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MR. EDWARD ATKINSON writes to the Boston *Herald* an interesting letter in regard to the recent Federal Street fire in that city. The fire started in a large wool warehouse, and, although it was bravely fought by the firemen, it caused a destruction of about sixteen hundred thousand dollars' worth of property. As the *Herald* remarks, this is fully two-thirds of the total annual premium paid for fire-insurance by the property-owners of Boston, so that, considering the expense of carrying on the business, the underwriters have already lost all that they can afford to lose for the whole year; and, even if there should be no more fires, their Boston business at the end of 1893 will show no profit. This is, naturally, a rather unpleasant state of affairs for the insurance companies, and Mr. Atkinson, who is in a position to know about the matter, says that business is already suffering, on account of the unwillingness of underwriters to issue policies on many buildings in the business part of the city, and that another great conflagration, such as, in his opinion, is sure to occur, will induce the principal foreign companies to withdraw altogether, and will put half the native companies into bankruptcy, causing, of course, a long period of stagnation and depression. As is his way, he attributes the defenceless condition of the business portion of the town to "neglect of duty" on the part of the owners of buildings, and, to a certain extent, he is right; but, as we have so often maintained, and as even insurance-men, who used to have no epithets too virulent to apply to the architects of buildings which happened to be burned, are beginning to acknowledge, it is the insurance companies, and the insurance companies alone, which can dictate the sort of construction to be used in an entire community. So long as underwriters will insure a combustible fire-trap at nearly the same rates as a solid, conscientiously constructed building, just so long the fire-trap will be the ordinary construction, and the solid building the exception. Here and there an owner is found who, against his own interest, will try to build in such a way as not to endanger his neighbors, and architects are always the first and foremost in endeavors to secure legislation to enforce better methods of building, which the underwriters might cause to be adopted at a week's notice, if they chose, by a change in premium rates, but by which they prefer to profit quietly. Now, in the architect's view, Nemesis appears to be overtaking the insurance companies, and the practice of charging exorbitant rates on good risks, to allow policies to be placed at competitive rates on bad ones, has, naturally, diminished the number of good risks, and increased that of bad ones, until the companies appear to be on the verge of being devoured by the lath-and-furring Franksteins, the creation of which they have, at least, encouraged. As our readers

know, the complaint that the influence of the insurance companies has tended to promote bad and combustible construction is made abroad, as well as here, and it seems to be well founded. Now, however, according to Mr. Atkinson, the underwriters, in Boston, at least, seem to have been forced, for self-preservation, to take some action. We trust that they do not contemplate any such action as he suggests, that is, withdrawing from the city, or going into bankruptcy, if there should be another great fire. Of these two courses, the first would be foolish, and the second dishonest, and there is certainly something better to be done than either. To the ordinary mind, the obvious and straightforward course seems to be to charge premiums proportionate to the risk. It is not difficult to make the necessary calculations for the purpose, and, although the rates on the average Boston wool and leather warehouses, thus figured, would probably be rather startling, the effect would be to send the wool and leather merchants immediately in search of non-combustible buildings, and to set land-owners at work building such structures to meet the demand, which is exactly the result which is to be desired, and which must be secured before Boston or any of our large cities can become safer against destructive conflagrations. Mr. Atkinson, in his *Herald* letter, urges the adoption of his excellent plan of roof-hydrants, and this would, of course, be very desirable; but it is a mere detail. To meet what, we are sure, will be the demands of the near future, not merely roof pipes, but iron, brick, concrete, and terra-cotta must be the familiar features of construction for mercantile purposes. There are no architects in the world who use these materials with more skill than those of New York, Chicago and Boston, and they await only the impulse, which no one but the insurance companies can give, to provide just the degree of security against fire which the underwriters make it for the interest of owners to call for.

THE season of circulars will soon be at its height, and every busy architect has already to spend an appreciable part of each day in opening and tossing into the waste-basket a pile of documents which might have some interest for a man of leisure, but which he himself cannot spare time to read, much less to file away where he could find them again if he should ever have occasion to refer to them. It is curious to observe the simplicity with which the people who send circulars assume that no one but themselves has thought of that way of advertising. Most architects receive probably at least one huge placard every week, accompanied with a more or less peremptory request to them to "hang it in a conspicuous position in their office." As a good deal of money is often spent in the production of these objects, those who send them may be interested to know that, being easily recognizable, either by being packed in a large mailing tube, or by their brass edging, or the pink tape attached to them, or some other familiar sign, they form particularly available aliment for the waste-basket, to which they are usually consigned without opening.

IT is strange that the people who send out such things do not realize that if they were hung up in the offices, as intended, the walls of the largest office would be covered in a few months, to the exclusion of the photographs and framed drawings, of which every architect has already more than he can find room for. So with circulars. Although many come which an architect would be glad to file for future reference, it is impossible, out of the thousands which arrive every year, to preserve more than a very few, for the reason that, if a larger selection is made, the labor of turning them over to find the one wanted soon becomes so great that no use is made of them. With catalogues in book form, such as those which the great lock-companies and dealers in plumbing materials send out, the case is somewhat different. They can be put in a bookcase and found at a glance by the title on the back, and, in consequence, they are frequently consulted by architects, no doubt to the advantage of those who publish them. It is true, of course, that most manufacturers of building materials and appliances do not sell a sufficient variety of goods to make it possible for them to publish a catalogue in the form of a large bound book, but it seems as if something might be done—not only in their interest, but in that of the architects, who would be glad to have the means of finding just what they wanted at

a moment's notice, but to whom a search through several thousand circulars for a particular one is out of the question—to collect descriptions of goods of certain classes, made by different manufacturers, into books of convenient size for reference. We are afraid that we shall have to get a few years nearer the millennium before the rival manufacturers of a given class of goods will unite in placing the description of their products before the profession; yet we are sure that such a proceeding would be as much for their interest as it would be for the convenience of architects. Taking, for example, heating apparatus: in every office, during the winter and spring months, showers of circulars from the manufacturers of furnaces, boilers and radiators are consigned to the waste-basket without opening,—not because they might not be interesting, but because there are so many of them that it is useless to preserve any. The consequence is that the manufacturers of deserving novelties find their wares unnoticed, while architects generally confine themselves to a small range of furnaces and boilers with which they have become familiar. Neither side, probably, is quite satisfied with this arrangement, and it would be for the advantage of both if a substantial book could be put in the hands of architects, containing truthful representations and descriptions of all the principal furnaces, steam and hot-water boilers and radiators in the market, from which they could choose, for further investigation, if need be, the sort that appeared to them most likely to meet the conditions of particular cases. The same thing might be done with moulded bricks, tiles and similar goods, and with a great variety of other products, which could be classified without much difficulty. For goods of a more or less artistic character, half-tone process-plates, such as are sent out in great quantities by the German manufacturers, would give architects the information they would need as to style of design; and as the best designs would probably attract the most orders, a wholesome rivalry in that regard would be promoted among manufacturers.

NEXT to advertising encyclopædias of this sort, which, we must confess, we think are rather things of the future, there is no question that well-written, concise, and well-arranged advertisements in the professional journals are most desirable, both for architects and dealers. We have no wish to call attention to our own merits, and still less to make any false representations in regard to them; but it must be obvious that the more nearly the advertising pages of a professional journal resemble an abridged encyclopædia of the sort we describe, the more useful the journal is to its professional readers, as well as its advertisers. To be all that both could wish, it should furnish, in a position where it could be readily found by an index, a brief advertisement of every material, appliance and process currently used, or adapted to be used, in building, with the address to which application should be made for further information. The advertisements should be classified, so that the whole field should be spread before the inquiring reader, and everything in the market should be advertised, so that the architect could refer to his paper of the current week, with confidence that he would find somewhere in it just what he wanted. To give a single example of the advantages of such an arrangement: we had occasion a few days ago to write specifications for two buildings, both of which were to be heated by hot water, and both of which needed a large supply of hot water for baths and basins. The question was, how to get the hot-water supply for the baths. Although there were one or more small kitchens in each building, the supply which the water-front of a small range could furnish would be totally inadequate to the demand; while the ordinary resource in steam-heated buildings—a reservoir heated by a coil of brass steam-pipe—was hardly available with a hot-water heating system. We remembered having fitted up a physician's office, much to the doctor's satisfaction, with an apparatus for heating water, as it passed through the pipes, by means of a gas-flame, and it occurred to us that a similar apparatus, on a much larger scale, might answer very well the present purpose. The next thing was to find out where to procure one. The circular which described the previous one had long since disappeared, and there was nothing in the shape of an advertisement that we could find in regard to it. We wrote to New York, where an investigation was kindly made for us, which resulted in discovering and forwarding a circular from a manufacturer of such goods in England; and it was not until after much further inquiry, and considerable trouble, that we discovered the address of a manufacturer of just the apparatus we

wanted, and completed our specifications by an item calling for nearly a thousand dollars' worth of his goods. Now, as hot-water heating is increasing very rapidly in popularity, not only for private houses, but for office-buildings, apartment-houses, and hotels, and as electric elevators are also coming into extensive use for such buildings, there are already many cases, and there will soon be many more, where establishments of this kind have no occasion to use steam, and, in consequence, are deprived of the ordinary resource for heating water for baths. A hot-water coil in a reservoir could be used, but there is a great difference in heating-power between water at 180° and steam at 250°, and water circulates feebly in such coils as are usually put in for steam; so that capacious and economical gas-heaters would be likely to find a good and rapidly increasing demand, if architects could be kept informed, not by sending circulars, to be thrown unopened into the waste-basket, but by a standing and indexed advertisement, of the place where they, or further information about them, are to be had. The same is true about a great many other things. We have very frequent inquiries from people who wish to buy some material or appliance of which they have heard, but who cannot find out where or how it is to be had. In most cases, we cannot help them, and the manufacturers of the appliance or material lose in consequence not only a profitable sale but the opportunity of extending the knowledge of their goods. We imagine that a dry-goods merchant who kept the shutters up at his windows, and who contented himself with dumping descriptions of his stock into the sewers, would not build up a very thriving trade; yet this is just the policy pursued by many manufacturers, who depend almost entirely on architects for the sale of their goods, yet who oblige their would-be customers to make long inquiries and investigations to find them. In practice, the advertisements in the professional journals are the windows through which architects see the goods which they are expected to buy. It may be a long time before any individual architect has occasion to use some particular object displayed there, but, if it is there, he knows where to get it when he wants it, while, if it is not there, he generally goes without it altogether.

THE Commissioners of the Sinking Fund of New York, together with the other members of the Municipal Building Commission, have rescinded their resolution of last February, under which a site for a new City Hall was selected outside of the City Hall Park, and have determined to place the new structure in the City Hall Park, south of the Court-house, on the same ground as that occupied by the present City Hall, covering, of course, however, a much larger area. Undoubtedly, this is the best site that could be chosen, and it would probably have been occupied by the building long ago had it not been for the persistent pestering of the City Government by the State Legislature, which first authorized the construction of the building in the Park, then amended its action by ordering that it should be placed in the northeast corner; then changed its mind, and directed that it should be located "convenient to, but not in, the City Hall Park," and has now changed its mind again, and given leave to place it in the only part of the Park which is suitable for it, the large open space between the Court-house and the Post-office. There is, naturally, a strong public sentiment in favor of preserving the old City Hall, which is a well-studied, and, in its way, beautiful building, and the city authorities will probably endeavor to satisfy this sentiment. There seems to be no insuperable difficulty in making the old building form a part of the new design. If, however, this solution of the problem is adopted, it is much to be hoped that architects will be allowed to use their own judgment as to the method of accomplishing the desired result. In nearly all cases of the sort, public authorities, with the best possible intentions, handicap the architects by limiting them at the outset to a certain arrangement. Of course, this official disposition may be a good one, but it is not likely to be the only good one, or even the best; and to prevent the persons best able to propose suitable arrangements from doing so, by confining them to a fixed official plan, is to deprive the city of the assistance, in the study of its most difficult problems, of those best able to solve them with success. In great competitions abroad, architects are always allowed very great liberty in the general disposition, as well as in the details of their plans; and it often happens that some extremely novel arrangement, which would never have occurred to the official mind, proves by far the best.

THE ILE-DE-FRANCE SCHOOL OF ARCHITECTURE.¹—II.

Fig. 7. Deambulatory of Saint-Louis, Poissy.

however, it deserves careful consideration. No investigations can be idle that concern one of the greatest events of monumental history.

The intersecting rib or ogival arch and the broken arch, joined, when the dispositions of the vaulting permit, to the flying-buttress, are rightfully regarded as the primordial and organic characteristics of the Pointed style. The union of these three elements was effected for the first time and with permanent results in France, and, to be more precise, in the middle basin of the Seine. On this subject there is no longer any serious lack of harmony. The only question is, Must the theatre of this evolution be restricted to a section with Paris as the geographical centre, and Poissy, Pontoise, Creil, Senlis, Meaux, Étampes, and Dourdan as the boundary towns, or should the field be so extended as to include Beauvais, Clermont-en-Beauvaisis, Noyon, Soissons, and Laon, and should the true home of the movement be located within the zone thus added?

Adopting the first hypothesis, we find but four existing monuments offered for study: Saint-Louis, at Poissy, is the starting-point, Saint-Denis the other terminus, the choirs of Saint-Martin, at Paris, and Saint-Maclou, at Pontoise, are the intermediary landmarks.

Saint-Louis, at Poissy (Fig. 7), comprises a triple-aisled nave terminated by two towers,—one on the west and the other in front of the choir,—an apse with a deambulatory, and three chapels, one of which rounds into a horseshoe on the axis at the very extremity of the church; each of the other two consists of a somewhat irregular quadrangular division, on which opens a small apse. In their *ensemble*, the two lateral chapels, attached in a way to the deambulatory and inclined toward it, take the place of a transept. No account need be taken of the chapels of the nave and of the porch, which are later additions, nor of the recently built apsidal chapel, nor of the upper parts of the apse, which belong to the latter part of the twelfth century. In regard to the two towers, the only points that we note especially are their unusual disposition, which reminds us of Limousin, and the octagonal form of the central one, with the octagonal faces narrower than the four others. Let it also be remarked that we have now entered the twelfth century, and that at that period central and octagonal towers had won their way.

Everything at Poissy betrays the hesitation and want of skill of an architect absolutely inexperienced in the use of the rib, but, on the other hand, an excellent constructor. This element was then almost unknown, and he could not have seen more than two or three rudimentary and isolated examples of it, if, indeed, the idea did not suggest itself to him. He was evidently reluctant to adopt it, whether he questioned the artistic effect, or whether he encountered some obstacle to its

efficacious employment. He attempts to dispense with them in the vaults of the deambulatory, fearing, doubtless, that the flaring plan of the bays may compel him to raise the central key too much or depress the diagonal arches unduly; he contents himself here with the constructed Roman intersecting vault, but he obtains only a section of an ellipse on the walls, which he accentuates by means of a prominent *formeret*. The Roman intersecting vault is continued in the side-aisles, and here it is less ill-shapen, as the plan is a rectangle. Still more striking evidence of the indecision of the architect appears in the capitals, which, in the clusters of colonnettes along the walls of the nave and the deambulatory, are turned obliquely, as though they had been intended at first to support ribs.

In the lateral chapels, fulfilling the functions of a transept, ribbing appears in connection with vaults that are moderately convex in the quadrangular divisions and very markedly so in the hemicycles. The master-mason, not knowing what degree of resistance the ribbing might offer, on the one hand, made it quite powerful, while, on the other, he so arranged the sections of the vault that they would support one another as far as possible by their own mass, as though the aid of the ogive (*arc-ogive*) was to be counted on but little.

The decidedly oblong plan of the bays of the nave, in its turn, presented some difficulties. The influence of the Roman intersecting vault is apparent there, notwithstanding the ribbing, for the juncture of the lateral vaulting sections with the walls forms an ovoid figure approaching that of the broken arch; but this is not, however, emphasized by projecting *formerets*, as it is in the deambulatory.

The broken arch itself does not occur in any of those parts of Saint-Louis which antedate the close of the twelfth century. Its absence was one of the chief hindrances to the constructor, who probably had seen it or had found it under his compass, but who thought that he had already gone far enough, if not too far, as an innovator by introducing ribbing into his structure.

In the vaulting of the choir of Saint-Martin-des-Champs, at Paris (Fig. 8), which has a deambulatory and chapels, the broken arch is almost exclusively employed for supporting or framing arches. The indecision referred to above is not exhibited, except in the skeleton of the vaults, in several of which the arrises are bare, although their curve differentiates them from the Roman groined vault. Here, again, we encounter an artist who had no models; neither in the rather peculiar plan nor in the profiles do we detect traces of a direct importation from Poissy. The profile of the ribbing, formed of a heavy torus, is that which prevailed down to the beginning of the thirteenth century. The central apse at Saint-Martin seems, as at Poissy, to have been executed or rebuilt in the second half of the twelfth century.

In Saint-Maclou, at Pontoise, there is also a choir with a *chevet*. But, at Pontoise, all evidences of wavering in the establishment of the vaults and all oddities in the plans have disappeared. Corresponding to each of the five bays of the deambulatory is a very shallow, small apse, connected to the bay itself by a common vaulting compartment with five ribs.

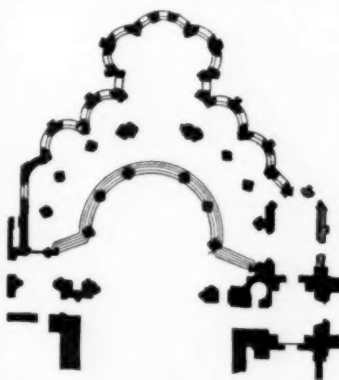


Fig. 8. Choir of Saint-Martin-des-Champs.

