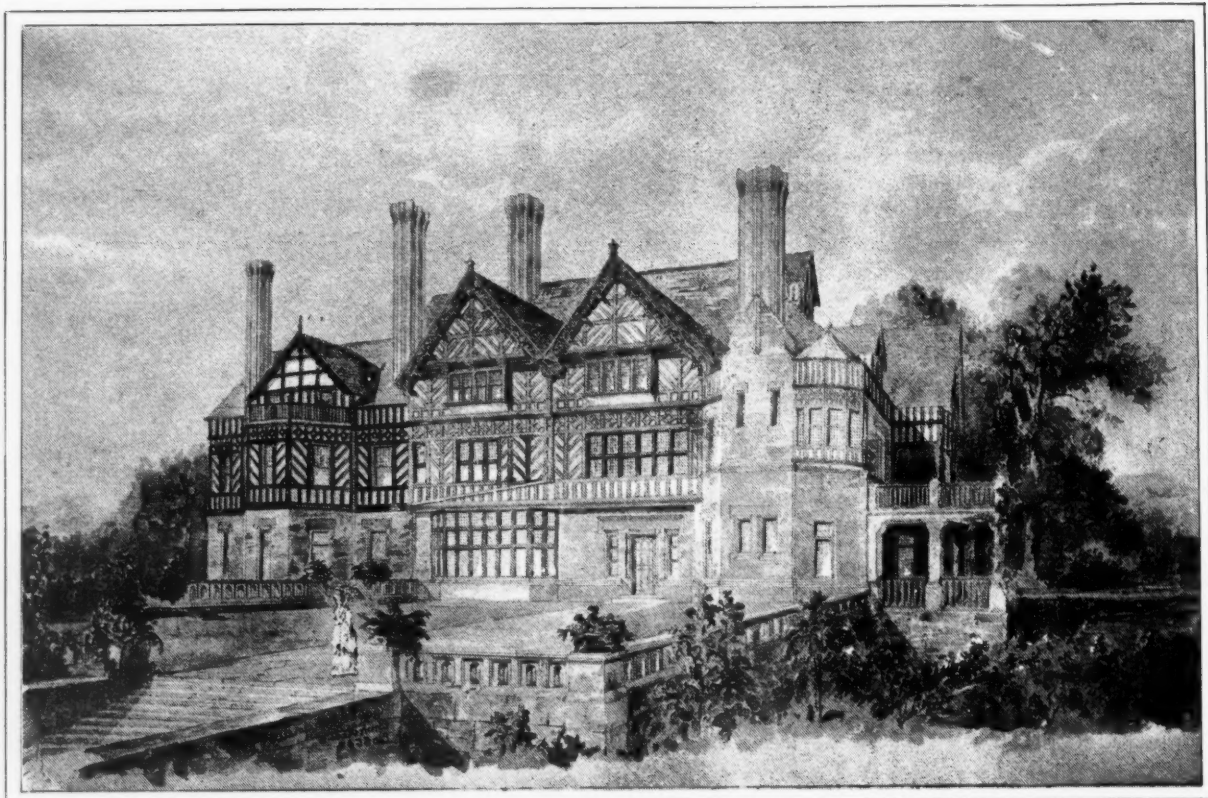


FRANCO-STRONG BRAND, PLATE 10.

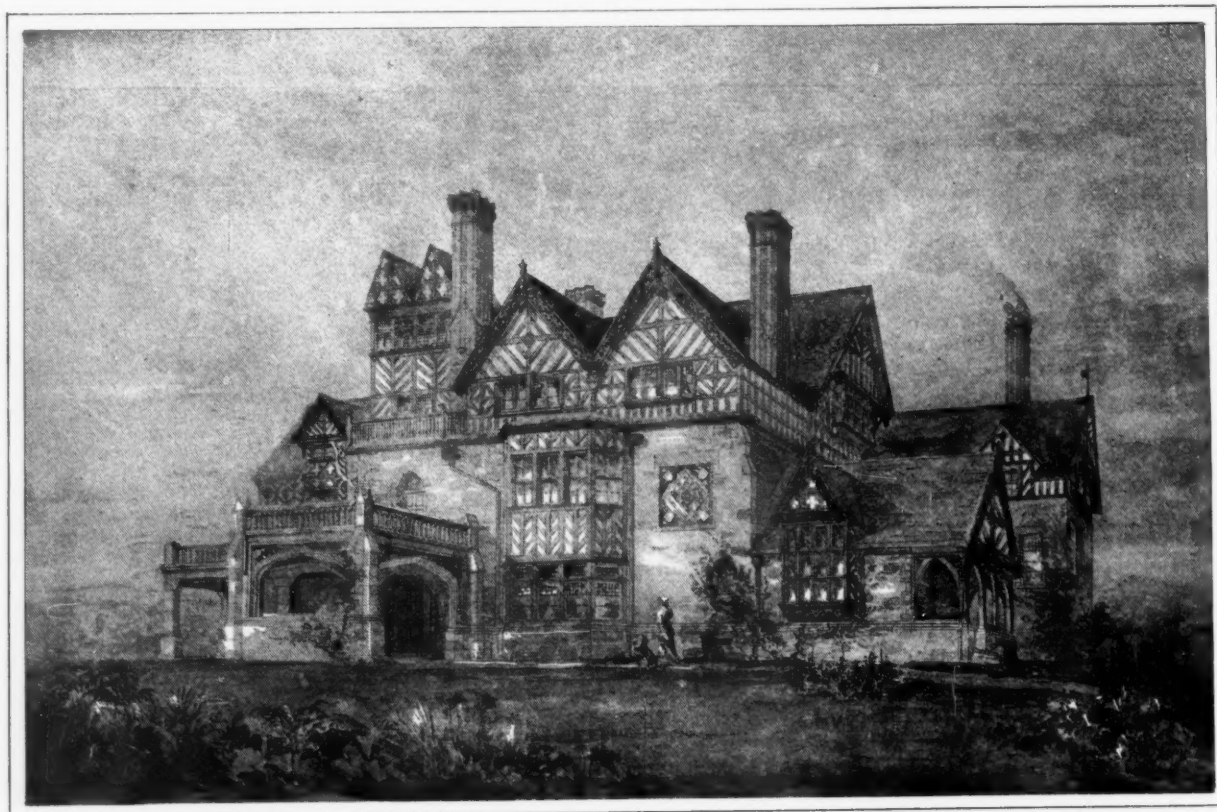


Cathedral, Zamora, Spain.

The Halotype Printing Co. Boston.



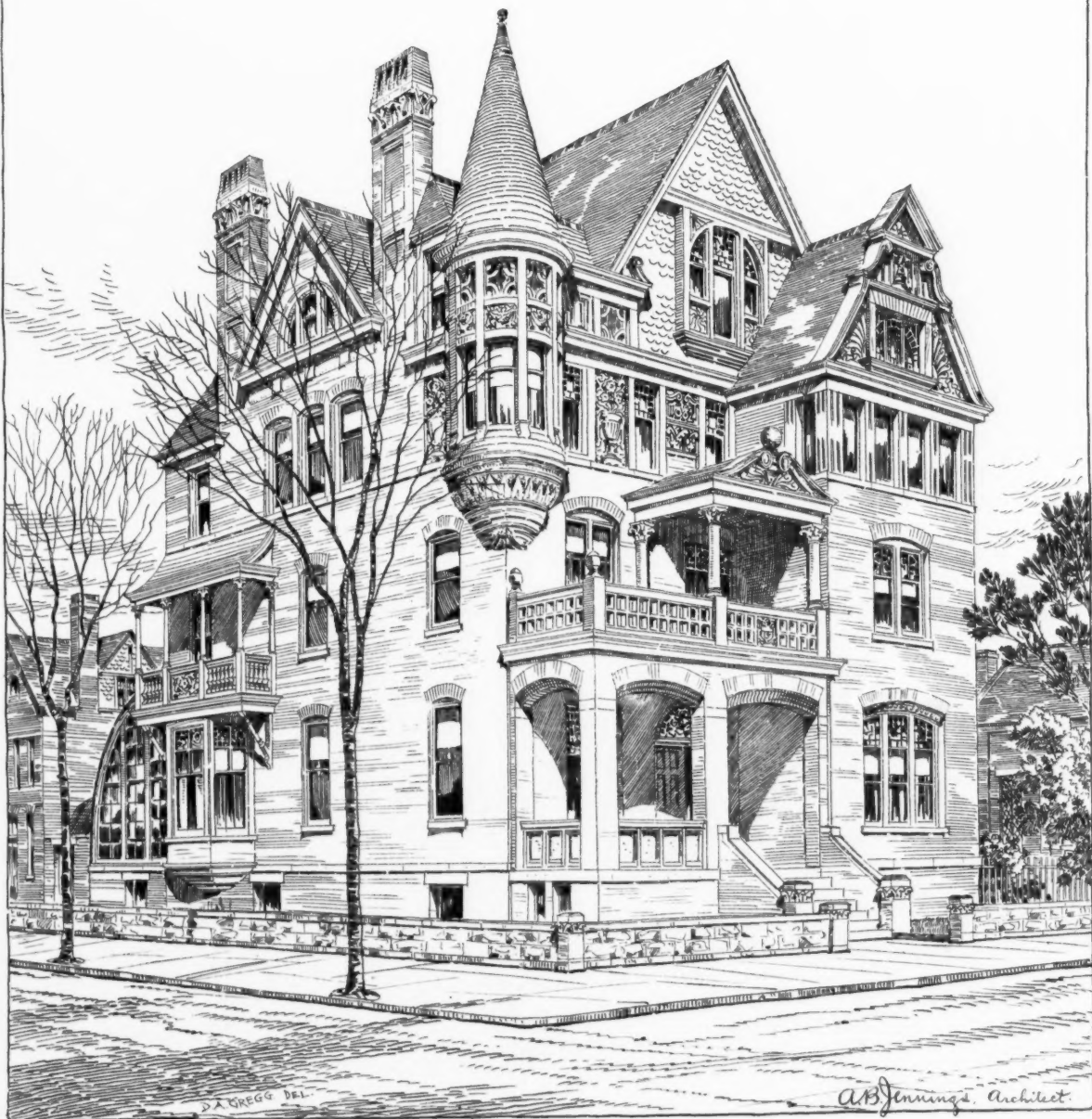
DESIGN FOR COUNTRY HOUSE, FOR H. G. DULANEY, JR. UPPERVILLE, VA.
MESSRS. CABOT & CHANDLER, ARCH'TS. BOSTON, MASS.



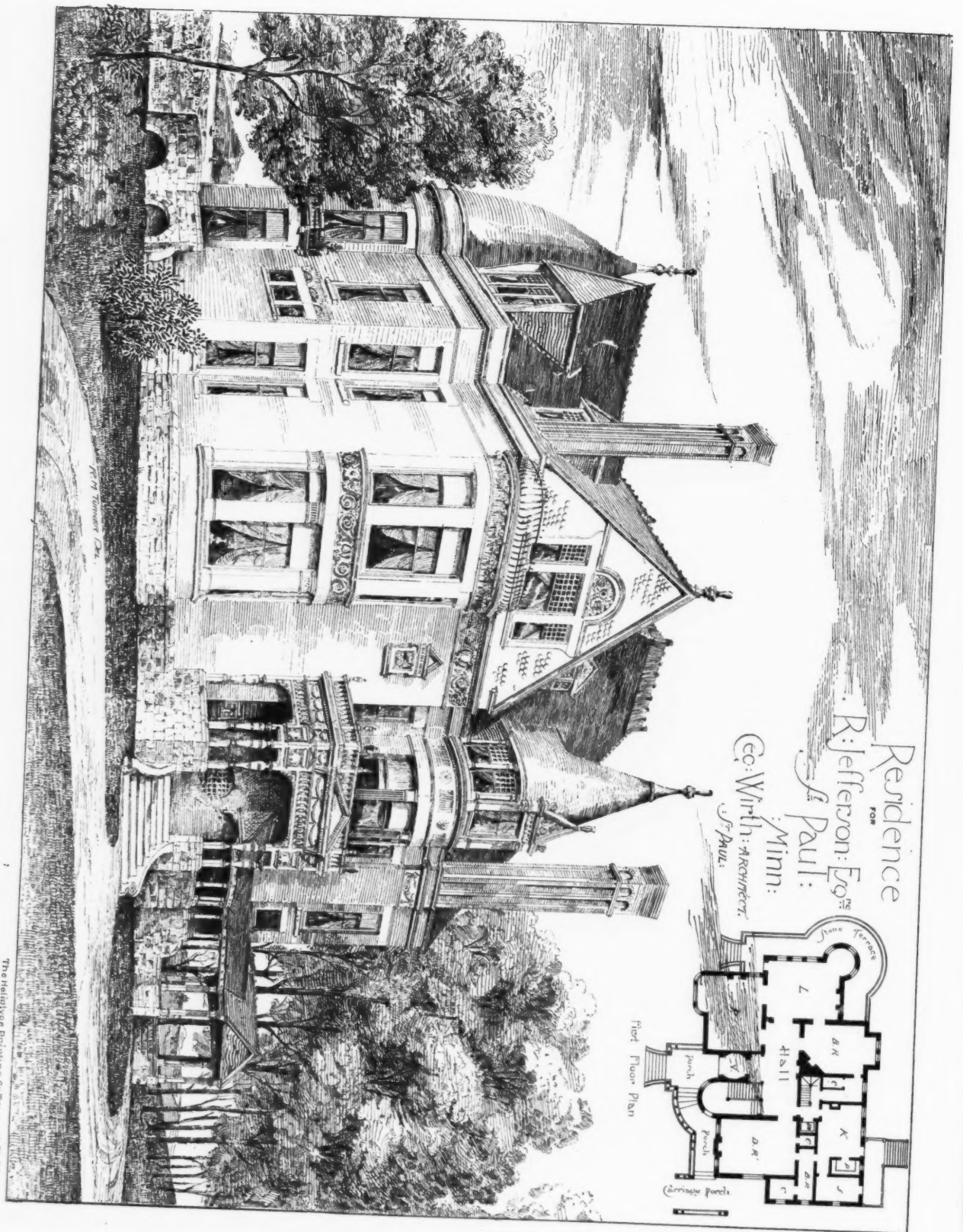
RESIDENCE OF DR. L. C. WARNER.

