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OPTICAL REFINEMENTS IN MEDIÆVAL ARCHITECTURE.*

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I.

ADMIRATION of the mediæval cathedrals is so much a matter of course nowadays that all persons inside the pale of European civilization are expected to feel it and to give expression to it, consequently they all do it. How far this admiration is a matter of fashion and how far it is really felt is, however, an open question. Historic associations and the romance connected with them will carry people a long way in Westminster or at Canterbury. The mediæval cathedrals are, generally, larger buildings than their modern copies, and in so far are calculated to excite admiration by this fact of their dimension, which is, of all elements in building, the most obvious and the most easily understood. It is, however, extremely doubtful whether the finest qualities of the mediæval cathedrals are those which generally excite the warmest admiration. Otherwise it would be extremely difficult to

understand why the deficiency of these qualities is so complacently tolerated in modern buildings at once by architects and by the general public.

When Viollet le Duc said "Our streets are deserts for thought; they have all the monotony of the desert without its compensating loneliness," he was thinking of the coldness of their strict symmetry, the monotony of their mathematical regularity and of their mechanically repeated and mechanically executed details.

Our modern architectural crime, which cries aloud to heaven for reprobation, is deficiency of the picturesque. An old barn or an old farm house are a thousand times more interesting than the New York Post Office and a thousand times more interesting than a good many other buildings which it is not quite so fashionable to sneer at. This deficiency of the picturesque is largely an inevitable result of our social conditions, but that is no reason

*The photographs used in illustration were taken by Mr. John W. McKecknie, under direction of Professor Goodyear, for the Brooklyn Institute, expressly to illustrate the subject and are its property. The plans, sections and drawings have been prepared by Mr. John W. McKecknie, under Professor Goodyear's direction, from surveys supported by the Brooklyn Institute.

why it should not be recognized and deplored.

In an old cathedral every capital, every gargoyle, every finial, every window, every statue, was an independent creative effort of the individual artisan. The designs were not passed over to the workman from an architect's office. The workman himself created the design.

Hence the infinite variety of mediæval detail which is one grand source of the picturesque character of mediæval building. Variety was an inevitable result when every workman did his own designing in detail, from the mere fact that many different workmen were employed; and the individual workman varied his own detail from one form to the next corresponding one for the same reason that he was himself the inventor of it.

Hence creations like the façades of San Martino, at Lucca, or of San Pietro, at Toscanella, to name two examples out of hundreds, are practically impossible things in modern art. Our façades are designed by an architect, not only as a whole, but also as regards their individual parts. Even where the effort occasionally appears in modern work, to manufacture artificial irregularity in the original design, this manufactured irregularity will never have the spontaneous and unpremeditated variety of the old creation. Generally speaking, even the effort is wanting. Given the effort, we still have to meet the difficulty that the stone-cutter, who works after the pattern which has been manufactured for him and not by him, will never give his cutting the sparkle, the force and the originality which distinguish the handiwork of the artist artisan of the Middle Ages. We have an analogous case in the contrast between the inferiority of our modern marble statues, which are rarely cut by the sculptor himself, and those more vital ones of older art, on which the sculptor himself did the cutting.

It appears, when these facts are examined, that the admitted inferiorities of modern architecture are largely inevitable results of changed social conditions, and that preaching and

criticism are ineffective weapons against them. To change our whole social fabric and to abolish the division of labor, which has separated the architect from the master-mason, which has separated the designing clerk in a pent-up office from the stone-cutter on his scaffold—this is the impossible task which the critic must set himself, who wishes to revive the virtues of mediæval building. It is a fact of deep significance that William Morris is a Socialist, that the works of Ruskin are brimful of economic theories. Let these theories be good or bad, wise or foolish, the fact will stand that every true artist of our day is also at heart a social reformer, and it may be that he knows it best who says the least about it.

But there are other differences between a mediæval cathedral and a modern church, besides the differences in the matter of picturesque details. How rarely do we find any exact symmetry in those apparently corresponding parts which belong to the design of the mediæval church as a whole. How frequently do we find variety in the design of two corresponding spires and other irregularities of arrangement. Uniformity, even in the main features of an old cathedral, is rather an exception than a rule.

It is the habit to explain such irregularities as the result of construction at different periods. But this habit of explanation really begs the question as to how they have arisen. A cathedral was frequently two or three centuries in building, it is true, but it is absurd to say that the façade of Dinan or the choir of Mainz (before the recent restoration) showed Gothic pointed work on top of Romanesque simply for this reason. If the sentiment asking for uniformity had existed, could not the later architects have finished the building in the style prevailing when the building was begun? Admitting that one spire of the façade at Tours is later than the other, as it naturally might be, is that any reason why the second spire should not correspond to the first, if the desire had existed to make it correspond?

The fact is simply this, that the

habits of successive architects corresponded to the habit of any one given architect, and that any given architect of the Middle Age habitually introduced any variation into his design which was suggested either by his fancy or by changes of plan made for some definite cause. If, for instance, he had finished one spire and had a chance to improve the design of its fellow, either because more money and more work on it were available, or because he discovered a defect which might be avoided, or an improvement which might be added, there was nothing in the ethics of his profession or in the prejudices of his time which would antagonize such changes.

To understand an old cathedral we must begin with the union in one person of the artist and the artisan. The picturesque variety springing from the creative capacity of the individual mason and the individual stone-cutter ran all through the building. The architect himself was simply a master-mason, *i. e.*, he was himself a mason by profession. He was not isolated in an office, he was at once architect and builder. It is well known that the first man in Europe who ever proposed to separate the profession of architect and builder was the Florentine Leon Battista Alberti (fifteenth century). The first man in England who ever compelled his wood workers and stone workers to copy *his* designs, for detail, and to give up making their own, was Inigo Jones (seventeenth century).