The junction is quite laboriously accomplished: to reach the central key, the rib running from the rear of the chapel is necessarily too long, and the *ensemble* has, consequently, a certain clumsiness, which, in addition to the ugly effect, jeopardized its stability, for nearly all the ribs had to be restored or renewed in the fifteenth century. The vault of the central apse was also rebuilt in the fifteenth century, so that neither at Poissy, nor at Saint-Martin of Paris, nor at Saint-Maclou, do we possess the original vaults of the upper hemicycle. We shall be no more fortunate at Saint-Denis; there, as in the preceding types, we shall not be able to go higher than the arches of the side-aisles.

We have just called attention to the fact that at Pontoise a

¹From the French of Anthyme Saint-Paul, in Planat's *Encyclopédie de l'Architecture et de la Construction*. Continued from No. 891, page 37.

rib runs from the rear of each chapel; it follows the axis, while, at the same time, it divides the hemicycle into two parts. This even division, which also occurs in the apsidal chapels of Saint-Martin-des-Champs, is worthy of note; it is one of the most marked of the indications that enable one to recognize the edifices which were the forerunners of the basilica of Suger, and those which, more or less directly, emanate from it.

It is deeply to be regretted that we have no documentary testimony as to the dates of the three church choirs cited above. We know that toward 1060 Henry I caused the monastery of Saint-Martin-des-Champs to be erected; but the present choir, considering the advanced character of its sculpture, and comparing it with authentic or unquestioned types of this king's reign, cannot, apparently, date back of 1130. This would not by any means be the sole example of a religious edifice constructed during the eleventh century, and rebuilt less than a hundred years after its completion. During the twelfth century many choirs, especially, proved to be defective—some in size, owing to the concourse of pilgrims attracted to the

their resources,—there was at Morienvall, at the close of the eleventh century, an apse in the narrow collateral of which [see *Eglise*, Fig. 36] ribbing was found in connection with the broken arch. The nave of Saint-Étienne at Beauvais [see *Eglise*, Fig. 35], that at Bury, the chapel of Bellefontaine, near Noyon¹ and, in part, the churches of Noël-Saint-Martin and Cambronne, Saint-Évremond at Creil and three or four others furnish, it is said, the intermediary landmarks, and the most recent of these structures is said to have been founded even earlier than Saint-Louis of Poissy. The archaic character of the sculpture and of the profiles in most of these edifices appears to justify their reputation for comparative age. Again, according to this hypothesis, the choir of the abbey of Saint-Germer, which has a *chevet*, tribunes and triforium, is the earliest, with that of Saint-Denis, where the three elements of Gothic architecture were employed on a grand scale and with consummate skill.

The adoption of one or the other of these theories is not a matter of indifference. With the first, we start from about 1125, and from the banks of the Seine, hardly quitting the

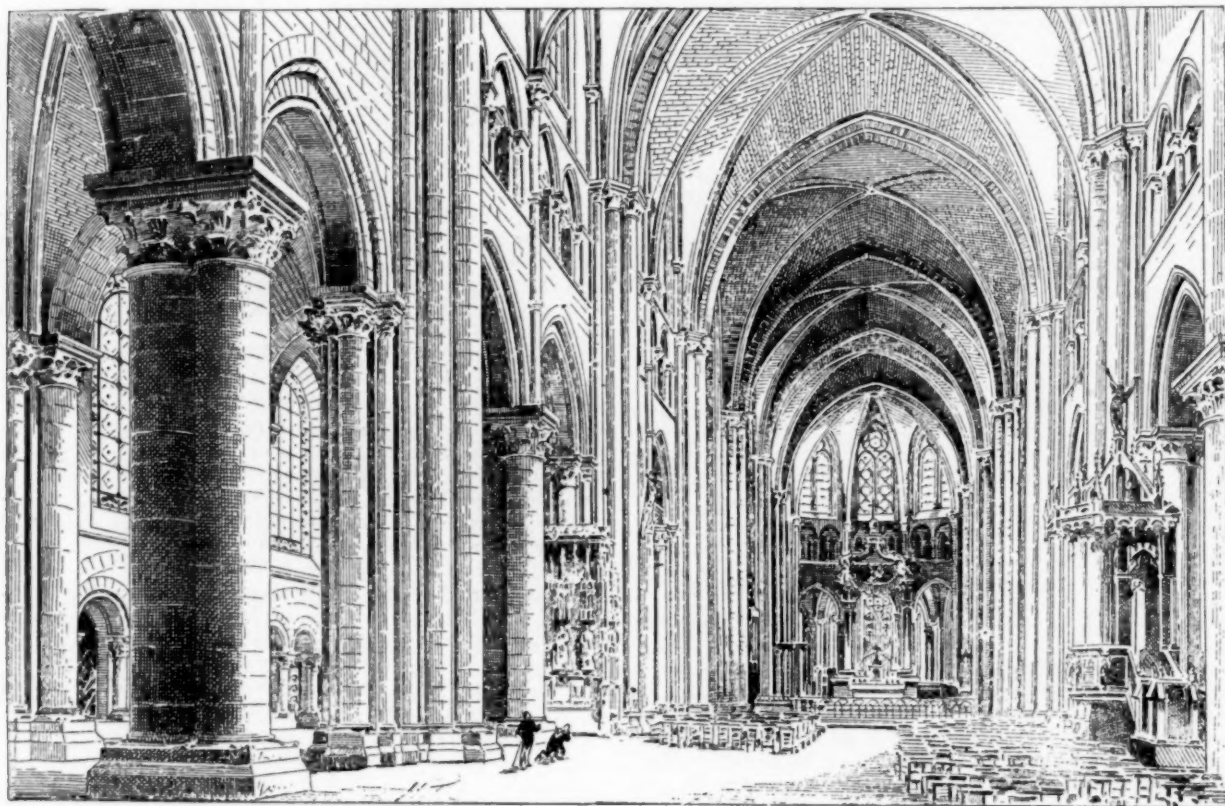


Fig. 9. Choir of the Cathedral of Sens.

churches to view the relics brought from the East, others in beauty, on account of the great progress made in architecture. On the first occasion that presented itself they were quietly replaced by more spacious and less barbarous constructions, and no care was taken to preserve a record of the original works. Thus it was at Saint-Germer and in Saint-Vincent at Senlis; nor was the cathedral that was being completed at Chartres when the fire of 1194 broke out the one so much vaunted by Fulbert, whatever might be inferred from the silence of the chroniclers on the subject.

Neither does Poissy reach back to the eleventh century; though the vaulting system is rudimentary, the rest of the church is not, and it would be hazardous to do the edifice the honor even of attributing it to the early years of the reign of Louis le Gros; 1125 seems to us the least improbable date: what we have elsewhere termed "the active transition" would then have begun with the second quarter of the twelfth century. This is wholly at variance with the second hypothesis, which is as destitute as the first of documentary support, but rests on investigations that demand an examination. According to this theory, whose expounders are men of genuine talent and cautious criticism,—men who have not yet exhausted all

stream to take in Pontoise; with the second, we gain more than a quarter of a century and are transported into Valois, Soissonais and Beauvaisais, that is, into the very centre of the Picard school. Moreover, the second hypothesis makes the broken arch appear at the same time with the rib; yet the former must have been common enough toward the year 1100 in the architecture of Picardy, for it seems difficult not to refer to this period a few of the naves where we have found the windows set astride the pillars; and in some of these the semi-circular form has been abandoned in the longitudinal arches (Saint-Denis at Crépy-en-Valois, Champlieu, Orrouy, Plailly).

It seems to us that by lopping off a few years from the age of the Picard group the two theories might be so harmonized as to form a basis for new views and suggestions. We wish to express frankly our own ideas on the subject. We believe, in fact, that there were two parallel movements resulting from a common impelling force that started about 1110 or 1120, from one of the dioceses of Senlis, Soissons, Noyon, or Beauvais. In yielding to this impulse the architect of the church

¹ This chapel seems by exception to have its date fixed by a charter of 1125, which grants permission to build it. But it is possible that no advantage was taken of the permit until ten or fifteen years later.

of Poissy would naturally have attempted to give it a peculiar direction; but the dominant influence would not have come from him. The two currents are well defined about 1140. In this memorable year Saint-Martin-des-Champs produced the choir of Saint-Denis, and Poissy the choir of the cathedral of

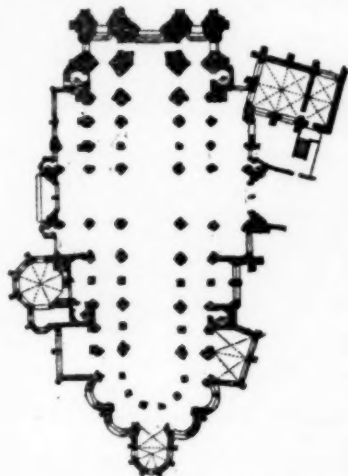


Fig. 10. Cathedral of Senlis.

intrados by a fascia or fillet, while at Saint-Denis it is the big torus (*boudin*) of the Picard school that is plainly preferred.

All the structures which we have cited as having ribs prior to 1140 are merely transitional, for they all betray a certain hesitancy and a certain barbarism in the handling of the ogive, as well as the pointed arch. We find the architect master of his methods and sure of himself only at Saint-Denis, the church which was termed in 1863, by Felix de Verneilh, "the earliest of Gothic monuments." This designation is applicable only to the choir (see *American Architect* for August 2, 1890, "Religious Architecture," Fig. 3), although in our opinion there is nothing of the Romanesque remaining in the narthex, which was erected from about 1130 to 1140. Quite unlike the narthex, the choir is a complicated construction and it is certainly the first in which all the difficulties attendant upon the establishment of ribs over a complete and spacious apse were met and overcome. These difficulties were the greater because there was no time for making experiments and feeling one's way. Suger was in a hurry; the work, begun July 14, 1140, was entirely finished — crypt, upper chevet, tribunes, high windows, main vaulting, and roofs — at the end of three years and three months.

To make the crypt lower and strengthen the vaults which were to support a pavement, Suger adopted the Roman system of intersecting vaults, and almost everywhere also he made use of semi-circular forms. In the upper chevet all compromise has disappeared; evidently the master-mason who conceived and executed the plan did not make his maiden effort here, or he had studied profoundly the system he was called upon to apply on a scale hitherto unknown. The deambulatory, preceded by a rectangular bay with double collaterals, comprises seven bays, corresponding to which are as many chapels of uniform size and directly connected by a second circular collateral. The chapels are not deep; they have four divisions,

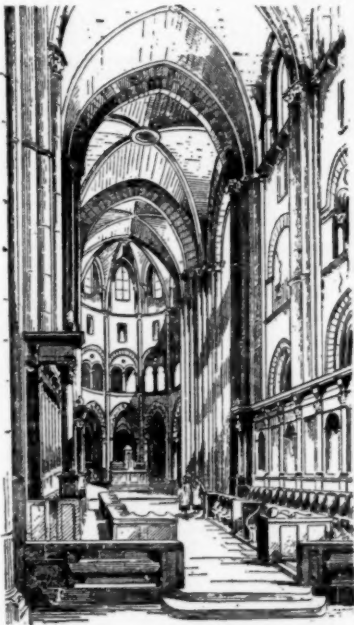


Fig. 11. Church of Saint-Germer.

two of which are taken for the connecting passage. The pillars are composed of simple, elegant, monolithic columns, with foliated capitals; — two or three only have subjects borrowed from the animal kingdom. The ribs are a simple torus; the broken arch is invariably adopted for all the arcades and bays. There are no tribunes, but an examination of the narthex shows that they once existed: as to the main vaults, we learn from a very clear, and consequently very valuable, passage in the writings of Suger, that they were ribbed, and even that the ribs were put up before the construction of the triangular spandrels. Finally, the buttresses projecting outside between the chapels could hardly have served for anything but bases to flying-buttress abutments.

In the same way that Saint-Denis, through its choir, built by Suger, is the first of Gothic monuments, Saint-Étienne of Sens (Fig. 9) is the first of Gothic cathedrals. The foundations of the cathedral were laid at the same time (1140) with those of the choir; but the work at Sens moved much more slowly and the architect employed less advanced or less substantial processes. The plan is that of Poissy enlarged: false transeptal arms, each with one small apse, a horseshoe-shaped terminal chapel, and a deambulatory with very flaring bays [see "*Cathédrale*," Fig. 20]; the transept was added at the beginning of the sixteenth century. The semicircular form occurs together with the pointed in the great arches; several ribs are

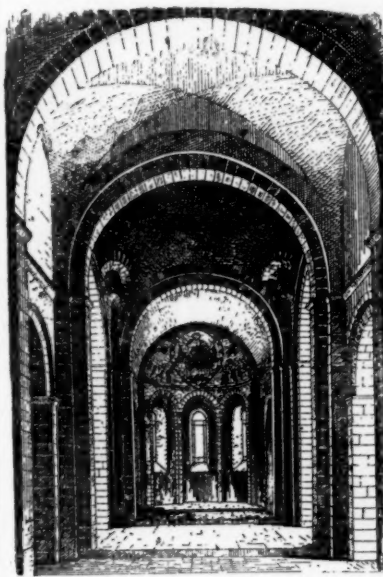


Fig. 12. Interior View of the Church of Saint-Loup-de-Naud, after a Photograph by M. E. Durand.

awkwardly disposed and the transeptal part of the structure, or at least the small apses, seems never to have had any. The profiles of the ribs with double toruses is derived from Poissy. It is interesting to note that at Sens the peculiar influence of Saint-Denis also appears; this is in the façade. Saint-Étienne, in its turn, furnished the model for the elevations and profiles of the choir of Saint-Germain-des-Prés at Paris, which was consecrated in 1163; but the family is limited to this trinity.¹

On the contrary, the Saint-Denis of Suger groups around itself an illustrious and numerous progeny, which, like the mother edifice, had a preponderant part in the direction that the new style was destined to take. In its equally divided chapels, Saint-Germain-des-Prés quits Sens and returns to Saint-Denis. The architects of the cathedrals of Senlis (Fig. 10) and of Noyon [see "*Cathédrale*," Fig. 33] did not design their choirs until they had seen Saint-Denis; Notre-Dame of Senlis might even pass for a genuine copy. The peculiar type of a series of equally divided shallow chapels may be, or might be, followed through Saint-Martin of Pontoise (an abbey-church now destroyed), through Saint-Leu-d'Esserent, and, outside the School of Ile-de-France, through Vézelay, whose choir was reconstructed toward the end of the twelfth century, and reproduces the chapels even to the communicating passage (see *American Architect* for July 26, 1890, "Religious Architecture," Fig. 22), through Saint-Étienne at Caen, in which the passage likewise exists, and through Ébreuil and Saint-Pourçain, on the very soil of the school of Auvergne.

We need not touch step by step on the modifications and ramifications that finally, about 1200, rendered it impossible to recognize this origin. The individual stamp of the French school disappears in the cathedrals and great basilicas; to follow its trace we must turn to the smaller edifices, glancing at the more important ones merely to determine the purely

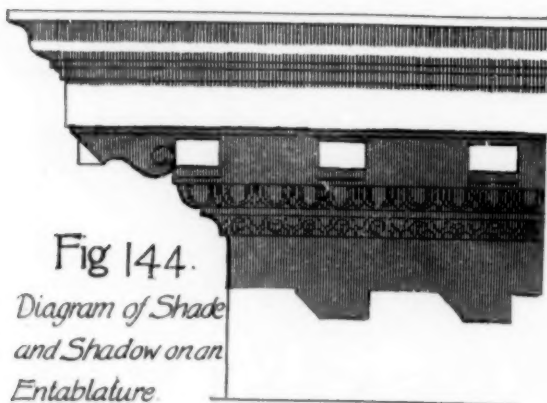
¹ In France; but in England it includes the choir of Canterbury cathedral, whose architect, William, was from Sens (see *American Architect* for August 2, 1890, "Religious Architecture," Fig. 7).

local influences. There are two churches, however, which are not to be classed under the transitional movement, and which amply merit the few lines that we cannot refrain from devoting to them. One is the church of Saint-Germer, between Beauvais and Gournay (Fig. 11), constructed, as we believe, between 1140 and 1160: though it may have transmitted little or nothing, it has at least accomplished much for itself. Ribbing is adopted and even emphasized, as well as the pointed arch, by geometric designs. With all that, it is difficult to understand how the master-mason could have made use of the Roman intersecting vault with the semicircle for the tribunes and rectangular bays for the triforium.

The other church, that of Saint-Loup-de-Naud, near Provins (Fig. 12), is simply a sort of *pot-pourri* of all the vaulting systems that were known in the middle of the twelfth century: tunnel-vault, cupola, bare arrises and ogives; and nothing justifies us in assigning to it the rôle that we once thought it might play.

(To be continued.)

ARCHITECTURAL SHADES AND SHADOWS.¹—XVII. CHAPTER XII.



The rendering of architectural shades and shadows. Reasons for detailed rules; the conventional character of architectural elevations and consequent conventional assumptions as to conditions of illumination, etc. Architectural rendering an art, based on science. The interpretation of values; usual procedure; phenomena of reflected light, reflected shadow, contrast, and aerial perspective. Concluding remarks.

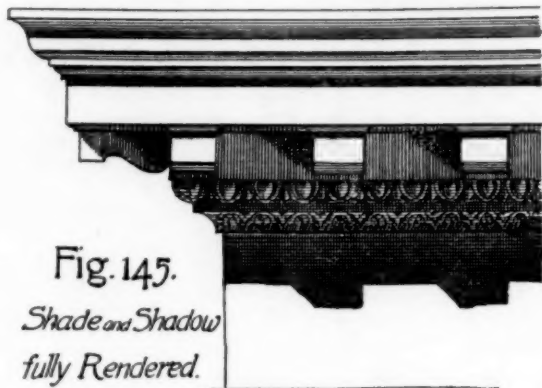
216. A careful review of the methods and rules for architectural shadow-casting hitherto given in these papers will reveal the fact they are all in reality special solutions of three general problems of descriptive geometry, which may be stated as follows:

1. Given a line passing through a given point in a given direction; to find its intersection with a given surface.
2. Given a line of shade and rays passing through it in a given direction; to determine the surface they generate (that is the shadow-in-space), and its intersection with other given surfaces.
3. To find any number of tangents at a given angle to a given surface, and to determine their intersections with other given surfaces.