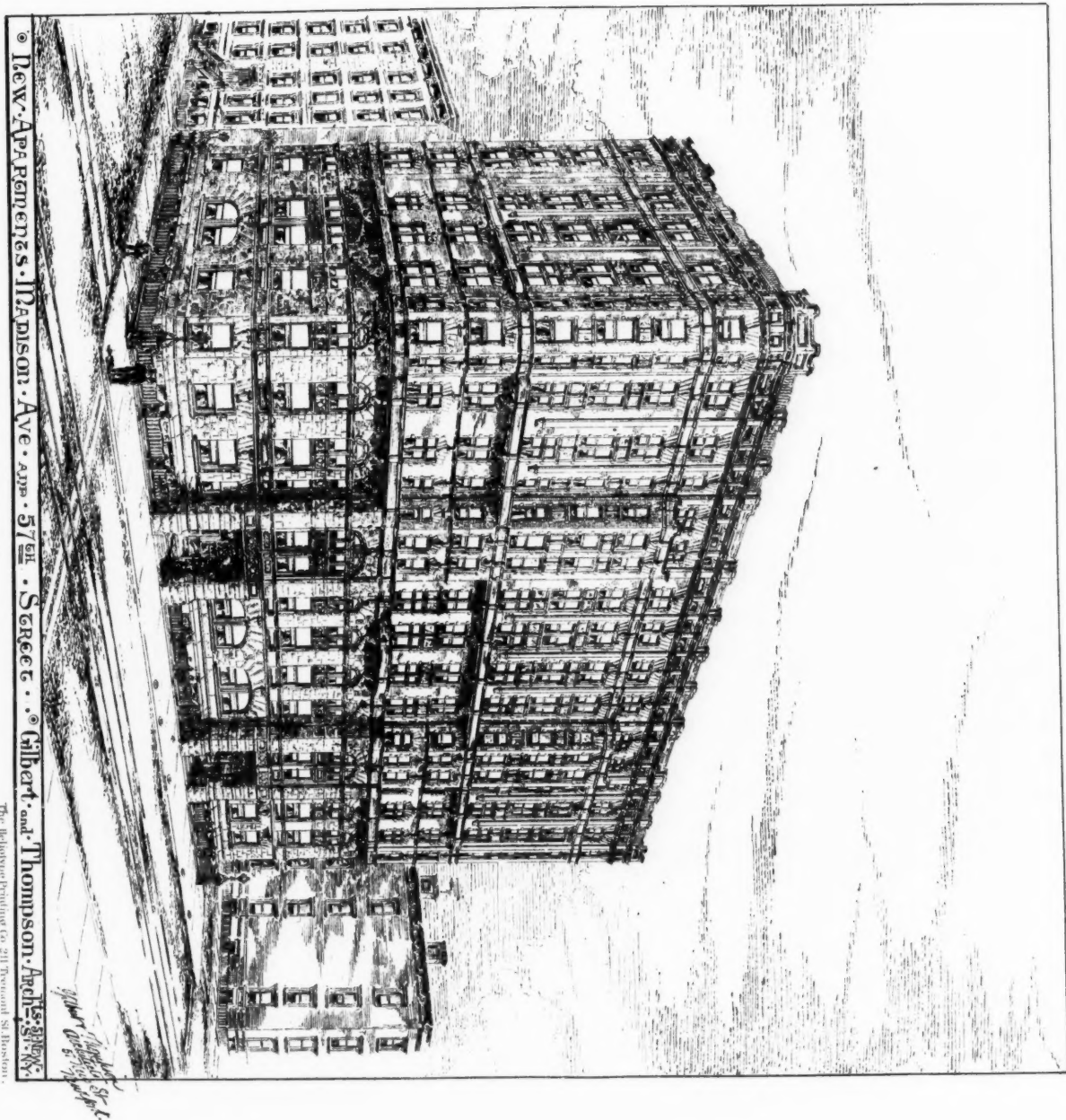
(COR. 5TH AVE. AND 126TH ST.

N.Y. CITY.



The Helotype Printing Co. Tremont St. Boston.





• New-Appliances • Madison Ave • 57th • Street • • Gilbert and Thompson Architects •

The Engraving printed by 211 Broadway St. Boston.



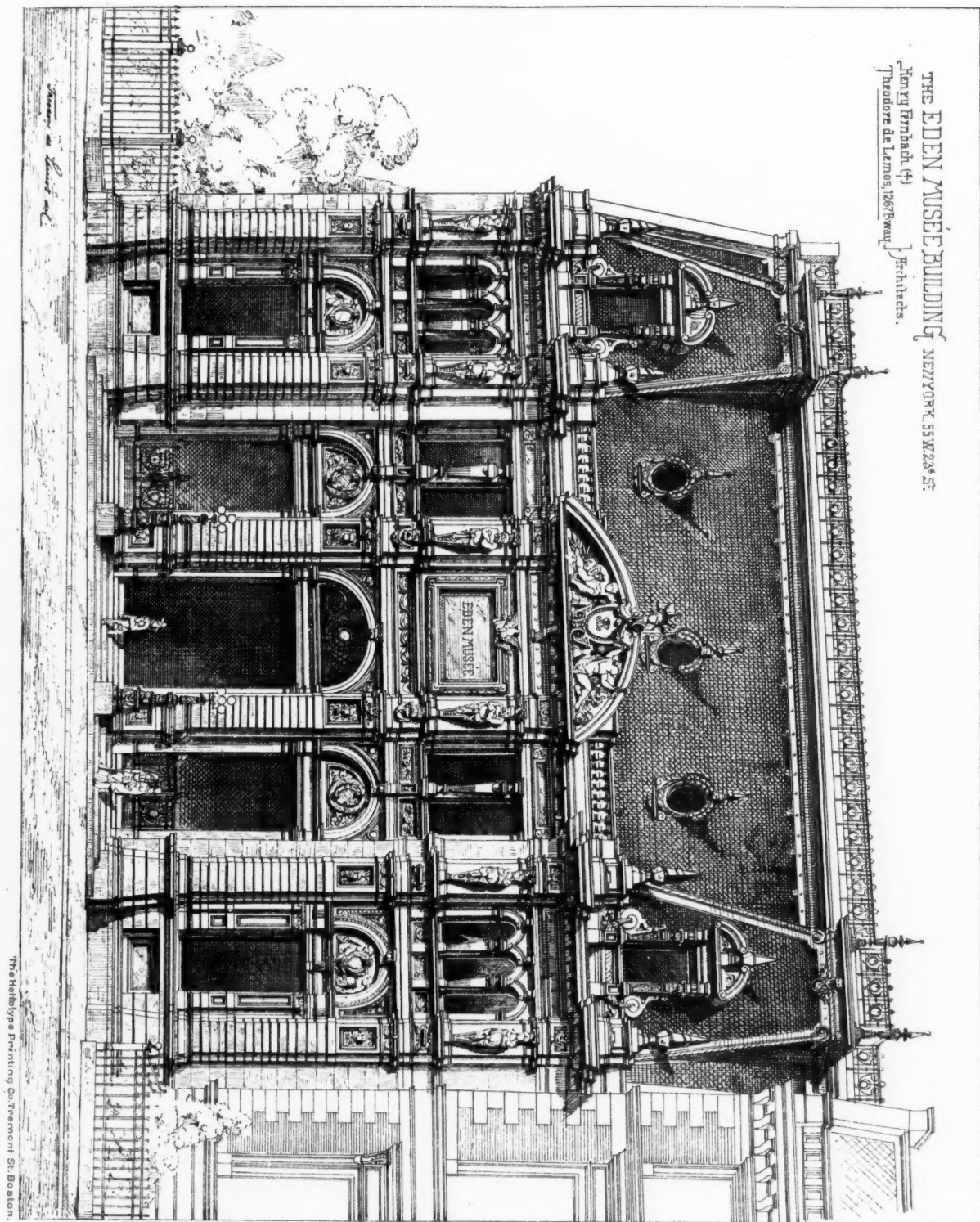
The Heliotype Printing Co. 211 Tremont St. Boston

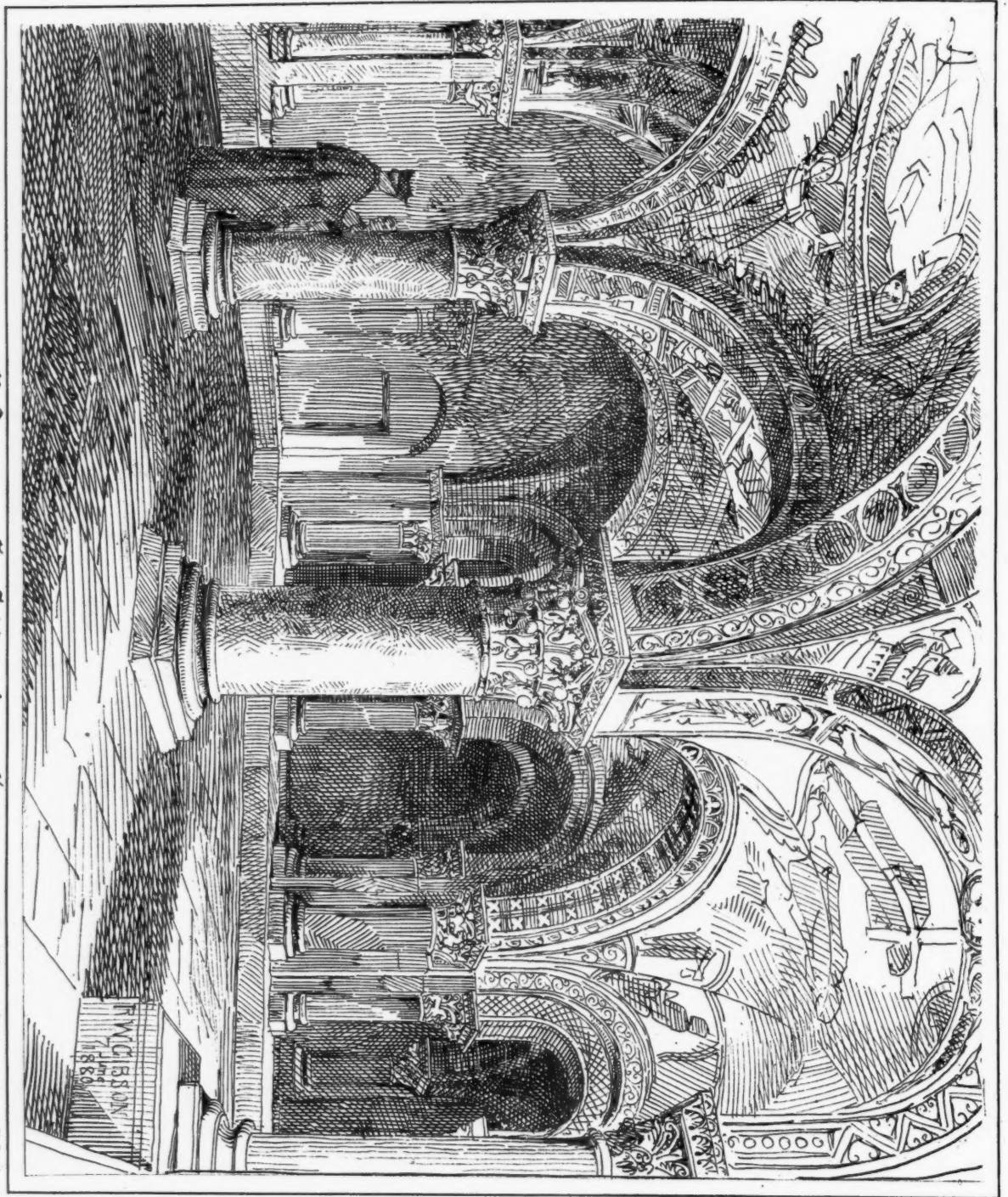
(FROM L'ENCYCLOPÉDIE D'ARCHITECTURE.)

GRANDS MAGASINS DU PRINTEMPS, PARIS. M. PAUL SÉDILLE, ARCHT.

COPYRIGHTED, 1884 JAMES R. OSGOOD & CO.

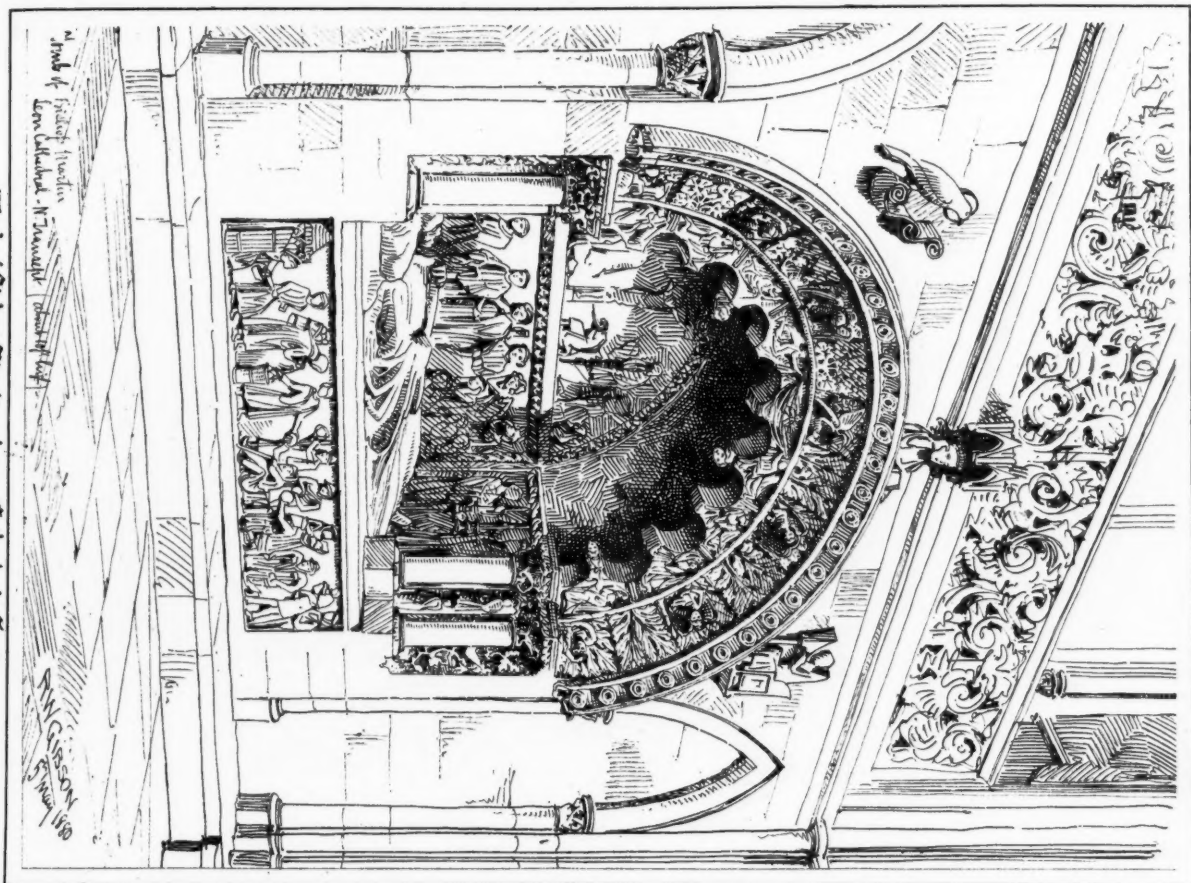
THE EDEN MUSEE BUILDING
NEW YORK 551.223 ST.
Henry Firmbach (†)
Theodore de Lemos, 1261 Bway. Architects.



