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VOL. XXIX.

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NO. 761.

ARCHITECTURE

ENGINEERING

DECORATION

TICKNOR & COMPANY

CONSTRUCTION

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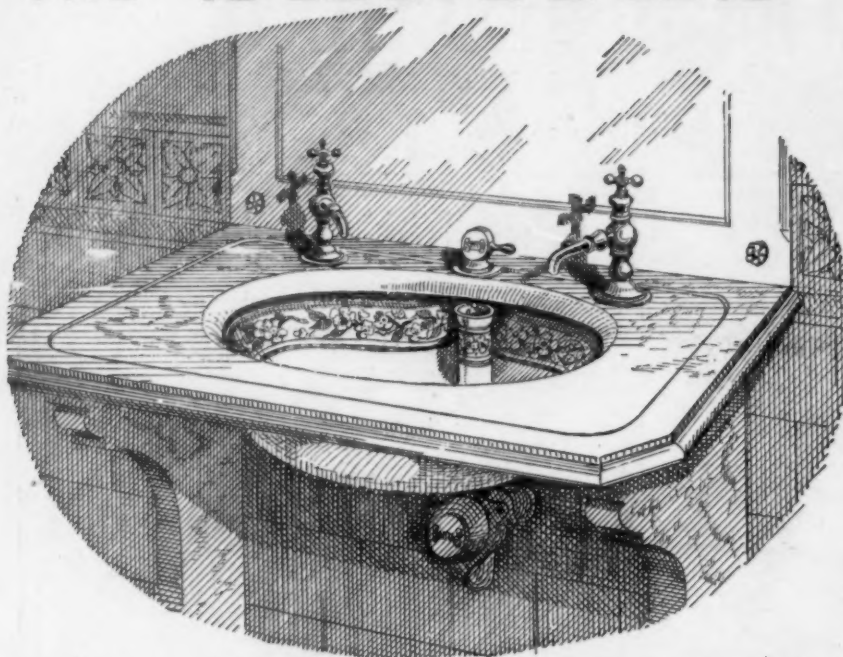
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DIVINITY HALL, CAMBRIDGE, MASS.

RUINS AT TLEMSEN, ALGERIA.
SOUTH SIDE OF THE CHURCH OF NOTRE DAME, VITRE, FRANCE.

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[Gelatine Print.]
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[Gelatine Print.]
BUILDING FOR THE UNION BUILDING ASSOCIATION ON REICHS-
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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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JULY 26, 1890.



SUMMARY :—

The Avery Memorial Architectural Library.—Settlement of the Carpenters' Short-hour Strike in Ireland.—The May Strikes and the Losses entailed on Workmen who "participated in Profits."—A Strike and Riot caused by an Order to Wash and be Clean.—The Sheffield Town-hall Competition.—Gibson's "Tinted Venus."—A Story of Tory Gold found in an Old Hingham House.—The *New York Star* on Architects.—Some Dangerous Suggestions made by that uninformed Journal.

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A NOBLE memorial to the late Henry O. Avery has been planned by his father, Mr. Samuel P. Avery, who has given fifty thousand dollars to Columbia College for the purpose of establishing and maintaining an architectural library, which is, by the terms of the gift, to be kept in a special alcove in the college library building. The college already possesses, in a great degree through the generosity of Mr. Schermerhorn, a tolerable collection of architectural books. To these Mr. Avery adds his own library of works on art and architecture, the value of which those most familiar with his distinguished reputation as an expert and collector will best be able to estimate, and expends at once fifteen thousand dollars to make the architectural collection what he thinks it ought now to be, placing fifteen thousand more in the hands of the trustees of the college, as a permanent fund, the income of which is to be used from year to year in buying new books. It would be difficult to imagine a more useful or more appropriate memorial to the unselfish and accomplished young architect who has been taken from us, and many New Yorkers, particularly among those who like pictures, will be pleased to think that the father, in his affection for the son, has unconsciously prepared a memorial also of one who, within the last quarter century, has done, perhaps more than any one else in the country to educate the public taste in the art of painting.

MR. S. P. AVERY writes us, enclosing some more detailed and correct information in regard to the Avery Memorial Library at Columbia College, which we are very glad to have. It seems that the use of the library is not to be confined to students of the College, but will, under suitable restrictions, be open to all persons interested in the subject. No books are allowed to be taken away, the collection being intended for reference only. The nucleus of the library consists of the collection made by Mr. Henry O. Avery himself, and contains, besides about two hundred books and volumes of photographs, a selection of his own drawings, made at the School of Fine-Arts in Paris, and later, during his professional life. These will form a very interesting and valuable part of the library. To the collection made by the son, the father adds about four hundred volumes from his own library, selecting those relating to architecture and the allied arts, which he had accumulated for the ultimate benefit of his son; and completes his noble gift by a payment of thirty thousand dollars in money, half of which is to be used before next January in the purchase of such additional books as may be most useful to the profession, while the remainder is to be invested, and the income used perpetually for making additions to the collection.

A WAY out of the short-hours strike among the carpenters has been devised in Ireland, where the same agitation has been going on as in our own country. The builders have proposed that the short-hour day should be adopted, by mutual agreement, on the first of September next, and the men have generally acquiesced, and have gone back to their work. This seems to us a very sensible settlement of the dispute. No one wants to compel carpenters to work nine or ten hours a day, if they would be healthier and happier for working eight hours; but builders who have signed contracts, on the supposition that their men would work nine hours a day, and will lose money if they work only eight hours, have good reason to complain when a walking-delegate suddenly forbids any of their men to work more than eight hours, whether they wish to or not. If a reasonable time is given for the contractors to complete their agreements, under the conditions on which their estimates were based, they are not likely to object to an eight, or even a six hour day, if they have time, before the adoption of the new system, to make their estimates accordingly; while, with the men, an agreement on some such honorable and business-like basis would mean steady work and a good income, under present conditions, for a few weeks, and the assured opening of the eight-hour millennium at a fixed date.

M. DELAHAYE gives, in the *Revue Industrielle*, a curious instance of the unreasoning folly, or, perhaps, the blind terrorism, by which men suffer themselves to be actuated in case of strikes. Every one knows that the first of May strikes, which ruined building business for this year in all the principal cities of the United States, were ordered from the other side of the ocean, and the skilful demagogues who directed that on this side of the water the attack should be made in the building trades, ordered, on their own side, demonstrations of a different sort, which have been carried out with an energy very disheartening to those who hoped that the day of misunderstandings between capital and labor was over. In France, much more than anywhere else, it is now quite common to interest the workmen in the business which they help to carry on, by sharing the profits with them, or offering premiums for faithful service, but even these considerations failed to have much effect on workmen who had been ordered to strike by the authority that they feared. In the gas-works at Lyons, the workmen receive an extra premium of ten cents a day, payable at the end of the year, if they work faithfully during the year. On the reception of an order to strike, which was sent to them, many of the men had premiums nearly due, amounting to thirty dollars or more, and all had something owing them which, by their agreement, would be forfeited if they left their work; yet, at the word of command, all the men marched out, leaving their premiums, their regular wages and their prospect of advancement, all behind them.

OUR own impression is that among these timid and helpless people the unscrupulous leaders govern principally by fear. To a man who has a wife and family, and nothing laid by for emergencies, the hints thrown out by the Unions, of deprivation of work, bodily maltreatment, or destruction of tools, have a terrible significance, and, when the choice is presented to him of living for a few weeks, or months, on ten dollars a week "strike pay," or incurring the enmity of the Union, he cannot hesitate long. Of course, most of the acts of the Unions are, nominally, decided in open meetings, but practically, the Union meetings are attended mainly by the professional mischief-makers and their friends, and a majority of these, even if it consists of half-a-dozen members, binds all the others. Occasionally, there is no doubt that a widespread feeling among a set of workmen leads to a strike, as in the case of a French lead manufactory, where the manager, who was devoted to his work-people, and very popular among them, provided facilities for washing, and directed that the men should wash themselves regularly, as a protection against lead-poisoning. This order excited the workmen to fury. They not only struck in a body, but rioted through the streets, and attacked and destroyed the manager's house, killing several people. Such spontaneous demonstrations are, however, very rare, and strikes are now almost always ordered on account of matters in which the workmen take little or no interest, even if they know anything about them.

THE competition for the Sheffield Town-Hall, which has ended in the adoption of the very beautiful and thoroughly studied design of Mr. E. W. Mountford, has brought out a rather novel notion. An unsuccessful competing firm, after the announcement of the result, complained that Mr. Mountford had in his final design adopted an arrangement for which they had applied for a patent, and had already secured "provisional protection," answering, we suppose, to our caveat. The arrangement, of which a monopoly is claimed, applies only to public buildings, and consists in the provision of a general office into which the public entrance opens directly, and through which is reached a set of corridors, on which open the private offices; the town officials thus being able to communicate with each other through the corridors without being interfered with by the public, while persons who wish to see any official can reach him only through the general office. There would probably be several opinions as to the value of this notion, but the idea of patenting any arrangement of rooms in either a public or a private building is not pleasant, as architects would never know whether their plans might not infringe some one's monopoly. The *Builder* has "a very decided opinion" that the arrangement of the plan of a building does not come under the class of inventions which can be protected by a patent, and it will be interesting to see whether the applicants, Messrs. Flockton & Gibbs, secure their monopoly; but even if such an arrangement should not be patentable in England, it might possibly be so here, and it certainly could be protected from direct imitation by copyright.

PEOPLE of middle age will remember the violent discussion which followed the exhibition of Gibson's "Tinted Venus," the most noted work of English sculpture of modern times. Gibson, in his day, was the unquestioned head of English sculpture, and his fancies were received with reverence by all English critics. One of his fancies was that cold white marble was unsuitable for the representation of flesh, an opinion in which many artists would now agree with him. To enforce his theory, he executed, what, judging from the photographs, was a very delicate and pretty statue of Venus, and tinted the marble with an extremely faint flesh tone, the hair and eyes, and portions of the drapery, being rather more strongly colored. The statue was exhibited all over Europe, and attracted universal attention, although opinions were, perhaps, about equally divided as to the success of the coloring. After serving for a few years as one of the artistic wonders of the world, it was forgotten, and few people probably thought of it until it was advertised to be sold at auction a few weeks ago in London. According to the *Builder*, which gives an account of the sale, the poor Venus only brought about nine thousand dollars, and was bought, it is said, for the Messrs. Pear, the soap manufacturers.

A HOUSE stands in Hingham, on Massachusetts Bay, which has a peculiar history. According to the Boston *Herald*, the building was originally erected in Boston perhaps a hundred and fifty years ago. During the occupation of Boston by British troops, the house was used as a barrack for refugee Tories, many of whom, it will be remembered, were persons of wealth and distinction. About 1820, the site being wanted for a better building, the old house was sold for a hundred dollars to Mr. Humphrey, of Hingham, who had it taken down, the pieces marked, and the whole transported by water to Hingham, where it was set up nearly in its original state. So far, it must be confessed, the story has nothing very remarkable about it, but it appears further that two Hingham masons were then employed to build a new house in Boston on the site of the old one, and that these worthy persons, who were in very modest circumstances, if not actually poor, before they began their task, after it was finished were discovered to be rich, and soon bought land and built fine houses for themselves in Hingham. Contracts in those days did not yield extraordinary profits, and their neighbors never could ascertain with certainty how their sudden wealth came to them; but there were rumors, which have persisted to this day, that in the cellar of the old Tory barrack the two masons found buried a pot filled with gold, which they divided between them.