As long as the architect was the master-mason he was not bound by his own plan. He carried his plan in his head, and on the scaffolds of his building he changed it at will and freely, as he went along.

Therefore, in its whole plan, and also in its details, an old cathedral differs from a modern church as hand-made lace differs from machine work, as a Hindoo rug differs from one made in Yonkers, as a camel's hair shawl differs from a Paisley.

II.

Up to date the element of picturesque irregularity in mediæval ar-

chitecture has been most potently emphasized and most eloquently described by Mr. Ruskin, especially under the heading of the *Lamp of Life* in the *Seven Lamps of Architecture*.

He has attributed it to a conscious purpose in some definite cases, which he has specifically described, while freely admitting that there is no hard and fast line to be drawn in the examples he has cited between artistic and praiseworthy work, which achieves the element of "life," or of the picturesque, simply because it has not set up a mistaken standard of mathematical regularity—and that work which was consciously and definitely planned to avoid the coldness of strict symmetry.

There is, therefore, an element of irregularity often found in mediæval building which corresponds very closely to the style of decorative design in modern Japanese art—as regards the philosophy of the irregular quality. Clearly the artistic spirit of the Japanese decorative art consciously scorns the trammels of mathematical symmetry, but it would be difficult to say, in a multitude of cases, whether the decorative design is purposely irregular or whether it is so simply because the more difficult and yet inadvisable methods of applying mathematical measurements to decoration are not practiced in Japan.

It is rather difficult for the average taste of modern European and United States civilization to realize the interpenetration of the conscious and the unconscious factors in a really picturesque style, because this modern taste is an extremely vitiated one; judged from the standpoint of the expert in Oriental ornament or in historic design; as regards its preference for mathematical regularity in ornament or its easy toleration of the cold and formal results of such regularity. Many of our most elaborate and pretentious imitations of historic style are ridiculous caricatures of the historic monuments, when the deficiency of the vital element which makes the historic monument interesting, is considered. This vital element has a twofold character—bold contemp

for strict symmetry as regards the whole organism of the building, combined with the inevitable and natural results of leaving individual details to the individual artisan. These last results, of course, can only be imagined as existing in social conditions which made of the artisan an artist having a creative capacity which to-day he has wholly lost.

The century in which division of labor has lowered the capacity of the artisan class, in which machine-made work has accustomed the eye to in-artistic uniformity of ornamental detail, in which the specializing of professions and occupations has made it difficult for the educated public as a mass to be thoroughly familiar with even the most elementary canons of artistic taste, in which the habit of slavishly copying old historic styles has crippled original design in architecture, is not very well prepared to appreciate the vitality of mediæval architecture at its full value.

It is, moreover, a point of supreme importance as regards the inherent prejudices and deficiencies, both of uninstructed and also of presumably cultivated modern taste that our architectural traditions, as a matter of strict historic continuity, are those of the late Renaissance in which this vital element and the picturesque quality were wholly lacking. None of the various reactions against these traditions of the cold and formal late Renaissance date back of the last quarter of the eighteenth century. All of these reactions have been artificial revivals of older historic styles; consequently also of a necessarily formal character. How utterly, the modern Greek temple copies, for example, have been wanting in all the most interesting traits of the historic originals has been laid bare by the discoveries of Pennethorne and Penrose, whose first publication is as recent as 1851.

I cannot, therefore, feel it advisable to announce my own discoveries regarding the architecture of the Middle Age without this preliminary effort to clear the way for such announcements. The appreciation of the importance of the observations which I

am about to publish will come from persons of artistic temperament already appreciative of the picturesque quality in mediæval building, and especially from those already pre-disposed to credit the artist of *any period* with knowing fairly well *what* he is doing and *how* he is doing it.

That the artist, in any field of art, pays very much attention to the *why* of his doing I consider rather doubtful, and in so far as my readers prefer my facts to my explanations of them or to the assumption that these explanations represent any definite theories of the builders themselves I shall be well pleased. I believe that every artist works largely from intuition, from feeling, and *from experience*. But if it be assumed that I have attempted to read into some works of the Middle Ages a subtlety and a knowledge of which their builders were naturally incapable, this is an assumption which I should indignantly resent, not on my own account but on theirs.

It is an untenable attitude which exalts or concedes the beauties of the façades at Toscanella as equal to any work in Italy, and which then attempts to explain the ground plans, which I shall publish, as being oblique because the architects did not know a rectangle when they saw it, and as having curves because they did not know how to make a straight line. To say that the interior arches of these churches are of irregular size (in dimensions, which make oversight of the fact impossible,) because the designers were barbarians or careless workmen is to say that the façades are beautiful for the same reason, which is absurd.

All I demand is that the unfamiliar but beautiful buildings which I have examined, such as the Cathedral of Troja, shall be considered as wholes and as works of inspiration throughout, and that the new facts which I shall present for buildings already familiar and already admired shall be understood as having *always* contributed to the beauties *which have been already conceded to exist*. If certain facts about them have been

hitherto overlooked, let us not make the mistake of separating these facts from the effects to which they are the main contributors, of despising or neglecting the study of unknown phenomena *because they are unknown*. A ground plan is not in itself a thing of beauty, sections of churches are not in themselves interesting, measurements are not easy reading, photographic details are not the buildings themselves, but if the results which they represent are an inspiration of picturesque beauty in the given buildings, let us admit that the subject is worth looking into.