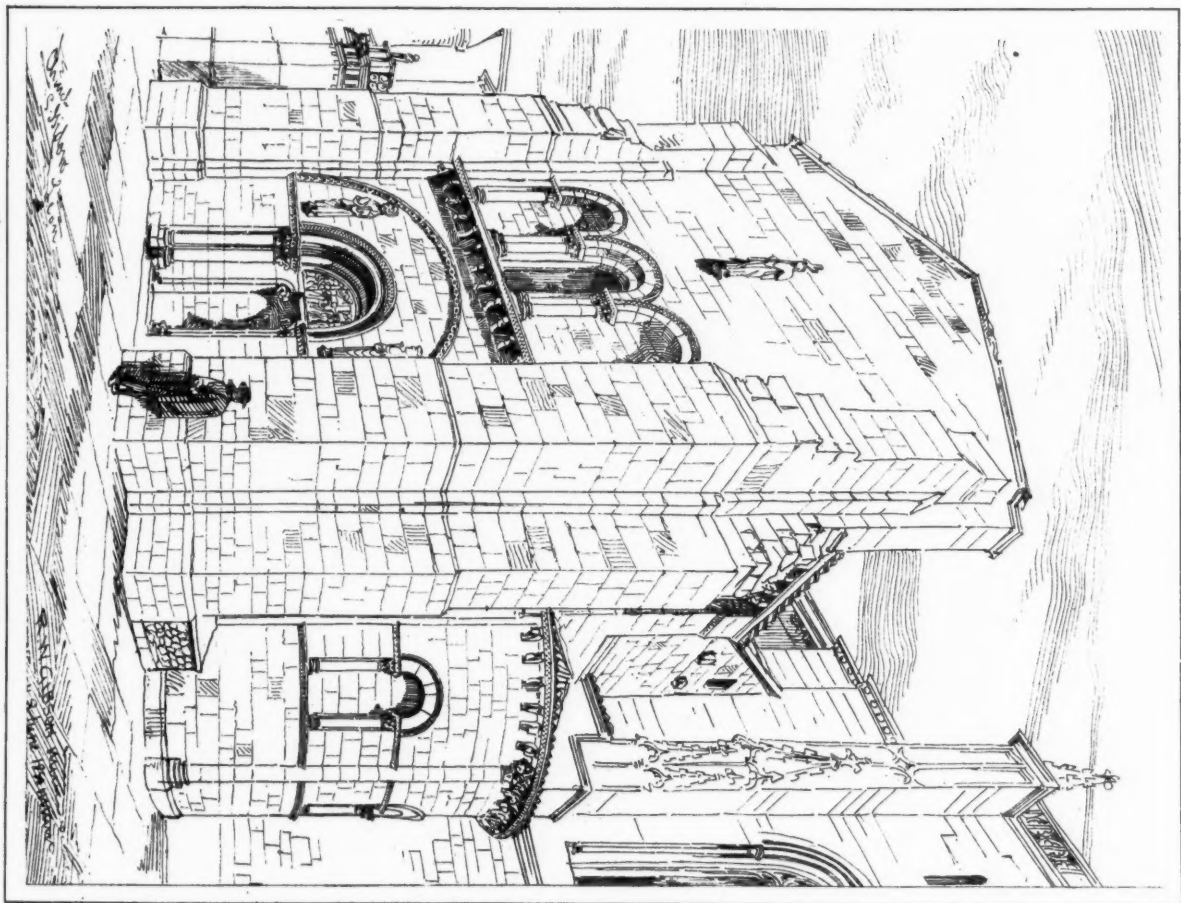


El Panteon : San Isidoro-Leon, Spain

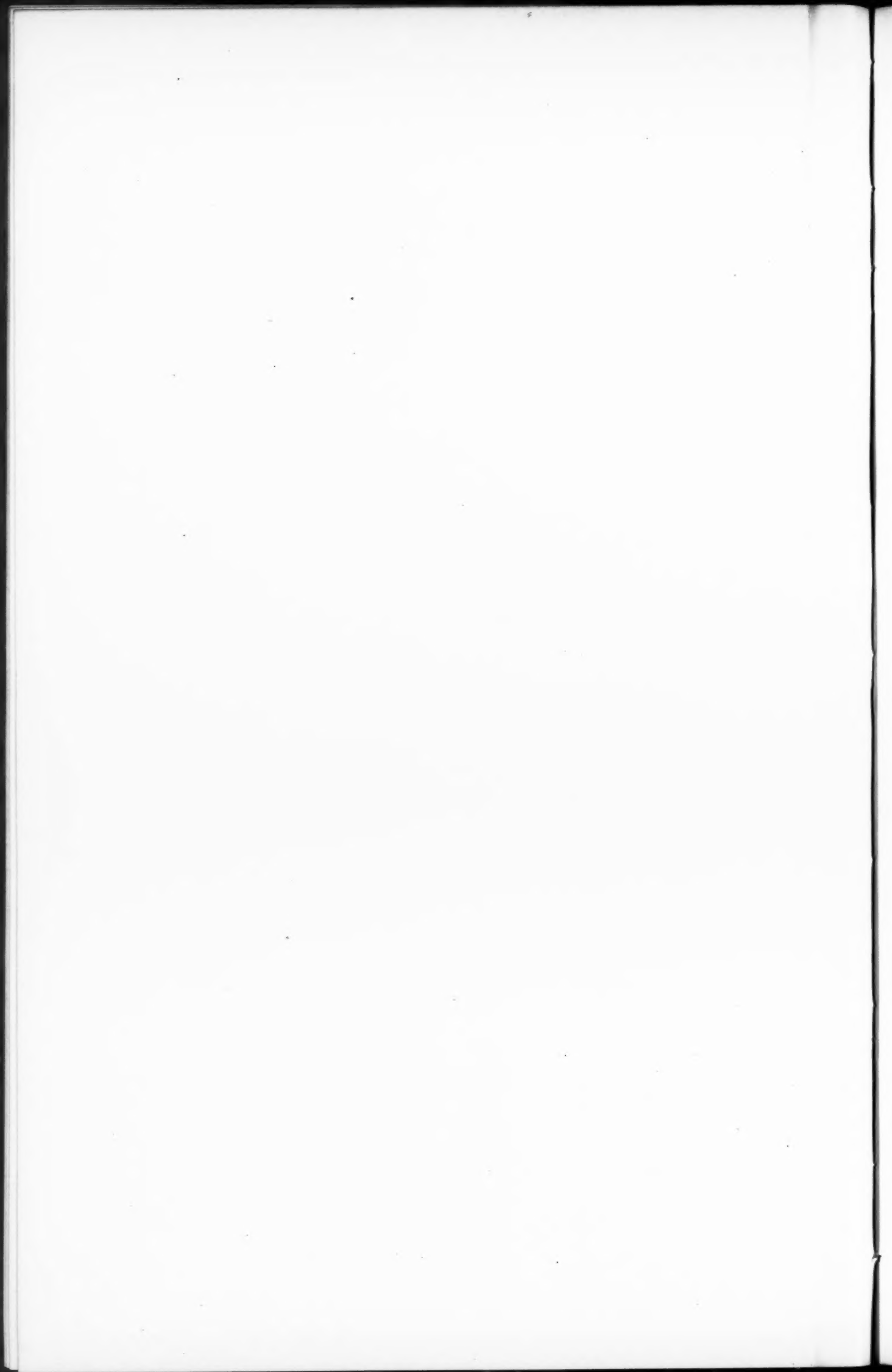
The Melrose Printing Co. Treatment St. Boston.



Tomb of Bishop Martin. Leon Cathedral Spain.



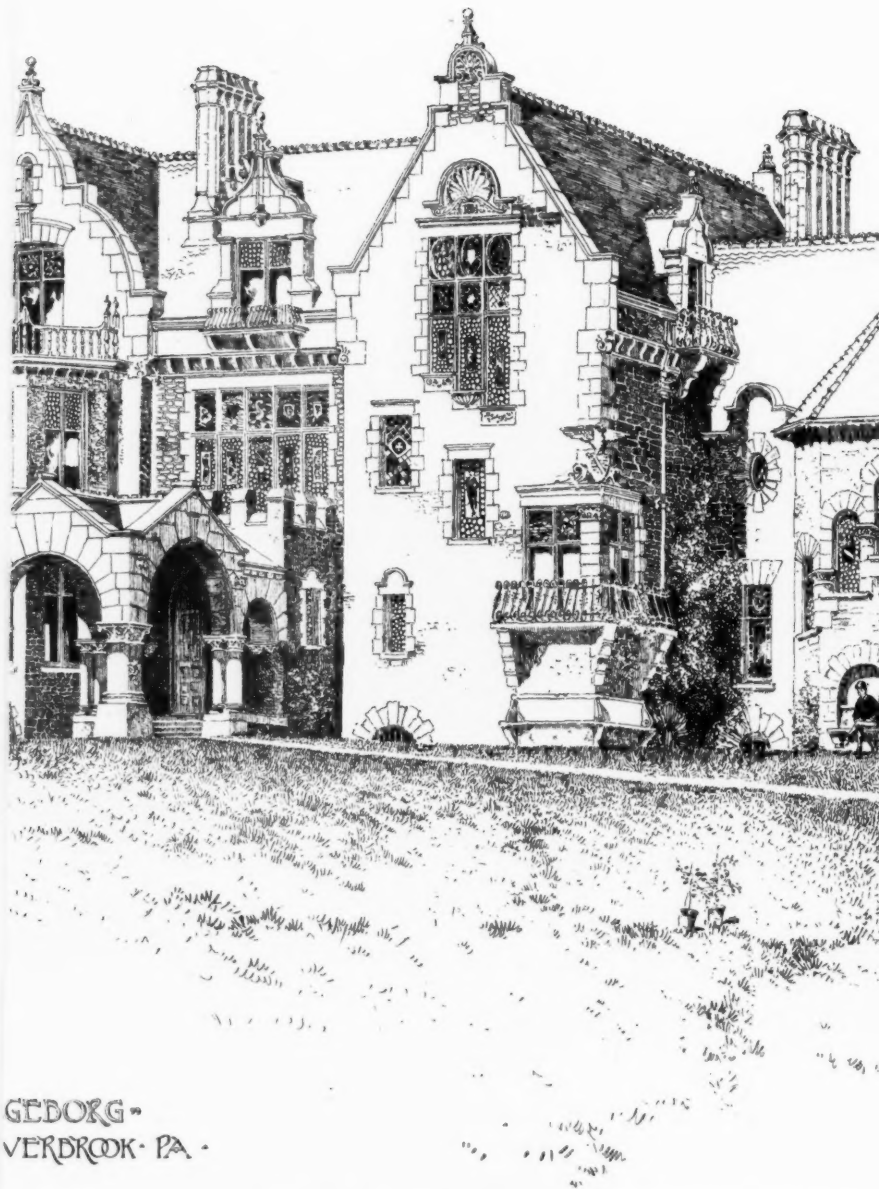
Transept. San Isidoro. Leon Spain.



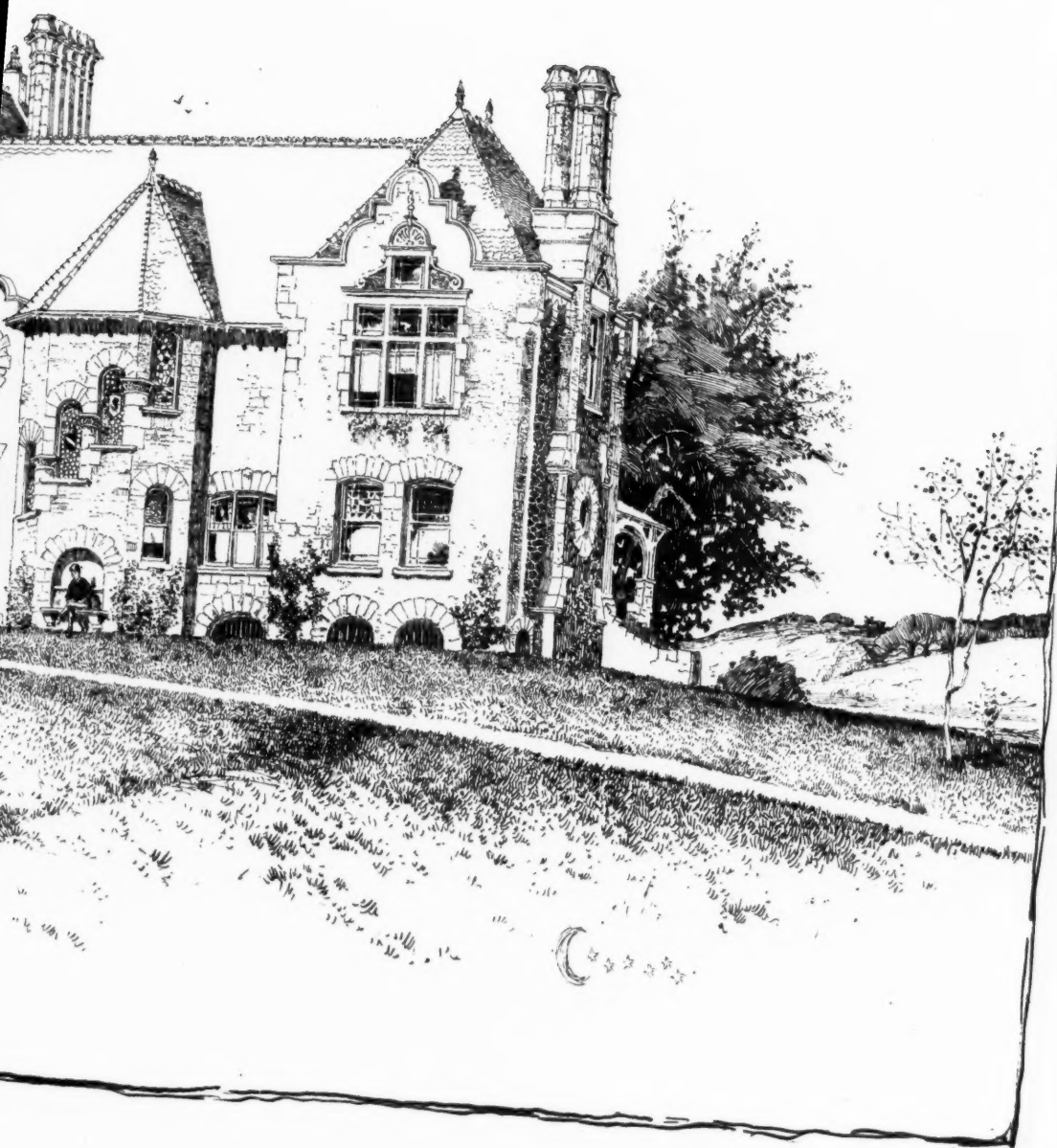


• INGEBOG •
• NEAR OVERBROOK, PA. •

Theophilus P. Chandler, Jr.
Architect
302 Walnut St. Philadelphia, Pa.