THE New York *Star* has been discoursing to its readers about the art of construction, and particularly about architects. These gentlemen, we are told "have been disappointing guides in the past, because most of the prominent members of

their profession have been prone to ride somewhat unreliable hobbies of their own creation, while their less distinguished brethren did their best to imitate them." We imagine that most architects will agree with us that this is the most astounding statement ever yet published in regard to the profession. We have been told in print that architects quite commonly had incomes of a thousand dollars a week; that they usually swindled their employers; and that few, if any of them, ever knew anything of the art which they spent years in learning, and many years more in practising; and we have forgiven the authors of these statements, because we reflected that there might perhaps have been an architect who had for a short time an income of a thousand dollars a week; or one who was dishonest, or one who professed to be an architect, but was really only an ignorant pretender; and that on such a slender foundation a misconception might have been based; but an architect, prominent or otherwise, who had any hobby whatever in matters of construction, we have yet to see or hear of. The only person that we remember to whom the description could even most remotely apply is Mr. Peter B. Wight, who, while yet an architect, and a very good and distinguished one, was attracted by the hobby of fireproof construction, and left the profession to ride his new steed; but, so far from being a "disappointing guide," he has been, since then, the most reliable authority on this subject, not only in this country, but probably in the world, the pioneer in the modern system of protected iron construction, and perhaps the principal means through which this country has been placed far in the lead of the whole civilized world in real fireproof building, the principles of which all trained American architects have at their fingers' ends, and which they practise with perfect success, and without indulging in any individual eccentricities or "hobbies" whatever.

IN fact, those persons who wish to invest their money in fireproof construction, thoroughly studied out in detail, and as reliable as human skill can make it, can get it now only under the direction of thoroughly trained architects, who can be depended upon to keep them from falling a prey to the whims and hobbies, not of "prominent architects," but of bustling pretenders, amateurs, "old builders" and others, whose nostrums fill the columns of the newspapers from one year's end to the other. The *Star* itself gives two excellent samples, in the very article in which it denounces architects as being "disappointing guides" to good building, on account of the "unreliable hobbies" in which they indulge. A few lines below this statement about architects we are told that "Burnt clay, in various forms, is theoretically the best material for resisting fire." It is conceded that even the architects are acquainted with this fact in regard to burnt clay, "but they have not been able to utilize its valuable properties to a satisfactory extent, because they have not been in possession of a reliable mortar." The circumstance that architects use, by the thousand barrels, where they think it advisable to go to the expense, a "mortar" for their walls, so much stronger than the bricks that the latter, after the mortar is set, will tear in pieces before the joints will yield, seems to be completely unknown to the writer of the article, who goes on to say that "Chemists have wrestled with the mortar problem for years, and a German scientist recently invented a compound which solidifies rapidly, and unites itself so firmly to brick that the two practically form one substance. The drawback connected with this admirable mortar is that it costs about five hundred times as much as ordinary cements." We should say that a "mortar" which was only about half as strong as Portland cement, and cost a thousand dollars a barrel, was not likely to come into extensive use as a building material, but architects do well to be prepared for catechising from their clients on these matters. The *Star's* second hobby is not so innocent. It has discovered that "it is the opinion of experts that concrete, as a fire-resister, is most useful when used as a coating for wooden beams." This dangerous fallacy is getting to be so widely spread by such newspaper articles that no occasion must be lost for attacking it. All architects know that to "coat" wooden beams with concrete, properly so-called, is to insure their rapid destruction by dry-rot. The porous compounds, of cinders and plaster, which are often used cautiously by architects, and with safety, although technically concretes, are very different affairs from the heavy, impervious substance, made with cement, which is now usually implied by that term, and which no architect in his senses would think of using as a "coating" for a floor-timber.

RELIGIOUS ARCHITECTURE.¹—XVI.

ROMANESQUE PERIOD.

TO finish the creation and produce a perfect specimen of the new style termed Gothic, it was necessary that all its requisite elements should be so combined as to supplement one another. Now, it can be confidently asserted that the earliest really complete examples of Gothic architecture appeared in the Ile-de-France. Before that time, under the influence of an intellectual movement, which manifested itself simultaneously all through the Occident, and of such great events as

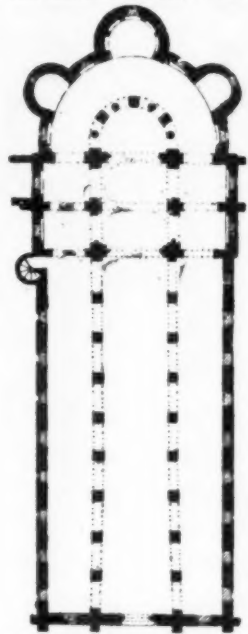


Fig. 2. Plan of the Church of Vignory (Haute-Marne) [11th Century].

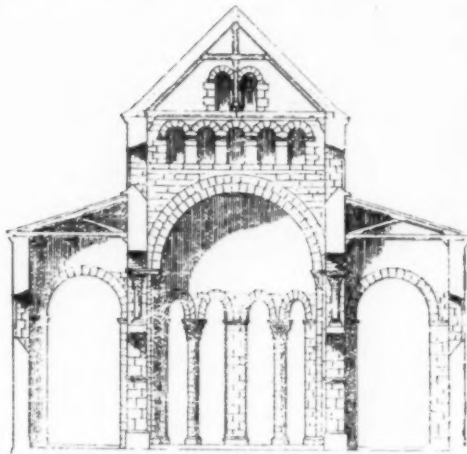


Fig. 3. Transverse Section of the Church of Vignory.



Fig. 4. Interior of the Church of Vignory.

the Crusades, or owing to the previous establishment of intercourse between the different nations, it is quite probable that, during the first period of groping, every country brought its partial contribution; but it was only partial.

We will follow, by means of a few examples, the various stages of the art during the eleventh and twelfth centuries, before the final solution of the great technical problem was reached. We shall note the intermediate steps spoken of above.

The French churches of the tenth and eleventh centuries were still vaulted, as at

of arches occurs everywhere in the structure. The small apses, as in nearly all Romanesque churches, are covered with half domes. The rampant barrel-vaulting of the cloisters belongs to the twelfth century.

St. Sernin at Toulouse exhibits a variant of the solution

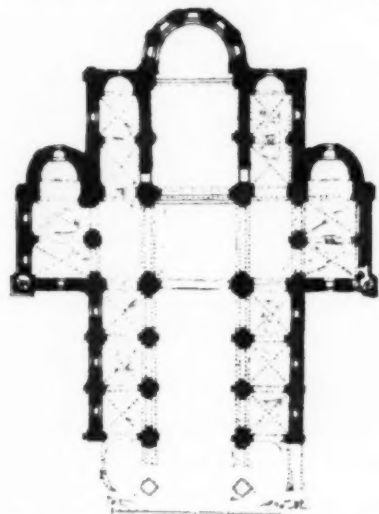


Fig. 5. Plan of the Abbey-Church of Cérisy-la-Forêt (Manche) [11th Century].

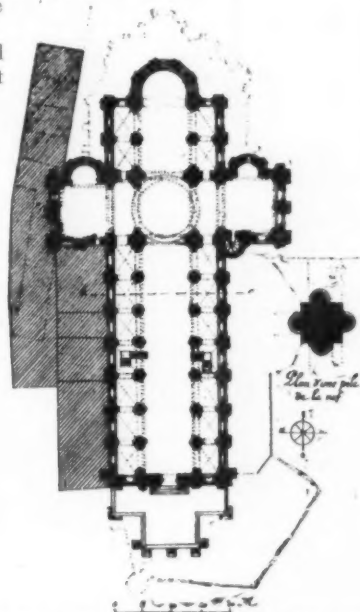


Fig. 6. Plan of the Abbey-Church of Mont St. Michel [11th Century]. After M. Corroyer.

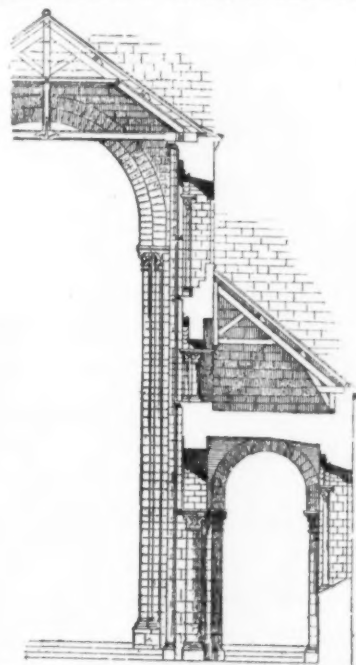


Fig. 7. Transverse Section of the Church of Mont St. Michel.

Vignory (Figures 2, 3, 4), both over the aisles and the nave; the apse was covered with a semi-dome. At Cérisy-la-Forêt (Figure 5), and in the first church of Mont St. Michel (Figures 6, 7, 8), we find attempts at covering a portion of the edifice, at least, with masonry.

In Notre Dame at Poitiers (Figure 9), the aisles are all covered with barrel vaults of nearly equal height. St. Paul's

adopted in St. Paul's at Issoire: there is a wagon-vault over the nave, with half-vaults in the aisles acting as buttresses. The church, it is true, was rebuilt in the fifteenth century, but the main dispositions of the original edifice were preserved.

Quitting France, we find the transition still more clearly marked in the cathedrals of Worms and Spire (Figures 15, 16, 17): here the basilican plan is preserved, but intersecting vaults are employed in the naves as well as the aisles. However, it is not as yet Gothic vaulting in its final form and

¹ From the French of P. Planat, in Planat's "Encyclopédie de l'Architecture et de la Construction." Continued from page 36, No. 760.

with its final features; the vaults are so high as to give them a domical appearance. We noticed the same fact in the churches derived from St. Front: on both sides the architects were groping in the same direction. The central cupolas, over vaulted niches, still retained the Byzantine construction and appearance.

In the Trinité (Abbaye-aux-Dames) at Caen (Figures 19,

ed by a supplementary transverse rib (Figure 21), reaching to its summit. This shows how timidly the first attempts were made.

During the Romanesque period the pronaos of the early basilica disappeared and the atrium, or fore-nave, served to accommodate the throng of

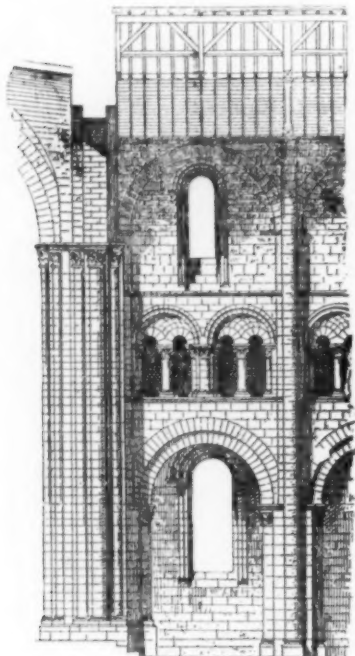


Fig. 8. Longitudinal Section of the Church of Mont St. Michel.



Fig. 9. View of the Nôtre-Dame-la-Grande, Poitiers (11th Century).

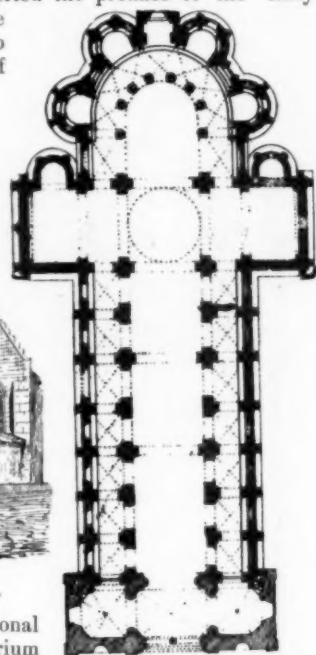


Fig. 10. Plan of St. Paul, Issoire (11th-12th Centuries).

