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WOODEN HOUSES IN SWITZERLAND.

VISITORS to the Geneva National Exposition of 1896 have had an opportunity to admire quite a large number of wooden buildings typical of those peculiar to the different Cantons of Switzerland—châlets for mountain, valley and plain, country houses, etc.—of various epochs, from the sixteenth century to the present day, all grouped together under the title of the "Swiss Village." The idea in the minds of the organizers of the Exposition was to give a sort of epitome of one of the most interesting, and certainly the most original chapters in the history of Swiss art—that of house building in wood—and it was important that visitors should have before their eyes a picture of the surroundings amid which former generations passed their lives, and should see what a thorough and charming sense of art, what graceful and picturesque originality, had been displayed by Switzerland in that architecture which is peculiarly her own. The "Swiss Village," therefore, was arranged on historical lines. Each house or chalet figuring therein exists, or did at one time exist, in reality; each has its date, its place of origin—in fact, its identity is fully established. These reproductions are absolutely faithful, not only the general plan and the mode of construction being exactly followed, but also the smallest details of the painted and carved ornamentation. The ex-

amples presented have been taken from almost all parts of Switzerland, and we find every architectonic form of wooden house, from the humblest and most modest, such as the little châlets (*mazots*) built high up on the mountains to shelter the cowherds in summer time, to the richest and most artistic creations in the way of carved and painted façades adorning châlets of the valley and of the plain, handsome inns, or dwellings of well-to-do farmers, such as the Châlet de Fischental or the Auberge de Treib. Everything is authentic enough to satisfy the most exacting of archaeologists. Imagination has been brought into play only in the grouping of the châlets and the arranging in a village—street, square, lanes, pump, etc.—of elements procured from all parts of Switzerland.

But the "Swiss Village" in the Geneva Exposition goes beyond the object which was at first contemplated. The idea was to reproduce a national feature, and we find that the bringing together of the elements of this historical picture has resulted in the revival of a style and the restoration to a place of honor of a mode of house-building which can be employed at the present day, thus resuscitating a variety of most agreeable architectonic forms. It is a natural album for the use of architects and artists, and we are inclined to believe that, the example now

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having been given, we shall witness a renaissance of the art of wood-working. In Switzerland, architects have already begun to study the old models of *châlets*, and the modern edifices in course of erection (photographs of which will be given) no longer present those architectural absurdities that are embodied in certain fanciful *châlets* built during the last twenty-five years. By studying the faultless works of former times one gets a fuller comprehension of the fundamental principles of *châlet* architecture, all of which principles have their origin in the art of working in wood—in carpentry.

In America, where wood is such a favorite material for the construction of country houses, it is evident that the fact mentioned above, namely, that this art has its own principles and its own *technique*, is in too many cases forgotten or ignored. It would appear that architects are unable to cast aside the theory and practice of stone work and believe it is possible to produce the same effects with wood that are obtained from stone. Hence the ridiculous result that many of the country houses of wealthy people in the United States have colonnades and frontons, attics and porticos, treated *in wood*. This has been done and is still being done every day, and it is nothing less than an architectural heresy. It is a complete jumble of the most elementary principles of the building art. An architect who desired to reconstruct the Parthenon in iron would not be guilty of a graver error than this.

Another cause of the inferiority of wood architecture in America is the manner of placing the boards on the walls, the upper ones usually overlapping the lower. The certain result of this is to prevent any decoration of the fronts, and to produce, by the numerous lines of the revetments, a fatiguing effect which mars the appearance of the edifice. Besides, the joists are not visible and give no idea of the internal structure of the house. Furthermore, a proper use of wood is not made in

the decoration of the interior. Nothing is better adapted for this purpose than wood, by its color, its grain, and the facility with which it can be ornamented, moulded and carved; yet in most cases it is sought to hide the material employed by means of papers and hangings, thus taking away the stamp and character of the building. Lastly, the deplorable custom which exists in the United States of painting the whole of the woodwork puts the finishing touch to it! All the houses are colored in some hue or other, and beneath this coating there might just as well be plaster, or brick, or stone. The effect is cold and commonplace. In Switzerland, on the contrary, where the woodwork is left in its natural color, being merely treated with refined linseed oil, the fronts of the *châlets* become bronzed and take various shades as the years go by with their showers and their sunshine, and they acquire an exquisite patina which makes each habitation a living thing in harmony with its surroundings and its climate.

In Switzerland, too, and the other countries where the woodworking art has flourished and created a style, instead of masking and hiding the material employed, every effort has been exerted to make the most of its decorative properties; hence the joists are exposed, the projections of the upper floors emphasized, and the joints left uncovered; the roofs are developed and the eaves extended, protecting the house and producing the finest decorative effect imaginable with their supporting brackets. Inside, wood forms are the basis of the ornamentation, the walls are wainscoted and the beams are left visible in the ceiling. This is the natural and logical decoration of a *châlet*. Following in this way the most simple and the most evident principles a style of architecture has been created which is full of grace and originality.

Before giving a detailed description of the different types of *châlet*, it is necessary to furnish a little general information as to their dates and history. The art of building in wood has flour-

ished in Switzerland to a special extent since the sixteenth century. The finest specimens of wooden edifices belong to the seventeenth and eighteenth centuries. The *châlets* of those periods are those which have the best ornamentation and present the most perfect styles. The farmers' *cnalets* of our own day are not so rich, nor in such impeccable taste. It is for the edifices of the upper classes to continue the sound traditions of the last century. All the elements exist, and architects have the opportunity to make a close study of the most perfect models. It would be unpardonable to copy the errors of our predecessors and be content merely to get somewhere near the mark.

There is another interesting observation to be made upon the style of decoration illustrated in *châlets*. We have here an art which flourished in the sixteenth, seventeenth and eighteenth centuries; that is to say, during the period when, in stone architecture, the ornamentation borrowed from the antique Roman was, through the neo-classic Renaissance, at the height of its glory; when the study of ancient bas-reliefs and monuments led Italy, first, and then France and the rest of the civilized world, to abandon the architectonic and decorative styles evolved by Christian and feudal Europe, in order to resume a tradition long dead and which had been beautiful and brilliant only because it was the natural and legitimate outcome of a special society and a special civilization. At that period, when the craze for the uncouth and the *rococo* sprang up (it endures still), wood architecture had reached the fullness of its growth, and its efflorescence was in no wise modified by the strong current which carried Europe towards the antique. On the contrary, the woodworking art has conserved the traditions of the Middle Ages and we are able to see on the fronts of some of these *châlets*, perpetuated for our delight and wonderment, the arabesques and palm branches, the roses and the flower-work, created by the inventive fancy of the masters of that period. We meet with some

very curious survivals, showing how the trades' corporations have clung to their traditions and defended them against the learned innovations of the architects. Even in the masons' trade we see how the existence of the Gothic arch has been prolonged long after the resurrection of Vitruvius radically modified the principles of architecture. In the woodworking branch this resistance has been complete. The carpenters have repelled all attacks made upon the traditions handed down to them by their ancestors. They have realized that they exercise a special art, with its own principles, requirements and beauties, and also its own limits. These principles have been developed by them and carried to their full conclusion, and, remaining thus faithful to themselves, they have attained a genuine architectural style.

Even if one is only slightly acquainted with the early Romanesque decoration, one cannot fail to see the resemblance thereto of some of the motives met with in the Swiss *châlets*. And if one has studied the origin of the Romanesque style and traced its roots in the industrial arts; if one has examined the earliest manifestations of carpentry in Norway and Sweden—all that distinct and very original decoration revealed in the doors of certain churches constructed in wood—one cannot have helped noticing the large part which wood decoration, in a word the carpenter's art, has played in the formation of the Romanesque and Gothic styles. This influence is undeniable, although it has been studied by very few. People who have examined those primitive examples of woodwork must have been struck by the very oriental character of some of the decorative motives. In some of the twine and rosework there is clear evidence of our common oriental origin, and it is not one of the least subjects for astonishment to find that civilization did not spread solely by way of the Mediterranean basin, but that traditions and a certain current of art traveled directly from the East to the North.

It is thus to Romanish art, to the



FIG. 1.—CHALET DE FISCHENTHAL.

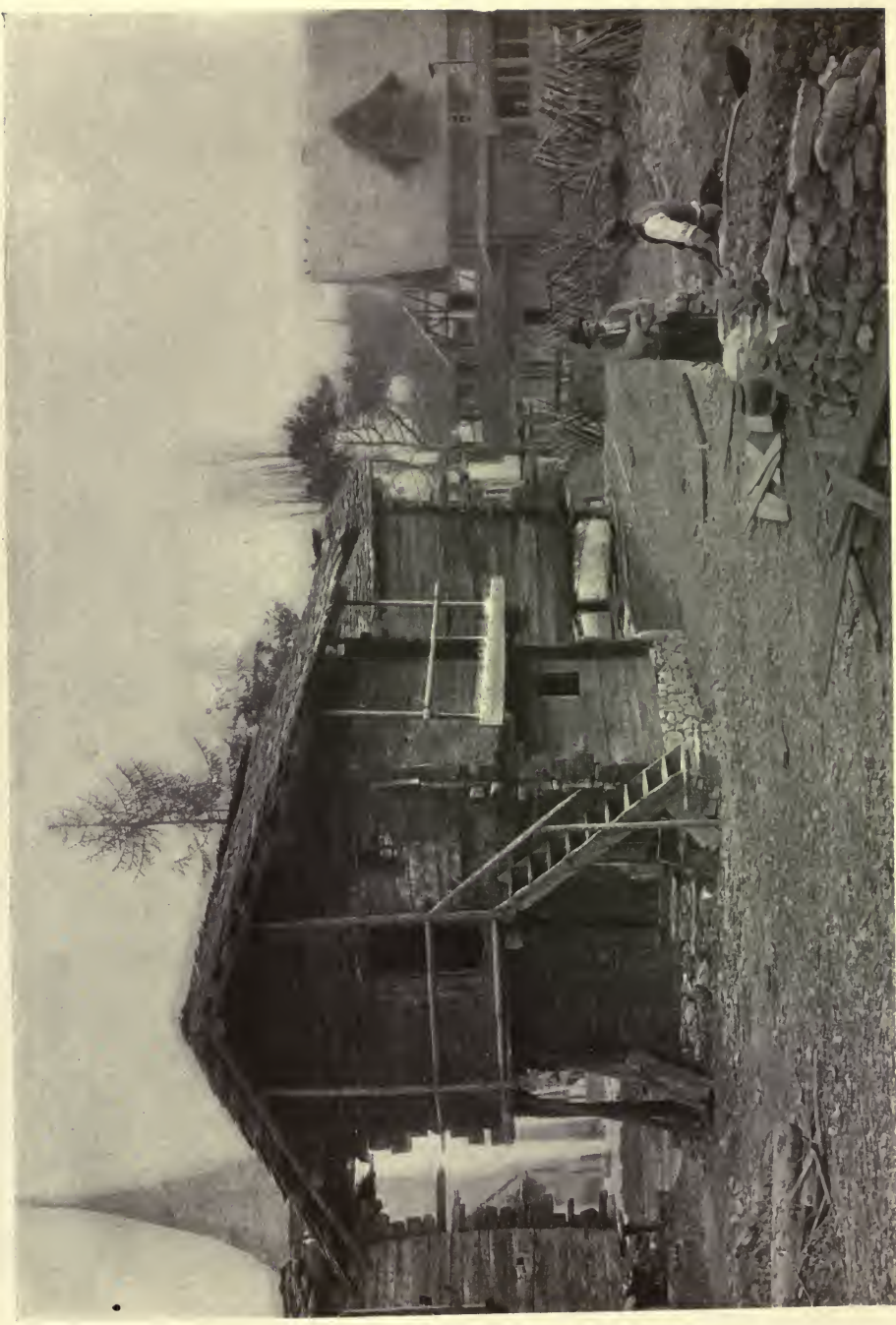


FIG. II.—COWHERDS' SHELTER.



FIG. III. —CHALET DE STANZ, A. D. 1724.



FIG. IV.—CHALET DE BERLINGER, A. D. 1750.

art of woodworking as practiced in early times in the North of Europe, and, if we wish to go back still further, it is to the East, that we must look in order to find the origin of the ornamentation that subsists to-day upon the fronts of our châteaux. These are sound and authentic patents of nobility for Wood Architecture. Our carpenters have been unconscious of the high antiquity of the traditions of their calling; but they have performed their task with earnestness and candor; they have pursued a good and ancient craft, and it is legitimate, even in an ephemeral review article, to say so and render them this homage.

* *

Let us now deal with the practical and technical side of our subject. Varied as are the châteaux found in Switzerland, they can nevertheless be comprised within three principal classes, to wit: the chateau of the plain, the chateau of the mountain side or of the valley, and the chateau of the heights. We will give two or three examples of each of the first two classes, but will limit ourselves to one chateau of the third class. The last-named type is not suitable for us, whereas in the other categories there are numerous specimens that could be copied by us and adapted to the requirements of contemporary life; in fact, there is a large series of edifices in exquisite taste which would furnish country houses thoroughly habitable and of pleasing aspect. In a future article we shall treat of the technical side of chateau construction in Switzerland, giving the methods followed *at present* and the cost of erection.

The *roof* will assist us in classifying the châteaux. It is modified in a very interesting manner according to climate and altitude. If the climate is a wet one, the roof is made higher and steeper; the gable is raised and brought forward to shelter the front, while the steep slope of the roof causes the rain to run off rapidly into the gutters instead of remaining on the thatch-planks. The fine Chateau de Fischenthal (Fig. 1)* affords a perfect example

of this kind of roof. It is scarcely necessary to draw attention to the extreme gracefulness of this roofing, nor to the elegance and style which it imparts to the entire edifice; but it should be noted that not only is its silhouette charmingly picturesque, but it is the sole logical and rational roof for a certain kind of temperate climate—the Swiss, in fact. The greater number of châteaux of the plain are covered by high roofs of this sort, recalling the beautiful roofs of the Middle Ages which the French sixteenth century has handed down and was able to combine, for a time, even with the principles of construction of the Renaissance. We lost a great deal, not only in grace and picturesqueness, but also from the point of view of comfort and durability, when we abandoned this system and replaced it by flat roofs, and often by galleries after the Italian fashion.

Fig. III. shows another admirable specimen of these large roofs, which seem to envelop the house protectingly. It belongs to a house at Stanz. The façade is constructed in bays of joists bricked in and covered with plaster, so we are here only on the border land of wooden buildings. The roof, however, is typical, being quite that of a chateau. The line of the main roof is broken; it is inflected so as to cover the staircase and the external gallery; at the summit the gable-end is cut off, in order to avoid the too acute angle which would have resulted from the meeting of the two ascending lines. This ingenious arrangement is very frequent in wood architecture. The reader will remark the large mass of the dormer window. True to the principle enunciated above, the architects in wood have never sought to deceive by hiding the organic parts of the building, but have preferred to let them stand forth in all their picturesqueness. It should be noticed, too, as we have an

*We give here, after the Chateau de Fischenthal, one of the most elaborate types of chalets of the plain, a mazot, simple and primitive chalet of the heights, which is only in use during the summer and which needs no more detailed description. (Fig. II.)

illustration before our eyes, that the chimney is provided with a board, which is intended to be upraised on one side or the other according to the direction of the wind. Before finishing with this house, we must not omit to say a word about the beautiful aspect of its front, with all its framework in full view, its exposed beams adding to the architectonic effect, and of its window-frames and roof-brackets, which appear in all their solidity, to the advantage of the general effect. We see here a most successful application of those principles that constitute the beauty and elegance of wood architecture. However, we shall deal in detail with each of these points, and for the present only wish to show one or two of the best specimens of high roofs, which are to be met with in places where rain is more often to be expected than snow.

On the other hand, in spots where there is much snow the roofs are entirely different. Instead of being built so as to throw off the snow, they are flattened in order that it shall accumulate on the house, for a thick layer of snow protects the dwellings from the extreme cold just as it shields the seeds in the earth from the very hard frosts. Thus the roofs are flat and low, and are usually covered over with shingles, the beams projecting beyond the house and forming a sort of ledge on which the snow rests. They certainly have a less picturesque effect than the high roofs, but they are indispensable in certain climates—in the mountains, the upper valleys, etc. We give an illustration of one of these in the *Châlet de Berlingen*, Canton de Thurgovie (Fig. IV.). The gable in this case is also cut off, and the roof projects nearly two meters. Compare the horizontal lines of this roof with the almost vertical ones of the *Châlet de Fischenthal*. The two systems are totally different.

At this point we will make a halt with the rich and handsome *châlet* of the valley—that of *Fischenthal*, for instance, which is one of the most perfect types of wood architecture. This *châlet*

was built in 1785 for some well-to-do farmers in the Canton of Zurich. The "*Swiss Village*" contains a reproduction of the front and roof, and it is from this double point of view that we shall examine it. It will tell us a good deal about the principles of house-building in wood and about the decorative effect aimed at and which is only obtainable from that material.

We have already spoken of the roof as regards its height and steep slope. Fig. V. gives a three-quarter view of the *châlet*, showing the roof under a new aspect. One can form an idea of how it juts out over the façade and how the house seems to take shelter beneath it. In the "*Swiss Villæe*" the *châlet* has a frontage of 27 feet, and the roof projects a little more than 4 feet. It is to the steepness and the overhanging of the roof that the *châlet* owes its admirable state of preservation. Wooden constructions require that their front and lateral walls should be protected from the inclemency of the seasons; hence the extension of the roofs, a feature from which the ingenuity of the architects has managed to obtain such picturesque effects. In front (see Fig. 1) the roof is sustained by large brackets, which are sufficiently massive to contribute to the general effect of the façade, and we see once more how it is in the very nature of wood architecture to throw into relief all the frame-pieces of the edifice and utilize the same for the decoration. The roof is further supported by pendentives of handsome design, resting on the brackets. These relieve the monotony of the ascending lines and give the entire building a stamp of elegance.

The façade itself tells us unequivocally all the secrets of the construction. The whole framework of joists is vertical, and, of course, visible. Between the beams the boards are placed one overlapping the other. The façade is entirely composed of these ascending lines, broken by the window frames.

We touch here upon one of the points on which the wood-builders



FIG. 5. — CHALET DE RISCHENTHAL.



FIG. VI. —DETAIL FROM CHALET DE STANZ.

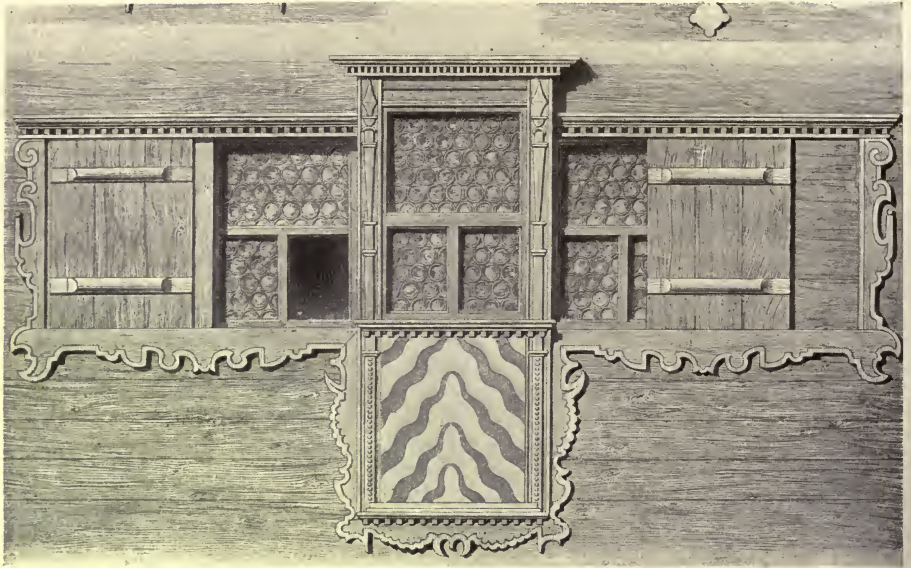


FIG. VII.—DETAIL OF CHALET WINDOW.

have displayed their taste with the greatest success. They have deeply studied the matter of windows; they have employed divers forms; they have made them double and triple, united in a single frame, and have produced some charming varieties. In the course of these articles we shall show a number of examples. These windows rarely appear singly; mostly they are double, and very often triple and quadruple. The reason of this is found in the arrangement of the chalet, which usually has only two floors, and with low ceilings it is not admissible to have high and wide bays, whereas a series of little connected windows has a most pleasing effect from the inside.

It is to be noticed also that symmetry is scarcely ever aimed at, although it is considered by our architects to be an absolute necessity. In the finest chalets the place and grouping of the windows have been decided by fancy and personal taste, and one cannot help recognizing that the graceful freedom of our forefathers has done more to make the window a decorative feature of the façade than could

ever have been obtained by an inflexible adherence to the principles of the architects.

One other characteristic of the window in wood architecture is found in the Châlet de Fischenthal, namely, the prolongation of the frame. It does not merely surround the window, but extends below it as far as the floor, thus giving it a larger place in the *ensemble* of the façade. The panel enclosed by the frame below the window is generally decorated. In the present instance this decoration consists of a lozenge, which is repeated beneath each window.

Lastly, the frame itself demands some sort of decoration, and in chalet architecture the frame-motives have furnished ornaments admirable in style. We need only cite the frames belonging to the Châlet de Fischenthal and those of the Maison de Stanz, of the latter of which we give a separate illustration (Fig. VI.). Here we have, not merely efforts more or less happy, but a complete art that has attained its full expansion and the full mastery of its effects.

Fig. VII. shows a delicious set of low



FIG. VIII. —DECORATION IN CARVED WOOD—CHALET DE FISCHENTHAL. †

windows taken from a ch[^]let in the Canton of Appenzell. It is after Varin's well-known work. We propose to give other models of windows with overhanging ledges, which will be found equally charming.

Our last illustration (Fig. VIII.) shows one of the best specimens of carved woodwork. It is the foliage on the ground floor of the Ch[^]tel de Fischenthal, which separates the two groups of windows. This ornament, owing

nothing to the ancient classic, has that special beauty which was attained in the most exquisite works of medieval decoration.

The wood used in the construction of the Ch[^]let de Fischenthal is deal. It was left in its natural state and probably merely treated with linseed oil. It has, therefore, a beautiful reddish brown patina to which each passing year adds an additional mellowing touch.

Jean Schopfer.





FIG. 6.—HIPPLEWHITE SIDEBOARD.

CHIPPENDALE FURNITURE.

WHENEVER furniture is the subject of conversation it will not be long before the name Chippendale is introduced. It seems to have a peculiar fascination for the tyro in furniture lore and often his sole stock in the names of prominent furniture makers. Usually there is a more or less definite idea of some style or kind of furniture with which the name is associated, even among those least informed on the subject. In a general way every one on hearing the word Chippendale calls to mind some article of furniture he has seen either in the shops where "antique" furniture is sold or in the house of some friend who has a "Chippendale room." Such a piece of furniture they recollect is of mahogany, and, perhaps, has claw feet, but further than this no definite idea of its detail is fixed in their memory. The term is used so regardless of its proper application that those who are familiar with styles are in doubt whether the speaker is applying the word correctly or not. And to those who do not understand the differences in furniture styles the word includes almost anything that is old-fashioned.

The most common misuse of the name is its application to sideboards, and this is encouraged by many dealers in furniture who know better but thereby avoid dispute and make a sale.

It is the endeavor of this paper to explain what are the characteristics of Chippendale furniture, and the differences between it and the nearly contemporaneous makes with which it is confused.

In the second half of the seventeenth century what is known in architectural arts as the Rococo style began to exert its influence in all civilized countries. At first the purer and simpler forms of the Renaissance were mixed with those of the new style, but finally the greatest freedom of treatment prevailed, everything taking the most fantastic forms and combinations.

In Rococo work there is a prominence of ornamentation, and an entire disregard of constructive principles. The lines are curved in the most varied manner, for no particular reason; all straight lines are avoided. The most characteristic ornaments are scrolls, shells and garlands of fruit or flowers.

Rosengarten says: "During this period the deterioration of architecture and taste went hand in hand with the contemporaneous unnatural fashion of wigs and the senseless want of taste in the employment of pigtails and powder; and a certain affinity between the architecture of the seventeenth and eighteenth centuries, and the method of dressing the hair which then prevailed has led to the expression 'pig-tail and periwig style' being employed to describe the period under consideration."

This style of work was almost universal. It was better carried out in

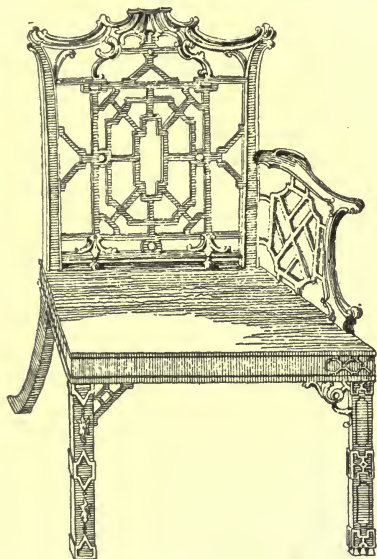


Fig. 1.—Chinese Chair—Chippendale.

France, where it characterized the work at the time of Louis XV., than elsewhere.

In other countries the details are coarse and less refined. Paris was the model for imitation throughout Europe, and except for the local influences the Rococo style became universally the same. England did not escape the fever for the French style, though, perhaps, it did not accept it as early or adhere as closely as some other countries.

Some years before the Rococo period was replaced by a new style, an English book known as the "Gentle-

man and Cabinet Maker's Directory" was published. This was by Thomas Chippendale, and was printed in 1754.

Chippendale was a carver, who un-



Fig. 2.—Type of Chippendale Chair.

doubtedly learned the trade from his father, a maker of carved furniture. The book of sketches he published is one of the earliest (perhaps the earliest) of books on furniture in the English language. This, together with the fashion for old work, has much to do

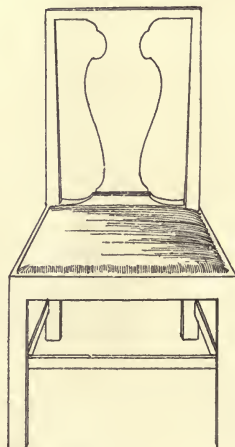


Fig. 2a.—Simple Chair by Chippendale.

with our associating his name with a style of furniture which surely he did not invent. Styles are never invented; they are due to a slow development, step by step until fully evolved. Where,

then, did he receive his inspirations, if we may call them such? He lived at a time, as we observe, when the Rococo period was drawing to a close, but his father worked at the furniture trade when the French craze was at its full height. His son's apprenticeship probably was devoted to Rococo carving almost exclusively.

Interested, as he may have been, in the French style, ample opportunity was afforded both by examples and

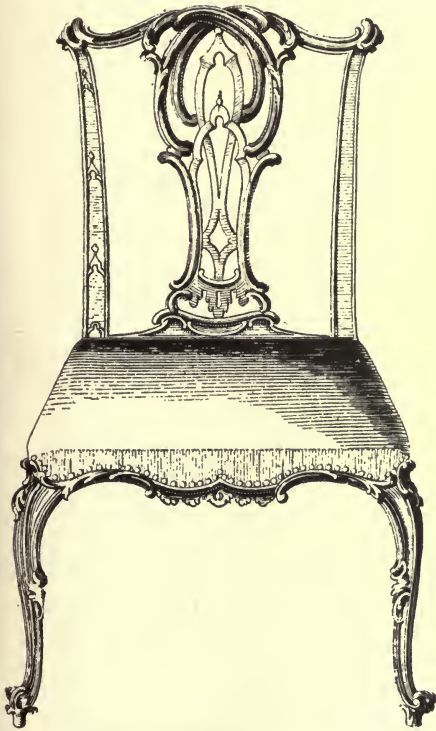


Fig. 3.—A Chippendale Chair.

publications for him to study the forms. But when conducting a business for himself there were other influences which were felt, and not the least among them was that of money. He undoubtedly made anything that "would sell" or that fashion dictated, and fashion in England at that time called for things that were Chinese. Sir William Chambers, an architect, who had traveled in China, introduced the fashion, and it was soon adopted by the furniture makers of the times.

Many articles had been brought to England from China, and they were used as models by Chippendale, and others of his time, who introduced Chinese forms into the carvings of their furniture. Such forms were no more out of place than many of the other meaningless shapes employed. How furniture of this character was to be used he explains in the table of contents of his book, thus: "Nine designs of chairs after the Chinese manner, and are very proper for a lady's dressing-room. They will likewise suit Chinese temples." (These latter were little garden houses built on English estates at that time.) "They have commonly cane bottoms, with loose cushions; but if required, may have stuffed seats and brass nails." Chippendale also mixed with ornament forms taken from the Gothic period, and produces what he called "Gothik" furniture. We may claim, then, that Chippendale furniture belongs to the decline of the Rococo period, and that it is a mixture of French forms, with ornamentation adopted from the French, Chinese, and occasionally other styles. It remains for us to see what are the particular features which characterized his work. We shall at the very outset find a difficulty. Chippendale had many contemporaries, who worked in exactly the same manner, so it will be almost impossible for us to say that any particular detail was used by him exclusively.

There are, however, forms employed by English furniture makers of that time which may be called "Chippendale," as he is the best known to us among them. If we examine the designs and examples of the chairs which are preserved to us, we will notice that if the ornament is omitted, so they are reduced to lowest terms, there is a similarity of design in nearly all. This is what may be called the type of the Chippendale chair. It is only a question of adding ornament to this form to produce his most elaborate design. The ornaments he employed are principally those common to all Rococo work, with the addition of Gothic or Chinese

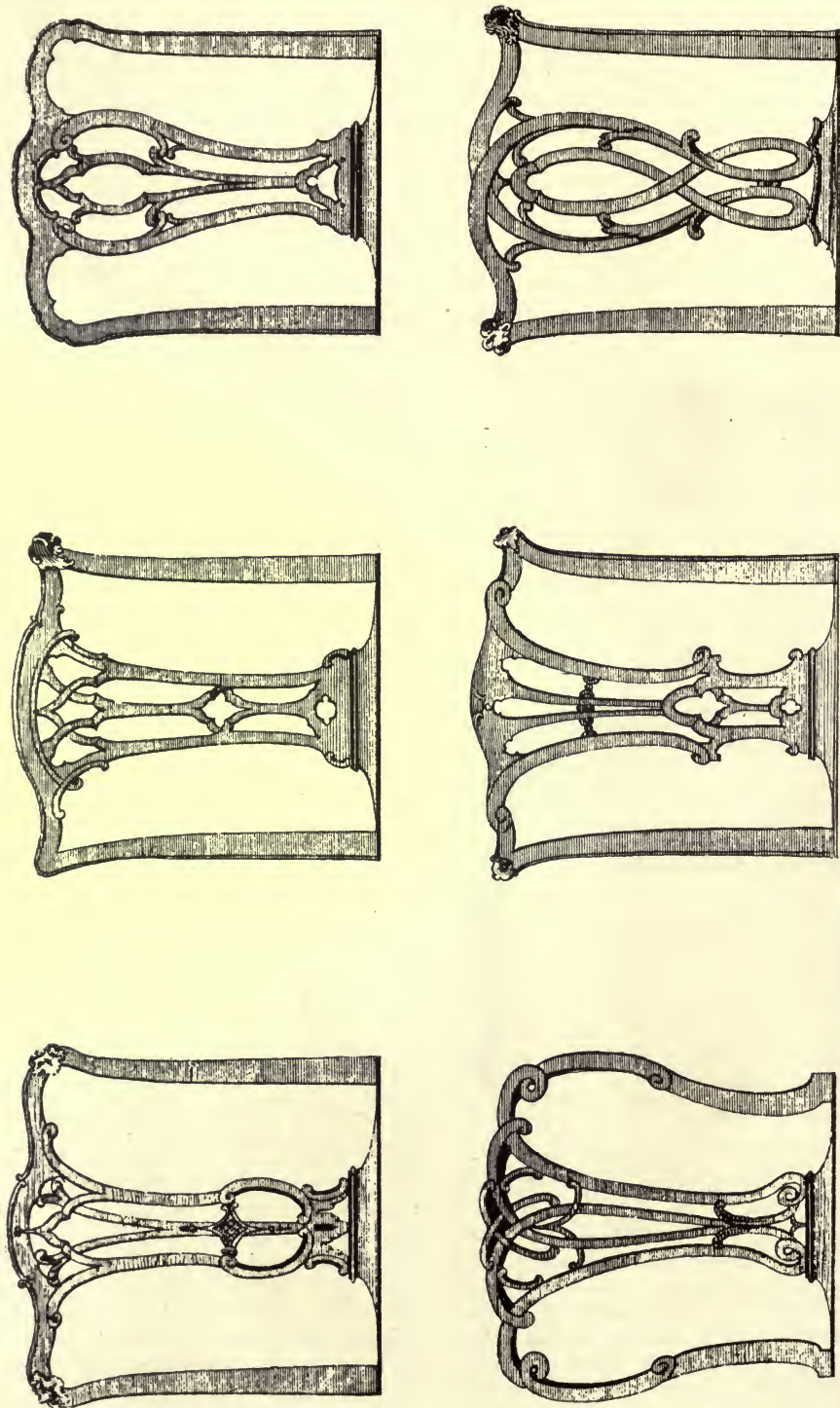
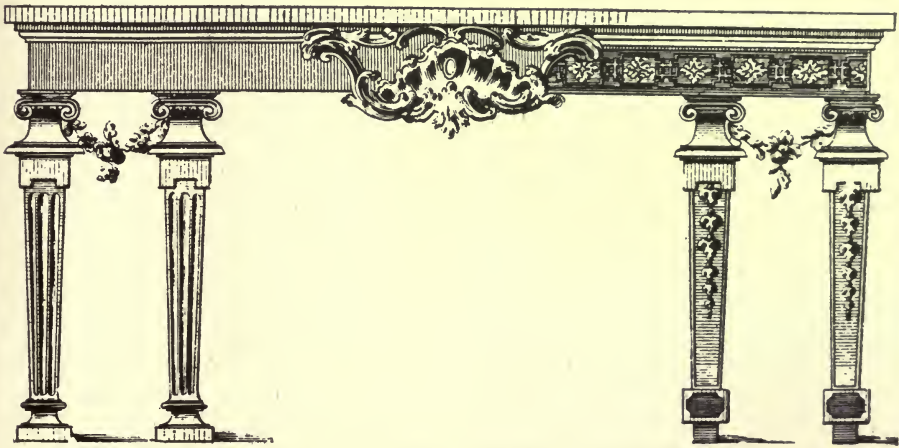


FIG. 4.—THE BACKS OF SOME CHIPPENDALE CHAIRS.

shapes. The Gothic feeling is found often in the perforations of the chair back, where we see a resemblance to the form of a cusped, pointed arch. Sometimes there is a surface decoration like the profile of a series of small Gothic finials. This is what he did when making a chair without striving

The chair leg which Chippendale seems to have preferred was the bandy leg, usually ending with a ball and claw foot. It is strange to note, however, that not one of these simple claw-foot forms is shown in his book, all the designs there being more elaborate. He did not use exclusively the curved leg,



FIGS. 5 AND 6.—CHIPPENDALE SIDEBOARD TABLES.

to produce a particular style. In those shown in his book under the caption of "Gothick Chairs," we find less of the Rococo ornament, with more of that sawn perforated work representing trefoils, quartre-foils, and lattices, which are believed by many to typify Gothic ornament. But even in these chairs he has not been able to avoid introducing a little of other ornament.

for we find chairs, tables, etc., with square legs, the same size throughout their lengths, and others which taper towards the foot. The turned leg does not seem to have been much used. The shaping and ornamentation was also confined to the front leg, in most instances the back leg being square.

We know that mahogany was not the only wood used by him, for in describ-



FIG. 7.—SHERATON SIDEBOARD.

ing the drawing for a dressing table he says it was "made of rosewood, with gilt ornaments." And speaking of a library table, he says, "the ornaments are intended for brass work."

His book contains a great variety of designs which were never executed, and some of his critics (as he states in the preface of the third edition) said many were "impossible to be worked off by any mechanick whatsoever." He resents this and claims that "every design in the book can be improved, both as to beauty and enrichment in the execution of it."

Chippendale not only made chairs, but almost everything in the furniture line, except the one article with which his name is most frequently associated to-day. We refer to sideboards. It is doubtful if he ever made a sideboard. In his book there is no reference to sideboards, though there are several large tables which he calls "sideboard tables." Though the word sideboard was used long before his day, it is prob-

able that the early English sideboards were merely tables.

In 1787-91 Hepplewhite & Co., English cabinet makers, published a book of designs. Among them are those for sideboards, with a deep drawer at each end, and a long shallow one in the middle. They also published in the same book four designs of sideboards of the table form, without drawers, similar to those shown in Chippendale's work. In the preface of Hepplewhites' book are the following remarks: "Sideboards.—The great utility of this piece of furniture has procured it a very general reception, and the conveniences it affords render a dining-room incomplete without a sideboard. Of those with drawers, we have given two designs. They are often made to fit into a recess, but the general custom is to make them 5½ to 7 feet long, 3 feet high, from 28 to 32 inches wide."