III.

I do not lay claim to any originality of presentation or any discovery of facts as to the points so far discussed regarding mediæval irregularities of construction. They have been abundantly and eloquently presented by Mr. Ruskin, especially in his *Seven Lamps*, and especially in the *Lamp of Life*. They are ideas which are certainly felt by every true artist in some way or other, and which may be half-heartedly professed by other men, whose every stroke of work gives the lie to such profession.

As distinct from the mediæval irregularities so far considered there are other phenomena of construction which have so far escaped the attention of science and of the History of Art; phenomena which constantly escape our notice when we are in the buildings; phenomena which were meant not to be seen or noticed, or not to be obtrusive.

There are still other phenomena which have been seen and misinterpreted, which have been attributed to accident when there was no accident, which have been attributed to careless designing when the purpose was subtle, or which have been considered as local mysteries when they have analogies all over Europe.

These phenomena are by no means universal. For the amount of diffusion, for the localities in which they appear most frequently, for the buildings in which they exist or do not exist, I am at present only able to

speak definitely, as regards one country in Europe. As far as six months' time would allow me I have made a complete survey and examination of all the mediæval buildings in Italy. This country is, however, undoubtedly the one from which the given phenomena have spread, as far as Northern Europe is concerned, and therefore the one in which a systematic study of them should be first attempted. They are largely or prominently of Byzantine origin.

Among these phenomena I will specify the following:

(a) The construction of the piers and vaulting of many mediæval churches in a delicate curve, sometimes leaning into the nave, sometimes bending back from the nave, and in either case making a delicate transition return curve to the arch of the vaulting (Fig. 1). There are no publications extant known to me which specify this feature in mediæval buildings. It easily escapes the eye, even when the observer is familiar with the fact and prepared to recognize it. The minimum amount of this deflection is about three inches, which means very delicate masonry adjustment. When noticed by modern architects it has, as far as I am aware, been referred by them to thrust of the aisle vault against the side of the piers supporting the nave vault or arch. I have naturally prepared myself with the evidence on this head before announcing this feature as a refinement in construction, and will mention here as one instance the case of the Cathedral of Vicenza, where there are no side aisles and where the curving piers face solid chapel walls over 20 feet deep. The curving pier is frequently met in North European cathedrals.

(b) A refinement analogous to the last and probably the original and earlier form of it. *It is nothing more or less than the survival of the classic entasis* in the Middle Ages, and is found in the engaged half-columns which occasionally face the Romanesque pier. There are good cases in the Cathedral of Fiesole, and in San Miniato, at Florence. The announcement of the classic entasis as existing



FIG. 1.—PISA CATHEDRAL NAVE.

From a photograph of the Brooklyn Institute Survey. Showing the delicate forward bend of a pier at the Transept. A plumb-line suspended from the gallery shows a deflection of $3\frac{1}{4}$ inches from the true perpendicular. See text for question of thrust.



FIG. 2.—SANTA MARIA DELLA PIEVE AT AREZZO.

From a photograph of the Brooklyn Institute Survey. Showing an outward lean or spread of the piers in a delicate curve.

in the Middle Ages has been received with surprise and incredulity by certain gentlemen supposed to be experts, to whom I had made the fact known before collecting the evidence now in hand. I shall therefore assume the fact not to be generally known. I will simply add that I was taken last summer to see a case of the mediæval entasis in San Giacomo, at Florence, by Prof. Giglioli, Director of the Natural History Museum of that city. Probably, therefore, I have not imagined it. (See Fig. 11.)

(c) A refinement possibly or proba-

bly derived from (a) and frequently connected with it; a leaning outward and away from the nave of the nave piers, in phases grading from an exaggeration of the backward bend and continuing the curve, to others in which the leaning backward or spread of the piers is in a straight line and not in a curve. This feature has been erroneously ascribed to thrust of the arch or vaulting by architects to whom I have mentioned it. There is a good case at Trani of this lean against the lines of transept walls thirty or forty feet deep. There are other cases of this lean



FIG. 3.—FAÇADE OF THE CATHEDRAL OF FERRARA.
Photographed by the Brooklyn Institute Survey to show the lean.

against solid ancient chapel walls, to which the pier is a facing, in San Eustorgio and in San Ambrogio, at Milan, and in San Francesco, at Pavia. It also occurs in St Mark's, at Venice, and at Santa Maria della Pieve, at Arezzo (Fig. 2), under conditions which make a theory of thrust impossible. In the latter church the outward leans amount to about fourteen inches deflection in a given pier, making a spread of over two feet in the upper nave at the springing of the arch. They are recognized as facts of construction by the local experts, who are not, however, aware of the existence of this spread elsewhere. They are known at Arezzo simply as a local mystery without analogies. There are other cases where thrust cannot be even suggested (by one who has examined the masonry), and I do not know of any case where thrust can be proven or indicated except in the unfinished part of the Siena Cathedral where an original curve has been exaggerated by a thrust, due to non-completion of the building. Cases can be shown in St. Mark's, at Venice, where the leans in the exterior vestibule and within the church are in opposing directions in one and the same wall, showing thrust to be impossible.

(d) A system of bends in vertical lines in the exteriors of façades and choirs, differing from some of the interior pier bends in the fact that the lower part of the bend is *always* a forward lean toward the eye facing the wall, and never, as often in the case of the interior piers, a backward lean beginning at the base (as regards the eye of a spectator in the nave facing the pier). The maximum cases of the forward lean are about fifteen inches. There is a fine instance in the Pisa Cathedral façade erroneously ascribed by Ruskin in the *Seven Lamps* to settlement. A number of corroborative cases have been carefully examined for indications of accident (Fig. 3.)