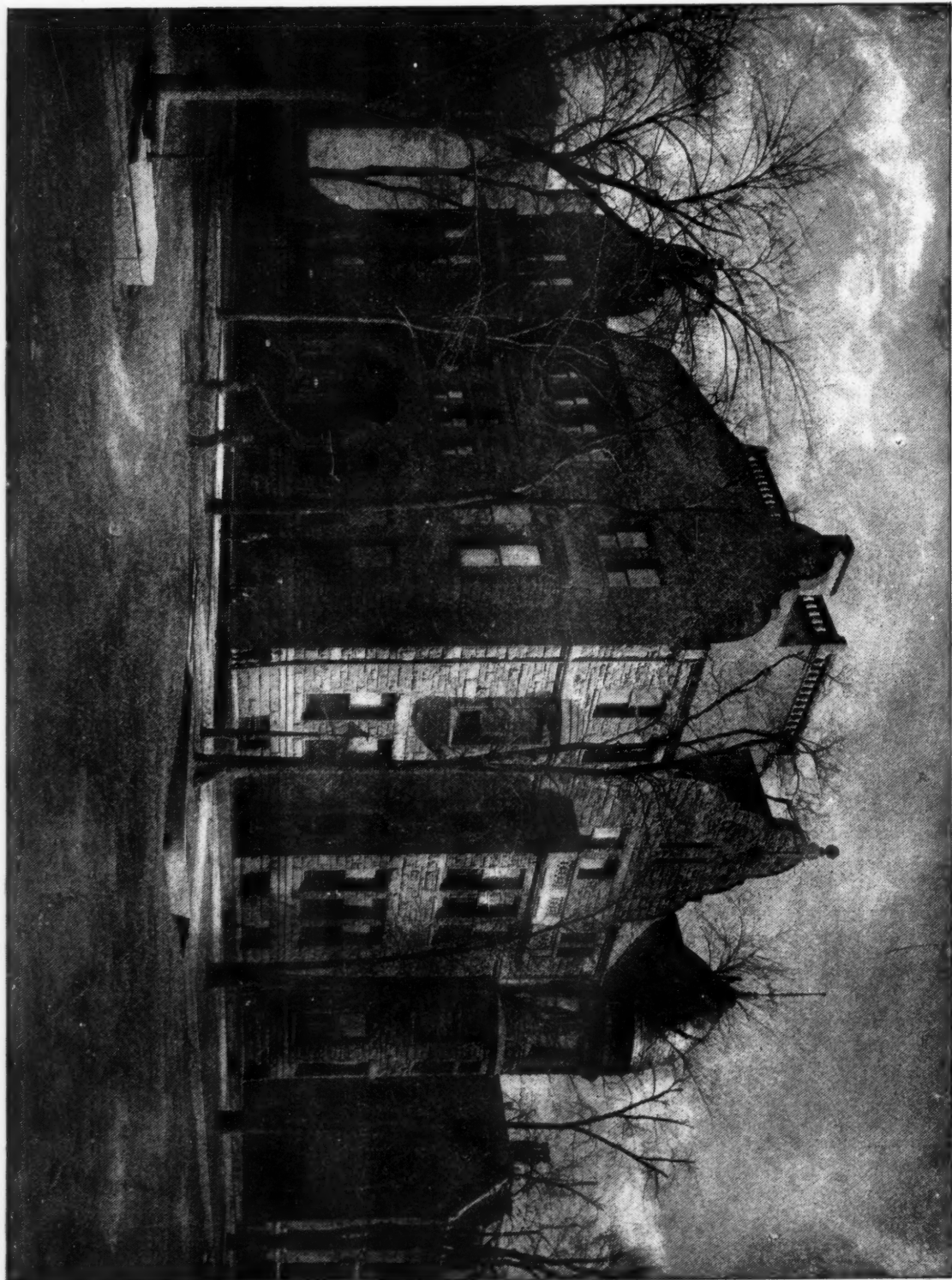


GEBORG
VERBROOK PA.

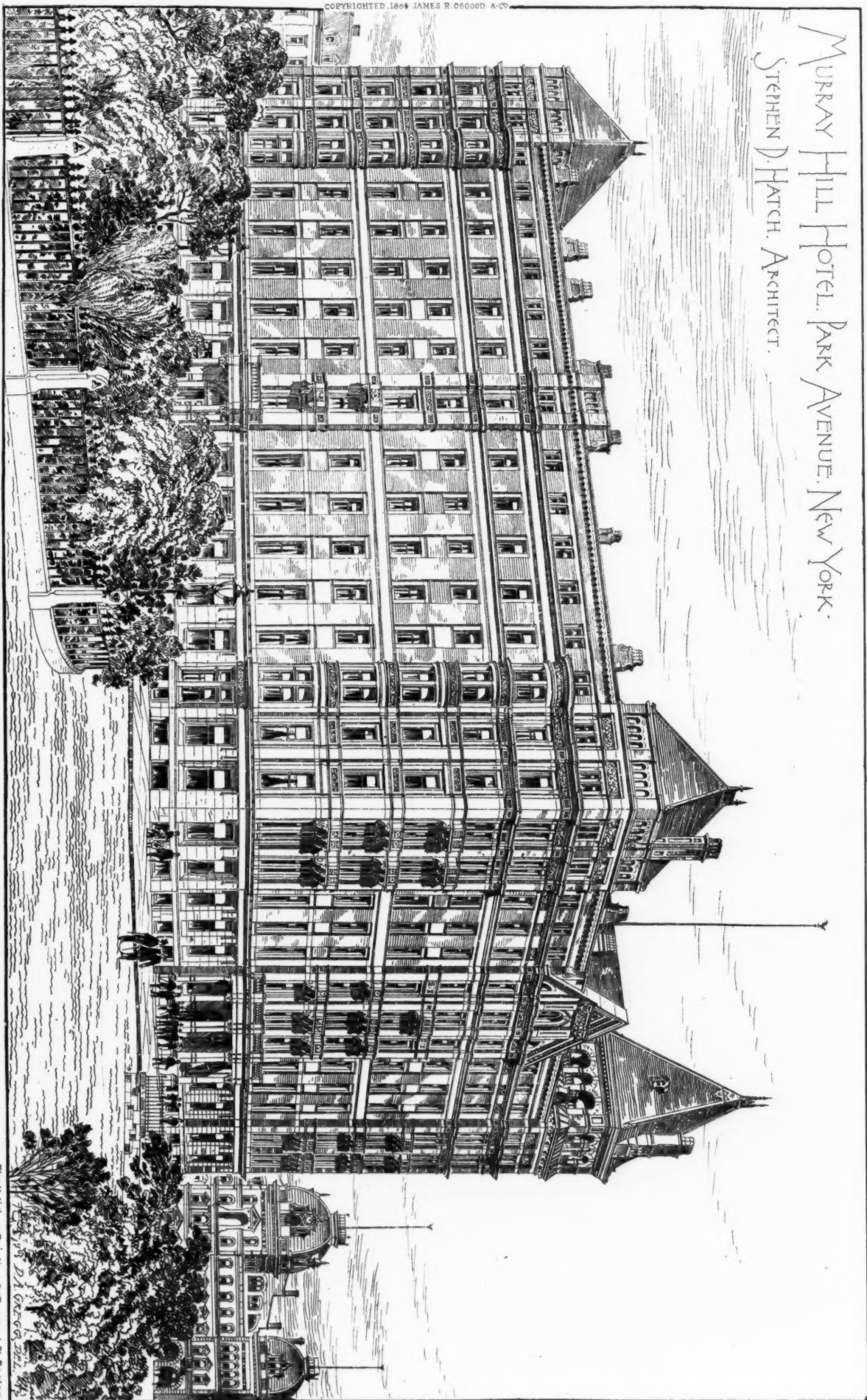


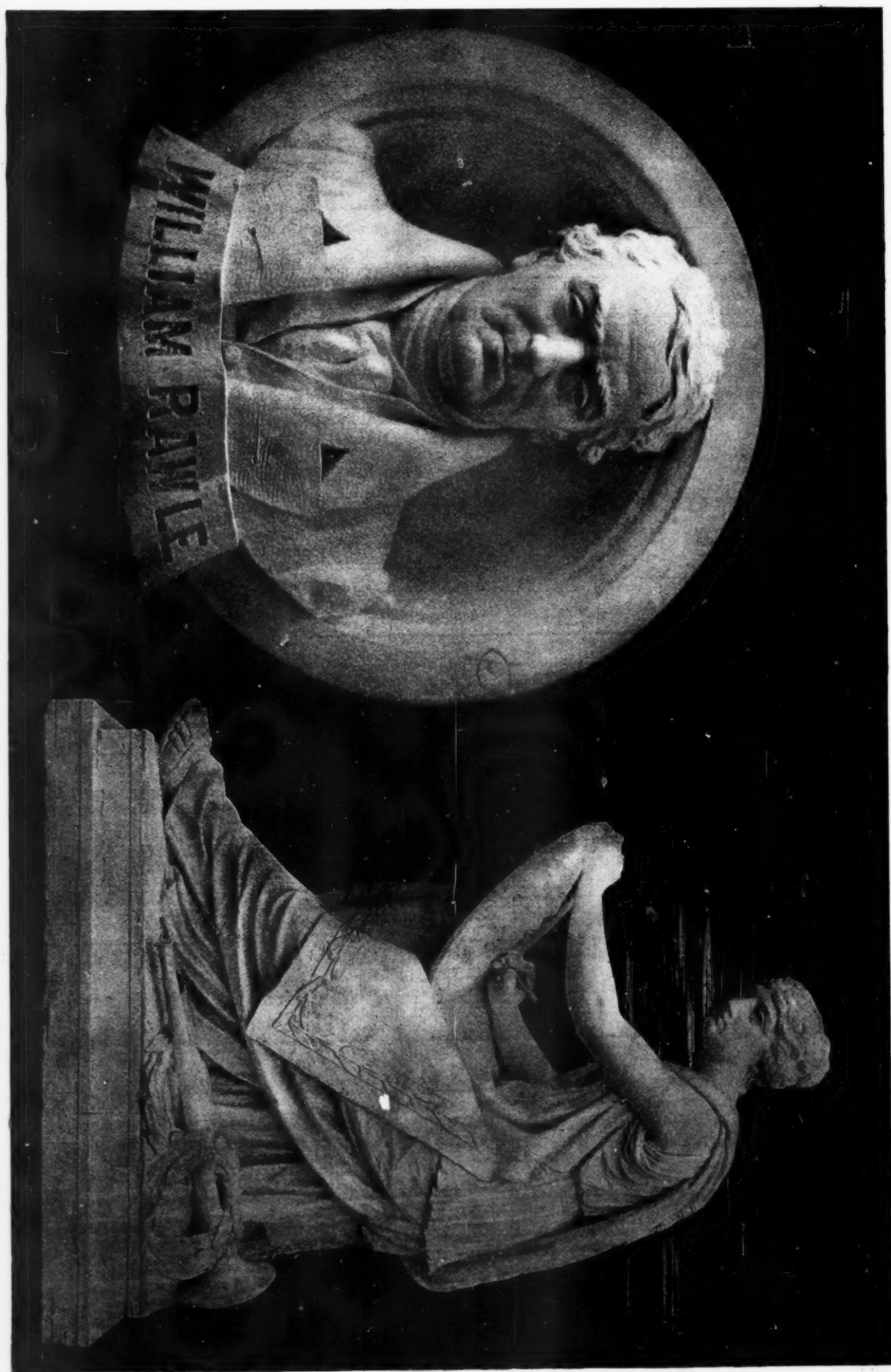
(LUB-HOUSE FOR THE UNION (LUB, (CHICAGO, ILL. MESSRS. CORB & FOST. ARCH'TS.

PHOTO CAUSTIC, HELIOTYPE PRINTING CO., BOSTON.



MURRAY HILL HOTEL, PARK AVENUE, NEW YORK.
STEPHEN D. HATCH, ARCHITECT.



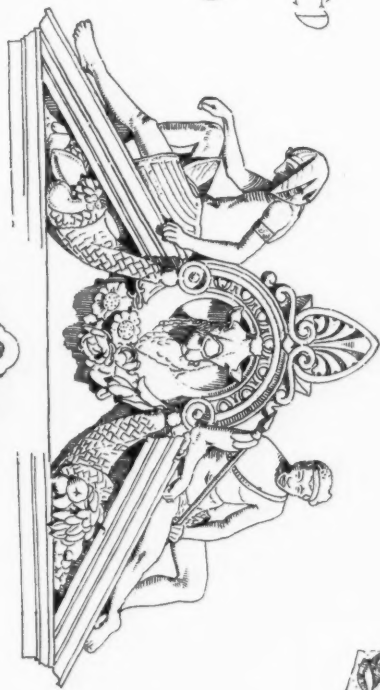
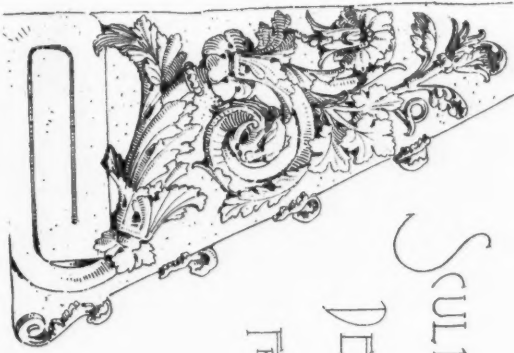


SCULPTURED DETAILS FROM THE NEW CITY HALL, PHILA. PA. BY J. McARTHUR JR. ARCHT. A. MILNE (ALDER. SCULPTOR.

PHOTO CAUSTIC, HELIOTYPE PRINTING CO. BOSTON

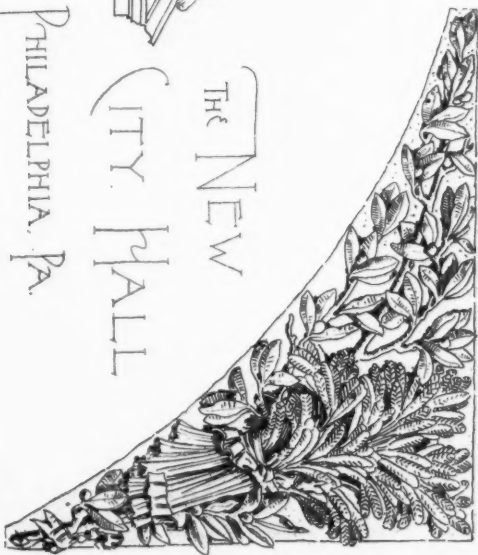
SCULPTURED
DETAILS

FROM



PHILADELPHIA, PA.

THE NEW
CITY HALL



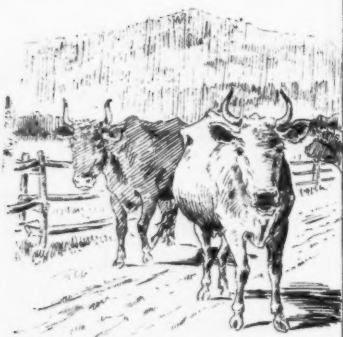
J. McARTHUR JR.
ARCHITECT



A. M. MILNE CALDER
SCULPTOR



Old House at
Bruynswick



Shawangunk Church
150 Years old



REDAYS
84.