It was a sideboard similar to these (that is, a Hepplewhite pattern) which was placed on exhibition recently in a

collection of colonial relics and was noticed in the newspapers as "a mahogany Chippendale sideboard, 200 years old!"

Hepplewhites' mahogany work is usually severely plain and the legs square, tapering towards the bottom. The ends of these sideboards may be square or rounded, and the front

the work of Chippendale, yet it is constantly called such, probably because it has a quaint appearance, and it has become customary to call anything odd, Chippendale.

Sheraton's furniture is more elaborate than that of Hepplewhite. The legs are fluted, whether square or turned, and the square portions receiving the

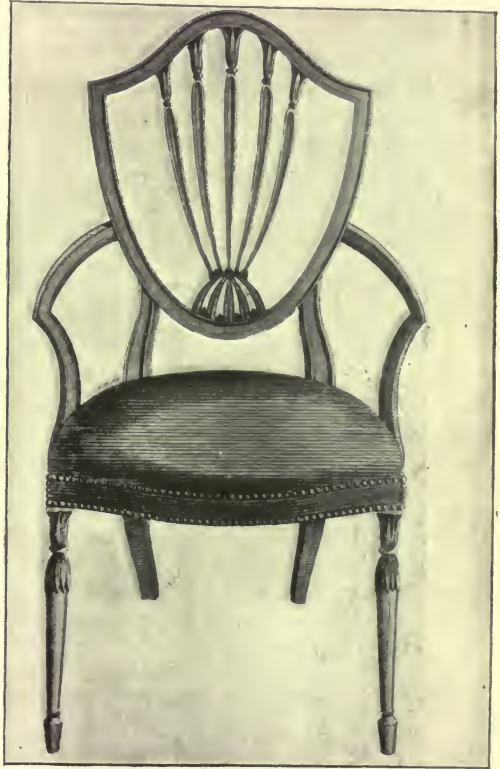


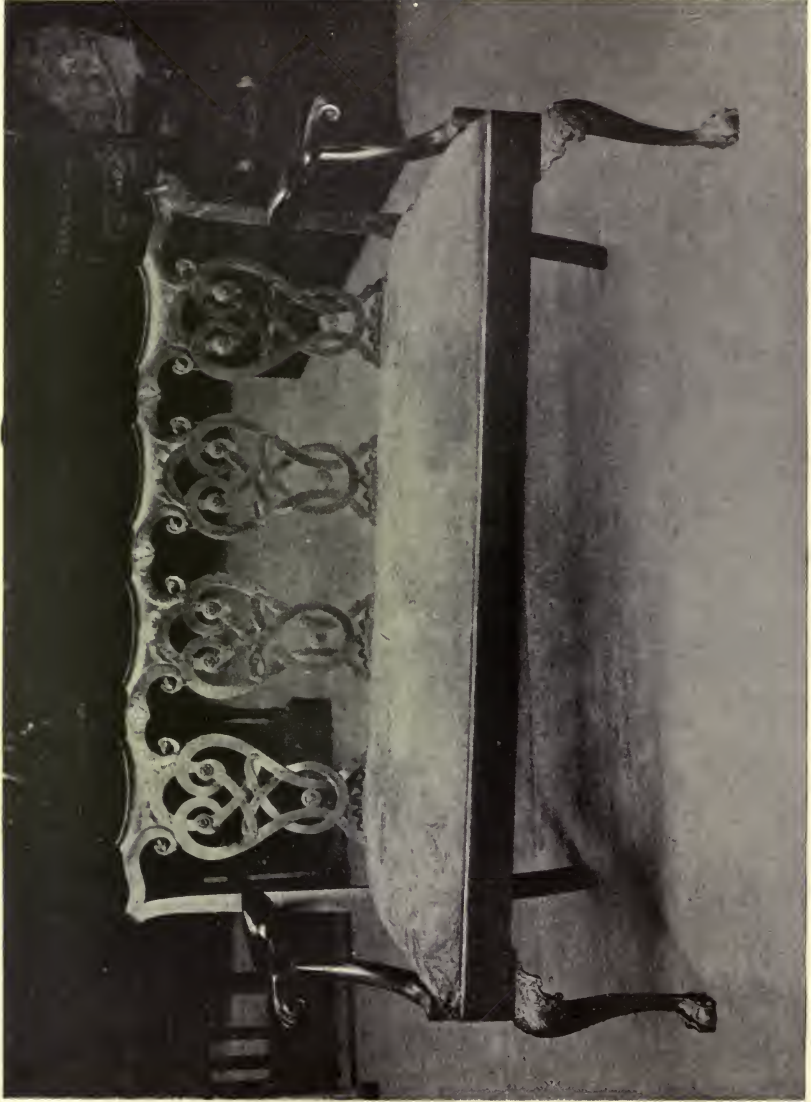
Fig. 8.—A Hepplewhite Chair.

swelled out, straight, or curved in. They are most often of mahogany, and almost invariably inlaid, though carving is not excluded. The inlay consists of lines and veneers with a rich grain.

Another Englishman, Thomas Sheraton, published, in 1791-93, designs showing sideboards, with pot cupboards, cellarettes and shelves. The character of the designs by these two men, Hepplewhite and Sheraton, does not resemble in scarce any particular

framing are veneered with inlay or carved. The edges of the drawer faces often have a band of inlay made of alternating strips of colored woods.

Every opportunity is taken to ornament the different surfaces by either carving or inlay. The inlay serves as a means of distinguishing these makes from that of Chippendale, for probably he did not make use of inlay at all, certainly not frequently; and if a piece of English furniture of



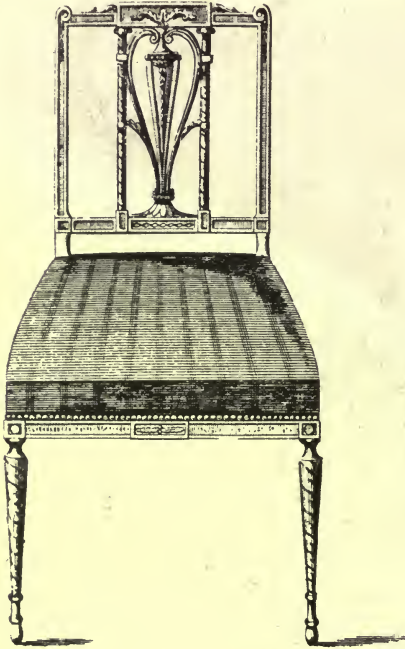
MAHOGANY SETTEE DESIGNED BY CHIPPENDALE FOR THE BURY FAMILY, OF KATESHILL, BEWLEY, ABOUT 1750.
(From "The Art of the House," by R. M. Watson.)



CHAIR DESIGNED BY CHIPPENDALE.

this period is inlaid we may quite safely call it a Hepplewhite or a Sheraton.

Sheraton says of sideboards: "It is not usual to make the sideboards hol-



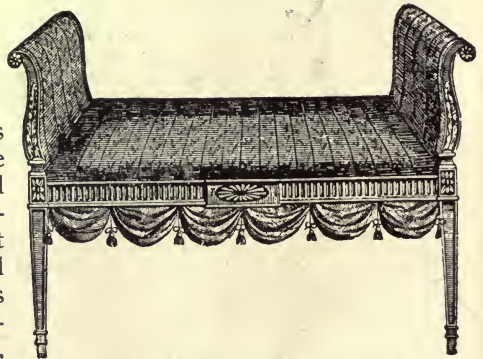
Feet and Inches
Fig. 9.—A Sheraton Chair.

low in front, but in some circumstances it is evident that advantages will arise from it. If a sideboard be required nine or ten feet long, as in some noblemen's houses, and if the breadth of it be in proportion to the length, it will not be easy for a butler to reach across it. I therefore think, in this case, a hollow front would obviate the difficulty, and at the same time have a very good effect, by taking off part of the appearance of the great length of such a sideboard. Besides, if the sideboard be near the entering door of the dining-room, the hollow front will sometimes secure the butler from the jostles of the other servants."

It is quite easy to distinguish chairs of the Chippendale pattern from those

of Hepplewhite or Sheraton. We say *pattern* because we do not wish to infer that either of these three men whose names are so prominently associated with the furniture of the late eighteenth and early nineteenth centuries, were the exclusive makers of the styles which bear their name. There were many others who made the same character of furniture and it is impossible to say from its appearance alone that any particular article was made by either of the men referred to. All we can say is, that it is in the style of Chippendale, Hepplewhite, or Sheraton. Hepplewhite used the shield shape, ornamented with wheat ears, for the back of the majority of his chairs, and the legs were square. Sheraton used on most occasions an approximation of the rectangle for chair backs, and the legs were turned.

Though Hepplewhite made chairs and carved them in a manner similar to that of Sheraton it was when working in woods to be lacquered and decorated, instead of mahogany. This lacquered work was subsequently displaced by white paint, like our enam-



A Window Seat by Hepplewhite.

elled work, and was popular with all the furniture makers of the period.

With the above facts in mind there should be but little difficulty in deciding whether an article of furniture is of the Chippendale (Rococo) period or of the later Renaissance revival used by Hepplewhite and Sheraton.

Alvan C. Nye.



THE STUDIO OF M. EMILE WAUTERS.

A FLEMISH PAINTER'S ART TREASURES.

IN the city of Brussels, at the end of the Rue de la Loi, not far distant from the Parc du Cinquantenaire, and the Decorative Arts Museum, there stands a house built in the Flemish Renaissance style. The edifice we speak of, which attracts notice by its handsome turret, here depicted, was a few years ago the residence of Mr. Emile Wauters, the well-known painter, collector and keen connoisseur. This large building, designed by Mr. Janlet, who received the Grand Prize of the Rue des Nations at the Paris Exposition of 1878, contained a splendid studio which was one of the great sights of Brussels. Here Mr. Wauters gathered together a choice collection of Dutch and Flemish works of art, the whole of which, we may say, now adorns his Paris *atelier*, where the por-

traits of many American beauties have been painted by him.*

Mr. Wauters' art treasures comprise pieces of furniture dating from the Renaissance and the Regency, banners of the "Guilds," wood carvings, terra cotta, an interesting group of musical instruments, Delft-ware, varnished earthenware from Lorraine, some very original stoves of the last century, numerous woven and embroidered cushions with the arms of the United Towns and Provinces, sacerdotal and other vestments of the 15th, 16th and 17th centuries, weapons, brasses, etc., etc., the whole being displayed with a colorist's taste and

*Among these ladies we may particularly mention Miss Carroll, of Baltimore; Miss Pierre Lorrillard, Mrs. Parker Deacon, the Comtesse de la Forest-Divonne, nee Audenred, the Princesse de Chimay, nee Ward, the Misses Isaac Bell, and Mrs. Sharron, of San Francisco.



RESIDENCE OF M. EMILE WAUTERS.

eye for harmonious effect. This truly artistic collection includes a number of those life-like portraits belonging to the fine 17th century school represented by Moreels, Mierevelt, De Vos, Terburg and others, as well as paintings, studies, etchings and sketches by various masters.

The walls of the immense staircase

sanctuary of art, which the Paris "Figaro" once referred to as being one of the most fascinating in existence, comparing it with those of the painters Mackart, at Vienna, and Munkacsy, in Paris. The subjoined plates will give the reader an idea of a few of the many rare and curious objects included in M. Emile Wauters' collec-



FIG. 1.—FLEMISH CUPBOARD.

were adorned with Brussels tapestry, having large designs illustrating incidents in the lives of Jacob and Esther; its steps were covered with long Persian carpets brought back by Mr. Wauters when he returned from his travels in Egypt and Morocco; its two large windows were of richly colored stained glass with escutcheons and armorial bearings—evidently the debris of some Friesland castle.

We reproduce a general view of this

tion. The following is a description of these:

(1) An oak cupboard of the Flemish Renaissance period. It consists of two parts, and is inlaid in rosewood and satinwood. This handsome piece of furniture is considered the finest of its kind in Flanders, where it is known as the "Cupboard of the Five Senses." The lower part is ornamented with Corinthian columns at each corner and in the center, and is surmounted

by a frieze of foliage and lions' muzzled. The upper portion is separated into two divisions by caryatides representing the Five Senses. The middle one, Hearing, is playing the lute. These busts are supported by brackets carved with angels' heads. On each leaf of the two folding doors there is a man's head in high relief. The upper frieze is divided by grinning masks, all of different models. This cupboard

heavy, lacking, as it certainly does, the delicacy of the Italian and the French, but it possesses, on the other hand, a wider grasp, a more virile spirit, and the restricted ornamentation allows the geometrical element to speak with all its grandeur and eloquence. In French furniture, dating from the Renaissance, the lavish decoration is often a positive defect, and we know of a certain celebrated example of which



FIG. 2.—LIEGE CLOCK-CASE.

stands $8\frac{1}{2}$ feet high, and is 6 feet in width. Date 1620. The proportions are well planned and imposing, the mouldings finely traced, and the profiles strong and animated. The general aspect is simple, without too much ornamentation, the heads and the friezes being bold but not affectedly so. The whole is in decorative harmony, sculptural art sustaining architecture while according it a predominant rôle. Flemish Renaissance may perhaps be somewhat

it might be said that "it is all ornamentation."

(2) A Liège clock-case, in carved oak, belonging to the Regency epoch. This piece of furniture came from a convent of the Black Sisters at Waremme. It stands 8 feet high, and is a gem of elegance. It resembles French art of the same period. It is supposed to be the work of the Hermans, of Liège, a family of wood carvers who have left numerous specimens of their talent. The design is perfectly orig-



Fig.—3.

Fig.—5.

Fig.—4.

inal, the taste exquisitely refined, and the execution in all respects marvellous. The glazed cupboards by these artists, in two parts and with a fronton, are much sought after. The Belgian museums possess a few specimens in the most charming Regency style.

(3) An oak chair, which connoisseurs have attributed to Vredman de Vries, de Lesuwarden, the celebrated furniture designer of the 17th century, whose engravings show how fertile was his imagination and how severe his style, a style strictly his own. A chair of the same model is comprised in the Sauvageot collection in the Louvre, except that a St. George takes the place of the small upper portico.

(4) A chair, in walnut, Dutch Louis XV. style, with rococo ornamentation. The carving, perhaps, is not very delicate, but the outline is graceful, the lines supple, the movements undulating and nervous, indicative of boldness of invention. The chair is rich, elegant and very handsome in appearance.

(5) An armchair, Dutch Louis XIV. style, in polished walnut. The back has open-work ornamentation. The general effect is extremely pleasing; small columns and balusters of pure

design, and arms the curves of which are well traced. The cushion placed on this chair is finely woven and bears the arms of North Brabant upon it. It dates from the beginning of the 18th century. The stitch is fine and close and the heraldic lion very archaic, the colors standing forth distinctly from the dark green canvas ground.

(6) A small door of a room. Renaissance style, in oak, incrustated and inlaid with ebony and rosewood. It came from a castle at Ypres, in Flanders. Height, 7 feet 7 inches; width, 3 feet. This is a charming composition, delicious in its simplicity and highly architectural in its arrangement and coloring. The lines are easy, the mouldings fine, while the delicate carvings are treated in a really masterly manner. Here, again, the architecture stands prominently forth, with its perfectly balanced lines and proportions.

The small bench shown in the same figure belongs to the period of transition from the Gothic to the Renaissance. Upon the bench is an ivory lute inlaid with mother-of-pearl and ebony. It is signed "Johannes Hofman, Leipzig, XVII. century."

(7) This moneychanger's table. in

oak, is an extremely curious sample of 15th century art. The top, when turned, brings to view a number of drawers and hiding places. The table stands on two massive carved feet. Height, 32 inches; width, 39 inches. The wooden figures in the Bruges style, standing upon the table, are very rare specimens; the St. Sebastian seems to have been taken from a painting by Memling, while the Virgin,

earthenware, made in Mombaert's pottery in the year 1720. The cover, representing the head of the bird, may be detached from the dish. This ornamental piece is well executed and very realistic, the coloring being strong and rich-toned. The enameling recalls that of the most beautiful Delft polychromes.

A dalmatic in green silk velvet, embroidered with bands of orfrays is



FIG. 6.—DOOR FROM A CASTLE AT YPRES.

draped in her Gothic robe, with its long and ample folds, might conceivably have come out of one of Jean Van Eyck's panels. A chased silver crown, enriched with precious stones, once covered the Virgin's head, but was stolen.

By the side of these, which date from 1400, is a soup tureen in the shape of a turkey-cock, in Brussels

another of M. Wauters' treasures. On the horizontal bands, behind, St. Elizabeth, of Hungary, is depicted distributing garments to the poor, while on the front St. Martin is shown in the act of dividing his mantle. The vertical bands are ornamented with figures of male and female saints. The workmanship is exceedingly fine. This dalmatic, which formerly belonged to



FIG. 7.—MONEY CHANGER'S TABLE.

a church at Gouda, in Holland, dates from the year 1500. It has retained its original ample shape.

The second dalmatic, of similar pattern, and coming from the same church, is now in the collection of the city of the Hague.

The whole of these rare objects were exhibited at the important exposition of ancient art which was held at Brussels in 1888, and demonstrated that Belgium still pos-

sesses numerous examples of her once flourishing art industries, and that the town halls, museums, hospitals, convents, etc., contain an immense number of these treasures. The exposition also enabled manufacturers to learn something from models and processes that were very little known; it reawakened the artistic spirit in workmen, improved their technical knowledge, while it opened up to the archaeologist a wide and fertile field of study.

A. J. Wanters,

Professor of the History of Art at the Royal Academy of Brussels.



VIEW OF SAFE BURGLARIZED IN FRANKLIN GROVE BANK, FRANKLIN GROVE,
ILLINOIS.



READING ROOM OF THE MISSOURI SAFE DEPOSIT CO.

St. Louis, Mo.

John Beverley Robinson, Architect.

MODERN VAULT CONSTRUCTION.

THE ordinary portable burglar-proof safe is the type of the burglar-proof vault. Vaults indeed are distinguished chiefly by their size; a vault is a safe big enough to walk into, with other minor differences that we shall hereafter note.

Ordinary portable safes, such as that which is shown in Fig. 1, are of various sizes up to about six feet width of front and seven feet height. The depth inside in the clear, even of large safes, must not exceed the reach of a man's arm, which means about three feet depth outside, owing to the thickness of the walls and doors and the space required for the mechanism.

Vaults proper, such as are large enough to walk into, are usually eight feet high inside and as large as required on the floor—seldom less than eight feet square, and seldom needed

more than eight by sixteen feet for the use of banks.

Safe-deposit vaults are often built of great size, forty feet square or more; the height, however, does not exceed eight or eight and a half feet.

With the portable safe we have not much to do at present, as it is only when the safe has grown to the dignity of a vault in size that especial provision need be made for it by the architect.

In arranging a place for the vault, whether of a bank, safe-deposit company, or other concern needing one, the first consideration is to place it clear of contact with the building on all sides. A space wide enough for convenient passage at least, must be left all around the vault; a similar space between the top of the vault and the ceiling of the room in which it stands.

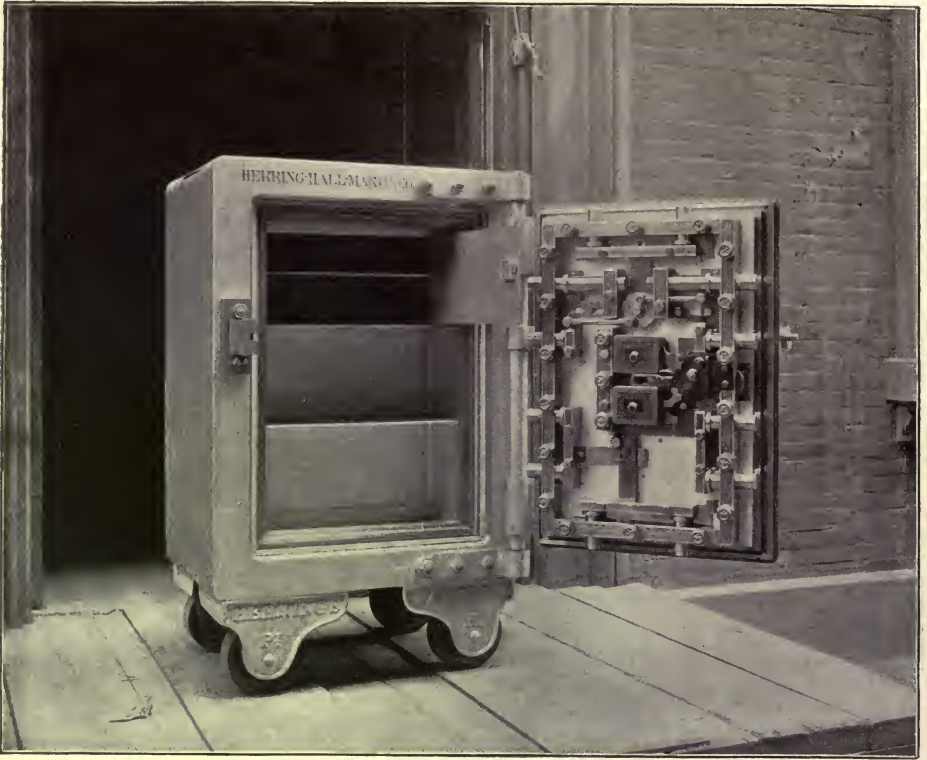


FIG. 1.—PORTABLE OFFICE SAFE.
Showing inside of door and mechanism of bolt-work.

while the space in the room below the vault must also be open for continual inspection. Often an open grating in the floor surrounds the vault, making it possible for a patrol to watch the whole circuit in two stories at once. When this is done the bars of the grating must run in the direction of the path of the patrol, to permit an easy view.

This matter of the isolation of the vault, although often neglected, is a fundamental requirement for safety.

The next thing to be looked out for, trivial as it may seem, is the swing of the entrance door. In the first place, the throw of a vault door is very much greater than the width of the clear entrance. If the inside entrance door is to be two feet six inches wide, clear of the bolt work, we must add to this about three inches for the bolt work, as much again for the opposite rab-

bedded jamb (a matter which will be explained hereafter), and again another foot for the splayed, rabbetted jambs of the outside door. Add to this several inches more for the working of the mechanism of the hinges, and we have four feet six or eight as a minimum throw of the outer door to be provided for. Again, it is quite usual to place the floor of the vault a foot or so below that of the room in which it stands. This is done so as to bring the highest point of the rabbetted sill low enough to allow a movable platform to be placed over it, terminating in an easy slope inside the vault. This is done to do away with the annoying and dangerous stumbling-block that would otherwise be formed by the rabbetted sills of outer and inner doors. It is one of the standing difficulties in the use of vaults; so much so that a movable sill, which

lies down flat, out of the way, has been invented and may be used. But, when this is not used, the lower edge of the outer door will swing below the level of the floor of the room, and provision must be made for it.

Finally, all vaults must stand on a foundation of their own; not on beams, however strong. Beams are sure to bend a little, and the slightest bending will throw the swing of the great doors out of true, so that it will be impossible to open and close them. Besides, the tremor of a floor would tend to disturb the mechanism of the time-locks. Moreover, to stand a vault on a floor makes the integrity of the vault depend upon the stability of the building; a fire, or earthquake, or explosion, or unaccountable fall of the building, would carry with it the vault, which might be penetrated in the crash. So it may be laid down that a foundation of its own a vault must have, preferably of brick arches. We shall again allude to foundations, after we have spoken of the construction of the vault itself.

In planning a safe deposit vault much more careful provision is required than for any other kind. The arrangement of the interior depends upon the placing of the banks of small safes, with which the vault is to be filled. These safes are of a regular depth, usually two feet, whatever may be the size of the door in the face of the stack. The passages between the stacks should not be less in width than three feet, nor greater in length for a "cul-de-sac" than ten feet. This, for two reasons, partly for ventilation, as the air is apt to stagnate in long blind passages; partly to avoid undue interference and jostling among the depositors.

Fig. 2 shows a plan of a large vault and the arrangement of the banks of small safes.

Fig. 3 shows the interior of the same vault, with a bank of safes in place.

The placing of the entrance and exit is determined by the general plan

of the offices, and upon this, in turn, depends the laying out of the passages and banks of safes inside.

Every safe deposit vault must have two entrances, each complete, with vestibule and outer and inner doors, as will be hereafter explained. The most economical form of vault is about eight feet wide, with a door at each end, and banks of safes on each side. Up to twenty or twenty-five feet in length, this will do very well.

Beyond this, some form of square or oblong vault, with transverse secondary passages, branching from the main passage must be used, as the single straight passage begins to pass reasonable length.

Two entrances are essential for safe deposit vaults on account of the ever-present possibility of an accidental lock-out, caused by defect or stoppage of the time-locks. With banks a lock-out is disagreeable enough, but for a safe-deposit company, with hundreds of concerns wanting to get at their deposits, such an occurrence would be fatal. Two entrances render the chance of an accident to both at the same time infinitesimal.*

Indeed, it would always be well, were it not for the cost, to provide bank vaults and all kinds of vaults with two entrances. On account of the cost, however, this is rarely done. Various expedients are resorted to with the same end. I have designed two vaults alongside each other with a hole in the partition wall, usually covered by a steel plate cover, secured by bolt work and locks, but serving to give access to either safe from the other in case of a lock-out. A similar design I have made in two stories, with a hole in the floor between, similarly made secure.

Another continual care of safe-deposit officers is the ventilation of the vault. The unavoidably contracted space, with many people frequenting it, and only two doors giving admission to the outer air, is sure to make trouble.

*Fig. 4 shows the entrance door of a vault, the outside and inside doors both open, and the open-barred "day-door," as it is called, visible.

The best thing to do, although costly, is to make one or more holes in the ceiling of the vault, with covers fitted precisely as the doors are fitted that can be lifted by screw, or other power, while the vault is in use, and closed at night and bolted inside.

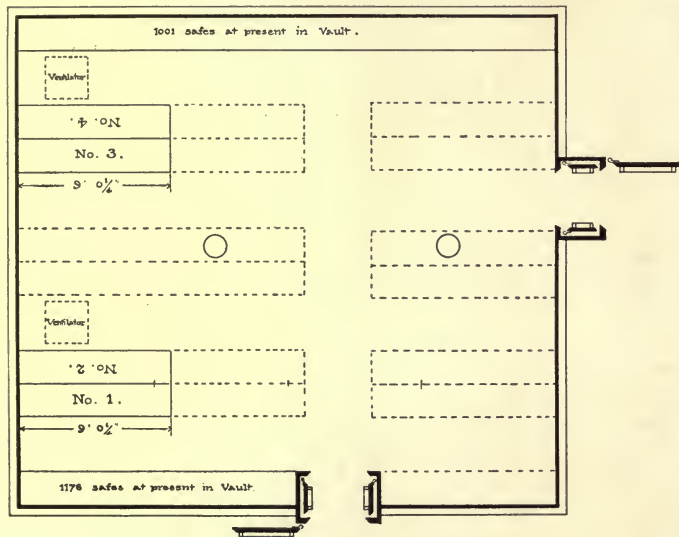
Such an opening, enclosed in a sheet metal trunk, may be connected with a Blackman-wheel air-current, and the interior of the vault supplied with abundance of fresh air.

The use of electric lights has simplified the question of vault ventilation, which, in the days of gas light, was an almost insoluble problem.

same thickness of walls built up with inch plates throughout. Inch plates are stronger and better construction, but half-inch are very good, and quite usual.

The plates are not generally all of the same material. Steel, indeed, they all are, but the alternate plates are usually of chrome steel.

Nor are these chrome steel plates simple; they are in themselves compound, each plate being built up of five plates, rolled together hot, welded into one mass, the central and interior layers being of ordinary homogeneous Bessemer steel, the intervening two



Plan of Vault.

Fig. 2.—Plan of a large vault, forty feet square, for safe-deposit company, showing location of stack of safes and of passages between them.

For both safes and vaults there is one predominant method of construction; there are besides this half a dozen other methods more or less in use.

The usual way is to build up the required thickness of the walls with plates of steel screwed together. These plates vary from half-an-inch to two inches in thickness. Half-inch plates are commonly used, with an inch plate on the outside, because such a construction is much cheaper than the

layers, making five layers in all, of chrome steel proper.

Chrome steel has a small proportion of chromium added, which gives to it an excessive hardness against attack by the drill—nothing but diamond drills and plenty of time to use them will cut it. By the use of the blow-pipe, however, the temper may be drawn, and it is then drilled with as much ease as other soft steel. It is rolled in layers, as described, because with extreme hardness there is an ac-

companying lack of tenacity which the layers of ordinary steel are intended to supply.

The plates that are not chrome steel are of the usual mild steel, which is so fast supplanting iron, being both better and cheaper, rarely as those qualities are found together.

The illustration Fig. 5 shows this construction, although the difference in color of the chrome steel is exaggerated for the sake of clearness in explanation. In fact, it is difficult to distinguish the different layers by the eye in a piece of polished or cut five-ply chrome steel. A broken edge shows some differences in the fracture, but even these are not conspicuous.

The plates are fastened together by screw bolts screwed in from the inside. These are not long enough to penetrate the outside plate; they give no indication of their position. The bolts that secure each succeeding plate are carefully laid out so that no two bolts occur at the same point.

The whole vault is built up in the shop of untempered plates screwed together just as it will be in the bank, safe-deposit office or other institution for which it is destined. It is then taken apart; the plates are tempered and afterwards straightened before they are taken to the place where the vault is to be built.

The walls of vaults vary in thickness. Three inches is a good thickness, four inches ample, and the thickest built, so far, is six inches thick.

All vaults of any pretension at all are provided with a double set of doors at the entrance—with what is called a vestibule. The illustration, Fig. 2, shows the plan of a large vault built under the charge of the writer with the usual vestibules. The vestibules may be deep enough to contain the whole of the inner door, when open, or may be only deep enough to accommodate the knobs and levers of the inner door and the bolt work on the inside of the outer door when both doors are shut. In the former case it is possible to make the opening

of the outer doorway no larger than that of the inner—in the latter case the outer doorway must have additional width enough for the inner door to stand out at right angles.

The clear width required for the inner doorway is not less than two feet six inches, nor more than two feet ten inches. Both outer and inner doors are by preference single doors, because such can be made stronger than double doors; often, though, for convenience the inner doors are made double, one opening into a pocket on each side of the vestibule.

Both outer and inner doors fit into their jambs with rabbets and grooves, shown in Fig. 6. Each steel plate of which the door is composed sets back from that outside of it, and if more than half-an-inch thick is itself rabbetted in its thickness in half-inch steps. Besides these rabbets there are used in each door usually two groove irons, as they are called, really angle irons; for thick doors three are used, but rarely less than two, for in addition to the rabbets, and as far more efficient, the grooves are depended upon to exclude explosives. For still more perfect protection the edges of the angle irons are corrugated, as seen in the illustration, and in the bottom of the opposed groove is placed a strip of rubber or asbestos packing upon which the sharp edges of the corrugations press tightly and form an airtight joint. This closeness of joint is especially meant to keep out nitroglycerin, which is used in liquid form in the attack.

Two things are needed for the attack, force and time. The force must be such as can be used quickly. Drills are all very well, but wedges, driven by a copper-headed sledge, which makes but little noise, start the edge of a plate more quickly. Into the minutest crevice a little nitroglycerin penetrates, drawn into incredibly small space by capillary force. The explosion tears away more or less of the plate, leaving the next joint exposed for the wedge.

When circumstances prevent the use



Fig. 3.—Interior of large vault shown in plan in Fig. 2. Of the safe deposit safes the larger lower ones are for the use of banks and large concerns, the upper and smaller for individuals. The two large columns are part of the construction of the building. The small columns will be removed when the rest of the stacks of safes are put in place.

of explosives the drill and the hydraulic ram are resorted to, but for speed and force combined, explosives are preferred.

The noise of the explosion, muffled by the walls of the building in which it occurs, to outside ears, seems to passers who may happen to notice it like some distant report, or often attracts no notice at all. For this reason it is often possible to use explosives where it would seem to be impossible without immediate discovery.

Nitro-glycerine is the agent most feared nowadays. It will penetrate any joint, and at least relax it with its tremendous shock, giving space for the introduction of a heavier charge. Although dangerous to make and difficult to buy, it is easily obtained from ordinary commercial dynamite, which is nothing more than nitro-glycerin held in absorption by infusorial earth or other absorbent. The liquid nitro-

glycerin is obtained by the simple process of dissolving it out with ninety-five per cent alcohol, and then precipitating the nitro-glycerin by the addition of water.

In order that doors constructed as has been said with rabbets and grooves may be opened and closed, something more than ordinary hinges is clearly required. Something it must be that will move the whole door parallel to itself a distance equal to the depth of the grooves and rabbets, in most cases that is to say, half an inch. To do this several kinds of crane-hinges, as they are called, have been devised, which accomplish their purpose admirably. Not a trifling matter this either, to wield at the end of a rotating arm, to suspend upon it in a position where it can easily be moved backwards and forwards, and yet is so firmly immovable otherwise as to fit with accuracy into its complicated

seat, a weight not less than four tons, often six, and sometimes as much as ten.

Although the weight of the heaviest vault is trifling compared with the weights that architects are accustomed to deal with in building, yet certain precautions are necessary in providing foundations for them. The vestibules especially must be upon an immovable base, for the slightest sag or settlement means a distortion of the door-jambs, and the impossibility of closing the doors. The bottom of the vault, although amply strong enough to sustain itself over ordinary spans, say, up to ten feet, is apt to sag slightly in reaching its point of resistance, and is better supported by rolled beams placed three or four feet apart. These must be adequately supported by columns, piers or walls, for the vault must not rest upon the earth directly, as such a situation invites attack by tunnelling from a distance, which can be carried out with perfect security, as observation is in such an arrangement impossible.

Therefore all vaults are on some kind of open foundations, usually extending through a basement, and supporting the vault level with the floor above. Sometimes these foundations are in the form of a brick vault, less secure than the steel vault above, but sufficient for the storage of silver, paintings and valuable books. In this case the brick vault has a door like that of the steel vault, less ponderous perhaps, but substantially the same thing.

But if not used for this purpose the foundation should be as open as possible, the walls perforated with arches everywhere. Brick walls are much to be preferred to iron columns, as less likely to be destroyed by fire.

Columns, if used, should be securely covered with fireproof material, as also should any iron columns that support the floor of the vault.

For supporting the floor brick vaulted arches, dispensing with iron altogether, are as much to be preferred as brick walls are to iron columns.

The ceiling of the vault up to eight or ten feet span will sustain itself. For wider spans some interior support must be provided. This is often furnished in safe-deposit vaults, which are the largest vaults in use, by the banks of small safes with which the vault is occupied.

These, however, are not usually put in all at once when the vault is built, but gradually as the business requires; because often the character of the business requires a change in the style of safe used, or new inventions must be included to make the safes rentable.

Until the banks of safes are put in it is usual to support the ceiling of the vault by small cast columns or pieces of wrought pipe. The ceiling is jacked up the half or three-quarters of an inch necessary, and when it comes down it holds the column firmly in place.

When the ceiling must be carried without columns over a clear span the steel beams necessary to carry it are placed outside, above the ceiling to be carried, and the outer shell is attached by conical eyebolts and suitable hangers to the beam. It would be as well or better to put the beams inside were it not for the valuable space they would occupy.

Vaults are usually made only eight feet high in the clear, because of the great cost of every added inch, and beams inside would cut this down, both for use and looks, very materially.

The steel walls of the vault itself afford sufficient support for the suspended ceiling without special provision in addition.

Thus built and upon such foundations stand some vaults, good ones at that, without defense against fire at all, being in buildings called fireproof, and certainly unflammable in their constructive parts.

It is better, however, in all cases to provide some kind of fire-resisting jacketing. Of this, two kinds are commonly used. Nothing is better for fireproofing than a brick wall. It should be hollow, if possible, with two eight-inch walls or an outside eight-



Fig. 4.—Entrance to a large vault, showing the main outer door open, one of the vestibule doors also open, and the "day-door" of ornamental scroll work closed.

inch and inside four-inch at least. The ceiling must be covered with at least four courses of brickwork.

All should be laid in good cement mortar; although lime mortar gauged with plaster of paris might be even better than cement. In a combustible building at least, this covering of the ceiling should be in form of brick arches, laid between iron beams, placed on the top of the vault, with the usual tierods, and made as strong as possible, to resist crushing by a falling wall if fire should occur.

The great objection to brick walls is the space that they occupy. Two eight-inch walls with a four-inch space will be twenty inches, and this carried around a vault of fifty feet circuit covers about eighty-three square feet—a considerable space where space is most valuable. So sometimes the fire-proofing is done with a covering of

concrete—cinders, plaster and cement, mixed and filled in between the outside of the vault and a quarter or three-eighths-inch plate of soft steel held to the shell of the vault by anchors at frequent intervals.

Besides the construction of the vault itself above described, there are, as has been said, several other methods.

In one, which is much used, and which is the subject of the Herring patents, spiegeleisen is used to resist penetration. This is a kind of iron ore found in nature and also produced as a waste product in certain processes. It can be cast into plates, and is of an excessive hardness, altogether impenetrable by the drill, although it can be chipped away without difficulty.

It is therefore used only with an outside covering of chrome steel plates, such as has been described, to

protect it from violence, the sniegel-eisen or Franklinite being depended upon to resist the drill.