The considerations regarding a settlement of the Pisa façade will be gone into at length. I first announced this lean to be a fact of construction in 1874. The measurements in detail

of 1895, taken up to and above the first cornice, are conclusive as to masonry construction. These measurements compel the assumption of a double settlement, if any took place, one sideways and one forwards, and

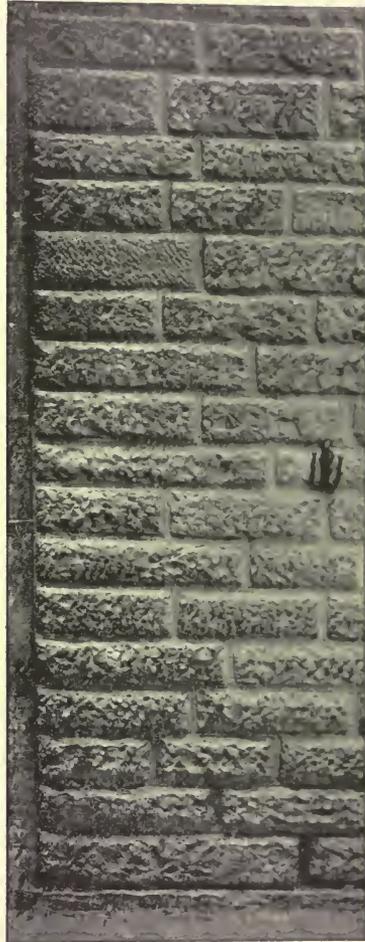


FIG. 4.—MASONRY OF THE BARGELLO TOWER, FLORENCE.

Showing a constructed lean. Photographed by the Brooklyn Institute Survey.

when the theory of a double settlement is applied to the façade cornice the levels taken by Mr. McKecknie show that the façade must have settled laterally *in opposite directions at one and the same time*. The difficulties of the sceptic who asserts settlement for the

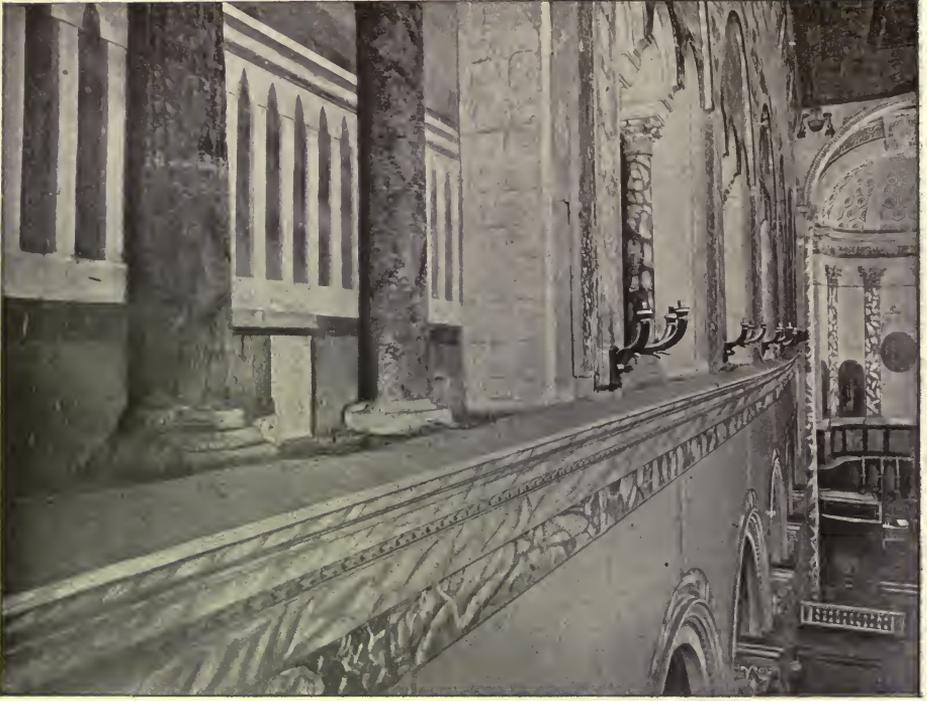


FIG. 5.—THE CURVE AT TRANI.

It extends down to the supporting columns and their bases, showing thrust to be impossible. Photographed by the Brooklyn Institute Survey.

Pisa façade are destined in the future to be somewhat amusing.

The survey of the south wall, near the angle of the façade, compels one theory of settlement for the stripes of the masonry, another theory for the pilaster capitals, another theory for the arcades, another theory for the cornice and another theory for the masonry above the cornice. What has misled Mr. Ruskin and many another investigator is a deceptive bend in the masonry stripes for which many analogous cases can be cited in Byzantine construction.

(e) Occasional cases of leans in circular buildings or towers which are not due to accident, and tending to raise a question as to others in which the evidence for accident is not clear, but simply presumptive, and based on the supposed improbability that any building made by common-sense mortals should be unlike those made by

nineteenth century common-sense mortals. Positive cases of lean by construction are the Baptistery of Pisa, the Bargello Tower at Florence (Fig. 4), and the Torre del Publico of Ravenna. (The intention in the case of the Leaning Towers at Bologna is, up to date, the only case conceded.) Two cases of leaning towers in Pisa exhibit curves toward the perpendicular which are analogous to the curves of the leaning façades.

