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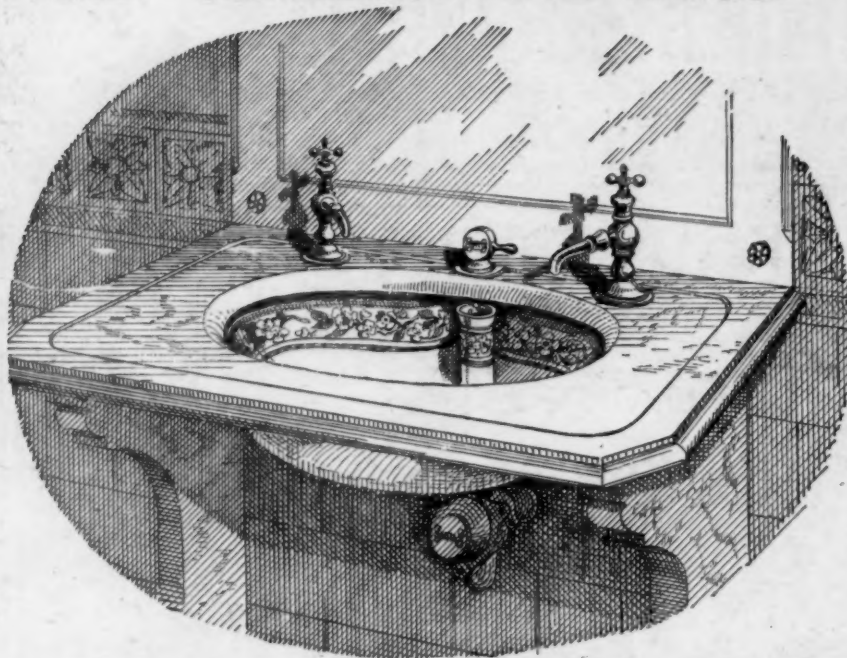
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VOL. XXIX.

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AUGUST 9, 1890.



SUMMARY:—

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ARRANGEMENTS have been made for inviting competitive designs from members of the New York Architectural League for the new Fine Arts Building, which is to be erected for the joint use of the League, the Society of American Artists and the Art Students' League, on Fifty-seventh Street. In the first competition only an elevation or perspective drawing of the Fifty-seventh Street front is required, although other drawings will be gladly received. These drawings must be submitted by September 1 next, and sketch-plans, showing the general disposition desired, will be sent to competitors as a guide in designing. Out of the drawings thus submitted, three will be chosen, and the authors of these will compete again, the author of the best design being appointed architect of the building on the ordinary terms, while the other two will each receive two hundred dollars. The scale and style of rendering of the competing drawings in the preliminary trial will be at the discretion of the designers. The jury in the first competition will be composed of the Presidents of the Art Students' League, the Architectural League and the Society of American Artists, with the President of the American Fine Arts Society, the Chairman of the Trustees of the Gift Fund of the same society, and Mr. Kendall, as Chairman of the Committee on Site and Plans. In case of disagreement, Mr. R. M. Hunt may be added to the jury. The jury in the final competition will be composed of the Presidents of the three societies which are to occupy the building. A more interesting competition has, perhaps, never been held in this country, and, while we regret that the time allowed for preparing the designs is so short, we trust that the competitors will do their best to create a composition worthy of its purpose. A building in which, for centuries, perhaps, the most earnest students in the country are to train their hearts, as well as their eyes and hands, to the revelation of that great and noble American art which only waits for worthy interpreters, has something almost sacred about it, and the street-front should have all the beauty and sincerity that architecture can express.

THE Board of Walking-delegates in New York has again used its enormous and dangerous power to perpetrate an outrage which will probably affect half a million people. The summer vacation, naturally, is the season chosen for repairing and altering school-buildings, and a very large number of such buildings are now in process of active repair in that city. In many, perhaps most of them, there is so much work to be done that great efforts must be made by the contractors

to get it finished before the ninth of September, when the school year begins. This chance for advertising themselves, and wantonly inflicting annoyance and injury upon an immense number of people, was too good to be allowed to escape the all-powerful tyrants. It was quickly discovered that some non-Union men were at work in some of the school-buildings. This was pretext enough, and at a meeting of the delegates thirty of the schools were "struck," with the understanding that forty more should be placed under the ban at once unless the School Board immediately acceded to a "peaceful settlement" of the delegates' demand. This is, of course, that all men who have not joined the unions, and sworn unquestioning obedience to the tyrants, shall be discharged, and the delegates by the same tactics will do their best to prevent them from earning an honest living anywhere in or near New York. If the School Board does not at once comply with this order, all Union plumbers, painters, carpenters, bricklayers, plasterers and workers in metal will be forbidden to do any work in any building under the Board's control. Of course, this proceeding is a criminal conspiracy against the non-Union men, punishable in New York by fine and imprisonment, and the non-Union men who are discharged in consequence of the strike, if they have agreed with the contractor for employment for a fixed time, as all non-Union men should be careful to do, can collect their wages for the full time, whether they are discharged through fear of the delegates or not; but notwithstanding all this, the chances are that the School Board, caught at a disadvantage, and feeling its first duty to be the punctual opening of the schools, will comply with the infamous demand rather than wait for the law to defend or avenge its rights and those of its fellow-citizens. We should be very glad if it should turn out that we were mistaken in judging of the temper of the School Board, and would rejoice sincerely to hear them declare that they would postpone the opening of the school-houses for a year rather than allow the children of New York to learn a lesson of cowardly surrender to insolent conspirators, but our hopes are very faint.

IT is incredible that the once liberty-loving people of New York should have become so completely enslaved by the Union schemers as appears to be now the case. A little reflection will show that a few men, a small minority, even of the workmen, can, under the present system, control the Unions, and, through the successive small concessions which, by artfully concentrating their forces on particular points, they have wrung from the contractors, the whole building business of the immense cities of New York and Brooklyn. It is easy to see that the various branches of construction are so dependent upon each other that one sort of work cannot go on unless others also proceed in regular order. For example, a building on which an army of masons and carpenters is employed can be completely stopped by withholding the supply of wrought-iron wall and floor anchors, the work of one or two blacksmiths; the lathers, twenty or thirty of whom do all the lathing for a large city, can keep a contractor against whom they have a grudge waiting for months until they condescend to work for him, and, in certain indispensable parts of construction, the entire business is done, even in New York, by a dozen men. The walking-delegates understand this thoroughly, and throw out of gear, first one small part of the great business machine, and then another, demanding a concession in every case, before they will allow the wheels to move again. It would be easy to circumvent these manoeuvres by employing men who could work at several trades in case of need, so that a stone-cutter might lay brick on occasion, or a plumber forge a floor-anchor, but the walking-delegates, who show far more generalship than the contractors whom they torment, provide against this by restricting each man to his own trade, or subdivision of a trade, under the most savage penalties; and a stone-cutter who should sharpen his own tools, or a stonemason who should dare to lay brick, or an ordinary bricklayer who should lay face-brick, would be in danger of starvation through the persecution of the Unions, if not of death by violence. The pretext offered by the Union managers for this rule is that if a stone-cutter sharpens his own chisels, he deprives a worthy blacksmith of a job, and so on; but this explanation, however specious, is a mere sham, devised to excuse, to their own slaves, as well as to the contractors, the tyranny

with which they maintain the system on which, as they know, their power for making mischief depends. Some years ago, a few small trades, notably the plasterers, made nearly all the trouble that disturbed building operations in New York, but it was easy for the long-headed plotters to see that by using these trades as levers, all the other Unions in the building trades could be compelled to join in their schemes, by the simple process of stopping the work on buildings until resistance ceased; and with the affiliation, or rather, the subjugation, of all the building trades, the power of the dictators has become, as they appear to think, absolute, the same weapons with which they conquered their power over the men being kept sharp, for attacks upon the contractors. How deadly they are is best shown by the conduct of the New York contractors themselves, who fall on their knees and roar for mercy, the moment they see them displayed. Whether a bolder front would not occasionally secure better terms, even if it did not permanently check the power of the magnates, is a question which has probably occurred to a good many people who have watched the course of the New York contractors, but for the present, the disposition to resist appears to be diminishing, rather than increasing.

THE matter of plans for the new Worcester High School Building, to which we referred recently, has been rather unexpectedly decided by the secret signing of a contract between the city authorities and a firm of young architects, Messrs. Barker & Nourse, by which the latter agree to furnish the plans and specifications required for the sum of fifteen hundred dollars. As Messrs. Barker & Nourse signed the paper in which the architects of the city mutually agreed not to compete unless the regular fees were promised to the successful competitor, their professional brethren naturally express a little surprise at their action, but the local newspapers seem highly delighted at the success of the device by which, as they are pleased to imagine, "a substantial sum" will be saved to the city treasury. How substantial the amount is that a man saves by entrusting costly and complex building operations to experts who are willing to undertake them for one-fifth of the usual fee is best estimated after all the bills, including those for alterations and repairs, have been paid; but, so far as the other Worcester architects are concerned, we may congratulate them, not only on the independence with which they maintained their professional claims before the city officials, but on their good fortune in not having become involved any further in the matter. Every architect who has had experience enough to make his opinion of any value knows that plans and specifications for an important public building can be furnished without loss for one per cent on the probable cost only by two kinds of architects; those who do not use proper care and skill in their work, and those who are dishonest, and receive from the contractors amounts varying from five to twenty per cent on the amount of the contract. Of course, we do not mean to suggest that Messrs. Barker & Nourse belong to either of these classes of architects, and, indeed, the guilelessness with which they received the information, volunteered by an astute city official, while they were hesitating whether to accept the offer made them, that "several of the older architects stood ready to take it," is good evidence of at least their honesty; but we can assure them that if their new clients know what proper professional service and responsibility are, and insist upon getting them at the agreed price, their High School commission will be the bitterest experience of their lives. The sworn testimony of the accountants of the Supervising Architect's office in Washington, where the utmost economy and system are used, and where simple buildings, of the same general type, but of enormous cost, are designed, shows that the actual cost of making the drawings and specifications alone for these buildings is usually about two and one-half per cent on the cost of the building; and there is ample evidence that the proportion is nearly the same among private architects who are engaged mostly on large buildings. To undertake to do such work for less than half of what experience shows to be the probable cost is to invite certain loss, the amount of which will be in inverse ratio to the conscientiousness displayed in carrying through faithfully a losing bargain; while, worse than this, the mere fact of once having been arrayed with that part of the profession which accepts engagements that can be carried out without loss only in one of two ways is a very serious misfortune to a young architect.

A CURIOUS piece of information, which conveys also a warning, in regard to societies for coöperative production, is to be found in a paper by Mr. Edward Cummings in the July issue of the *Harvard Quarterly Journal of Economics*. It seems that in 1878, Benjamin Rampal bequeathed to the city of Paris three hundred thousand dollars, to be used for aiding coöperative societies, then, as now, greatly petted and favored in France. In 1883, the first instalment, of eighty thousand dollars, became available, and was used in making loans to forty-nine societies. In December, 1889, an account was made up, to see what part of the loans had been repaid when due, and what, in general, were the financial prospects of the societies concerned. The loans to thirty-four of the societies had by that time fallen due. Of the thirty-four, six societies only, owing in all less than twenty-eight hundred dollars, had met their obligations: of the others, eighteen had gone through bankruptcy, or disbanded and disappeared, without provision for their creditors; seven were insolvent, and three still kept up a show of business, but were behindhand in paying their debts. The losses to the Rampal fund, through the loans made to these thirty-four societies, were four-fifths of the amount of the loans, and if this proportion holds good with the remaining societies, as their notes become due, the fund will soon be entirely dissipated.

PROBABLY few people on this side of the water realize the determination with which Germany, France and England, and perhaps Belgium and Italy, have set about dividing up the continent of Africa among themselves. Germany, which has never before had colonies of importance, seems to have been the first to see in Eastern Africa an opportunity for creating a sort of Teutonic India, while France, ever on the watch for German encroachment, seized a favorable pretext for appropriating the island of Madagascar, as well as for extending and consolidating its possessions in the north. England, although less quick to see its advantage than the others, has succeeded in negotiating with the Germans an arrangement, confirming its protectorate over the important Zanzibar territory, and Belgium holds the Congo State as a pledge for money advanced, which will probably never be repaid, while Italy has secured a foothold in Abyssinia. As the limits of the French and German possessions are quite undefined, while England, as guardian of Egypt, holds a claim to authority over the Soudan, which means Central Africa in general, it is easy to foresee that the pretension of the powers will, sooner or later, come in conflict. France, with its usual military aptness, is already convinced of this, and the project of a railway across the desert, from Algeria to the Belgian settlements on the Congo, which was agitated ten years ago, has been energetically revived. Circumstances are now, however, changed, France has acquired Tunis, and with it a wider base for military or engineering operations toward the South; but, in the meantime, Turkey, which has long been silently strengthening its influence in Tripoli and Morocco, has set up an energetic religious propaganda among the desert tribes, and has profited by the enthusiasm with which Mohammedanism has been received by the savages to establish two posts, one at Rhadamès, in the territory of Tripoli, and the other at Insalat, in Morocco, but both on the edge of the desert, from which rifles and ammunition, as well as the true religion, can be disseminated among the fetich-worshippers. With these two stations fortified, and in unfriendly hands, it would be almost impossible to build a railroad, or even to send out an expedition, southward from Algeria; and the French Government is being earnestly advised, by those who know the country best, to begin its railway forthwith, before its opportunity is wholly lost, and to strengthen it by military posts, much as the great Siberian railroad is carried through the conquered country of Turkestan. At present, the discussion seems to turn upon the selection of the best route, and *Le Génie Civil* publishes an interesting account of the three or four proposed lines, and compares their advantages. On the whole, the most favorable appears to be one extending almost directly south from the centre of Algeria, passing midway between the unfriendly points of Rhadamès and Insalah, and reaching Lake Tchad, instead of the Congo, through a region almost completely unknown. If the railway is built, it would not only be fortified, but artesian wells would be bored along the line, and settlement encouraged.

RELIGIOUS ARCHITECTURE.¹—XVIII.

GOTHIC PERIOD.

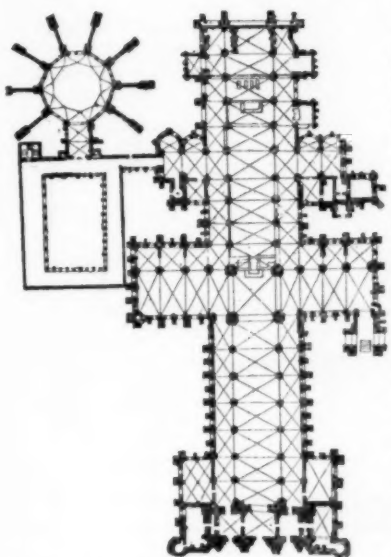


Fig. 12. Plan of Lincoln Cathedral [13th Century].

interior. The edifice towered aloft in slender proportions, without further obstacle. The work of mediæval architects consisted in developing the logical consequences of the new solution to their extreme limits. Gradually freed from Romanesque elements, the physiognomy of ecclesiastical structures became more and more distinctive, and originality was pushed to exaggerations which were all the more boldly expressed because of the slow and painful progress of the new style during its early stages.

The transformation was not accomplished everywhere with equal rapidity. The region north of the Loire and extending as far as the Rhenish district certainly took the lead and adopted Gothic art with the greatest heartiness. The Cathedral of Chartres (Figures 9, 10), the nave of Fécamp and the choir of Bayeux date from the end of the twelfth century and

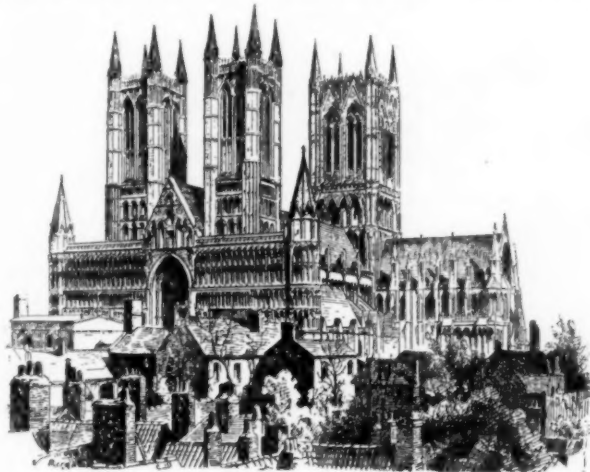


Fig. 13. View of Lincoln Cathedral.

the beginning of the thirteenth; as also do the Cathedrals of Paris (Figures 1, 2), St. Denis (Figures 3, 4), Auxerre, Tours, Le Mans, Séz, Rouen and Lisieux. The Cathedrals of Rheims (Figure 8) and Amiens belong to the first half of the thirteenth century. The Sainte-Chapelle at Paris, which goes back exactly to the middle of the century is, perhaps, the most perfect expression of the new art at this period.