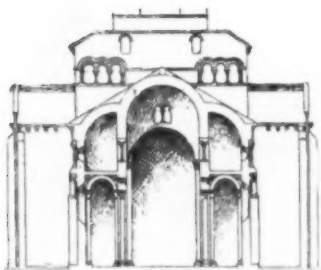


Fig. 11. Transverse Section of St. Paul's, Issoire.

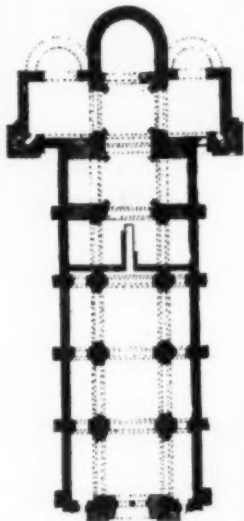


Fig. 12. Plan of St. Trophime, Arles (12th Century).

20, 21), the advent of Gothic art is still more distinctly foreshadowed. The original edifice, which was covered with woodwork, was reconstructed, and we find groined vaulting

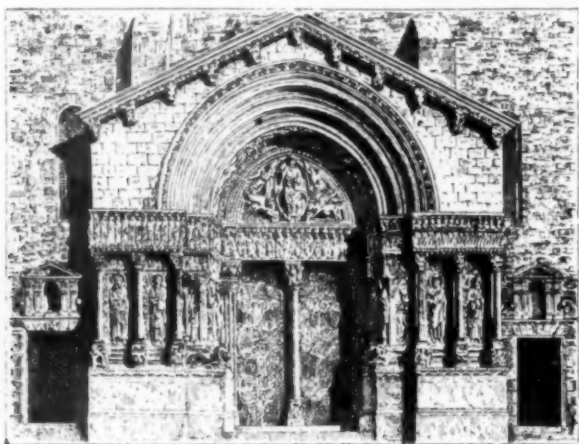


Fig. 13. Porch of St. Trophime, Arles.

over the nave as well as the aisles, with intersecting ogives and a rudimentary flying-buttress, the most characteristic Gothic feature. Nevertheless, the intersecting vault is support-

worshippers during processional ceremonies; ordinarily the atrium comprised merely the lower part of the tower rising in front. The rules of Cluny, drawn up in the eleventh century by the Abbé Hugues, provide that "the nave be preceded by two towers with an atrium constructed below in which laymen must remain during the procession"; the nave within was entirely at the disposition of the clergy.

The atrium was often an older church, with nave and aisles worked into the new construction; in such cases it was of unusual size, as at Vézelay (Figures 22, 23, 24), Tournus and Cluny.

The Romanesque transept, which is nearly always covered with semicircular or pointed barrel-vaulting, sometimes has aisles; sometimes, also, it terminates in hemicycles capped by a

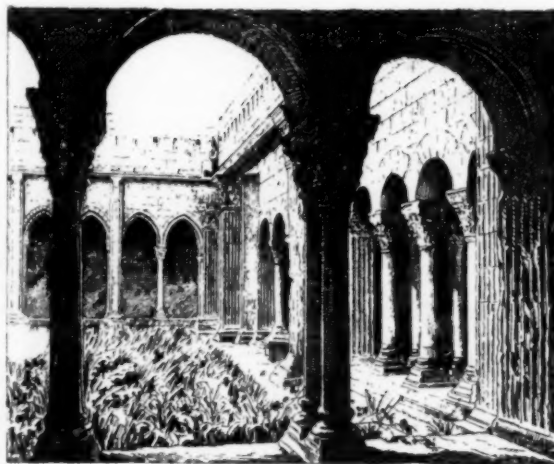


Fig. 14. Cloisters of St. Trophime (12th Century).

half dome. The square space forming the choir is sometimes covered with a barrel-vault, though recourse is generally had to the cupola. Romanesque architects were therefore called upon to solve, in a secondary manner, the problem of establishing a cupola on a square plan. Examples exist of the transplanting of the Byzantine construction into France at this period; but generally the difference between the square and the circle was overcome by the use of squinches (Figures 25, 26, 27), a more primitive disposition than that employed in the Byzantine art.

Sometimes the squinch is formed of a series of concentric curves projecting one over another; sometimes it is a semi-domical vault, and sometimes, finally, it is treated as a conical

vault, with radiating joints and a calyx. By means of squinches an octagon was obtained which could be easily covered with a circular or octagonal dome.

In some churches there is merely a choir with no apse; in such cases the apsidal wall is straight. Sometimes, also, the apse is surrounded by an aisle prolonging the sides of the nave, thus forming what has been termed the *rond-point* or *chevet*. The apse is covered by a half dome with transverse ribs, while over the aisle is an annular crowning, or, more frequently, intersecting vaulting on a trapezoidal plan.

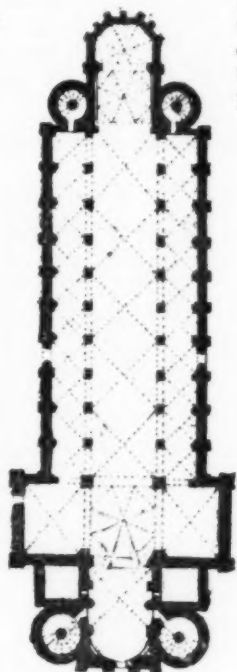


Fig. 15. Plan of the Cathedral of Worms (Hesse Darmstadt) [12th Century].

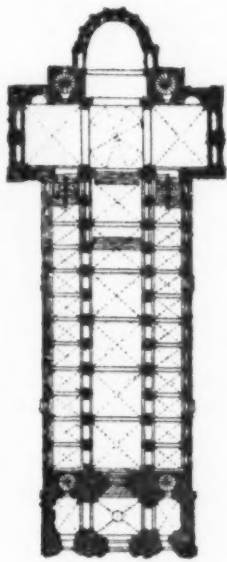


Fig. 16. Plan of the Cathedral of Spire (Bavaria) [12th Century].

The nave supports rest necessarily on pillars dividing the nave from the aisles. These pillars are consequently surrounded with shafts. However, as the latter cannot be much increased in size, supports of this kind are generally inadequate, and in no way make it possible to do away with buttressing by means of the aisles. Under the old fashion they



Fig. 17. Interior of Spire Cathedral.

are often masked under architectonic forms with engaged columns, half-columns, pilasters, etc. The external buttresses increase in thickness from summit to foundation, by resaults united *en talus*; the transept walls as well as the side walls are provided with these buttresses.

The façades exhibit various dispositions:

1. Basilican façades are simply the boldly-defined gables of the three aisles of the interior; the inner walls are prolonged outside by four buttresses, as, for example in the church at



Fig. 18. View of the Abbaye-aux-Hommes, Caen [12th Century].

Jort (Figure 28). There is frequently but one door, and this is in the middle bay, which also contains the window and the principal decoration.

2. Façades *en chevet*, as in the old Cathedral of Verdun and in many of the churches along the Rhine, are, as has already

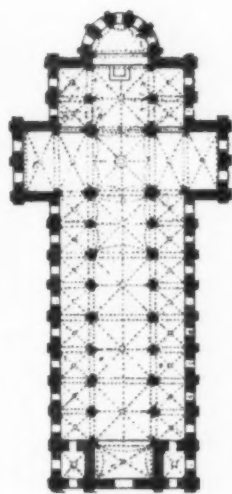


Fig. 19. Plan of the Church of the Trinité (Abbaye-aux-Dames), Caen [12th Century].

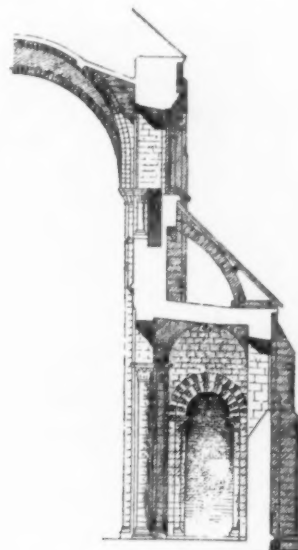


Fig. 20. Transverse Section of the Church of the Trinité, Caen.

been stated, those belonging to double-apse edifices. The entrance to these churches is by the side.

3. Certain of the Romanesque façades are fronted by a tower, placed in the axis, supported by buttresses, and containing the entrance door.

4. Some façades of this period have two towers, separated

to make place for the central door. The Abbaye-aux-Hommes at Caen presents a fine example of this disposition (Figure 18). The towers sometimes project, and are connected with the façade wall by a porch; sometimes they are even with the face of the building, and are joined to the interior by a low vault, forming an atrium.

As frequently, moreover, the towers rise from the sides of the church or on the transepts, and sometimes they are wholly outside. As for the central towers erected above the choir on a square plan, they usually become octagonal in form, rarely circular, near the top of the roof, by the construction of covings, squinches or pendentives in the interior. In the Rhone valley alone, towers are found which are square to

derived from ancient art; but geometric figures, intertwining patterns, roses with lobes rounded or lanceolate, and *cloisonnés* and twisted ornaments, predominated; the interpretation of the figures, borrowed from the *flora* and even the *fauna*, clothed this geometric character. One of the most prominent features of Byzantine decoration was just this appearance of *cloisonnés*, as A. de Caumont has remarked, produced by lines in relief, followed in such fashion as to look quite like the metallic partitions of the little cells in which the colored stones of the jewels of the period were set.

From the eleventh century, architects began to exercise far more freedom in decora-

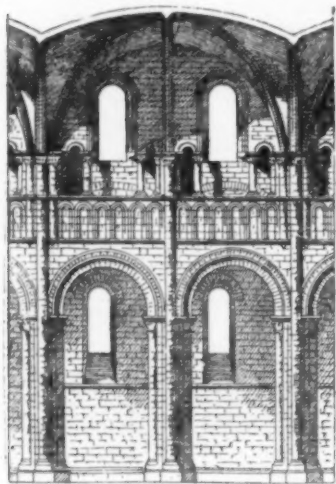


Fig. 21. Longitudinal Section of the Church of the Trinité.

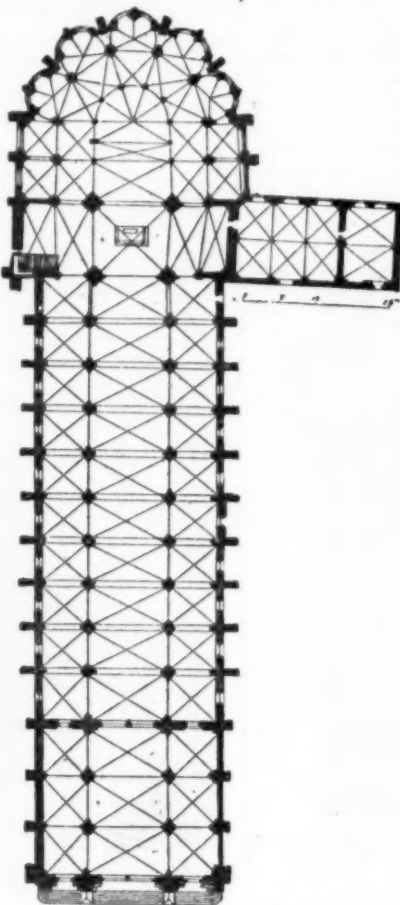


Fig. 22. Plan of the Church of Vézelay [12th-13th Centuries].