(f) Curves in plan of horizontal cornice lines. Many correspond in delicacy to those known for antiquity (see ARCHITECTURAL RECORD for April, 1895), and I am positive that they are a classic survival. A very fine case, where thrust is wholly out of question, is the cloister of the Celestines at Bologna. It is the exact counterpart of the court at Medinet Habou as regards use and place of the curve (see ARCHITECTURAL RECORD,



FIG. 6.—ARCHES OF THE FIESOLE CATHEDRAL.

Photographed by the Brooklyn Institute Survey. The maximum diminution in spacing toward the choir is about eight feet.

April, 1895). Many other cloisters to be quoted.

(g) Curves in plan in the alignment of columns and in clerestory walls (see Fig. 5) will be specified in detail. Good cases at Fiesole, Genoa, Trani, Ravenna (San Apollinare Nuovo), etc. These curves degenerate in the later Middle Ages into bends which may easily be ascribed to careless building, when considered as isolated cases. Such bends are more probably careless constructions of the earlier and more regular curves.

(h) Curves in elevation. There can be no suggestion of thrust for curves in elevation. There can be no suggestion of carelessness for an exact and regular curve in elevation. There can be no suggestion of accident for curves which are invariably curves convex to the sky line. If accidental, why are not some curves concave to the sky line? The announcement that

many wholly regular curves, both in plan and in elevation, corresponding in delicacy to those of Greek art, are found in Italy will excite scepticism and derision. I am prepared to meet both, and to furnish the evidence. A good case for a curve in elevation is the alignment of the plinths supporting the columns in the north aisle of the Pisa Cathedral. The chances of accident in this arrangement are 3,628,800 to one against accident.

(i) A refinement which consists in increasing the size of the arches near the main entrance of the church and diminishing either space, or height, or both, in the direction toward the choir, thereby giving to the building an effect of greater dimension. The eye is disposed to take a large bay near at hand as the standard of size for all the others. Over thirty different churches in Italy can be specified for

this phenomenon. There is a good case in the Cathedral of Fiesole (Fig. 6). Aside from announcements which I have previously made, there is so far no publication of the fact that these perspective illusions were common in mediæval Europe. It was suggested by a New York architect many years ago to whose attention I had brought certain cases of this peculiarity in *Northern Europe* that the narrowing of arches toward the choir was designed to strengthen the church under the dome or against the arches of the transept. I shall, therefore, take pleasure in publishing a list of Basilicas having this peculiarity which have no transept, and

(k) A refinement which consists in a pavement sloping upward toward the choir, nearly always with arches and capitals brought down to the horizontal level, and sometimes with capitals and arches brought below the horizontal level. The effect in either case is one of perspective illusion. I can specify eighty-five cases of this phenomenon for Italian churches. The slope varies from three or four inches to over three feet. The church of Santa Maria Ara Coeli at Rome, the Capella Palatina at Palermo, the Cathedrals of Siena and Orvieto are among this list. This phenomenon has been overlooked by all publications up to date, as far as known to

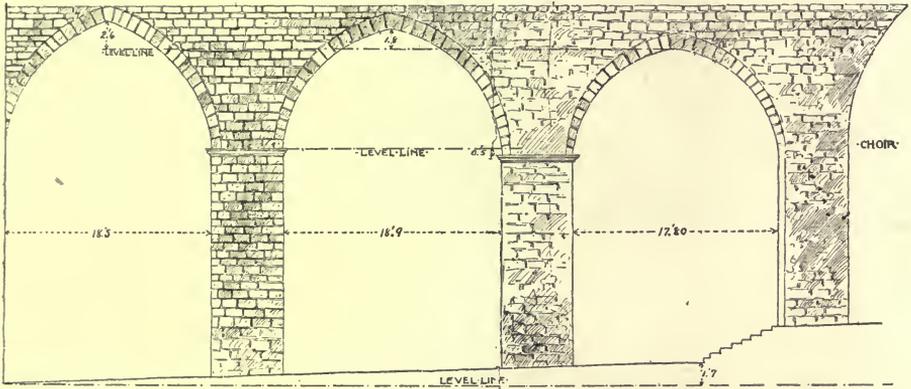


FIG. 7.—SAN PIETRO AT ASSISI.

Section showing a drop in arches of 2.60 (feet and decimals) and pavement rising 1.70. Survey and drawing by John W. McKecknie for Brooklyn Institute Survey.

another list of churches in which the span narrows in the choir *away* from the dome or the transept arch.

(j.) A refinement analogous to the last but applied to the second of the two transverse arches which span the nave of a church at the junction with the transept. By dropping this second arch below the level of the first a considerable increase of perspective is obtained. There are good cases of this scheme in the Cathedrals of Siena (drop of five feet), Piacenza (drop of four feet), and Pisa (drop of three feet), and in Santa Maria Novella at Florence (drop of two feet). There are no extant publications of these facts.

I can specify many interesting cases of oversight on the part of persons known to me of this peculiarity. There is no reason why it should not be noticed by tourists for pleasure as easily as by experts, but it seems to have escaped the notice of both classes. This fact is quoted for the Egyptian temples, and in them is supposed by Egyptologists to have the purpose of perspective illusion. The evidence to be submitted tends to show early Christian and Byzantine origin, as usual in all these refinements. The sloping pavement can be dated to the fifth century in San Sabina, at Rome.

(l) A refinement which consists in

converging the walls of the church or the piers and walls of the nave in the direction of the choir. (Fig. 8.) Five cases are known to me in Italy. None have been previously noted by publication for Italy, but one case is already known by publication for Northern Europe. It is the Cathedral at Poitiers mentioned by Fergusson. The maximum case of convergence is in San Stefano at Venice, whose walls narrow in toward the choir twenty-three feet in a length of one hundred and thirty-three feet.