217. The first problem is that of the shadow of a point on a plane or other surface; the second, that of finding the shadow of an object whose line of shade is known; while the third is the general problem solved by the "Method of Slicing." And as the latter method covers all imaginable architectural forms not susceptible of treatment by the first two, it appears that the whole science of architectural sciography is but an expansion of these three problems.

218. The reasons for thus expanding three elementary problems into a whole science are the same that underlie nearly all branches of mathematics which are composed mainly of special applications of a very few fundamental rules or principles. The skilled algebraist is the man who has thoroughly mastered the various abridged and "short-cut" methods of applying those general equations which

are the basis of the science. These general equations are themselves of little service in the ordinary operations of algebra, being too cumbersome and complicated for common use. In the same way the draughtsman's work is greatly simplified by substituting for the solution of the three general problems above specified a large number



of special solutions derived from them, each briefer and simpler than the more general one on which it is based. This explains how and why these papers have so largely consisted of special rules for each of the principal geometric forms out of which architectural design is mainly built up, and of special examples or applications of the "slicing method," and of one or two other methods more or less general in their nature.

219. Moreover, architectural sciography is a special branch of the general science of shadow-casting, by reason of the somewhat limited range of geometric forms and surfaces it deals with, and their occurrence usually with planes and axes parallel or perpendicular to the plane of projection, or at 45° to it, and by reason, also, of the uniform assumption of a special and conventional direction for the light. To these two conditions we owe a whole series of abridgments and simplifications of the general problem, and the possibility of formulating in the eighteen rules previously given a sort of alphabet of architectural shades and shadows.

220. And, finally, the architectural applications of these three problems are further specialized by the purpose in view, which is to represent, or rather, to suggest, the third dimension in plans, elevations, and sections by a conventional presentation of the lights, shades, and shadows, both direct and reflected. This purpose lifts the work of the draughtsman above the level of mere descriptive geometry, in which mathematical and quantitative considerations

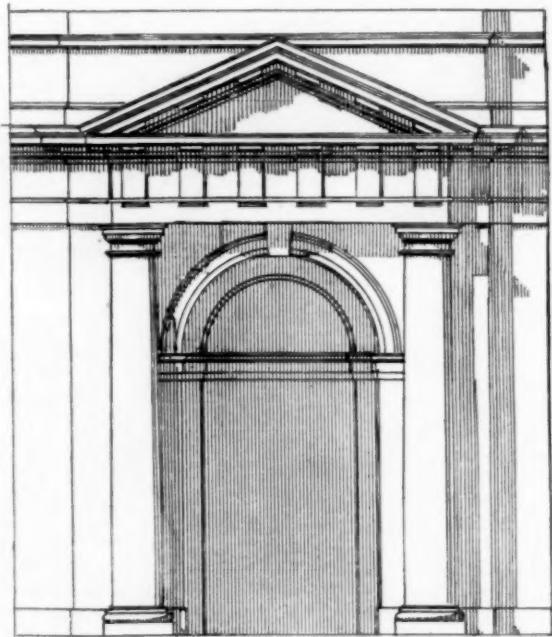


Fig. 146. Porch with Shades & Shadows in one flat Tint.

predominate. While these necessarily appear in architectural sciography, they are merely means to an end, in which qualitative and aesthetic considerations are dominant. It is in order to relieve the draughtsman as far as possible from the necessity of abstract mathematical operations and investigations that so many special rules

¹ By A. D. F. Hamlin, Adjunct Professor of Architecture in the School of Mines, Columbia College. Continued from page 40, No. 877.

NOTE.—[In view of the inconvenience of having to refer to back-numbers for explanations of the notation used in these papers, the following memorandum will be found of service.]

H.P. = horizontal plane of projection; *V.P.* = vertical plane of projection; *G.L.* = ground-line or horizon. Capital letters designate points and lines in space, small italics their horizontal projections, and the same accented or "primed," their vertical projections. Subscript figures indicate points of shadow; small figures above the line indicate points of shade. Greek letters ($\alpha, \beta, \gamma, \delta, \epsilon$) designate angles. The diagonal of a line or dimension is its length multiplied by $\sqrt{2}$. Shadows are indicated by vertical shading; shades by horizontal shading; shearing light by oblique shading parallel to the projections of the luminous ray.

formulas and methods have been introduced into these papers; for these, once mastered, can be applied and used as matters of habit in the actual work of draughting, with no burden of complex reasoning and study to adapt general methods to each special case.

221. The scientific work of the draughtsman ends when he has pencilled on his elevation or section the outlines of his shades and

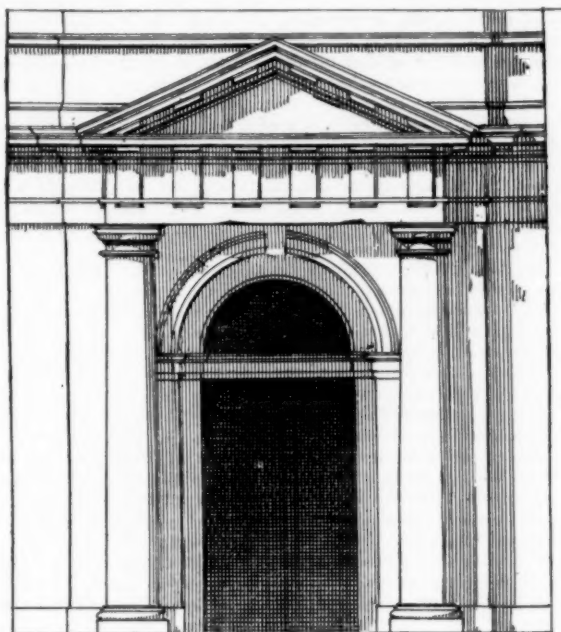


Fig. 147. Same as 146, with darkest darks added.

shadows. With the first brushful of India-ink or color applied to the drawing so prepared, his work as an artist begins. No amount of minute accuracy in the outlining of the shades and shadows will suffice to make the drawing a work of art, such as every rendered plan, elevation and section ought to be, unless the rendering itself be guided by a true artistic sense, and carried out with feeling and discernment. It is in this part of the work, and by no means in the mere accuracy of their geometrical operations, that the French draughtsmen are preëminent.

222. Plate IX, taken from an engraving in the *Moniteur des Architectes*,¹ derives its charm not merely from the beauty of its subject—the entablature of the so-called temple of Concord at Rome—but quite as much from the perfection of its rendering. Like the Ionic capital in Plate VII (No. 874, *American Architect*), it is the work of a *pensionnaire de Rome*, M. Dutert, and represents more faithfully and perfectly than the attempted *fac-simile* in Plate VII the original work of the master. We have here no mere diagram of descriptive geometry, but a work of art of a very high order, in which fine and exact drawing is supplemented by a remarkably beautiful presentation of varied intensities and gradations of light and dark, which give to the whole almost the vividness and relief of a perspective. And the reader who turns to the issue of the *American Architect* for November 12, 1892, will find in the beautiful drawings by M. L. Parent, of a residence in Paris, another admirable illustration of the quality and value which even a cross-section may acquire when the shadows are cast and rendered by a true artist.

223. While the artistic faculty can neither be created nor communicated by a text-book, nor the poetry of draughtsmanship taught in writing any more than the art of poetry in literature, architectural rendering has, like all the arts, certain fundamental principles and a basis of natural phenomena which can be formulated and taught. These we shall try to present in this chapter. Moreover, as architectural draughting is an art largely of convention, employing a purely artificial method of presentation and assuming purely conventional conditions, it is desirable to set forth clearly the limitations and the advantages alike which result from these assumptions and conventions.

224. When once the outlines of a drawing are completed, the controlling considerations in its subsequent treatment are those of intensity or value of both light and shade. The mere tinting of shades and shadows with a uniform wash of gray or black does not produce a rendered drawing, but a mere diagram; an absolutely conventional presentation of geometric facts and dimensions (Fig. 144). Character, meaning, sparkle and charm are imparted to this diagram only by variations of tone. One shadow is intensified, another softened; here a shade is made luminous with reflected light, and there a reflected shadow intensifies the darkness. Certain high lights are left absolutely white; others modified by almost imperceptible tints; and decorative details otherwise lost in the deep shadows

that fall across them are brought out by reflected lights and shadows and gradations of tint. Thus the projecting masses are made to stand out in bold relief, while the receding portions of the design retreat in their diminished brilliancy from the general plane of the picture. An illusion is produced, almost as of perspective, giving body and substance to what would otherwise be a flat and mechanical diagram.

225. All these effects are produced by variations of tint, especially in the shades and shadows. The comparison of Figures 145 and 144 illustrates the transformation effected by these varied "values"; and the same is shown by Figures 146, 147 and 148, which represent different stages of the same drawing. Plate IX is a further illustration and demonstration of the statements in the last paragraph.

226. The purpose of architectural rendering is, as we have said, to produce the impression of relief, to express the third dimension which any mere orthographic projection in outline fails to present. To this end the draughtsman avails himself of those phenomena which relate to the intensity of light, and which were briefly set forth in Chapter I.² In making use of these natural phenomena he assumes the conditions of each case to be such as will best subserve this purpose and produce the desired effect, emphasizing or exaggerating those conditions and phenomena which lend themselves to the end in view, and ignoring or partially suppressing the rest.

227. Such procedure, however illogical and indefensible in drawings from nature, in which an exact transcript of actual appearances is sought after, is in architectural drawing justified by the conventional character of all representation by orthographic projection. An elevation, a plan, or a section is not a realistic representation of form, but a purely artificial diagram of certain geometric relations between the forms it exhibits, as in a map. It presupposes an impossible point of view, i. e., one infinitely distant; and however truthful as a diagram, as a picture it is false and incorrect. The object of all the arbitrary and contra-natural assumptions to which the draughtsman occasionally resorts in rendering his lights and shades is to correct this pictorial incorrectness; to rectify the false-ness of an elevation or section, and, by assuming his conditions at will, to produce in his drawing a closer approach to truthfulness and reality than could otherwise be obtained.

228. To illustrate the procedure usually adopted, let us take a Doric porch or entrance on which the shades and shadows have been correctly outlined. The first operation, unless the draughtsman has had considerable experience, should be the application of a light preliminary tint of India-ink to all the principal shades and shadows indiscriminately. This tint should be substantially flat, and washed continuously without break over all contiguous areas of shade and shadow, whatever the interruptions of continuity in the architectural surfaces it covers. Figure 146 serves to illustrate this first operation, although the effect of its coarsely-lined shading is, in reality, quite different from that of a pale wash of India-ink. This



Fig. 148. Porch completely rendered with Graded Tints

preliminary tint serves to distinguish and identify, from the outset, the forms and areas of the shades and shadows, and to lay a foundation for the subsequent washes to be laid over it.

229. This tint, when first laid, will appear darker than it really is, by reason of its violent contrast with the white paper. The

¹ Plate XI in the volume for 1878.

² No. 687 of the *Architect* for February 23, 1889.

draughtsman is often surprised at the timorousness of his earlier tints, when the presence of darker masses in later stages of the rendering has reduced their apparent intensity by substituting the contrast with black for the contrast with white. As a consequence, he is often obliged to go over and retouch and intensify these earlier

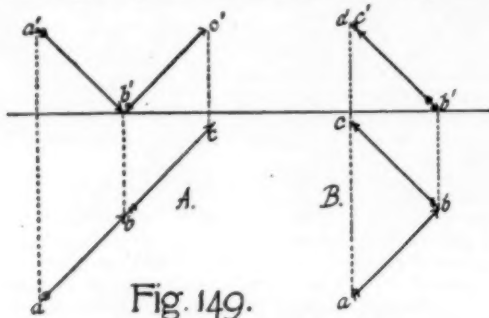


Fig. 149.

A. Theoretical direction of reflected light.

B. Assumed direction of reflected light.

washes, in order to bring them once more up to the tone he imagined them to have when he first laid them on the white paper. In order to avoid such wasteful labor, it is wise to correct at once the illusive contrast with the white by establishing a counteracting contrast with a strong "dark." To this end, the very darkest tints should next be washed in, such as are required for open doorways or windows. The drawing would, in the present instance, then appear as in Figure 147, in which the preliminary tint is noticeably paled by the dark tint of the doorway. Such dark masses not only lead the draughtsman to "key up" his subsequent washes to a sufficient strength of tone, but also furnish a limit of intensity which they may not exceed. They are the key to the intensity of the whole drawing, and should be made lighter or darker according as delicacy or power is aimed at in the rendered values.

230. These darkest portions are, in general, the doors and windows, or other openings of the building, since these reflect to the eye in most cases less light than any other part. Every one who has observed the effect of the unglazed openings in an unfinished building on a bright day has noticed their intense blackness, due partly to the contrast with the glare of the sunlight, and partly to the absence of any light reflected from the sky by glass to the eye. When the openings are glazed, their apparent darkness varies with circumstances. An uncurtained plate-glass window looks nearly black from the street, unless one be so placed as to catch the reflection in it of the sky or landscape, or unless the room be lighted by windows on other sides. Imperfect and irregular glass often presents, under the same conditions, a shimmering and confused mixture of white and black. Stained-glass and glass covered with dust absorb or transmit a part of the light, and reflect the rest in diffused rays, unlike the pure and sharp reflection from polished plate, and so present to the eye surfaces of a dusty gray, approaching blackness more or less, according to circumstances. Of course, all these conditions are changed by the presence of shades, blinds, or curtains behind the glass.

231. In order to give their proper architectural value to the voids in an elevation, it is customary to assume the absence of shades or curtains, and of all disturbing reflections from the glass. The windows are then rendered with strong washes of India-ink, sometimes tempered with a little blue, to give it coolness and depth, and graded somewhat rapidly downwards, in order to avoid a too heavy and monotonous effect. If the sash is divided into small

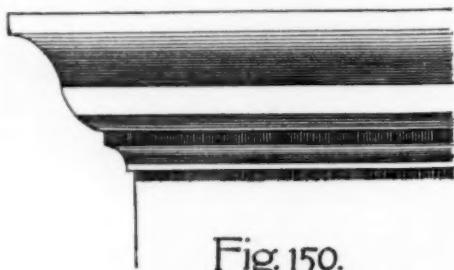


Fig. 150.

Shade and Shadow modified
by Reflected Light.

lights the minor bars are suppressed as far as possible, for the sake of breadth and simplicity. It is also customary to render the shadows cast on the glass by the jamb and lintel of the window, using a still stronger tone of black. These serve to express the depth of the reveal, and to give mass and solidity to the wall.

Without them, the windows appear as if set in the outer plane of the wall, and the whole effect is flat and unsatisfactory. Moreover, such shadows are quite justified from the point of view of realism, as any one may prove on a sunny day by careful observation.

232. The broadest and most important of the shades and shadows are next taken up, such as those behind colonnades and arcades, or those cast by projecting wings of the building. They are usually graded quite rapidly downwards, as though their lower portions were flooded with light reflected from the pavement. This has been done with the shadow under the arch, in Figure 148. In some cases, however, such shadows are graded in the opposite direction, being made lighter above than below,—not so much on any theory of an actually stronger reflection of light to the upper portions as for the sake of more agreeable or effective contrasts with the tones of other masses of adjacent shadow. When this is done with shadows behind arcades or columns the upper parts should not be made too light, as the result is apt to be an effect suggesting a glass roof of some kind as the only explanation of so strong an illumination of the upper shadows.

233. The exterior shadows on an elevation are usually graded quite rapidly downwards, both severally and in the mass. The same treatment is, in most cases, also applied to the "local color" of the building, so that all the tones, both of color and shadow, are strongest at the top and palest at the bottom. This treatment is justified by the fact that the upper parts of the building are seen against the brilliant background of the sky, and thus made darker by the contrast, while the lower portions are brightened by reflected light from the ground and from neighboring buildings, as well as by the absence of such strong contrasts with a brilliant background. There is also a practical reason for this downward gradation of shadows and color in the fact that the gamut of tones at the draughtsman's disposal falls far short of the range of values he is seeking to represent. Since it is impossible, with flat washes, to produce adequate contrasts in all the various parts of the drawing without too great intensity in the darker tints, the lighter of the contrasted tints must be made still lighter by grading it downwards.

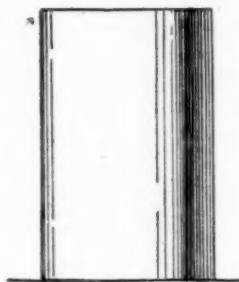


Fig. 151.

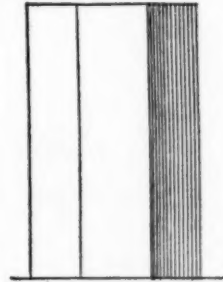


Fig. 152.

When this is done systematically throughout, it becomes possible at some point in every shade or shadow to obtain the required contrast with any other adjacent shade or shadow, whatever its tone. Moreover, this treatment adds greatly to the luminousness and transparency of the rendering, and is sometimes overdone in the effort to secure a meretricious brilliancy of general effect. Figure 148 illustrates measurably the gradation of shades and shadows, although on a limited scale.

234. Having so often, in the preceding paragraphs, alluded to the effects of reflected light, it is proper here to review briefly its phenomena, so far as they find application in architectural rendering, although they were treated of in the first of these papers as a part of the general subject of light and shade.