Fig. 23. Narthex of the Church of Vézelay. After M. Degeorge.

the summit, as the one at Cruas (Ardèche, Figure 29). Towers are seen along the Rhine with the lower part square and the upper cylindrical. The roofing was conical or pyramidal, and sometimes the tower terminated in an ovoid cupola.

In Central and Southern France there is no wood-work in the roofs. The extrados of the vault is smeared with mortar and overlaid with paving slabs.

tions, and to display a fruitfulness of imagination which was doubtless seconded by the skill attained in workmanship. Geometric forms were multiplied, varied and enriched; the *flora* and *fauna*, sometimes in fantastic shapes, sometimes wholly realistic, contributed their share to the wealth of ornamentation.

In Normandy, the Romanesque decorations comprise mainly the lozenge, meander, star, and zigzag or characteristic broken chevron. In Poitou the forms are more complex, with imitations of trellis-work, imbrications, palmettes, stars, pearled foliage, lace-work, fillets and intertwining patterns; figures of animals, on a reduced scale, are frequently met with; grotesque

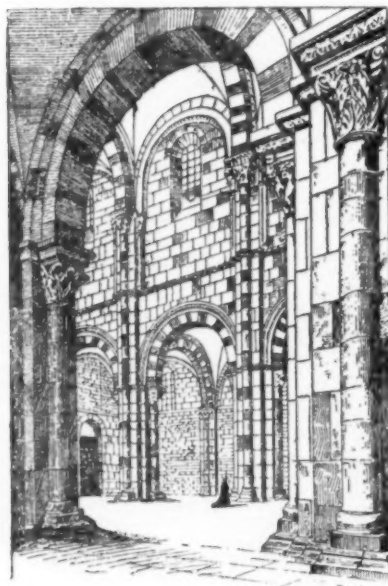
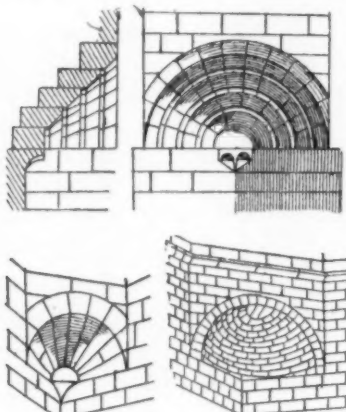


Fig. 24. Nave of the Vézelay Church. After M. Degeorge.



Figs. 25, 26 and 27. Romanesque Squinches.

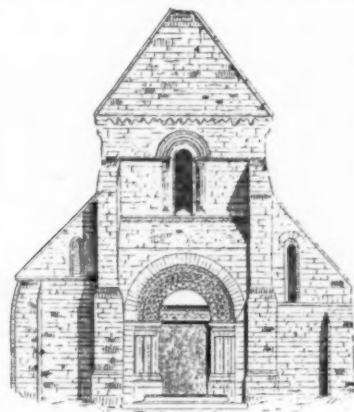


Fig. 28. Front of Jort Church.

In the other sections of the country the covering rests on a timber frame, which is sometimes entirely independent of the vaulting, and is sometimes supported upon it.

The decorative system of Byzantine art was evidently

representations of animals of quite large size also occur, combined with interlacing embellishments. In Burgundy, where the ancient types apparently obtained to a greater degree, the decoration has, perhaps, more strength and richness than in

any other section of the country; vegetable forms, interpreted as in Roman architecture, in a most decorative sense, play a very important part there.

Auvergne exhibits a unique feature, which consists of the incrustation of stones of different hues in the masses of white and gray, in geometrical figures, flowers, roses, checkerboard patterns and so on, in imitation of the old mosaics.

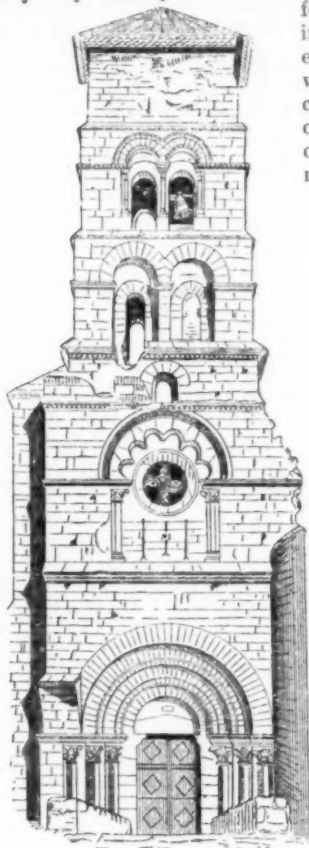


Fig. 29. Tower of the Church at Cruas (Ardèche) (11th Century).



Fig. 30. Apse of the Church at Cruas.

Toward the end of the century, the groined vault was applied to the nave as well as to the choir, aisles and apses. The general form still had a thick-set appearance, though often of most harmonious proportions. The choir was distinctly marked off; in important edifices, the aisles were continued so as to form an apsidal aisle, and the apse was surrounded by chapels; the transepts were boldly outlined. The plan, henceforth well-defined, possessed great beauty. The church of Pontigny, built about 1150, is a good example of these dispositions (Figure 33).

[To be continued.]



Fig. 31. Pointed Arch from the Church of St. Germer.

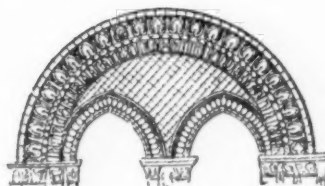


Fig. 32. Arch from the Church of Civray.

As the element of suppleness entered more and more into the decorations, purely geometrical forms were abandoned, and recourse was had to various combinations of foliage and animals' heads.

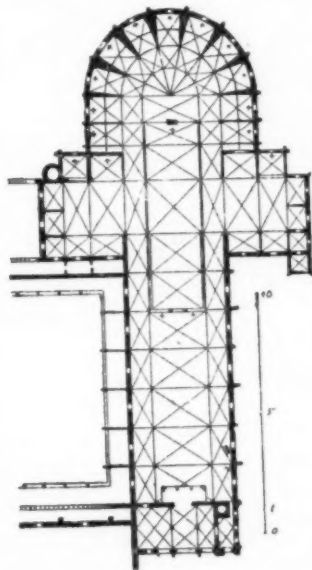


Fig. 33. Plan of the Church of Pontigny (12th Century).

The twelfth century marks the period of transition during which Gothic architecture appeared and developed. The broken arch, termed pointed, succeeding the Romanesque semicircular arch, has long been made the characteristic feature of the style—the feature peculiar to it, and differentiating it from all other styles. No doubt this form of arch was employed later on to the almost entire exclusion of every other, but it had been in use at a far earlier period, and in other styles, without producing the slightest resemblance to the French art of the thirteenth and fourteenth centuries.

Both the pointed and the round arch were employed in the twelfth century. Sometimes they occur in the same edifice, with the pointed arch in the lower story and the round arch above. Their relative position shows that, in such cases, the pointed arch could not have been introduced into an originally Romanesque structure through restorations or subsequent completion. Besides, the pointed arch of this period usually has purely Romanesque decorations, a fact strikingly illustrated in St. Germer, at Civray, and the arcades of la Charité-sur-Loire (Figures 31, 32).

BOOKS PAPERS

WE wonder whether any one was induced to subscribe for "*Die Bankunst Spaniens*"¹ because of the exordium with which we closed our notice of the first part of that work, and if any such there be we wonder still more whether, now that Parts II and III have appeared, he regrets following our advice. It is not a matter of regret with us that we used a rather stronger form of commendation than is often employed in book reviews, as the interest excited by the first portion is sustained by those which have followed it. In most cases the reviewer of books finds it difficult to consider the work before him without disturbing thoughts as to the personality of the author—even when the author has had the modesty to keep himself sedulously in the background. "Who is this man and what are his antecedents? What right has he to make these statements and these inferences?" are questions that must always be present in the reviewer's mind, else he may be carried away by the style and masterly rhetoric of the hair-brained enthusiast, and dismiss as dreary platitudes the hardly-coined phrases of some deep closet philosopher or non-academical worker in the field of natural observation.

In the case of such works as the one now under consideration these troublesome questionings do not present themselves. The author or compiler makes the simplest and most lucid record of fact and qualifies it neither with inference nor suggestion. Eyes alone are needed, and the trains of thought that are set in motion feel the impulse not of the author but of men the author knew not. What varied trains of thought are really stimulated as one looks over a collection of good architectural photographs, and how they meander through the high-roads and pathways of artistic, architectural, social and historical development! For, first, attention is drawn to the artistic presentation of the subject, the selection of the point of view and grouping, its lighting and its accidental accessories. Then, as it is an architectural subject, comes an examination into the style, composition and structural arrangement. Next, one drifts into wondering what manner of men they were who required such buildings as these; whether they were belittled by their surroundings or whether

¹ "*Die Bankunst Spaniens*" in ihren hervorragendsten Werken. Dargestellt von Max Junghänel, architect; Parts II and III, J. Bleyl, Dresden. Brentano, Chicago, sole agent for the United States. Price \$10.00 per Part.

they were worthy of them, and, so, less sordid and petty-minded than the men of to-day. From this point the mind travels back and forth over the history of the place from the epoch of the creation of the structure and feels surprised that where most of man's work is so mutable there should be any of the work of his hands that can so well stand the passage of time, the neglect and abuse of his successors and the assaults of the elements. Truly, it is—or should be—a grand thing for a man to be an architect and rear in enduring form monuments to his skill and knowledge such as no other class of men

chants, mechanics, laborers—the *profanum vulgus* without whose labor there could be neither war, nor law, nor literature—and have to content ourselves with the thought that the work of our hands will—or may—survive dynasties and constitutions, and may at length stand the landmark of a receding as it was once the sign of an advancing civilization.

A fate of this kind has overtaken the Spanish architects of the past, for Spain is particularly full of just such landmarks which indicate how far the civilization to-day obtaining in the Iberian penin-



have the opportunity of creating; and yet the name of the creator of the Cathedral at Burgos is not known to-day, while the names endure of generals and politicians, whose life-work was undone ages ago, of poets and painters who delight a much smaller audience, of jurists whose decisions have been overthrown, of chemists and doctors whose formulas have been superseded by later discoveries; all these and many more have succeeded in making what is called a "name" for themselves which passage of time cannot efface from the world's record.