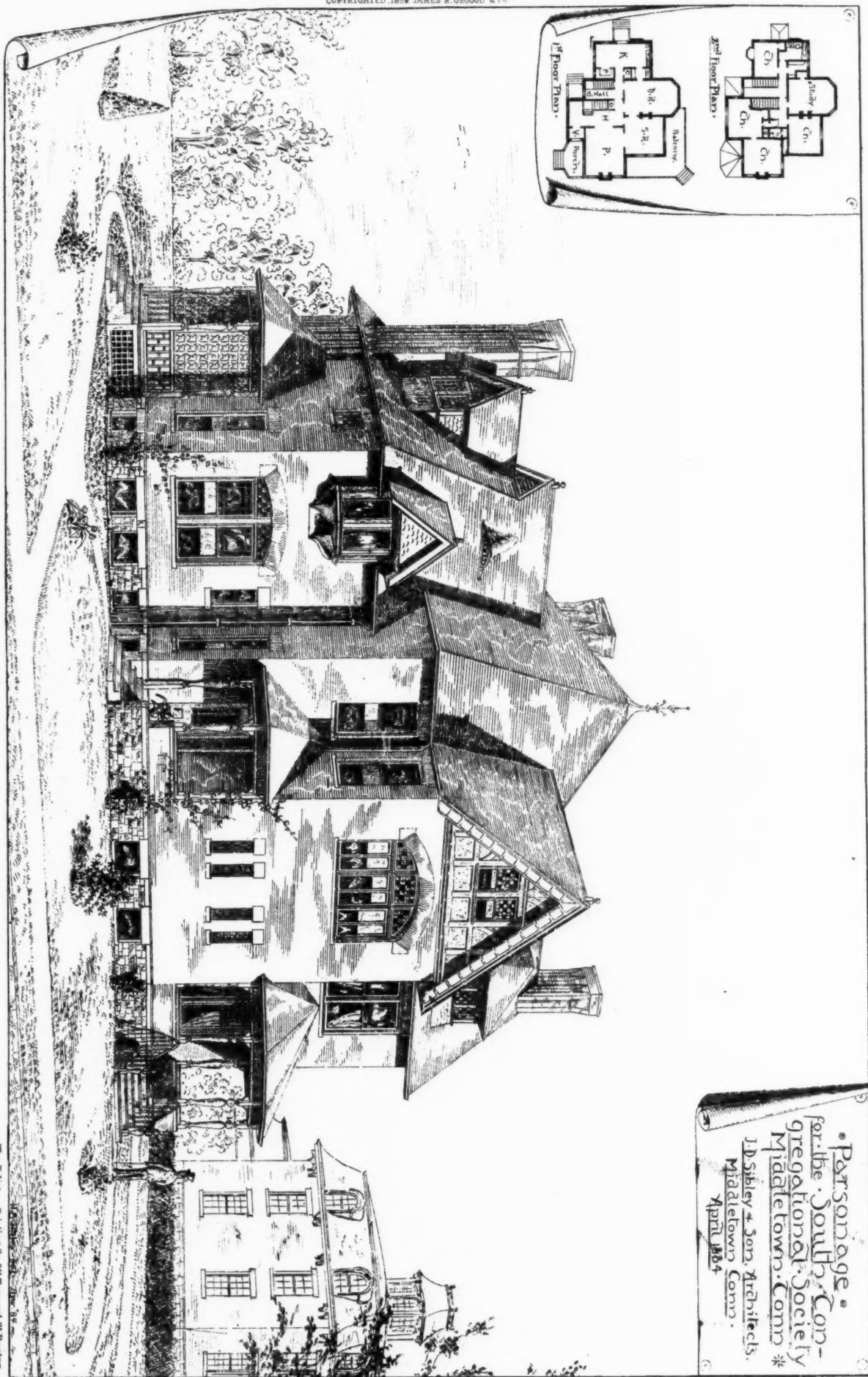
Old House at
Bruynswick



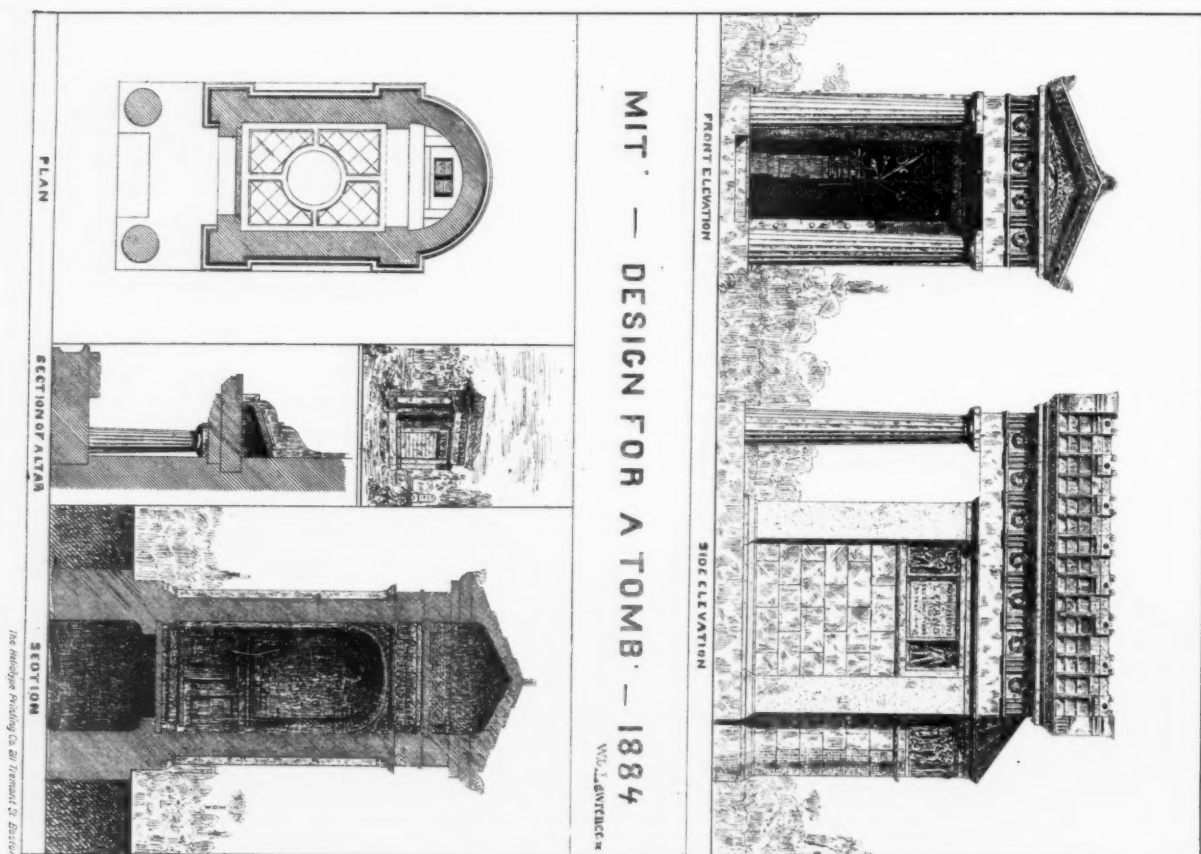
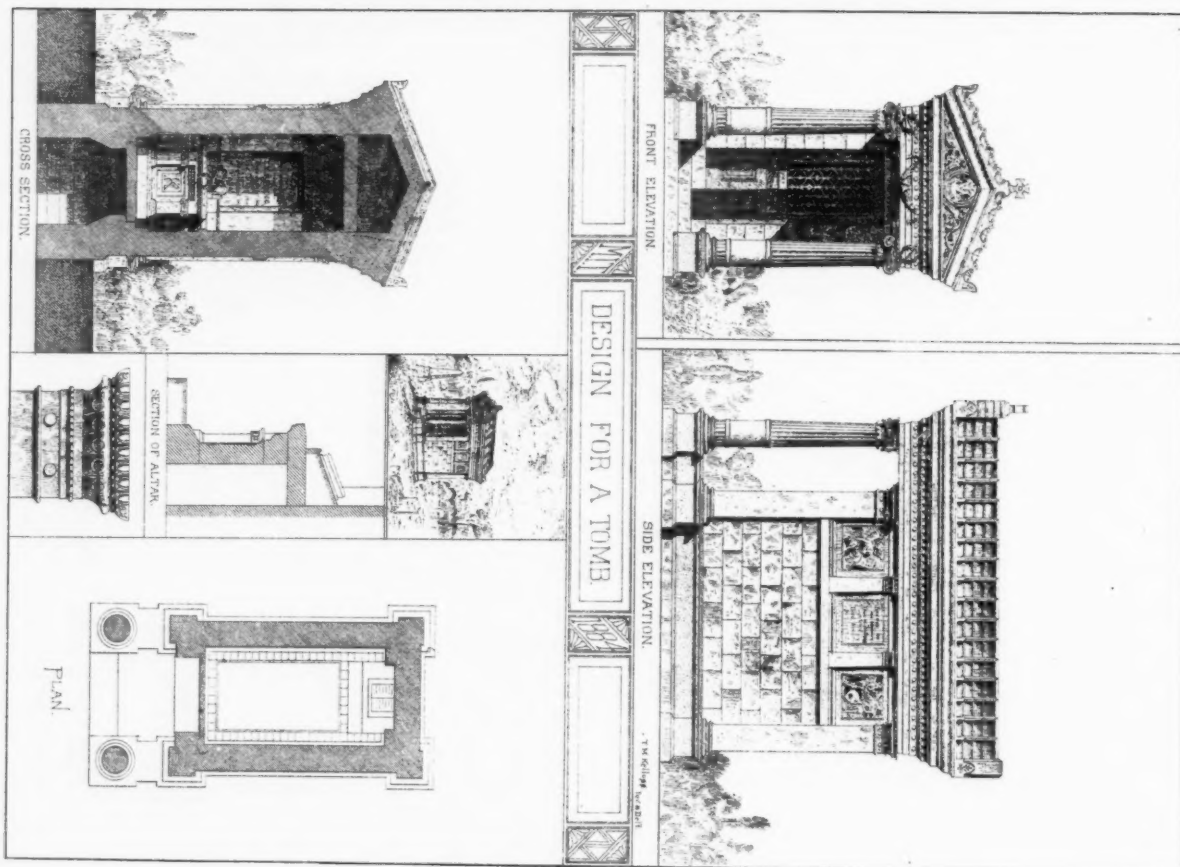
Entrance Porch
House at Bruynswick

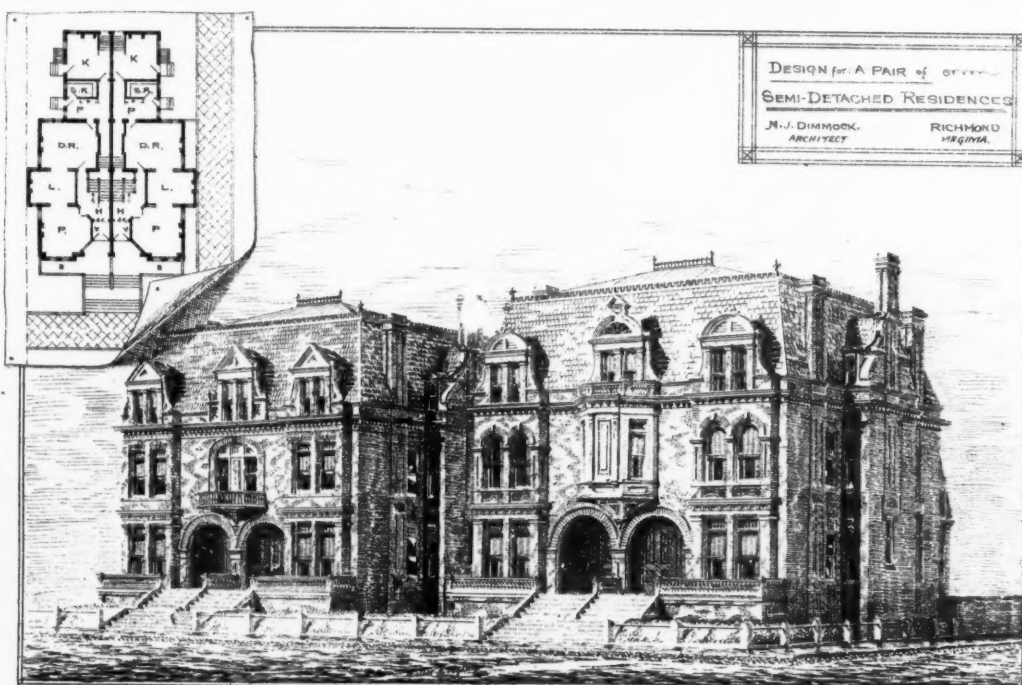
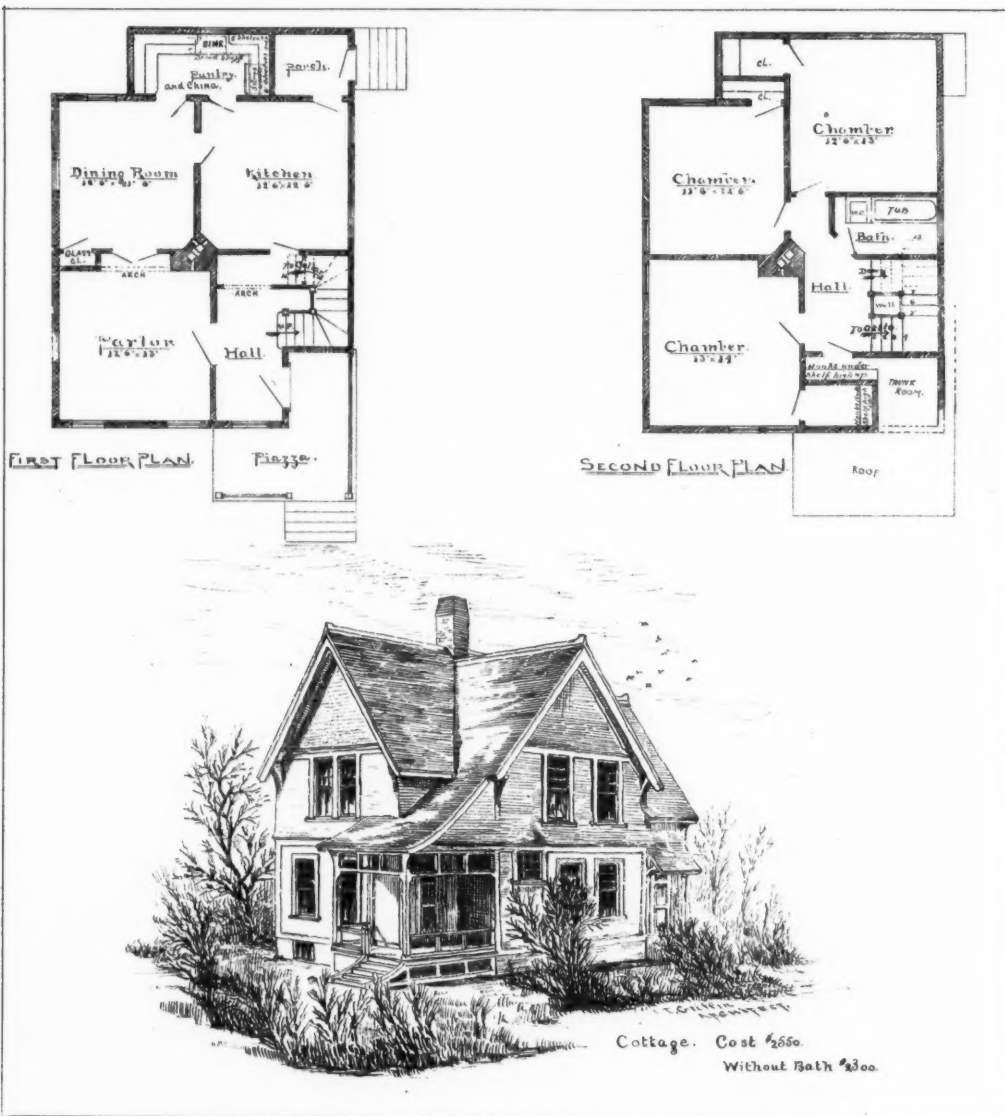


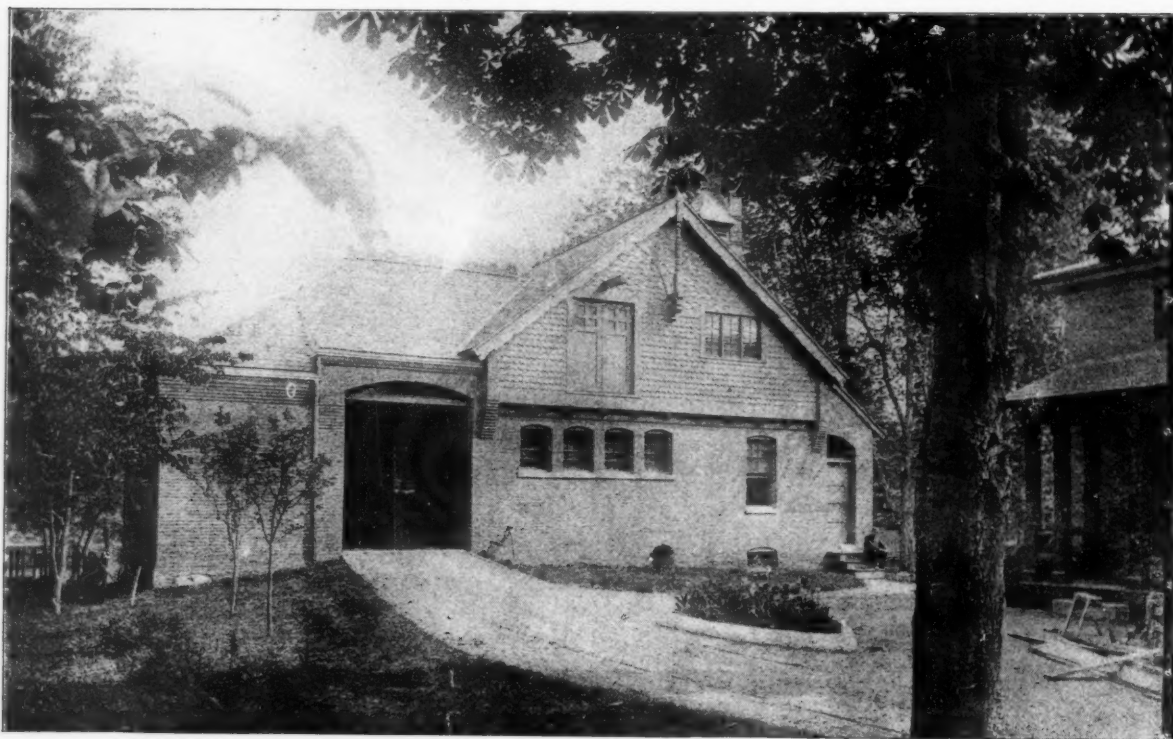
COPYRIGHTED 1884 JAMES R. OSGOOD & CO.