235. All illuminated surfaces reflect a portion of the light they receive, and are, indeed, only made visible by means of such reflection, except when they are transparent or translucent, and situated between the eye and the source of light. But, in general, the intensity of this reflected light is so low that it does not perceptibly illuminate or modify adjacent objects, which seem to absorb it, instead of again reflecting it to the eye. From polished surfaces, however, the light is reflected with considerable intensity, and at a uniform angle equal and opposite to the angle of incidence, as in Figure 149, A. All unpolished surfaces, by their minute irregularities, break up the light they reflect into innumerable rays issuing in every direction, and constituting thus a mass of diffused light. The smoother and finer the texture the greater the amount reflected; so that a pavement of white marble or a sheet of paper will perceptibly illuminate shaded surfaces in its immediate neighborhood, where rough and coarse-grained surfaces would produce no such effect. In any case, however, the range of such reflected illumination is very limited, by reason of the general law that the intensity of illumination of surfaces varies inversely as the square of their distance from the source of the light.

236. We have remarked that all unpolished surfaces break up

¹ This is an apparent, rather than a scientific, explanation of the fact. The limits of this paper do not admit of a detailed scientific discussion of the subject, which the reader can find in any text-book on physics.

the light they reflect, sending it forth as diffused light, made up of rays issuing in every direction from all parts of the surface. It generally happens, however, that there is a predominance of rays in one direction over all others, the light being less broken up by relatively smooth surfaces, and a larger proportion of the rays taking a particular direction, determined by the direction and texture of the

surface in question. And it is obvious that, even when the reflection is considerably diffused, a pavement must reflect generally upwards, and a vertical wall on the lighted side of a street or court send back considerable light towards the shaded walls on the opposite side.

237. As the draughtsman is at liberty to assume the conditions of texture at will, he

Fig 153. Shadow of Abacus on Shelf.

may suppose the light reflected upwards from the ground to take a direction inclined to the left, and at an angle with the horizon whose projection is 45° . This would, of course, be impossible if the reflection were from a polished mirror, in which case the reflected ray would continue in the same vertical plane with the incident ray, and be projected as a line at 45° inclination to the right, as shown by the diagram A, Figure 149, instead of to the left, as at B in the same figure. In the latter case, which is the direction assumed by the draughtsman for the reflected rays, the same line in elevation is the projection of both the incident and the reflected ray.

238. The assumption of this as the predominant direction of the reflected light results in illuminating—or, to speak more accurately, in diminishing the darkness of—those surfaces turned away from the sun, *i. e.*, the surfaces in shade, as the reflected rays fall most nearly perpendicularly on such surfaces. Surfaces in shadow are, on the other hand, less affected, in general, by such reflection, being turned towards the sun, and therefore receiving the reflected light always at an angle more or less acute. Accepting this as a general principle, the draughtsman makes his shades in nearly all cases lighter than the shadows. Thus in Figure 150 the uppermost portion of the cymatium is in shade, and lighter than the lower part of the shading near the middle of the moulding, which is in the shadow cast by the overhang of the upper part, and the shadow on the fillet below the cymatium is darker than the shades above and below the fillet. In Plate IX the same is true of the cymatium and of the shade on the under part of the modillion-ends, as well as of that on the lower part of the egg-and-dart and water-leaf mouldings, all of which are lighter than the adjacent cast shadows. So, also, the shade on the under surface of the bay-window in Figure 154 and that on the columns in Figure 148 are lighter respectively than the shadows they cast.

239. It should be remembered that all such reflected light is extremely feeble in comparison with sunlight, producing no perceptible effect on lighted surfaces, and only partial mitigation of the tones of shades and shadows. Even the most luminous of shaded surfaces should therefore be rendered less bright than even the palest of those in light. The draughtsman must be on his guard against the temptation to exaggerate the brilliancy of the reflected lights, and to make certain shaded surfaces actually lighter than those in half-light or shearing light. Allusion has already been made to the danger of exaggerating its effect in the general downward gradation of the tints of the whole drawing.

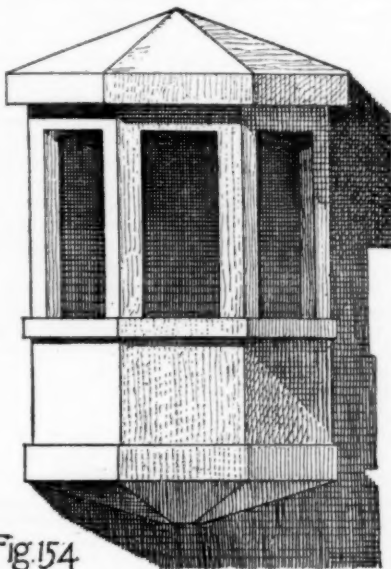


Fig 154

NOTE.—In the title of Plate VIII in No. 877 of the *American Architect* the word Abbey should be substituted for Cathedral. The error was copied inadvertently from Mr. Deshon's drawing in the "Association Sketch Book," upon which the plate in question was based.

[To be continued.]



CURIOUS ACCIDENT TO THE TORONTO WATER-WORKS.—THE PRICE OF STONE TO MASTER STONE-CUTTERS AND OTHERS.—PROPOSED MONUMENT TO MAISONNEUVE.—RELICS RELATING TO THE FOUNDATION OF MONTREAL.—SCULPTURED MEMORIALS OF SIR JOHN MACDONALD.—PAINTINGS FOR THE WORLD'S FAIR.

THE citizens of Toronto are in a bad plight as regards their water-supply. There has been trouble in this respect for many years, but it was thought that the outlay of a couple of hundred thousand dollars last year had put an end to it, and that henceforth people would have good water, without fear of its failing. But they were doomed to disappointment and further expense, and it is doubtful, even now, if the trouble is over. Water has to be brought from Lake Ontario by means of a conduit across the island that forms the southern and western sides of the Toronto Bay, and then across the bay, a mile-and-a-half wide, to a pumping-station. From thence it is pumped to a reservoir two-and-a-half miles north, at the back of the city. Until last year, the conduit was of wood, and in very bad repair, and, as the bay is the receptacle for all the sewage of the city, and bay-water found its way in considerable quantities into the conduit, and thence to the houses, it was found necessary to substitute for the wooden pipes a great steel conduit, which would also give a better supply. This was laid at a nominal cost of about one hundred and fifty thousand dollars; but there were many additional expenses, incident to quarrels with the contractor, which necessitated legal proceedings, costly delays, and other losses, without which few corporation works seem to be carried out nowadays. At the lake end of the conduit was a screen, to prevent weed and rubbish, etc. from being drawn in, and a man was employed to keep this screen clear, for fear of the weed blocking up the inlet. All went well with the pipe for some months, although there were break-downs of engines, and explosions, and so on, to vary the monotony of the engineers' lives at the pumping-house, and, in consequence of one of these entertaining incidents, the citizens have for some weeks been in danger of a water famine, although on the shore of a great lake—"Water, water everywhere, and not a drop to drink!" About Christmas Day, when probably the man at the inlet was not looking so closely after weeds as he should have been, the said weeds clogged up the whole of the mouth of the pipe against the screen; the pumps at the engine-house soon pumped the conduit dry, sections of which burst their anchorage and rose to the surface of the bay, breaking through the ice, and at the time of writing are still there, with sewage-water flowing in fast. The reservoir is so nearly empty that the engineer at the head of the water-works department has issued a notice requesting inhabitants to drink and wash as little as possible till the pipe is mended. The lengths of the conduit were joined with flexible joints, in order to allow of some play or movement, and these alone prevented entire ruin. Two joints were made solid, but at a part where there was little harm to be expected; these two joints have, of course, broken. The actual cause of the accident was, apparently, that the mouth of the pipe and the screen were of too small an area, and had the men in charge of the engines noticed that the water in the well there was gradually sinking, and stopped their engines, the pipe would not have broken. As the *Mail* says, Toronto people are gaining experience in water-works. They know now what a big steel pipe will do if subjected to careless treatment. Though it will be a long time before the pipe is sunk again to its proper position, the city engineer gives out that the leaks will be repaired in a few days, and that the bay-water will be kept out, so that a certain supply of lake-water will be obtained; but what would happen if there was a serious conflagration it is alarming to contemplate.

The Court-house Committee of the Toronto City Council have not reached a harbor of refuge, as they thought they had, through the piloting of their architect, who seized the works and turned out the contractor. The master stone-cutters have an association, and one of their rules is that members shall have stone supplied to them at lower rates from the quarries than other builders. Since the architect took possession of the buildings he has been carrying on the work by day-labor, intending to bring the works into a condition that they might be more easily tendered upon for completion. He found it necessary to order some Cleveland (Ohio) stone, and made a contract with a firm for the supply; but the stone came not, though expected every day. It was then found that the association was threatening to impose a fine of twenty-five cents a cubic foot upon the quarryman for having agreed to supply the stone at forty per cent less than the price that should be paid by buyers other than members. As it stands at present, the quarryman must break his contract and take the consequences, or he must pay a fine to the association of at least \$500. Some of the members of the association are, however, beginning to tremble in their shoes, for it is

rumored that action will be taken against them as an illegal "combine," subject to a fine varying from one to ten thousand dollars, in which light they seem not to have regarded themselves before.

The city of Montreal is about to erect a monument to its founder, Maisonneuve (1642 A. D.), at the cost of about \$24,000. A design has been adopted, but it still remains to collect two-thirds of the required sum. A ten-foot-high figure of Maisonneuve stands on a thirty-foot base. Maisonneuve stands with his left hand on his sword-hilt, and holding the standard of France in his right. At the base will be four kneeling figures, six feet high, two of which are historical characters—the one being Mademoiselle Mance in the act of bandaging a boy's wrist, the other Lambert Close and the celebrated dog Pilate, which did such good service in detecting the presence of the hostile Iroquois. Of the other two figures, one represents an Iroquois crouching in ambush, tomahawk in hand. The figure is very true to life, and is very striking in its attitude. It is, perhaps, one of the best productions of the artist, Hebert. The fourth figure is of a pioneer engaged in harvesting, his sickle in one hand, some wheat in the other, and his musket slung over his back. It was objected that this figure was too "gentlemanly" in appearance; but it seems that this was the very intention of the author, many of the pioneers having been members of noble French families, men of education and refinement. Four bas-reliefs will represent: (1) the conference between l'Abbe Oller, M. De la Douversiere, Baron de Fecamp, and Baron de Krantz, at which the foundation of Montreal was decided; (2) the celebration of the first mass on the island of Montreal; (3) the encounter on the Place d'Armes (as it now is); and (4) the death of Dollard, in the old fort at Long Sault. The arms of Montreal are designed to occupy a conspicuous position, but it has been suggested that it would be more appropriate to have the lilies of the Bourbons there instead, as being the emblem of the founders. For the benefit of those who want to take up this interesting subject, I would state that they could not do better than study Parkman's series of books on the history of Canada. Even to those not specially interested in Canada her history is interesting in the extreme, and ought to be more generally known than it is.

The last number of the *Canadian Antiquarian and Numismatic Journal* is a remarkably interesting one. It is mainly devoted to the exhibition of portraits and historical relics relating to the foundation of Montreal. It is published to commemorate the two hundred and fiftieth anniversary of that event. The paper is a good guide to the student of Canadian history, especially with regard to the old province of Quebec. An amount of information has been collected and published here which has not been set up in type before.

Photographs have reached Canada of the bust of Sir John Macdonald (the father of Canadian confederation), now set up in St. Paul's Cathedral, London, and also of the statue to his memory to be erected in Hamilton, Ontario, both the works of Mr. George Wade, of London. To people who knew Sir John well, the "views" of the bust and statue are most unsatisfactory, as an expression has been caught which they certainly do not recognize. It may be that, like the photographs of people, the particular angle of the "view" cannot be taken as a correct likeness, but when the Hamilton statue arrives, and we are able to see all round it, we may find we are very much pleased; but it is to be regretted that the work was not intrusted to some one who knew Sir John personally, rather than to one who made his acquaintance after death, through the medium of portraits and photographs.

There seems to be a fatality in regard to public buildings, it is rarely that one is completed without trouble and resort to the law. In the case of the Montreal Court-house, at which extensive alterations have lately been executed, an order in council has been issued permitting the contractor to bring suit against the Provincial Government to settle the dispute as to the amount owing to him for the work. The contractor claims no less than \$167,234.13 for extras and damages caused by a prolonged delay in proceeding with the work.

Preparations are being made for the next annual meeting of the Ontario Association of Architects, which is to take place in February next, according to by-law, and a large number of country members have signified their intention of being present. This convention will probably have put before it the results of the tests, made under direction of the Council, of a large number of the building stones of the country.

A competitive exhibition is shortly to be held in Montreal of the paintings of Canadian artists for the purpose of making a selection for exhibition at the Chicago World's Fair. The exhibition will no doubt be a very interesting one to the public, and perhaps not a little to the artists themselves. Hitherto there has not been held any such general exhibition of Canadian artists' work. As a rule, the pictures exhibited in Montreal are those only of members of the Royal Canadian Academy, and of course those residing in Montreal are better represented than those at a distance. But here will be an opportunity that all will endeavor to take advantage of; equally with their best works, works that have already been exhibited and criticised, and of which the authors are already aware of the general opinion. The space at the Fair in Chicago secured for the exhibition is roomy, so that a large number of pictures will probably be sent.

The exhibit of minerals in course of preparation is a very fine one, and will open the eyes of the public to the rich resources of Canada, which at present are very little known. On the whole, the Chicago

Fair will probably be very beneficial to Canada,—a country occupying a position in the world of increasing importance which only needs to be better known to make it rank with the first countries of the world as regards its products. No effort will be spared to represent Canada in every particular in the very best manner, and it is probable that the Dominion will secure a large proportion of the prizes awarded.

A FRENCHMAN ON THE WORLD'S FAIR AND AMERICA.¹



Window-head, Eighteenth Century, French. From *L'Art pour Tous*.

It only remains for me now to make some general comments on the Chicago Exhibition. That which strikes one most on arriving at Jackson Park is the entire absence of a *plan d'ensemble*. Different buildings have with one another no visible correlation and do not even seem to form parts of the same whole. Involuntarily the thought flits back to the banks of the Seine and the regularity of the plan developed in 1889 at the Trocadéro and on the Champ de Mars. It is impossible to avoid comparing these two exhibitions without finding how they symbolize the different genius of the two races. Like France herself, the French exhibition was compact, symmetrical, and built according to the majestic *ordonnance* of a general plan conceived in advance. Nearly two-thirds of the entire surface was under roof; and in the midst of an old city, which, on all sides enveloped them with its mansions, the vast metallic naves were squeezed one against the other, just as in our too narrow territory men and crops are crowded. The Exhibition of 1889, where the general views were so skilfully managed, took possession of the beholder by the majesty and symmetry of the whole more than by the finish and perfection of details. It was the work of an ancient race on ancient soil, the accomplishment of the continuous labor of succeeding generations; it was the creation of a nation having that surety and absoluteness of artistic perception which can be given only by the long traditions of a civilized past solidly compacted by the lapsing of centuries. It was, in fine, the type of a debatable ideal, but yet an ideal proceeding from certain preconceived and invariable principles; just as French society reposes upon the absolute legislative ideal, which she has, for her good or her ill, received from the Roman laws and those of the Revolution. The Exhibition of 1889 very well characterized the France of to-day: The constricted area relatively to her population, and consequently the complete utilization of her soil; the uniformity of legislation and regulating ordinances; the omnipotence of the State, as it confronts the isolated individual at the end of numberless political shocks which have violently wrenched from the old French society the social organization which attached man to man, to the field and to the workshop, and, finally, the surety and the assurance of the æsthetic idea, fruit of ancient European civilizations and refined tastes, tastes which have imbued the race with a long-reaching artistic education, and the classical traditions which came into Gaul through the basin of the Rhone from the shores of the Mediterranean.

Like the United States themselves, on the other hand, the American Exhibition is gigantic, and is not built according to a rigid and uniform general plan. On the contrary, the plan leaves so considerable a portion to each one's whim that it is hardly visible, and one would be tempted to deny the existence of any. Such as this is in our day the grand American Republic. When one travels through the different portions of the Union he forgets the flexible but strong bonds which unite them, that is to say, the Federal laws, so insignificant do these laws seem when one sees, upon the other hand, the profound material and moral divergencies which distinguish the different States of the Republic from one another. The fact is these different States are so wholly independent, so completely free, and so govern themselves, and administer their laws to their tastes, that they often have civil and political legislation entirely different the one from the other. The fact is they sometimes offer such dissimilarities in climate, products, customs, religions, and populations that one can almost say that in reality they constitute distinct nations, and, except for the question of language, have with one another hardly more resemblance than so many European nations. From certain points of view, the United States now constitute a nation of peoples rather than a united people. And, just so the buildings at Jackson Park constitute a nation of exhibitions rather than a single and homogeneous exhibition. The Exhibition at Chicago

¹ Extracts from the report of the Marquis de Chasseloup-Laubat to the Société des Ingénieurs Civils.

is not compact, but very much spread out. Less than one-quarter of the total surface is covered. It is not in the middle of a city that rise up the vast metallic roofs of the American palaces, but on an immense prairie, which towards the southwest is traversed by the gigantic Mississippi, and which upon the north borders the colossal lake system of the St. Lawrence, the superficial area of which is almost half that of the whole of France herself. The American soil is not encumbered with men, and one finds there, even through whole days of travel, vast spaces entirely unpeopled.