But we architects are lost in the great mass of useful citizens, mer-

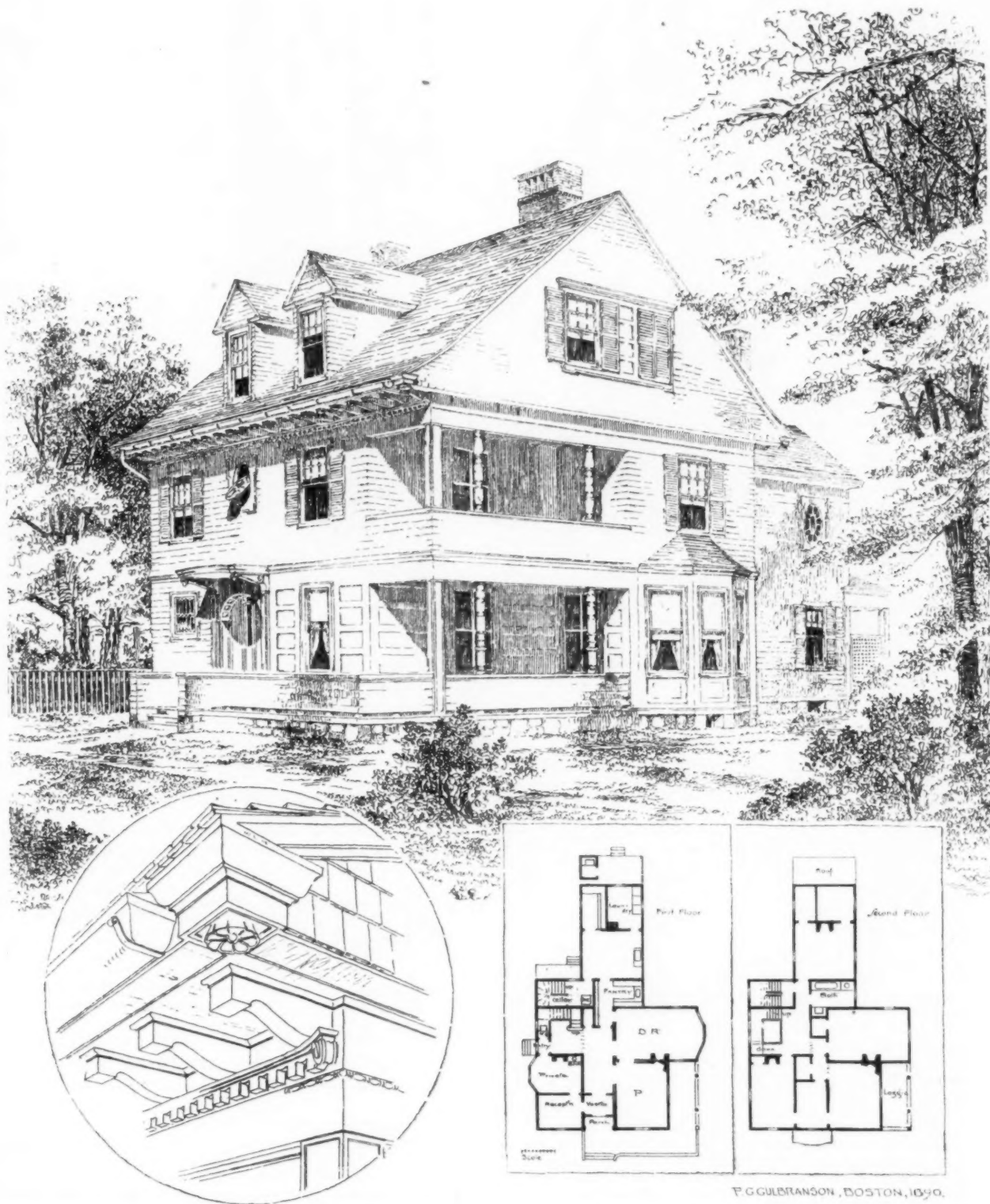
sula is inferior to that of the days when its many interesting architectural monuments were conceived in the minds and brains of now unknown architects. Perhaps these individuals did have a little contemporary fame. We hope so.

America is to-day looked upon as the great racial mixing-ground, and sociologists and anthropologists are looking with interest to the appearance of a race of men who shall combine all the good elements of their varied ancestors; but why not, as well, all the bad and non-intellectual traits? And what has been the result on other mixing-grounds? How does the modern Greek, Italian and Spaniard

compare as vigorous and forceful citizens with the undiluted Greek, Roman and Iberian of olden times? Greece has in a great degree fallen under the influence of outsiders. It seeks its king in the ranks of foreign princelings, and it allows the interesting and in-

popular education and religious tolerance are making a certain progress which is the most hopeful sign of all. Stagnation is, however, not an unmitigated evil. While it has kept a large portion of the people in such a state of semi-barbarism that their chiefest de-

SKETCH FOR A PHYSICIAN'S HOUSE



F. G. GILBRANDSON, BOSTON, 1890.

structive search for further enlightenment upon its past glorious history to be carried on by strangers. Italy has experienced a new birth and is making valiant progress and has already gained a place again in the front ranks of the nations. But the stagnation which for centuries has enveloped Spain is as yet hardly disturbed. The surface is ruffled now and then by political and social changes, and

light is found in the bloody bull-fight, it has also largely aided in the preservation of the invaluable series of architectural monuments, a series of more varied interest than can be found elsewhere in the world. Fortunately, the temperament of most meridional is artistic, and though slothful and non-progressive, the Spaniards of later years seem to have appreciated their buildings, and consequently

exerted themselves sufficiently to keep in a reasonable state of preservation not only the religious edifices, which, of course, the churchmen looked after, but secular buildings as well.

Another thing is somewhat striking, where so many styles and so radically different succeed one another in the same country, one naturally looks for evidence of the transition from one style to another in one and the same building, as is so often the case in other countries. Such evidences are to be found, of course, but the general impression one gets in looking over these plates is that the transition was studied out on paper and carried into execution in an entirely new building rather than through experimenting with uncompleted work cast in older styles. The result is that while there are buildings like the Church of San Vincente at Avila and the Cathedral at Sigüenza, where different portions of the building are designed in varying styles, there are others like the Cathedrals at Toledo and Seville where Gothic and Renaissance detail are so blended and leavened with Moorish feeling that it is hardly possible to doubt that they were designed as they were finally executed; and even the purist must feel that there is a gracious richness and even propriety about them that is denied to buildings which are carried out in strict and cold conformity with a single style.

But all this hardly tells what is contained in the second and third parts of this beautiful work. First, to satisfy the doubts of the "practical" American architect—who often scorns a thing however beautiful it may be intrinsically if he cannot make use of it, that is, copy it absolutely and palm it off on unsuspecting clients as original work—we will say that this is preëminently a work he will find useful to him. If he is incapable of inspiring himself with the spirit of Spanish work to such a degree as to be able to produce designs of such kindred merit as Messrs. Carrère & Hastings exhibit in their design for the Cathedral of St. John the Divine and their hotel buildings at St. Augustine, he will find here plenty of motives which he can convey, or prig, or purloin, or steal—whichever word best suits his conscience. Here is a large print of the Puerta de la Concepcion in the cathedral at Toledo, which is all ready to be "conveyed" without slightest change into the design of some architect, who has in hand a public library which he proposes to cast in the Renaissance style. The large roundel which intersects the inclined lines of the pediment would afford a famous place for the coat-of-arms of the municipality which is to own the library. Here is the fine wrought metal grille in the Capilla Real in the cathedral at Granada, which some of our ambitious and capable iron-workers can make their own—until they are found out. Here are enough views taken in the interior of the Alhambra to furnish data for the dining-rooms of numberless Western hotels. And here is the Giralda at Seville, all ready for the architect of Mr. Forepaugh's circus building, if he ever finds it wise to build such a structure in Philadelphia; or, perhaps he may prefer the tower of the cathedral at Toledo. Here is the courtyard of the Casa Zaporta at Saragossa, which could be priggishly bodily by an architect for the interior court of a small museum of fine arts; and this Romanesque doorway of San Vincente at Avila, why may it not be repeated not only on churches but on storehouses, hotels and private houses in every part of the country?

Yes, if any one wishes to make patch-work of his buildings, he will find in this collection patches of all kinds, sizes and qualities

ready to his hand. None the less, if he be an architect in the true sense he will find here also inspiration and instruction, which he should find invaluable in showing him how far it is safe to yield to the prevailing modern leaning to eclecticism, and also how dangerous it is to add enrichment without a restraining consciousness that it is a short step from orderly magnificence to disorderly riot.

One very ingenious device has been employed by the author, although we are surprised to find that it adds very little to the value of the work, while it unquestionably makes it more easy to understand the situation. Of the Alhambra a plan has been prepared, and upon it are indicated the stand-points from which the photographer took his seventeen interior views, the angle of vision being indicated in each case so that at a glance one can perceive from the plan what portions of the building are exhibited in the plates. It seems an ingenious and useful idea, but an inspection of the views shows that a slight study of the plan would without this aid at once reveal the point where the camera must have been placed. But there are cases where this could not be so easily determined, and the idea is worth repeating in similar collections.

The prints in these two Parts are as admirable specimens of gelatine printing as were those contained in Part I, but we regret to find that in a few cases colored inks, green, purple and brown have been used. Now and then a subject does gain an added value through being printed in brown, but the safest and most satisfactory color to use is a simple black. Some really fine

helio-chromes would have immensely increased the value of the work, but as it stands it is worth every cent of the money that is asked for it.



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

ENTRANCE TO HOUSE OF S. ALEXANDER ORR, ESQ., TROY, N. Y.
MR. H. LANGFORD WARREN, ARCHITECT, BOSTON, MASS.

[Helio-chrome issued with the International and Imperial Editions only.]

UNION PASSENGER DEPOT FOR THE I. & G. N. AND G. C. & S. F. R. R.,
GALVESTON, TEX. MESSRS. PERKINS & ADAMS, ARCHITECTS,
TOPEKA, KANS.

It is proposed to use:—Common brick exterior walls plastered with Portland cement stucco; jambs and angles to be formed of pressed brick quoins; roof to be covered with Spanish roof tiles; interior walls to be plastered in rough-cast and calcedined.

STORE ON FARNHAM ST., OMAHA, NEB. MESSRS. WALKER &
BEST, ARCHITECTS, BOSTON, MASS.



Rue St. Jacques, Paris.

A SUBURBAN HOUSE NEAR ST. LOUIS, MO. MR. W. ALBERT
SWASEY, ARCHITECT, ST. LOUIS, MO.

DIVINITY HALL, CAMBRIDGE, MASS. MESSRS. PEABODY & STEARNS,
ARCHITECTS, BOSTON, MASS.

RUINS AT TLEMCEN, ALGERIA.

SOUTH SIDE OF THE CHURCH OF NOTRE DAME, VITRÉ, FRANCE.

[Additional Illustrations in the International Edition]

INTERIOR OF ST. ETIENNE DU MONT, PARIS, FRANCE.
[Gelatine Print.]

HOUSE ON KAERNTHNER STRASSE, VIENNA, AUSTRIA. HERR W.
STIASNY, ARCHITECT.
[Gelatine Print.]

BUILDING FOR THE UNION BUILDING ASSOCIATION ON REICHS-
RATH STRASSE, VIENNA, AUSTRIA.
[Gelatine Print.]

A CORNER OF THE GREEN COURT, STOWELL PARK, GLOS, ENG.
MR. JOHN BELCHER.

"COMFORT YE MY PEOPLE." PORTION OF A DECORATION DE-
SIGN FOR A HOSPITAL CHAPEL. BY MR. R. J. STEGGLES.

THE upper panel of this illustration represents Our Lord seated between the cherubim and surrounded by a multitude of the heavenly host, commanding that comfort be shown to His people. Faith and Hope are in attendance, the former kneeling in adoration at His feet, the latter clinging for support to the mercy seat.

In the lower panel stands Charity, superintending the distribution of those gifts which are the outward and visible signs of obedience to the command to give food to the hungry, clothing to the naked, assistance to the blind and infirm. On one side an angel brings a message of hope to the despairing, while on the other a handmaid tenders words of comfort to an afflicted widowed mother, reminding her that though her only child is taken from her, yet he is but being carried upwards by an angel's hands to an angel's home.

There is no doubt that consolation is never more acceptable than when offered to those who are ill or in a state of convalescence, and it can be conveyed by pictorial means more eloquently and surely than by words. Invalids who are unable to follow a discourse can derive benefit from a picture. Some doctors show their belief in this power of art by having engravings of a hopeful character in their waiting-rooms, or scriptural words which are likely to be encouraging. Mr. Steggles's pictorial decoration, therefore, deserves the attention of philanthropists and the generous benefactors of hospitals. Money would be well laid out in its reproduction.

HOUSE, HAMPTON-ON-THAMES.

SKETCHES IN AND AROUND ESSEX.

THE subjects of this illustration are very characteristic of the native architecture of Essex, where the brightest effects are obtained by the simple means of cream-colored plaster and brilliant red bricks and tiles.