Gothic architecture had at the same time penetrated into England: a number of religious edifices of great beauty may be noted there, the oldest of which date back to the twelfth century. Canterbury Cathedral (Figure 7) was begun in 1175 by Guillaume de Sens, and was continued by William;

¹ From the French of P. Planat, in Planat's "Encyclopédie de l'Architecture et de la Construction." Continued from page 65, No. 762.

THIRTEENTH Century.—The thirteenth century marks the final flowering out of Gothic art. In full possession of the solution so long sought, so often tried, and at length perfected, architects thenceforth recoiled at nothing. They enriched their plans, and multiplied the intersecting vaults, which were made to buttress one another in all directions. The aisles were divided up, since the points of support could be carried outside by means of flying-buttresses; and these spanned in their bold flights the multiplied divisions of the

Lincoln Cathedral (Figures 12, 13) belongs to the thirteenth century. In both of these cathedrals some marked peculiarities will be observed in the plan, to wit: the unusual breadth of the narthex, the extraordinary development of the transept, and especially the considerable prolongation of the nave between the transept and the apse.

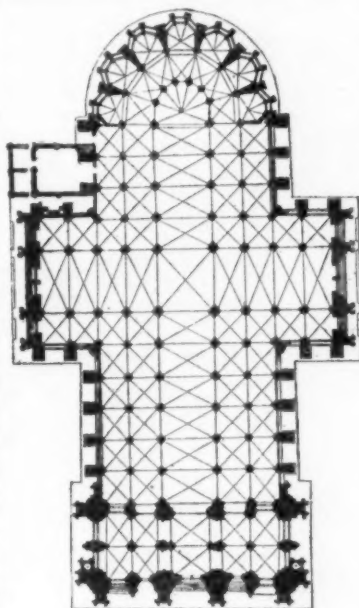


Fig. 14. Plan of Cologne Cathedral [13th Century].

Cologne Cathedral (Figures 14, 15), which is of wonderful beauty, is the same as that of the cathedrals of France, and was apparently inspired, as regards dispositions and even proportions, from Amiens and Beauvais.

This intervention, or rather influence, was exercised far and wide down to the fourteenth century. Must we not, for

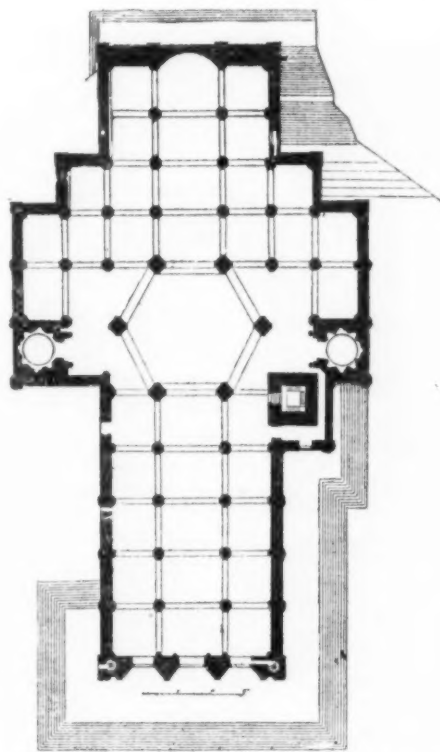


Fig. 16. Plan of the Cathedral of Siena [13th Century].

example, consider the plan of York Cathedral (Figure 22), and also, perhaps, that of Lincoln Cathedral, as striking imitations of the Cathedral of Laon (Figure 11), which belongs to the thirteenth century?

The same explanation is also given for the existence of five examples of purely Gothic architecture among the Romanesque structures of Central and Southern France.

In the thirteenth century, the plan did not as yet provide for side-chapels, although there were double aisles in all large edifices; the apse, on the other hand, which was richly decorated, and often encircled with two aisles, had a number of small apses attached to it. These were sometimes comprised

In less important structures, as country churches, the *chevet* was simple and square in form. The choir was almost always vaulted, but the nave was still covered with a panelled ceiling in many instances.

The towers of the thirteenth century were reared to heights

Fig. 18. View of Cologne Cathedral [13th Century].

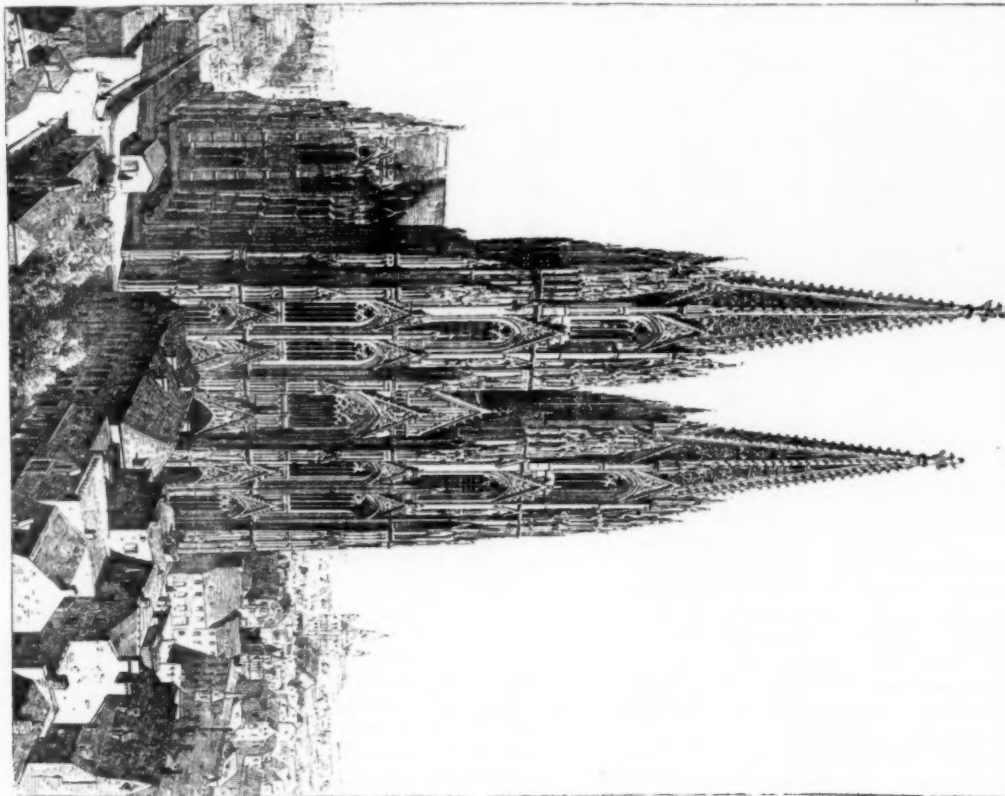
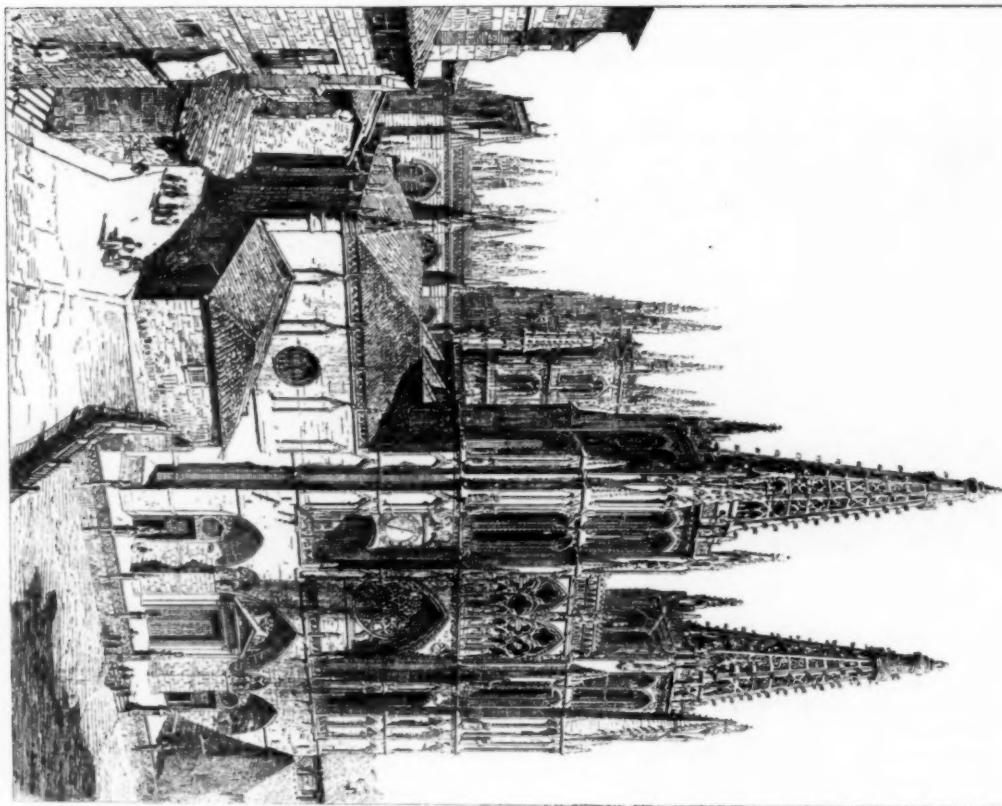


Fig. 19. View of the Cathedral of Burgos [13th Century].



in the second *chevet* aisle, as at Coutances; and sometimes they were wholly external, with no intercommunication, as at Le Mans and St. Pierre-sur-Dive. The Cathedral of Burgos (Figures 18, 19) exhibits a most peculiar arrangement of these chapels: they are carried into the transepts.

until then unknown. The two principal ones—that is, the loftiest—were placed at the right and left of the façade; a third and lower one rose over the crossing of the transept and nave. The transepts of the largest cathedrals were also flanked with towers, as at Chartres and Rheims (Figures 8, 9,

10). The transepts were, moreover, entered through porches, which were in no respect inferior to those of the main façade.

The most unpretentious towers often terminated in a pack-saddle roof; that is, a roof with two gables. In edifices of some little importance, the tower was finished with a square or polygonal spire of masonry work. When a polygonal spire was raised on a square tower, the angles of the square were adorned with turrets.

Sometimes the towers were left unfinished, as in *Nôtre Dame* at Paris, or in the Cathedral of Rheims. In such cases they are merely covered with a flat roof or with low timber-work.

Flying-buttresses furnished the crowning characteristic feature of thirteenth-century architecture. Their arches had to be carried up to a great height in order to support the thrust of the groined vaulting of the lofty and imposing naves. During the Romanesque period buttresses had served merely to strengthen the side walls; but Gothic architects carried them over these walls and above the roofing, thus imparting a peculiarly soaring and slender effect to the entire composition; and the pillars supporting the flying-buttresses terminated in pinnacles.

Besides the change of aspect resulting from the increase in the elevation and width of the naves, and from the reduction in the number of the points of supports, we note a corresponding modification in the general decorative character. During

consist of pointed arches, arranged in pairs beneath a single pointed arch. Sometimes they are found two stories high.

The windows were narrow, as in the twelfth century, and slender. Like the doors, they were embellished with covings supported on a few shafts. The rose-windows were adorned with trefoils, quatrefoils and other regular figures.

The decorative system, entirely freed from all the defects of geometric stiffness, and inspired by the multifold examples presented by nature, created an almost inexhaustible flora for itself; we find among its forms the foliage of the vine, the rose, the ivy, the alder, the thistle, the oak, etc., as well as flowers of every species interpreted in an ornamental sense. While ancient art had made use of only a few kinds of foliage which seemed in themselves sufficiently decorative, it may be said that mediæval architects laid hold of all kinds of vegetable life, knowing how to take advantage of the characteristics peculiar to each plant so as to obtain different forms and combinations, and varied inflections. Nature thus furnished the interpretative art with an almost infinite number of motives, all capable of being endowed with grace because they came from the hand of Nature. Just here we have surely one of the most original and distinctive features of Gothic art. As we remarked at the outset, if the needs of the cult or religion adapted to the character of each people, together with climatic requirements, determine the general plan-forms of the ecclesiastical structures; if the nature of the materials employed, the state of ad-



Fig. 17. View of the Cathedral of Siena.

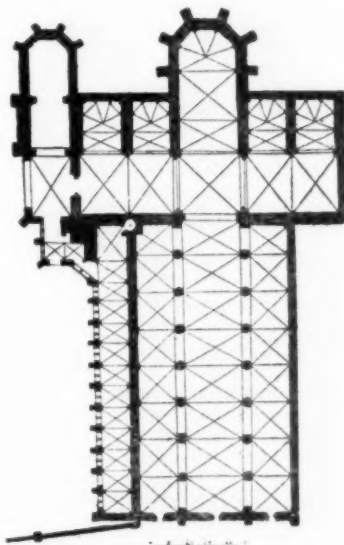


Fig. 18. Plan of the Cathedral of Burgos [13th Century].

the Romanesque period, even, the introduction of transverse ribs and *formerets* led to the addition of pilasters, or bowtells, to the pillars, thus modifying their aspect for a first time. The invention of diagonal ribs, for which special shafts had to be provided, still further complicated the division of the supports.

However, this complication was not pushed very far at the outset. The projecting diagonal ribs were merely profiled at first, and could be borne on a simple colonnette. The same was not the case at a later date, when, owing to the development and enrichment of these ribs, an entire cluster of shafts was required for the support of their arches. Moreover, in the early stages of Gothic art, Romanesque traditions prevailed to such an extent that the shafts did not run down to the bases of the pillars, but rested on the capitals of the heavy lower columns bearing the *formerets*. Examples of this disposition can be seen at Rheims (Figure 8) and Auxerre, where the pillars at their bases look almost like Romanesque pillars.

The portals were enriched with covings borne on shafts placed on either side, though the number of these was at first quite restricted. Then statues were ranged along the sides, and rows of statuettes were introduced as an ornamentation to the inner surface of the covings.

Galleries surmounting the aisles, as triforia, began to be of more frequent occurrence, and to exhibit a greater wealth of decoration, especially around the choir. Usually these arcades

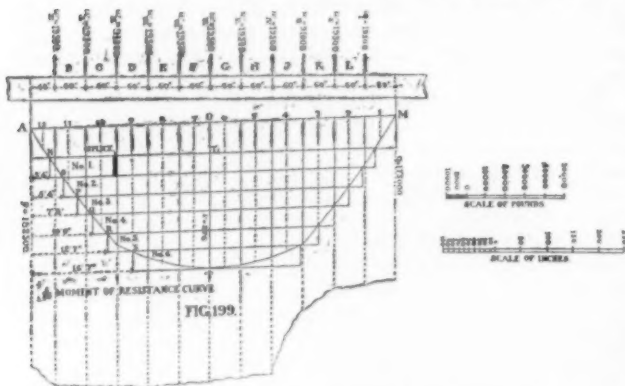
vancement in knowledge, and transmitted traditions dictate the general outlines of the edifice, by furnishing more or less complete solutions of the important constructional problems; if the principal lines characterizing each style of architecture are found traced by such agencies, the special forms of ornamentation, which are not the less characteristic because they vary greatly according to the tendencies, tastes, artistic knowledge and professional skill of every nation and every generation, and which are often considered as secondary, are of extreme importance, since they impart to the edifice what may be termed its physiognomy. It is with these decorative features in architecture as with those portraits in which the faithful reproduction of the lines, the internal framework, and even the outlines fail to bring out a real resemblance to the original; while the last after-touches, some slight inflection, a flatwise line or a more clearly defined angle will suddenly render the picture a strikingly truthful likeness. These remarks apply with far more force to architecture where the decorative system has a much more manifest and more clearly determined role.

(To be continued.)