Another construction that gives a very good safe, and a much cheaper one than those hitherto described, is made of railroad iron—steel rails, placed head and flange alternately locking together. They are held together by iron rods, and they are bedded in a mass of Portland cement, which fills all interstices, preventing rust, and forming a continuous shell. Outside and inside are covered with steel plates for a finish.

This construction presents a serious obstacle to the drill, as the rounding and irregular surfaces of the rails and the certainty of encountering voids make drilling impracticable.

To the wedge and to explosives it does not present by any means the resistance of the steel plate construction. If used, the type in which the rails are placed horizontally and bent at the corners is much to be preferred to that in which the rails are vertical and depend upon the outer covering for connection at the angles.

It is not to be recommended for important work, but may serve a purpose for country banks, where cost is a paramount consideration.

Less used than any of these is a peculiar patented construction of cast-iron. Massive blocks, eight or ten inches thick, are united by groove and tongue joints. The hardness and thickness resists the drill, and the joints cannot be satisfactorily attacked by the wedge.

Another exceedingly interesting invention is the Corliss safe.

It is a massive spherical envelope containing another sphere, which revolves on vertical pivots within the first. This second sphere is divided into halves, one of which contains the deposit space, the other the locking mechanism and the fortifying metal face. The locking is done by bringing the interior sphere forward, into close contact with the jambs of the opening, which is too small to per-

mit it to be taken out. To unlock, the interior sphere is screwed back an inch or so, and then is revolved, bringing the rear hemisphere to the front and giving access to the drawers and boxes. It is a clever device, and seems far less vulnerable to the powerful liquid explosives of to-day than a construction with numerous unavoidable joints.

It is, however, not well suited to vault construction.

It has always been a favorite fancy of my own to construct a vault with a water jacket. In all of our large cities there is an inexhaustible water supply. It would need but a strictly watertight door to the vault itself, and a watertight envelope to the vault with another watertight door. The space between, once filled with water, from more than one secreted and protected pipe and provided with proper expansion pipes, would be a protection quite complete against fire. Equally impenetrable would it be to the enterprising burglar. The slightest penetration would make further penetration impossible. Tools could not work in a flood of water. To check it would be out of the question, as the valves which controlled it would be at a distance. Explosives would be useless against it, and if once started the flow of water would soon give an alarm of itself as it covered the floors and leaked out under doors.

All of the strength of wall and door, of ceiling, floor and vestibule, would avail nothing without adequate provision for locking. Nothing of course is thought of but the combination lock, an invention of admirable simplicity and efficacy. It has tumblers, three, four or more, as any other lock, but that these may all be thrown at the same time several wheels, each one with a single notch, must be turned so that the notches coincide. Simple as it is in principle, this is the basis of the most elaborate vault locks.

This alone, however, would not suffice. The secret of the combination entrusted, as it had to be, to two officers, was a distressing burden to the minds

of both and at the same time placed the sole responsibility on no one person. At times, under fear of physical violence or at the point of a pistol, cashiers were compelled to reveal the

heir to, the other still would do its work at the proper time.

Notwithstanding this, both clocks at times fail to work and the vault is impenetrably secured; must be broken

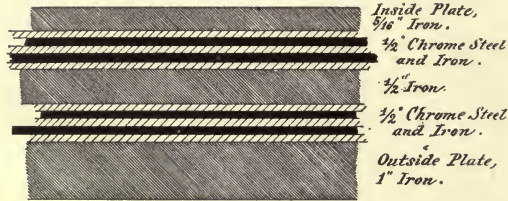


Fig. 5.—Section of a part of the wall of a vault 2 13-16 ins. thick, composed of alternate soft steel or iron plates, and rolled, laminated chrome steel plates.

combination, or were taken bodily to the vault and compelled to open it. As a safeguard against this the time lock was invented and is generally used. It is the same in principle as the alarm clock, but at the prearranged hour, instead of going off with an irrepressible jangle, it noiselessly withdraws a small piece of metal which, un-

into by force if there be no other help for it.

A perfect precaution is the use of two entrances to the vaults, which are necessary for every safe-deposit vault, even the least important, and almost as necessary, though not so invariably used, on bank and other vaults. With two entrances the chances against

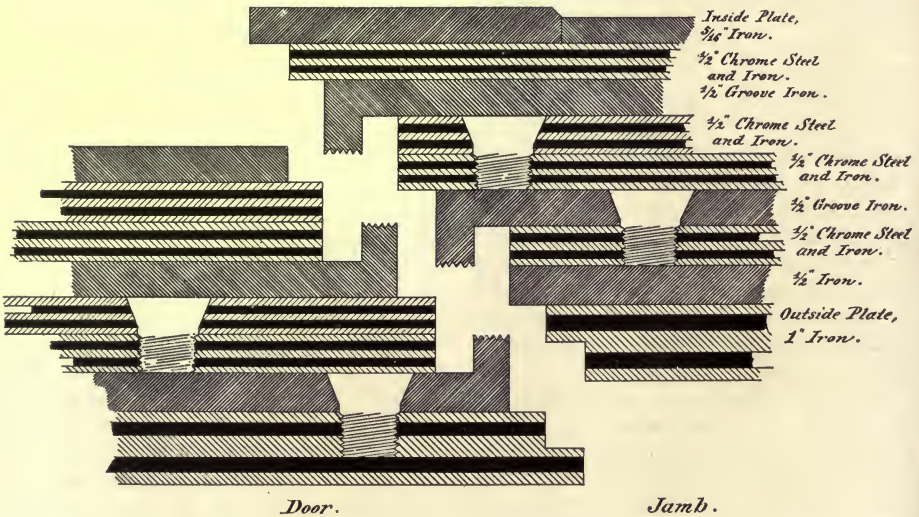


Fig. 6.—Section of the edge of an outer vault door 4 1/2 ins. thick and corresponding edge of jamb, showing rabbets of jamb and groove irons with serrated edges. Four conical headed screw-bolts are indicated.

til then, prevented the working of the combination lock.

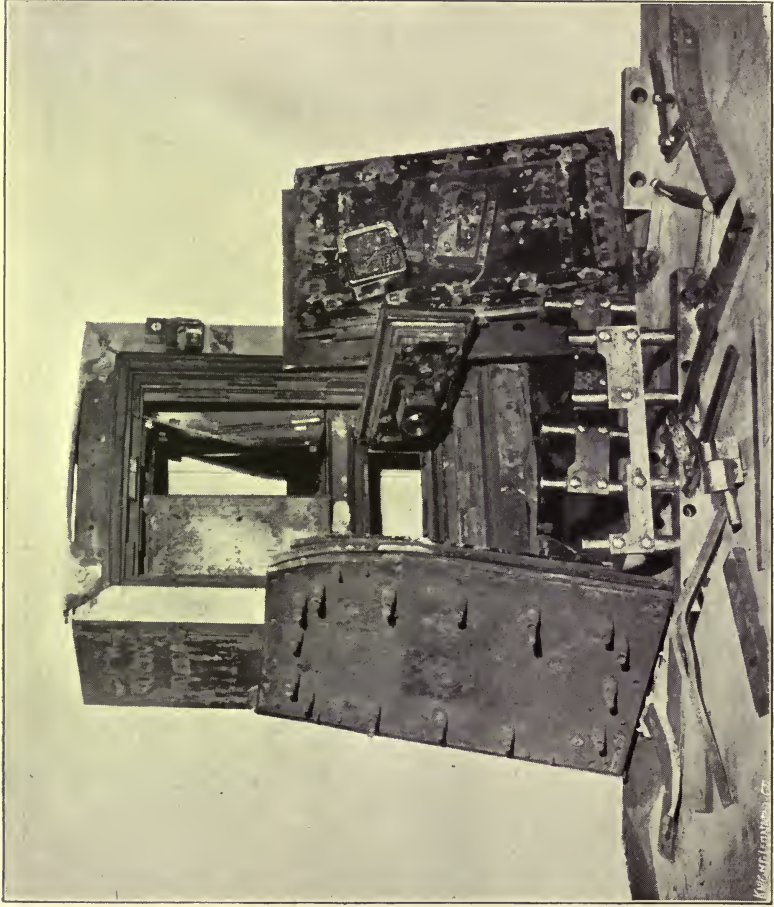
Two clocks are always used in each lock, in order that if one should stop from some of the ills that clocks are

both being out of order at the same moment are infinite.

There is another device to avoid the annoyance of locking-out, an exceedingly clever and simple device it is.



VIEW OF A SAFE BURGLARIZED IN FIRST NATIONAL BANK, LIBERTY, MISSOURI.



VIEW OF SAFE BURGLARIZED IN THE SOMONAUK BANK, SOMONAUK, ILLINOIS.

On each wheel of the combination lock at the time of manufacture is cut another notch at a certain distance from the unlocking notch. A record of the relation that these notches bear to the first set of notches is kept by the manufacturers. It is so arranged, too, that the secondary combination will not work unless the time-lock is not going. If a lock-out occurs the manufacturers send a man with the necessary information and the lock is opened at once. Even the discovery of the clue to the secondary combination would give no clue, it will be seen, to the primary combination.

A weak point of every vault is where the spindle of the lock penetrates the door. A hole through a door, however carefully protected, is an imperfection in its resisting power. Accordingly there has been devised an automatic lock, a time-lock like the rest, but so arranged that at a certain hour a mechanism of powerful springs is released, which throws the bolts and locks the door; and again at a certain hour withdraws the bolts and unlocks it.

The serious objection to this is that it does its work so well. Should a mob hold possession, having disposed of the proper officers, all the mob would have to do would be to sit around chewing tobacco at its leisure until the lock unlocked itself, when it could enter and amass considerable wealth. This consideration often rules out this clever automatic lock.

The boxes, as they are commonly called—safes, more properly—with which a safe-deposit vault is fitted up are matters of minute consideration. The depth is uniformly two feet: the difference in size is upon the face. This size varies from two-and-a-half by five inches to twenty by thirty, or more. Safes have been made as small as one-and-a-half by five inches, and under certain conditions these

small safes rent easily. There is a multitude of small details of information about these matters quite essential to the proper construction, yet almost impossible to communicate in a magazine article. The horizontal partitions are a quarter-inch thick, rabbetted for a door-stop. To these the doors are hung by a special form of hinge that permits them to open flat back against the adjoining box. The hinges are all on the right hand of the person facing the door, the sinister side of the door, except when the door is against a wall on the dexter side, then it is hung the other way. Key locks and combination locks are both used, usually interchangeable to suit the tenant, and each having advantages of its own, which will occur to anybody. The keys are different up to a certain point, but when the safes exceed a certain number there will be more than one safe in that vault which a key will open. Not much risk to be sure, but some.

There must be provided a key closet in some corner of the vault, built like the safes themselves, and used to keep the keys of the unoccupied safes.

The doors of the safes are from half an inch to an inch thick of a plate of five-ply chrome steel, the larger, say above a square foot of face, provided with bolt work like any large safe.

The construction of these banks of safes is, so to speak, iron cabinet work, so great is the care and accuracy of fit required.

The details of the construction and the reasons for certain ways of doing things might be indefinitely elaborated. Enough has been said to give a notion of the requirements and accepted methods to one entering upon such work without previous knowledge of it.

John Beverley Robinson



THE ST. JAMES BUILDING.

Broadway and 26th Street, New York City.

Bruce Price, Architect.



THE BANK OF COMMERCE BUILDING.

Nassau and Cedar Streets, New York City.

Rowe & Baker, Architects.



THE GILENDER BUILDING.

Wall and Nassau Streets, New York City.

Berg & Clark, Architects.



WIDTH 77'6"
HEIGHT 154'

SPINGLER BUILDING.

Wm. H. Hume & Son, ARCHTS.,
LINCOLN BUILDING, N.Y.

Union Square, New York City.



THE STANDARD OIL CO.'S ENLARGED BUILDING.

Lower Broadway, New York City.

Architects, Kimball & Thompson.



OFFICE BUILDING.

Southwest corner Broadway and White Street.

John T. Williams.



THE CENTRAL BANK BUILDING.

Broadway and Pearl Street, New York City.

John T. Williams, Architect.



NEW YORK ATHLETIC CLUB.
COR. OF 59th ST. AND 6th AVENUE

W. A. Cable.
Architect
1163 Broadway, New York.



THE WOODBRIDGE BUILDING.

William, Platt and John Streets, New York City.

Clinton & Russell, Architects.



CATHEDRAL OF SISTERON AND TOWERS OF ANCIENT WALLS.

FRENCH CATHEDRALS.

Part X.

THE CATHEDRAL OF PROVENCE. VI.

I.

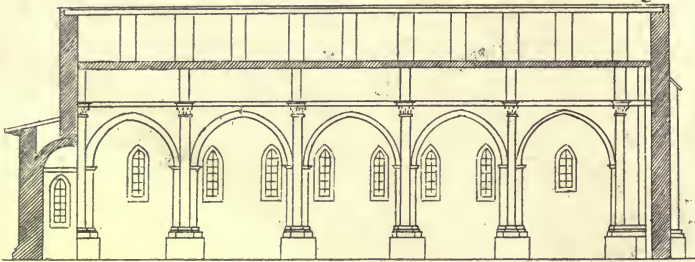
WITHIN a limited area in the Department of the Basses Alpes is a group of three small cathedrals which have many points of similarity. While retaining, to a considerable extent, the plan and structure of the other Provençal cathedrals, they have characteristics of their own. I refer to the cathedrals of Sisteron, Digne and Sénez, and with them may be included the little concathedral of Forcalquier, whose portal resembles that of Sénez which, in its turn, is manifestly derived from those of Digne and Sisteron. None of these churches have detail of Roman character, though the influence of Roman motifs has not wholly disappeared from the cathedral of Sisteron. In

the others, however, there is scarcely a suggestion of that rich art that flourished in Provence in the eleventh and twelfth centuries. They belong, therefore, to a somewhat later time than the cathedrals we have been studying, though the complete absence of any records renders their date a matter of conjecture. Of the cathedral of Sisteron it is stated that its reconstruction was begun in 1015 by bishop Frondon (died 1030); but the structure and the detail are manifestly so much later that it is impossible to believe that the present edifice is the one undertaken at that time. The second half of the twelfth century is certainly a safer period in which to place it.

Sisteron is a city that enjoys the ad-

vantage of an extraordinary situation. Built on a rocky gorge on the river Durance, and surrounded by precipitous rocks, on the highest of which is one of the strongest citadels in France, its narrow streets, its ancient military

north aisle, and a low octagonal lantern over the dome of the choir. Save the west front its exterior is plain almost to severity, yet it exhibits marks of Italian influence in its flattish gable and its main portal, which is almost



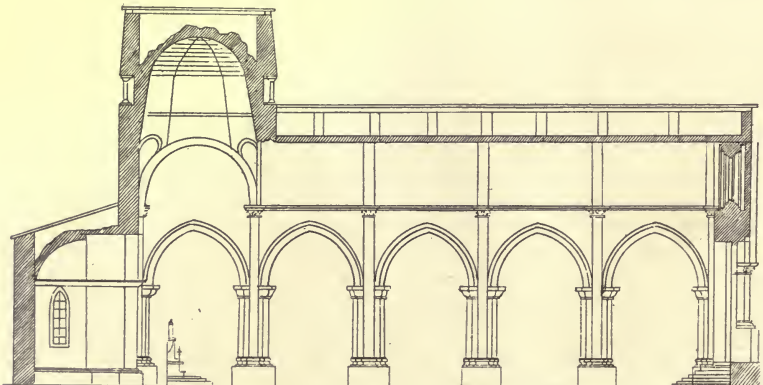
CATHEDRAL OF SISTERON;
Longitudinal Section Through South Aisle.

remains, its curious old houses and its primitive aspect, give it an interest apart from its cathedral, and though seldom visited it is one of the most interesting cities in Provence.

Its cathedral of Notre Dame de Pomeriis is the most important of the sub-Alpine cathedrals. Though small—its greatest length is 144 feet—its interior consists of a nave and aisles, with three apses, and chapels added at

identical with that of the cathedral of Notre Dame du Bourg at Digne.

The nave is of the Provençal type; four bays with tunnel vaults, a fifth bay with an octagonal dome, and an apse beyond. The vaults, however, depart from the usual form and are round instead of pointed as in earlier churches. They are carried on single vault arches resting on slender half columns applied to the centre of the



CATHEDRAL OF SISTERON;
Longitudinal Section Through Nave.

various times. The interior is of a very dark stone, almost black, and being lighted by but few windows, has a most impressive effect. There is a small tower at the east end of the

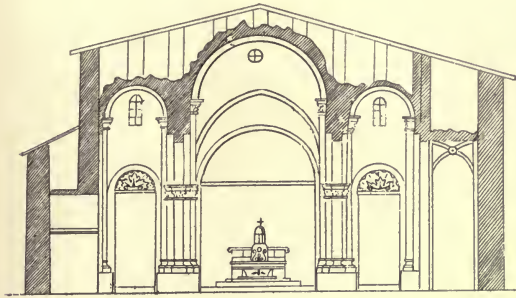
large square piers separating the nave from the aisles. These piers are square in plan, with half columns applied to the centre of each face, all resting on a large un moulded base, whose height

diminishes towards the altar. The capitals of the half-columns carrying the arches between the nave and the aisles are continued on the rectangular part of the piers to the half-columns of the nave vault, which rise

string. It has an inward slope of a conical section, and a string a short distance up divides the dome, which is without ribs. The entrance arch of the nave apse is round, though all the other lower arches of the nave are pointed. A pointed arch in the wall over it is below a small round splayed window, over which is an open maltese cross cut in the wall. The apse is a short rectangular portion with a semicircle beyond roofed with a semidome, which is slightly lower than the tunnel vault or deep arch over the preceding part. The original structure of the apse wall is almost completely hidden by the altar piece and niches for statues (XVII. century); it is lighted by a round topped window on the south side, and on the north

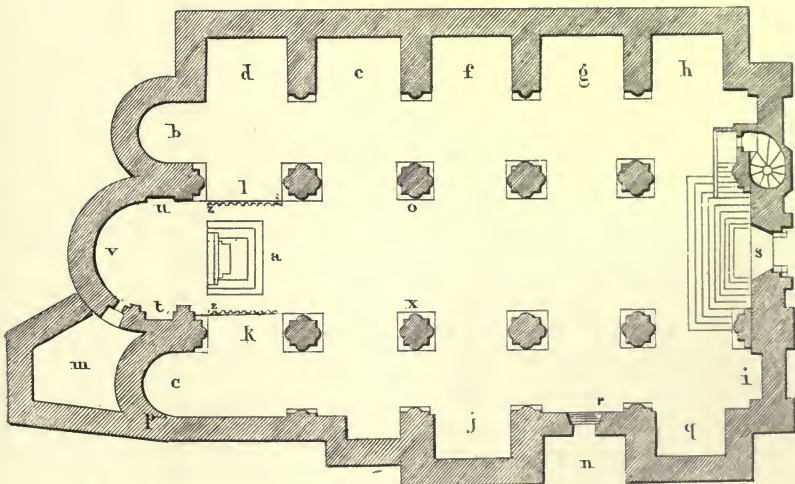
side at the entrance, is a large and interesting door frame in the Renaissance style now used as a canopy for seats placed below it.

The aisles are high and narrow, as is usual in the aisled churches of Prov-



CATHEDRAL OF SISTERON;
Transverse Section.

above them. The first pair of columns have strongly conventionalized foliage, while the others are of a plain swollen type. The arches opening to the aisles are double pointed and unmoulded, those in the first bay hav-

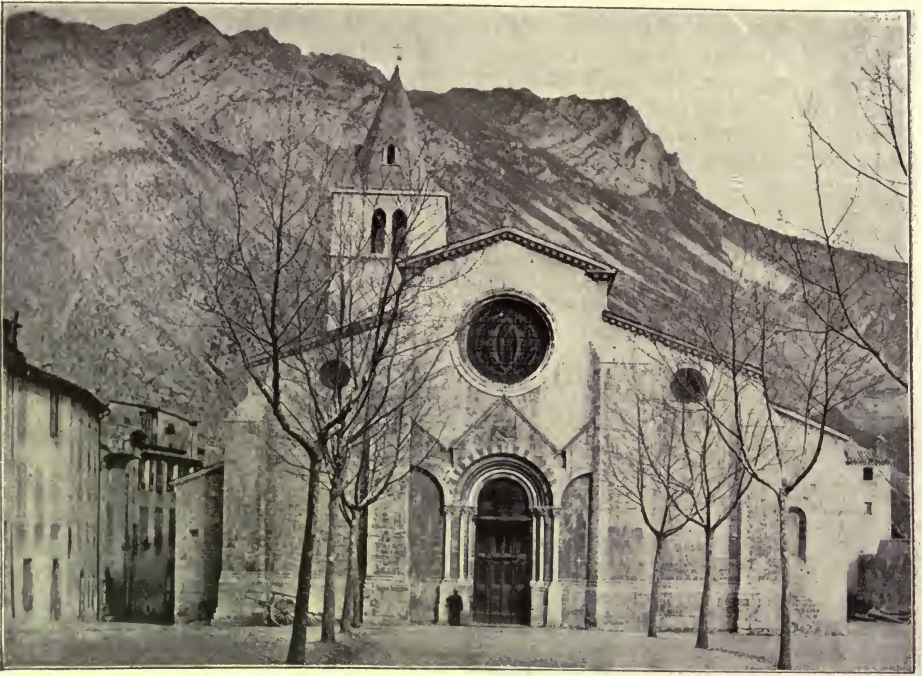


CATHEDRAL OF SISTERON;
Plan.

ing a small hollow worked on the edge.

The dome has some peculiarities of its own. The pendentives have somewhat long triangular bases and support the octagon without a separating

ence. Like the nave they have round tunnel vaults with plain arches on half columns. The outer walls have single round arches, below which are the chapel entrances. None of these are of special note. On the north side



CATHEDRAL OF SISTERON.

Photographed by M. Eysseric.

they are of various depths, those of the first and fourth bays being scarcely more than recesses with tunnel vaults. The second bay on this side is the usual entrance, and entirely featureless, while the chapel of the third bay, which has a ribbed cross vault, is the only true chapel on this side. On the south the chapels have the merit of regularity, though not all built at the same time. The wall arches have disappeared in some bays, and save the second chapel all the entrance arches are large and clumsy. The ribbed cross vaults differ in minor particulars, and the windows are round or pointed, and arranged one or two to a chapel. The aisle apses are small and without ornament.

The exterior of the cathedral though plain is not uninteresting. The west façade has been restored, but carefully and judiciously. It is rather low, owing to the fact that the ground slopes downward behind it, the floor of the nave being nine steps below the ground. Four large buttresses, with sloping tops, divide the front into

three parts, of which that to the right with inclined sides contains stairs to the organ gallery. In the upper part of each division is a round window, the central one larger than the other, and all with deeply splayed frames.

The portal, rather slender and high, consists of a round arch with a half arch on each side resting against the adjoining buttress. The half arches are single, while the central one is recessed with roll mouldings carried on two columns on each side. The structure is almost identical with that of the portal of the ancient cathedral of Digne, but there is an essential difference in the upper part, which is here inclosed with a pointed gable, with half gables over the half arches. A small bas-relief of an animal is inserted in the central gable over the arch. The columns are recent restorations, and are slender delicate shafts whose bases stand on a high base with a moulded top that run across the wall. The capitals, however, save those of the outer columns, are original, and their conventionalized acanthus



CATHEDRAL OF SISTERON.—EAST END.



CATHEDRAL OF SISTERON.—INTERIOR.



CATHEDRAL OF NOTRE DAME DU BOURG, DIGNE.— WEST FRONT.

Photographed by M. Eysseric.

leaves indicate a considerable departure from the Roman type. The first arch within the portal rests on a pilaster, and has a somewhat broad capital with symbolic animals.

The other portions of the exterior are plain walls and unimportant but-

The eastern wall is as featureless as the sides. The apses are unornamented. The choir has no gable, but a portion of its end wall forms part of the base of the octagon which surmounts the dome. The latter is a loggia-like structure, with small piers on the



CATHEDRAL OF NOTRE DAME DU BOURG, DIGNE.—MAIN DOORWAY.

tresses. The tower is rectangular, its longer east and west sides having two small pointed windows in its upper stage, with one in the others. It has a low modern octagonal spire. Beyond the tower is the uninteresting sacristy and former chapter house, enclosing the north apse.

corners and columns between them, with a passageway behind closed by a solid wall. A high piece of plain wall surmounts the loggia. The treatment is novel and beautiful, but the misshapen form of the eastern wall of the cathedral, the awkward effect of the adjoining tower, and the severity of



NAVE OF THE CATHEDRAL, DIGNE.



CATHEDRAL OF NOTRE DAME DU BOURG, DIGNE.—SOUTH SIDE, NAVE AND TRANSEPT.
 Photographed by M. Eysseric.

every part, deprive it of those adjuncts of regularity and beauty which are essential to a fine effect.

II.

The city of Digne, the flourishing and busy capital of the Department of the Basses Alpes, has two cathedrals. The present cathedral of Notre Dame et S. Jerome is a Gothic structure of the fifteenth century. The old cathedral of Notre Dame du Bourg, on the outskirts of the city, dates from the twelfth century, in plan at least, though the whole of its upper fabric appears to be of the thirteenth, while the essential parts of the façade belong to the fourteenth. Even in its present dismantled and deserted state it is one of the most interesting monuments of the region. It is an excellent type of a simple form of Romanesque architecture, in which the direct reproduction of Roman-like ornament has disappeared, while the simplicity and regu-

larity of its plan, together with the almost unique circumstance among French cathedrals that it is practically unrestored, make it more than usually valuable for comparative study, and a really delightful church to visit.

It is extremely simple: a nave of five bays, 165 feet long and 26 wide, shallow transepts of a single bay each, a short rectangular apse, a tower, and a sacristy—quite formless in its architecture—which, when it was built towards 1335, formed a chapel. And the construction is as simple as the plan. It has pointed tunnel vaults throughout, of the usual type, carried on double arches, but the supporting piers, instead of being, as heretofore, a group of rectangles, have the central or outer rectangle displaced for a half column. The capitals are clumsily carved and of a distinctively Romanesque type, with a heavy abacus that forms a string at the base of the vaults. This form is used throughout the

church, in the aisles, at the opening of the transepts, and at the entrance of the apse, which, like the other parts, has also a pointed tunnel vault, though slightly lower than that of the nave. The nave wall is marked off by single arches, whose piers have plainly moulded capitals. There is practically no decoration in this interior, and even the windows are of the same severe character as the rest of the structure. On the north side there are none at all, but the south wall contains three, with splayed frames with roll mouldings. Three similar windows light the end wall of the apse, and larger ones the end walls of the transepts. Instead of apses the transepts have, in each eastern wall, a pointed recess, and in the south transept, in the west wall, is a doorway that opens to a small vaulted crypt under the tower, where the curious who need other things than cathedrals to interest them, may see some particularly horrid mummified human skeletons.

It is, in truth, a strange and deserted little church, used only at certain festivals, and perhaps not now as its historians record was once the annual custom; for its ancient caretaker, to whom you must apply for the key, will protest against your removing your hat in its cold damp interior. It contains an altar, but it does not suggest use nor that loving care which might be looked for in so curious and ancient a building. There are some nearly obliterated remains of frescoes on the nave walls, dating from the fifteenth or sixteenth centuries. The most interesting is a Last Judgment on the south side, which, though much defaced, is still legible.

Of the exterior there are but two parts that show architectural treatment, the façade and the tower. The west front, which has been repaired in our own day, though scarcely more than was necessary to keep it intact, is enclosed within two huge buttresses. The central part is divided horizontally into two nearly equal divisions, of which the lower is formed by the porch, which, as has been pointed

out, is very similar to the main porch of the cathedral of Sisteron. It consists of a deeply recessed arch with large roll mouldings; the columns which supported it have disappeared, but the capitals remain. The outer arch, plain and unornamented, is continued on each side by a single half arch that rests against the enclosing buttress. A projecting stone between the junction of the main and half arches was formerly supported by a column standing on the back of an archaic lion. The lions are still in place, but the columns have disappeared. Above the arches is a plainly moulded string, with two corbels below which were doubtless part of the original finish of the porch. It is completed by a narrow sloping covering. This porch was repaired in the fourteenth century, at which time the capitals were put in place. This was probably prior to 1330, at which date a consecration of the church took place.

Above the porch is a large circular window, with a broad frame of rolls and hollows, which are repeated within, and which is evidently of the same date as the portal. The thin pointed arch of the nave vault appears on the outer wall over it, the space above, under the flat pointed roof, being filled in with stone-work that has partly fallen away and been roughly restored. Below, on each side, is a small niche of the fourteenth or fifteenth century, that to the south containing a statue.

The north wall is entirely plain except for the top of a pointed door-frame and the flat buttresses, which are stopped with a slope below a string that runs along the wall, a system we have seen in the cathedrals of Vaison and Cavaillon. The roof—a bare covering—is carried on a rough piece of wall above.

On the south side the wall is in better shape. The buttresses are the same, but the nave windows have moulded frames as within. The tower, which lost its spire in 1568, adjoins the west face of the south transept, and, with the exception of the main portal, is the most interesting feature

of the exterior. Various dates have been assigned to it, some authorities dating its lower part as a gallo-Roman wall of the sixth and seventh centuries, repaired in the ninth, while the upper stages are placed in the tenth century. These dates are certainly too early, for no other portion of the church goes as far back. But the lower stage, whose south face is decorated with two pairs of small round arches with a central corbel, and which is built of small stones, is unquestionably earlier than the two upper stages, built of largish smooth

stones, and of which the first is solid and plain, with an applied columnette on the corners—with capitals too small for the columns and apparently from another structure—and the upper with two round arched windows, with triple recessed frames, without ornament; a construction which appears to date from the epoch at which the cathedral was built, and probably completed in the twelfth century. The lower part of the west wall of the tower has a shallow projection, nearly in ruins, with a small window that lights the crypt below.

Barr Ferree.





Fig. 1.—S. Apollinare Nuovo, Ravenna (6th Century).

A DISCOVERY OF HORIZONTAL CURVES IN MEDIEVAL ITALIAN ARCHITECTURE.

I.

THE announcement that the refinement of curving horizontal lines, hitherto generally supposed to be restricted to the temples of the Greeks, has been discovered in Medieval Italian cloisters and churches is doubtless open to preliminary suspicion and scepticism. The facts, however, appear to be firmly established by the Brooklyn Institute Survey of 1895,* and what these facts are it will be the purpose of the present article to describe.

Inasmuch as scepticism and incredulity are to be anticipated, it may be well to disarm them in advance, as far as possible, by some preliminary explanations. These will take the shape of a reminder that our knowledge of the uses and purpose of curves in ancient architecture is at present extremely limited and fragmentary.

The general and practically universal presumption is, at present, that these curves were all rising curves in vertical planes and that they were confined to Greek temples. The mention of the curves is generally confined in popular works to the Parthenon at Athens and the presumption that they were intended in the Parthenon to produce the effect of exactly straight

lines by counteracting certain optical appearances of sagging and downward deflection, is also a very general one in the rare mentions of the subject by English or American experts.

As long as the account of the Greek curves is mainly confined to the Parthenon it does undoubtedly appear improbable that a refinement considered specially characteristic of this marvelously perfect building should be found in Medieval work, separated by many centuries from the Greek culture of the fifth century B. C. As long as the presumption is general that the Greek curves were always curves in elevation and always intended to correct an optical downward deflection, so long the existence of curves in Medieval architecture, which could not have had this purpose, is open to suspicion.

It seems, therefore, wise to stress the importance of an article which appeared in the "Architectural Record" in the Spring of 1895, as bearing on the announcements of the present Paper,* and to urge a review of this former article, by any one who is disposed to subject these later announcements to critical investigation.

*Vol. IV., No. 4. "The origin of Greek horizontal curves." This article has been republished by the Smithsonian Institution in the "Smithsonian Report for 1894"—the actual publication dating 1896; under the title of "A Discovery of Greek Horizontal Curves in the Maison Carree at Nimes," pp. 573-578.

*For a preliminary account of the work of this Survey, see Vol. VI., No. 1.

It was shown by this article that the prominence given to theories of optical correction in the matter of the Greek curves, on the part of English and American experts, is due to their natural respect for the high authority of Mr. Penrose, who has especially developed this explanation in dependence on the account given by the Roman author Vitruvius. (But Mr. Penrose, be it observed, in the first place, does not offer his explanations as to optical correction as final, or as more than tentative. In the second place he suggests additional explanations of a Greek preference for the beauty or variety of the curving line as alternative or additional causes.) It was also shown by this article that the curves in plan (as distinct from curves in elevation) on the flanks of the Neptune Temple at Paestum were unknown to Mr. Penrose,* that such curves are also found in the Roman temple at Nîmes known as the *Maison Carrée* and in the court of the Egyptian temple at Medinet Habou. It was shown moreover that the curves at Medinet Habou were discovered by Mr. Pennington before he made the discovery of the Parthenon curves and that this Egyptian discovery actually led to the other; in spite of which fact the Egyptian curves, which are curves in plan and not in elevation, have never been considered as an element in the problem of purpose—because their existence has been overlooked and ignored. The curves in plan which have just been mentioned have not been considered in the theories of a purpose of optical correction, and the facts are outside of these theories.

It is a natural tendency of popular writers to restrict their mention of Greek refinements to the curves, to restrict their mention of the curves to the Parthenon, and to restrict their mention of the probable explanation to the one which is best known to them.

Lest popular readers should be misled by this tendency of popular writ-

ers, lest us accent the following points as important to our own account of curves as found in the buildings of Medieval Italy.

(a) The Greek refinements were not confined to curves. They included constructive asymmetry in apparently equal dimensions, of all members and spacings. They included an avoidance of all parallels in verticals as well as in horizontals. (Even the curves do not have the same amount of deflection on the stylobate which holds for the entablature.) These refinements consequently included an avoidance of all exactly perpendicular lines in favor of constructed leans, both outward and inward. (These facts are also found in the buildings of Medieval Italy, as being due to construction and not to accident or carelessness. See article preceding and the article to follow.)

(b) The curves of ancient architecture are not confined to Greek temples. They are also found in Egyptian and in Roman temples.

(c) The curves of ancient architecture are not confined to curves in elevation, but they also include curves in plan. This holds even of the Parthenon, although no authority known to me has mentioned the curves in plan of the alignment of the portico columns of the Parthenon aside from Burnouf.* They are convex to the exterior.

(d) The theories of optical correction, as explaining Greek curves, are best known to readers of English publications, but they are not favored by Boutmy,* the leading French authority on this subject, nor by the German art historians like Jacob Burckhardt and Schnaase.

(e) Neither Penrose nor any other authority has ever antagonized the view that an effect of "life" and beauty was one purpose of the Greek curves, and Penrose has expressly mentioned this explanation.

* "Revue de l'Architecture," 1875, p. 152.

*These curves were photographed by the Brooklyn Institute Survey in 1895.

* "Philosophie de l'Architecture en Grèce." This work has been recently republished with a new title, *Le Parthenon et le Génie Grec*. Armand Colin et Cie., Paris.

(f) It may also be mentioned that two authorities, Hoffer and Boutmy, (to whose names we may add that of the American artist Stillman) have supposed the purpose of the Greek curves to have included that of exaggerating dimensions by artificial effects of curvilinear perspective. Artificial effects of perspective were certainly intended by other devices used in Medieval Italian churches* and there are, in Italian churches, some cases of bends in elevation (if not of curves) in which a purpose of perspective exaggeration seems to be clearly involved.

II.

Many or most of the Medieval Italian horizontal curves are found in the Italo-Byzantine or Byzantine-Romanesque churches. None of the horizontal curves have been found in the Italian Gothic, excepting in cathedrals like those of Siena and Orvieto, which in other details, and in recorded history, have affiliations with Pisan influences and artists and consequently with the Byzantine-Romanesque. Outside of the Fiesole Cathedral (Romanesque) most of the important instances of horizontal curves have been found in centres like Ravenna, Venice, Genoa, Pisa and Lucca (an art dependency of Pisa). This is suggestive of historic continuity through Greek Byzantine art and of a historic connection with classic architecture.

It would thus appear, as a consequence that later Greco-Roman Antiquity made a wider use of these refinements than has been supposed. In fact, on the instant that curves are conceded to have been used in the Italo-Byzantine architecture, the conclusion will be inevitable that it is only the general destruction of the monuments which has obliterated the connecting links between the use of the curves as found at Nimes in the 2d century, A. D., and their use as found at Ravenna in S.

Apollinare Nuovo in the 6th century A. D. This gap is not much greater than that which exists at present between the curves of the Maison Carrée and those of the temple of Olympian Jupiter at Athens (dated by Penrose to 174 B. C.) or between these last and those of the Parthenon. The gap is not nearly as great as that which now separates the curves of the Neptune temple at Paestum (6th cent. B. C.) from those of Medinet Habou (13th cent. B. C.).

Aside from a list of the Medieval Italian buildings in which curves have been observed and an account of their appearance, it is necessary to show the possible sceptic that thrust of vaultings or arches or other accidental causes could not account for them. It is also necessary to show that careless building could not explain them.