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

NATIONALISM.

BOSTON, July 21, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—My reply to Mr. Talcott Williams's question as to how Nationalism would give us better plumbing laws, was given in the lines of my article following the lines he quoted. "As the law benefits the dealers in lead and iron pipe, a powerful element exists in favor of its perpetuation and extension to other cities."

The corruption of our legislatures is not due to the depravity of human nature, but to the evils of our social system from under the crushing pressure of which human nature is constantly struggling to rise.

In the frantic struggle for existence under the competitive system, which has, however, already sounded its own death knell in giving birth to the giant "Monopoly," we cannot blame individuals for following the order of the day where "might makes right."

We can hardly criticise the officers of the West End Railway Company for spending fifty thousand dollars in influencing legislation to forward its own interests, in the city of Boston, nor, in the case in question, can we blame individuals interested in the use of lead and iron pipe for wishing such use to be extended. But we do blame the system which creates this conflict of interests where concord would be possible.

Let the city of Boston purchase and own its own street railroads employing the able managers of the West End Company in the interest of the whole people, and the fifty thousand dollars used for corrupting legislature would go towards improving the accommodations on those roads.

Let the State manufacture its own piping and do its own plumbing and the present complication in piping will instantly disappear, with the disappearance of its cause.

Leading plumbers recognize and frankly admit the folly of continuing this law in view of the improvements in plumbing systems invented since its enactment, and they see that the complication involved has had the effect of injuring their business by lowering the confidence of the public in plumbing and plumbers.

It is certain that the legislation enforcing trap venting has been kept in existence to the great detriment of the public at large, by the influence direct and indirect of persons pecuniarily interested in its maintenance.

Respectfully yours, J. P. PUTNAM.



NATURAL GAS IN UTICA.—On Thursday, July 10, just after the *Observer* went to press, a vein of natural gas was struck in a well being drilled for the National Brewing Company, on their grounds on South Street, the site of the old Eaton Match Company. The well is six inches in diameter and is being drilled by the veteran well-driller, P. H. Foley, of this city. From almost the very first the drill penetrated black-slate rock, in which it remained for 555 feet. No water was found, and throughout the entire drilling it has been necessary to pour water into the hole in order to operate the sand-pump. At 555 feet the Trenton rock was struck, and alternate layers of the hard sand-rock and water-line streaks were found from that time until the gas was reached, at 570 feet. As soon as it was discovered that the well was furnishing some gas, a cap was put on the top of the one length of casing, and a small pipe about fifteen feet long was attached so as to convey the fluid about the drilling apparatus. The gas was then lighted, and it gave out a strong steady flame two or three feet in height throughout the night. The flow continues to-day without any apparent decrease in volume, and bears every evidence of keeping up as it has started. The gas burns with the peculiar solid rose-colored flame always found in the gas from the Pennsylvania wells, and betrays none of the blue streaks and sputtering of swamp or pocket gas. Mr. Foley, who has drilled wells all over this county, and many in the city, is confident that the drill has penetrated the first seams of a strong and paying gas vein. For a number of years he has been strong in the belief that Utica was situated upon a paying gas-belt. Two years ago, while drilling a well for the Globe Woollen Mills, Mr. Foley found a strong vein of gas at 800 feet. The flow at that time was so strong that the gas took fire and was put out with difficulty. The well was intended for water, and so the gas was cased out and the drill sent down until the water was found. Much difficulty was experienced in casing out the gas, the pressure being so strong that the casing was bent and split when the first attempt was made to place it. Several other wells have been drilled by Mr. Foley in which gas has been found, and he has attempted to get some of Utica's capitalists interested in the matter, but they have always thought the speculation a hazardous one. The present find, however, is so pronounced in its nature that there is now a strong probability that the territory will be tested. The National Brewery Company is after water, but if they have touched a gas vein instead, as now seems most probable, it will prove of more value than would water, which can be procured from other wells. The fact that gas is found at such a depth, and is covered with such an impenetrable covering of slate, would indicate that it is pretty sure to be "a stayer." — *Utica Observer*.

ANTIQUITY OF STEAM-HEATING.—That steam-heating is not new, says the *Safety Valve*, appears from remarks made by George H. Babcock before the American Society of Mechanical Engineers some time ago. Mr. Babcock cited the fact that when at Pompeii he found that the old Roman baths there were heated by steam, and heated in a better and more scientific manner than is practised at the present time. The walls were double, and the steam, of course, not above atmospheric pressure, was carried up through these walls all around the room. The walls were thus heated to a temperature approximating to that of steam, and the occupants of the room were exposed to a radiation from all directions. This, Mr. Babcock held, is the true theory of heating, and the system of steam-heating by indirect radiation, or heating the enveloping air only, is unscientific, expensive and uncomfortable. It is of interest to add here that the late Joseph Harrison, Jr., of Philadelphia, in delivering a lecture before the Franklin Institute several years ago, said that he had seen in the museum at Naples a boiler substantially of the same construction as the modern vertical, tubular boiler. This boiler was found at Pompeii, and was made of copper.

AN OFFICIAL RAT.—As most people know, the main telegraph wires in London run through the subways in which the gas-pipes and sewers are placed. The principal arteries are so large that it is easy enough for men to work in them, but the pipes through which the side-wires branch off are much smaller, and great care has to be taken to preserve the connection between the main and the lateral wires. Some years ago men were repairing one of these latter, and carelessly omitted to attach it to a leading-line by which it could be drawn to its place when mended. The blunder seemed likely to have serious consequences, for it was thought that the whole of the lateral pipe would have to be dug up in order to get at the broken wire. But one of the men came to the rescue with a happy thought, suggesting that a rat should be procured, and with a fine piece of wire attached to it, sent through the pipe. This was done; but to the dismay of the workmen, the new hand came to a stop after it had gone a few yards. The inventor of this idea was not yet, however, at the end of his resources, and by his advice a ferret was procured and started on the dilatory rat's track. There was a moment of suspense before it was settled whether the rat would show fight or run away, but this was soon ended by the paying-out of the wire, and in a short time the latest addition to the staff of the Post Office appeared at the other end of the pipe. It was caught, the wire detached, and then it was set free in recognition of the service it had rendered. By means of the wire the telegraph wire was secured, and a long and laborious piece of work saved.—From "Rats" in the Cornhill Magazine for May.

HEATING BY ELECTRICITY.—What the possibilities may be in the application of electricity to warming buildings is beyond conjecture, but experiments in this line have, says the *Industrial World*, been made by Dr. W. Leigh Burton, although his efforts have been directed mainly to the heating of railway cars. It is stated that the current is passed through a system of resistance coils. Each coil is enclosed in a cast-iron case, forming the radiating surface coils. The resistance coils are covered with dry, powdered clay, for the purpose of absorbing the heat from the wires, and thus preventing them from burning out. The electric current supplied to the heaters has a force of 80 volts, and each heater is expected to use about two and one-third amperes of current, each heater having a resistance of 35 ohms, it being found by experiment that such a current raises the temperature of a heater about 200 degrees Fahrenheit. The heaters are arranged under alternate seats on either side of the car. It is proposed to generate the current for these heaters by dynamo driven from the car axles, a surplus of current being produced and stored for use when the car is disconnected from a train or employed to illuminate the cars with incandescent lamps. To heat a car standing in the yard, it is proposed to establish dynamos at the stations where cars are stored. These heaters, once constructed, are expected to be permanent fixtures, requiring no further attention. The moderate rise of temperature produced precludes all danger of fire, it is stated, and it is impossible for the resistance wires to be burned unless the surrounding clay is raised to the burning temperature of wire. The probability of electricity becoming a rival of steam and water as a heating medium is too remote for consideration at present.—*Invention*.

TESTING ALUMINUM BRONZE FOR THE NAVY.—A series of tests to determine the tensile and transverse strength, ductility, elasticity and compressional strength of aluminum bronze was begun under the auspices of the Government at the Watertown Arsenal July 15. The tests were private, not more than half-a-dozen witnesses being present, including Colonel Flagler and Major Howard, of the arsenal; R. C. Cole, an expert in metallurgy, representing the various companies interested, and J. H. Perry, passed assistant engineer, United States Navy, who will report results to Chief Engineer Melville, U. S. N. As bronze will enter largely into the construction of the new Government gunboats these tests are of great importance, inasmuch as aluminum bronze can be produced at less cost than manganese bronze, which is used at present. To-day's tests of the tensile and transverse strength were far more satisfactory than had been anticipated. The tensile strength was shown to be something over 90,000 pounds to the square inch, which is largely in excess of anything ever before shown. The transverse strength developed was 6,600 pounds on one-inch square bars. This result is not equalled by any other metal, with the single exception of the finest quality of crucible steel.—*N. Y. Tribune*.

THINGS MADE OF PAPER IN JAPAN.—In Japan, as is well-known, it has long been customary to manufacture a multitude of articles, from overcoats and window-panes to string and pocket handkerchiefs, out of paper, but the Japanese Government, not content with these feats of national ingenuity, is just now bestowing great attention on the paper industries, and experimenting with pith, old silk rags, and many kinds of vegetable substances, with a view to other employments of paper in the arts. Mr. Liberty, in his recent paper read before the Society of Arts, describes a visit that he made to the Government paper factory at Shiebu-Ogi, where he watched hundreds of intelligent little Japanese girls and women preparing the "mitsumata," or bark of the famous "paper mulberry tree," and arranging the snowy layers of pulp on the rectangular straining sieves. Toughness and a silk-like surface are the usual characteristics of Japanese paper, which, in spite of our recent progress in this department of the arts, still remains far superior to European paper.—*London Daily News*.

THE WORLD'S LARGEST RESERVOIRS.—Omitting lakes, which are in many cases natural reservoirs, the largest reservoir or artificial lake in the world, says the *New York Telegram*, is the great tank of Dhebar, twenty miles south-east of Udaipur city, Rajputana province, India. It covers an area of twenty-one square miles. The masonry dam is 1,000 feet long by 65 feet high; 50 feet wide at the base and 15 feet at the top. In southern India, also, there are some immense reservoirs. That of Cumbum in Cuddapath district is formed by damming the Gundlakamana river by a dam 57 feet high thrown between two hills. The reservoir has an area of fifteen square miles. The Suleker reser-

voir in Mysore State is very little smaller, and next to Cumbum is the finest in southern India. Compared with these artificial lakes, Loch Katrine (supplying Glasgow), four and one-half square miles, and Vyrnwy reservoir (supplying Liverpool), nearly two square miles, are insignificant in size. The Manchar tank in Scinde has an area of 180 square miles, but only when fed by the waters of the river during the months of flood. In dry months it shrinks to quite a small area.

WATERPROOF WHITEWASH.—A formula for a whitewash which can be applied to lime walls, and which afterwards becomes waterproof, so as to bear washing, is given by a German paper. Resencheck, of Munich, mixes together the powder from three parts of silicious rock (quartz), three parts of broken marble and sandstone, also two parts of burned porcelain clay, with two parts of freshly slaked lime, still warm. In this way, a wash is made which forms a silicate if often wetted, and becomes, after a time, almost like stone. The four constituents, mixed together, give the ground color, to which any pigment that can be used with lime is added. It is applied quite thickly to the wall or other surface, let dry one day, and the next day frequently covered with water, which makes it waterproof. This wash can be cleansed with water without losing any of its color; on the contrary, each time it gets harder, so that it can even be brushed, while its porosity makes it look soft. The wash, or calcimine, can be used for ordinary purposes, as well as for the finest painting. A so-called fresco surface can be prepared with it in a dry way.—*Invention*.