A BYZANTINE CHURCH DISCOVERED AT CHALCIS. — In demolishing the fortress of Chalcis, in Eubœa, part of an ancient Byzantine church has been found, still preserving some good mural paintings, representing saints, of vivid coloring. — *N. Y. Evening Post*.

SAFE BUILDING.¹—XLII.

CHAPTER X.—PLATE AND BOX GIRDERS (Continued).



At the very ends of girders there should always be stiffeners over the reactions, of sufficient strength, as columns, to carry the amount of reaction, less the amount of bearing of web on reaction. As the length of these columns will be only equal to the depth of girder, and the column will generally consist of the bearing amount of web, plus two angles, they, the stiffeners, can safely be considered as short columns and the full safe compression stress, per square inch, allowed on them. The number of rivets connecting any of the stiffeners to web, should equal the amount of cross-shearing being carried by the stiffener, that is vertical cross-shearing at the stiffener, less the amount borne by web. This latter amount at the ends is the safe load on a column or section of web, equal to its bearing on reaction; between reactions a section of web equal to its depth is taken as assisting or being assisted by the stiffener, that is as acting together with the stiffener. While the web really receives its load from the flanges by pin-connected ends—rivets—it is, nevertheless, assumed by most engineers to have planed ends, presumably to avoid too many stiffeners, the whole calculation, as it is, being but very theoretical anyhow.

We should have, then, amount of strain on end stiffeners,

$$\text{Strain on end stiffeners.} \quad s = p - \frac{12000 \cdot b \cdot x}{1 + \frac{0.0003 \cdot d^2}{b^2}} \quad (125)$$

and amount of strain on intermediate stiffeners,

$$\text{Strain on intermediate stiffeners.} \quad s = y - \frac{12000 \cdot b \cdot d}{1 + \frac{0.0003 \cdot d^2}{b^2}} \quad (126)$$

Where s = the total compression strain on stiffeners in pounds; the stiffeners should have sufficient area of cross-section to resist this strain, considered as short columns, and sufficient rivets connecting them to web to s in value.

Where p = the greater reaction, in pounds, where the reactions are unequal; or either reaction where they are equal, see Formulae (14 to 17).

Where y = the amount of vertical cross-shearing, in pounds, at any point of girder, see Formula (11).

Where x = the distance, in inches, that girder rests on (selected) reaction p .

Where b = the thickness of web, in inches, at end or at point y , as the case may be.

Where d = the depth of web, in inches, at end or point y , as the case may be.

To decide whether the web needs or does not need stiffeners, and if so, at what points, use the following formula.

$$\text{Where stiffeners are necessary.} \quad y = \frac{12000 \cdot b \cdot d}{1 + \frac{0.0003 \cdot d^2}{b^2}} \quad (127)$$

Where b and d same as in Formulae (125 and 126). Should y be larger than the greater reaction p of Formulae (125 and 126) no stiffeners are required, except at the very end.

Should y be less than either reaction, stiffeners will be required up to the point of web where the vertical shearing—(as found by Formula 11)—just equals y .

At this point place stiffeners a distance apart equal to the depth of web.

Stiffeners should always be placed under concentrated loads. At end of web place stiffeners and again just inside of reaction, and between end and point where y equals shearing place stiffeners, not less than the depth of web apart, and gradually diminishing the distance between them towards end; this distance should be regulated by the amount of increase in vertical shearing towards end.

In regard to the deflection of plate girders, the same rules apply, as for beams, that is Formulae (36) to (42), Table VII, and Formulae (95) to (97). It should be noted, however, that owing to more or less imperfections in riveting, fitting of parts, etc., the plate girders will deflect

very much more than if calculated by these rules, with a modulus of elasticity same as for perfectly rolled beams.

To allow for these imperfections in manufacture a lower modulus of elasticity should be used, to be varied according to the care exercised in manufacturing the girder. Experiments on riveted girders have given moduli of elasticity for steel as low as 5000000 pounds-inch.

This, however, is probably an extreme case. The writer would recommend that the following be used, where no experiments can be made:

For wrought-iron plate girders $e = 18000000$ pounds-inch.

For mild-steel plate girders $e = 20000000$ pounds-inch.

Where e = the modulus of elasticity, in pounds-inch, to be used in calculating the deflection of plate girders.

Before giving an example, Tables XLI, XLII and XLIII should be explained. They have been calculated to enable architects to lay out the required size of plate girders by their use, and without elaborate calculations. They will be found to be very accurate and valuable for preliminary estimates, quick designing of girders, and checking of final calculations.

Table XLI gives the value of the web in resisting the bending-moment. It should be remarked here, that some XLI, XLII and engineers do not include the web at all; others XLIII include only one-sixth of the web at top and bottom.

This is practically reducing the web to the same level as if the top and bottom flanges were merely latticed together. The writer believes, that in house-work at least, it can and should be safely included, particularly as it does not greatly affect the final result anyhow. In box girders the two webs should be considered as one web of thickness equal to the sum of the two; except when calculating for buckling, when, of course, each web is taken separately.

Table XLII gives the value of the four angle-irons, for six different sizes of angles, and Table XLIII the value of each inch of effective width of flange. In all of the Tables the horizontal column of figures at the top indicates the length of span of girder, in feet; the vertical columns of figures to the left indicate the respective values in tons (of 2000 pounds each); while the figures on the curves indicate the depth of web of the plate girder.

The tables are calculated for a safe modulus of rupture ($\frac{k}{f}$) or extreme fibre strain of 12000 pounds per square inch, and intended, of course, for wrought-iron.

For those desiring to use a smaller or greater strain it will only be necessary to increase or reduce the actual load (respectively) in the calculation. Thus, if it is desired to use a fibre strain of 15000 pounds, this will be one-quarter more than allowed for in Tables. We therefore use but four-fifths of our load in the calculation and find by the Tables, what sized girder will safely carry four-fifths of our load with an extreme fibre strain of 12000 pounds. When we then add one-fifth of the original load (or a quarter additional to the calculated load) it will, of course, add also one-quarter or 3000 pounds to the extreme fibre strain. Or, we wish to use an extreme fibre strain, of only 10000 pounds. We add one-fifth to our load making it $\frac{4}{5}$ (or one and one-fifth) and find from Tables the size of plate girder to carry this increased load at 12000 pounds fibre strain; when now we deduct one-fifth of the original load (or one-sixth of the calculated load), we will, of course, at the same time diminish our extreme fibre strain one-sixth to 10000 pounds.

The use of the Tables is very simple and easy. For loads other than uniform, and for steel, the data at bottom of Table XLI shows their respective values as compared to those given in Tables.

It should be noted that the "greatest deflection" has been calculated for the most perfect work. For ordinary work this deflection will be increased, according to the quality of the workmanship, to one-half more than for perfect work.

In using the Tables, first settle the size of web, then of the angles, and finally the size of flange plates.

Example I.

Designing girders by Tables. We will suppose that we have a wrought-iron plate girder of 60 feet span, which is to carry a uniform load of $89\frac{1}{2}$ tons and two loads of $44\frac{1}{2}$ tons each, one concentrated near each end, and one quarter span from reactions. We are to use a web 36" deep and flange 21" wide. Design the girder parts by use of Tables.

From the arrangement of loads W_m and W_r (at bottom of Table XLI) we see their sum is equal to a uniform load, or

$$44\frac{1}{2} + 44\frac{1}{2} = 89\frac{1}{2}$$

that is, our two concentrated loads will have the same effect on the girder as a uniform load of $89\frac{1}{2}$ tons; our total load on the girder, therefore, will be equal to $178\frac{1}{2}$ tons uniform load, which we will assume includes the weight of the girder itself. We will decide to use four 6" x 6" x $\frac{3}{4}$ " angles, as the loads are very heavy, and $\frac{1}{2}$ " rivets throughout.

We now settle the thickness b of web, from formula given in right-hand corner of Table XLI, namely:

$$b = \frac{U}{8 \cdot d} = \frac{178\frac{1}{2}}{8 \cdot 36} = 0.621$$

or, say, web should be $\frac{5}{8}$ " thick.

¹ Continued from No. 753, page 131.

We now find the value of web in resisting the bending-moment from Table XLI. Pass down the vertical span line marked 60' 0" till we strike the curve marked 36", this is two-thirds way between the horizontal lines marked on the left—in the $\frac{1}{2}$ " thick vertical column, the second from left—7,5 and 10,0 respectively, or our web would safely carry about 9 tons. We next take Table XLII, remembering that we selected the 6" x 6" x $\frac{1}{2}$ " angles, the values for which are in the extreme left column.

We again pass down the 60' 0" vertical line till we strike the 36" curve, which is a little more than half-way between the horizontal lines marked in the extreme left—(6" x 6" x $\frac{1}{2}$ ")—column 28,2 and 32,9 respectively; or, our four angles together will take care of about 30 $\frac{1}{2}$ tons, this added to the web value (9 tons) makes 39 $\frac{1}{2}$ tons of the 178 $\frac{1}{2}$ tons to be cared for, or a balance of 139 tons to come on the flange.

The flange is to be 21" wide, from this we must deduct the two $\frac{1}{2}$ " rivet holes,¹ or our effective width of flange would be = 19 $\frac{1}{2}$ ", therefore each inch must carry

$$\frac{139}{19\frac{1}{2}} = 7,22 \text{ tons.}$$

We now take Table XLIII, pass down the 60' 0" vertical line till we strike the curve 36" and then pass to the left to find the above value 7,22 tons. We strike the curve on the fifth horizontal line from the top and passing to the left find that we cannot find any such value as 7,22 tons, in other words the flange will have to be thicker than two inches. The value of 2" we find is 4,8 tons, leaving us 7,22—4,8=2,42 tons to care for in addition to the 2" thickness; this, we find (still on the fifth horizontal line) is under the thickness marked 1 or our flanges will have to be exactly 3" thick at the centre of girder.

In regard to the web, should we decide to make a box girder, each web should be at least one-half the calculated thickness or $\frac{1}{8}$ " thick.

SOME SOUTHERN CAPITOLS.—I.

MISSISSIPPI'S CAPITOL.

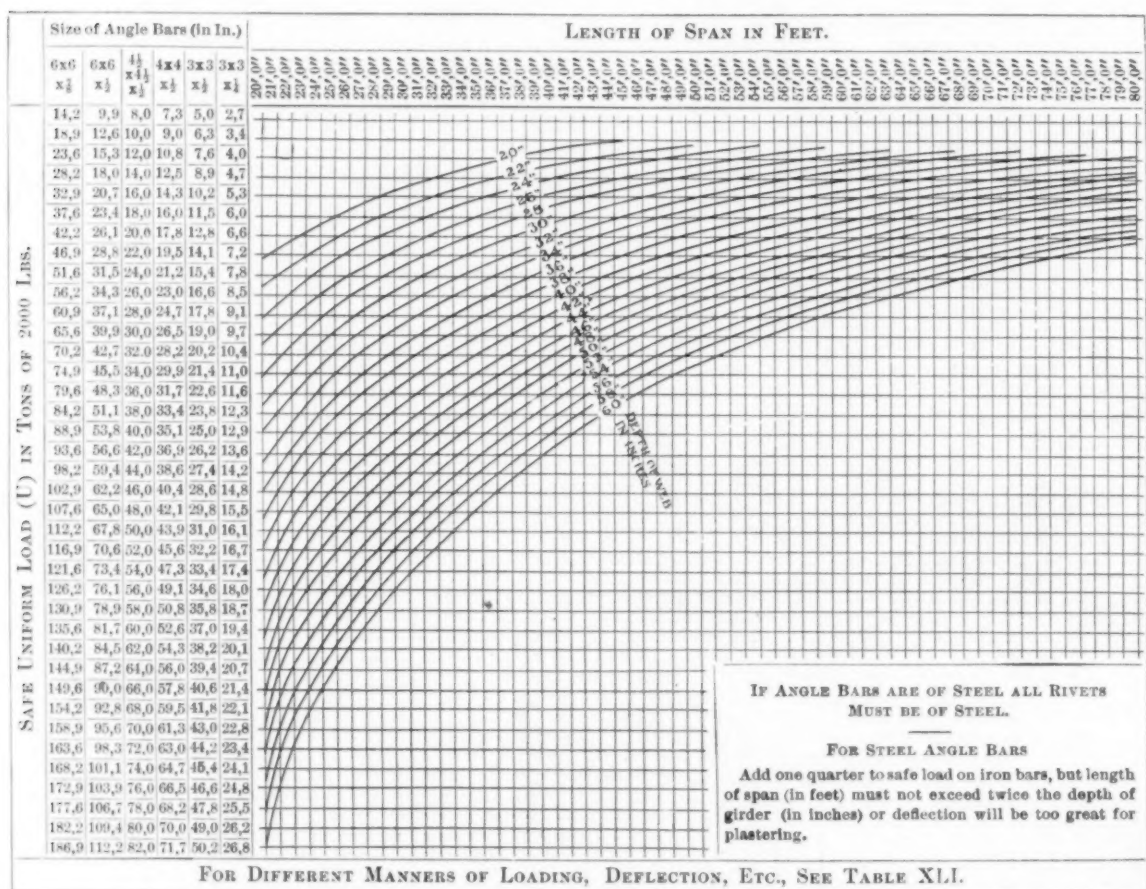


The State-house at Jackson, Miss.

AS time effaces the horrible scars with which the Southern States emerged from the great civil conflict twenty-five years ago, and as the States turn to account the sources of wealth which were undiscovered before the war, the demand for architects to beautify the Southern cities will be increased. Already there has

TABLE XLII.

WROUGHT IRON RIVETED GIRDERS.—STRENGTH OF THE ANGLE BARS.



"old colonial" is attracting the attention of the architects of the North and its many admirable features are gaining favor for it among Northern home builders, is perhaps suggestive of a train of thought, which, if pursued, might turn this paper into a screed on the restlessness of popular taste.

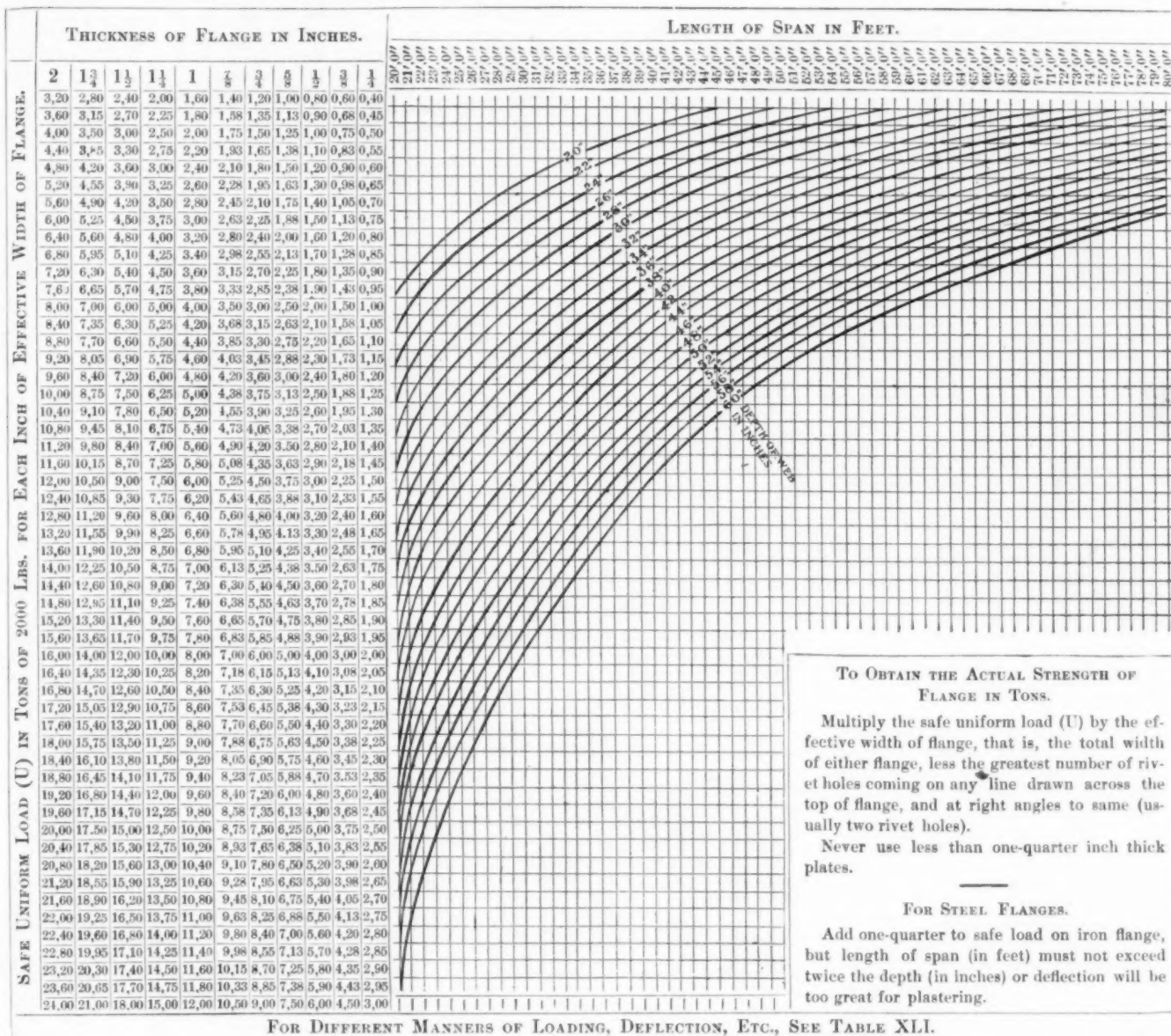
Attention to private architecture must lead to an increased interest in public buildings. Already this is being exemplified throughout the South. There are several reasons why county pride awakens earlier and develops faster than State pride. There are also several reasons why the county is better able than the State to carry out its plans for public improvement. Thus is to be explained what may be noticed by the Southern tourist: new court-houses, jails and other county buildings, all of modern designs, rising all over the

were worth preserving, and are still adapted to their needs. Poverty has held the other States back until now. But with returning prosperity we may expect ere long to see other new capitols rising in the South. When the movement gets fairly under way doubtless the country will look to the South to find the handsomest specimens of State architecture. Architects everywhere will look with interest upon such a renaissance. It will not be unprofitable for them now to take a survey of the field of this future architectural activity and watch patiently for the first signs of its appearing.