We will begin our list with Ravenna, because the sixth century church of S. Apollinare Nuovo is the earliest one in which the Medieval curves have been noticed (Fig. 1). The ascendancy of Greco-Byzantine influence in this church is, of course, undisputed.

In S. Apollinare Nuovo the lines of the nave columns supporting the clerestory are arranged in parallel curves in plan, of about six inches deflection at the centre from a stretched line. The curve is convex to the nave on the right side of the church and concave to the nave on the left side (looking toward the choir). These curves continue in the clerestory walls up to the ceiling. There are no aisle vaultings in this church to exercise thrust, and if there were, one of the curves would be against the thrust. The nave is timber-roofed, as was always the case in the early Christian basilicas of Italy, and the arched ceilings of the aisles are Renaissance lath and plaster. This is visible through an un-repaired break in the ceiling as one ascends to the organ loft, by a stairway from the right aisle. The best place to sight for the curves of the walls is from this organ loft. The walls of this church retain the original sixth century mosaics, and this is the only case

* "Architectural Record," Vol. VI., No. 2, "Perspective Illusions," etc.

in Europe of an early Christian basilica which has retained its side wall mosaics. This is a fortunate point for our observation, because if the walls had moved, the mosaics would have dropped off or would have been badly damaged; but no one will seriously suggest a movement of the earth's surface or any accidental displacement of masonry as having moved both lines of columns, from the pavement up, and both walls, up to the ceiling, into parallel curves in plan. These curves were discovered on Oct. 14th, 1895, after Mr. McKecknie's five months' time had expired and after he had left Italy. Consequently no photographs were taken here. The measures as given below were taken to a straight line. On the left side of the church this line was stretched tightly from the first column to the last, on the side toward the nave, and the measures, in inches, begin at the entrance.

0.0, $2\frac{1}{4}$, 3, $4\frac{1}{2}$, 5, 6, 4, $2\frac{1}{4}$, $1\frac{1}{2}$, $2\frac{1}{2}$, 0.

According to these measures the curve, concave to the nave, is strongest at the centre and is unbroken with exception of the placing of the tenth column. On the right side of the nave a line was stretched on the nave side of the columns at a distance of six inches from each of the two end columns. Thus the measures below, as they decrease toward the centre, indicate a curve convex to the nave, which is strongest at the fourth and fifth columns from the entrance and which is regular, with exception of a bend at the tenth column. The same bend occurs in the case of the same column on the opposite side. See the measures below, which begin at the entrance:

6, $5\frac{3}{8}$, $3\frac{3}{4}$, 2, 2, $2\frac{7}{8}$, $2\frac{7}{8}$, $3\frac{7}{8}$, $4\frac{3}{8}$, $7\frac{1}{8}$, $6\frac{1}{4}$.

Fig. 1 is taken from an ordinary photograph and does not sight on the curve, which in the given aisle is convex to the nave; but it illustrates the survival of the wall mosaics in the nave and the general appearance of the church.

We will now rehearse the facts already mentioned which bar out the suggestion of accidental movement.

(a) The curves start at the pavement in the alignment of columns and the measures are taken at this level. (b) There are no vaultings in the church, the aisle ceilings being Renaissance lath and plaster. (c) The curves are parallel as regards direction and if a "thrust" could be imagined as having ever existed in the building one of the two parallel curves must have been counter to the thrust.

It is generally conceded by experts that curves in masonry construction must be due to constructive purpose, unless they are due to thrust. This view is explained by the obvious point that careless or rough building might produce a "wobble" or an irregular line, but that it could not produce a curve. The thrust which produces a bulge or curve can only be exercised by a vaulting of masonry and it does not operate in timber-roofed buildings. In all vaulted churches the push or thrust of the vaultings against the supporting walls or piers is greatest at the centre of the building, because at the ends of the thrust the vaulting is tied in by transverse walls. Hence there is a tendency in the thrust of the vaulting of a side aisle to bulge out the wall of the clerestory toward the centre of the church. Otherwise a curve in masonry must be produced by a gradual and delicate series of changes in direction, all tending at first in one direction and all tending subsequently in a contrary direction. Such an arrangement implies contrivance and the effort of the human will, as a matter of course. When the curve "in plan" of a clerestory wall starts in the alignment of a series of columns, the conditions of the problem are the same. In the case of one line of columns the chances against an accidental arrangement in a curve, due to carelessness, are the same which hold against drawing a sequence of numbers first in a regularly rising and then in a regularly descending scale, and where two lines of columns are in question, of which each one shows a deviation from the rectilinear line of the same general charac-

ter and direction, the chances against accidental arrangement, due to carelessness, are so increased that the certainty of a constructive purpose is fairly established. The doubts which may still cling, in spite of all probabilities, to a single case, where the consequences involved are revolutionary for the present attitude and knowledge of the art historian, ought to disappear in face of such a series of observations as will follow.

Meantime it may be suggested that scepticism, even for one case, must be consistent with itself. If it could be even suggested that the phenomena in S. Apollinare Nuovo were accidental, it would follow that the masons of the given church and the given city, at the given time, were unfamiliar with the method usual in building a straight wall, of stretching a line, and building to it. How then could it happen that the outer walls of S. Apollinare Nuovo are perfectly straight, which is the fact?

If again it should be assumed that these parallel curves are due to Medieval carelessness, how can it be explained that the columns of S. Apollinare in Classe, another sixth century Ravenna church, are placed in perfectly straight lines. The measures in this last church for widths of nave and aisles, as compared at the two ends of the church, show accurate building in the right aisle to a hair's breadth, accurate building in the nave with an error of *only two centimetres*, accurate building in the left aisle, with an error of *only five centimetres*. These errors do not specify a deflection of straight lines, resembling a curve, but they relate simply to differences in width at opposite ends of the building and in measures which were intended to be equal. They may be regarded, therefore, as establishing for this church the limit of error due to ordinary causes.

As I am not able to publish photographs sighting on the wall curves of S. Apollinare Nuovo for reasons explained above, it is well to say that they are of regular and even construc-

tion. This is implied by the existence in this church of the before-mentioned mosaics. Byzantine artists are at least free from the suspicion of making mosaics with an uneven surface. In other words, the well-known fact that the mosaics are here verifies my assertion that the curves of the walls are even and regular. The expert who wishes to test my observation for curves in the clerestory walls of S. Apollinare Nuovo should make use of the organ gallery over the entrance, from which point of view the most satisfactory sightings are obtained for the upper walls of the church. The photographs published in this article for other churches give a correct idea of the nature of these curves.

The church of S. Donato in Genoa (11th century Byzantine-Romanesque) shows regular parallel curves, with a deflection of six inches, in both lines of nave columns, beginning at the bases and continuing in the clerestory walls to the height of the ceiling. These facts were noticed by our party of three on the first day we spent in Italy, on landing at Genoa; but the measures were not taken until a second visit to Genoa, after Mr. McKecknie had left Italy. They were then taken on a Sunday, shortly before Mass, and consequently in a hurried way, as regards details, but with perfectly satisfactory results.

A cord was stretched in the left aisle, $4\frac{1}{2}$ inches out from the column nearest the entrance and $5\frac{1}{2}$ inches out from the column next to the choir. The nave is thirty-five paces long and there are seven columns. The measures at the first and last column show the points at which the cord was stretched and must be subtracted from the other measures to obtain the amount of curve.

$4\frac{1}{2}$, 6, $7\frac{1}{2}$, $10\frac{1}{2}$, $10\frac{1}{4}$, $8\frac{1}{4}$, $5\frac{1}{2}$.

There is no break in this scheme, the measures show a curve of about six inches convex to the nave (the line being on the aisle side). On the opposite side a pulpit interfered with taking measures, but the facts are the same. There are two witnesses besides my-

self for the existence of the curves in the clerestory walls of this church, Mr. Nelson Goodyear and Mr. John W. McKecknie.

As to the general delicacy of these curves in the upper walls of the given

of the masonry joints; the curve is delicate and regular and it starts in the bases of the columns at the pavement. It is much more pronounced on the line photographed than it is at the pavement, but the aisle vaulting could



Fig. 2.—CURVE IN PLAN, CATHEDRAL OF GENOA.

The curve begins in the columnar alignment at the level of the pavement, and has an upper deflection of about eight inches.—Brooklyn Institute Survey.

buildings a photograph taken in the Genoa Cathedral by Mr. McKecknie on the first day of our survey in Italy will be of interest (Fig. 2). The photograph was taken from the organ gallery above the entrance, sighting down on the curve. There are no partings

not have produced this increase, being too far above it. The curve has about eight inches deflection, according to Mr. McKecknie's estimate, on the line photographed. The deflection in the line of columns at the pavement is about two inches. The curve would

be much more apparent in the picture if it had been possible to place the camera farther to the left and sighting more directly on the line.

No curve could be noticed in the opposite clerestory wall of the Genoa Cathedral.

It is also the case at Trani that only one wall is curved. Here also the curve starts in the bases of the col-

Mr. McKecknie's survey of the Fiesole Cathedral (twelfth century Romanesque) deserves the close attention of the expert (Fig. 4). Our photographs here (made under many disadvantages) were less successful in showing the facts which actually appear by sighting, but as seen by the eye the curves at Fiesole are more remarkable than any so far mentioned;



Fig. 3.—THE CURVE AT TRANI.

It extends upward from the supporting columns and their bases, showing thrust to be impossible. Republished from Vol. VI., No. 1. Fig. 5. Brooklyn Institute Survey.

umns and here also it increases in the upper wall. Our photograph at Trani was so successful that it is repeated here from the first article of this series (Fig. 3). By Mr. McKecknie's measure the columns are placed in a curving line of five inches deflection at the bases and in the upper wall the curve increases to over a foot deflection, by Mr. McKecknie's guess. The survey also possesses a photograph sighting on the curve at Trani along the line of the bases of the columns.

having a deflection of about twelve inches, and they are attested by the extremely careful and accurate survey, published herewith, as well as by the eyesight of three observers. The curves are *parallel returning curves* (Hogarth's "line of beauty") on both sides of the church, starting from the bases of the piers and rising in the walls to the ceiling of the church. The extreme deflection of the line of the piers from a straight line at the bases is about a foot. We have here

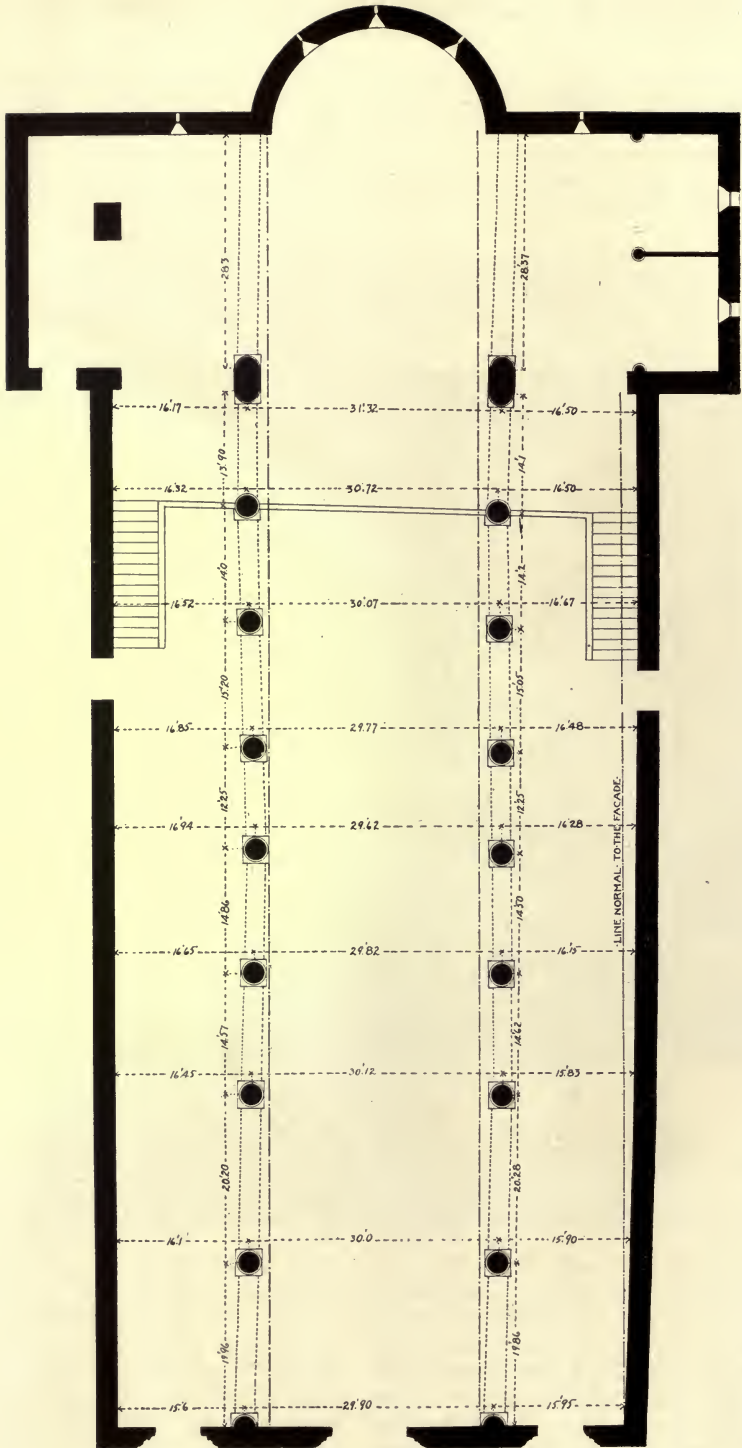


Fig. 4.—PLAN OF THE FIESOLE CATHEDRAL.

Showing pier spacings which narrow toward the choir and parallel returning curves in the alignment of piers. These curves continue in the clerestory walls. Survey by Mr. John W. McKecknie.

another case attested by a detailed survey into which no suspicion of either carelessness or thrust can be injected. No case has been so far quoted in which the objection of thrust could appear, for this is nat-

plan. In this case, if my memory does not fail me, both outer walls of the church follow the same line, which is not the case at Fiesole. Some remarks on an explanation current in Northern Europe and offered by the



Fig. 5.—PHOTOGRAPH SIGHTING ON THE CURVE IN PLAN OF THE FACADE OF ST. MARK'S, VENICE.

The deflection at the pavement is ten inches, concave to the Piazza; i. e., counter to supposable thrust. The curve is repeated in the retreating upper story. Brooklyn Institute Survey.

urally eliminated when the curves are found in the plan of the foundations. Moreover, there are no vaultings at Fiesole. That both clerestory walls of a church, including the supporting piers could be built in *parallel* returning curves as a result of accident, is wholly incredible.

St. Ouen at Rouen has a similar

sacristan of St. Ouen, regarding the representation of the bending of the head of the Saviour on the cross, have been made in the preceding Paper, which related to the subject of deflected and oblique plans. As mentioned at the close of that article these deflected plans grade over into the curved plans, and among these are many

which could not possibly represent the bending of Christ's head on the cross. A section of the Fiesole Cathedral, showing a remarkable case of perspective illusion in the arrangement of arches and pier spacings was

The façade of St. Mark's at Venice has a curve in plan of ten inches deflection starting at the foundations and concave to the Piazza. That is to say, in the upper surfaces, the curve is against the supposable thrust of the



Fig. 6.—CURVE IN PLAN OF THE SOUTHWALL, PISA CATHEDRAL.

Deflection, 22 inches. Compare ground-plan in last issue (Fig. 5.) Brooklyn Institute Survey.

published in a recent issue (Vol. VI., No. 2). These pier spacings are also represented in the survey of Fig. 4.

It would be possible to describe in detail a number of additional cases of curves in plan against which even the suspicion of thrust cannot be urged, but for the time being they will be briefly mentioned.

vaulting in the vestibule. See the photograph sighting on the curve (Fig. 5). This curve is best seen by noting first the corresponding line on the surface of the pavement. It is naturally much more easily seen in the dimensions of the building than in the small dimension of a photograph.

The north wall of S. Paolo Ripa

d'Arno at Pisa has a curve in plan convex to the street, starting at the foundations, and having about four inches deflection. Photographs of convex curves in plan are not generally sat-

isfactory, and our photograph of this curve is not reproduced in this article. The south wall of the Pisa Cathedral has a curve in plan, starting at the foundations, concave as regards the exterior and having a deflection of twenty-two inches. See Fig. 6. This curve holds, of course, in the upper wall and is there counter to thrust, of



Fig. 7.—PORCH OF S. GIORGIO IN VELABRO, ROME.
The cornice curves in plan; no vaulting within.

of the given buildings. They then become important as cases which are wholly free from the suspicion of thrust.

The instances of exterior cornice curves in plan, which do not rise from the foundation, are always potentially open to the suspicion of thrust when they are convex to the exterior. It is

of the given buildings. They then become important as cases which are wholly free from the suspicion of thrust.

The instances of exterior cornice curves in plan, which do not rise from the foundation, are always potentially open to the suspicion of thrust when they are convex to the exterior. It is

well to remember here however that these cases are numerous in Italy for the period of Byzantine influence and that there are no known examples of exterior cornice curves for the Gothic. If masonry movement be assumed to explain these curves there does not appear to be any reason why they should disappear in the Gothic period.

suggested from the timber truss-work within. The joints of the brick-work have not parted. (Fig. 7.)

It is so far apparent that no general theory of thrust or other accidental displacement, will make headway as explaining the phenomena, or receive even a moment's consideration from experts when the facts are known; we



Fig. 8.—CURVE IN THE SOUTH GALLERY, PISA CATHEDRAL.

View looking toward the facade. The same curve appears in the gallery cornice, deflection about five inches. This curve is counter to thrust of the aisle vaulting. Brooklyn Institute Survey.

We offer an illustration of such an exterior cornice curve in plan from the porch of S. Georgio in Velabro at Rome (12th century porch; 7th century interior). There is no vaulting inside this porch and no thrust to be

shall therefore begin to consider more in detail the possibility of carelessness or constitutional inability to construct straight lines of masonry. Mentions of individual or isolated curves like those just specified for the façade of St.

Mark's, the north wall of S. Paolo Ripa d'Arno, or the south wall of the Pisa Cathedral, do not carry much weight with a sceptic considering a report and not weighing the facts on the ground. In face of the monuments

in the last issue, favor the belief that the masons knew what they were doing there, but in weighing a report the sceptic is disposed to suggest careless building for every isolated curve. Hence the value



Fig. 9.—CURVE IN THE NORTH GALLERY, PISA CATHEDRAL.

View looking toward the facade. A line is stretched to exhibit the curve. Brooklyn Institute Survey.

there is an aggregation of facts pointing to a system of optical refinements and such a multitude of instances of curves that the cases wholly free from suspicion of thrust are not easily to be explained as due to carelessness. For instance, the remarkable points published for S. Paolo Ripa d'Arno

of the evidence offered by the churches in which the curves are found in pairs in the lines of the nave or clerestory. The number of instances of this class is sufficient to show that they belong to a system of building connected with the more distinctly bent and deflected plans discussed in our last Paper.



Fig. 10.—CATHEDRAL OF VOLTERRA.

View looking toward the entrance. Showing parallel curves in the clerestory walls. Brooklyn Institute Survey.

These would appear to be a medieval exaggeration or development from the more delicately bent or curved plans now being considered. From this point of view the quoted cases at Ravenna, Genoa, and Fiesole appear to be very satisfactory evidence. We will now add mention of similar instances at Toscanella, and in the Siena and Pisa Cathedrals. The bend of the façade of S. Pietro at Toscanella is represented by the survey of our last Paper (Fig. 1, Vol. VI., No. 3). No expert will suggest careless construction here.

In this last Paper (Fig. 18) was also published a survey of S. Maria at Toscanella, but reference was purposely then avoided to the curves. Attention is now again called to this survey and to the curve in plan of the line of columns on the left of the nave. The bend continues in the alignment of the

choir. The columns on the right side of the nave are in line, but the corresponding bend appears in the alignment of the choir. See Fig. 13 for a photograph of the left clerestory wall.

In the Cathedrals of Siena and Pisa the upper lines of the nave are curved or bent in plan and in the same direction on both sides of the church, but the bends are not found in the alignment of the supporting columns or piers of the naves. The bend of the Siena choir (Fig. 12) is much more abrupt than the bends in the clerestory cornice lines of the nave. These clerestory cornice lines at Siena correspond in arrangement to the gallery lines at Pisa, and our illustration for both, as regards the general facts, will be drawn from the latter cathedral (Fig. 8). These curves have a deflection of about five inches.

In these two cathedrals the curve on

one side of the nave might potentially be due to thrust of the aisle vaulting, but as the curves are parallel as regards direction, it follows that the curve is counter to thrust on the opposite side of the nave. Thus at Pisa the south gallery line curves counter to thrust (Fig. 8). This curve was photographed for convenience on the inside of the gallery, but it also holds on the exterior side.

Fig. 9 is taken in the aisles of the north gallery. It will be noticed that this curve is above two lines of thrust in the aisle vaultings below, which are opposed to one another.

The clerestory walls of the Cathedral at Volterra show the same bends (Fig. 10) which are found at Pisa, Siena, Toscanella, Fiesole, Genoa and Ravenna. This cathedral was built by Nicola Pisano, which is a suggestive fact, considering that Pisa, on the whole, is the most remarkable centre for these phenomena taken collectively. The Cathedral of Prato, whose phenomena have been illustrated in preceding Papers was begun by Giovanni Pisano and Pisan artists are known to have been long employed on the Siena Cathedral. Their co-operation at Orvieto has been asserted by some authorities.

The curves do not appear at Volterra in the alignment of the columns, and these lean on both sides of the church in the same direction. It is difficult in the case of this Cathedral to conceive of any movement in the walls or in the earth's surface which could have curved both clerestory walls throughout their whole extent, from top to bottom, in one direction. There has, however, been a movement of masonry due to accident or earthquake in one outer wall of the Volterra Cathedral, and this instance needs more circumstantial description than space allows at present. The value of our illustration for Volterra is that it offers a photograph showing facts similar to those found elsewhere about whose constructive existence there can be no suspicion. The leaning columns of the nave at

Volterra suggest a difficulty to one who has not grasped the possibility that even the leaning columns of some Italian churches may possibly belong to the phenomena of constructive asymmetry. It may also be that the church was originally built with curving walls and that it has subsequently suffered from a settlement on one side which drew over the opposite side. Both lines of nave columns at Volterra lean in one direction, but the nave is not vaulted, and although the present ceiling is of Renaissance period it is hard to see how any forces operating through the original timber ceiling could have bent two walls into parallel curves.

All cases of church interiors so far quoted offer bends or curves in plan which have the same direction on both sides of the church. S. Agnese at Rome and S. Mustiola at Chiusi, on the contrary, show upper curves which are both convex to the nave and which are not found in the alignment of the nave columns. Fig. 11 shows one of the curves in S. Agnese of a wonderfully delicate construction. It was impossible to place the camera so as to sight directly over it. The deflection is three inches in seventy feet. It seems impossible that curves of such delicate nature could be repeated with the same amount of deflection in both gallery cornices as a result of careless building. The suspicion of thrust from aisle vaultings is eliminated here by the heavy parallel curves in the outer walls of both galleries amounting to six and seven inches. If the curves of the gallery cornices were due to thrust of the aisle vaulting the curves of the gallery walls would be in the opposing direction. The survey has photographs sighting on these walls. I believe there are no aisle vaultings at Chiusi (S. Mustiola). The clerestory walls curve from top to bottom (both sides convex to the nave, as before observed).

In the Orvieto Cathedral the galleries are both curved concave to the nave (only to be sighted in the galler-



Fig. 11.—S. AGNESE, ROME (7th century).

Showing a curve in plan of the gallery cornice. The opposite gallery shows the same curve of 3 inches deflection in 70 feet. Brooklyn Institute Survey.

ies). This is the only case noticed in Italy of two curves concave to the nave. There are no aisle vaultings here, but if there were, the curves would both be counter to thrust. The survey possesses photographs of these curves. The masonry construction is in good condition and wholly without partings in the joints. Curves or bends in plan for clerestory walls are also mentioned in my note-books for Troja (a Byzantine colony) for Amalfi Cathedral (a Byzantine centre) and for the Cathedrals of Naples and Beneventum. These observations are not however sufficiently minute and specific to be of value in this Paper, excepting as possibly corroborative facts, attesting a widespread diffusion of the phenomena, and supporting the view that Byzantine Greek influence is the original source of the medieval curves.

We will now consider some general

arguments against the possible view that careless or rough building may explain the phenomena mentioned, as nearly all the instances quoted negative without debate, thrust or accidental masonry movements.

(a) The phenomena of curves or bends in plan are not characteristic of the churches which are distinguished by rough building in other details. All the most important cases known to our survey have been specified (except the cloister curves) and it will be admitted that the cases are all in the more important churches of the given locality. The phenomena have not been noticed, for instance, in the minor churches of Siena, or Orvieto or Volterra. They appear in St. Mark's but have not been observed at Torcello or Murano. They are seen at Pisa in S. Paolo Ripa d'Arno (the old Pisa Cathedral) and in the Pisa Cathedral but not in the neigh-

boring humbler basilicas of S. Piero in Grado or Calci or in the minor Pisan churches. They are not known to the multitude of poorly built minor early Christian basilicas at Rome.

(b) The above point is repeated here

carelessness seems also improbable on this account.

(c) The point as to Byzantine centres has been dwelt upon. No church is known for instance in Florence, in Perugia, in Prato, or in Pistoja which



Fig. 12.—BEND IN PLAN OF THE CHOIR. SIENA CATHEDRAL.

Taken from the dome gallery. Brooklyn Institute Survey.

in other words. There is too much rectilinear building in Medieval Italy in poorly built churches to favor the suggestion that building to a straight line was either difficult, unusual or unpracticed. It may be added that rectilinear building occurs so constantly in some portions of churches showing bends or curves that the theory of

exhibits horizontal curves. Of all refinements dwelt upon by these articles that of the horizontal curves is the rarest and the most definitely related to the known facts of Byzantine Greek influence, or of classic survivals in other particulars. It is impossible to understand why horizontal curves should not be frequent in Gothic

churches, in roughly built churches, and in centres or periods remote from Byzantine influence, provided they are to be explained by accidental causes or medieval carelessness.

uniform for the whole nave and is reversed as regards direction in the choir (Fig. 4).

(e) Many of the curves are too delicately regular to admit of the theory

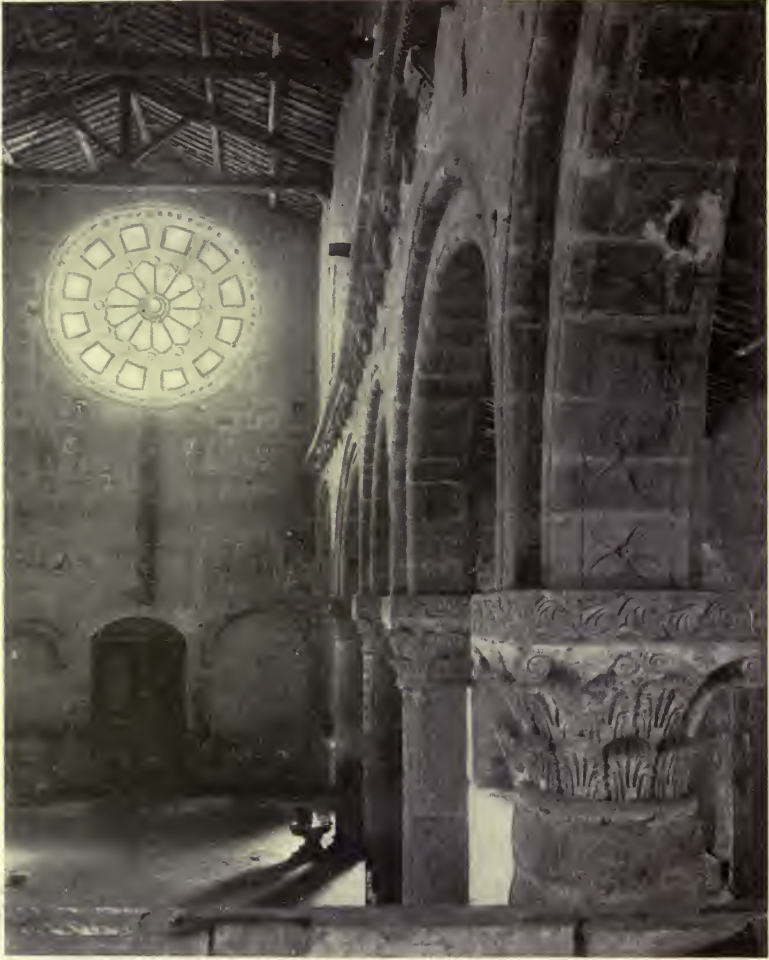


Fig. 13.—S. MARIA, TOSCANELLA.

View looking toward the entrance and taken from the pulpit. The curve of the wall begins in the bases of the supporting columns (12 inches deflection). Compare survey for plan Fig. 18, Vol. VI, No. 3.

(d) In no one of the cases quoted do we find a "wobble" or a line bending back and forth. If the bends are due to rough building why is the one uniform direction preserved? A returning curve of the large sweep seen at Fiesole does not interfere with this argument. At Fiesole the curve is

of careless building—see for instance the curves of S. Agnese (Fig. 11), of Genoa (Fig. 2), of Trani (Fig. 3).

(f) Some of the bends are so abrupt and so accurately jointed withal that the theory of careless construction is again inadmissible. This applies to the bend in plan of the choir at Siena. (See Fig.

12.) There are many cases in which the accurate and close fitting of joints, which is involved in the purposed construction of such bends, can be studied, as for instance in Fig. 12.

(g) If it be urged that such bends

have been a general one, the bend will illustrate this feeling as well as the curve. If the curves at Orvieto or at Toscanella (see Fig. 13) were the only ones, they might be attributed to rough construction, but when the



Fig. 14.—BEND IN ELEVATION, NORTH GALLERY, PISA CATHEDRAL.
Brooklyn Institute Survey. Compare the section Fig. 6, Vol. VI., No. 3.

ought not to be included in an account of curves which are supposed to be derived from classic tradition, the answer is obvious that medieval tradition and practice would have tended to produce ruder and more imperfect repetitions of the Byzantine Greek originals, and that if the standpoint of purposed asymmetry be admitted to

facts are viewed as a whole they show in the given cases exactly what provincial or medieval builders would naturally have done with an originally Greek refinement.

III.

Our demonstration has not yet exhausted its points, for so far the curves

and bends in elevation have not been considered.

The expert is requested to consult the surveys for the gallery levels at Pisa, which were published in the last issue, showing the bends in elevation

and over the same corresponding column in both galleries. The bend of the north gallery (Fig. 14) shows a rise from the façade gallery to the third column of .78 and a fall from that point to the transept of .93 (deci-



Fig. 15.—BEND IN ELEVATION, SOUTH GALLERY, PISA CATHEDRAL.

Brooklyn Institute Survey. Compare the section Fig. 7, Vol. VI., No. 3.

of these galleries (Figs. 6, 7, Vol. VI., No. 3), and then to compare the photographs herewith (Figs. 14, 15). That these bends are in the masonry construction is of course undisputed. It is as little open to dispute that no theory of accidental irregularity or careless building will account for them as occurring at exactly the same points

of a foot). The bend of the south gallery (Fig. 15) shows a rise from the façade to the third column of .83 and a fall from that point to the transept of .83. If it is suggested that the bend in Fig. 14 is so obvious as to defeat its own purpose and that it is too pronounced to be regarded as a "refinement," it may be answered that it

wholly escapes detection from the floor of the nave, as hundreds and thousands of visitors at Pisa can testify. Not only is its effect discounted by the eye into perspective in the nave, but from most points of view this bend

to see the whole line, and its deflection then corresponds to the ordinary facts of vision, with some exaggeration of apparent dimension. We have illustrated and described in this Paper the curves in plan of these



Fig. 16.—CURVE IN ELEVATION, NORTH CLERESTORY WALL, PISA CATHEDRAL.

View looking toward the facade. There is a corresponding curve on the opposite side which has also been photographed. These curves are directly above the interior gallery bends.
Brooklyn Institute Survey.

also escapes detection in the galleries and is only noticed by sighting. The results for the eye are not represented by such photographs as Fig. 14. The photograph is seized by one glance of the eye, but in the dimensions of the building the eye must move in order

same gallery cornices (Fig. 8). If now it be admitted that the bends in elevation are constructed and that they cannot be due either to accident or to carelessness is it not likely that the bends in plan of the same cornices were also intentional, and if this be ad-

mitted does not the probability grow that the curve in plan of the south wall had also a constructive purpose? The curves in elevation of the upper exterior walls of the Pisa Cathedral would then appear also to be due to constructive purpose (Fig. 16). These curves are directly above the corresponding bends in the galleries. The survey has a photograph for a corresponding curve on the opposite side of the Cathedral.

Bends which are similar to those of Figs. 14, 15, occur in the clerestory cornices of the Cremona Cathedral. (The remarkable plan of this cathedral appeared in the last issue and the illusive arrangement of arches and pier spacings was described in Vol. VI., No. 2.) The given bends at Cremona are wholly imperceptible from the pavement, where they are discounted into perspective effect. They can only be detected by ascending to the space beneath the aisle roofs, and above the vaultings of the side aisles (there are no galleries at Cremona). The rise of the cornice appeared to be about three inches and the drop about a foot. Bends which occur at corresponding opposite points cannot be due to carelessness.

The gallery bends at Pisa have their counterparts in the stripings of the outer walls of the cathedral. (See Fig. 11, Vol. VI., No. 1.) These exterior bends occur at the fifth bay from the façade on both opposite sides of the church. They cannot therefore be due to carelessness. Our next Paper will show that they cannot be due to settlement, as was supposed by Mr. Ruskin. Our survey has photographs and observations for many delicate curves in the Pisa Cathedral (as distinct from bends) which are not entered in this Paper.

One more remarkable case may be noted here. It is that of the plinth blocks which support the aisle columns on the north side of the Cathedral. The measures for the heights of these plinths are entered in the survey for the gallery levels (Fig. 6 of the last issue). They are repeated below

in order from the entrance to the transept (feet and decimals).

1.35: 1.57: 1.73: 2.17: 2.47: 2.30:
2.05: 1.84: 1.30: 0.57.

These figures rise gradually to the centre and drop gradually beyond it without a break in the scheme. Ac-



Fig. 17.—Curve in elevation, S. Michele, Lucca.

The curve has about 5 inches deflection in 76 feet. There is a similar curve in the cornice above. These curves are repeated on the opposite sides of the church, where they are slightly less than three inches. Brooklyn Institute Survey.

cording to the law of permutations and combinations, otherwise the law of chances, the chances are about three million to one against accident in the arrangement of this series.



Fig. 18.—BEND IN ELEVATION, GALLERY OF ST. MARK'S, VENICE.

Brooklyn Institute Survey.

We also photographed very delicate curves in elevation on the exterior of S. Michele at Lucca (Fig. 17). On both sides of this church the curves are found in the base courses (see photo.), and also in the cornices. On the side photographed the base courses curve about five inches, with slight increase in the cornice. On the opposite side the curve is slightly under three inches, both above and below. The length of these walls is about seventy-six feet. The survey possesses accurate photographs for all these curves. The survey has also photographs and measures for masonry bends below and cornice bends above, in S. Alessandro at Lucca. These are also bends in elevation. The survey has also photographed curves in elevation of a more roughly built character on the side of the cathedral of Ferrara, and they appear in all the interior galleries of St.

Mark's at Venice (Fig. 18). There are twelve other galleries in St. Mark's having similar curves in elevation and the survey has photographs for six of them. In St. Mark's the question of settlement had to be carefully considered, and all possible means were taken to reach certainty on this head as regards the origin of the given curves. It is believed that experts who examine the galleries of St. Mark's in connection with the evidence from Pisa and other sites will agree with the opinion that these curves are not due to settlement—but it might be well for such experts first to consult Mr. Street's observation as to the more prominent bends in St. Mark's pavement and to imitate his example of testing the facts regarding the pavement by a visit to the crypt.

The following passage will be found in Street's: "Brick and Marble in the Middle Ages," relating to St. Mark's,

and my readers will remember that the observation is that of a practical architect and of an expert in construction. "But of all the features of this grand church that which next to the gorgeous colors of the walls most attracted me was the wild beauty of the pavement. I know not what other word to use which quite describes the effect it produces. It is throughout arranged in the patterns common in most Opus Alexandrinum, but instead of being laid level and even, it swells up and down as though its surface were the petrified wave of the sea, on which those who embark in the ship of the church may kneel in prayer with safety, the undulating surface serving only to remind them of the stormy sea of life, and of the sea actually washing the walls of the streets and houses throughout the city. It cannot be supposed that this indulation is accidental, for if it had been the consequence of a settlement of the ground we should see some marks of it in the crypt and walls and some tokens of disruption in the pavement itself. And the corresponding example of Sta. Sophia at Constantinople where we have it on record that there was an intentional symbolism in just such a floor is conclusive as to the intention of its imitators here." Our own examination of the pavement of St. Mark's shows many minor depressions which must be due to settlement, but the ceiling of the crypt argues that the main and prominent wave line (across the church) of the pavement is intentionally constructed. At all events the piers have not settled and it is only here that the curves of the galleries could have been accidentally produced. One point is clear for the curves in elevation of the galleries of St. Mark's. No movement in the way of settlement has taken place since the casing was put on, for its joints are close and well-fitted and the casing follows the lines of these curves (Fig. 18). The casing in question dates from the original construction of the church.