The decoration of the Exhibition buildings of 1893 is generally unfortunate enough, and one may say that it most often lacks the prime quality, style. The American architects have, in fact, copied the best-known styles of antiquity, and appear even to have forgotten the correlation, the intimate harmony which ought perforce to exist between the styles of decoration and the materials employed. They appear not to have taken into account that one cannot make a work of art by copying in brick and iron the pure contours of Greek temples which were built with blocks of white marble, nor the powerful Roman arches constructed with cement, nor the lace-work which the Arabs worked out of plaster, nor those which the masters of the Middle Ages chiselled out of granite. In 1889 the French no more sought to copy the Greeks and the Romans and the Arabs than those of their own ancestors to whom they owed their cathedrals, but they created a style, that is to say a method of decoration in harmony with the materials they used. One might say whatever one wished upon this style. One might criticise it or admire it, and think that it was very ugly or very beautiful; see in it a failure or the discovery of a new way; but one had to recognize that there existed in itself this the first of the necessary conditions which a work of art of any kind must fulfil. In 1893 the Americans limit themselves to copying the decorations of admirable monuments, which are the glory of past ages, and can only copy them badly, since they do not employ the same materials of construction which served in the creation of their models. It is all the more desirable to have to bear witness to this lack of confidence of the Americans in themselves, since they have really made some beautiful and original works in iron construction—in which certainly inheres the real beauty of the exhibition buildings at Jackson Park, a beauty of boldness, audacity, lightness, purity of lines, and a profound general harmony resulting from a perfect utilization of the materials.

Moreover, what we witness at Chicago need not astonish us: America is still too young, and the current of European immigration over the soil of the United States is too intense for the Americans to conceive, and give expression to a national art in harmony with their climate, their customs, and their building materials. The different European elements are not yet thoroughly amalgamated, especially in the West, so as to constitute human types impressed with the characteristics of their social station and the climate in which they live. The different artistic notions received from Europe are not yet, in their eyes, grouped and crystallized into a single or into several conceptions of the ideal. At Chicago one recognizes without difficulty, under the deceitful uniformity of an active American city, not only different races, but often different forms of thought. Certainly time has not yet affected its grand work of fusion between men and ideas. The Exhibition at Chicago, then, very well characterizes the United States to-day: the immensity of territory relatively to the population, and, consequently, the incomplete utilization of the soil; the difference in legislation and regulations, as well as those variations of climate and the products of different States; the weakness of the Federal State when confronted by powerful associations of workmen, capitalists and religionists, who have created the unheard-of prosperity of modern America, while attempting to produce by the human machine, solely stimulated by the energies and wills of individuals stretched to their utmost limit, a yield unheard of elsewhere; and, finally, an æsthetic taste, floating and undecided because the body of American society, still in the full fever of increase and development, has not yet had time and leisure to melt and assimilate one with the other the chaos of ethnic elements and artistic notions cast pell-mell by European emigrant-ships upon the new world, so radically different from the old Continent.

It is this retrospective comparison between the exhibitions of 1889 and 1893 which perhaps will constitute one of the most vital interests which the Exhibition at Chicago will offer. On this account, I have voluntarily abstained from saying a single word of the building constructed by the women, or, to speak more exactly, of the building constructed on the plans of a woman by men directed by a committee of women. This unusual combination, which would fill an Oriental with keenest astonishment, and would profoundly trouble all his acquired notions as to the relative rights which Allah and Mahomet in their wisdom have attributed to the two halves of the human race, has not passed unnoticed in the United States,—doubtless because the work which has resulted from it is very characteristic. The Woman's Building seems to have caused numerous and lively discussions. It has received many criticisms and eulogies. A great number of people have found it absolutely insignificant. As for me, I shall not allow myself to pass judgment on the building of the women. In fact, when one has very precise ideas on architectural art, and when one is destined to return to the United States, where, more than anywhere else, the hostility of the feeble sex is very much to be feared, it is preferable to say nothing of a work which one could not prudently criticise, although it might not be

absolutely perfect. You will yourselves see the Woman's Building, will yourselves judge it, and yourselves admire it. I will confine myself for the moment to repeating to you, without comment, an epigram I heard at Jackson Park: "The Woman's Building, destined to prove to the world and America the equality of the two sexes, is a monument erected by female hands to masculine superiority." It is useless, is it not, to say that it was a man, and, what is more, an American architect, who uttered this malicious *mot*, which we will all attribute to a vile sentiment of professional jealousy.

Before finishing these rapid comments on the Exhibition at Chicago I must say a few words about the Midway Plaisance, which, as they say, will advantageously replace the Rue du Caire of the Paris Exhibition. At Jackson Park, still more than at the Champ de Mars, a considerable space has been reserved for the exploitation of the ingenuous native by more or less scrupulous tradesmen. Barnum's native country could not allow itself to be distanced by the country of Mangin, and everything tends to the belief that America will do this thing on a grander scale than we did. There has been talk of bringing thither tribes of anthropophagi, negro kings, monsters of every kind, and curiosities of all species. It seems that overtures have been made to well-known European personages, political and artistic celebrities, and even to crowned heads. Although the detailed programme of all the seductions that the Midway Plaisance will offer us does not appear to be drawn up, one can foresee that it will be very complete: multi-colored Tzigones will there produce the continuous movement of the Hungarian Csardas; small Turks will vend their acrid perfumes and rose-waters; Oriental merchants will offer the inevitable stuffs and strangely-fashioned arms (made at Paris); inventors of perpetual motion and the philosopher's stone will be there; Hindoos, Javanese, Malays, Chinese and Japanese will sell at a large profit imported krisses, teas, lacquers, bronzes, and a thousand trashy articles; and, in a word, there will be found all those self-styled exotics the beholding of which much more astonishes those who have travelled the face of our planet than those who have never quitted their homes. As you see, attractions of all kinds will not be wanting at Chicago. . . .

No description can give you an exact idea of the immense American city, built on the checkerboard pattern, covered with an immense net of wires, cut up by numbered streets, encumbered with vehicles of every kind, sprinkled with elevated railroads, which pass riotously over lofty structures of wrought-iron. How, again, picture to you the singular aspect which the houses of Chicago offer, with their sixteen, eighteen, and even twenty stories? . . .

Next, I ought to speak of the capital importance which the Exhibition at Chicago will have in the eyes of Americans, not only the eyes of the inhabitants of the United States but also those of the Canadas,—French and English,—and of all Latin America; that is to say, Mexico, Guatemala, Honduras, Nicaragua, Colombia, Venezuela, the three Guianas, Ecuador, United States of Brazil, Peru, Bolivia, Paraguay, Uruguay, the Argentine Republic and Chili. Since the exhibition takes place on the soil of the United States, amongst the most considerable, the most powerful and the richest of the young American nations, I will give you, in the first place, the opinion of North Americans on the Columbian World's Exposition. Well, the great majority of North Americans think, simply, that the Exhibition at Chicago is a marvel, or, rather, the marvel of all marvels. It believes with entire good faith that this Exhibition, the most remarkable which the United States have yet undertaken, must necessarily be, by that fact, the most remarkable which the whole world has seen since its beginning down to our days. This deserves some words of explanation. Of all the people in the world, I do not know of any one which has a higher idea of its power and force, which has more faith in its destiny and its "star," than the American people. "Our country, right or wrong";—such is the sentiment which Americans often repeat. Such sentiments, of course very respectable, and which manifest the patriotism of the inhabitants of the United States, are deeply anchored in the hearts of the mass of the people, and are found more often amongst the workmen, the agriculturists, and the people of moderate fortune and instruction, than in the upper classes of society, that is, the intellectual *élite* of America. This is not to say that the classes privileged in the way of fortune, instruction and intelligence have a less deep love for their country than that which less-favored Americans profess; that is not at all my idea, for every inhabitant of the United States fairly believes in the future of his republic, and is justly proud of the grandeur, riches and power of his immense country, where wise laws hold together by supple yet robust bonds States whose people, as people and as individual men, are free. But these profound feelings of national pride and ardent patriotism are expressed in a very different fashion by different classes, and there necessarily results that different classes have opinions and judgments absolutely different upon foreign nations, principally as to their power, their wealth, their mode of existence—in a word, as to the civilization of European nations. The educated American—having travelled abroad, the American who has scurried through the ancient cities of Europe and Asia, who has read and thought—is not convinced that his country is in everything and for everything preferable to all others. He applauds with much satisfaction whatever at home is better understood than it is in Europe, as, for instance, the more rapid and comfortable railroads; the elevators, which move with the rapidity of projectiles, rather than move along with the slothfulness of the snail; the admirably installed public supplies of hot-water, gas, and

electricity; the universal use of telephonic communication; the systems of electric wires, which allow, without leaving one's house, the calling of the police or firemen; the metropolitan railways; the electric or cable surface-cars, which everywhere furnish means of rapid and economical movement; ventilators actuated by electricity, which give in the midst of the torrid summer heat a degree of freshness—in a word, all those most recent applications of all the sciences which have helped to produce a material civilization very advanced, infinitely more advanced than anywhere else. Besides, it is certain that in America one is more free, less hampered by regulations, the victim of fewer administrative acts, than in other countries of the globe. One feels that he has before him a grand country of vast resources still unexplored, where energetic and enterprising men can rise rapidly.

But, in opposition to all these advantages, the educated American is forced to recognize a material and moral inconvenience of the civilization and customs of his country: the immense buildings which tower up for twenty stories keep the air and light from the lower stories of other buildings; street-cleaning is almost non-existent, and streets are badly cared for; the execrable pavement is cut up in every way by the rails of surface-cars; the immense network of wire which covers the city is ugly and dangerous; the bells of the cars and locomotives maintain a deafening concert; the trains of the metropolitan elevated lines come and go all night long, producing a noise and succession of shocks comparable to those of earthquakes. The struggle for life is more ardent in America than anywhere else, and it is almost as difficult to preserve one's fortune as to make it. The daily press intrudes too often into the privacy of the family, without scruple and with entire impunity. Finally, a detail which has its importance, competent domestics are great rarities, and one is obliged to pay very dearly for their very imperfect service; and, since one dare not discharge them for fear of falling into the hands of others even less competent, one has hardly any other consolation than to take an oath that one will be even more exacting and intractable if ever the fortune of life brings about one of those brusque overturns of fortune, so frequent in the United States, and so reverses the rôles as to bring your ruined self into the service of one of your ancient domestics, who, in his turn, has suddenly become a millionaire.

Besides, the wisest, the best educated, and the most reflecting of the citizens of the United States are not without disquietude as to the future, and they perceive on the political horizon of their country threatening clouds. They demand with anxiety whether the crowd of gross and ignorant emigrants who encumber the steerages of transatlantic vessels, and are then poured over the whole territory of the Union, are not a danger for their institutions; whether these unfortunates, who hardly know the language of the country of their adoption, and whom laws more generous than prudent convert too speedily into citizens, are capable of judging with due discernment those questions upon which they may be summoned to pass an opinion; whether the regular performance of American democracy will not be seriously compromised by the mass of votes which are cast into the ballot-box by men who seem ignorant that every right entails a corresponding duty, that liberty is not license, and that the grandeur of the United States rests solely on the respect of those liberal laws, thanks to which individual energy reaches a maximum intensity. They demand, finally, whether facts as grave as the recent strikes in Pennsylvania, during which America witnessed massacres, horrors, and the savagery of another epoch, are not indications of future graver perturbations, of a frightful war between capital and labor.

Thus the *élite* of the American nation thinks that old Europe has many good points. This *élite* knows our countries and our customs. It discerns what may be met with there that is good and bad; it knows that if America is, from many points of view, in advance of Europe, the older continent, on the other hand, offers many advantages over the new. It is too cultivated not to appreciate our superiority in the pure sciences and in the arts not to comprehend that all the gold in the world is powerless to create one of those *chefs-d'œuvre* the remembrance and worship of which survive in many perished cities, dismembered empires, dead civilizations, and forgotten religions.

But the masses of the American nation—that is to say, the great majority—have confused and unjustly prejudiced notions as to Europe. They do not know the old continent, or, what is worse, they know it badly. It could not be otherwise, since the time and means of information are lacking to them for forming equitable and precise ideas as to countries and societies so different from their own. For that matter, how many Europeans, how many Frenchmen, are there who have any misgivings that they really know what the grand American Republic is? It seems to me that the number is, unfortunately, too small, and that in the matter of complete ignorance of foreign countries our compatriots can hardly give points to many others. Now, these are the masses who are going to flock to Chicago, especially after the harvest, and who will judge the wealth, the arts and the civilization of the different peoples of the globe, not in accordance with the reality, which they cannot know, but merely after that which they will be able to see on the shores of Lake Michigan. And these are the masses who, in the United States, dispose of the majority of votes, who produce and buy most; that is to say, who possess the political and economical force. It is, then, easy to comprehend the importance of the rôle which our

French section may play at Chicago by showing to the inhabitants of the United States our resources of all kinds, and by creating for us precious commercial relationships, which later may furnish outlets for those of our products in which we may be able to maintain a superiority. Besides, the French are sure of being well received in America. The old traditions of sympathy which have always existed between the two countries cannot be extinguished, and now the same form of government creates one more bond between the two republics. On this head, it is proper to refer to a fable which is sometimes heard, and which ought not to be believed. It is said that the German element, very powerful in the United States, is seeking by every possible means to do injustice to France, and that our interest at Chicago will feel its action. As for me, I believe that this is false, entirely false. It is doubtless true that there exists in the United States a German element, and this German element is powerful because it is numerous, and that it knows how to preserve in America its strong qualities of order and labor,—qualities which have made Germany one of the first nations of our epoch; but it is not true that this element can do anything at all against us. First, I do not believe that it is hostile to us, because the immigrants who compose it have for the most part been driven from their own country by misery and military servitude, and because, while preserving a remembrance of their native country, they probably have sentiments which are anything but tender for their government, which they consider, rightly or wrongly, as the prime cause of their exile. Moreover, Germans are so easily assimilated that they very rapidly lose the sentiment of their nationality; and, finally, Americans are not the people to allow certain individuals to set at naught their firm determination to live in excellent relationship with our country, and I believe that an attempt to do injustice to France would cost the authors of the attempt dearly. . . .

Finally, I will add that we have every interest to go to America, in order to study there and understand many instructive facts.

Doubtless, we have nothing to copy from the Americans in all those things which have connection with the industries supplying the luxuries, the arts and pure sciences; but how many points and interesting details shall we not assimilate in the domain of sciences applied to the industries, and in the methods of organization, exploitation and administration of grand enterprises.

But that which we ought particularly to study in America is the liberty of the individual with all its numerous consequences; the thousand forms which clothe free association; the disdain and distrust, perfectly justified, which Americans have for the modern State, whose powers and functions they intend to reduce to a minimum; the strong federations of workmen, independent because they demand nothing of public powers, nor of any one; the grand companies of which no superannuated regulations applied by tricky and untrustworthy administrations come to stop the advance and prosperity. We shall see how from the American soil, free from the Roman traditions of the omnipotence of the State, have sprung spontaneously independent associations in the face of public powers, which a wise legislation created sufficiently feeble, so that the temptation to interfere in the industrial affairs of its citizens could never be crowned with success. Over yonder, between the individual, who is stronger, and the State, which is weaker than with us, rise up, like buffers intended to deaden and localize the reverberations of social shocks, a quantity of organizations of various kinds, agricultural, commercial, industrial, scientific and religious, too powerful for the State to suppress them, and too numerous, and having interests too opposed and aims too different for them to consolidate together and usurp power. It is from the conflict between their interests and from the intense competition between them that has been created the modern prosperity of the United States,—a prosperity solely based on the fact that human labor there achieves and performs more, considerably more, than anywhere else, and because no false conception of the rôle of the public powers of modern society intervenes to hamper the free development of each man.

While with us a triple administrative machine—the State, the Department, and the Commune, complicated, slow, unyielding, brutal, costly, incapable in its very essence of ever answering the needs of the moment—too often inflicts, under the pretext of humanity, or uniformity of regulation, upon the individual energy of those whom it pretends to protect the same treatment that Procrustes compelled his victims to undergo, America is happy enough in having for the purpose of filling the different functions of the social body hardly anything more than private organizations, simple, rapid, supple, inexpensive, always ready through their very nature to respond to the complex and changing needs of industry, custom and ideas. These free associations have, then, created the wealth and prosperity of the United States, but they have done far more: They have created a nation, a type of society, the only type of future society in fact which can be supple enough to easily accommodate itself to the extreme instability of modern democratic government: they have created the American with his audacity, with his energy, and his determination; and since the wealth, energy and the moral forces of the nation are only the working capital, are only the integral forces of wealth and energy and moral forces of all the individuals of that nation, we ought to carefully study these American associations, in order to find amongst them, through the magnificent results which they have already achieved—and not in the enervating and deceitful reveries of State socialism—the future ways of material and moral progress for humanity and for civilization.

A CENTURY OF FRENCH ART AND EDUCATION.¹Miserere in Choir of Amiens Cathedral. From *L'Art pour Tous*.

THE exhibition [Paris, 1889], in celebrating the great upheaval of a hundred years previous, both gained strength and lost it. Whether in the sphere of art or in that of education generally the revolutionary epoch offers us a series of picturesque incidents and movements which rivet the reader's attention to a degree which the results achieved perhaps hardly justify. How strangely mixed the ingredients which went to the making of that great bubbling, seething *pot-au-feu*, the French Revolution! an enlightenment which threw open the *Salon* to all comers, French or foreign, as was done in 1791; a bigoted wrong-headedness which called for a holocaust of all the works by artists who had left the country as a sacrifice to the shades of dead patriots! How absurd, yet how nearly bordering on reason, the creation by David of the *Salon* jury, to the composition of which went not only artists, or, perhaps I should say, not only philosophers, poets, mathematicians, men of science, but a tailor or a bootmaker and an artist or two! What unmixed wisdom, on the other hand, that which prompted the dedication of the Louvre as a public gallery and the inauguration of departmental museums, which date from the same year! When discontent against the institution at Burlington House, because of the want of room for outsiders and the greediness of the members, is in the air, it is well to remember that although, on the throwing open of the *Salon*, the number of pictures exhibited jumped at once from 794 to 1,791, and in the next year to 2,000, not a trace of new talent was discoverable. It went only to prove, what ought never to be forgotten, that talent will make its own opportunities. The central figure of this period was David; indeed, for forty years he ruled his fellow-artists like a dictator; always classical in his leanings, he gradually deserted Rome for Greece as the source of his inspirations, for, as he said, Rome would have been barbarous without Greece. Like most reformers with a real foundation of good sense, he soon found himself left behind, and the school of Primitives, who burned to destroy every work of art subsequent to the time of Phidias, did not scruple to label him "Rococo." It is impossible to follow the "Century of French Art" in detail. Ingres succeeded to David as the champion of the Classicists, while the Romanticists ranged themselves under Delacroix. Corot, Rousseau and Daubigny, who first made Barbizon historical, belong, as it seems, almost to our own day. Later still come Millet and Breton, and then we are face to face with Regnault and his contemporaries. Such a roll of names as the French painting and sculpture of the period present is to be matched nowhere else.