Mississippi furnishes an illustration of a rather discouraging phase of this subject. The need of a new State-house must be apparent to the most casual visitor at Jackson, the capital city. It is a city of between five and ten thousand inhabitants. Evidences abound of

TABLE XLIII.

WROUGHT IRON RIVETED GIRDERS.—STRENGTH OF FLANGES.



South, while at the various State capitals the tendency is to adhere to the ante-bellum structure in which the State has transacted its business from the start.

But the architectural impetus apparent throughout the South must be sufficient to impel itself eventually into the State capitals. A people who fought so long and so nobly for State rights will not be found deficient in State pride. And State pride is sure to find its expression sooner or later in the erection of an official habitation for the commonwealth conforming in dignity to the high idea the Southern people have of the State.

The movement has begun. Georgia found its opportunity when, after the war it selected a new capital city and began *de novo* the work of supplying itself with public buildings. "The Lone Star" State has made an effort to eclipse even the National Capitol, in the structure it has recently completed in Austin. Some of the other States were fortunate in preserving, through the war, capitols which

wealth, taste and a recent impetus given to building. It is a beautiful residential place. The residents are by no means deficient in local pride, but it is manifest that their local pride is not based upon their possession of the commonwealth's capitol.

In exhibiting their city to visitors they recommend other State buildings upon the same broad avenue—the State Lunatic Asylum, the State Deaf and Dumb Institution, the Institution of Learning for the Blind, and even the State Penitentiary—but they are inclined to be apologetic in regard to the capitol. Legislators whom one may meet in Jackson are not anxious to exhibit the scene of their legislative exploits. And the governor being provided by the State with a substantial residence in the old colonial style, recently refitted at an expense of four thousand dollars, doubtless takes more pride in that than in the larger and more important building in which he is interested.

The location of the present capitol could scarcely be surpassed.

It is at the head of a busy thoroughfare leading from the hotels and union depot, and at the summit of a slope sufficiently high to make it a prominent object from any point of view within the city. But the building itself is not prepossessing. It is of a thoroughly conventional type, with dome, rotunda, portico, pediment and columns. In size it suggests scarcely more than the court-house of an ordinary county town. Substantially built in its day it has had to submit to the disintegrating process which time inflicts upon all buildings. War has ragged about it also, but the defacement of its stucco ornamentation, and the wide cracks which appear in the interior walls denote, not the ravages of war, but neglect and attendant decay. It is not suggestive of any interesting history so that it need be preserved on that account. The only suggestion it has to make is that it has served its time, faithfully, let us hope, and that it should now give place to the fulfillment of some architect's dream.

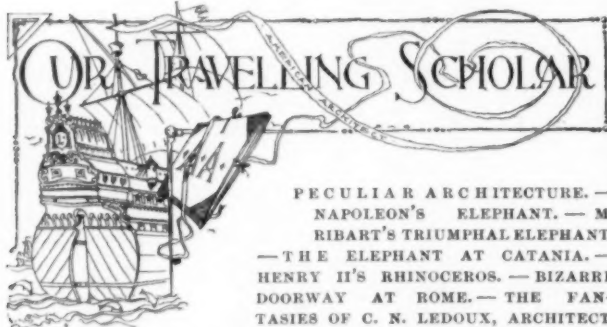
Upon the grounds stand the foundation of a monument to the memory of the Confederate dead. This has been the undertaking of a Monumental Association, composed of ladies. The State recently appropriated \$10,000 towards the completion of the monument, and the work is now being carried rapidly forward.

For several years the question of building a suitable capitol has been agitated by members of the State government, and it cannot fail to be instructive to consider some of the causes of failure to carry through such a scheme of apparent necessity. Said a legislator to the writer recently, "We are farther from building a new State-house to-day than we were when the matter was first proposed." This does not sound encouraging, it must be admitted. But Mississippi, though slow in recuperating after the war, will not long consent to having the other States outstrip her in the progressive march. Mississippi has suffered from something which every Mississippian will tell you was worse than the war, viz: reconstruction. There are certain terms used here that no Northern man can understand until he has lived here awhile, and then he will not only understand what "radical rule" and "negro domination" mean, but also why the reconstruction period was such a dark passage in the history—the unwritten history—of the State, and why Mississippi has been so slow in recovering from the effects of the war. Her day of prosperity is but just now dawning, and this prosperity is destined some day to exhibit itself in a new and beautiful State capitol, despite the gloomy predictions of the legislator.

But another reason is to be assigned for the perpetuation of the relic of ante-bellum contentedness known as the State capitol. Mississippi is essentially an agricultural State, and the Farmer's Alliance is a political power in the State. The ante-bellum planter was usually a gentleman of culture, taste and generous habits. Not so the average Alliance man. And this political power is opposed to public improvements which do not make immediate returns with interest to the people of the amounts expended therein. A biennial legislature is the result of Alliance legislation, and there is a prospect that this will be changed in time to a session once in four years. Such a policy is, of course, destructive of real progress. But despite these drawbacks Mississippi is bound to advance. Her debt has been reduced \$10,000,000 since 1875, and is now only \$3,000,000. She is developing her resources, and living within her means. And being proud of her prosperity, she will some time throw off the trammels of Alliance parsimony, and give free rein to the refined ideas which characterize the better class of Mississippians.

ARTHUR HOWARD NOLL.

[To be continued.]



OUR TRAVELLING SCHOLAR

PECULIAR ARCHITECTURE. —
 NAPOLEON'S ELEPHANT. — M.
 RIBART'S TRIUMPHAL ELEPHANT.
 — THE ELEPHANT AT CATANIA.
 — HENRY II'S RHINOCEROS. — BIZARRE
 DOORWAY AT ROME. — THE FANTASIES
 OF C. N. LEDOUX, ARCHITECT.

"THERE is no city in the world which offers so many amusements to the passing stranger or the resident, as Paris: so says the world. The rich, the poor, the high, the lowly, the man of learning, the man of the world, each can draw his share from an over-abundance of material and find therein amusement or instruction for months and years. Let me add one item to the long list of amusements of the guide-books and let me mark it with a double star, for I know of no way in which an afternoon can be spent more pleasantly or more satisfactorily than in the manner I am about to suggest, that is, among the book-stalls that line the left bank of the Seine, commencing at the Pont Neuf, and extending way beyond the Pont du Carrousel. Under the shady trees, amidst an atmosphere of learning and comparative quiet, seldom broken by anything but one of the forty thousand cabs and the ploughing of the steamboats in the waters of the Seine flowing below, these vendors of

second-hand books have taken up their stations from whence they distribute literature for the multitude, for the shop-girl, for the student of the Sorbonne. On the low parapet-wall in small boxes and portfolios they display their tempting wares which attract the passer-by, who oft, uninclined as at first he may be, stops and reads until seconds pass into minutes and minutes into hours. The promenade is so pleasant, the surroundings are so serene and calm and full of rest and yet of life, with the motley crowd passing to and fro in a never ending stream over the bridges and going — who knows where! Opposite, the Louvre and the garden of the Tuileries, and glancing up the river we see majestic Notre Dame, behind which as we know is the morgue — also full of rest. Wherever we look, up the river or down it, to the east or to the west the eye alights on something which in its beauty makes us unwilling to remove it. And in the boxes, what an array to make the eyes of a book-worm glow: Greek, Latin, English, French, German, Italian, Russian books, we find thrown together in one dusty heap. Old manuscripts, old portraits and older prints, sketches, coins and stamps, are there, and, in fact, so is everything else one can dream of. Here are guide-books from Algeria, from the Rocky Mountains and from the Holy Land; in the same box the familiar covers of the *Century* and *Harper's* appear together with magazines from St. Petersburg, Rome, Milan, London, Edinburgh, Berlin and Vienna. All are there awaiting purchasers, and they find them.

Here in the ten-franc box is a rare book with the autograph of a baron on the fly-leaf. Perhaps his valet stole it and with the proceeds of this business transaction had a glorious time in the country last Sunday. Perhaps he didn't. Perhaps the baron himself put it there, having had plebian needs but no plebian money. There in the adjacent box is the "Traveller's Manual of Conversation" and some "Baedekers," very likely placed



there by some unlucky tourist whose "check didn't come," and having had more need for gold than conversation — one language being quite rich enough to considerably lessen his chances of continuing in a state of agreeable existence after he had shuffled off his mortal coil — decided to have the gold. Yonder is "Appleton's Guide to New York." What is that doing here? Everything, we can find here, from Todhunter's Algebra to Zola's latest, from Dumas's to the trashy yellow-covered. In the midst of all, there lies a heap of back numbers of the *Magasin Pittoresque*. Selecting one and opening it, our eye alights on the picture of, and the words "Napoleon's Elephant."

Those who have visited Paris, and even those who have not, will, of course, remember the historical Place of the Bastille. Where stood this grim old prison? "With its massive walls, ten feet in thickness, and its eight heavy, sombre towers, it rose just at the entrance of the city; and the cannon on its battlements commanded the adjoining suburb of St. Antoine, the quarter occupied by the artisan classes. It formed the standing cognizance of despotic power under the old monarchy, and presented a formidable barrier to the advancing tide of the Revolution. Ere long, therefore, the popular desire for independence, coinciding with the designs of the demagogues, raised the cry, which speedily resounded throughout the whole of Paris — 'Down with the Bastille!' Notwithstanding the moats, the walls and the guns with which the castle was defended, the execution of the scheme presented no great difficulty. The garrison consisted of 138 men, one-third of whom were 'Invalides'; their provisions consisted of a couple of sacks of flour; they were unable to prevent the stoppage of their supply of water, and all hope of aid from without was cut off. From the suburbs an interminable multitude of armed men converged towards the entrance, and from the city came several companies of the regiments which had gone over to the Revolution, headed by the French Guards. De Launay, the commandant, however, refused to capitulate, and the struggle began. A number of the citizens, with reckless bravery, succeeded in cutting the chains of the drawbridge, and the first court of the castle was speedily taken; but to the excessive exasperation of the assailants their attack on the second court was repulsed with great loss. The courage of the

garrison was now exhausted. The Invalides desired to capitulate, and De Launay, who had been prevented by his officers from blowing up the castle and its inmates, let down the second bridge on being promised a free retreat. The victorious crowd immediately poured into the ancient building, some of them enthusiastic in the cause of liberty, others bent on murder and destruction. The lives of the garrison were now in great jeopardy. The French Guards succeeded with difficulty in saving the common soldiers, but De Launay, and his officers, in spite of the long and heroic attempts of the leaders of the populace to protect them, were slain, and their heads cut off as 'trophies.'¹

Here in the centre of this place now stands the Column of July. Even casual observers have, perhaps, been struck by the over-large



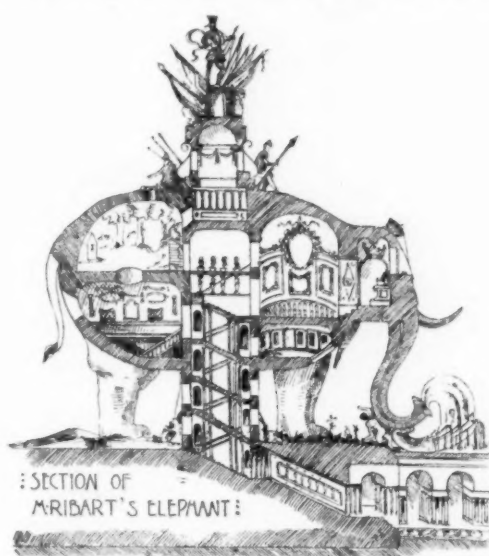
size of the platform upon which it stands. The reason of this fact is that this member was first designed to give place for the statue of an elephant, upon the description of which we are about to enter. At first, however let us devote a few lines in following up the history of the monument as we have done of the place upon which it stands and the Bastille.

A model of this prison (the Bastille), by the way, is yet preserved and can be seen at the Musée Carnavalet at Paris, together with numerous pictures illustrating scenes from the revolutionary years of 1789, 1830 and 1848 and also a goodly number of objects connected with the same epochs of French history. This model is one of the eighty-three made by the mason Palloy, who was entrusted with the demolition of the Bastille, and who after having selected eighty-three of the best blocks from the ancient prison, made from them exact models of the building from which they were taken and presented them to the various departments of France, after having had the following inscription put upon them: "*Modèle de la Bastille prise et démolie le 14 Juillet 1789 par les citoyens de Paris; adressé au département de — par le patriot Palloy.*"² The one presented to the Department of the Seine is to be found in the museum already spoken of.

After the demolition of the building had been accomplished immediate steps were taken towards laying out the now empty space in the shape of a park or place, and we learn that to this effect the National Assembly issued a decree in June, 1792. Probably very little was done towards beautifying the square; for in 1803 Napoleon took the matter in hand and intended to erect several fountains and the elephant of which we speak. Indeed he first intended to erect here the Arc de Triomphe de l'Étoile, the largest triumphal arch in the world. But upon the recommendation of the Academy of Fine Arts it was put where it now stands, in the middle of the square bearing the same name, at the junction of a large number of streets radiating like the points of a star and penetrating Paris in all directions. Four years after Napoleon's coronation the corner-stone of the base of a monument, a fountain to be cast from captured Spanish cannon, was laid. This fountain was never completed and after the death of M. Célurier, his former inspector and superintendent, M. Alavoine, succeeded him in the capacity of architect of this monument and it is to him that we owe the creation of that monumental elephant which, in his day, caused quite a sensation. It was not, however, until he had made fourteen designs, in which the figure of an elephant did not enter as a *motif*, that he finally hit upon a scheme which seemed to satisfy the committee in charge. But even after that the progress of the model was seriously impeded and at

times the work was wholly abandoned. But to the triumph of its creator, it was at last ready to be exhibited before a wondering public. It is from this model, or rather from an old wood-cut representing this model, that our sketch is taken. This gorgeous elephantine fashion-plate, bedecked with all the finery ever invented for the use of civilized or uncivilized man, woman or child, from the ten-pound bracelets which encircle his feet and the Indian-club-like ear-rings, to the tassels and other ornaments from the hand of the imperial *passementier*, however, never took any more serious form.