• Parsonage •
for the South Con-
gregational Society
Madison, Conn. *
J. D. Sibley & Son, Architects.
Madison, Conn.
April 1884







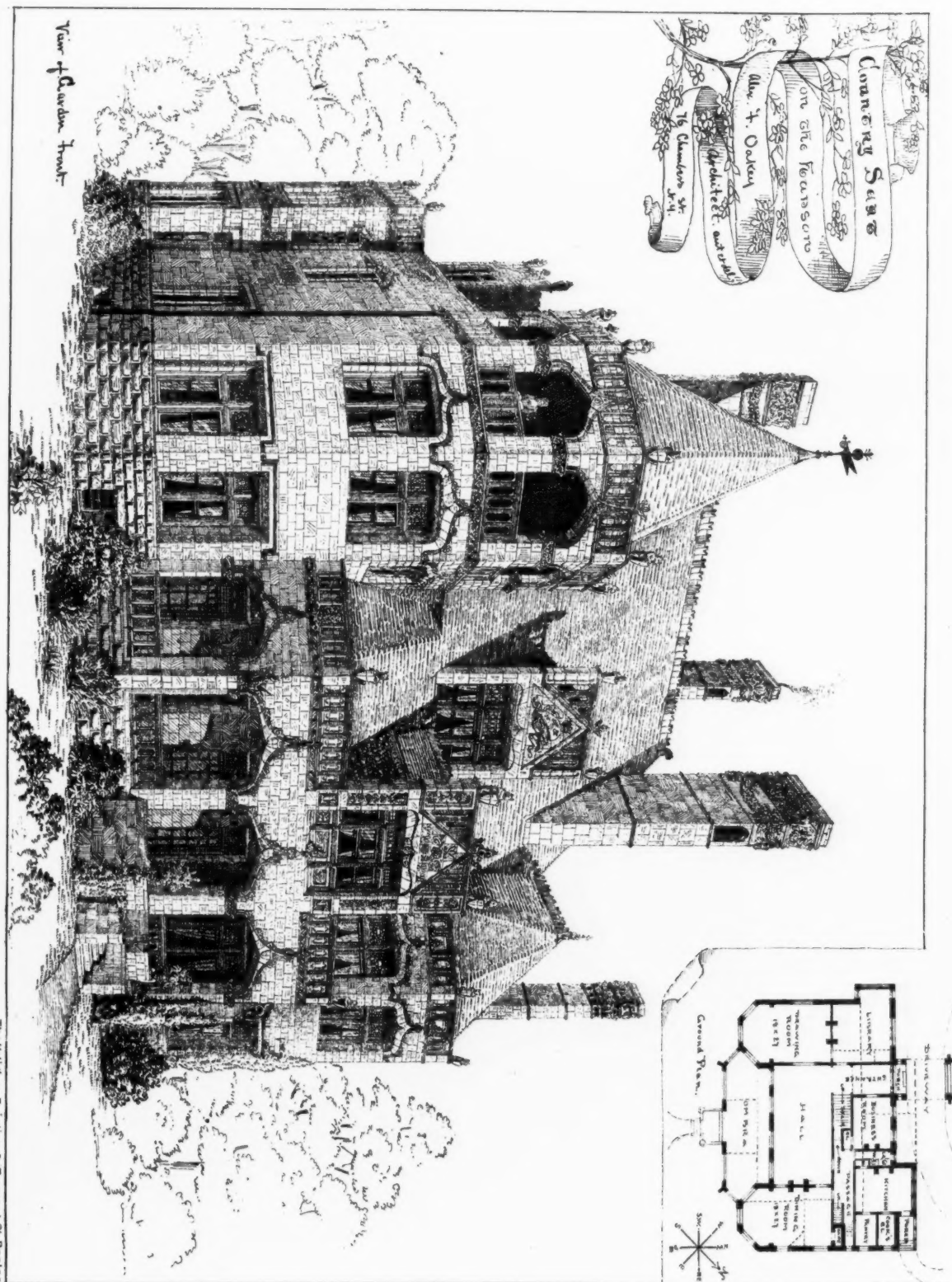
STABLE FOR JOHN WALES, ESQ. BROOKLINE, MASS.



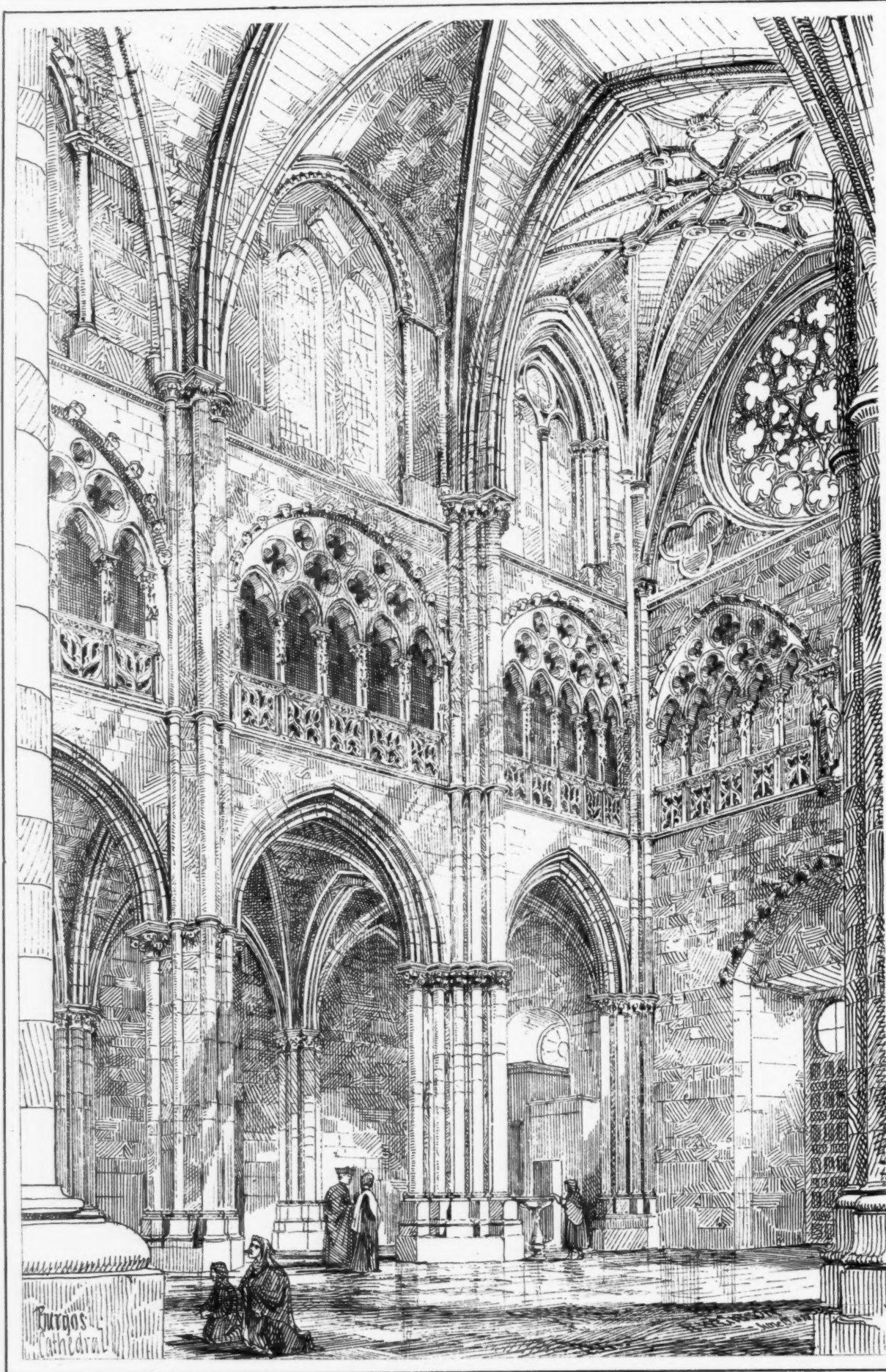
HOUSE FOR B. P. LOVEJOY, ESQ. SOMERVILLE, MASS.

W. W. LEWIS, ARCHITECT.

PHOTO CAUSTIC, HELIOTYPE PRINTING CO., BOSTON.

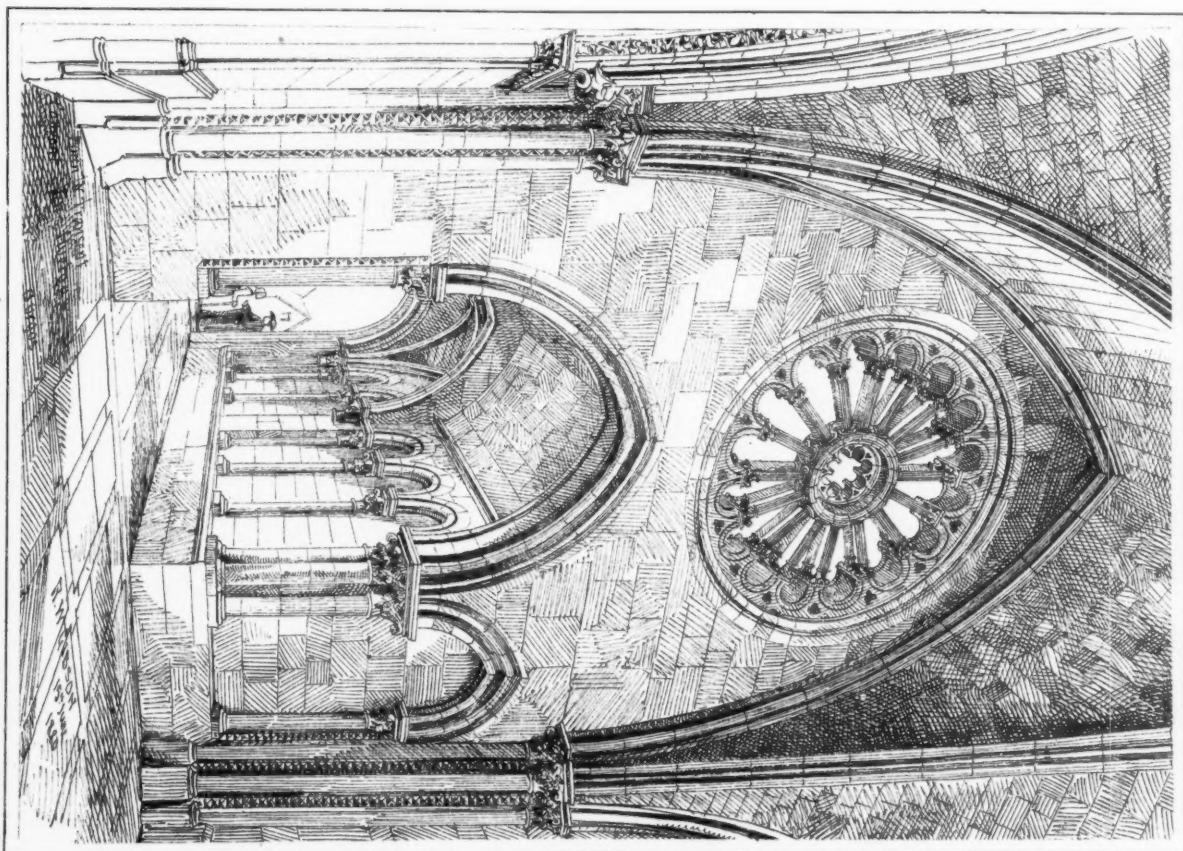
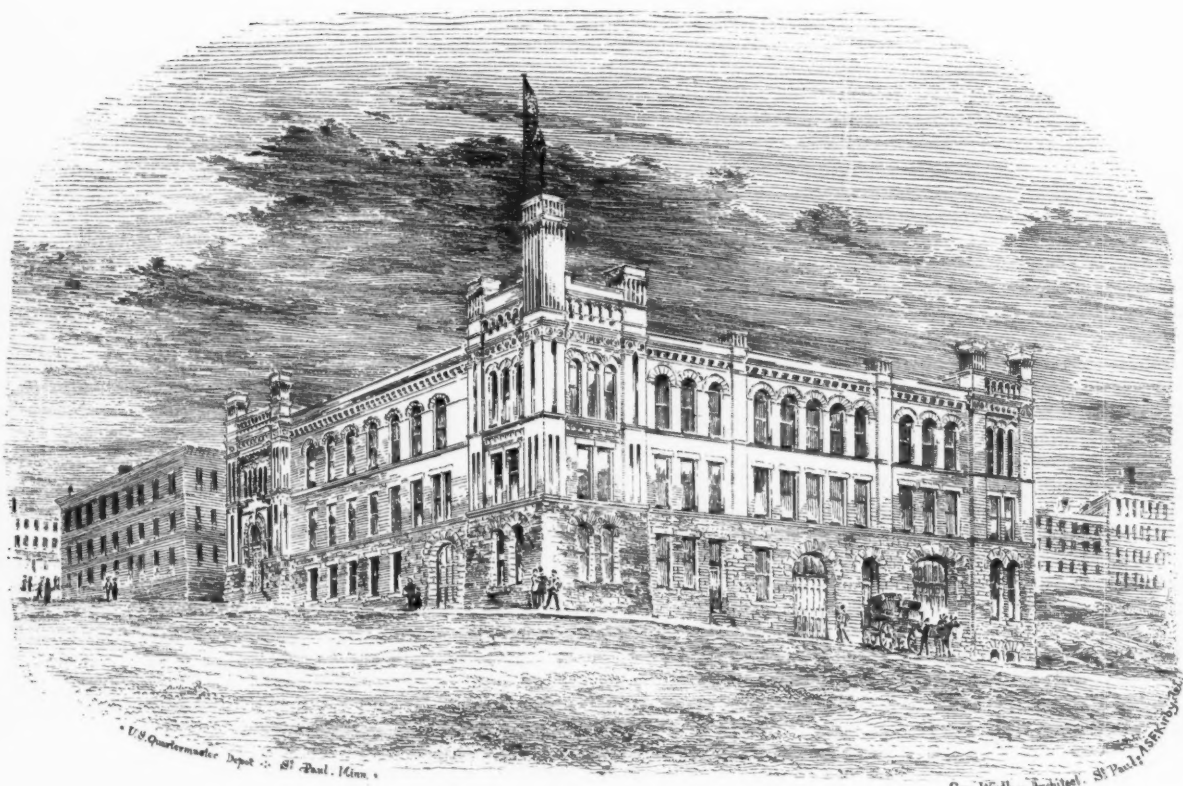


View of Garden Front.