The same period saw the building of the Panthéon, the Madeleine and, later, Ste. Clotilde; while among sculptors, as among painters, the classical feeling, which at one time was so strong, or at least so much in the mode, was gradually exchanged for a manner which inclines to sensuousness, and is sometimes too clever to be statuesque.

Of the long survey of education it is impossible to give even the barest outline. Marcus Aurelius, Charlemagne, Remi of Reims, who opened the first public school in Paris in 908—these are the names most closely associated with the establishment of educational machinery in France during the first ten centuries of the Christian era, and, from the time of the last-named teaching, may be said to have become not only a recognized career, but even a stepping-stone, as in the cases of Adrian IV, Innocent III, and others, from the most humble to the highest place. From the earliest days the rhetoricians had found a fertile soil in the acute intellects of the people of Gaul. Their forensic abilities, their love for the subtleties of argument, soon showed themselves, and we find that the actual creation of the other faculties in the University of Paris was mainly due to the exaggerated addiction to argument which marked the theological professors appointed by the Pope, and a general desire for some means of suppressing them. This antagonism was no passing feeling, and resulted in a gradual estrangement of the University from the Pope, till at the beginning of the fourteenth century it was in close touch with the civil authorities.

The setting-up of the first printing-press in France, in 1470, was the beginning of a new order of things; mental gymnastics, wild and often childish speculations, gave way to a better-regulated system of study, the formation of a more compact body of established knowledge, and the growth of a more scientific attitude of mind. It was no longer the day of an Abélard confronting the deepest controversies with airy audacity. Erasmus epitomized the new spirit of the age when he said: "When I have money, I shall buy Greeks books first, and clothes afterwards"; and Montaigne first gave the

real formula of education when he described it as the "bringing-up of men so that they can do anything, but choose only to do what is good."

I pass over the days of the Reformation, dark ones for the general cause of education, however warmly Luther himself was inclined to promote it, because the attention of the world of learning was devoted almost exclusively to theological studies; and I pass over the days of Jesuit dominion, constantly broken and as often rearing its head again, when the aim was less to turn out thinkers, than Christians with a sufficient appearance of education to be deceptive. In 1762 appeared Rousseau's "*Emile*," and the secularisation of education became the universal cry. With the Revolution came a whole crop of vast projects based on sound reason in many respects and prophetic of much that is familiar to us now, but involving changes so fundamental that, at the moment, they led to little or nothing.

Boissy d'Anglas in 1792 urged the general teaching of design. "It is the school," said Representative Portiez, "in which are formed, directly or indirectly, all the industrial arts." Talleyrand asks the National Assembly for free education for all—in the first degree; Condorcet makes an almost similar appeal to the Legislative Assembly—free education up to such a point as should secure every man his independence. The Convention throws it all aside, and prefers to train up the youth of the country to be not only independent, but, above everything, citizens of a republic. Meantime, while reports are being printed, and projects growing larger, public instruction is almost at a standstill, and the retrograde step of allowing liberty to individual effort is given under compulsion. In vain the "Directoire" threw every obstacle in the way of private schools, which were regarded as hot-beds of Royalism. They only flourished the more.

The First Empire need not detain us; Napoleon did indeed found an imperial university in Paris, but, on the other hand, he denuded half the universities of Europe of their students. MM. Victor Cousin, Guizot, and Duruy fill the interval till the war of 1870, but it wanted that stimulus to make the spread of enlightenment other than tedious. The result of the war pointed to an obvious rottenness somewhere, and the friends of education had the whole people at their back when they demanded that the general level of intelligence should be raised. Public attention was turned by M. Jules Simon to the necessity for a greater development of physical powers, history, geography, and modern languages were given a larger space in the field of secondary education. The leading idea, indeed, was to provide remedies for the special weaknesses which the war had brought out. It remained for M. Jules Ferry to accomplish what Jules Simon, and Duruy before him, had desired, and in 1881 primary education was made free, and shortly afterwards obligatory; while a few years later public instruction was put exclusively into the hands of laymen. The tendency in France, in the higher education, just as it is in England, is to the so-called "modern side," and to general culture rather than to a high degree of proficiency in special subjects. Meantime two principles have been evolved, which have what would seem a lasting foundation in their justice and reasonableness: First, the duty of the State to teach; and, secondly, the right of the individual to exercise the same function.—*The R. I. B. A. Journal*.



SOUTHERN CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

AT the Second Annual Convention of the Southern Chapter of the American Institute of Architects, held at Birmingham, Ala., January 10, the following officers were elected for the ensuing year: *President*, Mr. L. F. Goodrich, Augusta, Ga.; *Vice-President*, Mr. E. G. Lind, Atlanta, Ga.; *Secretary*, Mr. W. P. Tinsley, Lynchburg, Va. The following Board of Directors was elected: D. B. Woodruff, Macon, Ga.; T. H. Morgan, Atlanta, Ga.; C. C. Burke, Memphis, Tenn.; Tom Wood, Sherman, Tex.; T. H. Maddox, Birmingham, Ala.



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

HOUSE OF DR. HENRY HOOPER, NORTH STATE ST., CHICAGO, ILL. MESSRS. BURLING & WHITEHOUSE, ARCHITECTS, CHICAGO, ILL.

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

ARCHITECTURAL SHADES AND SHADOWS: PLATE IX.

For description, see article elsewhere in this issue.

CENTRAL BUILDING, KINDERGARTEN FOR THE BLIND, JAMAICA PLAIN, MASS. MR. WALTER R. FORBUSH, ARCHITECT, BOSTON, MASS.

¹ From a review by Mr. A. E. Street of the "*Exposition Universelle internationale, 1889, Paris, Rapport général*," par M. Alford Picard.

PUBLIC LIBRARY, CHARLESTOWN, MASS. MR. C. C. MCALPINE,
ARCHITECT, BOSTON, MASS.

HOUSE OF D. B. ANDERSON, ESQ., NEW CUMBERLAND, W. VA.
MR. S. T. MCCLAREN, ARCHITECT, PITTSBURGH, PA.

HOUSE DESIGNED BY MR. SAMUEL MILLIGAN, ARCHITECT, PHILA-
DELPHIA, PA.

[Additional Illustrations in the International Edition.]

THE ANCIENT CATHEDRAL OF CAMBRAI (NORD), FRANCE.

THANKS to the labors of an architect, M. Peinte, lately deceased, we are able to furnish, in connection with the plate we copy from *La Construction Moderne*, the following facts concerning the ancient Cathedral at Cambrai:

M. Peinte, who for sixty-five years practised his profession in Cambrai, devoted himself to determining the sites of the cathedral, the episcopal palace, and the other dependences which surrounded the main entrance to the cathedral. His son, also an architect, settled at Paris, has furnished the graphic and archæological data for this study.

In his history of the cathedral M. J. Houdoy says: "Succeeding conflagrations destroyed the primitive church of Cambrai, the foundation of which dated back to the fourth century. Rebuilt by Saint Waast in the sixth century, and by Bishop Gérard II in the eleventh, on a larger scale, it was partly consumed by the conflagration of 1148, which destroyed all that quarter of Cambrai called 'Le Château,' in which was included the cathedral, the episcopal palace, and the abbey of St. Aubert. Nicolas de Chièvres was at that time the bishop; he undertook the reconstruction of the cathedral on a new plan, and to this work he consecrated not only the revenues of the church itself, already wealthy by reason of gifts from emperors, kings and princes, but to it he devoted also his personal fortune. Thirteen years after the disaster I have just mentioned, the church, or at least an important part of it, was raised upon the ruins of the old building; the nave and transepts were rebuilt or repaired, as well as the steeple, which was rebuilt upon the eleventh-century stone tower, the interior of which had been spared by the fire. . . . At the end of the twelfth century the Romanesque portion of the building was finished, and this included the main entrance, flanked by two projecting turrets, which rose to about the height of the platform, from which started the octagonal stone spire, then recently rebuilt, and which, at a height of one hundred and seven metres, supported the bronze angel which crowned its apex; also the nave and the aisles, in one of which the chapel of St. Gengulphe had been included; and, further, the transepts, with their ends rounded, as is the case with those of the cathedrals at Tournai and Noyon. As for the choir, it was not built at this epoch, and this was the reason why, in 1167, Bishop Nicolas was buried beneath the tower, which was his own work."

The building of the choir was begun during the rule of Bishop Godefroi de Fontaines (1220-37). This portion is ascribed to Villard de Honnecourt, an architect who had already built the Abbey de Vaucelles. On the completion of the choir, the Cathedral of Cambrai had a total length of about one hundred and twenty-eight metres.

Popular rumor mentions a remarkable clock, which is in fact frequently referred to in the local annals. For instance, the account-book for 1318 itemizes the salary paid to the mechanic in charge of this apparatus, which was placed in the north transept surmounting the Chapel of Notre-Dame-de-Pitié, or du Sépulchre.

In 1796, the cathedral, being public property, was sold to undergo demolition. M. Alexander Lenoir, who in 1806 visited the ruins, made to the Société Celtique a report upon the main porch and the tower surmounting it, which at that date was standing. On January 30, 1809, however, this tower was overthrown by a tempest.

At this time an accurate plan of the cathedral ruins was prepared by M. Boileux, architect to the city, and his reconstruction of the plan of the choir conforms exactly with the plan which was found later in one of the note-books of Villard de Honnecourt, the celebrated thirteenth-century architect.

The numbers upon the plan may be interpreted as follows:

(1) Porch; (2) Tower; (3, 4, 5, 6, 7) Chapels; (8) Sacristy; (9, 10, 11, 12, 13, 14, 15) Chapels; (16) Entrance; (17, 18) Transept Doorways; (19) Triforium; (20-28) Chapels; (29) Entrance from Episcopal Palace; (30) Porch; (31) Gallery; (32, 33) Entrances; (34) Gallery; (35) Entrance; (36) Ante-chamber; (37) Chapter-house; (38) Court-yards; (39) Court-yard of the Episcopal Palace.

DOMES OF THE CATHEDRAL, MARSEILLES, FRANCE. M. VAUDoyer,
ARCHITECT.

This plate is copied from *La Semaine des Constructeurs*.

STAIRCASE, SCHLOSS MIRABELL, SALZBURG.

This plate is copied from *Architektonische Rundschau*.

ST. PAUL'S CATHEDRAL, CALCUTTA.

THE Anglican Cathedral Church of Calcutta, an illustration of which is to-day copied from *Indian Engineering*, though not faultless either in its planning, its construction, or its details, is, nevertheless, the most conspicuous ecclesiastical edifice in the city. It occupies a prominent and appropriate position in the southeast corner of the open space known as the *Maidan*, and its graceful steeple soars higher than any other structure in Calcutta.

Its erection was due to the untiring efforts of Bishop Wilson, who himself contributed most handsomely to both the building and endowment funds. The foundation-stone was laid in 1839, and the church was consecrated eight years later, the designs having been prepared by Major Forbes, of the Bengal Engineers, to whose memory a marble tablet was subsequently placed in the church. The cost was about five lakhs of rupees.

The design of the building is in the Gothic style, treated in a manner that may fairly justify our calling it by the not inappropriate name of Indo-Gothic. Fergusson, in his "*History of Modern Architecture*," freely criticises this specimen of Anglo-Indian architecture, remarking that the architect and bishop "produced between them a building in a style such as has not been seen in this country since the Peace of Paris."

In plan the cathedral consists of a large square hall without aisles, transepts, or separate chancel, properly so called, such as one is accustomed to see in the larger churches,—rather conspicuous defects. At the west end is a large porch with the library over it, and the tower with steeple rises through the roof between the porch and the nave. The space below the tower forms a sort of crossing, there being north and south transverse blocks forming entrances to the church and leading to the two vestries which are placed west of these blocks.

The phase of Gothic employed is that known as "Perpendicular," but the leading features are feeble and ill-placed. Fergusson is not less severe in his criticism of the details than of the structure as a whole. He says: "We have done strange things in this country, but nothing quite so bad as that. It entirely fails as a Gothic representation. The worst feature, however, is that of being entirely unsuited to the climate, having neither verandas for shade nor proper windows for ventilation; nor do its arrangements satisfy any of the requirements of the ecclesiologist of the present day." This is sweeping condemnation, but is no doubt given in a fair spirit of criticism, and the fact that the English Cathedral in the capital of our Eastern Empire has so many shortcomings, and is not to be compared with any of the larger churches in England, ought to cause a pang to the large body of Christians of the Established Church whose ways are cast in India.

The extreme length of the building is 247 feet and its width 81, and at the transepts 114. The height of the tower and spire from the ground is 201 feet, and of the walls to the top of the battlements 59 feet. There is a grand enclosed veranda or porch to the west, 61 feet by 21 feet, over which is the library. The vestibule is 36 feet by 22 feet 8 inches. The lantern beneath the tower is 27 feet square, and opens by lofty arches to the transepts.

The dimensions of the main body of the cathedral are 127 feet by 61 feet, and it is spanned by an iron-trussed roof adorned with Gothic tracery. The interior fittings are handsomely carved. The east window was the gift of the Dean and Chapter of Windsor. The subject is "the Crucifixion," after a design by West. The communion plate was the gift of Her Majesty the Queen. The building was consecrated on October 8, 1847.

ALL SAINTS' CHURCH, HERTFORD.

WE copy from *Building News* a general perspective view of the new Church of All Saints, Hertford, from the drawing by the architects, Messrs. Paley, Austin & Paley, of Lancaster. The style of the church is Perpendicular, and, in plan, consists of a nave of five bays, 73 feet long by 26 feet 6 inches wide, with western tower about 26 feet square, and north and south aisles 20 feet and 18 feet wide respectively, with aisles opening into the tower, in which is placed the font. The north porch is hexagonal, so that its entrance may be more convenient as regards the pathway. There is also a western entrance through the tower. The chancel is a continuation of the nave, and is 42 feet long. There will be no chancel arch, as in the old church and in other instances in Hertfordshire. There will be a spacious south chancel aisle, with separate entrance and porch, and on the north side of the chancel a lofty organ transept with two arches opening into the north aisle. There are also clergy and choir vestries on the north of the chancel. The new church will cost at least £15,000. A limited number of well-known church architects were invited to send to the committee drawings and photographs of their executed works, and by these a choice was made of the architects, who thereupon received the commission.

NEW PREMISES, CHELSEA. MR. F. G. KNIGHT, ARCHITECT.

THIS illustration, copied from the Jubilee issue of the *Builder*, shows some new business premises, with residential apartments for assistants above. The buildings are now in course of erection in Sloane Square for Mr. D. H. Davies. The materials used for the front are light-red bricks from the Laverstock & Acorn Company, and terra-cotta dressings and enrichments, with Westmoreland green slates on the roof.

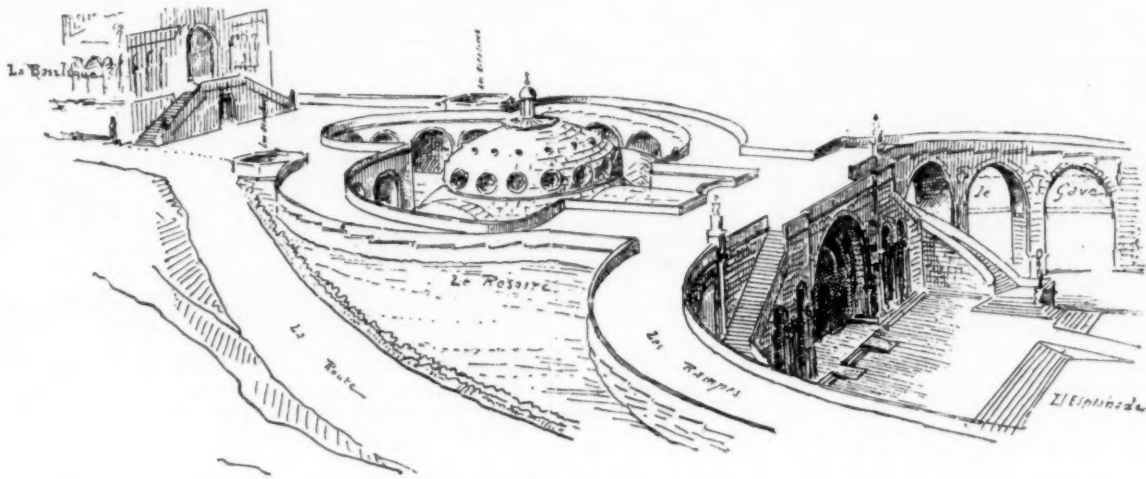
THE CHURCH OF THE ROSARY, LOURDES, FRANCE. M. HARDY ARCHITECT.

TWENTY-FIVE years ago, in consequence of the miracles said to have been performed at Lourdes, a church was built on the cliff which overhangs this celebrated grotto, under the direction of the late M. Durand, diocesan of Tarbes. This building, now called "the

dition seems almost superfluous, since a true artist will not do wrong to the work of his predecessor.

The new church was erected in the name of the Rosary and this nomination determined the form of the plan. Work was begun in 1883 and all the important portions except the spires were finished in 1889.