(*m*) A refinement which consists in building the church with an oblique or twisted plan, so regulated as to mystify the eye as to the proportions of the building and without revealing itself as an obtrusive fact. Of all the phenomena quoted the one of a deflected choir is the only one so far known to science. There is no evidence in Northern Europe to support the view that a deflected choir represents the bending of the head of Christ on the Cross. On this point of lack of evidence see *Notes and Queries*. The idea that a deflected choir represents the bending of the head of Christ on the Cross may be a fancy of modern sentiment, or it may be a tradition springing from the explanation of some mediæval builder who found it inconvenient to give his true reason. The evidence which I have collected in Italy antagonizes this explanation, because there is no trace of this tradition in Italy, because the phenomenon appears in many churches which have no transept and which consequently do not represent the Cross (see Fig. 9), because there are cases in which there is no bend or deflection of the plan, but only an obliquity of the whole plan, and other cases where there is obliquity and where one side of the church is longer than the other, but no bending of the choir, and because these cases merge into others which simply show the curve in plan of columns or clerestory walls (one or both), which is the earliest dated phase (sixth century at Ravenna). In other words, the deflected choir of Northern Europe is only one phase of

a wider fact, which no doubt also has many Northern illustrations (some of which are already known to me). I have collected thirty-six cases of these curious plans in Italy, and many of them have been carefully surveyed. Good instances are found at Arezzo, Bari, Toscanella, Viterbo, Cremona, etc. Nearly all are oblique from the façade as distinct from churches with a deflected choir.

(*n*) There are many phenomena which are most easily classed under the general heading of symmetrophobia, or dislike of mathematical symmetry. This designation has the advantage of avoiding optical theories or optical explanations, and may be applied to many facts already cited under foregoing heads if other explanations offered, or to be offered, should not satisfy the reader. This designation may be applied, for instance, to the oblique or twisted ground plans by any one wishing to preserve an agnostic attitude as to explanations of curious facts. Mr. Ruskin's conception of "life" in mediæval building is preferable to the conception carried by the term "symmetrophobia," which implies a negative attitude on the part of the mediæval builder, whereas all the motives which tended to give variety to a building by discarding symmetry tend also to this effect of "life." Some cases, like the bent column at Arezzo (Fig. 10), seem to be pure symmetrophobia. As I have a long list of phenomena for later description, which have not been cited by Mr. Ruskin, and which do not come under any of the classes so far mentioned, we will use the word "symmetrophobia" provisionally to designate them. This word, by the way, is not one of my own coinage, as has been supposed by some. It has long been applied to the irregular features of Egyptian temples (for example, at Philæ), and originated in Egyptology or with persons interested in it.

IV.

The foregoing schedule, in spite of its length, is wholly tentative and preliminary. It is a condensed statement needing much elaboration and

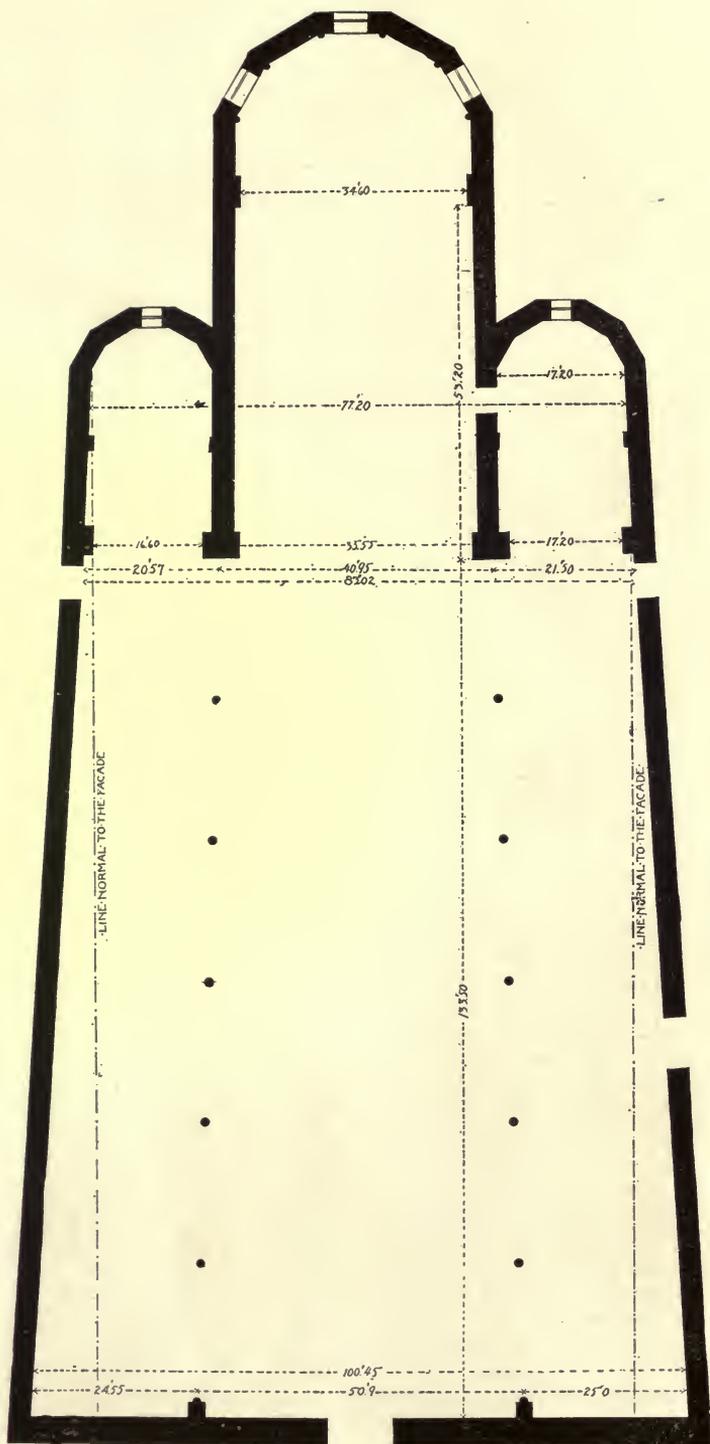


FIG. 8.—GROUND-PLAN OF SAN STEFANO AT VENICE.