Burgos Cathedral Spain West end of Nave:

The Helotype Printing Co Boston

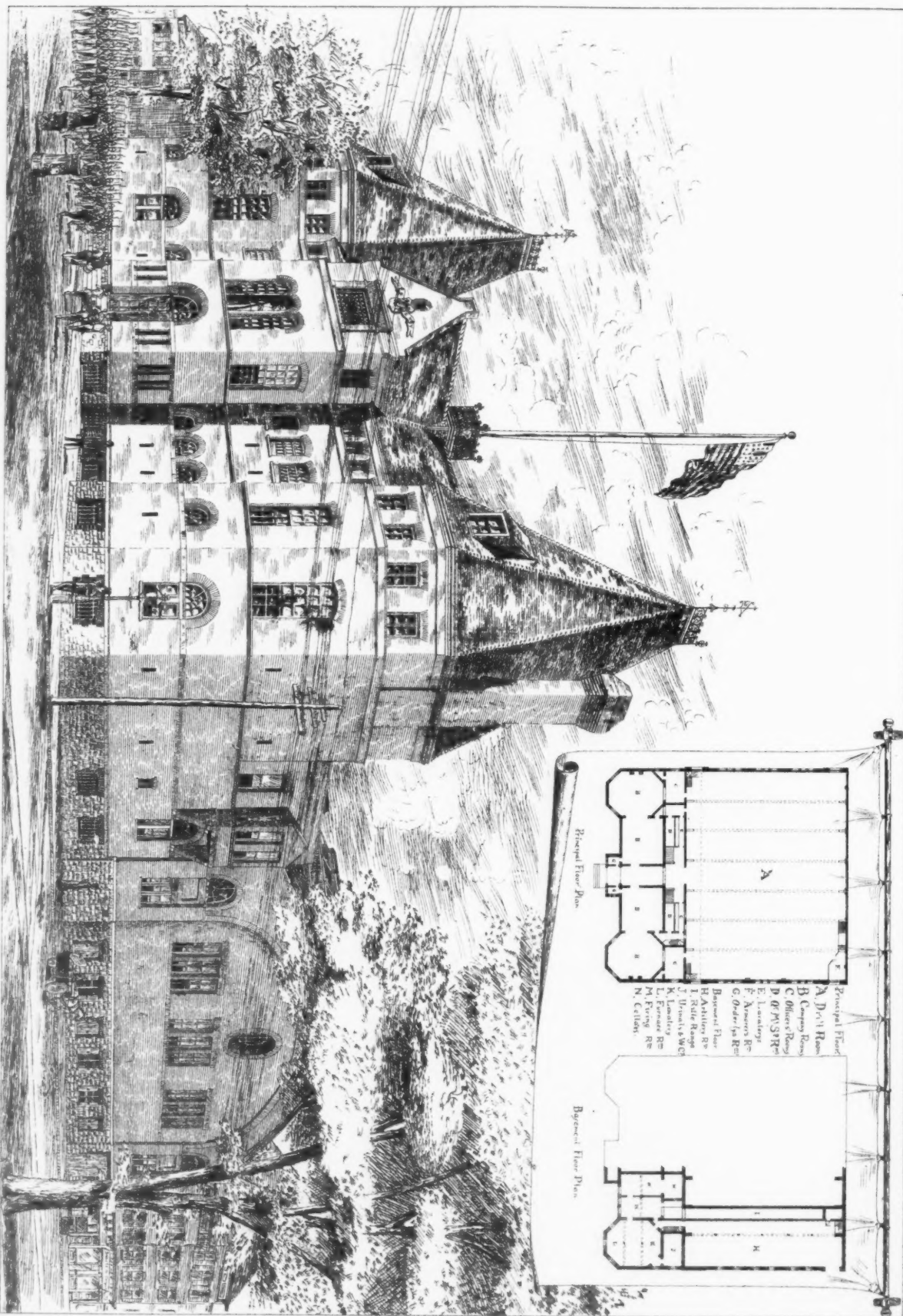


Forth Las Huélgas Burgo: Spain.

The Machinery Printing Co. Boston.

NEW STATE ARMOY. Troy, N.Y. BROWN & DAWSON Architects.

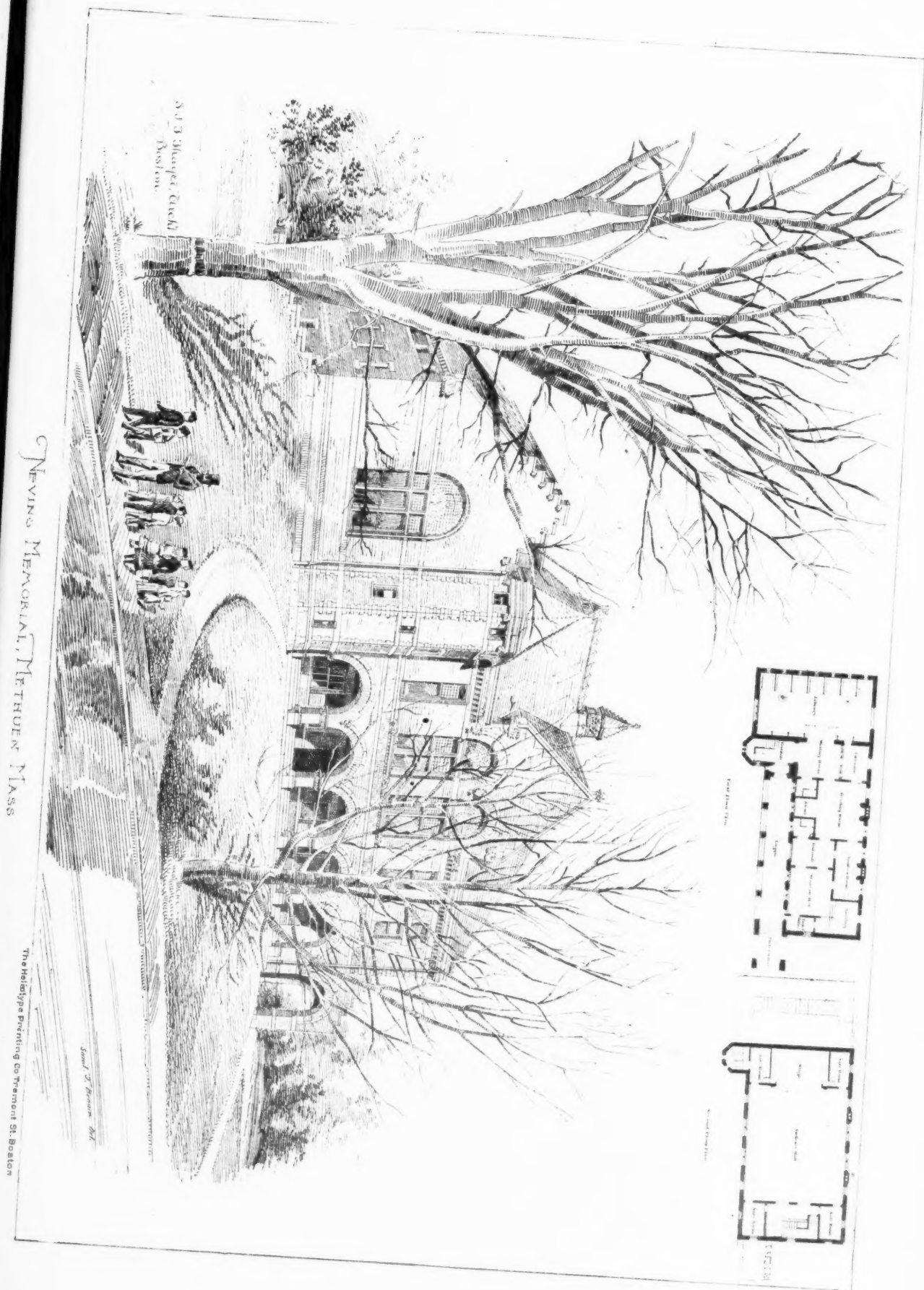
The Engraving printed by 211 Broadway, N.Y.

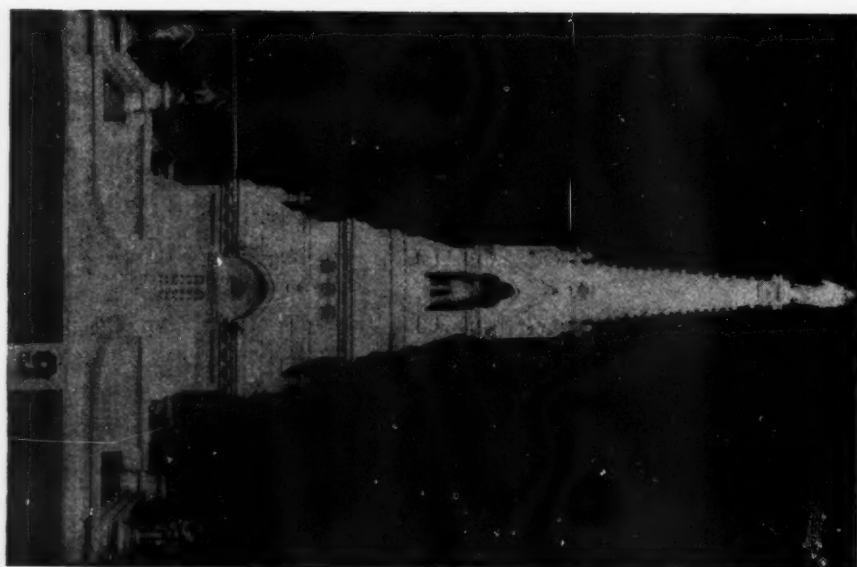
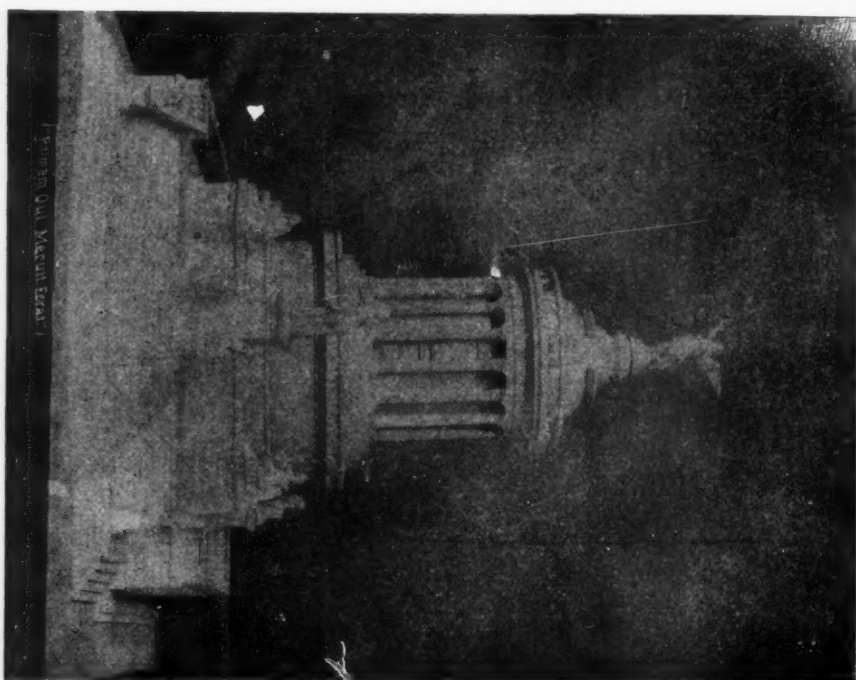
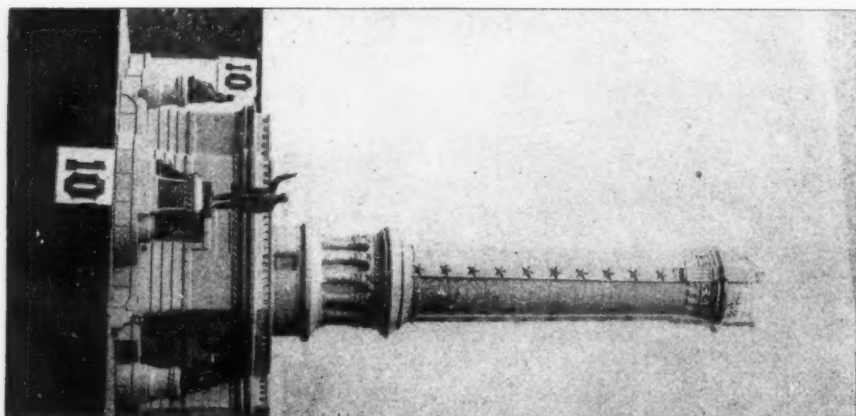


NOTICE.

Owing to imperfections in the negatives of the Union Club-House interiors, furnished by the architects of the building, it has been found, too late for the substitution of other subjects, necessary to omit these views and the view of the Clafin Building.

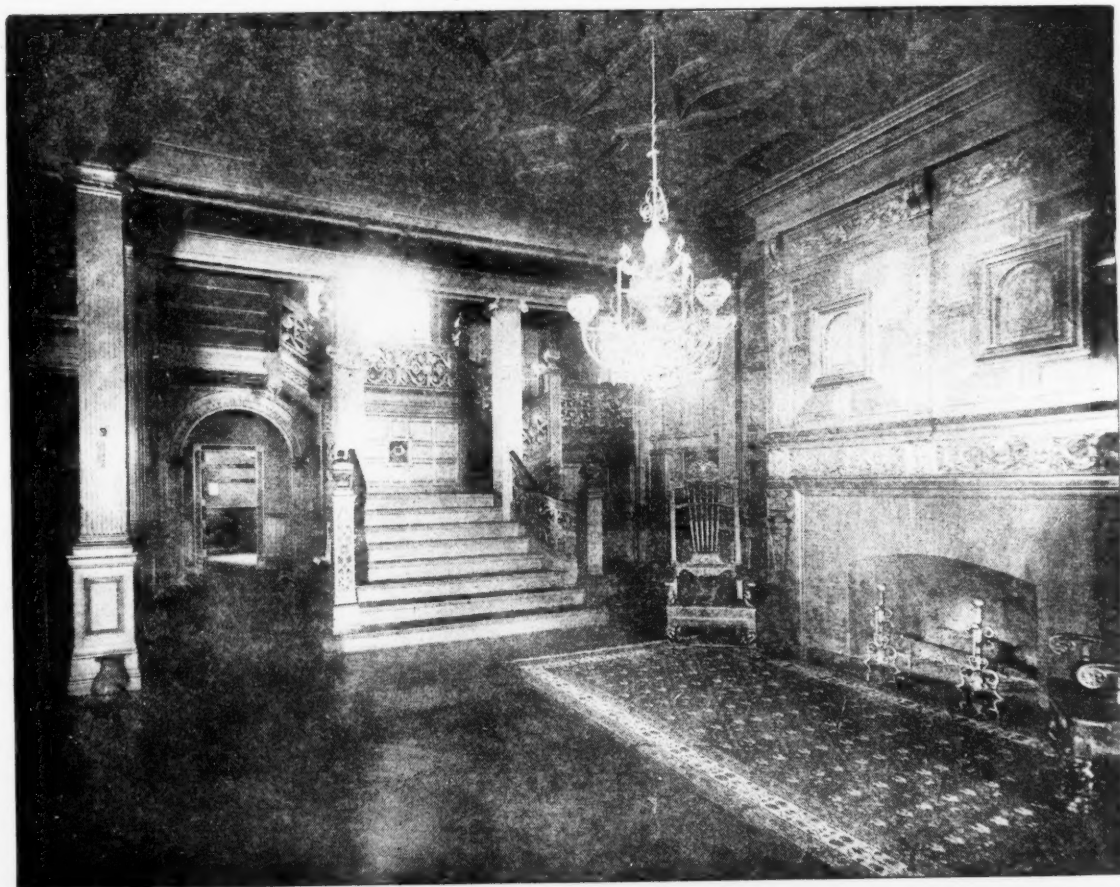
EDS. AMERICAN ARCHITECT.