Had this glorious bit of elegance been created in these days, perhaps we would have seen a more dignified and refined specimen of the race with less of the servant-girl appearance about him, the jewelry of course he ought to have, but he ought not display it in such a



reckless manner; he might keep it locked up in his trunk, excepting on fête days, when he might exhibit it to the country-cousins. Also, instead of the four heavy bracelets he would perhaps only be supplied with one narrow, delicate gold ring which he could coquettishly display on one of his feet, leaving the others as nature made them, rich in the charms of simplicity, and showing that although he could afford bracelets he didn't need them to enhance his loveliness. The sex of a monumental elephant being of little consequence, we might bedeck him with the choicest bits from the wardrobes of both man and woman.

The model of this elephant, with a frame-work of wood and iron and a covering of plaster, was 30 feet long and 45 feet high, the latter dimension including the howdah on top. In this was to be placed a pumping-engine by means of which the fountains below could be fed. This chamber could be reached by ascending a spiral staircase placed in one of the legs.

As has already been intimated, this scheme was entirely abandoned, and on this platform was placed the Column of July, commemorating the events of the years 1789 and 1830. M. Alavoine, to whose unfinished task M. L. J. Duc succeeded, was also the designer of this monument, an immense column of bronze, too well-known to necessitate any description.

As there is "nothing new under the sun," so we may be justified in looking back to see whether or no there was any precedent for this singular elephantine monument. And we find it in a quarto volume consisting of a few pages of text accompanied by several illustrations written in the year 1758 by M. Ribart, and bearing the title, "*Architecture singulière: l'Éléphant triomphal, grand Kiosque, à la gloire du Roi.*" "I have designed this *Kiosque*," says the author, "to be erected to the glory of the king."³ It is to be placed upon a rise of ground in front of one of his palaces, or it can be put in a position closing the view up one of the grand streets; for example, in the middle of the Champs Elysées in the *etoile*, which can be enlarged for its reception; it will thus agreeably terminate the view from the Tuileries.

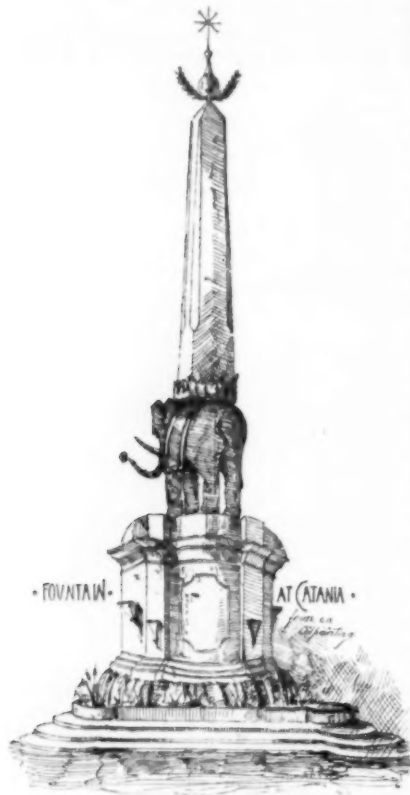
"This monument represents an elephant just returning home from victorious fields of conquest bedecked as fits the occasion, and covered with trophies from the vanquished enemies. He bears upon his back a kind of tower, which, however, might be replaced by a statue of his majesty. He apparently quenches his thirst from the basin of a fountain, but in reality the water issues from his trunk thus forming a magnificent cascade. The elephant is to be placed on a high platform, the sides of which are pierced by arcades admitting one to the vaulted halls within, from the centre of which rises a grand but simple staircase. In one simple flight it leads to the first landing from whence three smaller flights, located in the rustic column placed in the centre of the pedestal for that purpose, enter the body of the colossus. The walls of the hall are all to be covered with

¹ H. v. Sybel, "*Period of the Revolution.*"

² Model of the Bastille, taken and demolished on the 14 July, 1789, by the citizens of Paris; presented to the Department — by the patriot Palloy.

³ Louis XV.

memorial tables, inscriptions and trophies. Ascending and leaving the hall, we first enter an apartment fitted up to be used as a bath-room. Opposite are the kitchens, ante-chambers, offices, etc. Ascending another flight and turning towards the head of the animal, we enter a spacious amphitheatre, opening off of which are two alcoves. The one in the head contains a magnificent throne. This hall can be used for giving balls, theatrical performances, and as a general assembly-room. Crossing the hall we enter a magnificent dining-room (the rounded ceiling formed by the animal's back is



taken advantage of in a most admirable manner), which when completed will have the appearance of a forest. Trees, rocks and grottos will cover the walls, and vines clinging to the ceiling will hide it. A brook flows around the hall, and in several small cascades reaches the floor, from which also ascends a winding path from whence one can, looking through the limbs and tree-tops, soothed by the rippling of the waters, survey the scene. This water, after having passed out of the hall, can be used below, either in the bath-rooms or to feed the fountain.

"From the hall, we can, by means of a staircase, go up to the back of the animal and also to a small room *à la Italienne*, to be used as a card-room. The winding path in the dining-room also enters this room. The elephant's back

will furnish an admirable promenade. Above all this, in a recumbent position, is a winged lion, upon whose wings stands a statue of the king, the crowning figure of the whole."

The author then speaks of a small chamber in the shape of a paraboloid, which is to be placed on the back of the animal and, opening into the amphitheatre, is in some way to distribute the sound of the music, playing in the latter place, throughout the elephant. My impression is that this device would fail singularly in its object, for although a paraboloid reflects sound it gathers it rather than distributes it. For, after striking this form the waves will issue forth in parallel lines. It has not been untried to place vessels of this shape behind public speakers: directly in front all was well, and the voice could be heard with remarkable distinctness, but out of this line the sound was entirely lost.

"At Catania in Sicily, which a French writer describes as one of the most beautiful cities in this region, and indeed in Europe, at the same time as lying in an

unfortunate position, having been twice almost entirely destroyed—once, in 1669, through an eruption of Mt. Etna, and again in 1693 by an earthquake," he continues, "in the centre of the *Piazza del Duomo* stands a monument singular enough to merit description, and also by reason of its age and the vicissitudes which have befallen it. It consists of an elephant of lava, upon whose back stands an obelisk of red Egyptian granite, placed upon a pedestal around which is the basin of the fountain, of which the group forms the central feature. By some the elephant as well as the obelisk are held to be of very high antiquity. When in 1738, in honor of Charles de Bourbon, king of the two Sicilies, steps were taken towards its re-erection, it was found amidst dirt and rubbish, the accumulation of many years, with legs and the trunk broken. The architects at this time encased it in a coat of white marble upon which the arms of the city were engraved. The obelisk is octagonal in form, thus differing from



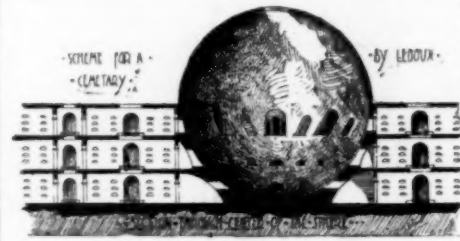
The House of Salvatore Rosa, Rome.

those of Egypt, which were always four-sided. Its height is a little over ten feet, and its sides are covered with hieroglyphical inscriptions which proclaim it of Greek origin."

While enumerating the curious flight of architects into the animal world we must not forget the temporary monument which was erected at Paris to celebrate the entry of Henri II into that city after his marriage with Catherine de' Medici. The whole city was in holiday array; flags and decorations everywhere. Arches of triumph, statues, shafts, etc., were to be seen in abundance. For example, in front of the fountain Ponceau, three statues representing the goddess of Fortune, one of gold, one of silver and the third of lead, were erected. But the most curious of them all was a rhinoceros bearing on his back a huge shaft with triangular base, the whole monument being about eighty feet high. This group stood on a pedestal nine-and-a-half feet high and was painted in imitation of porphyry and marble; each side being ornamented by the monograph of the king, the arms of France and other emblems. Directly upon this platform stood the rhinoceros, 18 feet long and 11 feet high, who was covered with bark and shells in imitation of the skin of the original. Upon the top of the shaft stood France, while its sides were covered with pictorial representations depicting scenes from the life of a Parisian. Under the feet of the rhinoceros were a lion, a wild boar, a dog, etc. This group had some symbolical meaning, which, however, now has no interest.

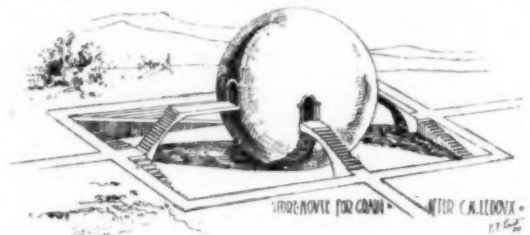
In Rome, on one of the streets near the Church of S. Trinità dei Monti, we find a most curious entrance. This house is known as that of "Salvator Rosa," and was probably erected towards the end of the eighteenth century.

When we speak of singular architecture we cannot overlook the name of C. N. Ledoux. Consulting the encyclopedia, we find that he was born in Dormans in Champagne in 1736 and that he died at Paris in 1806. He is well-known as architect of a number of the gates of Paris and during his life held many honorable positions, among which we may enumerate: inspector-general of the Salines, architect to the king, Louis XV, and to several foreign courts. Probably at this time he was the most popular architect in Paris. He was also charged with the construction of a palace at Luciennes which owing to the death of the king was never completed; for



At the height of his fame he was called to Germany where at Cassel he erected a library and was made director of the public works by the Landgrave of Hesse-Cassel; to Switzerland where, at Neuchâtel, he erected the town-hall. All over France his services were demanded. Thus, at Toulouse, a theatre was built from his plans, at Aix, the palace of Justice, the prisons, etc. His wonderful activity and the phenomenal fruitfulness which he had already exhibited in his youth continued through this period. He planned with untiring assiduity castles, churches, public-halls, bridges and every conceivable kind of a building, and proposed to lay out, on a new plan, an entire city.

Of the family of this remarkable man we know but little; he entered while very young the office of M. Blondel, a nephew of the celebrated, or notorious, architect of the Porte St. Denis, which, by the way, has been the standing butt of bad jokes and the object of sallies of wit from the mouths of all who are truly Parisian, for many years. What the Beaux-Arts student in criticising at the exhibitions would do without his "*comme la porte St. Denis*" is hard to be imagined. Ledoux here distinguished himself by his many talents, his vivid imagination and originality, and drew much attention upon himself by his many designs, which were original as they were bold. He was an ardent student of the classics and a great admirer of Servandoni, the Italian architect, whose designs he studied with the greatest enthusiasm. It is not to be wondered at, that in view of his talents, the variety of his projects which was proof of his prodigious activity, that he soon became well known and found protectors among the highest. Always creating something, his mind continually filled with new plans, in his reckless haste and activity he encountered many obstacles which rendered his life far from happy. It is strange that a man like Ledoux should indulge in such vagaries as we shall



a similar reason a palace for Madame du Barry was abandoned. At the height of his fame he was called to Germany where at Cassel he erected a library and was made director of the public works by the Landgrave of Hesse-Cassel; to Switzerland where, at Neuchâtel, he erected the town-hall. All over France his services were demanded. Thus, at Toulouse, a theatre was built from his plans, at Aix, the palace of Justice, the prisons, etc. His wonderful activity and the phenomenal fruitfulness which he had already exhibited in his youth continued through this period. He planned with untiring assiduity castles, churches, public-halls, bridges and every conceivable kind of a building, and proposed to lay out, on a new plan, an entire city.

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hereafter describe, for, at the same time while evolving these, the designs, he made for buildings which were actually erected, were rational and of much merit, and indeed, dignified, cold and sombre in the highest degree. A contemporary wit wrote of the *portes* which he erected for the city of Paris, that they had a solemn and sad appearance as though they knew why they had been erected and wept over the share they took in the oppression of mankind.¹

In the book² which he published, and upon which he spent the greater part of his fortune, he laments: "Contrary all my life in my views to the views upon architecture now existing, I have made nothing as I should wish to have made it, and yet of those I have designed for erection even my largest works have been left uncompleted. Those of my works, which could be carried through with the haste and rapidity with which they were conceived, stand, those which would have required time in execution, and which would have contributed most towards making the labor of my life valuable, have been begun and abandoned. It seems that this nation thinks but of to-day and not of to-morrow; it is unsusceptible to all that is stable and lasting and can but live in the present and to it, its future is a blank. The soul of my occupation is, to me, dead; my life embittered. The fruits of thirty years of labor have been taken from me; a position obtained by these years and hard work have passed into sacrilegious hands. I was inspector-general of the Salines in 1771, the disfavor following upon the celebrity of 1793 does not well pay for the services I have rendered. Like Aréthuse, I am under the earth, when and how shall I leave it!"

During the Reign of Terror he was imprisoned, having been an admirer of the king and a loyal monarchist; he was, however, set at liberty. One day it was proposed to erect a house for a popular poet, an abbot. The façade had been designed in the ordinary way with windows and door in the walls. Seeing this, Ledoux broke into the following exclamations: "What! Window openings! The house of an abbot, a poet, must receive light from above. It is a temple of glory!" These words did not excite much surprise at this period and probably it would have taken but little more to carry his views into effect. Like the marble gods of Phidias the unfortunate abbot might have passed away the rest of his days receiving the light of glory only from above.

We will not enter deeply into the fantastic designs which Ledoux created, but will only take up one or two. His descriptions accompanying them are often very vague and weird and all through his writings one sees rather the pen of a romantic poet than that of the cool-headed architect. We give, in an accompanying sketch, a section of a cemetery which he devised and will attempt to repeat the words with which he describes it. Here we see the round form which he used in a number of his *projets*. The exposed hemisphere of this immense globe was to be covered with a map representing the geographical divisions of the world. Then says he: "The choice of a site for a cemetery is not a matter of indifference. It must be far removed from the habitations of man, from the vice, the noise and the strife of human existence, far removed from the scenes of joy and sorrow, in the depths of a forest amidst the strange spells of solitude and quiet. Not a noise shall enter the sacred precincts, not a wind shall blow from the outer world to disturb the rest of the dead and mar the solemnity of this abode of peace. Two staircases, massive as they are imperishable, descend to the bowels of the earth. Here, upon a landing, the living shall view the dead, shall from them learn lessons of virtue, and by the sight of them be led on towards all that is honorable. . . . Following a narrow path among the rocks we enter the hall where the religious ceremonies are held, occupying the central part of the edifice. These walls are covered with inscriptions announcing the virtues and talents of the departed and upon them the dazzling light of the heavens shall fall through the opening overhead. The architect of this edifice must be pure-minded and honorable and possessed of all the qualities which shall give him a place forever in the temple of virtue."³

We give another sketch, for a grain-storage house. This is also circular in form. "In the centre above," says he "there is a kitchen, communicating with which are chambers and living rooms. Below are the granaries and on the underside are many small windows and openings not shown on the drawing." He then gives many other designs, all of which are equally difficult to comprehend, and to understand how they can be constructed or how the arrangement can be made practical. One, in particular, is very curious, a theatre in the shape of an eye, which, at least, does not do credit to his knowledge of anatomy. We also find a drawing of a structure which he calls a *cénobie*, a house designed for six families desiring to live together, in the quiet of the woods. Another a "*pacifère*," an

asylum of atonement. Besides these we see plans very well studied and practical, which display much knowledge and talent. For example the hôtels de Montmorency, d'Halleville, de Montesquieu and d'Uzès.

All these vague schemes of Ledoux, which to day must seem absurd, met with not a little admiration in the days in which he lived.

THEO. F. LAIST.

BOOKS AND PAPERS

THE little volume¹ before us forms a supplement to Mr. Gerhard's book on "*House Drainage and Sanitary Plumbing*," published in 1882, in treating of the best methods of disposal of sewage, garbage and ashes, after they have left the building in which they have been generated, the treatment of the plumbing within the house being considered in the first publication.

The merit in both treatises consists in the simple, impartial and interesting manner in which a somewhat dry and difficult subject has been presented.

An introductory chapter defines the few technical terms contained in the body of the book, and outlines the subject matter.

Chapter I relates to the treatment of isolated country habitations, Chapter II to habitations in villages, and Chapter III to habitations in cities and towns. An appendix gives specifications, accompanied with illustrative cuts, for laying house-drains and pipe-sewers, for building a tight cesspool and for the subsurface irrigation system for a country-house. Finally, the appendix gives suggestions for a sanitary code.