The plan of the church itself is a Greek cross, each arm of the



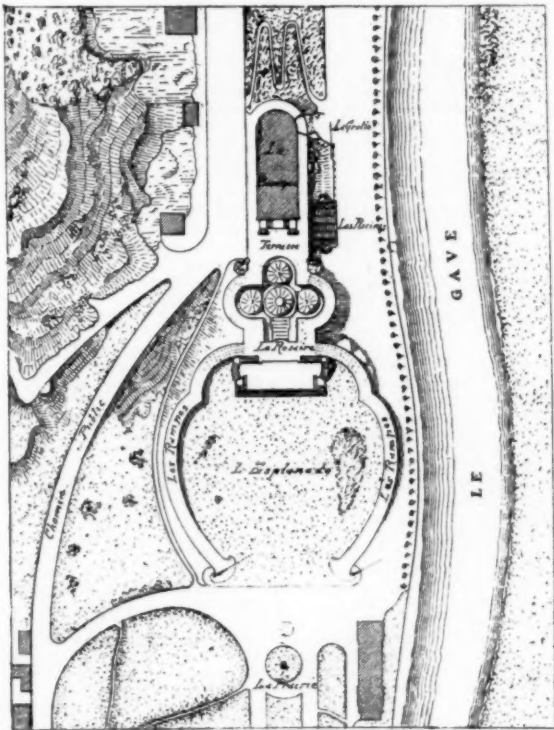
Church of the Rosary, Bird's-eye View.

basilica," is not of great size, and consists of merely a nave with lateral chapels, while a crypt has been provided under the choir and chapels. As this building has now become too small for the accommodation of the many pilgrims to this famous shrine, it has been necessary to build a new church. Besides, it was very desirable that the processions, which form the characteristic feature of the devotions, should take place elsewhere than over the public roads.

The basilica is built on a cliff nineteen metres above the Gave, which flows at its foot. The cliff and hillside extending northeastwardly, it seemed to be difficult to find a proper site for this new building; so, on the suggestion of the architect, it was decided to excavate the cliff to the foot of the basilica and let the ramps ascend from the plain to the head of the basilica, passing above the new church as they did so, although the work would be of considerable

cross containing five chapels, consecrated, the five in the south transept to the Joyous Mysteries, the five in the choir arm to the Sorrowful Mysteries, and the five in the north transept to the Glorious Mysteries. The south and west sides backing against the hillside not affording a chance for windows, light had to be admitted from above.

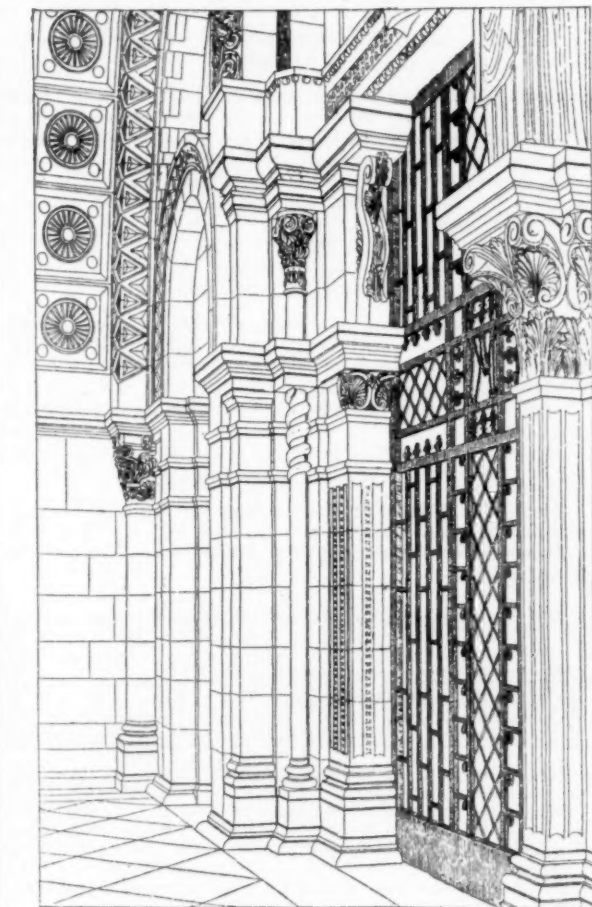
The church is vaulted, the central space being covered by a dome



Ground Plan.

magnitude, involving the removal of ten thousand cubic metres of stone.

The prime condition was to meet the urgent requirements of the situation without injuring the basilica. The last part of this con-



Detail of the Porch.

on pendentives. This is pierced with thirty-two bull's-eye windows, while the eye of the dome, like the others, still waits for its furnishing of stained-glass. Each chapel is lighted through windows that take their light from under the arcades which support the ramps.

These *rampes* ascend with a grade of 0m.10 per metre, and in their construction all steps and stairs have been omitted, to avoid accident during nocturnal processions. Starting from a level, the one bordering the river is supported upon solid arcades, while the other rests upon arched niches dug in the cliff itself. The first runs end in a wide landing just over the nave of the new Church of the Rosary, and from this level they continue with a grade of 0m.11 or 0m.12 per metre, getting their support on the piers of the chapels below. Two spiral staircases, at right and left, provide means of descending from the level of the basilica to the new church and to the *quai du Gave*. These staircases are ultimately to be crowned with stone spires and connected with the basilica by cloisters or porticos, the façades of the basilica being widened by the addition of two towers.

The church is built of a very hard grayish marble obtained from the local quarries, so hard that the workmen have to use hammer and chisel with great care. In consideration of this hardness of the material, and considering also the rude aspect of the surroundings, it was thought best to build the *rampes* with rock-faced stone, dressing only the more important parts.

The interior of the church was lined with a white stone, not only for economical reasons but also because the native stone used for the exterior was, curiously enough, in spite of its hardness, of a very hygroscopic nature.

Half of the church is founded on the living rock of the cliff, while for the other portions foundations had to be sought in the ancient bed of the Gave under water. These foundations had to be carried five metres below low-water mark. Between the layer of concrete which finishes the foundation and the level of the church floor above a large reservoir has been contrived, in which, during the winter, will be collected the precious water that flows from the grotto.

Between the two *rampes* is enclosed a broad esplanade on which can be gathered as many as three thousand pilgrims. Here on solemn occasions will be set up a portable altar just in front of the great entrance, the steps of the church serving as the choir, and the spiral staircases on either hand as ambos.

This description and the accompanying illustrations are copied from *L'Architecture*.

ST. PAUL'S CATHEDRAL: SOUTH SIDE OF CHOIR STALLS.

ST. PAUL'S CATHEDRAL: DETAILS FROM CHOIR STALLS.

A FLEMISH MAISON COMMUNALE. MR. W. C. BRANGWYN, ARCHITECT.

This building has been erected at Cruybeke, near Antwerp. The walling is in red brick, with white stone dressings and green slate roofs. On the ground-floor are the offices of the "Bureau de bienfaisance," entrance-hall, etc., and on the first floor the council-chamber and secretary's office. At the rear are lodgings for the care-taker. The work was obtained in competition with several Belgian architects.

OFFICES, LAWRENCE LANE, LONDON, E. C., ENG. MR. HERBERT E. KNIGHT, ARCHITECT.

This building, covering an area of over 2,000 feet superficial, with a limited frontage, is being erected in the present-day luxuriously fitted manner, the whole of the office-fittings being in English oak, the external front being in Portland stone and glazed brick. Like all first-class modern offices, the electric-light is being adopted.

SANDHILL SCHOOL, LAUNCESTON, TASMANIA. MR. ALAN C. WALKER, ARCHITECT.

This building is being erected from the designs to which was awarded the first premium in open competition. The working-drawings were prepared by the Public Works Department of Tasmania.

DESIGN FOR VILLAS, MOUNT MARTHA ESTATE.



INTELLIGENCE AS IT USED TO BE IN HOLLAND.—A correspondent says that the good citizens of Kempen, in Holland, where Thomas à Kempis was born, do some droll things. At one time a fire broke out, and much damage was done because the engines were out of repair. The Council met, and after much argument it was voted that on the eve preceding every fire the town officers should carefully examine the engines, pumps, etc. One of the greatest profits of the town was the toll exacted at the gates. The Council wished to increase the income, and instead of increasing the toll it voted to double the number of gates. This same Council also ordered the sun-dial to be taken from the court-house common and placed under cover, where it would be protected from the weather. But of all the queer things that are told of Kempen and its people nothing is so absurd as this: Grass grew on the top of a very high tower, and the only way these droll Dutchmen

could think of to get it off was to hoist a cow up and let her eat it.—*N. Y. Tribune*.

THE COST OF A BILLIARD BALL.—The cost of a billiard ball is curiously estimated by a Cairo author as follows: In the judgment of honest African travellers, the tasks of dazzling whiteness are answerable for the following: 100 deaths that must be counted as murder or manslaughter; thirty deaths, incurred during the journey from the interior to the coast; ten "deaths by law," and ten accidents during the elephant hunt. "Add to this fifteen thefts, any amount of cheating, drunkenness, and acts of brutality and cruelty." A medium-sized faultless tusk yields two, or occasionally three, billiard balls; and every ball means, it is stated, at least one murder or one great crime.—*Invention*.

ALUMINIUM FOUR CENTS PER POUND.—Dr. Meyer, of Berlin, claims to have discovered a process by means of which aluminium can be produced at 2d. per pound. In 1830 the value was £1,000 per pound. The price to-day is 4s. per pound. There is said to be ten times more aluminium in the world than there is of iron, lead, copper, zinc, nickel, gold, and silver combined. It is stronger than iron, and more malleable than copper, as hard as silver and one-fourth the weight, as white as polished steel, and it is unaffected by the atmosphere.—*Invention*.



THE abundant statistical information and voluminous reports that have been published since the opening of the year go very far to strengthen and fortify the conclusions drawn late in the old year concerning the probable characteristics of 1893. The strong point is that stocks are low. The weak point is that prices are abnormally low—so low as to check production beyond really safe limits. The duration of this depression will cause exhaustion of stocks. Cold weather has, of course, obstructed deliveries of some of the heavier materials, but the weekly figures of railroad traffic show very little, if any, diminution in general merchandise shipments. The returns of one hundred and twenty-five railroad companies' reporting for eleven months show heavy gains in gross earnings and moderate gains in net earnings. Probabilities as to railroad earnings in the near future are very favorable for the maintenance of the increase observed during the past year. Another point deserving notice is the wonderful development of traffic on new short lines constructed during the past two or three years, which is shown in railroad-company and State reports. Small towns and small industrial centres are growing rapidly, and traffic resources are developing most satisfactorily. As to new railroad construction, the latest reliable information is that three or four large rail orders have been placed; that construction will begin early in the spring on about two thousand miles of new road; that equipment and rolling stock will be ordered very largely during the next two months, and that a perceptible improvement will result to general business from this source. Careful inquiries made of car-builders prove that the reported activity is true, and that a large amount of new work will be placed soon. It is also definitely ascertained that the requirement for all manner of equipments—railroad, electrical, mechanical—will be unusually large. A leading authority in matters relating to equipment supplies says there is an unusual degree of activity at this time in taking out old and putting in new machinery, in enlarging capacity, in reorganizing industries, and so on, the outcome of which will be greater activity in the numberless little and big shops and factories turning out those things which may come under the name of equipments. A common reply to business managers of trade and class journals is: "We have too much to do to advertise for more business"—a correct statement in a great many instances. The fact is, no less than a dozen States are being made over into industrial States, if the term will answer to explain the great expansion of capital in industries, and its relative increase as to agricultural capital. It is the demand from this source that is making work so abundant in the Eastern industrial centres. But this statement demands modification. In certain channels dulness prevails; but this is due to the accident of enlarged capacity in these special lines. There is so much that is new in all kinds of machinery that those who stand still long enough to rest find themselves distanced by competitors. In the financial world, the ordinary channels are well supplied with money at low interest rates. The realization of the fact that the exportation of gold is due to special causes having their origin in European necessities, real or imaginary, has done something towards relieving the public mind on that score. The contentions of the hostile camps on proposed silver legislation have simmered down to a question of votes. No comprehensive or acceptable plan for a national currency has been presented, though half a score of measures to that end have been formulated. The continued ease in the money markets is exerting a favorable influence on general trade, though it is too soon to move forward. New York jobbers said, last week, they anticipated a heavier trade than for years. Boston jobbing interests, though not so outspoken, have confidence in a year of heavy trade, and at improved margins. The bank clearings are very encouraging, and the fact that the country is not burdened with stocks gives a tone to the market that means steady prices for months to come. The iron and steel trades are quiet. The Western manufacturers contemplate a contest with their skilled workmen next summer, and it is probable an attempt will be made to "non-unionize" the iron and steel mills of the entire West. In the meantime, some preparations will be made for a long suspension by the piling up of stocks. In lumber, strong prices rule; in paper-making, restriction continues; in coal-mining, great activity prevails, except where operations are impeded. In textile mills, orders are crowding production. The policy that manufacturers follow is to keep in sight of the market requirements. The projecting of new work is seen on every hand, despite the modest encouragement given. Promoters and investors argue that an era of higher, if not high, prices is a probability within the next year or two, and they feel it is safe to build and enlarge on low prices. The evil of long credits is being slowly overtaken. This is more due to the stronger commercial health than to any specific efforts of the traders. With all conditions favorable, with low prices, declining mortgage indebtedness, and a fair volume of good money, there are no reasons for anticipating adversity or depression. Another good building year is promised. The enterprise displayed last year was wise, and has been fairly rewarded. Material is lower in price, and manufacturers are soliciting yearly contracts on the basis of last season's figures.

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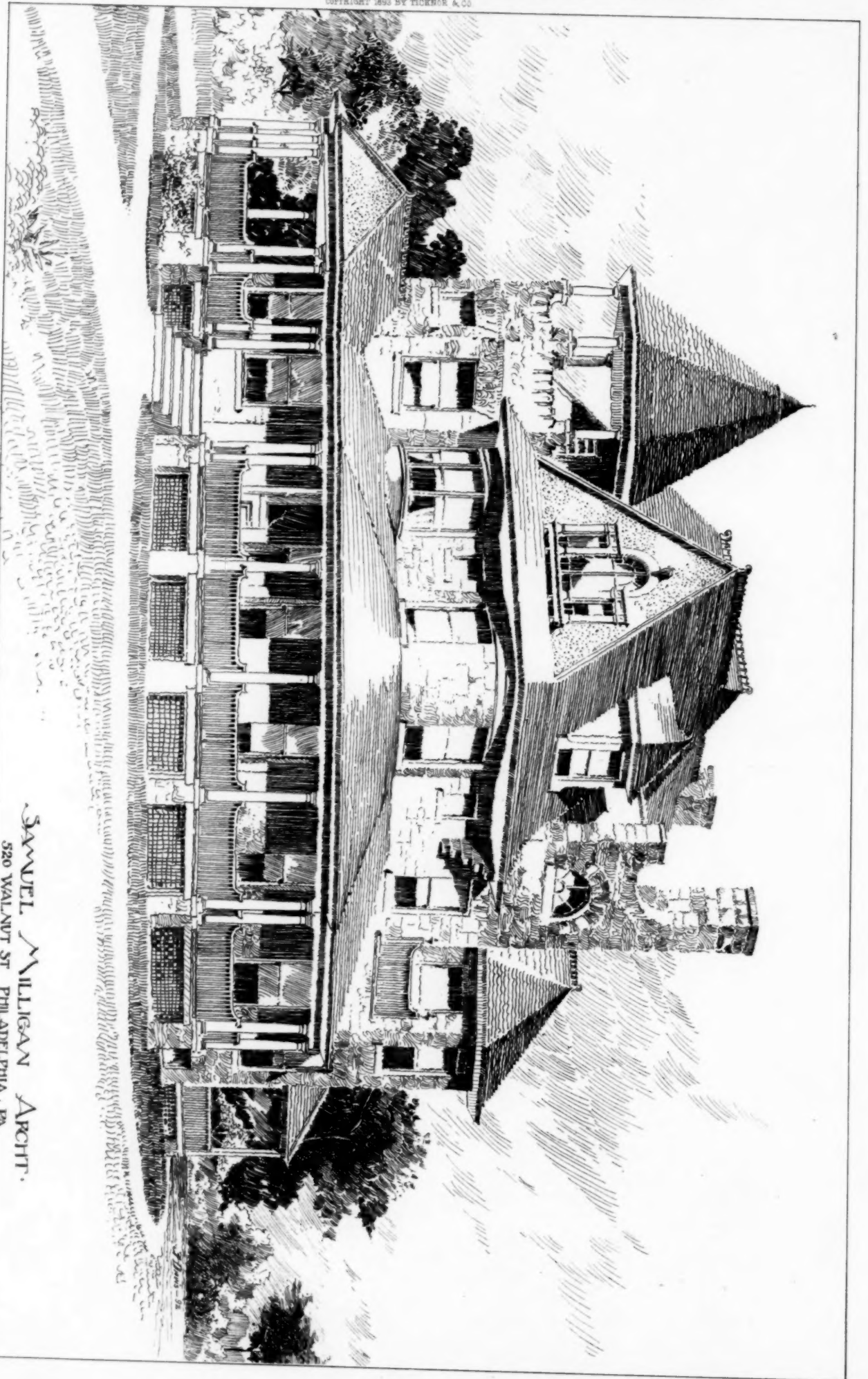


RESIDENCE OF D. B. ANDERSON. NEW LUMBERLAND, W. VA.