It is an important point that the curves and bends in elevation ob-

served by our survey all exhibit the rising line—that is, they are always convex to the skyline or to the ceiling of the building and always concave to the spectator below.

The only case noted in Italy of a curve in elevation concave to the skyline is that of the centre string-course on the north wall of the Pisa Cathedral (see next issue). If the curves in elevation were not intentionally constructed it is difficult to understand why they are all rising curves. If, for instance, the gallery cornices of St. Mark's were due to careless construction, one would imagine that some would be concave and others convex and that some would be "wobbles." As a matter of fact there is one "wobble" in the whole large list of St. Mark's gallery curves, but none are concave to the sky-line.

It has been remarked in the opening of this Paper that when the proof of the existence of curves in Italo-Byzantine building is admitted the inference as to a connection of these phenomena with those of antiquity will be unavoidable. The question will now therefore be considered as to what present evidence there is of such connection.

It is an astounding fact that several of the Italian medieval cloisters exhibit curves in plan which are the exact counterpart of those discovered by Mr. Pennethorne at Medinet Habou.* These Italian curves are also convex to the court on all four sides of the court, and they are as regular and as delicate as any ancient curves. An impregnable case, as regards constructive purpose, is offered by the cloister of the Celestines at Bologna. In this two-storied cloister (Fig. 19 and Fig. 20) the walls curve regularly in plan (on all sides and in lines all convex to the court) from the foundations up, which eliminates the suspicion of thrust from the vaultings. On one side of this court, moreover, there are no vaultings on either story. These curves have a deflection on the second

* See "Architectural Record," Vol. IV., No. 4.

story of about 5 inches in 51 feet and are somewhat less prominent at the foundations. For these delicate curves, which are all convex to one point, there are only two theories possible, constructive purpose or thrust, and where thrust is impossible constructive purpose must be admitted. Experts who wish to test the facts described in this Paper are advised not to take adverse ground before they have examined this cloister of the Celestines. As the upper story is accessible, the curves

The cloister of Sassovivo near Foligno offers a beautiful example of curves in the cornices but not in the parapets (Fig. 21). The deflection is $2\frac{1}{2}$ inches in 50 feet. They are found on all four sides of the court of the same delicacy. The joints of the masonry have not parted. Our photograph sighting on one of these cornice curves is fairly successful in showing the facts. They also appear in the cloisters of S. Paolo Furori le Mura and of the Lateran at Rome.



Fig. 19.—CLOISTER OF THE CELESTINES, BOLOGNA. (11TH CENTURY.)

can be literally studied under one's feet and in the jointing of the blocks of the parapet.

The cloister of the Certosa at Pavia exhibits similar curves in all its parapets and in the alignment of columns, but not in the cornices, as far as my observation went. Similar curves in the alignment of the columns were noticed by Mr. Nelson Goodyear on all sides of the cloister of S. Zenone at Verona which I did not visit.

Both of these latter instances are possibly open to sceptical objection, but when the case of the Celestine cloister at Bologna has been examined such objections will probably not be urged. The details of the masonry jointing in St. Paul's cloister offer many arguments in favor of the view that the cornice curves were built in by gradually leaning out the pilasters toward the centre of each side. This appearance would of course also hold, if the vault-

ing had pushed out the cornice, but the tops of the pilaster capitals do not tilt downward as they would do, in the latter case. There are other indications of a constructed bend of the cornice in the cutting and fitting of the masonry blocks. The survey has a series of photographs to show these

court. The Lateran curves measure about $4\frac{1}{2}$ inches in 87 feet at the cornice, and from $1\frac{1}{2}$ to $2\frac{1}{2}$ inches at the parapets; all convex to the court.

Let us now rehearse the points as to cloister curves. No case has been found in which the curves are not seen on all four sides of the court.

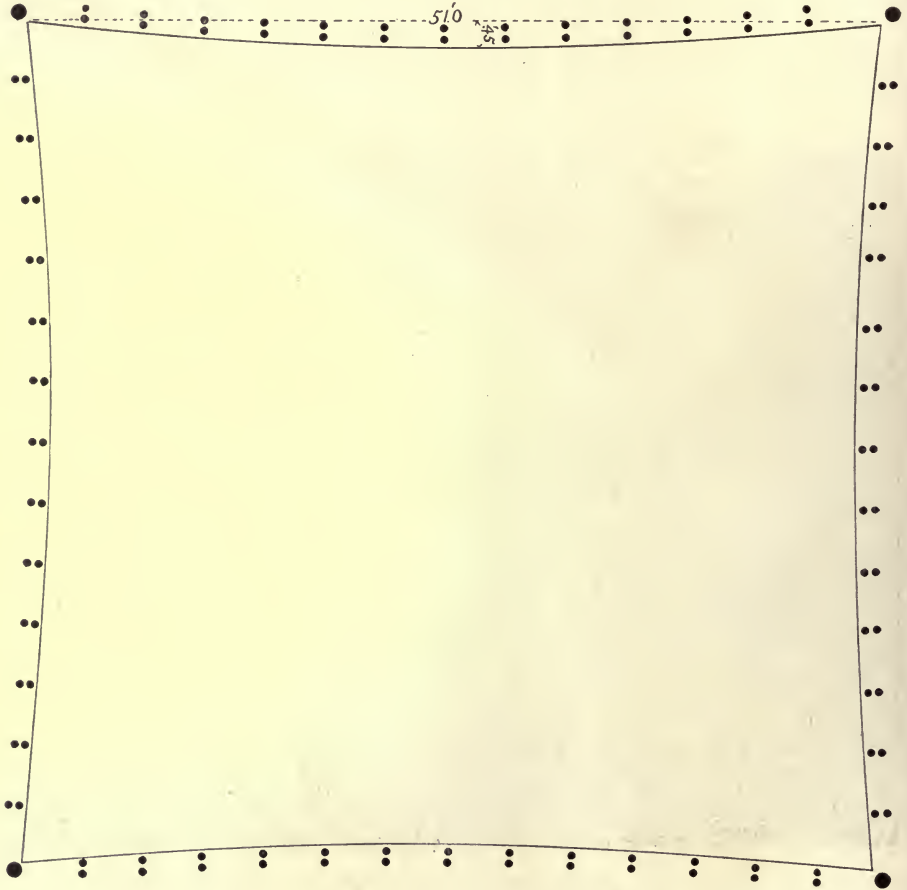


Fig. 20.—PLAN OF THE CLOISTER OF THE CELESTINS, BOLOGNA.

Showing the curves in plan at the level of the second story. The drawing exaggerates the curve.

facts. In the case of the Lateran cloister the curves appear also in the parapets, which is decisive for questions of purpose in construction, but a thrust of the vaulting has possibly accented and exaggerated the curves seen here in the cornices. At all events, there are slight partings of the masonry joints which might have been caused in this way, on the east side of the

There is no case known in which the curves are not delicate and regular and of the same character on all four sides of the court. For these facts there are three witnesses in the case of the two cloisters named at Rome and two witnesses for the cloisters at Sassovivo and Bologna. If accidental causes be assumed, would it not be surprising that a movement of mason-

ry had stopped short in so many cases at the same inconspicuous point and that it had produced in so many instances curves of the same delicate quality? Thrust is a force tending to disruption. Outside of the mind of the sceptic there is no reason why it should always stop short at the point required to produce a Greek curve.

the standpoint of the sceptic, it will be found that, generally speaking, he will be obliged to assume thrust for the cloister curves and carelessness for the rest of the curves. He cannot, for instance, assume carelessness for the cloister curves, because they are always delicate and always in one given direction. He cannot assume

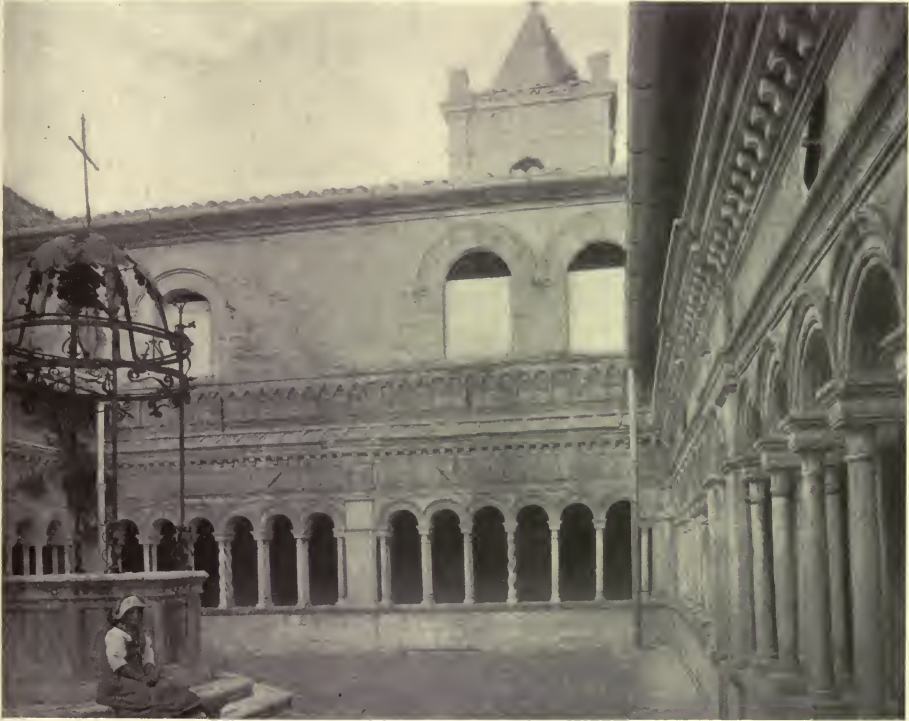


Fig. 21.—CLOISTER OF SASSOVIVO, NEAR FOLIGNO.

Showing a curve in plan of the cornice, with a deflection of $2\frac{1}{2}$ inches in 50 feet. The same curve is found on all sides of the court. Brooklyn Institute Survey.

Admitting that steps had been taken to secure these vaultings from farther disintegration, how does it happen that these steps have always been taken before the masonry has parted perceptibly and before a bulge, as distinct from a delicate curve, has resulted? These arguments apply to S. Paolo Fuori, to the Lateran and to Sassovivo. They are not needed at Bologna. Our case here is impregnable. If now we undertake to summarize the results of this Paper from

thrust for the nave and clerestory curves, because so many are counter to thrust. He cannot assume thrust for the curves in elevation, because thrust does not operate here nor could any theory of settlement cover the facts which are known, for the curves and bends in elevation. Even if such a theory applied to St. Mark's it would not cover the facts known at Lucca and at Pisa.

Having thus shown the sceptic what is the best ground for him to

take generally, we will still farther assist him by pointing out the instances which he needs to deal with most carefully. Having generally assumed carelessness for nave and clerestory curves and for curves and bends in elevation, he should study the gallery levels of the Pisa Cathedrals (Figs. 6, 7, Vol. VI., No. 3, and photographs of this issue, Figs. 14, 15) and the ground plan of the Fiesole Cathedral (Fig. 4). Having generally assumed thrust for the cloister curves, he should pay a visit to Bologna.*

The point still remains to be considered whether the phenomena of Medieval curves tend to illuminate the purpose of those used in Antiquity. Everything goes to show that the Italian curves represent a dislike for mathematical symmetry and for the hardness and dryness of straight lines, and

if they are classic survival or inheritance this must consequently have been one purpose of those used in Antiquity. There are cases of bends in elevation like those of the Cremona Cathedral clerestory cornices and like those of the Pisa Cathedral galleries which are locally connected with the obviously illusive arrangement found in the nave arches of these two cathedrals. It is therefore probable that the use of curves and bends in elevation was occasionally connected with a purpose of increasing effects of dimension. All curves in plan convex to the position of the spectator give the result of curves in elevation for optical purposes,* but the number of instances in which two parallel curves in plan were used in the church naves would show that optical mystification and an effect of "life" were the results generally sought.

*The cloister of the Celestines belongs to the complex of churches indexed in Baedeker under the name of the church of S. Stefano.

*See "Architectural Record," Vol. IV., No. 4, "Origin of Greek Horizontal Curves."

Wm. H. Goodyear.

(To be Continued.)



DECORATIVE WINDOWS IN ENGLAND AND AMERICA.*

THIS book is peculiar in having a very elaborate analysis of its matter presented in the form of a table of contents. Pages 7 to 15 are occupied with this analysis, each chapter having its general title followed up by a close and well-reasoned statement of the course of thought of the chapter itself. Thus, the chapter on Light and Shade is analyzed through more than a page of close printing, as follows: "Light and Shade may enhance the interest of details, or the decorative beauty of the whole; these two considerations must always go together, p. 75; light and shade as means of expressing modeling; possibilities of light and shade unlimited in glass; but limits to their use very important; extreme degrees of light and shade seldom sought by painters, 76; plausible contention that capacity for depth without blackness should be utilized for effects of chiaroscuro; objection that this would lead to false expectation and put spectator on wrong track, 77," and so on, down to page 101. A careful reading of this synopsis of the book reveals a remarkable intelligence and rightness of theory and a consistent and thorough development of the thought from the beginning to the end of the work. Nowhere is there to be found a sounder theory of fine art as developed in the matter of decorative painting, especially in that translucent decorative painting which we call stained glass; nowhere is the series of truths, which every worthy artist admits in his practice, whether he has thought them out or not, more perfectly expressed in brief words of analysis than is found

to be the case here. In fact, if the book were lost and these leaves of the table of contents alone were left, they would afford an admirable scaffolding by which to erect a structure similar to the book before us in purpose and in aim. Any student of the art might find a theory of his proposed book ready made to his hand, and might, with confidence, proceed to develop the severely abstract statement of principles here given into a treatise. It is, of course, in the development of these thoughts into a treatise that different writers will differ greatly.

The decorative windows of the Middle Ages were made by putting together, with leaden sash bars, irregularly shaped pieces of glass of different colors, upon which glass, painting in opaque, vitrifiable pigment was freely used. This opaque pigment naturally joined with the leads in forming a dark background, which was so formed as to its outline that the translucent color was left to express the figures, the drapery, the different objects which the design of the glass included. A piece of blue glass would, for instance, form the sleeve of a garment, and this piece of glass was shaped nearly as required for the sleeve, but the exact outlining of the sleeve was produced by painting in upon the blue glass from the lead which surrounded it on either side. That is to say, the narrow strip of lead was widened on the side toward the blue sleeve by painting with this opaque, brownish-black color directly upon the piece of blue glass. Moreover, the folds which were required to model the sleeve and to give it some semblance of roundness, and also to express its tumbled and creased character, were rendered by the same painting in opaque color carried into the blue from the solid background. The same treatment marked the paint-

*Stained Glass as an Art. By Henry Holiday. With a colored reproduction of the drawing for "The Creation," twenty collotypes, and many illustrations in the text from designs by Sir Edward Burne-Jones. W. B. Richmond, R. A., and the author. London: Macmillan & Company, Limited. New York: The Macmillan Company, 1896.

ing of the face, or the naked hand, or arm, with this difference, that as the gradations required on the flesh are more delicate than those which a piece of drapery makes necessary, the process of painting with the opaque pigment is less uniform. In the sleeve which we have taken as an instance of a garment or a piece of drapery as treated in medieval glass, the necessary shading is commonly given by opaque touches between which the color of the glass is left nearly untouched so that the character of the artistic gradation here is like that of shading on paper with a coarse pointed pencil of black chalk, or the like. The shading is done by bold touches and the gradation from complete opacity to unobstructed, translucent color is produced by the constant diminution in thickness and nearness together of these touches, exactly as all the pupils in our art schools are taught drawing without the stump and by means of the point alone. In the flesh, however, attempts are frequently made to reduce this opaque pigment to such thinness that it becomes not wholly opaque—much as we nowadays in house painting thin out oil paint into what we call a “stain”—in the attempt to make the gradation on the flesh softer, as if in this case a graduated tint was substituted for bold cross-hatching and similar point-work. It is as if a pupil in our drawing schools were taught to shade the drapery of his figure with the point alone but to draw the face and hands with the stump because drawing with the point alone would not give sufficiently delicate gradation. It must be said that this attempt has not generally been successful. In the finest ancient glass, the heads will probably be found to be shaded in the same vigorous manner as the drapery: as if with touches of a full brush and opaque pigment alone. The design is so arranged in the mind—the head so appears to the painter’s imagination—that he can render it by means of opaque color without any attempt to thin it out to a semi-translucent pigment. It is to be noted, however, that a dry brush or a cloth

wrapped round a stick has frequently been used to draw open lines in the solid pigment before firing; and that these open lines produce necessarily a semi-translucent thinning of the pigment.

The strong background made by the opacity of the lead extended on either side by the painting in thick pigment gives to the unpainted parts such luminosity that the touches of the opaque color which are to serve the purpose of folds of drapery and shadows under eyebrows, rounding of the cheek, and the like, must be put on as the glass picture itself requires. No cartoon done on paper in advance can serve as a precise model for the painter on glass, for it is not until the brilliant dazzling lustre of the translucent medium is before him that he, the painter, can judge of the touches which are needed to modulate his piece of blue, or crimson, or yellow glass into the object which he endeavors to represent, or, at least, to suggest. The piece of blue, crimson, or yellow glass will always be something unexpected; its color is not a constant quantity, but varies in depth as the thickness of the piece of glass varies. The cartoon can only give the general arrangement of the color-masses because the actual colors cannot be appreciated by the designer until he begins to handle the glass itself.

Now, one of the difficulties in the production of stained glass is, and probably has always been, the satisfaction which the artist feels in his cartoon. Perhaps the glass workers of the Middle Ages were least concerned in this way, because we can hardly imagine them exhibiting their cartoons as works of art worthy of anyone’s attention. We are bound to believe that those cartoons were made for the workshop alone, and were cut up, or used up, in the workshop without any attempt to show them off in the first place as if they had a life of their own. In our own time things are different, and large surfaces of wall in the exhibitions, as of the New York Architect-

ural League, once a year, are hung with cartoons which are supposed, by a fiction agreed to by artists and public alike, to represent in some way the future windows. That is well enough. If the artist were sure to remember that the cartoon is not what he has been employed to produce, what the public might think of it would be of little moment. The few visitors to the Gallery who care for designing in glass as a noble and independent fine art not very closely allied to opaque painting, such as that upon walls, may be trusted, perhaps, to wait for the window and to use the cartoon merely as a hint that there will be something better worth seeing by and by in such and such a church. Just in the same way the book under consideration is illustrated by photographic copies of the cartoons for important windows. These are supposed to represent those windows and to stand for them although they do so no more than an outline print in a History of Painting represents the masterpiece of Correggio. Indeed, it represents the glass less well than the outline represents the oil painting. It may, indeed, serve as a memorandum of the distribution of parts, but care should be taken to explain that it can do no more than this. The danger is, and, in fact, the mischief is proved to be, in the state of mind of the artist himself, who grows to care about his cartoon and to think of it in some way with undue respect as of a finished composition. This it is so far from being that one may almost say that the most highly-finished and elaborate cartoon is likely to produce the least good window. The process of making a very rich and elaborate window is so complex, the mingling of the pieces of colored glass is such a slow tentative process, the painting upon the glass is so much a personal matter of feeling of the painter as he takes brush in hand and plunges into his work, that no drawing on a large sheet of brown paper, made in advance and for his guidance, can be anything more than a programme, as it might be called—a statement of what

the window will be like in its outlines. Even if it is not the chief who is to do the actual painting, the assistant will paint as he knows his chief expects him to paint, and as the traditions of the workshop are. He will not paint exactly as the cartoon seems to instruct him. The lover of glass designing, he who has seen and studied the finest ancient and modern work and loves it, will be the more apt to select for observation in the galleries the cartoons that seem the flattest, the palest and least completely worked up. If a fine window has perished, that which such a student would wish to have preserved from the wreck would be such a flat outline cartoon, together with, if possible, a small scale-color sketch, whether that color sketch had been made in advance to show the general intent of the artist, or afterwards as a memory. These propositions may be elucidated by the extreme difficulty of rendering in modern illustrated books anything of the effect of fine old windows. There is a magnificent work on the glass of Le Mans Cathedral, in which the colors of the glass are given as nearly as was found practicable, and the scale is that of the original. There exist also several valuable books of recent date in which the photograph has been called into use to give, directly from the glass, black and white reproductions of the main outline and main system of light and shade of fine windows, and this, of course, on a much reduced scale. Neither of these two methods of representing windows of colored and painted glass can be called satisfactory, but the peculiar fact is that the latter, the photographic method, is the more interesting and instructive of the two. Such photographic illustrations as are given in the works of Lucien Magne, for instance, come nearer to recording the spirit of ancient glass of fine quality than the elaborate colored plates given by M. Hucher, in the Le Mans collection. Neither small photographs nor large chromo-lithographs give any real idea of the beauty of the window represented, but of the two, the photo-

graph brings the student nearer to the original. All this is merely a way of saying that a design in translucent material cannot be rendered by an opaque drawing or print, and this is advanced merely as a suggestion of the great difficulty which awaits that artist who fancies that his cartoons are capable of giving to his workmen, to himself, or to the public who looks at them, any precise idea of what his window is to be.

These suggestions are made not as in any way commenting upon Mr. Holiday's explanation of his beloved art, or as in any way deteriorating from the excellence of his own way of stating his case. They are intended only to point out the difficulty which he and all writers on the art have to experience in giving illustrations of his own or other men's work and the danger which attends the notion that the opaque design is in any way expressive of the window. It is certain that many of the cartoons of which large and fine photographic reproductions are given in the work before us are finer than the windows; that is to say, that they give the idea of a more advanced and more perfectly successful work of art than the windows in which they may have resulted. If, for instance, the large plate opposite page 86 and numbered Fig. 28 be considered, it will appear that a most elaborate piece of figure drawing, filling four panels of equal size, has been so combined that each of the four panels is worthily filled with a group at once fine in line and fine in mass, and that the four panels together make up a composition, which, if somewhat restless and contorted, is still impressive. It does not follow that the window would be a very fine one, and a somewhat imperfect recollection of that window leads to the conviction that it is not as fine as the cartoon and that it does not even seem as elaborate or as masterly, considered as a design. This is not introduced as a criticism of Mr. Holiday's work as a designer of windows, which question is not before us at present and which it would be

impossible to treat without an examination of many important windows in many parts of England and America, but it is intended as a criticism of the school to which Mr. Holiday may be said to belong. In his interesting and instructive text, Mr. Holiday is never weary of insisting on the importance of form in combination with color in modern window designing, but, perhaps, there is a break, or hiatus, as it were, and a lack of consideration in this valuable book as to what should be aimed at in studies of form by the painter in glass. That the form should be severe, in a sense, abstract, with but few details and little effort to express rapid motion or unusual and somewhat distorted attitude; that the severity of medieval and of Renaissance design should be followed, or at least studied with a view to approximate reproduction; that the drawing should be perfectly accurate and scientific, as far as it goes, but that it should not go very far; that the main object of the design in glass should be the display of brilliant and glowing color with the form strictly subordinated to that; all these we take to be conditions precedent for any fine result.

Allusion has been made above to the school to which Mr. Holiday may be said to belong. The principles of this school are nearly those which govern medieval glass but with added modern skill in drawing, especially in drawing the human figure. The outlining, the minor details of the drawing and the modelling into some slight roundness and relief are done by the opaque pigment nearly as was done in the Middle Ages. A modern window, built upon this principle, should be nearly what a thirteenth century window was except that the human figures would be more accurately delineated. As, however, the art of true decorative design has been almost wholly lost to the modern world, it has resulted that modern windows are generally as inferior to the medieval ones in appropriateness, in good taste and in true artistic worth as they are superior to them in science. The attempt to keep in a window by

Burne-Jones as much as possible of the qualities of an oil painting by Burne-Jones, has ended disastrously for the beautiful art of designing in translucent color. All that Mr. Holiday says in his valuable treatise on modern corruptions and the artistic falsity and worthlessness of what is commonly known as Munich glass is true and good, but some part of it may be extended to splendid windows of the English school designed by the best men. The attempt has been to substitute modern decorative feeling for mediæval decorative feeling. With that desire every lover of art must sympathize. In that attempt every lover of art must be interested. If there had existed a modern decorative sense, at all equivalent to the decorative sense of Western Europe in the Middle Ages or in the sixteenth century, it might have succeeded; indeed, it must have succeeded. Had the decorative sense existed in the modern world the feeling for what a window should be and should not be, the feeling for propriety, for keeping, for what may be and may not be done, would have been strong enough to guide the modern pictorial sense in the right way. This however, could not be. The modern pictorial sense is strong and active; it is alive with realization of the immediate past and of the present, and with expectations of a clearly foreseen future. Admirable works of art in the way of painting and in the way of figure designs in monochrome are made every day, and the novelties and the innovations are those which healthy progress allows and even causes. There is a modern world of painting worthy of comparison with that of any past time, and what that comparison will result in we cannot now judge. How nearly the painting of our present day, taken in the mass, will compare for excellence with the painting of great epochs in the past, we do not know, but we do know that the comparison will have to be made by posterity. In the world of decoration there is none of this success and energy. Decorative art, as such, is

absolutely non-existent. The only graphic ornamentation which has life and originality is the direct application of representative painting, of what might be called, by a slight forcing of the phrase, realistic painting, into the service of adornment. No one now can design a diaper, no one can design a border of scrolls, no one can cut up the surface of a panel into diaper or can fill it with floral ornament. If we have a vase to adorn, what we instinctively do is to lay a sprig of flowers upon its surface, painted as it grows, or not more conventionalized than the unmanageable enamel color makes necessary. The trained workman who could design ornament along traditional lines and as he had learned in his father's or his master's workshop, no longer exists. The complete failure of all the attempts at Gothic revival has had other causes, indeed, but no one cause has been more powerful than this, that there were no workmen left who could carve ornament in stone. In like manner there are no workmen who can paint ornament on walls or on plates or on fans; all our decoration that is worth anything has to be produced by highly trained artists who have been through the regular course of study in the art schools or in the studios of great masters, and who turn their attention away from the more usual quadrangle of canvas to painting on walls or on fans. This is so generally true that the few exceptions are registered in the mind of every student of decorative art. Five or six potteries; three or four makers of furniture; three or four looms where splendid stuffs are woven; these, and such as these, in all the great world of European stock, make but a short list of designers, or groups of designers, who produce decorative work along natural lines of development and of what seems originality; everywhere else there is either direct copying from the ample stores of the past or there is chill nonentity. Under these conditions, the decorative sense may be said to be non-existent. The pictorial sense carries it over the decorative sense,

and must do so in ninety-nine cases out of a hundred. The window produced under these conditions is nearly certain to refuse to keep its place in the wall; it is nearly certain to be undignified, because of the crowded and restless grouping of the figures; it is nearly certain to be non-decorative because of the exaggerated gesture and realistic and unconventional pose of the figures. In the work before us, Mr. Holiday speaks again and again of the importance of giving to our glass designs the modern skill which as a matter of course representative drawing requires; but we may be accurate and yet be severe; that is what the windows require. In like manner Mr. Holiday speaks again and again of the supreme importance of color, and brilliant glowing color, in glass, but he insists also on the co-ordinate importance of form. If by this is meant elaborately modulated form, then that is asked for which cannot be had. So, with the matter of light and shade; if light and shade, considered as a principal or important part of a composition, is kept in mind by the designer in glass, his design, considered as a piece of translucent mosaic in color cannot but be ruined. In every piece of decoration one or another principle must prevail and the principle which must prevail in glass designing is that of color in its purest, freshest, most strenuous and richest variety.

It has been said before that the power of designing conventional patterns, diapers, scrolls and such like ornaments, is non-existent among European peoples; it is also disappearing very rapidly in those Eastern lands where European influences are at work. There is one very curious phenomenon to be noted in this connection; it is the appearance of qualities of surface and of texture used as a substitute for the patterns which we cannot design. We moderns have but two ways of adorning a wall or a vase or a metal tray; one is by representative drawing and painting of men, animals and plants nearly as the artist

sees them, and nearly as he would paint them on canvas, the other is by means of the textile quality of silk or worsted, the interlacing of basket work, the ribbed and fluted surfaces of matting, the lustrous quality of beaten and embossed metal, the vibratory and cloudy quality of vitrified color, the grain of wood, the veining of marble or alabaster. If there is not money enough to paint the wall with the fully-realized figure subject for which an artist of rank must be employed, the wall shall be hung with white cotton stitched with silk or wool in pale tints hardly visible as a distinct color relieved from the ground, but effecting its general aspect, or faced with tiles or with marble, or wainscoted with wood; or the plastering shall be slightly embossed with a formal chequer or scored with irregular lines. There is no half-way measure. We cannot endure unskillful painting; therefore, we will have none unless we can have the master. We cannot even endure figures drawn on a vase as a Chinese of three centuries ago, or as a Greek of twenty-four centuries ago, would have drawn them; and, therefore, we will have no figures on a vase, but, instead of them, mere dragging and splashing with the colored glaze. This, then, is also to be considered in our glass. As we can draw the figure admirably well, whether in lively action or in severe repose, and as we have the power of producing beautiful surfaces and incalculably varied gradations of color in the accidental gradations of color in the translucent material, let us, then, utilize these two powers and see whether a decoration will not come of them, a decoration different, indeed, from that of the Middle Ages, but, perhaps, on that account the more to be cherished as being our very own. It is probable that such considerations as these have been of weight with those artists, mostly Americans, who have tried to make innovations in the art of decorative glass.

The principle of the so-called American school may, perhaps, be stated in this way. There shall be no

painting on the glass that can possibly be avoided. The glass itself shall be produced in such variety of color and with so many gradations and modulations in the shades themselves that almost every conceivable combination of tints, passing one into another, or sharply contrasted, may be obtainable. This glass shall be combined on a glass easel, or in some way by actual observation and comparison by means of transmitted light, the artist himself indicating the combination of the glass as a chief part of his design. The lead sash, which is now to be our only opaque background, is to be used with deliberate purpose to emphasize, to outline, to support, to sustain the linear composition. The forms chosen shall be simple and severe, the human figures at rest or in slow and easy motion, the parts few, the draperies not much subdivided, the backgrounds of landscape, or architecture largely suggestive, without much attempt at detail. If this is a correct statement of that which is, of course, not stated in words, but is in daily execution in our cities, then, it will be seen that the principles which govern such stately mosaics as those of S. Apollinare within the walls at Ravenna are the right ones for glass considered as a decorative art, aiding in the beautifying of our interiors. The superiority in the translucent composition of such simplicity of design, as alone is compatible with such opaque compositions, as in wall mosaic is, we think, evident. A window with few figures, and those in repose, with heavy folds of drapery and little subdivision of parts, with the background a mere suggestion of landscape and sky and the accessories of tree or flowering plant treated with severe conventionalism, is so superior as a decorative composition to the windows crowded with flying, swarming, squirming, restless figures in violent action, and with lilies and roses as near the real thing as the artist knows how to paint them, that no comparison as to their relative merit is possible to one who studies them both.

The American system is obviously nearer to that of the sixteenth century, as illustrated by the Fairford windows, by those of St. Etienne de Beauvais, by those of the Cathedral in the same town, by those of Saint Foy at Conches, by those of Santo Spirito at Florence and by those of the Cathedral of Lucca than it is to medieval glass, properly so-called. This, of course, has been inevitable, because our modern methods of thought in art are much nearer to those of post-Renaissance times than they are to those of the Middle Ages. And it may be stated as a general proposition that the school of glass-workers in America are trying, in a great measure, unconsciously, to combine the large way of figure drawing which they have received from the sixteenth century through modern France, with those methods of subordinate decoration which alone are possible to the modern workman.

The objection which Mr. Holiday makes to this way of working is mainly founded upon the assumption that the American artists are using accident to replace deliberate design. This means, of course, that as all the tints used in a window are those of the glass itself, the artist will inevitably take up the chord of color suggested by the pieces of glass which he is handling and not the chord of color which his artistic instinct bids him confer on the piece of work before him. But this is to confuse uncontrolled and extraneous interference of accident with that accident which may in a sense be thought not so very accidental. As the painter mingles color on the edge of his palette, new color thoughts arise in him which had not come to him until the colors struck his vision. No man, however great his power of abstract thought in art may be, is capable of thinking out a color scheme exactly as he will produce it upon the canvas or wall. The glass in his rack is to the composer of a window what the tube color squeezed upon his palette is to the painter on

canvas. It is his palette, it is his group of possibilities; it is that out of which his design is to be made. A piece of green drapery is in his mind, but the exact tints which that piece of drapery is to receive are not more clear to the glass worker than they are to the worker in paint; not more clear, but equally clear; in the one case, and in the other, the actual handling of the color vehicle modifies old ideas and creates new ones as the work of art grows. Let any one see a composer in glass feeling for the exact tint or series of tints which he requires, trying a hundred pieces of glass in vain and then trying two pieces superposed, and then three, the intention being, of course, to combine these pieces permanently as doubling or lining one another, by the process known as plating; let any one see the artist at work in this patient way, and he will change his mind as to the power of accident in glass designing according to this realistic method. Let any one see the cartoon of an important American window, and then see at a later time that cartoon overlaid with the paper patterns cut out

for the pieces of glass as they are to be fitted together; like what the children used to call "dissected maps;" and then let him wait a few weeks and study the superb result in its glow of translucent color, and his belief in the power of accident as a principal feature in the production of these windows will disappear.

Space does not allow of a complete comparison of the methods of the best American workers in glass with those of the best Englishmen. Mr. La Farge's name occurs frequently in the pages of Mr. Holiday's book, and his methods, as the chief exponent of a somewhat new style of work in glass, are criticised unfavorably, while the man's ability as an artist is fully recognized. The controversy between the English school and the American school is one of importance; it is founded on really different principles and not on a mere superficial lack of resemblance. But to explain it fully, and still more, to argue the case from the point of view of either side, or of both sides, would be to write a small volume and not the review we have now in hand.

Russell Sturgis.



THE WORKS OF CADY, BERG & SEE.

J. Cleveland Cady was born in Providence, R. I., and educated at Trinity College, Hartford (receiving the degree of M. A.). He received his technical training from the professor of architecture of a German university, who, exiled for political reasons, was spending some time in this country. Later he entered a New York office, remaining until he commenced business for himself in 1868. In these earlier and "waiting" years he pursued the study of water colors with Alfred Fredericks. His first building of importance was that of the Brooklyn Art Association. This was soon followed by the North Sheffield Hall and the Peabody Museum of Yale University. In 1881, the firm of J. C. Cady & Co. was formed, by the association of Mr. Berg and Mr. See, who had been for several years his assistants and intimate friends. In 1893, the firm title was changed to Cady, Berg & See.

Louis DeCoppet Berg, born in New York City, 1856, is the son of Albert W. Berg, the organist and composer. He studied architecture at the Royal Polytechnicum, in Stuttgart, and entered the office in 1873. Is the author of "Safe Building," and a member of the Am. Society of Civil Engineers.

Milton See, born in Rochester, N. Y., 1853, is the son of Coles C. See, whose ancestors were among the first settlers of Westchester Co., several having served creditably in the war of

the Revolution. He first entered the office of the late Emlen T. Littell, and about 1871, that of Mr. Cady.

A sensitive and enthusiastic American architect, beginning his practice thirty years ago, unless he was diverted from his normal course by some foreign influence, almost inevitably began with Victorian Gothic. That is a phrase of rather baleful import now, so many restless disjointed and crudely colored edifices have been committed in its name, so many more than of the examples of peace and quietness which also illustrate it. But at that time it was a phrase to conjure with and indeed it was "a marvellous good word before it was ill-sorted." No doubt Ruskin's eloquence had much to do with its vogue, but there were practitioners who took it up on the technical even more than on the literary side, who undertook not merely to reproduce but to revive Gothic, and who did in it things true and artistic, and not to be forgotten. The fundamental principle that construction should give its own forms can never become obsolete. If the "style" has been discredited, it is because the practitioners on the one hand confined the application of the principle to the period in which it was without doubt most brilliantly illustrated, but in which the forms were the expressions of a construction no longer current or vernac-



THE BROOKLYN ACADEMY OF DESIGN.
J. C. Cady and Henry M. Corydon, Architects.

ular; on the other because the recklessness of half-education is the more distressing in its results the more freedom the designer is allowed by his style. It may be questionable whether we have had any other buildings better than the best that the Gothic revival gave us; but it cannot be questioned that we have had no other as bad as the worst. Thirty years ago, the revival was at its height. The leaders of the profession in England had in great part outgrown the notion that purity depended upon the actual reproduction of old details, and had learned to compose in their style with freedom and without pedantry. Moreover, they had extended it from ecclesiastical to civic and to domestic architecture with an encouraging measure of success. The competition for the Law Courts was just then in progress. Although the final outcome of this was so disappointing as probably to give the final stroke to the revival, the designs were of singular interest; more interesting probably than those submitted in any English competition before or since. What most architects would probably pronounce to be the finest achievement of the revival, Mr. Burges's design for this structure, though unsuccessful, had made a great impression upon the architects of England and America, and in both countries reminiscences of it may be found in actual buildings.