In each chapter the order of treatment is the same, namely, the consideration first of garbage, and second of sewage disposal.

Mr. Gerhard is in harmony with all sanitarians in condemning percolating cesspools unreservedly. Tight cesspools with overflows are only permissible where but little water is used in the house, and where no other method of disposal is possible. He advocates, and we believe rightly, the subsurface irrigation system as the best in all cases where a suitable area is accessible for the irrigation pipes, and it is, as the author says, a matter of wonder that this method has as yet been so seldom adopted. Besides a sufficient area of suitable, absorbent and well-aerated land, it is important for the best results that the land should be thoroughly underdrained either naturally or artificially, and that the sewage should be applied intermittently to ensure its thorough aeration. Mr. Gerhard says: "The system is based upon the well-known fact that the well-aerated layers of soil next to the surface—the subsurface—possess in a high degree the power of destroying organic substances buried in them by nitrification and oxidation, aided during a part of the year by vegetation, and assisted at all times by minute organisms or bacteria. The latter play an important part in the round of changes in nature. They are, says Tyndall, 'by no means purely useless or purely mischievous in the economy of nature. They are only noxious when out of their proper place. They exercise a useful and valuable function as the burners and consumers of dead matter, animal and vegetable, reducing such matter with a rapidity otherwise unattainable to innocent carbonic acid and water. Furthermore, they are not all alike, and it is only restricted classes of them that are really dangerous to man. One difference in their habits is worthy of special reference here. Air, or rather the oxygen of the air, which is absolutely necessary to the support of the bacteria of putrefaction, is, according to Pasteur, absolutely deadly to the vibrios which provoke butyric acid fermentation.'" Mr. Gerhard lays particular stress upon the importance of laying the distribution-pipes within ten or twelve inches of the surface to ensure the aeration which is an essential condition of the effectiveness of the whole system.

The objections which are sometimes raised against the subsurface irrigation system are then considered at some length. Mr. Gerhard enumerates thirteen objections, among the most important of which are the danger of freezing in winter, the retention of a large volume of sewage in the intercepting tank, and the liability of the small irrigation-pipes to clog with paper and solid refuse involving their periodical cleansing. But all of these objections are less formidable than those applying to any other system of sewage disposal now known, and can be obviated by using care. It is indeed curious that the system should work in the colder parts of the United States in winter. But experience for many years has shown that the warmth of the sewage is sufficient to keep the ground from freezing around the pipes even in the coldest parts of the New England States.

Many other systems of sewage disposal are carefully examined. The direct discharge from the house fixtures into water-courses or the sea; the purification of the sewage by chemical treatment, by artificial filtration or by subsidence; application of the sewage either with or without partial purification by chemical or mechanical means, to the land by broad irrigation or by downward filtration.

The whole subject is treated in a masterly manner rendering it

¹ "*The Disposal of Household Wastes*," by Wm. Paul Gerhard, C. E. New York: D. Van Nostrand Company, 1890.

¹ All these *portes* are octroi stations. All eatables, etc., which are to be brought into the city are here weighed and taxed. Should a person attempt to enter with lunch enough for one meal he would be stopped and compelled to pay the tax. In Italy this tax is very common; I remember once I was stopped at a similar station at Milan for attempting to take two oranges into the city which I had purchased without the gates, where they were about one-half as dear and better than those which could have been bought on the other side not 100 feet distant.

² "*L'architecture considérée sous le rapport de l'art, des mœurs et de la législation. Ouvrage contenant des plans, élévations, coupes et vues perspectives, etc. construits ou commencés depuis 1768 jusqu'en 1789: collection qui rassemble tous les genres de bâtiments employés dans l'ordre social par Ledoux, 1804.*" A reprint of the plates without the text was put on the market in 1847 and was called "*L'architecture de C. N. Ledoux*."

³ Vitruvius tells us of the Greeks who considered these qualities the first requisites of an architect, and were very careful about employing an architect for any public edifice if there was the slightest doubt as to his morality, probity and integrity. The architects of the Romans on the contrary, at an early period at any rate, stood in little esteem, most of them being merely slaves.

extremely interesting, and accordingly even the unprofessional reader is left with a pretty clear idea of the general system appropriate for most of the problems likely to be presented in ordinary building.

A number of illustrations, taken from the author's own practice in public and private works, very greatly aid in the practical elucidation of the subject. The book will prove valuable for the professional and invaluable for the unprofessional reader.



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

THE PORTE DE STE. CROIX, BRUGES, BELGIUM.

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

IF the American anything in the shape of a fortified town has an air of unreality which is always attractive, and as there are few towns of mediæval Europe which do not possess at least the relics of fortifications he is apt to carry away with him more vivid recollections of such remains than even of more notable pieces of architecture. Our illustration shows one of the gates of the town of Bruges, one of the famous cities of the Hanseatic League, erected it is believed during the domination of the Spaniards over the Netherlands. If the town was ever surrounded with masonry walls they are now replaced with more or less non-continuous earthworks, crowned here and there with the ubiquitous windmill. But some of the gateways being more ambitious structures architecturally have been preserved and are properly classed amongst the "sights" of the town.

DUNHAM & JOHNSON'S WHOLESALE GROCERY WAREHOUSE, MINNEAPOLIS, MINN. MR. L. S. BUFFINGTON, ARCHITECT, MINNEAPOLIS, MINN.

DESIGN FOR A COUNTRY CHURCH. MESSRS. LORING & PHIPPS, ARCHITECTS, BOSTON, MASS.

MAIN FRONT OF HOUSE FOR C. OLIVER ISELIN, ESQ., PREMIUM POINT, WESTCHESTER CO., N. Y. MESSRS. STRATTON & ELLINGWOOD, ARCHITECTS, NEW YORK, N. Y.

WATER FRONT OF THE HOUSE OF C. OLIVER ISELIN, ESQ., PREMIUM POINT, WESTCHESTER CO., N. Y. MESSRS. STRATTON & ELLINGWOOD, ARCHITECTS, NEW YORK, N. Y.

HOUSE OF WM. STORRS, ESQ., PAINESVILLE, O. MR. IRWIN W. THAYER, ARCHITECT, PAINESVILLE, O.

COURT-YARD OF THE HOUSE OF MRS. CONSINO, SANTIAGO, CHILL.

[Additional Illustrations in the International Edition]

PORCH OF THE CHURCH OF ST. PAUL, LIEGE, BELGIUM.

[Gelatine Print.]

The entrances to this interesting building are very irregular, the main entrance is a galilee porch through which one enters at the western end of the north side of the nave, while the one shown in the plate faces the west on the south side of the building, a little to the rear of the western front of the nave. Besides its other features of interest this porch is noticeable because of the bit of sculpture in the roundel which represents the overthrow and conversion of Saul.

A DOORWAY AT GENOA, ITALY.

[Gelatine Print.]

This is one of a series of doorways which belong to neighboring palaces at Genoa, all of which have sculptured lintels similar in general character but varying in details, as it was necessary to introduce the arms of the owner of the building which varied in each case. In several of them the legend of St. George and the dragon is used for the central feature, armorial supporters being introduced on either side.

MUSEUM FRANCISCO-CAROLINUM, LINZ, AUSTRIA. HERREN VON ELS AND BRUNO SCHMITZ, ARCHITECTS.

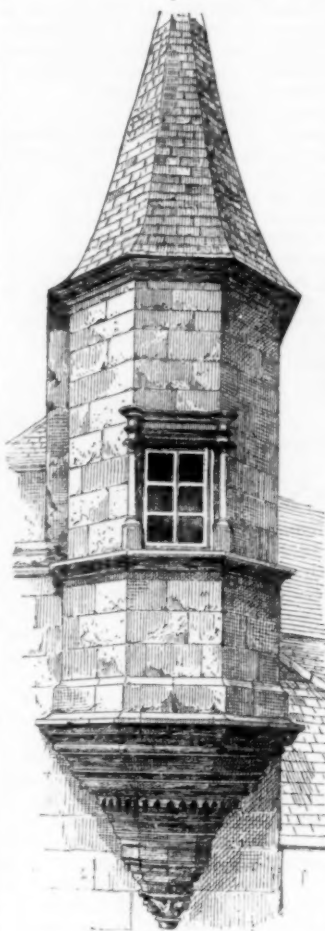
[Gelatine Print.]

SAN MINIATO AL MONTE, FLORENCE, ITALY. PLANS, SECTIONS AND DETAILS, DRAWN BY MR. R. W. SCHULTZ.

ANTWERP CATHEDRAL. DRAWN BY MR. KINGSLEY OLIPHANT.

THE JOHN BENTLEY GYMNASIUM, PURLEY, SURREY, ENG. MR. J. KINGWELL COLE, ARCHITECT.

THE SPIRE OF ULM CATHEDRAL.



"WE have just finished our four-day celebration over the completion of the cathedral, and are wondering if this can be the same sleepy Ulm that we have known for so long. Since Mack, the 'incompetent Austrian,' surrendered his 23,000 men here to Napoleon, the world has not heard of us again until now, and now that the last stone has been laid on the spire that reaches far up into the air above the narrow streets, something of the glory and dignity of the old days when this was an imperial city has returned with the pageants imitating that bygone era.

"Like the Duomo of Florence and the Dom of Cologne, the Ulm Minster remained unfinished for centuries. More than 500 years have elapsed since its first stone was laid. Begun in 1377, though the main building was completed in 1494, the work is not crowned and ended until 1890.

"The setting in place of the last stone of the spire occurred on May 31, and the lofty structure was completed at its height of 530 feet, eighteen feet above the Cologne towers and the loftiest cathedral spire in the world. The ceremonies began on Saturday last with an open-air choral festival on the Cathedral Square. The whole of Swabia (and the Swabians are not a thin folk) seemed to have crowded into the city.

There were the traditional broad, honest faces, the descendants of the wise men, grouping round the gayly-dressed stands in their national costumes, and thronging the streets from dawn until midnight. Thousands of visitors from all parts of Germany had come. The feature of the day was the procession, which depicted the life of the city from the fourteenth to the nineteenth century. In this procession, 1,500 people participated; soldiers, heralds and townspeople in the distinctive garb of each period ushered in the respective centuries. The first group was interesting as carrying a model of the foundation-stone and of the cathedral itself.

"The historical play acted on Monday and Tuesday may have been less interesting to strangers. The performance opened with the scene of the laying of the corner-stone of the cathedral. To the townspeople all this was spirit-stirring, and the picture given of life in Ulm in 1704 held their attention enraptured. Yet the visitors were to be pardoned if these local recollections had less charm than the entertaining and individual display of the Danube fishermen on Tuesday, and the fêtes, organ recitals, concerts and banquets which continued throughout the holidays. On Tuesday night the festivities came to an end. They were protracted till late, but the merry-making was protracted until later still—much later than the dying out of the last beams of the illumination from the cathedral tower.

"The cathedral, the glory of the town, stands in a nearly oval-shaped open space among the gray and rather sombre gabled houses. This edifice takes rank among the six finest Gothic minsters of Germany, and is, after Cologne, the largest, being 485 feet long and 200 broad. Originally three, now five aisled, it is built without transepts or side-chapels. Though completed, it is still in one sense unfinished, the brick walls having never yet received their coating of stone, which gives the exterior a very heavy appearance and brings it into strong contrast with the colossal and richly-decorated tower. The whole building, however, is now undergoing careful restoration, and it is hoped that funds will be procured to bring it to perfection.

"The tower, which is flush with the main wall and commands an extensive view of the surrounding plains and of the distant Swabian Alps, is of late Gothic of elegant and harmonious, though rich, design. In the tower hang a large number of bells, including the 'wine bell,' once rung nightly at ten o'clock for the purpose of calling the male population home from the taverns. Of the doors that conduct into the church the richest in point of decoration are those in the chief portal, with their niches for statues. But the quaintest and most fanciful is the south door, that is decorated with a

most original device, namely, a tree carved in stone, with its branches bent and lopped to form the arch. But all the doors are equally rich in symbolic carving and of great interest in respect to the light they throw on the costume and armor of the period. Gothic grotesque, together with deeper meaning, is blended in that curious mode possible only to the Gothic mind. This is specially notable in the carving that represents the revolt of the angels, a fine, dignified conception, in which is introduced the involuntarily comic element—the Almighty sweeping away the rebellious angels with a school-master's birch-rod.

"Another door bears in its tympanum a representation of the Passion; yet another of the Last Judgment. Here Christ is depicted, drawn sword in hand, sitting upon the rainbow, a conception evidently borrowed from the defunct northern gods. As in all mediæval churches, one door is decorated with the parable of the wise and foolish virgins. It was used for marriage parties, and was always known as the bride's door. A little street opposite the cathedral is still called Bride Lane.

"The first aspect of the interior is impressive from its rhythmic dignity, and, notwithstanding its heavy style of building, it produces an effect of lightness. But the glory of Ulm is its cathedral stalls. They display a wealth of luxuriant figure, flower and geometrical decoration that makes them difficult to describe. While so rich, however, no sense of overlading is ever for one moment produced. Two rows of sculptured busts decorate the wall back of the seats, while one row adorns the doors of the seats themselves.

"The first row of heads, both the largest and the most prominent, those in the doorways, are the images of enlightened heathens. Then follow the men who inspired the older Scriptures, then those who bore testimony to the Christian faith. On the north side are the men, on the south the women.

"The sculptures are all in the natural colors of the dark wood, though there are remains of blue and gold color on the canopies, indicating that these were formerly painted. — *Philadelphia Times*.

THE LATE ALBERT C. NASH.

MR. ALBERT C. NASH, architect, died at his residence on Walnut Hills, Cincinnati, July, 1890, aged 64 years. Mr. Nash died in the fullness of years, honored and beloved by all who knew him. He was a close student and observer, and was, perhaps, on scientific subjects the best posted man of any one of his brethren of that city. He was peculiar in his habits, inasmuch as it has been his custom for years to work until about three o'clock in the morning and then, after taking a few hours' sleep, he would visit his buildings and about noon each day would find him at his office. To the study of his plans he gave his personal attention and even in the preparation of his sketches he had a manner peculiar to himself, for he nearly always made the preliminary sketches on paper that had been ruled by light blue lines into quarter-inch squares and this paper seldom saw the T-square or the triangle, but would respond to the stroke of the architect's pencil and show forth the plan or the elevation or the perspective even, that would nearly always meet the wishes of the owner.

From an architectural standpoint, Mr. Nash was successful more in planning than in exterior or interior decoration. In his early architectural career he was led into what was then known as the "Lake Shore Style," which certainly had nothing to recommend it but its name. Like all diseases it had to run its course, and, fortunately for the profession, that course has been run, and those who were its advocates a few decades ago are out of business or, better still, are abandoning it for something better. If Mr. Nash had not got started on this unfortunate style, but instead had been rooted and grounded in the classics, he would have been one of the most powerful men of his time, for he seemed to have every faculty that fit men for those high positions that so many strive for and so few attain. He was a gentleman and a scholar. He was polite and warm-hearted, and being a ready speaker, he was always looked to to represent his brethren at any public gathering. He had a way of winning to himself all with whom he was thrown in contact. After nearly a quarter of a century of professional practice among us he passes away with his praise upon every lip. In those difficult positions that the architect is so often placed, i. e., as arbitrator between owner and builder, he carefully weighed all the facts and had a judicial mind that enabled him to quickly and rightly arrive at a decision and when his mind was thus made up, nothing could move him, and in truth his decisions were so carefully arrived at and so pleasantly rendered that they were always satisfactory and both parties felt that they had been dealt with justly.

Mr. Nash was the friend of the young architect and more than one young man just starting on his professional career owes much to Mr. Nash because of timely advice of encouragement, and even of that more substantial commodity known as a "job," for he has been known to turn these over to young men when, for some cause or other, he could not or would not (for he has been known to refuse "jobs") execute the commissions committed to his charge.