THE NIAGARA FALLS TUNNEL.—The first test-hole, for the purpose of ascertaining the thickness of the different strata of rock which will be encountered in digging the big tunnel, has been completed. The drill went down 214 feet. At a depth of 142 feet the drill passed out of the hard gray limestone into hard blue slate, and at 203 feet it again left blue slate and passed back again to limestone. A second test-hole was commenced farther up the river on Tuesday. Preliminary work on the tunnel has been commenced, and ground has been broken for the foundations of a tower from which observations as to the different elevations of land for the proposed route for the tunnel will be taken. It is expected that formal commencement of the great undertaking will begin on August 12.—*Pittsburgh Chronicle*.

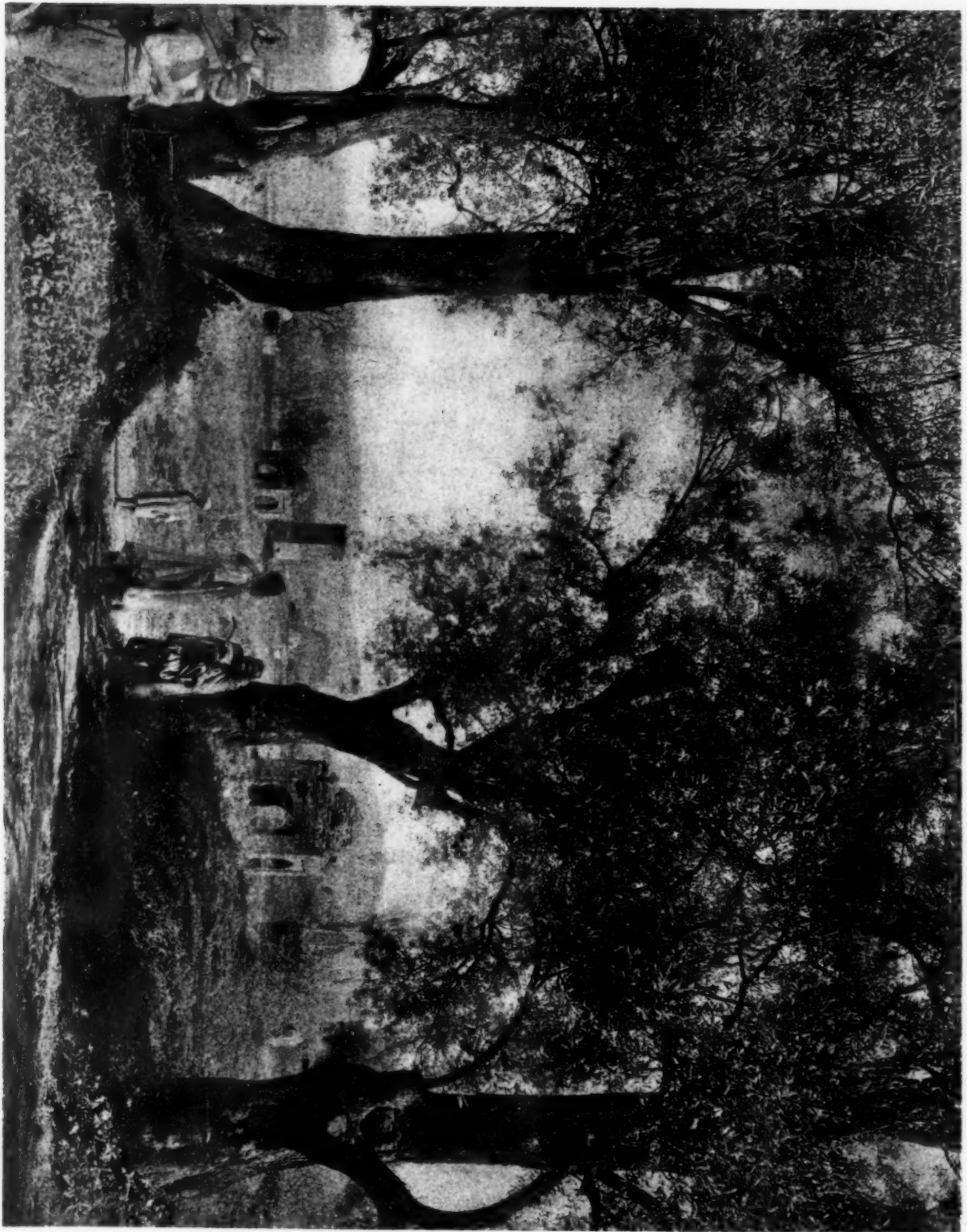
TRADE SURVEYS

It is not necessary to go far to discover evidences of unusual business activity. Work in all kinds of building throughout the Western States is being hurried along rapidly, and both skilled and unskilled labor is in demand. In the Southern States, new manufacturing enterprises are following each other in rapid succession. In the older States, capacity of all kinds is occupied about up to fullest capacity. There is abundant proof of the general activity in railroad traffic reports and tables of comparative earnings, as well as in the activity in investments. A fresh impulse has been imparted to house-construction in numerous small towns, the assigned cause being the gradual expansion of manufacturing capacity during recent years. Labor itself is becoming more settled. Building and loan associations are exerting positive influences in this direction on the wage-workers of mills and shops. Savings-bank and cooperative association figures show that there is a rapid and vigorous growth in membership and depositors not only in the older, but also in the newer States. The chiefs of labor bureaus state that, taking labor in the aggregate, there is less agitation and less probability of agitations than for many years; that the workmen of late have begun to study with more care and intelligence the economic problems with which they are surrounded. Other authorities in a position to speak say that there are fewer dangers of a general labor strike than ever before, and that agencies are at work which will reduce these dangers to a minimum. Yet the wage-workers are far from content. The only real advance they have made as a whole is to discover the weakness of mere numbers and mere organization, and the edicts of an organization. A new programme has been adopted, and quieter methods will probably be adopted in future efforts at amelioration. Railroad employes here and there are calling for the redressing of grievances, and managers in numerous instances, have, in a spirit of fairness, complied. In a general way, employers are exercising more discipline, without permitting it to be apparent. The prospects for the autumn and winter trade are, according to good authorities in Boston and New York and Philadelphia, even better than twelve months ago.

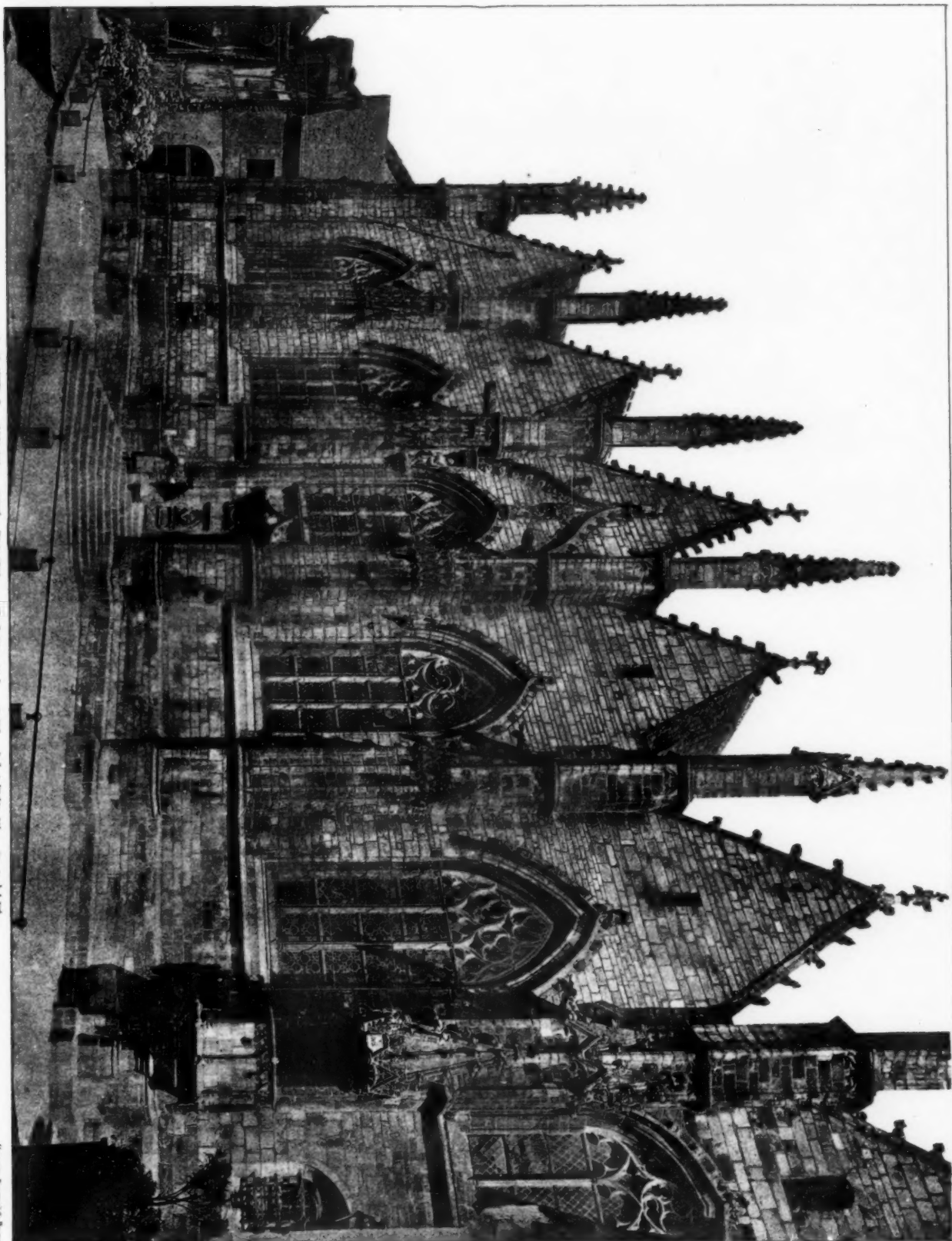
The anxiety to extend and expand is still the ruling motive almost everywhere. One creditable authority stated recently that there are now over one hundred cotton-mills projected and under vigorous promotion. Considering the narrow margins on cotton goods this is encouraging. The older concerns North and South in many instances are enlarging. Jobbers do not complain of over-stocks and distributors report an easy and steady movement of goods in all interior markets. What is true of one industry is true of many. Throughout New England there is very little murmuring over dulness, slow payments or stock accumulations. Paper-makers, hardware-manufacturers, boot and shoe interests, electrical and machinery interests are all well fixed. The Middle States are in good trade condition. Locomotive-builders and car-builders are very much crowded. Railroad companies are heavy purchasers. Steel-rail mills are crowded. Pipe-iron makers have a full summer's work on hand. Coal-miners are busy everywhere and the present out-put is the highest of the year. New engineering enterprises are attracting fresh capital. Three or four ship-canal and two or three tunnels are proposed, involving very heavy outlays. Money is abundant in business circles and reasonable rates prevail. Merchants are ineffectually struggling to avoid the post-dating evil but competitive influences are aggravating the evil despite sound judgment against it. Iron-makers see a heavy trade looming up. Machinery-makers are in many cases making over-time. Textile manufacturers discover an improving distribution of goods. General indebtedness is kept within control. Speculation is doing a minimum of harm. There is less idle money now than for twenty years and a greater demand for capital. The phenomenal growth of capacity in all directions may excite fears in the minds of conservatives who can only measure future growth by just progress, but a different measure is necessary. The fact must be kept in mind that the consuming capacity of this country can be very greatly increased in all directions.

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RUINS AT TILMAGEN, ALGERIA.