The first important work of Mr. Cady's, so important, indeed, that for the execution of his design he associated with himself a more experienced practitioner, was the Brooklyn Academy of Design. This was not only a distinctly Gothic work, but it seems to have been in a considerable degree inspired by the design of which I have just spoken. It is not an imitation, however, in any sense that at all diminishes the credit of the later author. The proportion of the stories, the placing and proportioning of the arcade, and the suggestion of the dormer, may very well have been derived from Mr. Burges's work. The preference for French detail over the English which imposed itself upon most of the revivalists and

the Italian which Mr. Ruskin's eloquence had imposed upon some of them, which was one of the marks of Mr. Burges's work is equally shown here. But the main motive of the composition—the relation between the narrower and taller front crowned by the steep gable and the broader and lower with its crested roof crowned by the crested roof relieved by the gabled dormer—was quite the young designer's own. It was carried out with unflinching pains and skill and to a most fortunate result. The detail is all thoroughly studied in itself and very successfully adjusted in scale. This success in scale is one of the points that make the work so remarkable as a first essay. But indeed the front has throughout an air of ease and ripeness as far as possible from the crudity which disfigured so many of the works of the revival, and perhaps more than any external influence accounted for its abandonment. If the revival had produced many works as good as this it might have retained its hold upon architects and obtained a hold upon the public. This is as restrained and sober in color as in design. The violent contrasts in which many of the revivalists loved to indulge themselves are carefully avoided, and although seven or eight different tints of natural stone are introduced, the introduction is so discreet, and the result so harmonious that the vivacity imparted by the variety is attained without any loss of the sobriety and repose of monochrome. One would be at a loss to name any later work in its kind which is more effective. It gained greatly when it was built, by being a member of an extremely interesting group. It adjoined the long and solid and somewhat sombre façade of the Academy of Music, itself one of the marked successes of the Gothic revival, and it confronted another product of that revival in the Mercantile Library, a picturesque and effective front. The buildings are all there to-day; but the effect of ensemble which they made a quarter of a century ago has been utterly destroyed by unneighborly neighbors which have since ar-



RESIDENCE.

St. Nicholas Ave., New York City.

rived. These are of varying degrees of demerit in themselves, but the only thing they show in common is a manifestation of disrespect, not only for each other but for their predecessors. But if one wishes to see what the promise was that was broken by the abandonment of the revival, there is no place in this country where he can see it to better advantage.

While the Brooklyn Art Building is the most elaborate and costly of its author's secular works in Gothic, there are others that exhibit, on a smaller scale, the same qualities of design. One of these is a house in St. Nicholas avenue, which was suburban at the time of its erection, but has long since been erased or transmogrified beyond recognition by the march of improvement. It was a cottage of a story and a half in red brick banded with buff, of very moderate dimensions and simple treatment, which nevertheless derived a picturesque and agreeable aspect from the disposition of its parts, half of it be-

ing covered with the mansard of the period, while the other was carried up to two complete stories and crowned with a roof of very steep pitch against which at the side were relieved a dormer and a tall chimney, and which at the end was hipped into a hood over the gable which was pierced with the pointed window that formed, after the roof itself, the chief feature of the house, and chiefly designated its style. That was the day of small things, evidently, with the architect as well as with the client. But the evidence that this unpretentious dwelling afforded that intelligent and artistic pains had been ungrudgingly bestowed upon every detail of the design made it a particularly welcome object, especially in what was then and still elsewhere is the distressing ugliness of suburban New York. The owner who should now desire to have so much thought devoted to the expenditure of so little money would have far to seek.

Another early work of Mr. Cady's that was erected under equally rigid limitations and even more discouraging conditions may still be seen in that part of New York of which the new Criminal Court is the latest and the most full-blown architectural ornament. This is, or was, an Italian school in Leonard street, an extremely simple front, in which there was evidently no money available for decoration. A brick superstructure, of which the red is relieved with buff, with no visible roof, surmounts a brownstone basement, with flat arches. The front is divided into three bays and four stories. It is of no style, being merely the straightforward fulfillment of practical requirements and expression of the structure. But the disposition of voids and solids, the relation of the stories, and the relation of the bays have been so well studied that the building is a very agreeable object, and that it is especially instructive to compare its modesty with the pretentious vulgarity of the courthouse around the corner.

The first of the long series of buildings which Mr. Cady and his firm have designed for Yale was prepared under equally stringent limitations of cost. This was what is now known as North Sheffield Hall, and so careful, indeed, was the committee which had it in charge lest the appropriation should be exceeded that they directed the preparation of a design without informing the architect where, or for what institution it was to be built. The precaution may have been justified, but obviously it did not conduce to the exact appropriateness of the building to its site and its surroundings. The practical requirements and the practical limitations issued is a flat-roofed brick box of three stories, with no other features than a porch on one side and an apsidal extension on another. The latter feature is more effective than the former, which is neither very taking in itself nor very congruous with the building to which it is attached. The architecture, however, is really in the treatment of the walls and is as satisfactory a solution as could have been

expected of so vague a problem. The lower two stories become by the continuity of the openings and the withdrawal from their plane of the transoms that mark the floor-lines a single and predominant feature, and the arcade above them with its machicolated cornice becomes an appendage to the principal motive. The piers are visibly ample, although the principal stage rather suffer from the misfortune by which the terminal piers are narrower than the intermediate. The arcade is very well designed indeed, both in itself and with reference to the substructure, and the effect of the design is very much enhanced by the employment of the second color of the brickwork, which is here applied with unusual skill and discretion. Below the springing of the main arches, the wall is a monochrome, but for the definition of the bases of the piers, while the lighter color is used to mark the impost and to express the construction of the arch. In the upper arcade it is much more freely introduced, in bands as well as in bases and arches, and the cornice is faced with it, and the building thus effectively finished, for the attic is, I believe, a subsequent addition.

This work, like the last, is of no style or at least is designated as Gothic only by the fact that the architecture is merely the exposition of the structure. Its author's next contribution to the architecture of Yale is quite consciously and avowedly Gothic. This was the Peabody Museum in which, of course, the designer was aware to what neighbors he had to conform. The Art building, and the chapel and the dormitories that were intended to supplement the brick barracks, comprised all the "architecturesque" buildings then erected or projected for Yale, and indicated that Victorian Gothic was to prevail upon the campus. What was in fact built of the Peabody Museum cannot, of course, be fairly judged without reference to its intention. It is in fact but a fragment, a wing, comprising one pavillion and one connecting curtain of a project that comprised a correspond-



Yale College.

PEABODY MUSEUM.

New Haven, Conn.

ing wing and a loftier and more ornate centre, crowned with a central gable and flanked by polygonal towers. The fragment is highly promising as a fraction of the general scheme, and is not without interest in itself. It is noteworthy for its unusual scale among the college buildings, which have otherwise become so heterogeneous. This is fixed by the height of the stories, something over twenty feet, which in turn is the result of a requirement for galleries in the principal exhibition rooms. Provision for the cases and the need of abundant light determined the size of the openings and the intervals between them, and this requirement operated unfavorably on the architecture, huddling the openings much closer than a consideration of the best architectural effect would have admitted. The actual arrangement attenuates the piers, especially and painfully, on one front, the corner pier, and leaves the architect to seek at the top of the building for the expanses of wall surface that are so

much more effectual at the base. It is questionable, in view of the inexorable requirements, whether a better effect would not have been gained by spanning the lower openings with lintels, and reserving the arcade for the superstructure which is in fact rather bald by comparison. Nevertheless the fragment makes an impression of stateliness, much enhanced by the simplicity of the steep roof, relieved only by a single dormer in each front. The effect of the combination of material, red pressed brick and Nova Scotia stone, is very good; the detail of the doorway, the cornice and the crocketed gables scholarly in design and effective in scale, and the fragment, in spite of its fragmentariness and of its drawbacks, an impressive piece of work.

The connection of Mr. Cady and his firm with the building of Yale has continued until now. The buildings just noted are among the latest of his essays in Victorian Gothic. The series of his works there shows more or less

the architectural vicissitudes to which the campus of every old and growing college bear witness, and none more than that of Yale. In fact, if an architect called in to add to the existing buildings of any of the old colleges made it his first care to conform to what he found he would be at a loss, so irrelevant are the existing buildings to each other. If he undertook to make his work conform to what might be erected thereafter, even for a decade to come, his difficulties would be greatly increased, for in American architecture we know not what even a lustre may bring forth. The reversion to Romanesque immediately followed the Gothic revival, or followed it after a brief interregnum of Queen Anne, of which at Yale it is fortunately not necessary to take account. Dwight Hall, which is the Y. M. C. A. of the University, and the Memorial Library, are the two contributions of our architect to the Richardsonian phase of Yale architecture. Neither of them is by any means an extreme example. Perhaps the more Richardsonian of the two is the former, which is very simple, very massive, very rugged, and which aims to make its effect merely by the force of its masses crowned with large expanses of unbroken roof. In this it is fairly successful. By avoiding the exaggerations whereby Richardson so loudly called attention to his intention and effectually forbade apathy on the part of the most careless or preoccupied spectator, much of the peculiar effectiveness of his work must be lost. The voussoires are not so deep, the columns not so stout, the features not so insistent. Decorum, so to say, is gained at some expense of effectiveness. The same may in part be said of the Memorial Library. The piers of the porch seem affectedly rude and simple, and would gain by a more elaborate modelling into the sheaves of columns that form one of the most attractive features of Provençal architecture, and the ruggedness of the wall seems somewhat excessive considering the general treatment. But the openings are effectively distributed

and effectively designed. The relation of the stories is such as to avoid the monotony threatened by the extreme simplicity of the outline. The detail strikes in scale, the just mean between extravagance and ineffectual minuteness, and the polygonal annex is well adjusted to the main structure. Finally, the contrast of color between the red of the wrought work and the gray field of wall gives vivacity without disturbing the repose of the work. This is one of the most successful of the university buildings, and it exhibits a desire to conform to the rest, so far as conformity is possible to a designer who finds it also necessary to be "in the movement" and to show that he knows the current mode.

In the latest of the contributions of the firm to the architecture of Yale, the ruling motive seems to be to make sure of conforming not only to what is but to what may be. I have already indicated the difficulty of carrying out this laudable intention. In order to obtain even an approximate success in it, it is necessary to avoid as much as possible the labelling one's own work with the badges of any particular style. Accordingly the two dormitories, the Sheffield Chemical laboratory and the Law School Building, are all plain and simple structures, and as little as may be "examples" of any historical mode of building. The two dormitories, White Hall and Berkeley Hall, are two mansions which have nothing in particular of collegiate, but seek their architectural effect by the distribution and grouping of their simple openings, by fortifying them with as large masses of wall as possible in the right places and by the refinement and careful execution of such ornamental detail as is very sparingly introduced. The enclosure by a decorative railing of the court between them secures and denotes privacy and gives occasion also for a striking feature. For the rest, they have not, at a glance, the air of college dormitories in particular, but of eligible mansions which might be habitations in any city, and their aspect is not so much cloistral, in spite of the



LAW SCHOOL, YALE UNIVERSITY. (1897.)

New Haven, Conn.

exclusion of the railing and the lodge, as that of "a comfortable bourgeoisie." This mode of designing has the advantage of securing what we have assumed to be its object. That is to say, these plain and solid buildings, besides being inoffensive and even satisfactory in themselves, cannot very well become incongruous with anything that may be executed in their neighborhood. One may find them a little dull, but they neither are nor can become ridiculous or offensive. They will be effective foils to whatever may ensue of richer and more monumental, just as the Jacobean and Georgian dwellings in the English cathedral-closes are effective foils to the minster. In the one case as in the other, the spectator ought to be grateful to the designer for forbearing to obtrude his own work to the detriment of its actual or its possible neighbors.

Something of the same kind may be said of the Sheffield Chemical Laboratory. This goes well enough with North Sheffield Hall, erected a quarter

of a century earlier, though it is far from being Victorian Gothic, and, indeed, is not designated as of any historical style, though the cornice shows a reminiscence of mediaevalism. Its effect comes from the solidity and sobriety of its treatment. The cornerpiers are kept as broad and as plain as possible and even reinforced by a slight projection, and thus strongly framing the front. The object of grouping the lower two stories by continuing the openings through them is evidently to make them together the predominant feature of the front and the two upper stories, if there be, indeed, two are united in themselves and separated from what is below, so as to form a single and subordinate feature. But the result of this disposition is to give to the openings a spindling aspect which rather contradicts than enhances the effect gained by the breadth and simplicity of the general composition.

The front designed for the Law School building, owes its effect to the same qualities of solidity and sobriety,



THE YALE INFIRMARY.

New Haven, Conn.



DWIGHT HALL AND BERKELEY HALL.

New Haven, Conn.



THE YALE LIBRARY.

New Haven, Conn.



FARNHAM MEMORIAL GATEWAY.

Yale College.



WINCHESTER HALL, SHEFFIELD SCIENTIFIC SCHOOL. (1891.)

New Haven, Conn.



BRIDGE IN CENTRAL PARK (1883).

New York City.



MORGAN HALL (1888).
(Gift of late Governor Morgan.)

Williams College.



WILLIAMS COLLEGE.
GYMNASIUM, WILLIAMSTOWN,
MASS.



JARVIS HALL OF SCIENCE (1888). Trinity College, Hartford, Conn.



GYMNASIUM WESLEYAN UNIVERSITY.

Middletown, Conn.



GYMNASIUM.

New Rochelle, N. Y.



VILLAGE LIBRARY.

Huntington, L. I.

but it is much more elaborately and artistically carried out, and is a far more successful composition. This is composed in a style, denoted mainly by the coupled columns of the principal story as in general "classic," although the arches doubled under a large relieving arch, with the head pierced with a rudiment of tracery are a survival of mediæval work. There is, however, no incongruity in the form except from a strictly scholastic point of view, and the general result is that of those earliest arches of the Italian Renaissance, in which classic detail is introduced without the reduction of the composition to Vitruvian formula. The building is by no means an "example," and will go with anything in reason that may be brought into its neighborhood, while the effect of it by itself is excellent. The designer was fortunate in finding that his requirements admitted of a base so nearly unbroken, although it seems they compelled him to place the largest opening in it too near to one end for the best effect, but still not so as grievously to disturb the repose that comes from the massiveness and simplicity of the treatment, and that is accentuated rather than weakened by the other openings. The composition both laterally and vertically, is very successful. The relation of the three stories to each other is a rhythmical relation, and the solidity of the sides gives value to the more open triple feature of the centre, to which, indeed, the rest of the front is but an effective setting. There is nothing especially collegiate, it is true, in the aspect of the building nor is its expression very highly specialized. It might be a public building for any one of many purposes. But it is a dignified and imposing front, an ornament to Yale and to New Haven.

The last that we shall consider of the Yale buildings is much more specific in intention, and seems to be very happy in carrying out its intention. It is the Yale infirmary, and it was evidently the architect's aim to provide a refuge for sick students that should not repel them or their visitors by its

institutional appearance. There has been provided for there an old-fashioned mansion, of which the air is exclusively and attractively domestic, and of which only the rather unusual extent would indicate that it was anything but a home. Even in extent it has been outdone if not by many of its prototypes, by a great many of the modern reproductions and imitations of them, but I know of none which more completely reduces the charm of the old county-house without a too literal reproduction of their details.

Such an attainment was, of course, quite out of the question in a city hospital of the first-class, such as the Presbyterian Hospital, which Mr. Cady was employed to reconstruct after its partial demolition by a fire, which left of the original institution, as designed by Mr. Hunt early in "the seventies," only the Administration building still available. Here there was no question of conformity. Even if Mr. Hunt himself had been called in to do over again his own work, it is highly unlikely that he would have recurred to the phase of his professional development which these buildings indicated, and through which he had long passed. Indeed, the administration building, which was spared by the fire was that part of his design which was best worth saving. While the talent it shows is undeniable, the vivacity imparted to it in the first place by its design, and in the second by the startling contrast of color, was so excessive as to render it ineligible as a model for the group of new buildings that was to adjoin and surround it. This was evidently the feeling of his successor in the work, whose additions were in a monochrome of red brick and red terracotta, relieved with only so much introduction of brown sandstone as not to disturb the general sense of monochrome. They were also in a sober and moderate version of Romanesque which has nothing in common with the liveliness of the modern Parisian version of French Gothic. As a hospital according to the experts, the Presbyterian hospital is a model in its kind,



Madison Avenue,

PRESBYTERIAN HOSPITAL.

New York City.



NEW YORK SKIN AND CANCER HOSPITAL
NEW BUILDING



HUDSON STREET HOSPITAL (1894).

New York City.

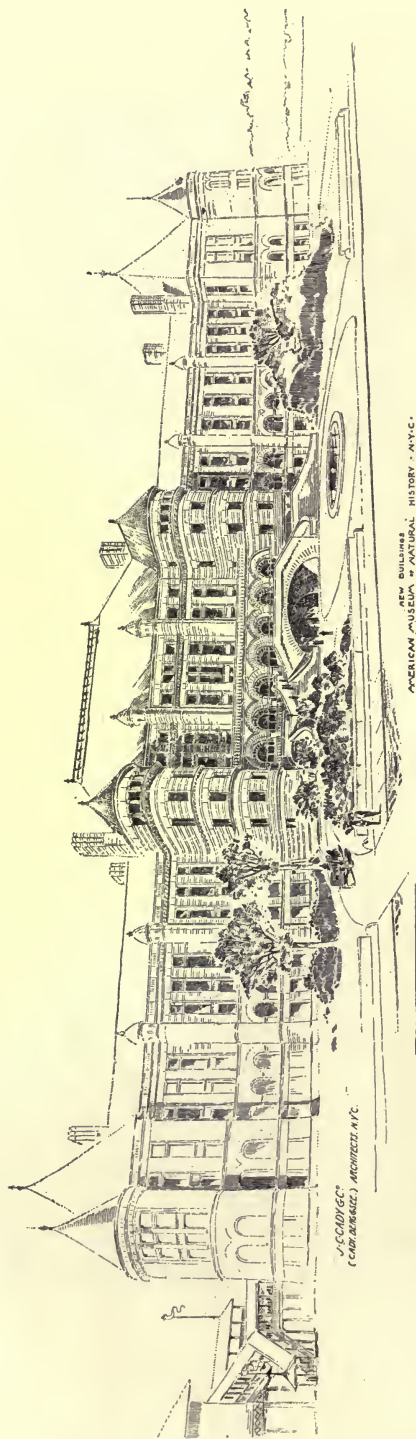
and the dispositions of the architect have left nothing to be desired in the way of light and ventilation and communication. Our concern, however, is with the architecture only and we have to own that neither the relation of the stories nor the fenestration, which have been dictated by purely utilitarian considerations, has proved to be favorable to architectural effect. The wards cannot aspire to any higher praise than that of inoffensiveness. The only architectural opportunities occurred in the design of the dependencies, the operating-room at one end of the south front and the dispensary at the other, with the square tower attached to it which looks purely monumental, but in fact serves the highly practical purpose of supplying ventilation for the whole group of buildings. The operating-room is a modest edifice of two stories, square in plan, with a peaked roof that is a very agreeable object in spite of its limited dimensions and in spite or because of its simplicity of treatment, the openings being well placed, carefully detailed and serving to punctuate and enhance the simple expanses of wall space. The counterparting feature deserves a higher praise, and indeed seems to me one of the firm's most distinguished successes. The requirements of the dispensary worked out naturally into a church-like structure of which the nave was the waiting room, and the bays of the aisles, devoted in the Roman use to chapels and confessionals became private consulting rooms, while the nave was continued to an apsidal termination. It is this apse that combines so happily with the tower, of which the stark shaft so increases the value, both of the openings of the main building and of its own upper stages, one variegated merely by application and recesses in its brickwork, and the other developed above an emphatic band idiomatically treated in baked clay, into the likeness though not the use of a belfry stage. There are few more welcome examples in our street architecture of thoroughly studied and artistic design.

Another and even more conspicuous example of institutional architecture is the Museum of Natural History, on the west side of Central Park. This occupies an extensive and conspicuous site, and occupies it very worthily, although the composition is evidently incomplete in the present state of its execution. The long range of building needs to be still further prolonged by the addition of the terminal pavilions which will extend it from avenue to avenue, and will supply counterparting and completing features to the central mass. The façade will then have the five fold division for which the design evidently calls, whereas what is already built is but the central pavilion, with the two curtains that are meant to count only as intervals in the completed front, and are not meant to be looked at for their own sake. But the designer has been much more fortunate here than in the somewhat similar case of the Peabody Museum in New Haven; in the first place, that he has been allowed to build first the dominant central mass from which the remainder can with some safety be inferred, instead of the flanking pavilion which leaves the uninformed spectator entirely at the mercy of conjecture; in the second place, because he has assurance of the execution of the entire design. The Romanesque which he has chosen for his style is by no means the aggressive and importunate phase of that style. It is carried out with so much decorum and moderation, indeed, that the style of the building is scarcely designated except by the unmistakable badges of the large, round piers that subdivide both the pavilion and the curtains. It is questionable whether even these have not been designed too exclusively to designate the style. Though their finials are effectively relieved against the roofs, and give point and variety to the composition, it seems that this purpose might have been equally well served by the application of buttresses modelled less with reference to an historical style and more to their function of re-inforcement, with the stages and offsets which



MUSEUM OF NATURAL HISTORY.

New York City.



J. C. DODGE
CHICAGO, ILL., ARCHITECT, N.Y.C.

NEW BUILDING
AMERICAN MUSEUM OF NATURAL HISTORY - N.Y.C.

that function implies, and that were recognized in design only after the Romanesque had ceased to be. However that may be, it will not be disputed that the façade is successful and impressive. It is worthy of its conspicuous place and of its very unusual dimensions. It will be, when it is completed, probably the longest front on Manhattan Island, and an important requisite of the design was to get the full benefit of this lateral extension. Such an extent is so valuable in itself that it behooves a designer to be especially careful, lest in variegating and decorating it to avoid monotony he dissipate some part of its inherent effect. This has been successfully looked out for in the design of the Museum of Natural History. The central building is, as should be, a predominant feature, and it is differentiated from the flanking walls not only by a greater height, emphasized by the steep and simple roof, and by a difference of fenestration, but by a considerable projection of its flanking towers. These devices give sufficient detachment and relief to the centre, but the principal lines of the flanking walls are so emphatically continued across it, and so closely connect it that the disposition rather enhances than interrupts the effect of the lateral extent. Moreover, the centre is notably well designed in itself. The flanking towers are well designed and well adjusted to their places. The archway, which at once carries the approach to the main floor and gives access to the basement, is a striking feature, and the arcaded loggia again emphasizes the principal dimension and is in itself well proportioned and well detailed. Add that the architect has been very fortunate in his material, having obtained a red granite as strong in color as brownstone, and equally effective rough-hewn or polished, and you have the sources of the architectural success of one of the most successful of our public buildings.

The Metropolitan Opera House is a work which no longer supplies the material for a just judgment of its authors. The interior, in the course of

the reconstruction it underwent after a fire, has been, perhaps it would be harsh to say vulgarized, but at any rate deprived of whatever individuality it originally had and reduced to the common level of theatrical architecture. But even in its original state, the conditions were very hampering to a designer whose work, when it was done, would inevitably be compared with the achievements of architects who were unhampered. With such a public monument as the opera house of Paris or of Vienna it would be very unjust to compare our opera house, in the construction of which the necessity prevailed of reducing to a minimum both "fixed charges" and "operating expenses." We ought to be too grateful for what has been done by the public-spirited men who have provided and maintained the opera house at their own expense to carp at them for not going to an expense even more lavish. Such an expense would have been required to add to the practical fulfilment of the purpose of the place a monumental expression of that purpose. In the interior the economy of space entails painful results, not, indeed, in the auditorium itself, but in the entrance hall, which might have been an imposing feature like that of the Paris Opera or of the Congressional Library, but which is reduced by want of space and money to a mere stairway, of which only one flight is visible at a time, the next being cut off from view by the flooring over of the well at each stage. In the exterior the mutilation is even more lamentable. For on the main front all that appears of the opera house is the central third, and this is flanked by buildings taller than itself, of which the only connection with it is that they contribute to its revenues. The problem presented by this collocation is really not soluble. Mr. Cady perhaps took the most judicious course in treating his monument and its adjuncts in the same material but distinguishing by richness of treatment the front of the opera house above the fronts of the apartment houses which were distinguished above



METROPOLITAN OPERA HOUSE (Rear View).

New York City.

it by greater height. The result of this course, however, inevitably is that casual inspection regards the whole front as of one piece, and estimates it in the lump. This necessarily does injustice to the design of the centre, which masks the staircase hall. If the corners had been reserved from building instead of being filled out to the limits of the plot, so that this central pavilion stood by itself, it would be recognized as a scholarly, rich and harmonious composition, whereas, being flanked by structures which have the annoying air of belonging to it, though they really do not, it makes scarcely any effect at all. Possibly it might have been signalized to its advantage by the use of a different material, but that would have been awkward also, seeing that only the corners are devoted to baser uses, and that into one even of these a dependency of the opera is extended. To omit the flanking buildings altogether would have been the only real

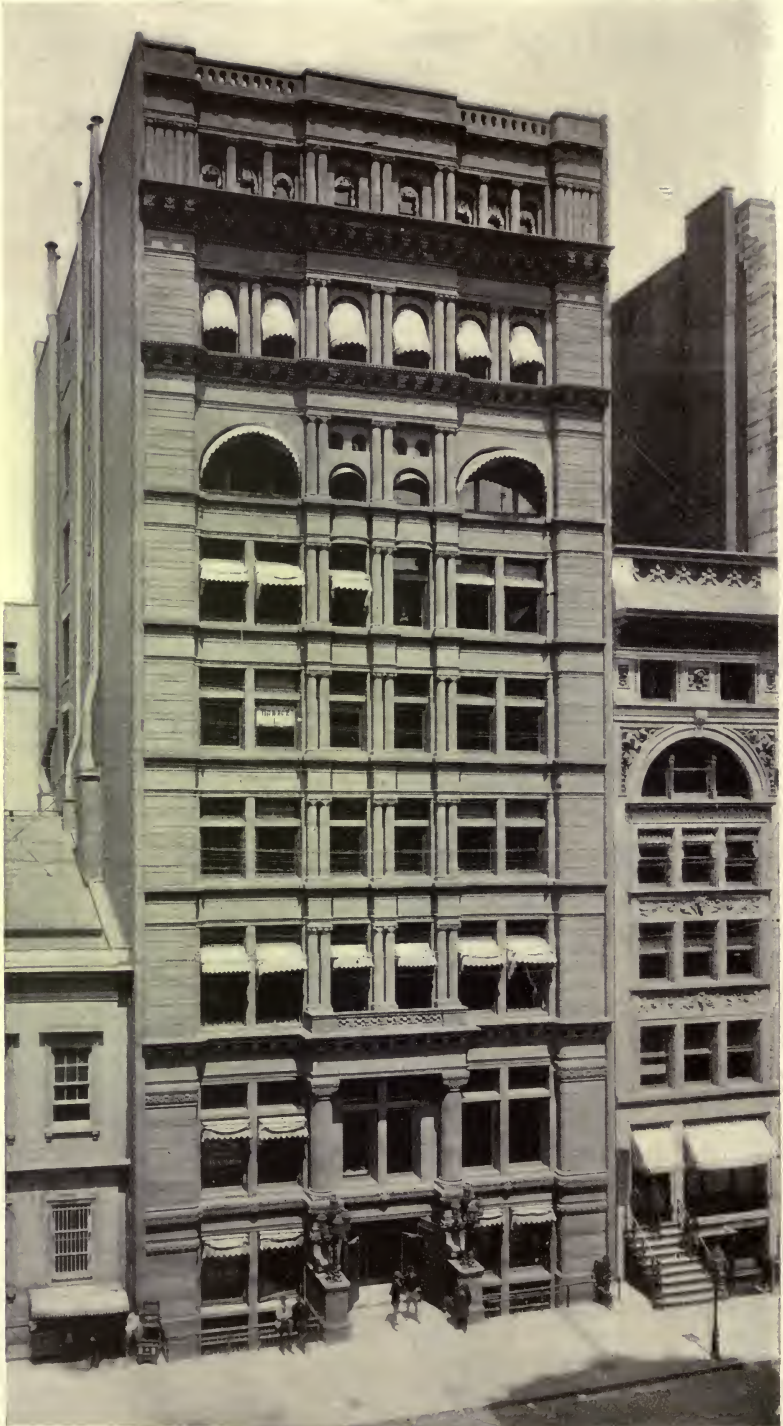
solution of the architectural problem. The entrance pavilion thus detached and isolated would have done to its own design the justice which it is deprived of doing by being flanked by huge utilitarian erections.

All this is a misfortune, but one is bound also to recognize that the architecture is not so effective as it might be in the matters in which the architect was left unhampered. Its defects are defects only and not blemishes, and criticism of them must be negative. The whole, along with an undeniable gracefulness, lacks vigor. The general treatment is as expressive as it could be considering the annoying interpolations at the angles. The three great elements, entrance-hall, auditorium and stage, are distinctly indicated on the outside, and the last is notably well carried out. The most forcible piece of design in the building is the rear wall, the center of which is mainly blank, with only such openings as em-

phasize its expanse and its massiveness. Its massiveness is still further and very effectively emphasized by the projection of two great buttresses. These are a structural necessity, since a stage wall must carry itself without interior staying, and they have contributed a needful architectural feature, of a vigor for which one looks in vain over the more architecturesque fronts. The drawings, indeed, promise a more effective building than the actual structure. The large relieving arches of the sides, for example, lose in execution the importance they possess in the drawings. Perhaps this is in part due to the failure of the designer to make due allowance for his material. The material is very good in itself, a light buff brick that wears very well and that, after fourteen years, gives no sign of shabbiness, but it is a material in which a slight projection or recess is of little avail. It is used in conjunction with terra cotta of the same tint, which would now afford opportunities for a much more emphatic treatment. But, in 1883, both designers and manufacturers were much more timid in the handling of terra cotta than they have since become, and this work seems to illustrate that timidity. At any rate, the detail is unduly minute in scale. Excepting the fortunate vigor of the stage wall, the only impressive piece of design is the entrance pavilion, and this has been robbed of its legitimate expression as aforesaid. Upon the whole one may say of the opera house that it is a good story marred in the telling, a design deprived of its due effect in part by the conditions of the problem, and in part by the architect's fear of loudness and exaggeration.

Of the commercial buildings of the firm, the Gallatin Bank in Wall street is perhaps the most costly and conspicuous. It is not a "sky-scraper" in the newest sense. Although the firm have also contributed to the tower-like buildings of New York, their work in that kind has been so hampered by the conditions of them, the most hampering condition being the limitation of the

frontage to that of a city lot, or even less, that it would not be fair to judge them by work executed under such requirements. But although the Gallatin Bank reaches the respectable altitude of nine stories, and is perhaps twice and a half as high as it is wide, it is not a sky-scraper for the reason that it is a structure of real walls of masonry, and not a cage of metal panelled in masonry. Of its nine stories, two are given to the basement and one each to two attics, the intermediate five being grouped as the principal division of the building and strongly separated by entablatures from the basement on the one hand and the attic on the other. This is a rational distribution, although in fact, from the most usual points of view, the attics count for little in the general effect, by reason of their distance from the eye and of the projection of the entablature underneath. The lateral division is triple and is maintained in the attic by a projection at the centre, while this central part is decorated in the principal division with three pairs of columns in each of the five stories. This decoration is the most conspicuous feature in the building, and may almost be called its leading motive. It is rather a grandiose feature in itself, but it cannot be said to constitute an effective front. The outer piers are left plain but for the prolongation across them of the projecting mouldings of the entablatures, and the lateral bays are also simply treated. The ornament is concentrated in the columns at the centre. Although the horizontal lines are strong the superposition of five orders makes the columns in effect continuous, and the central feature has thus a spindling aspect that is very disturbing to the repose the front would have had, in virtue of the power of the piers and transoms, and the arrangement of the openings, if the orders had been omitted. The effect of them in the attics, however, is very good, though weakened by repetition, since here they are extended across the front, forming a gallery between the piers, and since they are very emphatically



THE GALLATIN BANK (1885).

New York City.



DESIGN FOR PUBLIC BATHS (1897).

New York City.



PHOENIX MUTUAL LIFE INSURANCE CO.'S BUILDING (1897). Hartford, Conn.

framed by the projecting cornices. If the lower attic had been plainly treated as a foil to the richness of the upper, and if the order had been left off from the main division altogether, the front would have been extremely satisfactory. As it is, the detail throughout is carefully studied and successful in scale. The classic employed is so very free and eclectic that in the basement it ceases to be classic and takes on a distinctly Byzantine air. This basement, to my mind, is by far the best thing in the front. It is one of the best schemes that our street architecture has to show for the treatment of the entrance of a commercial building. The difficulty in this is to signalize the entrance and give it importance without making it unduly large and without mistating the facts of the case. This is admirably managed in the Gallatin Bank. The entrance is signalized by the two massive columns above it on the principal story, and by the buttresses that flank it. But it is at the same time made clear that the two columns are not really part of the entrance, but only appropriate crowning members for its massive piers. The detail of all this is capital, the buttresses have power and vigor, and the Byzantine leafage of the basement-cornice is designed and carved with great spirit. The whole basement is a very exemplary specimen of commercial architecture, and, indeed, is of a richness that would be appropriate to public architecture.

I am compelled, for want of space, to pass by much of the work of the firm which invites comment, but which, however interesting, is episodic, so as to be able to consider a series of buildings which are essays towards the solution essentially of the same problem. The problem is that of the modern Protestant church, and the series extends over twenty years, for the first of the series, for our purpose, is the church erected at Bridgeport quite so long ago. Everybody recognizes that the Protestant church, what in England would be called a "dissenting chapel," presents a prob-

lem that what may be called the sacerdotal churches of the past styles do not meet. Everybody ought to recognize the importance of the problem, for the country church in the United States at least ought to be what Coleridge called the Anglican parish-church, the centre of civilization in its sphere of influence. It is first an auditorium, a place in which to hear preaching, and, secondly, it is a place of social assembly. The convenience of hearing and seeing is the primary requirement, and many are the devices to which it has been resorted to attain it. It long ago became evident that it could not be attained by the reproduction of "the long-drawn aisle and fretted vault," of mediæval architecture, and that the modern theatre supplied a more eligible type than the ancient minister. Some architects have frankly built what one of them called "a theatre with ecclesiastical details," but it is impossible to adjust to this interior an ecclesiastical exterior, and the complete abandonment of the ecclesiastical exterior has, in many cases, been attended with a vulgarizing of the edifice. To build what is wanted, and, at the same time, to give it dignity and churchliness, has been the aim of many architects, and of none more than of the firm now under consideration. The earliest essay, the Methodist church at Bridgeport, shows an unreserved acceptance of the auditorium idea and abandonment of the ecclesiastical type, the plan is octagonal, and the posts and piers support a lantern, or cimborio, from which the interior receives a great part of its light. At that time, however, Victorian Gothic prevailed, and all the details were in the prevailing mode, whereas it is plain that it is not in that style, if in any recognized style, that such a scheme can be worked out to the best advantage. But the church was none the less an interesting experiment which attained an encouraging measure of success.

The South Church of Morristown, the next in point of time of the series, is an attempt to fulfil the practical re-



THE SOUTH PRESBYTERIAN CHURCH.

Morristown, N. J.

quirements without too wide a departure from the traditional forms of church architecture. The exterior is a rectangle of brown stone, with a gabled front, flanked on one side by a carriage-porch and on the other by the unbroken shaft of a massive campanile with a steep slated hood. The belfry-stage shows two tall canopied openings, of which the steep luffer-boards are hung with red tiles. The only intimations that are given on the outside of any peculiarity in the arrangement of the church are that the gable window is rather unusually broad and low, and that the wall which frames a like opening on the side, instead of being gabled, is covered by a hip roof, above which is seen a row of low openings in the main roof, which give additional light to the interior. The interior is virtually reduced to what would be the crossing in the

cathedral arrangement. Four stout posts enclose a square of about 45 feet and support a quadrangular lantern, of which two sides are pierced with rows of low windows, the third and fourth sides, or the front and rear, continuing the fenestration as decoration. One bay is formed on each side of the square and one at each corner. The ceiling of the lantern is flat, but the ceilings of the outlying dependencies are open-timbered and decorations of the actual roof construction. The detail is of the Victorian Gothic of the period. That of the roof construction is apt and expressive, and all of it is interesting, though it suffers pretty uniformly from excess in scale. Upon the whole, the interior is impressive and churchly, and the exterior dignified, quiet and harmonious.

This plan, of a central square carried above the rest of the building and



HAMPTON MEMORIAL CHURCH, HAMPTON INSTITUTE. Hampton, Va.



INTERIOR OF CHURCH, HAMPTON INSTITUTE. Hampton, Va.

J. C. CADY & C^o
COPY RIGHT 1892
ARCHITECTS, N. Y.



NEW YORK AVENUE CHURCH (1892).