Mr. Nash had the highest sense of personal honor and uprightness. He was the very soul of honor, and while requiring of the contractor a strict account of his stewardship, he ever accorded him his just dues, and, if the contractor was entitled to an "extra" he got it, but woe betide the contractor who endeavored to shirk his

responsibilities, or who approached Mr. Nash with any proposition that had the appearance of a bribe in it. He held his own office force to a similarly strict account: he had, at one time, a superintendent who accepted a diamond stud from the contractors on a certain building (and this, too, after the building was completed) as a memento of his uniform kindness and impartiality, etc. Mr. Nash did not seem to understand how a superintendent could, conscientiously, accept a gift from those who should have been held to the letter of their contract, and so he at once discharged this superintendent.

While of late years, for reasons sufficient for himself, Mr. Nash seemed to lose interest in the Institute, yet he was an Institute man, believed in it and worked for it; and, for many years was a member and always a good one. For many years he was president of the Cincinnati Chapter A. I. A. and was seldom so professionally busy as not to be able to attend to its duties; and was a good, firm and polite presiding officer; in short, he had all those qualities that go to make a man in the fullest meaning of the word as the world understands it.

The architects of Cincinnati attended his funeral in a body, and President Samuel Hannaford appointed a committee who have reported the following memorial:

IN MEMORY OF A. C. NASH.

WHEN A. C. Nash died the architectural profession lost a good man, and we who remain desire, the best we may, to record our testimony of his worth, though the best we can do, or say, will be but a feeble testimony and will come far short of his high character.

Mr. Nash was a man of the highest integrity and honor, to do a mean or small thing was foreign to his nature; he had the highest idea not only of personal honor and uprightness, but also of professional etiquette, and no one can point to a single act of his whereby any discredit was brought upon the profession. He was always regarded as a leader among us, and his advice was not only sought but followed. To the young architect he was a true and good adviser. As arbitrator between owner and contractor he was rigid and exact, faithful to his client and just to the contractor, and his decisions were seldom appealed from. His extensive practice of more than twenty years in this city bears a record of fewest mistakes and of the greatest number of successful achievements.

In accordance, therefore, with the above sentiments, we record our heartfelt loss in the death of Mr. Nash and we recommend that this memorial be spread upon the Minutes of our Society and be published in the Architectural Journals and the daily press.

Committee Cincinnati A. I. A.

SAMUEL HANNAFORD,
JAS. W. McLAUGHLIN,
E. ANDERSON,
H. E. SITER,
CHAS. CRAFTSEY.



[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.]

THE DOME AS AN ARCH.

July 25, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Noticing that Mr. Berg in "Safe Building" treats the dome as though it were an arch, I write you asking him through your journal if he will kindly state by what process of reasoning the dome can be so treated.

Most respectfully, D.

ALEXANDRIA BAY, N. Y., July 29, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—The letter with Mr. D.'s inquiry reaches me here, where I have no copy of "Safe Building" with me, but I think it gives in a sufficiently clear manner the "process of reasoning," by which I treat a dome as an aggregation of half arch slices, very thin at their apex points, and wide at their abutments.

Very respectfully yours, LOUIS DE COFFET BERG.



A LARGE GRANITE SHAFT.—Vinal Haven, Maine, claims to have produced the largest stone ever brought to light. The Bodwell Granite Company recently quarried a shaft of granite which is the largest piece of stone ever quarried anywhere, and if erected will be the highest, largest and heaviest single piece of solid stone standing, or that ever stood, so far as any record can be found. In height it considerably exceeds any of the Egyptian obelisks. The tallest of these, which was brought from Heliopolis to Alexandria by Emperor Constantine, and afterwards taken to Rome, where it is still standing, is 105 feet 7 inches high,

while the Vinal Haven shaft is 115 feet long, 10 feet square at the base, and weighs 850 tons. It is understood that the company quarried this immense monolith for their own account, not having an order for anything of the kind, and they suggest that it would be a fitting contribution from Maine for the monument to be erected in honor of General Grant.—*N. Y. Commercial Advertiser.*

THE INSURANCE PATROL DECLINES TO PROTECT A BUILDING.—The Western Union Telegraph Company is noted for its chronic meanness, and when fire destroyed its offices last week, there was no word of sympathy to be heard in the great crowd that witnessed the burning. Sympathy there was for the employees of the "soulless corporation," but not a word for the corporation itself. On the contrary, there was considerable satisfaction expressed over the fact that the "fire-fiend" had found a way to reach a company that has persistently defied public opinion, the laws and the courts, and in its general policy takes advantage of every one whom it can bully or outrage. There have been three fires in the building, but none so serious as that of last Friday, when a loss of several hundred thousands of dollars was incurred. On a previous occasion, as soon as the alarm was sounded, the insurance patrol rushed in and covered the valuable records, papers, office-furniture, etc., with their covers, thus preventing their damage by water, and saving the Company a large sum of money. They subsequently ascertained that the Company carried no insurance, and that, consequently, they had expended time and material belonging to the insurance companies upon property not entitled to their protection. A bill for services rendered was made out by the patrol and duly presented to the Western Union Telegraph Company, but payment was most positively refused. So, last Friday morning, when the patrol responded to the alarm and found the Western Union building again on fire, they quietly folded their arms and watched the floods of water doing their work of destruction among the books and papers in the different offices without making any effort to protect them. Not a cover was spread, and no attempt made by the patrol to save the imperiled property. The Western Union not only did not insure its property, but refused to pay the patrol for previous services rendered. The insurance companies are large patrons of the Western Union, paying it many thousands of dollars annually, but it evidently is not a believer in the doctrine of reciprocity, for it pays no premiums to insurance companies. The calm indifference with which fire underwriters and the insurance patrol viewed the work of the flames was something seldom seen at a fire.—*The Spectator July 20.*

EXCAVATING IN QUICKSAND.—At a recent meeting of the New England Water-Works Association, Mr. Albert F. Noyes read the following note:

"Some years ago I had occasion to make an excavation in material known as quicksand, some 15 ft. deep, near buildings. If the excavation were made in the ordinary way, a settlement of the foundations would be likely to occur, so I adopted the following method, which in my case proved successful; and I see no reason why, under similar conditions, and in a great many cases, it could not be used to advantage. The excavation, as I have said, was about 15 ft. deep, about 60 ft. in length and 8 ft. wide. Usually below these veins of quicksand there are veins of a coarse material which form ready conductors for the water, and the vertical distance through the quicksand is usually less than the horizontal distance; the ground water has the least resistance in the vertical direction, and tends to soften and take up the quicksand with it. If the water is drawn out, or the water-level lowered below the bottom of the trench, this fine material becomes compact, very much like clay, and excavations can be easily made with perfect safety and the use of a light sheeting. In the case I refer to I used fourteen pipes 1½ inches in diameter, and these were driven equidistant about the excavation to be made, with the ordinary perforated well-point, having attached outside a fine-mesh brass screen. They were driven into a stratum of coarse material from 35 to 50 feet below the surface of the ground. The pipes were ganged together and attached to a common plunger pump, and the water was drawn down. I might state that the normal level of the ground water was within some 3 or 4 feet of the surface of the ground, so we had to draw the ground water down some 10 or 11 feet. We found by test-tubes outside of the gang that we could readily hold the water to a level, which insured the excavations being made without any difficulty whatever; in fact, the banks were dry, and the lower portion of the excavation was very firm. In this case the well-points, after we used them, were sold to other parties at nearly the first cost. The pipes, which were taken from the stock at the pipe-yard, were returned and used over again, so that there was little loss in that way; and the whole cost of driving the pipe was about \$18, so that the expense of that method was really less than sinking a well outside of the excavation in the usual manner."—*Railroad and Engineering Journal.*

A WROUGHT-IRON CHIMNEY.—The description of a wrought-iron chimney of novel design, which has recently been built at Creusot, France, is of interest. The chimney stands on a masonry foundation, extending 3 feet 3 inches above the ground, and is an iron tube 279 feet high, 23 feet in diameter at the base and 7 feet 6 inches at the top. The weight of iron is 80 tons. The shaft was built in successive rings, each 4 feet 1 inch in height, the thickness varying from 9-16 inch at the bottom to 1-4 inch at the top. The nine lower rings were formed of eight plates each, the upper ones of four plates each. The base was encircled by a massive angle-iron bolted to the foundation. The eight lower rings were lined with fire-brick. The erection of the chimney occupied 70 days, including taking down the flying scaffold. The latter was of a somewhat novel character. It consisted of a central wrought-iron tube 7 inches in diameter, and provided at the bottom with four wooden cross-bars or arms, so clamped that their length could be adjusted to suit the varying diameter of the chimney and carrying the internal platform. These arms rested on angle brackets refitted to

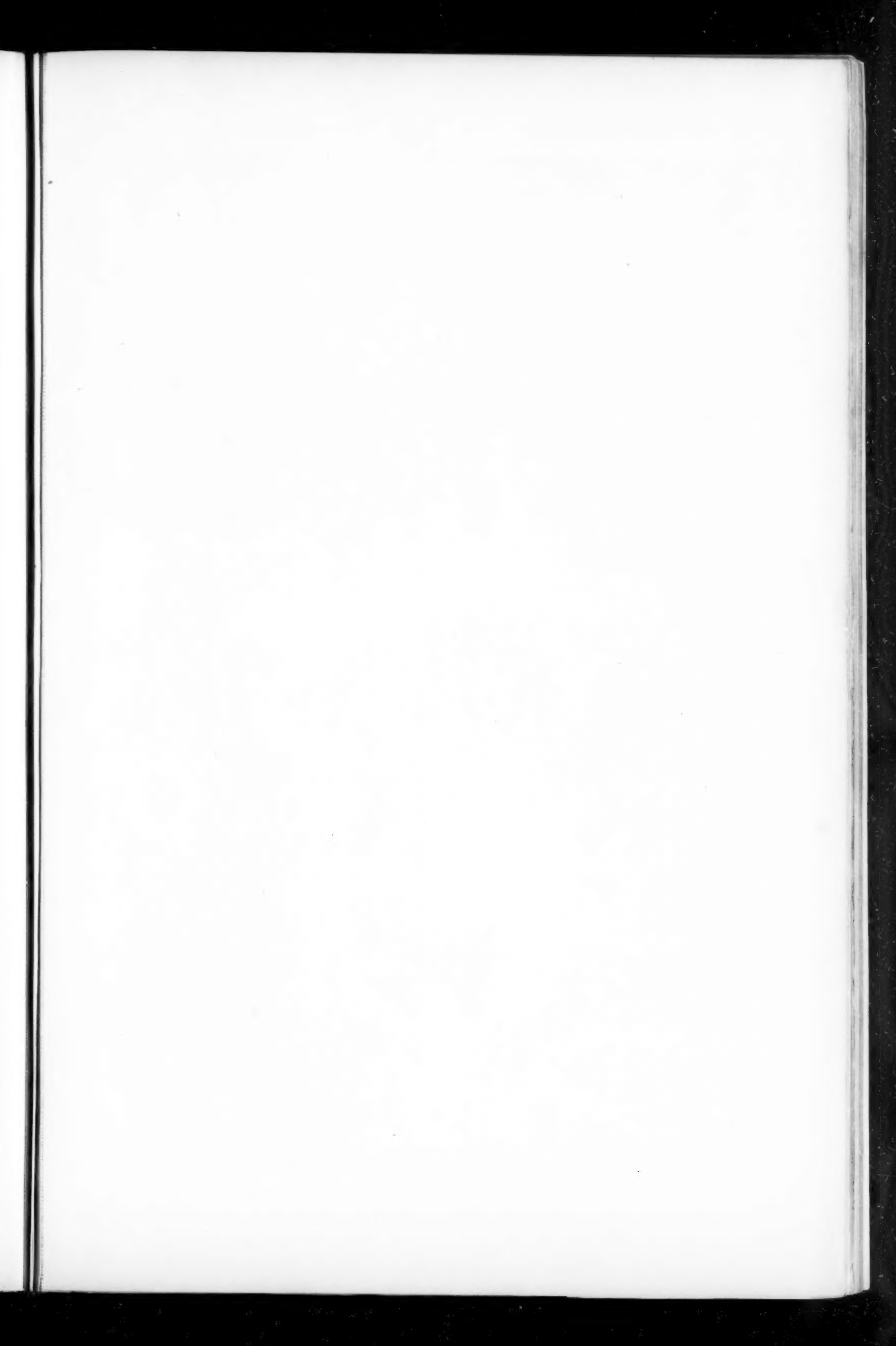
the interior of the plates. The upper part of the central tube carried four cross-arms, or jibs, each consisting of a pair of timbers stiffened by raking-struts from the central tube. From their outer ends was slung the exterior circular platform. The latter consisted of a pair of angle-iron rings, to the outer part of which was riveted a plate-iron fence, while the inner was provided with T-iron stanchions. Radial bearing timbers, resting on these rings, and adjustable endwise to suit the varying diameter of the chimney, carried the platform, an annular space being left just sufficient for hoisting the plates. The latter operation was effected by a rope passing over an adjustable pulley fixed to each jib in turn, and carried down a central tube to a snatch-block fixed at the bottom of the chimney. As each successive ring was riveted up, two pairs of bars were laid across, by which the scaffold was slung by four jack-screws furnished with ratchet collars, and thus raised high enough to take a bearing on the next set of angle braces. The complete scaffold weighed about four tons, and the heaviest plate about 900 lbs. The chimney cost about \$8,000, not including the masonry foundation.—*Railroad and Engineering Journal.*

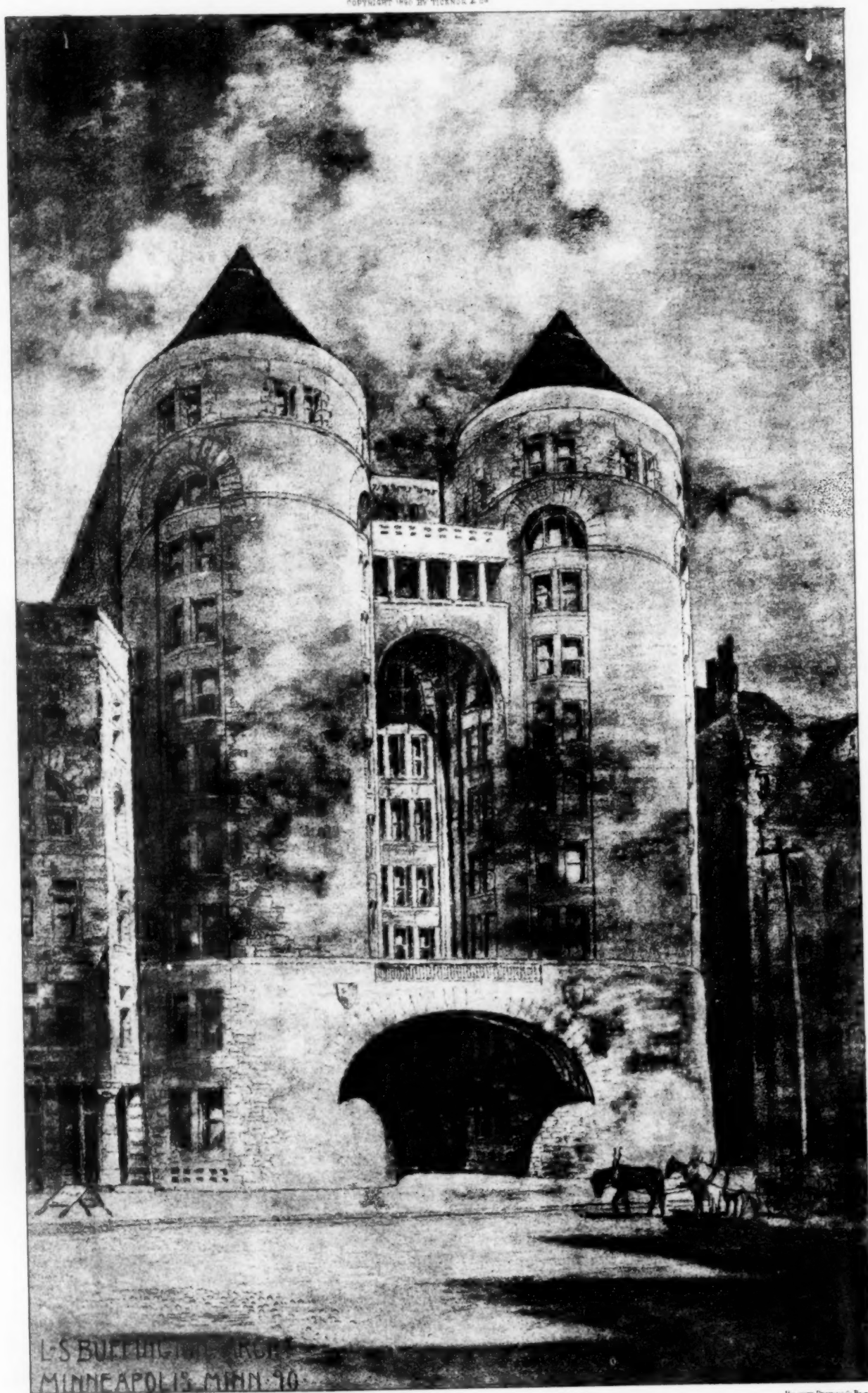
A CENTURY OF AMERICAN PATENTS.—One hundred years ago on July 31, 1790, the United States issued Patent No. 1, to Samuel Hopkins, for "making pot and pearl ashes." Only three patents were issued during the year 1790. At present the average weekly issue is about 450. During the year 1889 the aggregate number of patents issued was 23,360. The highest number attained is 433,432, in the list issued for the week ending July 20, 1890. The advance of arts and sciences in the United States is perhaps nowhere better illustrated than in the records of the United States Patent Office, as indicated by the office work of 1790, contrasted with that of 1890.—*New York Tribune.*