S. T. M. Carter, Architect, Westinghouse Bldg., Pittsburgh, Pa.



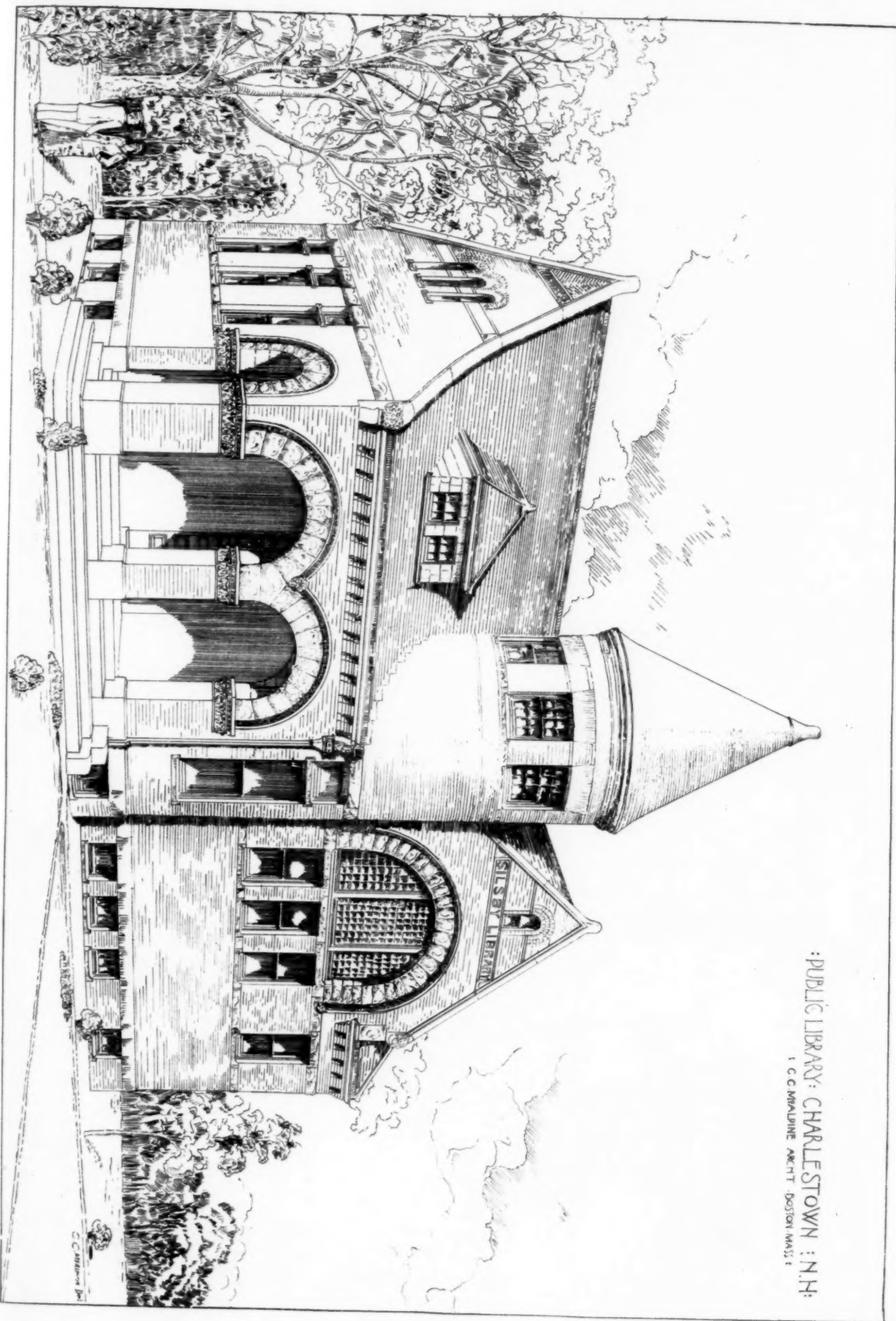
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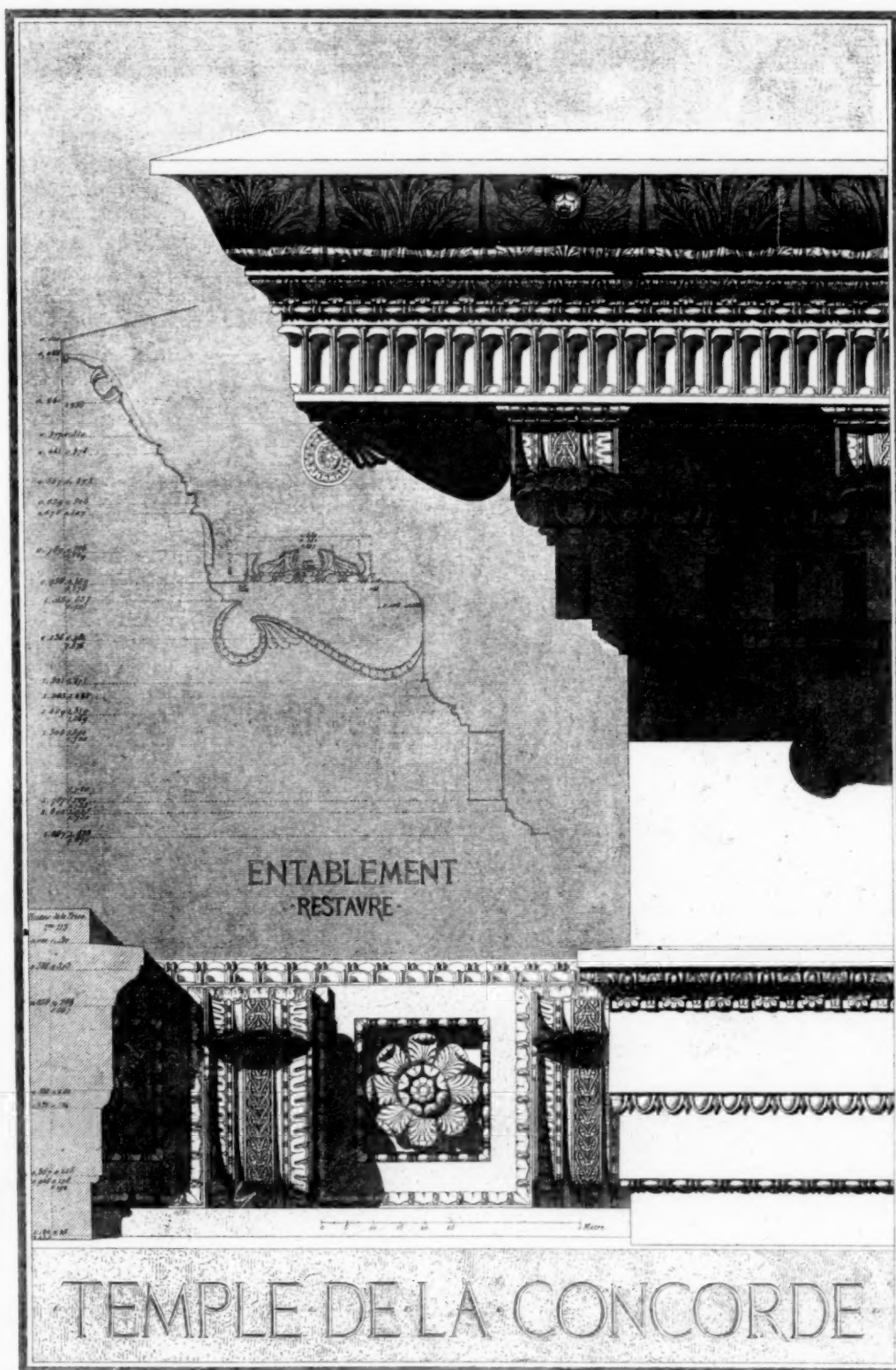


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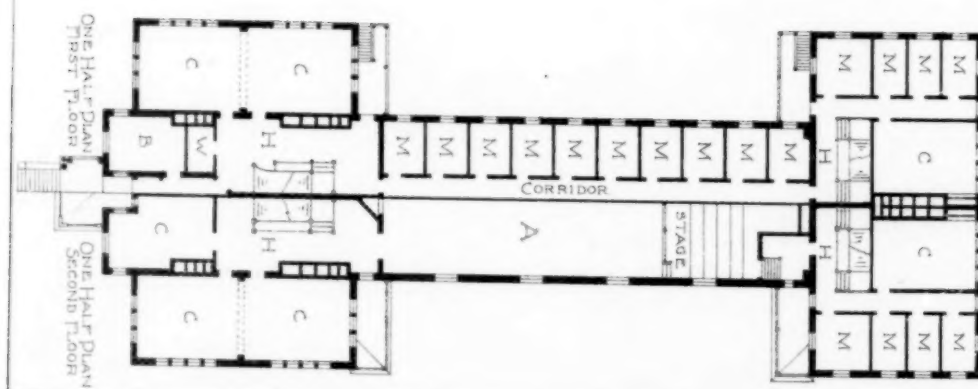
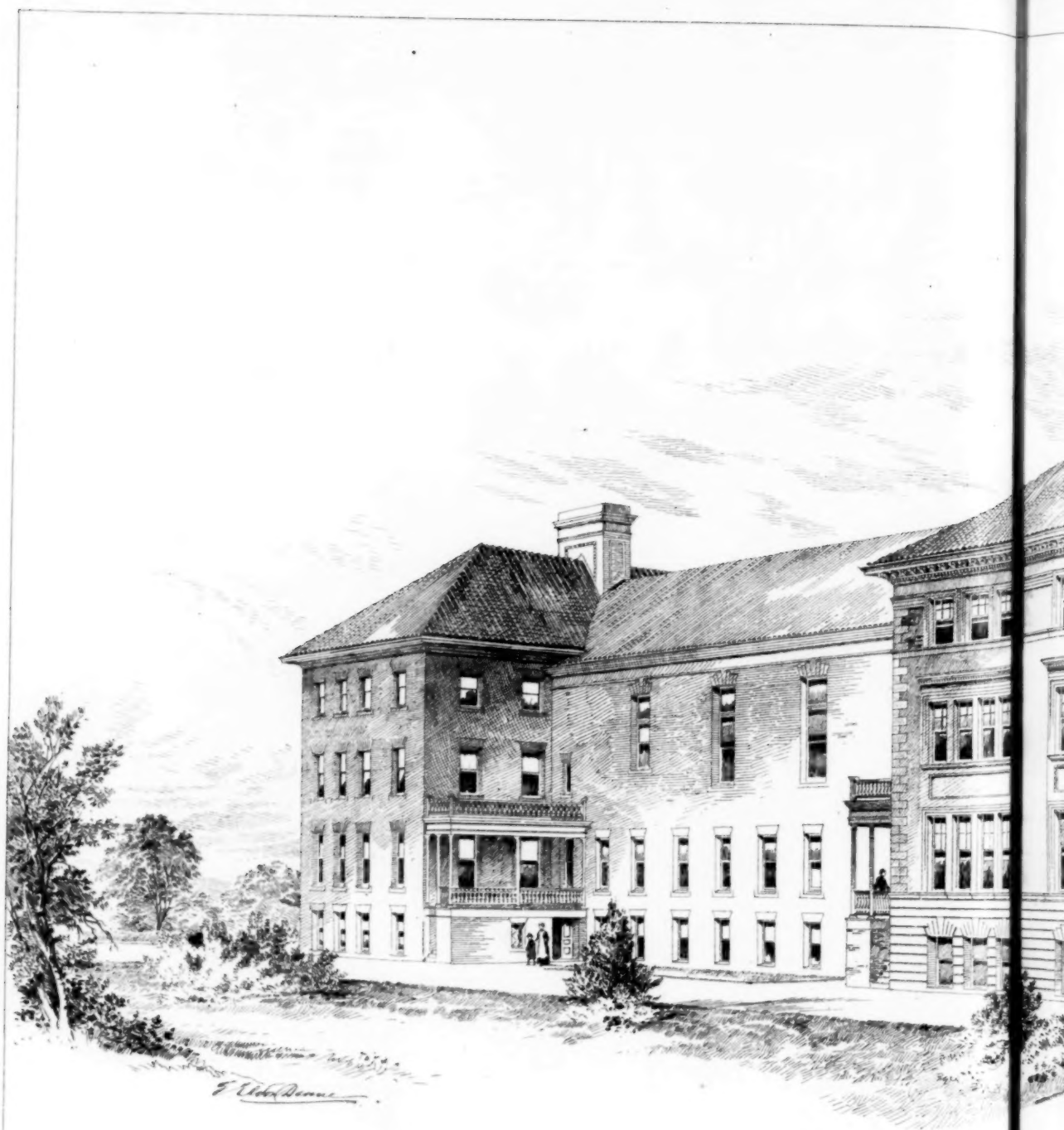
SHADES AND SHADOWS.

PLATE 9.



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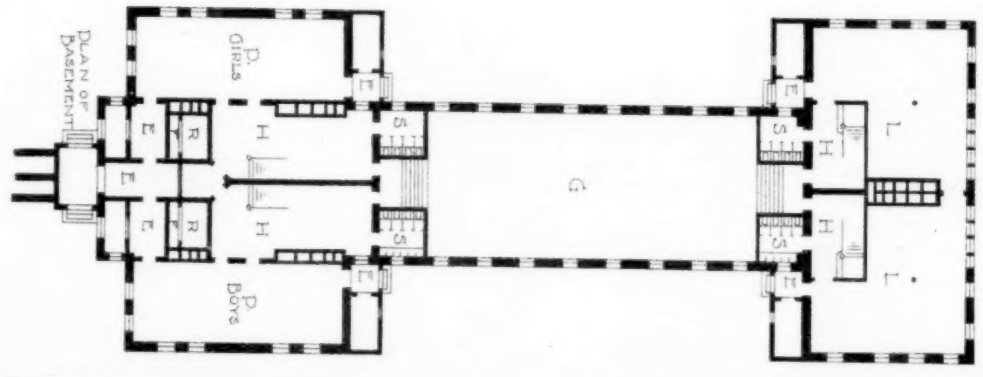
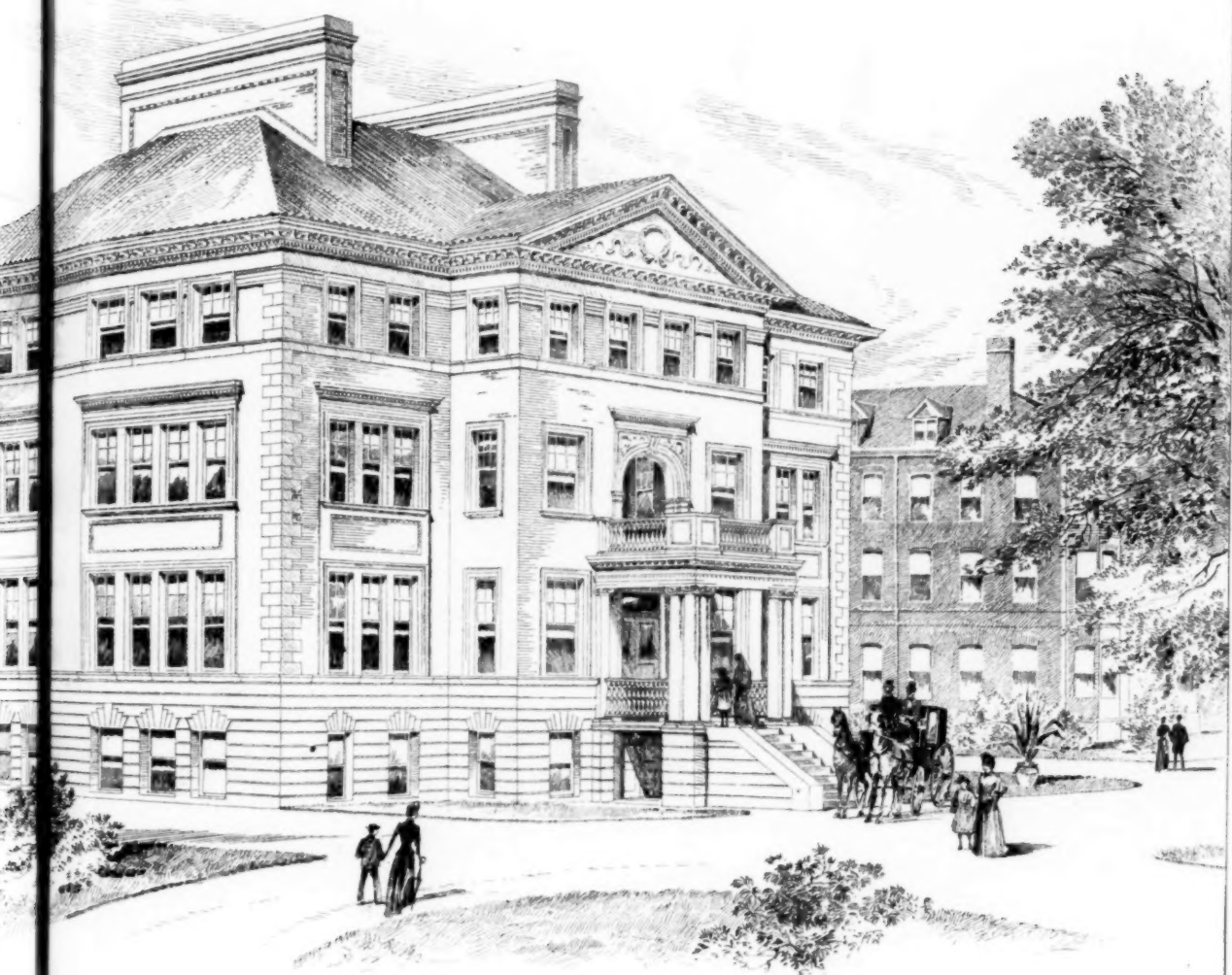
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- A • AUDITORIUM
- B • RECEPTION ROOM
- C • CLASS ROOMS
- E • ENTRANCE
- F • FANS
- G • GYMNASIUM
- H • HALLS
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- M • MUSIC ROOMS
- P • PLAY ROOMS
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• WALTER • R • FORBUSH •



FOR THE BLIND.
JAMAICA PLAIN.