The walls narrow in 23 feet in 133 feet. The nave narrows in 16 feet. Survey and plan by John W. McKecknie for Brooklyn Institute Survey.

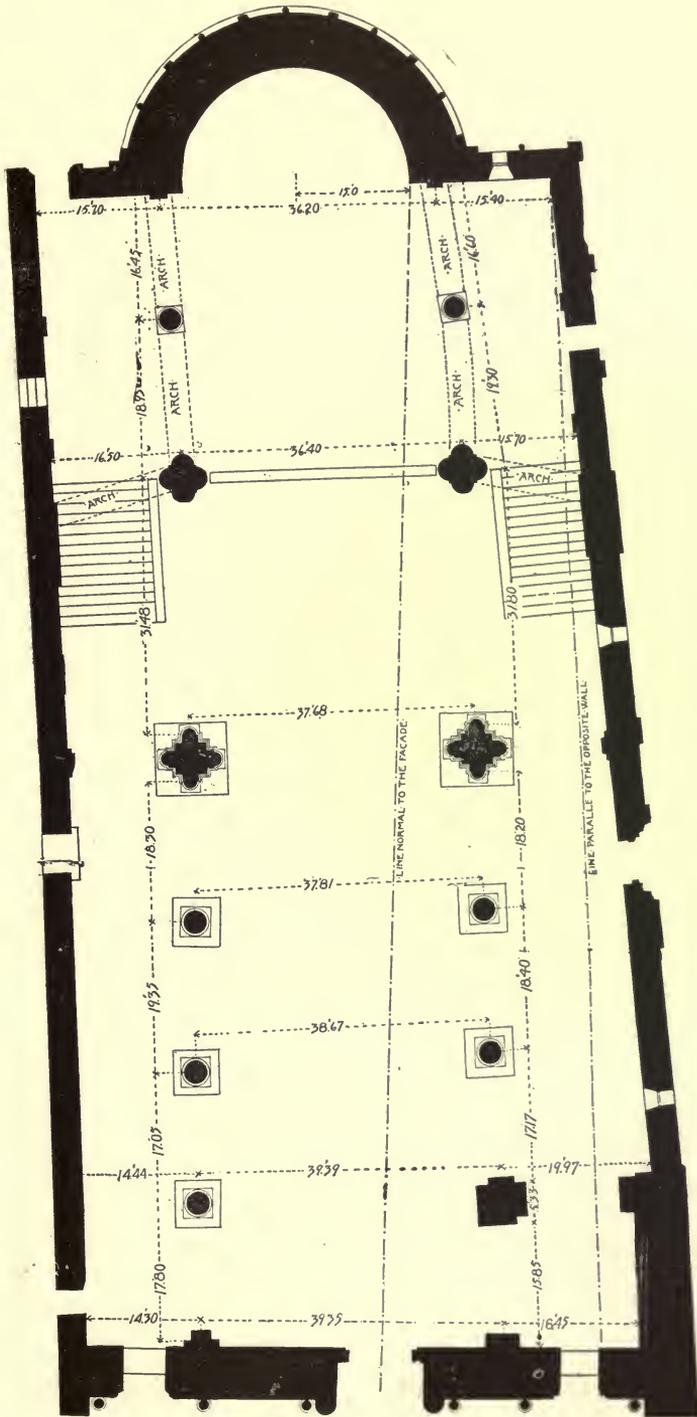


FIG. 9.—GROUND-PLAN OF SANTA MARIA DELLA PIEVE AT ARFZZO.

Survey and plan by John W. McKecknie for Brooklyn Institute Survey. The church is deflected 15 feet from the normal line.

development, and is a mere hint of the actual facts, which have to be specified for about one hundred and thirty-three churches, many of which need careful description and all of which need very abundant explanations in rebuttal of suggestions of accident, carelessness, indifference and the like.

This schedule is, however, sufficiently definite and explicit to permit of my announcing the general main fact of what I conceive to be an epoch-making discovery in the study of mediæval architecture. As distinct from views hitherto held by the most enthusiastic students of the Middle Ages, I shall be able to prove that, apart from the beautiful variations of detail due to artisan skill, and apart from the picturesque effects of general organism due to a noble contempt for mechanical regularity, there was in mediæval building a definite system of optical and perspective illusion very largely, but not universally, practiced—a definite system of very subtle calculation of optical effects—a definite system of *masonry refinements*—and a definite system of survivals of some of the most remarkable architectural refinements of classic antiquity. I shall be able to prove, moreover, that the facts, in so far as they are made manifest for Northern Europe, move from Italian influence; that in Italy they move from the Italo-Byzantine centres, and that the facts are most numerous for the period and buildings of the Byzantine-Romanesque. Dates are established for the curves, the sloping pavements and the converging walls which carry them back to the earliest extant buildings of Christian architecture.