Brooklyn, N. Y.



lighted from without, is also that of the Park Avenue Methodist church, in New York. The exterior, however, is not a satisfactory or intelligible exposition of the arrangement, the light, upon the visible side, being introduced through a clerestory arranged in a tiled and gabled superstructure in the plane of the aisle-wall, and the central compartment indicated only by a four-hipped roof, which is by no means a predominant feature. As an expression of the plan the arrangement cannot be called successful, although the exterior has interesting features, a very good west front, flanked by a plain campanile and the wall of the Sunday school room, crowned above the flat roof with a triplet of arches open to the sky, while at the centre is a picturesque projecting porch of two round arches, enlivened at the angles by gargoyles. The side shows a range of large lintelled openings in the wall of rough-faced brown stone, effectively framed between the tower at one end and the rectory at the other, and less effectively crowned by the gabled clerestory already mentioned. The interior, however, is impressive, and notably successful in the union in its expression of churchliness and homeliness, at which the designer evidently aimed.

The designer recurred to the essentials of this scheme many years later than the first essay, in the church of the Hampton Institute. Here, however, the scheme is so developed that the exterior is not in the least a compromise between the traditional church-form and the practical requirements, nor in any degree a mask, but a complete expression of the plan. Moreover the architects were enabled to carry out the project in a more durable material, the interior as well as the exterior, excepting the ceilings, being of solid masonry, and the building gets the benefit of this fact, as well as of the artistic advance that they had made in the interval. It is an extremely satisfactory piece of work. One may regret that the shaft of the campanile has been divided into stages,

instead of being treated with the massiveness and simplicity that are so attractive in the tower of the Presbyterian hospital, and certainly the stages, especially the upper two, containing the belfry and the clock-face, respectively, are too nearly equal. But the treatment of the body of the building—the emergence and predominance of the central lantern, and the convergence upon it of all the subordinate parts of the composition—is admirably managed. The interior is equally expressive and equally impressive. Here, also, the superiority of the principal feature is emphasized, and the rest duly subordinated. The plainness of the interior is in itself very effective, and gives value to the ornament which has been so sparingly introduced. It is a very typical and a very successful modern Protestant church.

In a more conventional manner of church architecture, although it also is distinctly an auditorium, in the interior of the Church of the Redeemer at Paterson, and also, as the material allows and the illustration shows, of a much more elaborate development. In fact, it gives the impression of richness almost as strongly as the church at Hampton gives the impression of simplicity, and it is equally successful in its very different way. We have to allow the designer his timber arches at the crossing, liable as they are to the charge of "constructed decoration," and obvious as it is that their forms are not determined by their structural functions, in view of the grace and harmony of the result.

A series of suburban churches erected after the designs of our firm within the past decade are noteworthy in the architectural provision they have made for the social needs of a suburban or rural parish. The need is commonly answered, so far as it is answered at all, by a mechanical makeshift, often in the basement, if in a city, or otherwise in a dependency that is merely adjoined to the church and not architecturally incorporated with it. To make the assembly-room an integral part of the church is the effort that is evident in



CHURCH OF THE REDEEMER

Paterson, N. J.

a series of interesting works of which the earliest is the Presbyterian church at Greenwich, and the latest the First Church of Morristown. In these an apsidal projection at the front answers the purpose of an assembly-room. It is separated from the church only by a light screen which is not a barrier, and is, on occasions, an addition of so much to its available space, while the illustrations show its value as a feature of the exterior. The church at Greenwich, with its central gable and apse, and its robust and simple tower flanked on one side by the lower transept and on

the other by an umbrageous carriage porch, may be accepted as very nearly a model of an American Protestant country church. Its effectiveness does not depend upon ornament, for of elaborate ornament there is none at all. It comes simply from the careful study of the requirements and the successful pains that have been taken in the proportioning of the various members of the composition and their adjustment in relation to each other. There is not even enough of detail to designate the "style," though certainly it has style, and much of its charm comes from the



CHURCH IN THE ADIRONDACKS Racquette Lake, N. Y.



CHURCH IN THE ADIRONDACKS. Racquette Lake, N. Y.



CHURCH IN THE ADIRONDACKS. Racquette Lake, N. Y.



PRESBYTERIAN CHURCH

Greenwich, Conn.

home-bred and vernacular air which is incompatible with a more scholastic design.

The Webb Memorial, in Madison, much resembles its predecessor, the assembly-room being an equally conspicuous feature, and the treatment of the tower similar. The modelling of the doorway, however, is carried far enough to designate it as an example of Romanesque, though evidently nothing was further from the designer's intention than to present an example of any style. The interior exhibits, in a general way, the arrangement with which we have already been familiarized. The central square is here doubled and the arrangement is not carried out in a clerestory, the interior depending for its light upon the openings in the outer walls. Executed as it is in a monochrome of rough brown sandstone, the building has a gracious and comfortable aspect that is extremely taking.

The latest of the series, the First Church at Morristown, is considerably the most ornate, and in expression considerably the most urban of the series. Compared with the others it

makes a distinct impression of richness and elaboration, and is more ample in arrangement as well as in scale. The apsidal assembly room is more developed than in the preceding examples, and, instead of adjoining the tower, is detached from it by the length of an arcaded cloistral passage which enhances the effect of both features, while it has its own effective counterpart in the arcaded porch on the other side of the apse. A rather rich arch-frieze supports the cornice of the apse, while the tower, above its solid shaft, shows a tall and elaborated belfry stage, a great mullioned and tracered window in a recessed panel covering each face. The material is a light limestone, in which the wrought work shows to advantage, and which contrasts effectively with the varnished tile of the roof.

The interior also may almost be called splendid in contrast with the austerity of some of the earlier churches we have been considering. The nave is covered with a barrel-vault, decorated with cassettes, through which are cut the lunettes that serve as clerestory lights, and of which



WEBB MEMORIAL CHURCH.

Madison, N. J.

the protecting domes are effective exterior features. It is of three bays, carried upon columns and terminal piers of polished red granite, with carved capitals. It is a very effective interior, and a chief factor in its effectiveness is the open assembly room

which, architecturally, is an integral part of it. The details and fittings have all evidently been thoroughly studied with reference to the ensemble to which they effectively contribute. The font, a plain polygonal pyramid of sumptuous Egyptian marble, is



INTERIOR WEBB MEMORIAL CHAPEL.

Madison, N. J.



GRAVES OF TWO LITTLE SISTERS.

Newburgh, N. Y.



CHURCH AND SUNDAY SCHOOL.

Fairfield, Conn.



NOS. 8 TO 14 PIERREPONT STREET (1896).

Brooklyn, N. Y.

noteworthy among the interior details; but, indeed, all of them have an attractiveness which in the present condition of architectural practice is much less frequent than it ought to be. It is the attractiveness which comes from the sense that an architect has lived with his building and watched it grow under his hand and enjoyed his labor.

This series of churches appears to me, upon the whole, the most serious and successful of the work of our firm. Certainly no one who considers them can consider that architecture, in all its phases, is a matter of mere fashion and aimless fluctuation. No doubt that is true of a good many of the phases, and the work of almost any busy architect

bears witness, more or less, to its truth. But a series of buildings like these churches, aiming seriously at the satisfaction of a real though not a merely physical requirement and at a worthy expression of their purpose, constitutes a worthy and exemplary work. When we contrast these dignified and civilizing edifices with the awful "meeting houses" of a generation and two generations ago, around which the young affections of the American villager were invited to twine, we must own that in some departments of architecture there has been progress, and that the progress is of high public importance.

Montgomery Schuyler.



PROTESTANT HALF ORPHAN ASYLUM (1893).
Manhattan Ave., New York City.



HOME FOR OLD MEN AND AGED COUPLES (1897).
Morningside Heights, New York City.



LE PETIT PALAIS DES BEAUX ART (Main Facade).

M. Girault, Architect.

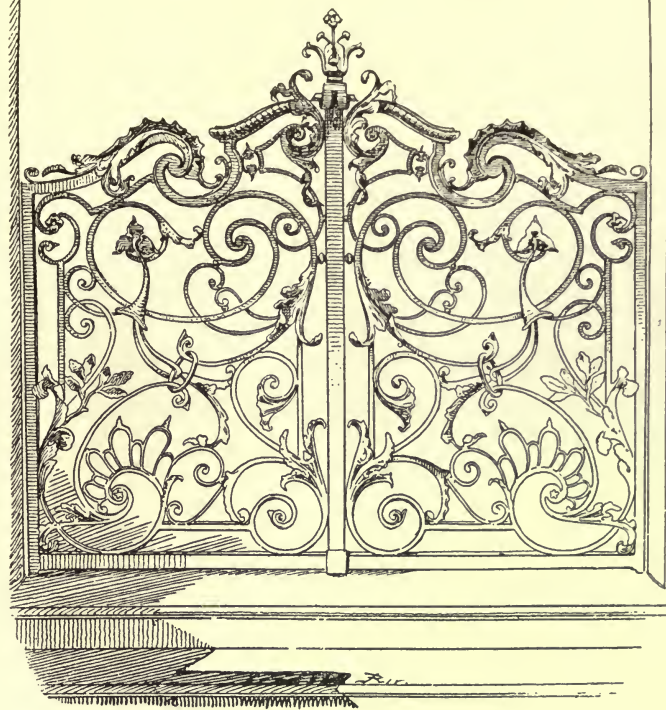
Design for the Paris Exhibition.



LE PETIT PALAIS DES BEAUX ART (Rear View).

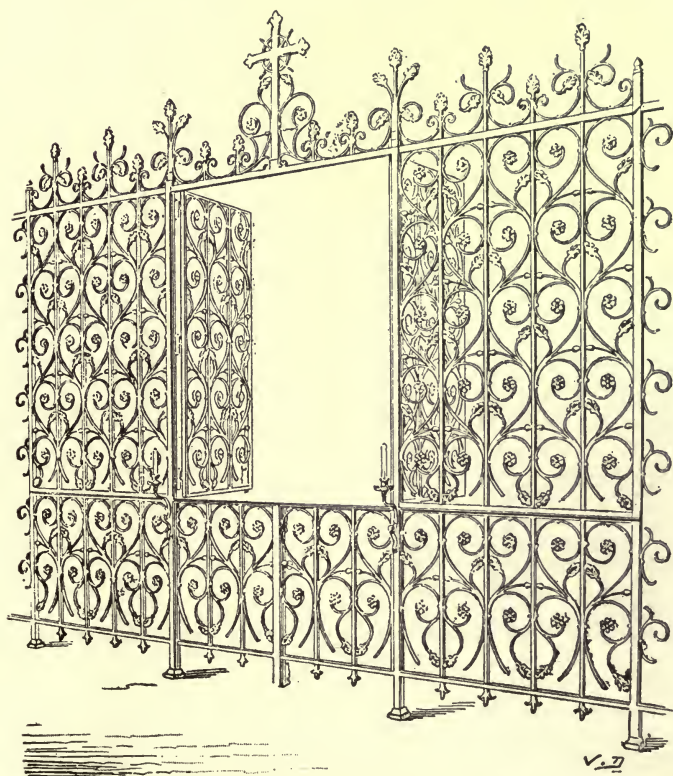
M. Girault, Architect.

Design for the Paris Exhibition.



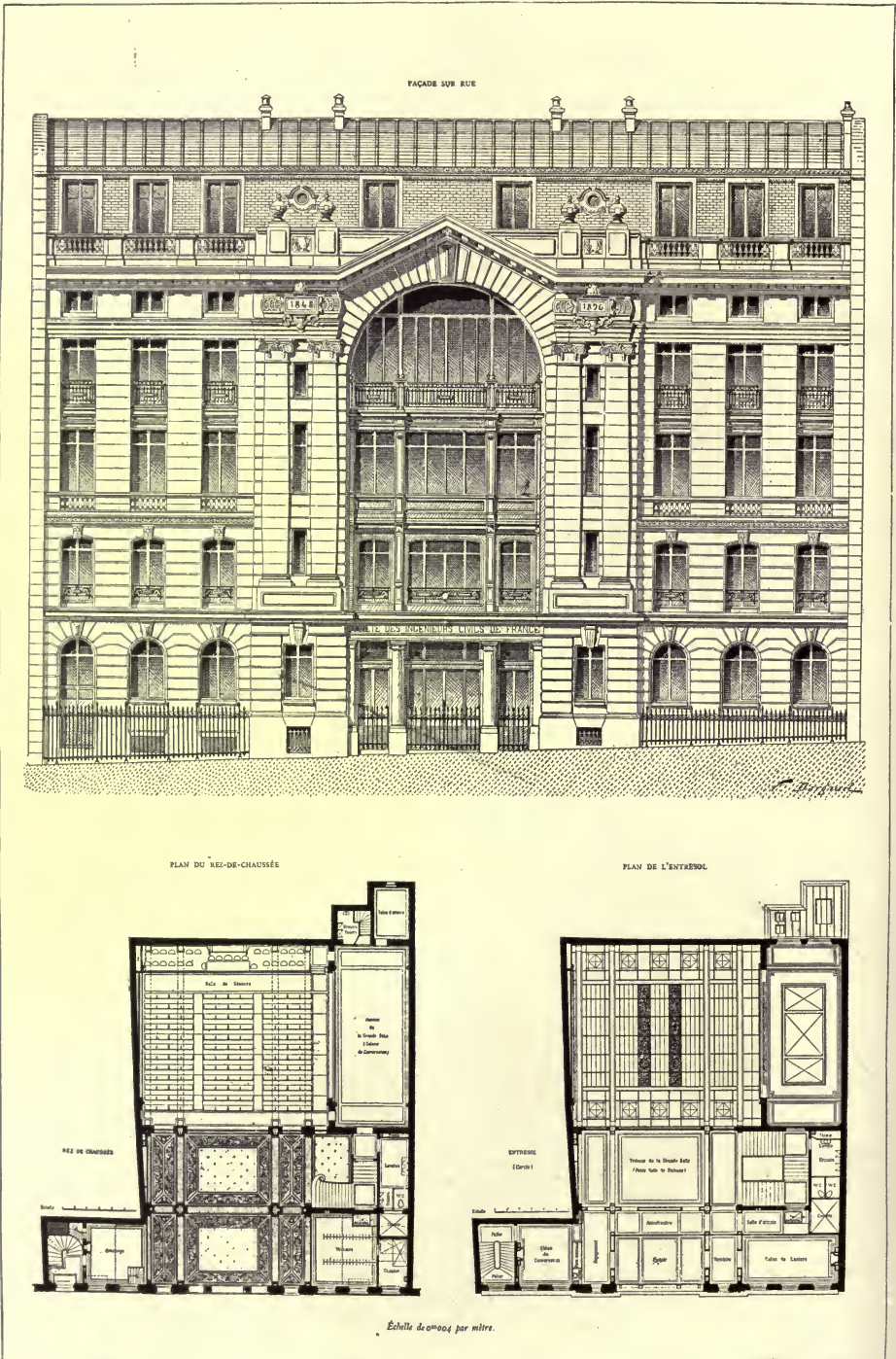
FRENCH IRONWORK.

Designed by M. Ray.

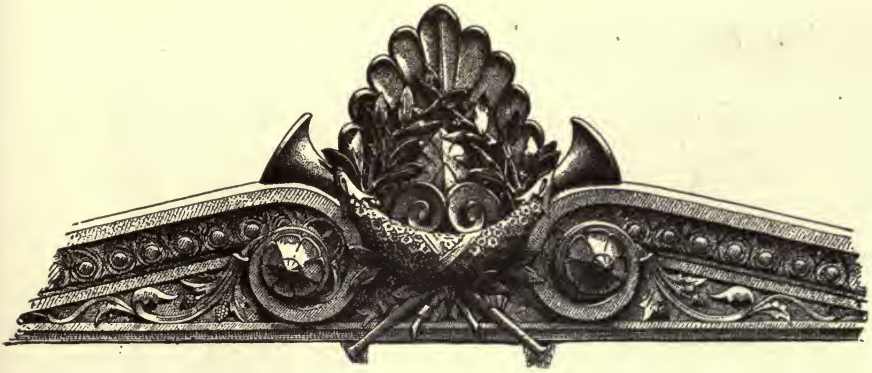


FRENCH IRONWORK.

Designed by M. Laisne.



NEW QUARTERS FOR LA SOCIETE DES INGENIEURS CIVILE.
M. Delmas, Architect.



NEW BOOKS.

SCULPTURED TOMBS OF HELLAS.—By Percy Gardner, Litt. D., Lincoln and Merton Professor of Classical Archaeology and Art in the University of Oxford. With thirty Plates and eighty-seven Engravings in the text. London: Macmillan & Co., Ltd. New York: The Macmillan Co. 1896. Price, \$8.00.

Prof. Gardner's theme is wider in its application than it may seem at first reading of the title page. The sculptured tomb may be primarily an object interesting for its sculpture, but, on the one hand, the general term includes many buildings whose architectural character is of universal and permanent interest, and, on the other hand, the significance of the sculptures is connected with the deepest and best teachings of the Greek masters of thought and with the instinctive beliefs of the Greek populations. On the one hand, we have to do with such monuments as the lofty structures of Hellenic Asia; on the other hand, the question as to the belief of the Greeks in a future life, as to ancestor worship, and as to the fear of ghosts, comes up and incidentally demands an examination and a comparison of theories. To speak very briefly of this latter and most difficult subject, let it be said that Chapters I., II. and III. deal with the Burial Customs, the Worship of the Dead, and the Belief as to Future Life among the Greeks. These chapters are illustrated by a number of photographic and other prints taken from vase paintings, mural paintings in tombs, and terra cotta reliefs. A curious analysis of a recorded painting by Polygnotus in the Lesche of Delphi, which analysis is expressly stated to be founded upon the work of a German archaeologist, Karl Robert, occupies a part of Chapter III., and is a curious instance of that tone of absolute certainty in the conjectural restoration of a lost work of art which grows

upon archaeologists and which is, perhaps, partly traceable to the natural impatience of a writer who has to say continually "it appears," "it is probable," "apparently," "it seems to follow," and the like. Let it be allowed the critic to say, once for all, that the inferences drawn by modern students from an existing work of art, or still more, from a comparison of several, are respectable and important and are our main helps along the road of art study; but that reconstruction, based upon the words of ancient writers, are of a far different and vastly inferior value. The descriptions by even the most careful, classical writers of the works of art which they had seen, even these—for there are many more descriptions of works of art which they had only heard of—are descriptions written by men who knew nothing of the processes or of the purposes of the artist, and who avowedly describe the scenes represented rather than the artistic purpose of the designer. We have not from antiquity the writings of any man who seems to have understood fine art as artists understand it. These accounts have come down to us in MSS. of disputed authenticity, where words, and sometimes whole passages, are asserted to be interpolated, changed, or dropped: and yet our whole idea of what Polygnotus's art was like, is based upon these unsatisfactory, untrustworthy passages taken in comparison with the Greek sculptures which are thought to be of that period and which still remain to us. It is well to do what Prof. Robert has done and to do again what Prof. Gardner has done in rendering the German text by English paraphrase, but the words of positive assertion should all be replaced by careful and guarded phrases with a strong tone of "perhaps" and "probably" running through them. Think what is under-



STELE IN THE NATIONAL MUSEUM AT NAPLES.

Closely resembling one given by Mr. Gardner in Plate IX.



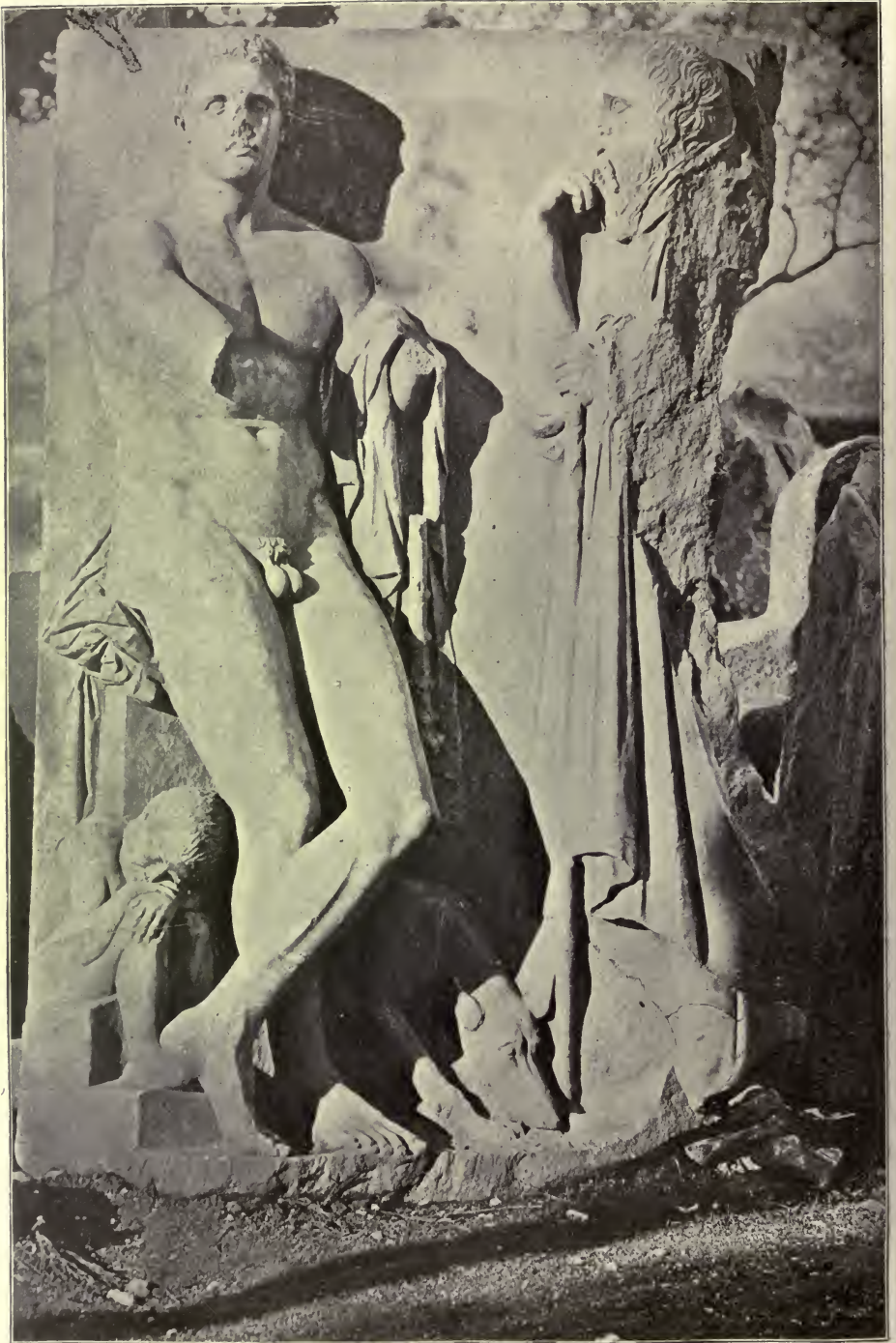
STELE OF PRE-PHIDIAN TIME.

Given by Mr. Gardner in Plate IX. It was found in Velanideza, in Attica, called the "Soldier of Marathon," and kept for many years in the Theseion, at Athens. Now in the Central Museum there. Covered with painting, which has now mainly vanished.

stood by the ordinary well-informed reader without special archaeological training when he reads such a sentence as this: "The central part of the picture . . . is occupied by the grove of Persephone, represented in the sparing fashion of Greek painting by a single tree, under which sits Orpheus, his lyre in his hands. . . . Orpheus is the central figure of the whole. To Polygnotus he is not merely a departed hero, but priest and hierophant." Or again, on another page: "The general tone of the painting of Polygnotus bears a close resemblance to that of the sepulchral reliefs which we shall describe in this book." Is not this the language of the man who has seen the painting in question? Can the reader be expected to keep before him the fact that no fragment of any picture by Polygnotus, and no reproduction or copy of one has been seen by modern eyes? The archaeological student is not deceived by this sort of phraseology or, at least, if he allows himself to be deceived for a moment, he will soon be brought back to reason by the protests of those who do not agree with these particular interpretations of the words of Pausanias. The comparatively uninstructed reader, that is to say the lover of art, the student of art, the architect who cares for the different ramifications of his art in the past, the sculptor who wishes to know how other sculptors have worked, and the painter who is glad to learn what history has to tell him of paintings of antiquity, are all of them likely to be deceived as to the amount of knowledge that we possess concerning ancient works of art. Indeed, it is a notorious fact that such deceptions exist everywhere in the reading world, and that even scholarly people are taken by surprise when the true facts underlying some of our modern theories as to ancient monuments are laid nakedly before them. This stated, it must be added also that the general conclusions drawn in these three Chapters are safe; that the analysis seems thorough, and the results reached at once accurate and useful to the student of art.

The Chapter on the Pre-historic Age of Greece which follows, and that on Early Asia Minor, have to do with buildings of architectural character. There is a great deal of interest in the analysis of the tombs at Mycenae and Orchomenos, and the carved stelae of the Mycenaean age should be compared, for their sculpture, at once with the larger buildings of the same epoch and region and with the rock-cut tombs of Asia Minor. These Chapters are only too brief; one could wish a much fuller treatment of the interesting buildings mentioned while yet sympathizing with the author in his haste to reach the splendid Athenian grave slabs which naturally form

the most important part of his book. We reach these first in Chapter VII., which deals with the Heroizing Reliefs, a class of tablets of which there are many examples in the Museum of the Acropolis and in the Central Museum at Athens and which are here treated in a systematic way, although, again, too briefly. It is not before Chapter VIII., Athenian Periods and Forms of Monuments, that we reach what is the nucleus of Prof. Gardner's treatise. More than 200 pages are devoted to the superb tomb-slabs which have been discovered in the famous burying-ground at the Dipylon Gate at Athens and those in other places which are immediately connected with them; and a number of successful photographic illustrations are supplied us. It is these slabs which, in the Central Museum at Athens, are the great surprise which arrests the art loving traveler. The unenthusiastic person who hears the student at Athens, or after he has returned thence, express his delight in the collections of that city, says, wonderingly: "Why, Athens has no statues; the Romans carried them all away." It is true that there are but few statues in Athens, not more than a dozen of first rate importance, but statues are not the only kind of sculpture known to the Greek artists, and such a Museum of sculpture in relief as exists in the different public storehouses there is in itself sufficient to set Athens among those cities of Europe most rich in monuments of art. Of these superb reliefs, the greater part, perhaps, are the tomb-slabs. Even this careful discussion of them is very far from being complete. Prof. Gardner would be the first to say that it was not complete. A large and really splendid book has been devoted to the illustration of them, published, of course, in Germany, and the text of that work is to be found in the comments of a hundred authors in a score of archaeological journals. But what is here is as valuable as it is timely. The few burial slabs of some importance which are contained in other museums, one in London, one in Berlin, another built into the wall of the Villa Albani, near Rome, are alluded to when their time comes, but Athens is the centre and capital of the sepulchral relief as we know it. As regards these chapters, of which the writer can only speak with enthusiastic approval so far as their general treatment goes, there is one thing which is to be seriously regretted and which causes through the whole book a certain air of being made "popular" in a rather unfavorable sense; that is the translation of the passages of Greek poetry into English rhyming verse. Prof. Gardner in his Preface states that he has translated the Greek elegiacs into rhymed



STELE IN THE CENTRAL MUSEUM, ATHENS.

Given by Mr. Gardner, Plate XV. Finest work of about 370 B. C.



STELE OF DAMASISTRATE IN THE CENTRAL MUSEUM, ATHENS.

Given by Mr. Gardner, Plate XIII.



STELE IN THE CENTRAL MUSEUM, ATHENS.

Given by Mr. Gardner, Plate XXIV.



VERY SMALL STELE OF DEMOCLEIDES, IN THE CENTRAL MUSEUM AT ATHENS.
Given by Mr. Gardner, p. 153. The youth is seated on the prow of a galley, of which the
details must have been given by painting.

heroic verse and the Greek hexameters into English ballad metre. Why is the student of art supposed to need Prof. Gardner's notions of how English rhyme can approximately render Greek verse? What the English student of art wants to know is the full significance of the Greek passages, of what the Greek writer meant to say. It is not alone in the Chapters which we are now considering that Prof. Gardner drives accuracy out of his renderings in order that they may rhyme. In Chapter III. we have this translation of the *Odyssey* IV., 560, viz:

"In Argos' horse-abounding plain
To die is not thy fate,
O Menelaus, there for thee
No mortal chances wait.
Thee shall the immortals far away
To earth's remotest end,
Where fair-haired Rhadamanthus dwells
In Plains Elysian send.
There life flows on in easy course,
There never snow nor rain
Nor winter tempests vex the land;
But Ocean sends amain
Fresh Zephyr breezes breathing shrill
To cool the untroubled life.
There dwell, since thou are kin to Zeus,
And Helen is thy wife."

It is not to confess one's self indifferent to poetry to say that this would be more accurately and even more agreeably rendered in the words of the Butcher and Lang translation, as follows:

"But thou, Menelaus, son of Zeus, art not ordained to die and meet thy fate in Argos, the pasture-land of horses, but the deathless gods will convey thee to the Elysian plain and the world's end, where is Rhadamanthus of the fair hair, where life is easiest for men. No snow is there, nor yet great storm, nor any rain; but always ocean sendeth forth the breeze of the shrill West to blow cool on men; yea, for thou hast Helen to wife, and thereby they deem thee son of Zeus."

A good prose translation of a Greek poetical original has a better chance of being in itself poetical than a verse translation has, as is sufficiently shown by comparison of the above extracts. Prof. Gardner's verse is a remarkably literal rendering, for verse, but all poetical expression has been expelled from the passage by the effort to secure as well as fidelity rhyme and meter. The purpose of this criticism is to set forth the supreme importance of giving the prose meaning of the Greek so far as modern scholarship is able to effect it, and not to hinder that by the interposition of rhyming verse which necessarily distorts everything.

The final chapters, XIII., XIV. and XV. deal with the architectural monuments of Asia, which, as the author truly says, are of a much more elaborate and sumptuous character than anything in Greece, and with the recently discovered Greek sarcophagi found at Sidon and now in the Museum at Constantinople. These works, like the Greek

relief monuments, have special books devoted to them, but these books are large, and of great comparative cost, and the summing up furnished by Prof. Gardner is of the very highest utility. In fact, what is to be said of this book, as a general criticism, is this, that it contains nearly all that the ordinary student needs to know concerning two or three very important phases of the great art of the Greeks. The wealth of the volume in photographic illustration is very considerable, and it affords, indeed, a small museum of architectural and decorative sculpture of a first-rate quality.

JEAN FRANCOIS MILLET; His Life and Letters. By Julia Cartwright (Mrs. Henry Ady), with nine Photogravures by the Swan Electric Engraving Co., and Messrs. Braun, Clement & Co., of Paris. London: Swan, Sonnenschein & Co., Limd. New York: The Macmillan Company. 1896. \$5.00.

The photogravures which illustrate this book are fairly successful. They are taken in an excellent way and probably nothing but their small scale and the peculiar character of the works of art themselves prevents their being altogether satisfactory. It is necessary, however, to protest against the translation into English of some of the French titles, although one recognizes the occasional difficulty of doing this translation aright.

The book is, as the Preface states in modest and becoming terms, a collecting into one volume and a putting into English of books about the painter Millet, which books are generally in French. It is not, however, the work of a mere compiler. Mrs. Henry Ady is a practised writer on subjects connected with painting, and is known as the maker of books of excellent character; books which are a real addition to the constantly growing literature of painting. Millet's greatness is strongly felt and its nature well explained in these pages, and if its comparative importance in the vast world of graphic art is a little forced in the expression, it is an error that one may forgive. The same tendency is visible everywhere among persons who care for Millet; there is no artist who inspires greater enthusiasm or a more unmeasured admiration even as his pictures are compared with the greatest paintings of the past.

The simple existence as of a French peasant without pretensions beyond the peasant life which Millet led for years is, also, very well explained. A great number of the artist's letters are printed and these help at once to a better understanding than would otherwise be possible, of his humble, country life and of his feelings and his ambition as a

painter. The translations of these letters seem to be very accurate. Those which the writer has compared with the originals in Sensier's book leave nothing to be desired in the way of fidelity to the originals.

In short, this book contains in excellent form all that one needs to possess for the proper understanding of Millet's life; or all, at least, except his work itself, as much as may be obtainable.

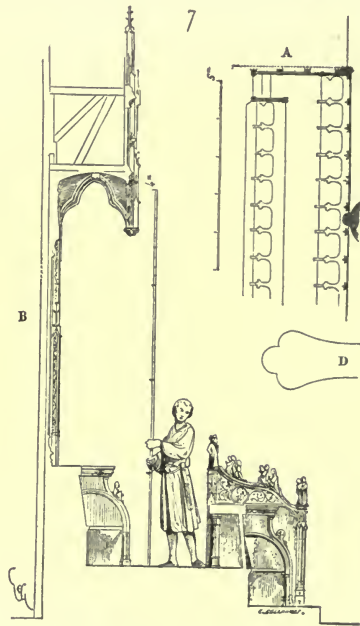
CHOIR STALLS AND THEIR CARVINGS.

—Examples of Misericords from English Cathedrals and Churches, sketched by Emma Phipson, author of "Animal Lore of Shakespeare's Time." With an Introduction and Descriptive Notes. London: B. T. Batsford, 94 High Holborn. 1896.

The choir of a church is that part which is given over to the clergy and the choristers, that is to say, to those who conduct the services, much of which in a large establishment will be choral. Choirstalls are those fixed seats with corresponding divisions, backs, and canopies which are arranged on either side of such choir. There are not necessarily more than three or four on a side; and, indeed, in late churches, small and unimportant seats, three or four in number, are put anywhere in the choir. But in a great Cathedral they are, of course, very numerous; perhaps, sixty on either side and arranged in two rows, those in front, or facing one another across the width of the open floor of the choir being raised one step above the floor, the others raised two steps higher still. Our illustration, taken from Viollet-le-Duc's "Dictionnaire," Vol. VIII., p. 469, shows in section the arrangement of the unequalled stalls of the Cathedral of Amiens, which were begun and completed between 1508 and 1522. Now, in this figure, the division between each pair of stalls is finished at top with an elbow rest, shown on a large scale at "D," the projecting front of which is called the *cluseau*, and is itself the recipient of delicate sculpture in cases where the stalls are rich. The misericord, which we call also *miserere*, and sometimes, as our authoress reminds us, *sellette*, is the hinged seat, which in our figure is shown as lowered in the upper stall and raised in the lower one. Now, when this *miserere* was lowered, the chorister sat upon it as upon a chair; but, during the very numerous occasions for singing or chanting a part of the service, the *miserere* could be raised, and then, resting upon the back of the stall, offered its projecting boss as a sort of half prop, half seat, from which the chorister could get some support while his elbows rested upon the division above. The name *misericord*, of course,

implies the pity embodied by this unrecognized but admitted quasi-seat.

The bosses on the under side of these adjustable seats, which bosses are *misericords*, properly so called, received a great deal of rich and fantastic carving even in churches where the rest of the stall was not so elaborately adorned. Miss Phipson points out how effective a row of these carved bosses must have been when, the stalls being empty, and the seats raised, the carvings showed in long rows all of the same size and general disposition, but all differing in their fantastic leafage and iconography. Her book gives what



Cathedral of Amiens.

Section through the choir stalls, from Viollet-le-Duc.

appear to be complete lists of the *misericords* in one church after another;—Lincoln Cathedral, Ely Cathedral, Soham Church, Beverley Minster, All Souls' College at Oxford, and many others. To each list is appended a certain number of illustrations. Thus, in the case of Exeter Cathedral, of which the stalls are stated to be the earliest remaining (in England, presumably), the list is of twenty-eight stalls on the north side and twenty-one on the south, and fifteen drawings are given on five plates. The plates generally give three figures each, and these, we are told, are all rendered on the same scale. They represent all epochs, from the early XIII.-century examples of Exeter to the elaborate ones in King's College, Cambridge,

more than two hundred years later, and which have a look as of Italian sculpture of the XV century.

The wholly unique figure sculpture of the Gothic period, abounding in characterization and extreme vigor of action and movement, often at the expense of plastic beauty, is, of course, better studied in the stone sculpture of the great porches and their concomitants when one can be sure that it has not been restored into meaningless monotony. There are finer things at Chartres in the porches than any woodwork can offer; that much is certain. But in England especially the stone carvings have been cruelly misused, not merely by being scraped and shaped and "surfaced," but in the setting up of modern figures made in the closest possible imitation of the ancient ones, so that time and investigation are needed to convince one of the authenticity of the partly denaturalized ancient pieces that remain. The wooden carvings of the stalls are free from this criticism. Just as the study of Greek coins is recommended to all students of sculpture because they, at least, are the genuine and unaltered design of the Greek artists, while the museum statue is generally a third-hand Roman copy, so mediæval spirit remains in the minute and often roughly-finished oak carvings where stone sculpture has lost its virtue. Let us print here Miss Phipson's description of one of the misericords of New College, Oxford. "Three men. The one in the centre is unarmed, in both senses, and wears his hair long; he is clad in a tight-fitting tunic and pointed shoes, as are the others, with very droll effect. The man on his right (A) has in his uplifted right arm a dagger; the man on his left (B) grasps the hilt of a sword merely, the broken blade lies on the ground; with his left hand he makes a gesture of despair. D, a man with two-handed sword advancing against (A), S, a man, nude, but for a short cloak and a peaked cap, his back turned to the spectator, throws back a Roman-looking sword to strike (B)." A representation of that brilliant composition is given in Plate 60, Fig. 2. Of course, there are few of these little ornamental masses which contain so many separate figures engaged in so elaborate action; the subject is more apt to be a mermaid in the middle with two dogs or lions for the side pieces, or two birds for the middle with leafage for the side supports. In one extraordinary case, the central mass is a shield-shaped escutcheon, carrying the impaled arms of Courtenay and of the See of Canterbury, as Miss Phipson explains. This is from the Church of All Saints, Maidstone, and the text informs us that De Courtenay

obtained the King's license to convert the Parish Church of St. Mary into a collegiate church, and that he gave it its new name of All Saints in 1395.