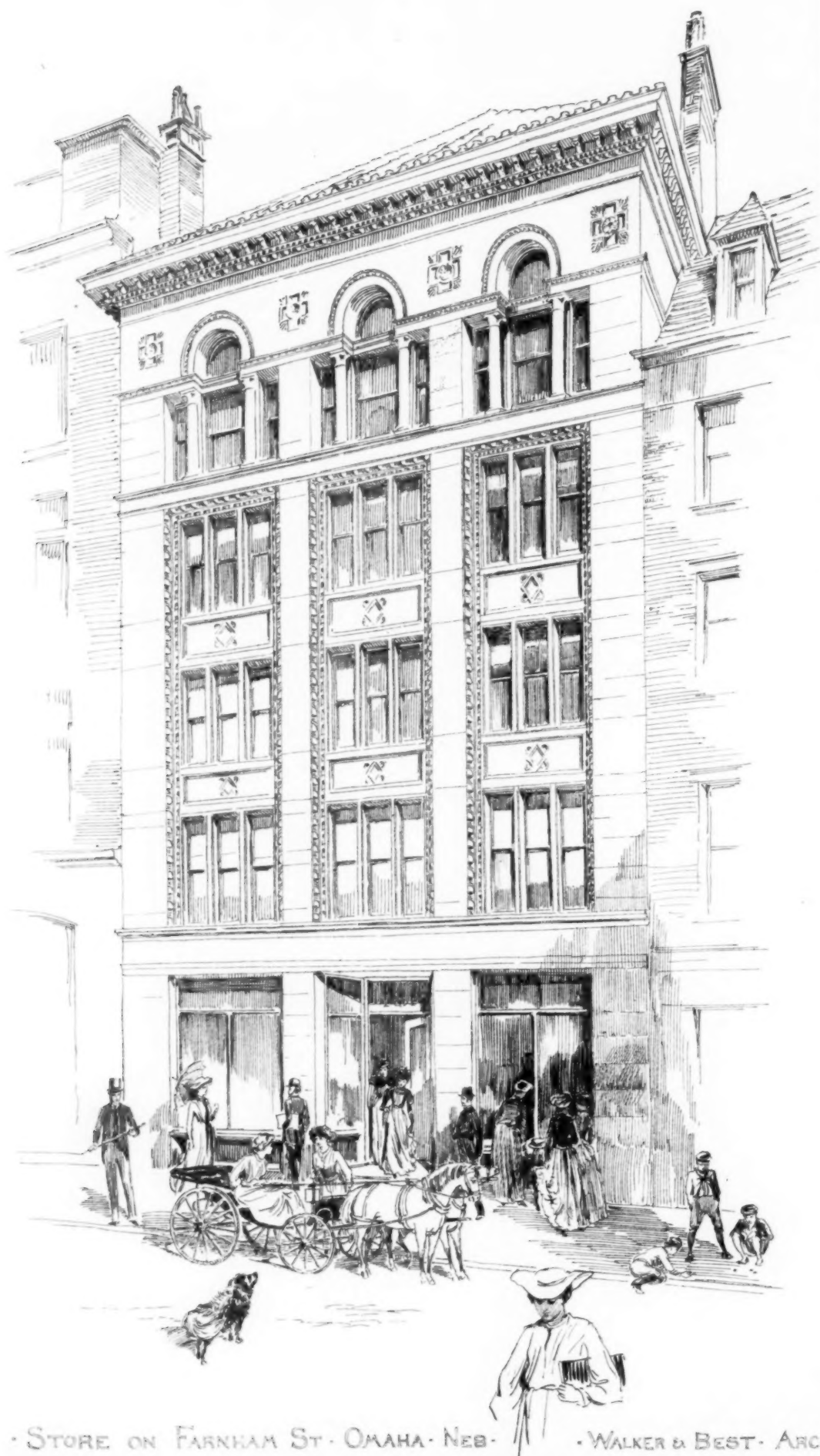
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SOUTH SIDE OF THE CHURCH OF NOTRE DAME.
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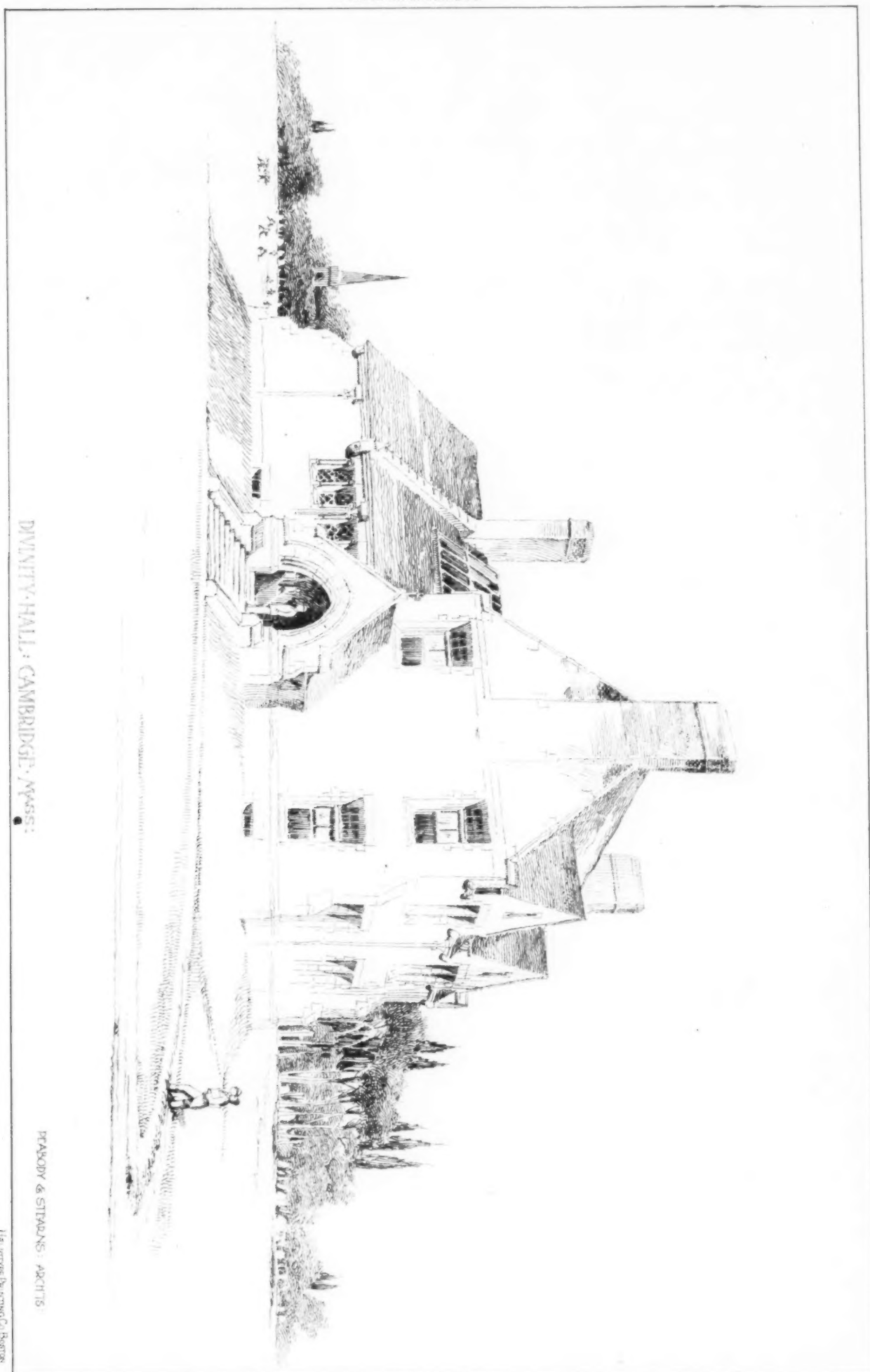
Harvey Bartholomew

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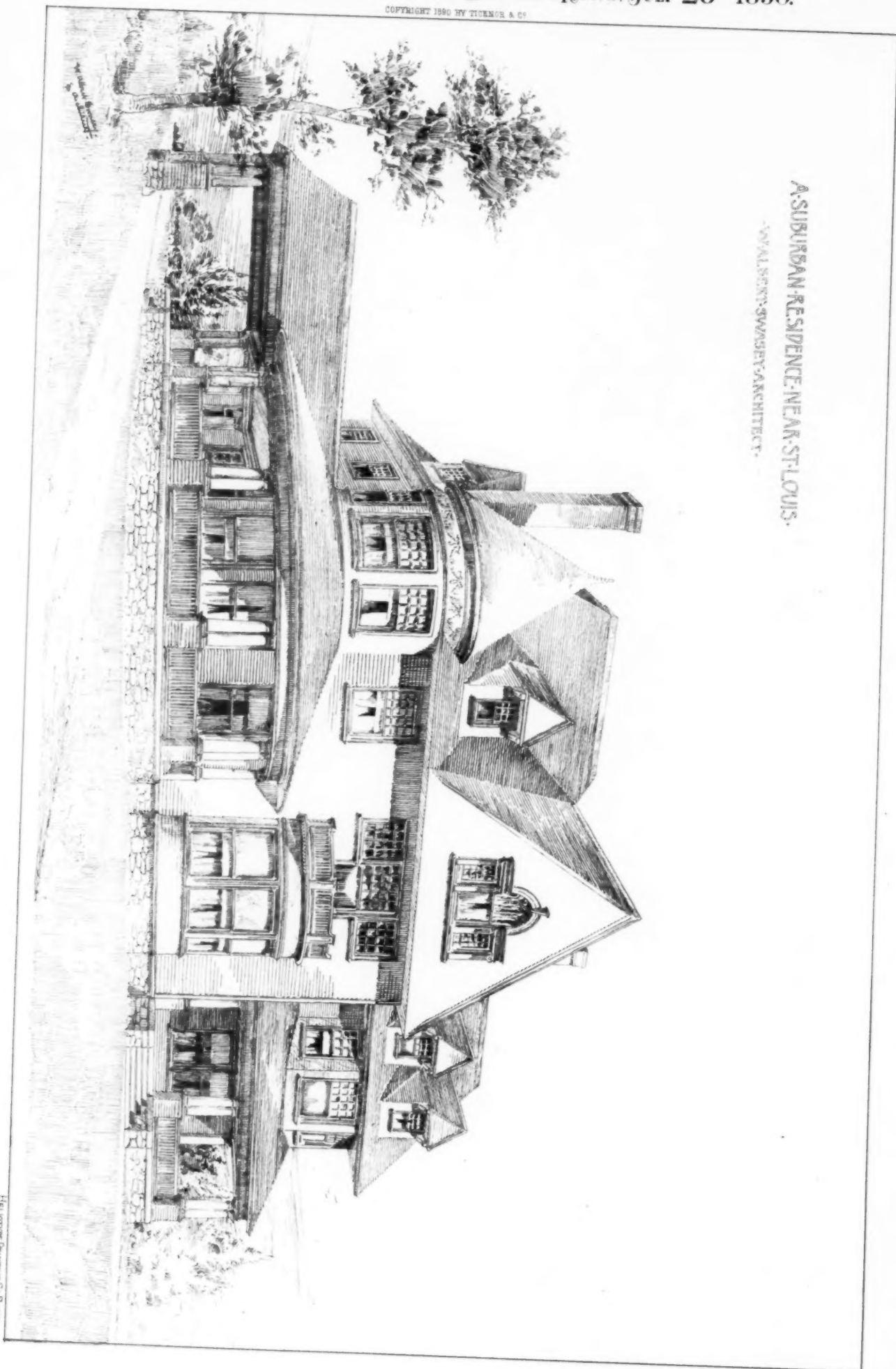
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