BUSINESS is growing in volume daily, even in midsummer at all the great coast and inland centres. Manufacturers in all directions are remarkably busy for August. Jobbers and middlemen are handling enormous quantities of freight. Bankers are once more hinting at the possibilities of an autumnal stringency of money. Railroad managers are rejoicing over the extraordinary midsummer traffic and the growing evidences of a rush of freight during the later months of the year. Builders are pushing work with vigor, and all available labor is fully employed. The exporting interests are much pleased with the orders for autumn export and at the opening up of some new markets where American exports have heretofore received but little welcome. Money-lenders have, on account of the great activity in all quarters, been able to enact a slight advance in the rate for short accommodations. It is not worth while to attempt to weigh the correctness or incorrectness of many of the opinions expressed by so-called financial authorities relative to a probable stringency, but it would be well to note the fact that those who make a business of loaning money on commercial paper are quietly anticipating what they evidently desire to come about, viz, a scarcity of money. Another matter deserving of passing notice is, that a great many persons are borrowing money to invest in lands, mineral properties and in promising manufacturing ventures: so confident are they that they will be able to pay interest out of early dividends. This is a dangerous policy, and one which is likely to check speculation. The railroad earnings, gross and net, show up well. Manufacturing corporations are almost universally paying good dividends. Cotton-mill stocks are yielding good returns, and individual enterprises North and South are paying pretty well, so well that since last June more cotton-mills have been projected in the South than were projected during the same time last year. The manufacturers of heavy and light machinery, of machines and tools and mill and shop equipments and supplies are all running full time, and many concerns are obliged to work overtime. Locomotive-builders are especially busy, and engines of great weight, power and speed are being contracted for in larger numbers than usual. Car-builders in several instances are sold up to December. Pipe-line builders are awaiting their turn for the acceptance of pipe orders, and mills making skelp for that purpose and muck-bars for general purposes are more crowded than, possibly, for years. More pipe-line for natural-gas and oil-conveying purposes is under contract than for many years. Shafting, pulleys and shop equipments are being called for to the fullest capacity of mills. With all this rush prices do not advance. Manufacturers meet, and confer and decide to let prices stand. Lumber manufacturers report a heavy and steady run of orders for all kinds of lumber, especially of material for interior finishing. Planing-mills, shingle-mills and saw-mills are all crowded. The lumber manufacturers South are enjoying an exceptionally active season, and the Northern makers of saw-mill machinery report an unusual pressure for new machinery. The textile machinery-makers are also busy on orders for work in the New England, Middle and Southern States. Money is still in abundant supply to push new enterprises. Paper-makers are particularly busy in expanding capacity, and makers of mining machinery have two to three months work under contract. Milling machinery-makers and the makers of agricultural implements have within two months loaded up with a large amount of business. While the industrial activity throughout the country is phenomenal, margins on work are rather smaller than in years past, though commercial reports do not show any material increase in failures. Business is being done more carefully. The paying-capacity of buyers is more carefully watched, and collections are made with more promptness, so say the commercial agency people. Many of the mistakes of former years are being avoided. The commercial interests are giving more attention to the possibilities of developing an export trade, and the preliminary steps taken point to the early building up of quite a valuable trade with foreign countries. The manufacturers are guarding against an accumulation of material. The builders are buying cautiously, and the makers of building material are working altogether on orders. The business men of the country feel that they are on a safe and solid foundation. Land values in the West and South are not advancing to speculative limits. Railroad construction has opened up so much land and such numberless opportunities that, for the time being, there is enough for all the capital seeking opportunities to find them at cost price.

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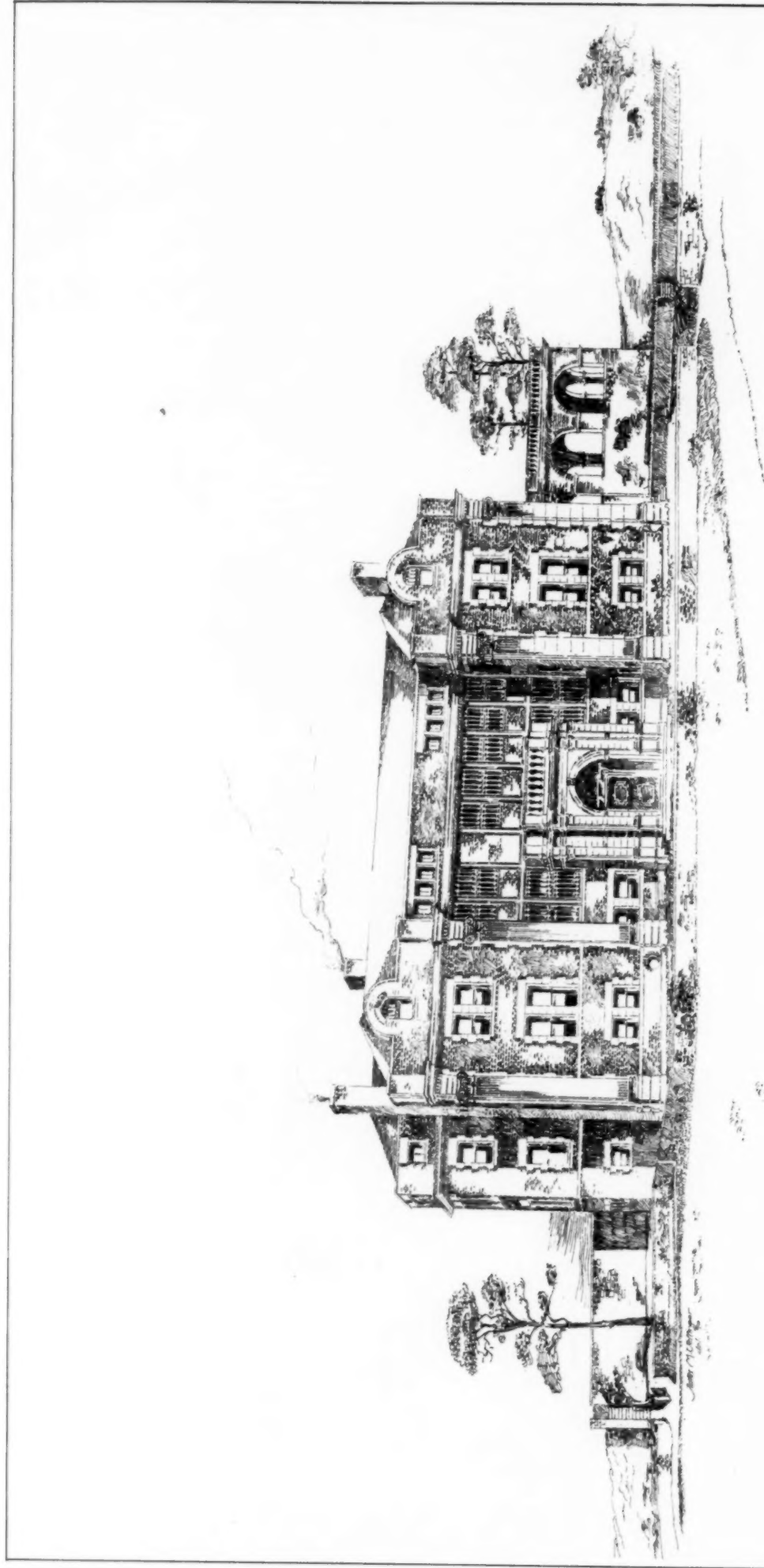
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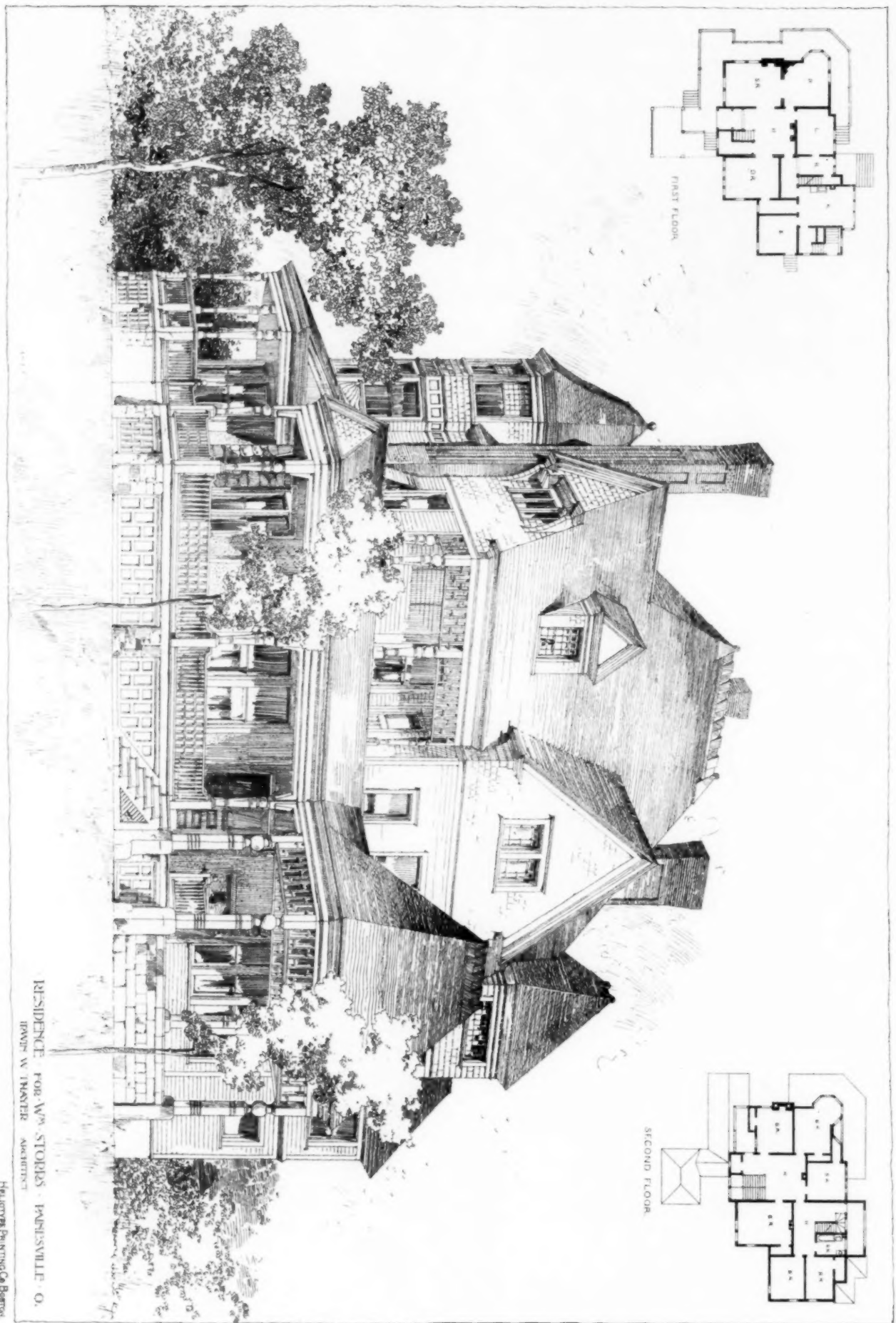


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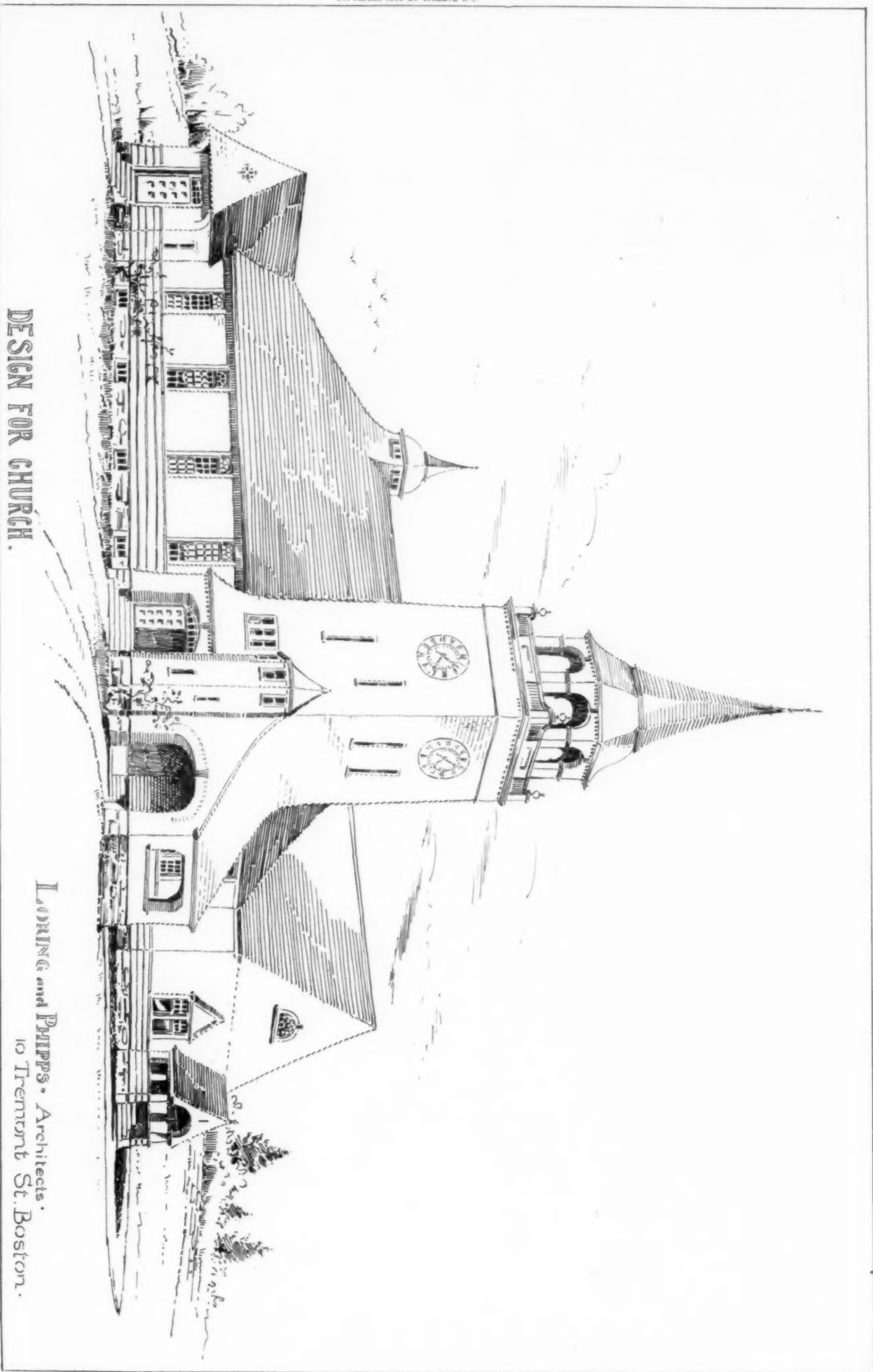
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