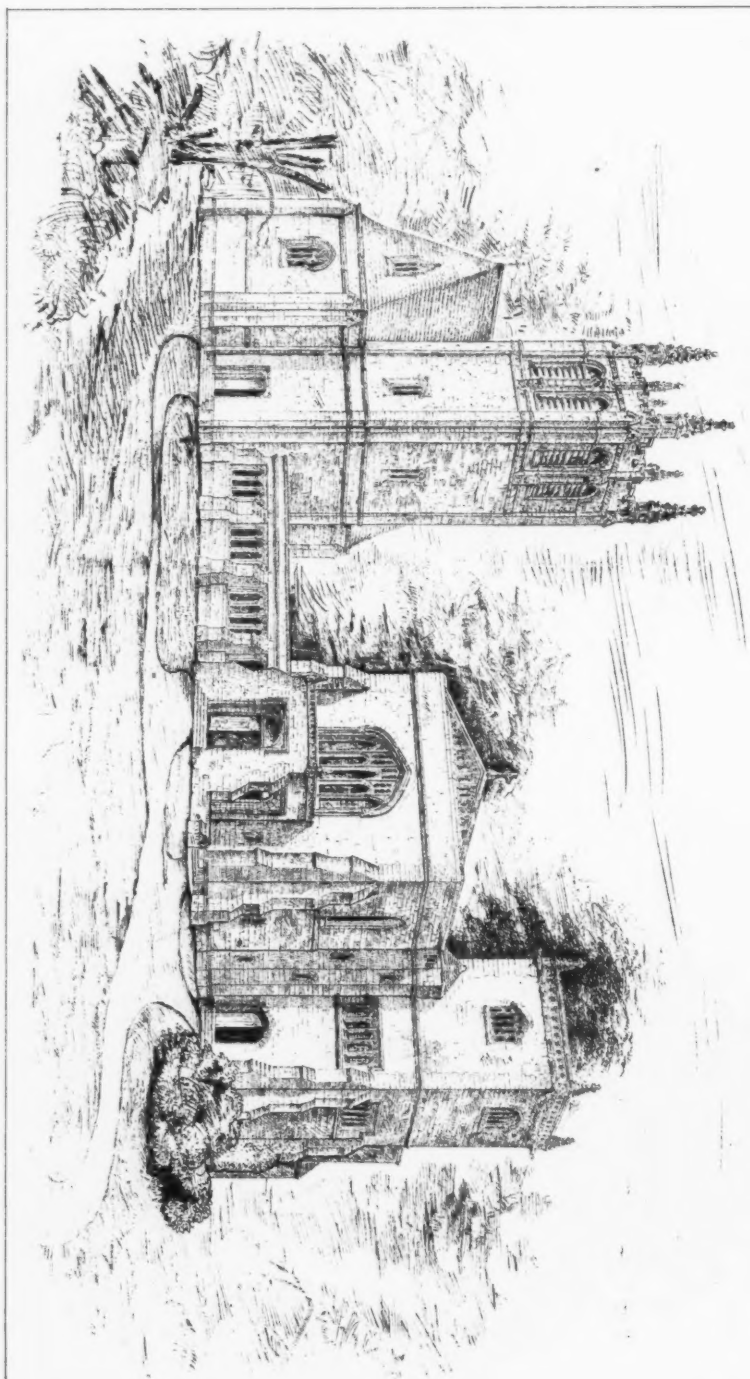
COMPETITIVE MODELS FOR THE CLEVELAND GARFIELD MONUMENT.

PHOTO CAUSTIC. HELIOTYPE PRINTING CO., BOSTON.



UNION CLUB-HOUSE, CHICAGO, ILL. (OBB & FROST Architects.)

PHOTO CAUSTIC, HELIOTYPE PRINTING CO. BOSTON.



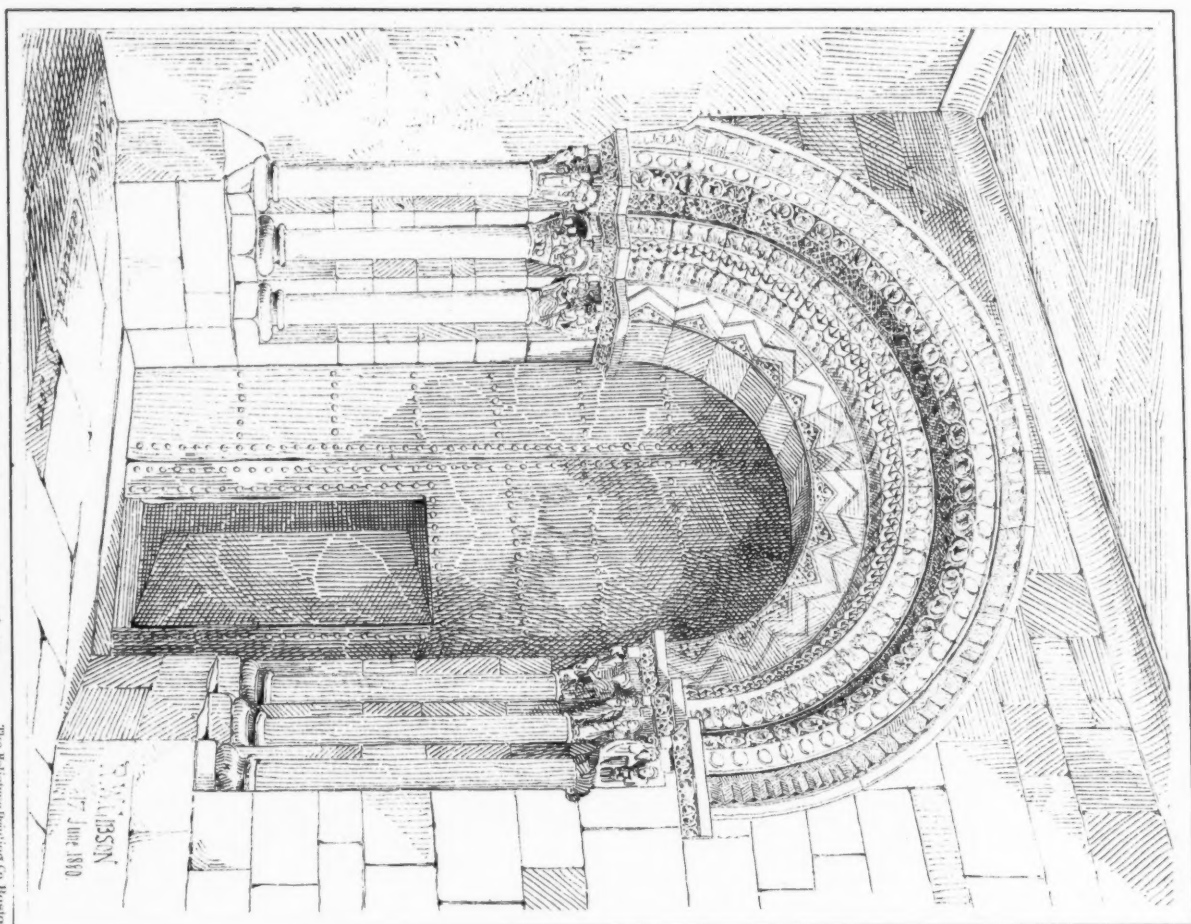
WILLIAM HALSEY WOOD, ARCHITECT,
226 FIFTH AVE. NEW YORK
764 BROAD ST. NEWARK, N.J.

Chapel Chapter-house and Cloister for the University of the South at Sewanee Tenn.

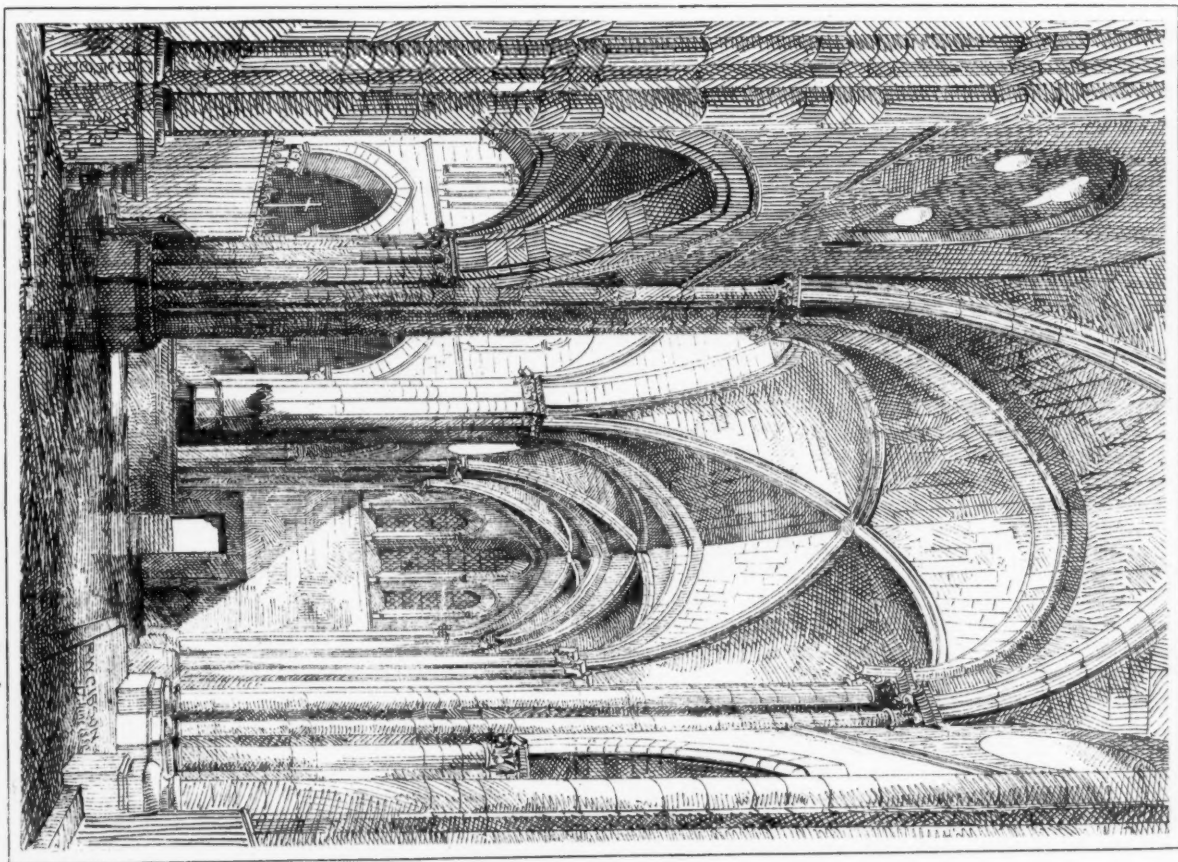
The Religious Printing Co. 211 Broadway St. Boston

Tudela Cathedral: Spain: South Door.

The Reliotype Printing Co. Boston.



Tudela Cathedral: Spain: Transsept: looking North.



"Claflin Building."

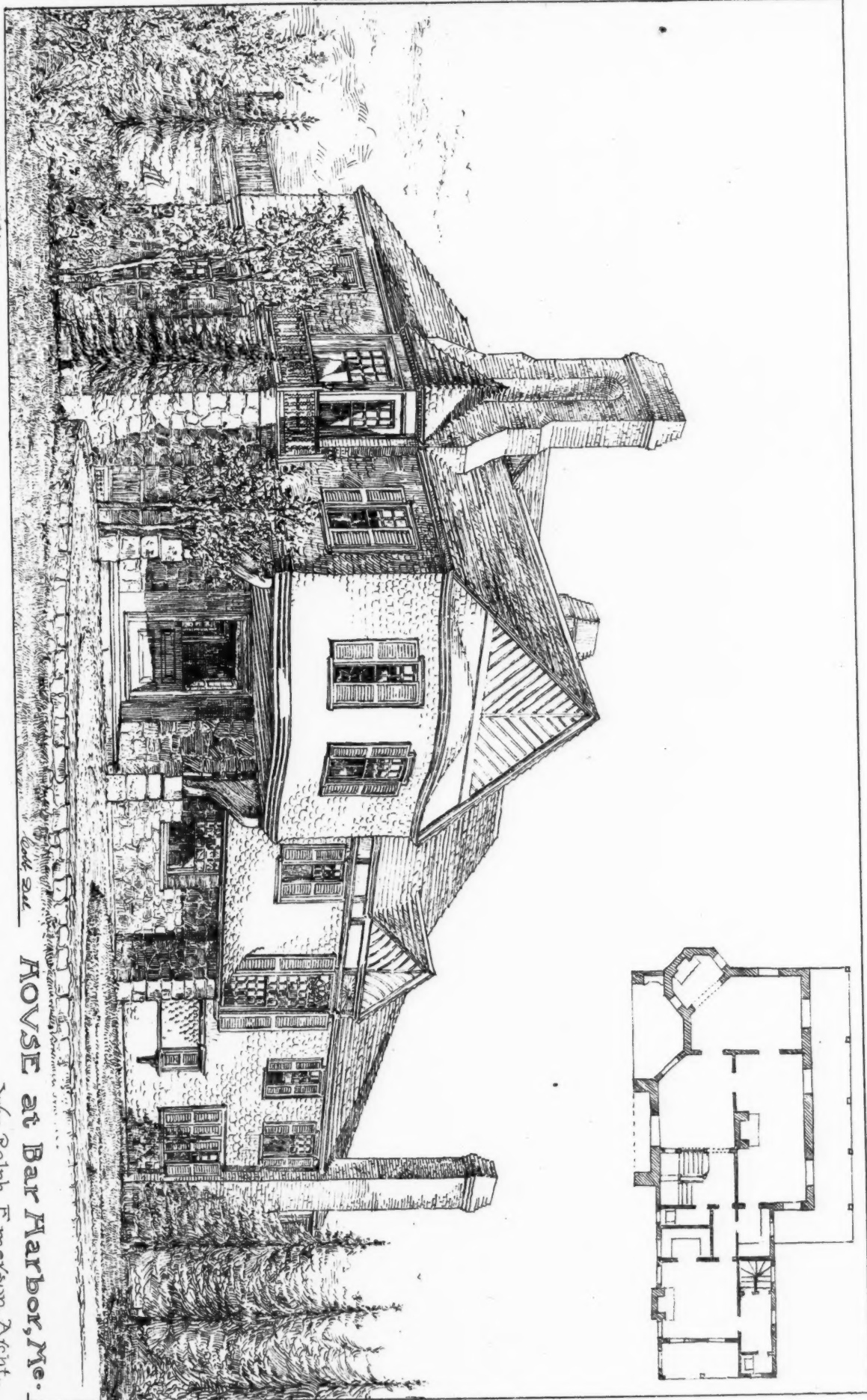
~ Boston. ~

Property of
Boston
University.



W. G. Preston, Archt.
1884

The Reliance Printing Co. 211 Tremont St. Boston.



HOUSE at Bar Harbor, Me.

Wm. Ralph Emerson, Archt.