The question now arises about the value of the drawings, and a word has to be said here to remind those practised draughtsmen who still, in these photographic days, are accustomed to make architectural drawings for their own use and benefit, that if it had been necessary for them to express the full significance of a piece of delicate sculpture, so that all who looked at the drawing would understand it, as they might understand a photograph, a different touch would become necessary from that which they use for their free memorandum. The present writer has drawn hundreds of capitals and bosses in his time, and is practically convinced that there is but one way of doing it, and that is to take the point of a pencil, or, under more favorable circumstances, the small brush, and work with what the free and vigorous artist of the studio would call a "niggling" touch, working up each little nook and corner of graduated shade as it is spread before him, until, little by little, a semblance of the original appears upon the paper. In some such way Miss Phipson has done her work. In no one of the cases before us has it been practicable to compare the drawing with the photograph of the original. Indeed, it may be said that photographs in detail of English architecture and architectural fittings and appurtenances do not exist; at least, they cannot be bought in the market; nor does any work exist, perhaps, in which they are given with any freedom. It can only be said that these drawings have the appearance of such verity as would be possible to painstaking work done in the right way by not very skilful draughtsmen. Probably Jules Jacquemart might have surpassed these in accuracy, as many a practised draughtsman could have surpassed them in other qualities. He above other men had the faculty of rendering the exact amount of imperfection or archaism in a piece of sculpture. There is always in the case of a very able artist the danger that he will insensibly deviate from the barbaric freedom of the original, and, as he corrects the anatomy, will destroy the design; Jacquemart is named here because he, almost alone among very able artists, knew how to give the exact amount of Chinese character to a jade carving, and of mediæval character to an ivory statuette. The great Viollet-le-Duc, of course, could not be trusted for a moment; he knew the secret of making explanatory drawings, drawings that would tell the reader of his book exactly what it was that he had to insist

upon, but accuracy was not in him. Accuracy is in all probability what Miss Phipson has aimed at and has attained, so far as it is attainable by a not very skilful hand.

We have to regret a certain use of words in the title in rather too universal a sense. This book does not deal with "Choir Stalls and Their Carvings," but with misericords alone, and it is limited to England. All of this appears, of course, in the subordinate or second title, but it is the primary title by which the book will generally be known. The volume closes with three indices; first, an alphabetical list of subjects, and second, an alphabetical list arranged under the towns which themselves are in alphabetical order; and third, a chronological list in which the stalls are arranged in the order of their dates, as far as these can be ascertained. The book is a convenient and tasteful quarto, in which one hundred plates are bound, with a text of 120 pages.

THE ARCHITECTURE OF THE RENAISSANCE IN ITALY.—A General View for the use of Students and Others. By William J. Anderson, Architect, Associate of the Royal Institute of British Architects, Director of Architecture and Lecturer at the Glasgow School of Art. With Fifty-four Collotype and other Plates and Seventy-four smaller illustrations in the text. London: B. T. Batsford, 94 High Holborn. 1896.

This book announces itself as being the substance of five lectures which were delivered at Glasgow. It is a brief treatise made into a volume by the insertion of many illustrations and analytical heads of Chapters. The point of view is that of the admirer of the Renaissance architecture and the admirer, also, within limits and with drawbacks, of the architecture of the Decadence; or, at least, of the first years of the Decadence as far as the beginning of that barocco style which the author seems to condemn altogether. The critical spirit is strong throughout the work and is evidently an enlightened one. The author's study of the buildings which he discusses has been minute and extensive, as is shown by those pages in which a lengthy comparison is maintained between buildings which may be supposed to have exerted an influence and buildings which seem to have received the influence in question. The remarks made in the way of general historical description are judicious and show independence of thought.

One of the best instances of that comparative analysis which has been commented upon above is the account given of Baldassare Peruzzi, Sanmichele and Sansovino, in Chapter V. It is, for instance, a thing worth noting, the influence exercised by Peruzzi over the

work of Sansovino as noted by the author. In the same Chapter the analyses of the palaces at Verona, by Peruzzi, and of the Venetian palaces by Sansovino, are capable of teaching much of the secret of the later Renaissance to students who will follow these passages of the text carefully, with good photographs before them. It may be that the later Renaissance has received a more careful and more extended treatment than the early epoch, but this may seem so rather because of the disproportionate attention given to the early Florentine work by other writers. It is, moreover, to be observed that in so brief a treatise, one of two alternatives must be chosen; either the description of all the buildings must be very brief and cursory, or the description of a few and the comparison between them may be carried out with care and at considerable length to the exclusion of other parts of the subject. That the author is at perfect liberty to choose between the two alternatives, no one has a right to deny. Moreover, it is certain that the choice which the author has made, of treating more fully that which he considers more important and letting the rest go with brief notice, tends to make by far the more readable and, on the whole, more instructive book. Synopsis or essay: between the two no one would hesitate as to which his choice would be, although the synopsis, of course, has its place in the curriculum of the school.

It is to be noted, though not to be insisted on too strongly, that the author's use of the English language is not free from fault. "Peruzzi's mouldings . . . indicate a superior knowledge of the antique than is evinced by the work of his contemporaries," (p. 108): "Such buildings as the Palazzi Strozzi or Grimani are unique and have no relation of an imitative kind to anything in classical times." These are the only examples that need be given of a careless wording rather common in these pages. This, however, is but a trifle and does not in any way injure the value of the work to the student. That which is to be greatly regretted is the inferiority of the illustrations; the more so, as the writer says expressly in his preface, that he leans upon his illustrations greatly and that pains had been taken to illustrate the subject thoroughly. The half tone prints are very indistinct; the small ones and large ones alike certainly very inferior to the worst which any number of this magazine contains. The collotype plates, of which there are nearly fifty, are proportionally inadequate, not comparing for a moment with the work which similar books published in Paris during the last ten years contain in great abundance. On the other hand, it is a

pleasure to find a number of measured drawings by the author carefully and well reproduced, and the plates made by copying these drawings are alone worth the cost of the book to any serious student. As an instance of what is meant, Plate XI., opposite page 32, is devoted to the Church San Salvatore del Monte, near Florence. Plates XXIX., XXX., XXXI and XXXIII., all at page 86, are devoted to the entrance vestibule of the Palazzo Massimo, at Rome, and text illustrations on page 87 and page 88, complete what is really a valuable monograph, which monograph is further elucidated by the collotypes in Plate XXXII. In like manner Plates XXXVIII., XXXIX. and XL., between pages 106 and 109, contain measured drawings of the Palazzo Albergati, at Bologna; one of its general elevation and two of details. These drawings of the author's are evidently altogether trustworthy and it is hard to imagine anything more useful to the student. Their value is enhanced by the photographic illustrations, unsatisfactory as are these last, and by the explanatory text.

DIE ARCHITEKTURFORMEN des Klassischen Alterthums mit besonderer Berücksichtigung der Säulenordnung und Gesimmsbildung herausgegeben mit Unterstützung des Herzogl. Braunschweigisch-Lüneburgischen Staats-Ministeriums von Constantin Uhde, Professor an der Herzogl. Technischen Hochschule zu Braunschweig. Berlin und New York: Braun-Hessling.

(The Architectural Forms of Classical Antiquity, with special reference to the columns and entablatures of the orders, published with the encouragement of the Ducal Government of Brunswick-Lüneburg. By Constantin Uhde, Professor at the Ducal Technical School of Brunswick.) Folio; pp. 8; 70 engraved plates.

This useful book furnishes the student with a great number of comparative measured drawings of Greek and Roman orders, many plates of sections through bases and cornices and the like, and many examples of decorated mouldings and details of capitals, key-stones and carved friezes. It is not the first of its class by many. The advantage that it has is that it is the latest of its class, and as such, in all probability, the best. The standard set up for such books of selections is constantly raised, and if any one now borrows from his predecessors, he must do so with a thoroughness and accuracy, and with an evident utility of purpose, which will seem to warrant his dressing himself in their feathers. The greater part of the figures given in these plates are ascribed directly to the works from which they are taken. Thus, the sections of Doric capitals on Plate X. are set down as

being taken from Hittorff and Zanth and from Serradifalco and those on Plate XI. are from Professor Newton, Blouet and Cockerell, respectively, and those on Plate XII. are from Penrose and Pennethorne. In like manner the Doric columns which are given in figured elevation in the Plates from XV. to XXII. are ascribed to the different authors named above, respectively, and to such other authorities as Wilkins, Texier and Pullan (a doubtful authority), Dellagardette, Durm, Stuart and Revett, and Adler. A list of the works from which the figures in these plates are selected is given at the close of the German pages of the text. There are some odd errors in it, due, probably, to careless proof-reading, but they are not likely to lead one far astray.

We have, then, a work which pretends to no originality except in matters of treatment, and even in the matter of treatment the work is less thoroughly done than, perhaps, we have a right to expect. Thus, in the unlucky reference of the Temple at Assos to Texier and Pullan, above mentioned, it would have been easy for the compiler to have referred to that publication of the American Archaeological Institute which treats the Temple at Assos with close reference to what it really was, and without the fantastic inaccuracies of Texier's book. Why, moreover, is the English publication referred to instead of Texier's original French work on Asia Minor? That book was, indeed, as full of errors as it was possible for a large and costly book to be, but these errors were carefully reproduced in the English reproduction which Mr. Pullan had to do with, and it is the French book, and not the English one, which is generally cited in all archaeological writings.

We have seen already in the few sentences given above what are the probable merits and the probable defects of a work of this class. Everything depends upon the accuracy of the plates selected for reproduction. Nearly all the writers named above are to be trusted, exception being made for those slips into which even an accurate student and draughtsman may fall when he is making up the order of a ruined temple by the measurements of its fallen parts. Still, if a real reconstruction of an ancient building is what interests the student, he must, of course, beware of plates like these, and must, of course, ascertain whether the original authority is to be trusted implicitly. Thus, when there is question of decorative building and the painted representation of decorative building at Pompeii and the authorities given are Niccolini, Zahn, Mazois and Chabat, it becomes the student to ascertain the relative value of these authorities. In like manner, when one of the earlier Italian

buildings, the Temple at Cori, is taken from Lampue, and the Temple of Fortuna Virillis, at Rome, is in part, at least, referred to Canina, one has to remember that Lampue is very trustworthy from the point of view of a student of the Paris school occupied in making careful drawings which are to form part of the permanent archives of the school, while Canina is as untrustworthy as it is possible for a so-called archaeologist to be. And this brings up another and a curious question. When the author tells us that the authorities for this plate for the Temple of Fortuna Virillis are Canina, Castro, Taylor and Cresy, and photographs, what are we to assume? It would not be hard, indeed, to compare the plates given by the three authors named with such photographs as can be bought anywhere of that well-known little building, but really it is not important that one should do so. What one desires to know is the way in which Professor Uhde has made up his plate. Has he taken Canina's pretty figure and altered it to conform to Castro, or has a skillful draughtsman altered it to correspond to the photograph? It is as certain as anything can be that all these four authorities do not agree exactly. A similar puzzle arises on the same page with regard to the Temple of Aphrodite at Aphrodisias, in Asia Minor. This plate is ascribed to Texier and Pullan and to the work on Ionian antiquities of the English Dilettanti Society, and it would be good practice for a student who feels himself curious in the matter, to compare at the Avery Library the plate of that building given in each of the two books cited. On Plate XXXVI., the Temple of Vesta at Tivoli is represented by a specimen of its order, and this is fathered upon no less than five different authors, besides the photographs. The reader, perhaps, sees now why the present writer has not undertaken to verify all these figures. In that collection of six different sources from which truth concerning the Temple of Vesta may be drawn, there is a first rate, a second rate and several third rate authorities, and if it should be found that this plate is made up from one with touches of another, it would become a very interesting piece of mental gymnastics, indeed, well worthy the attention of the youthful archaeologist.

So much by way of allusion to the errors, perhaps natural shortcomings, of such a work. It is made up critically, as one would expect to find it; but while the student who takes his measurements without inquiry from these pages may be led into some errors, he will certainly be led to the gaining of much useful knowledge and will find himself enriched with a kind of familiarity with the monuments of

antiquity which it will be hard for him to get as easily elsewhere. Plate LXIV. is, for instance, of really extraordinary value, and the inaccuracies that may exist in it will be found to be of no consequence whatever. It gives thirty-nine different figures of the systems of as many different Greek and Roman buildings, from the Temple at Assos to the Temple of Mars Ultor. All these are drawn to the same scale and the peculiarity of the columnar architecture of the ancients, namely, that the proportions were generally maintained the same in the smallest as in the largest buildings, is laid before the student with striking force when he sees the diminutive order of the Athenian Temple of Nike Apteros (Fig. 19) compared with the gigantic Temple of Zeus at Girgenti, or with the Temple of Mars Ultor, whose altitude is even greater than that of the more ancient structure. So the figures of the arcuated buildings given on Plate LXV., on the same scale, three triumphal arches and three theatres or amphitheatres, are equally important to the student. It cannot be too much insisted upon that one should study buildings with relation to their scale. Even the undoubted truth that classical architects proposed to themselves the same proportion of their order in large and small buildings alike, cannot do away with the importance of this question of size. In Plate LXIV., the student will see that the wide span of the intercolumniation in the Temple at Girgenti exists only because it is an assumed intercolumniation, because the columns are only make believe columns, having been built with the wall; and in the huge Roman temple, which vies with the Sicilian one in size, and which was really columnar in construction, he will see that the intercolumniation never exceeds the narrowest proportion usual in such cases. The immensely wide proportional stretch of the lintels in Fig. 31, the colonnade of the Forum at Pompeii, could never be carried proportionally into the large scale of the Roman monuments given in the last line of figures, and any attempt to do this, as in the Paris Madeleine, is shown by this example to be an error which has no classical authority. These niceties of classical building and the apparent sense of what was feasible and what it was not best to attempt, should be studied by those who wish to take their revived classical architecture from other than merely academic sources. The pages of Vignola are not everything, and neither are the exact proportions of any one monument everything. A novel interest might be given the columnar style, now so much in fashion, if those who decide to build in that style would study it a little more in detail as its originators used it. To a certain extent

the orders were plastic in the hands of the Grecian and Roman builders: and some thought given now to the limits within which these builders allowed themselves to play with their style would certainly be an inspiration worth going for to the original sources, or in default of that, to such reproductions as those contained in this book.

There is one plate devoted to the architecture of Egypt taken from the well-known book published by the French Government, and that almost equally well known, by Lepsius. There is also one plate of Assyrian architecture and ornament taken from the works of Layard and Place. There is also one of ancient Persian architecture and one of Egyptian ornament compared with Grecian painted mouldings, apparently with the view of showing the probable derivation of the European from the earlier style. This being done with, the rest of the work is devoted to the Greek and Roman orders, as explained already. There is a text of brief mention and description of the different monuments, and this is furnished both in German and in English. The book is one for every architectural student to own, if possible; but, also, one which he should consult with precaution, and allowing always for possible errors.

THE CULTS OF THE GREEK STATES. By Lewis Richard Farnell, M. A., Fellow and Tutor of Exeter College, Oxford. In three volumes, with illustrations. Oxford: Clarendon Press. New York: Macmillan & Co. Vol. I., 1896, pp. XX., 423; Vol. II., 1896, pp. 425 to 761.

This is a book which requires notice here merely in its capacity as a treatise on Greek sculpture. Nearly half of it is devoted to "Monuments of the Cult of" and "Ideal Types of" this divinity and that. The great importance of this subject in all our future studies in classical sculpture is evident, because the world of archaeology is at the threshold of a very great advance in all of its methods of study as applied to Greek and Greco-Roman iconography. It may be that Mr. Farnell does not quite see how very important is a patient and sagacious agnosticism in the matter of attribution; it may be that he accepts somewhat too readily the generally admitted types of the greater divinities of the Grecian mythology; and yet his book will aid very greatly the progress of more accurate knowledge. Until we realize that we are not certain that every figure of a mature and bearded man is a Zeus or a Poseidon, we shall not be in quite the position which we should assume in studying the expressional side of Greek sculpture. Already much has been gained in the knowledge that has been acquired concerning the statues

of men in the bloom of youth. It is much to know that these are not always Apollos and that those which are not images of Apollo are not necessarily images of Hermes. It is much to know that some of them at least were tomb-statues or idealized representations of men, and that there is a very great difficulty in separating the human form from the divine images. It must be repeated that our author seems a little too ready to accept the Apollo-attribution and the Zeus-attribution in the cases of well-known works of ancient art, but if a thorough study is given to these types, the encouraging and stimulating tone of his book will have the effect of aiding students whose reading is mainly in English books, toward that fuller sense of the meaning of Greek sculpture which the future has in store for us.

To illustrate this point by the most difficult case of all, the representation of Zeus by the Greeks of the Great Time, it will be well to take the treatment on page 126 ff., in which the figure on the Parthenon frieze, the first southward from the central group of priestess, priest, and attendants, is assumed to be that of Zeus. This attribution is, undoubtedly, the common one. The figure has been called, also, Hephaistos, and Hades, but there is a general consensus of opinion that the first in apparent place of honor of one of the great groups of divinities, is Zeus, and that his next neighbor is Hera. The photographic picture of this supposed Zeus (b., plate III.) is accompanied by another (a., plate III.) taken from an outline lithographic print in the *Archaeologische Zeitung*, which representation, in no way convincing as to its probable accuracy, is taken from a bas-relief at Bologna which itself is of doubtful antiquity. Immediately following these two representations comes a reproduction of another print taken from the well-known series of engravings of the Thesalon frieze; but these drawings are not archaeologically accurate, and the sculptures have been seriously injured since they were made, besides having been greatly defaced at an earlier time, so that the inference drawn from the seated figure shown in Plate IV., which, as the author says, "appears to be moving in his seat through the lively emotion which the combat caused in him," is a little doubtful as a starting point for any elaborate chain of reasoning. Now, everything depends upon what the author is trying to show. So far as he wishes to show that it became, during the Pheidian epoch the custom to represent Zeus with the body and arms nude, or with the drapery thrown over one shoulder and one arm only, while the drapery concealed the person up to the hips, or even to

the waist, and that, moreover, the custom was general to represent the god as seated, he is probably on safe ground, especially when we consider the documentary evidence we have concerning the enthroned statues of Zeus which have perished. Our author, however, draws some conclusions, also, from the features and expression of the Zeus in the slight lithographic drawing of the Bologna bas-relief, and it is worthy of notice that this is the only head which he finds, possibly, of the Pheidonian epoch, from which he can draw any conclusions at all: for the fairly well preserved figure on the Parthenon frieze is more defaced about the head than elsewhere, and the figure on the Theseion frieze has lost its head altogether. In Plate IV. there is given a photograph of the well-known bust called the Zeus of Otricoli. In Plate V. there is a very singular head known as the Zeus of the Hermitage, and on pages 134 and 138 the facial expression of these heads is considered, and some attempt is made to compare the intellectual character of these two heads with the earlier types. All this is extremely dangerous ground for the archaeologist to tread upon. He has to assume, first, that the heads in question all stood for Zeus in the sculptor's mind and in the minds of those who admired his work; then, he has to fix the dates in an arbitrary way, no doubt with considerable probability, but still he has to fix the dates, which are not capable of being absolutely ascertained; then he has to explain by means of an admittedly Roman copy, the intellectual character, first, of the Greek original, and, secondly, of the type which the Greek original undertook to represent, because there is always room for dispute in the exact significance of even an expressive countenance in sculpture or in painting, and the attempts of historians to add to our knowledge of sovereigns and statesmen by means of a physiognomical study of even their admittedly authentic portraits are quite bewildering, and many would think wholly without value. Reference is made on page 117 to the bas-relief found in the Peiræus and now in the National Museum at Athens, which bas relief is given in the photograph in Plate II.; and here an inscription of unquestioned authenticity records the dedication of the work to Zeus Meilichios (the Gracious or the Protector). Another, and somewhat similar bas-relief, is described in the text. Another votive relief, also at Athens, bears a dedication to Zeus Philios (the Patron of Friendship). These works of art are small and unimportant, the handiwork of low-grade stone cutters, but they imitate the original work of great sculptors, or, at least, follow types which have been established by artists of great standing. In these

representations the enthronement of Zeus and the general character of his attitude as seated upon the throne, the holding of the sceptre in the left hand, the placing of the right hand upon the right thigh, the representation in profile with the side of the figure toward the spectator, or the torso slightly turned so as to show the breast to the spectator, all these are points worthy of note, and they are undeniable. Moreover, it would be easy to bring many such works of art into court as evidence for the gradual change of the attitude and the characteristics of the head itself, as more or less bearded and more or less adorned with curling and flowing hair. The text, with the foot-notes, as containing an interesting analysis of the cult monuments of Zeus (Chapter V.), and the ideal type of Zeus (Chapter VI.), is extremely well worthy of study, but the reader has to remember that there are some conclusions which are safe, and others which are of a most doubtful character.

The examination of the ideal types of Hera and their treatment in Chapter IX. give us further instances of this truth. Plate VIII. offers a large photographic picture of the "Farnese Juno," and Plate XII. a similar view, but in profile, of the "Ludovisi Juno." Of both these heads it is only to be said that they represent dignified and stately women, one of them having the stephanefilet. Mr. Farnell reasons in favor of the Farnese bust being a Hera, but points out that Dr. Furtwaengler calls it an Artemis; and it might equally well be any ideal portrait of a maid or matron, human or divine. So of the Ludovisi bust. Mr. Farnell points out that it is part of a colossal statue and not a bust in the ordinary sense; and that Dr. Furtwaengler thinks it "a Roman lady of the Claudian period idealized as a goddess." In neither of these two heads is there any single attribute, or mark of any kind, which can in the slightest degree certify the intention of the sculptor to make a Hera out of his bust. On the other hand, the Metope from Selinus (Plate IX. a) and the vase painting (IX. b) have for their subjects in all reasonable probability Zeus and Hera, and the most interesting fragment shown in Plate X., in which a part of the "Judgment of Paris" is represented, gives us a womanly figure, which, undoubtedly one of the three goddesses, would almost certainly be a figure of Hera. Here, however, we have only a feeble outline drawing to represent the original; and one should really compare other outline drawings with photographs of the original object to realize how far astray a presumably honest draughtsman may go. In the figure before us, the garments, the flying veil, the wreath, the necklace, and even the arrangement of the hair,

may, perhaps, be assumed to be correct, but it is wholly unsafe to reason about the face or to state on the authority of Plate X. that "the expression of her face is very profound and there is a searching gaze in her eyes that are fixed on Paris."

What must be insisted on is that it is nothing whatever to the scholar of the present day that writers have agreed for sixty or seventy years past that a given statue or relief represents a given personage. It is the business of the modern writer to re-examine all the testimony and not allow himself to be prejudiced in the slightest degree by the fact that catalogues call one head a divinity and another a Roman lady. The opinions advanced by competent writers, with their reasons for holding them, are, of course, to be carefully considered, and their value weighed; but the mere nomenclature of the custodians, accepted at once by the literary world, is not to be considered as of any value whatever. The "Venus of Milo" may be an Aphrodite or a Victory or another personage, and there are arguments enough already in print for each of several attributions. The fact that she is generally called the "Venus of Milo" is neither here nor there in the discussion.

The final results will probably be that students of religious beliefs and of divine personality will resort rather to the vase paintings, leaving all but a few of the great monuments of sculpture to the purely artistic study to which they lend themselves without opportunity of error. In the meantime, every such book as this addressed to an English reading audience is to be welcomed as introducing to a community which knows too little of the subject, the thorough, exhaustive, and fruitful, although frequently fantastic, studies of the Continental scholars.

DIE BAUKUNST FRANKREICHS (The Architecture of France), von Cornelius Gurlitt. Dresden: J. Bleyl. 1896. MOTIVE DER MITTELALTERLICHEN BAUKUNST IN DEUTSCHLAND (Motives of Mediaeval Architecture in Germany), von Hugo Hartung.

The two works named above, of each of which one part has come to hand, are the latest additions to the growing library of truly modern architectural books. These are they which have photographic processes of one kind or another for their very life, and without which they would never have had existence. These are they which Germany, especially, excels in, and seems almost to have introduced. These are the books which are *biblia abiblia*, or books not books, in a sense very different from that in which the words were used by Charles Lamb. For how can you call that a

book which consists of 300 large plates and only a dozen or two dozen pages of text, the text itself stuffed so full of plans and details and diagrams that there is little room for letterpress? These are the publications which are making the enthusiastic buyer of architectural photographs hesitate, and ask himself whether he does not get what he requires in better form and at less expense by buying these extensive series.

All persons who consult modern books on the fine arts are acquainted with the superb work in heliogravure and similar modern styles of photographic engraving which is done in Paris. It is so far unmatched, this French work of the best sort. Still it is Germany in which the largest use has been made of these modern labor-saving and most accurate processes, in the direction in which we are looking to-day. There have been works in folio illustrated by photographic processes in full page plates, so numerous during the last ten years, that we will not give the list here, but try to make one, more or less complete, at an early date; and these have been issued by two or three German publishers, the attention of the compilers having been given to somewhat unusual subjects. Thus, Spain and Portugal, the German Renaissance, and what is very unfamiliar to the Continental student, English architecture, have been the subjects of important books of this class. In the meantime, the architecture of that country of Europe where architecture is the most rich and the most varied, has been generally neglected, and it is only now that a book begins to appear which has for its object the buildings of France. Moreover, German architecture itself has been treated only in certain specified ways along certain lines laid down in advance.

There is one important reason why a relative superiority is to be claimed for the large plates which make up such works as these; a superiority over the ordinary photographs of the dealers, and that is the great probability that the subjects selected and the points of view chosen will be determined by purely artistic or scholarly reasons. No one having photographs made to his own order, or trying to get together many photographs illustrating a given subject, or a given territory, can have failed to note the extremely unintelligent way in which the great majority of photographers do their work. It is, of course, to be stated at once, and always borne in mind, that the photographer who is making pictures, one by one, for sale to he knows not whom, is badly handicapped by the necessity of finding his market, and that it is almost inconceivable that he should have a clear mind as to what his purpose is. Such a photog-

rapher will be thinking always of the general public and hoping that this or that picture, although, as he believes, fit to please the student of architecture, will also appeal to the larger public of tourists. He works under a disadvantage, therefore. Those makers of photographs who think of the traveling public only, and whose notion of rendering a great cathedral in a photograph consists in giving it from three of the best known points of view, have, indeed, no afterthought. The west front of Notre Dame, the apse of Notre Dame taken from across the river, and the whole cathedral as it shows above the houses when taken from the top of the Pantheon or from the Tour St. Jacques, these are subjects that appeal to the general public, and which, there can be no doubt, will sell. But when the would-be artistic photographer tries to please more studious buyers, he is naturally at a loss what points of view to consult and what details to offer. Only those patriotic Provincials who live close under the shadow of a great building, and who make that building their specialty; or, who, living in a town where there are several important buildings, like to make a collection, as it were, of their native place, are to be trusted at all in such cases. Thus, Ricci, at Ravenna, has taken, one might say, everything in the little town, and thus, Trompette, at Rheims, took advantage of the scaffolding which some repairs to the Cathedral made necessary, and traveled over the church with his camera, taking these details at the rate of several hundred in one season. There are thus exceptions to the rule, but the rule remains, and every student of architecture who has tried to procure photographs at those European towns which are the richest in architectural monuments, knows how slow and difficult it is to gather from the booksellers and stationery dealers of the place even a dozen poor, faded, and unintelligently-made photographs of what he most desires. For France, indeed, the great collection of the Commission des Monuments Historiques makes amends, and the existence of such an establishment as Giraudon's, in Paris, helps to a great extent to bring together what photographs are to be had of French monuments. It is hard to supply one's self adequately in France, but it is partly feasible. One does not get all that he wishes, but he gets much. With Germany, however, things are different, and it has been, and probably still is, almost impossible to procure more than a few photographs of the monuments of any piece of architecture seen. It is probable that these few, in any given case, are trivial; that they are pictures taken on a very small scale, and from a considerable distance, and intended merely to sell to the Rhine tourists, or the

visitors to Saxon-Switzerland. The student in Germany will remember the cases where, in out-of-the-way towns, he has found two or three photographs of monuments of that town, or, perhaps, of its near neighbor, taken by some photographer long since dead, or at the command of a local society of archaeologists long since dissolved, while no later pictures are to be had, and none whatever of buildings that are to him equally important. Every such student has had to decide between employing some local operator, or taking his own photographs, or going without, and if he has wished to employ the local photographer, he has probably found it extremely difficult to get the workman in question to leave his workshop for a day, or for two or three afternoons, and to undertake any such task as that of making a dozen negatives. Germany always seems to be that country of all the nations of the continent where satisfactory pictures of the national architecture are the hardest to come by.

These, then, are the reasons why we should welcome especially the two works whose titles stand at the head of this review. Mr. Gurlitt's selection of French buildings; the points of view which he selects, and the details which he considers important, are to be preferred, other things being equal, to the selections of the local photographers, and as to the vast collection of the government commission above named, all that can be said is that these pictures are in addition to what that collection affords, and are also to be welcomed. Almost the first photograph that offers itself as one opens the portfolio is the upper part of the south tower of Tours Cathedral, one of the most beautiful Renaissance towers of a charming Gothic Cathedral, which towers are unique in Europe and yet are little known. An admirable view of the interior of St. Julien at Tours, differs in the parts selected for the picture from other photographs which have long been familiar. A very remarkable interior view of the extraordinary fortified Cathedral at Albi, and one of the interior of St. Pierre, at Angouleme, should be extremely welcome to the student, and a most successful photograph of the Roman gateway at Besancon, called the Porte Noire, will be to many the most attractive picture in Part I. For those who are studying the later revived classic, that of the eighteenth century, there is to be recommended the view of the Hotel de Ville, at Dijon. There is here only the first part, containing twenty-five photographs and no text at all; and the photographs are probably chosen so as to give the possible purchaser a fair idea of what the whole work will contain. It will be seen that

it ranges over all epochs, from the second century to the eighteenth century.

For reasons above given we consider Hartung's Germany more of an acquisition than the book we have been describing. It is unspeakable, the number of big books that one would have to turn over to find engraved plates or even inadequate wood-cuts of one-half of the monuments given here; while these are excellent photographs of the "Lichtdruck" variety. This first part contains what may be considered a monograph on Magdeburg Cathedral; seven plates devoted to the more out of the way, the less familiar parts of that most interesting structure, which would like to be Gothic if it had only been able to find a way of being Gothic without being French. This, in the thirteenth century, it was practically impossible to bring about, and a wealth of naive clumsiness was the result; so that those who like Gothic architecture pure and simple, concentrated and in full vigor, will get more comfort out of the extremely interesting view of the upper gallery which runs around the choir and is one of the most fascinating pieces of transition vaulting in Europe, or from the surprising and original chapel of the Baptistery than from the main nave or choir. Buildings far less familiar than Magdeburg Cathedral, which all books tell about, are given here, and given with some fullness. It is, indeed, especially to be remarked, the willingness of our compiler to go far afield and select seldom-visited buildings in small towns which the guide-books scarcely recognize. Koenigsutter, near Brunswick, in what is now, thanks to conquest, a province of Prussia, is a diminutive place, which few travelers hear of, and the splendid monastery-church which is nearly all that remains of the ancient Benedictine Abbey, is one of the most fascinating pieces of developed and perfected German Ro-

manesque in existence. It has been elaborately restored within, and the interior has been painted with some remarkably appropriate details, but the parts not so renovated will engage the student's interest the most, and to such students is to be recommended especially Plate XLI., with the irresistible cloister of two rows of vaulting and a middle range of columns. The flank of the Cathedral of Halberstadt is extremely valuable, offering as it does a complete flying-buttress system of perfectly understood and completely organized type, but obviously very early. The apse of the Conventual Church at Goslar, shown within and without in Plates XLV. and XLVI., is as complete a piece of the earliest Romanesque design as one will find this side of Syria. It is, indeed, curious to see how closely the exterior resembles the exteriors of some of those wonderful apses of the Hauran, which the Conte de Vogue has made familiar to the students of Europe. Some plates are given up to details, doorways and piers with carved capitals. Indeed, we are reminded by this that the title of the work is not German building or German architecture, but the motives of German architecture, and that that is a very different thing.

At a later time, when there are more plates within reach, and a part, at least, of the text, it will be a pleasure to speak of these two works more in detail.

NOTE.

Mr. B. T. Batsford, the well-known London publisher of architectural works, is about to issue a book by Messrs. John Belcher and M. E. Macartney on Later Renaissance Architecture in England—a work that will be a sequel to Mr. Gotch's volumes.

Russell Sturgis.



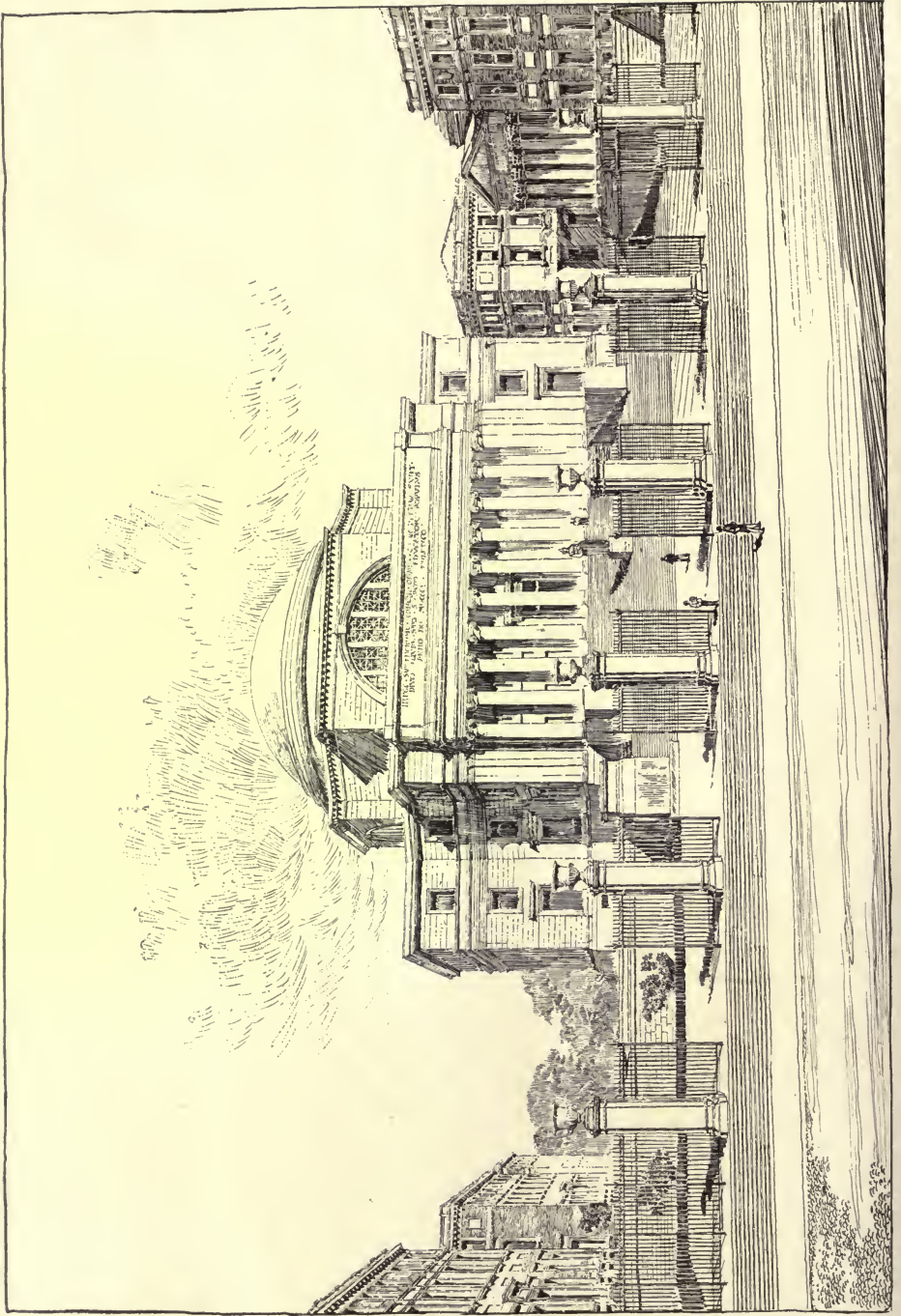


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