The germ of these discoveries goes back to measurements which I made at Pisa in 1870, and which were published in *Scribner's Magazine* for August, 1874, under the title of "A Lost Art."

I claim that the study of mediæval architecture stands to-day where that of the Greek temples stood before the discoveries of the Greek architectural

refinements by Pennethorne, Hoffer and Penrose. It is well known that all the studies of mediæval architecture lie wholly within the limits of our own century and that they date mainly after 1825 or later, whereas those of the Greek temples date from the middle of the eighteenth century. I have shown in THE RECORD article already quoted that the Parthenon had been surveyed and carefully examined during nearly a century, before the discovery of its curves, leaning faces, irregular spacings, and other optical refinements, which were first published by Penrose in 1851. The beginning of the study of mediæval cathedrals is, as a matter of fact, fully seventy-five years later than the beginning of the study of Greek temples; and if, in the last years of the nineteenth century, we are still ignorant of some of the most interesting traits of many important cathedrals, we are only repeating the experience of history that discoveries come gradually, and that the wisdom of all the ages has not been conquered in a day.

That the attainments of past ages have been forgotten and lost sight of and have had to be rediscovered is no unfamiliar thing. A most telling instance is that of the Greek refinements just cited whose existence had disappeared from the memory and apparently from the records of man until once more brought to light in the nineteenth century.

The success of the Survey in Italy was much indebted to the favorable disposition of the Italian Ministry of Public Instruction, as represented by Signor Ricchiardi. I obtained from him the extraordinary favor of a *carte blanche* permit to take measures and photographs in church interiors throughout the country, and to photograph in all Government museums. For this concession I have to be grateful, in the first instance, to the influence of the Smithsonian Institution, as represented by Professors Langley and Goode.

Wm. H. Goodyear.



FIG. 10.—CHOIR GALLERY OF SANTA MARIA DELLA PIEVE AT AREZZO.
Showing a bent column, Photographed by the Brooklyn Institute Survey.



FIG. 11.—MEDIÆVAL SURVIVAL OF THE CLASSIC ENTASIS, CATHEDRAL OF FIESOLE.
Photographed for Brooklyn Institute Survey, by John W. McKecknie.

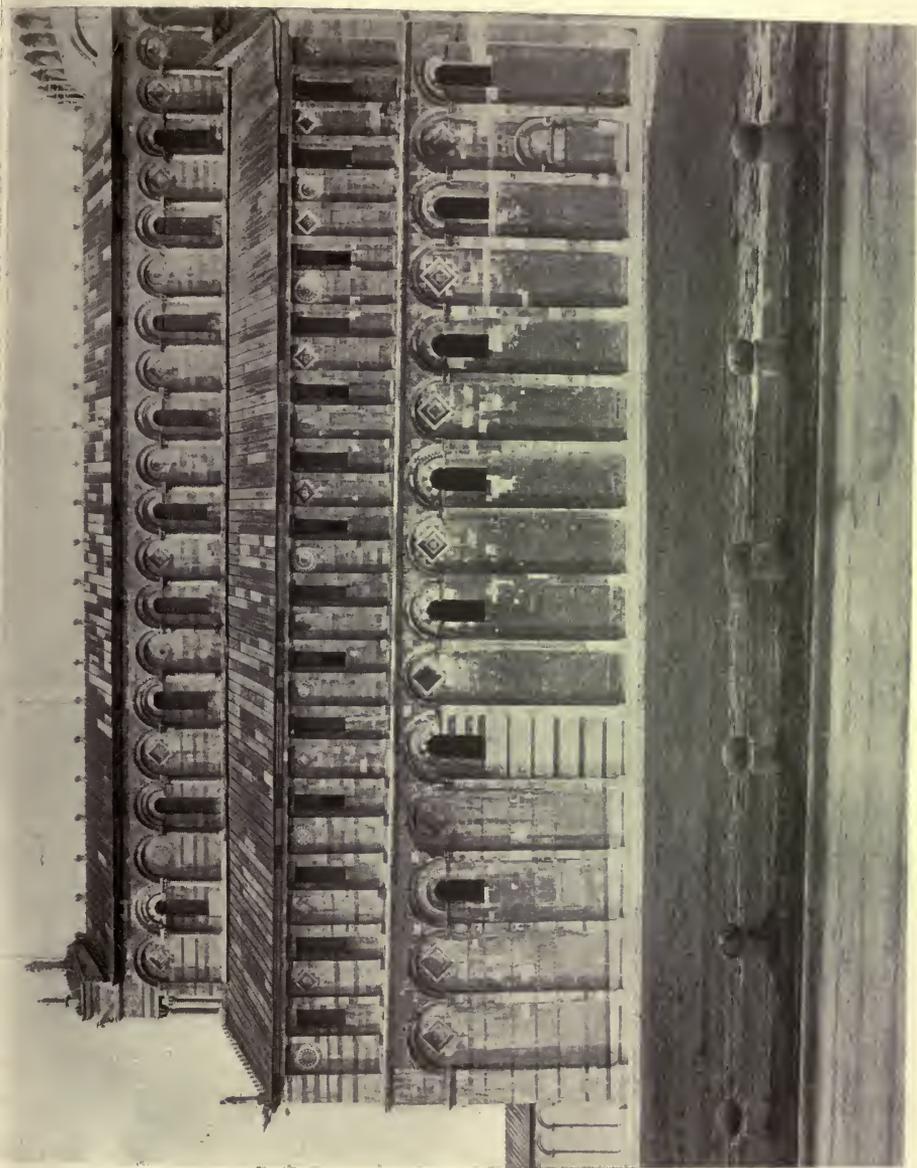
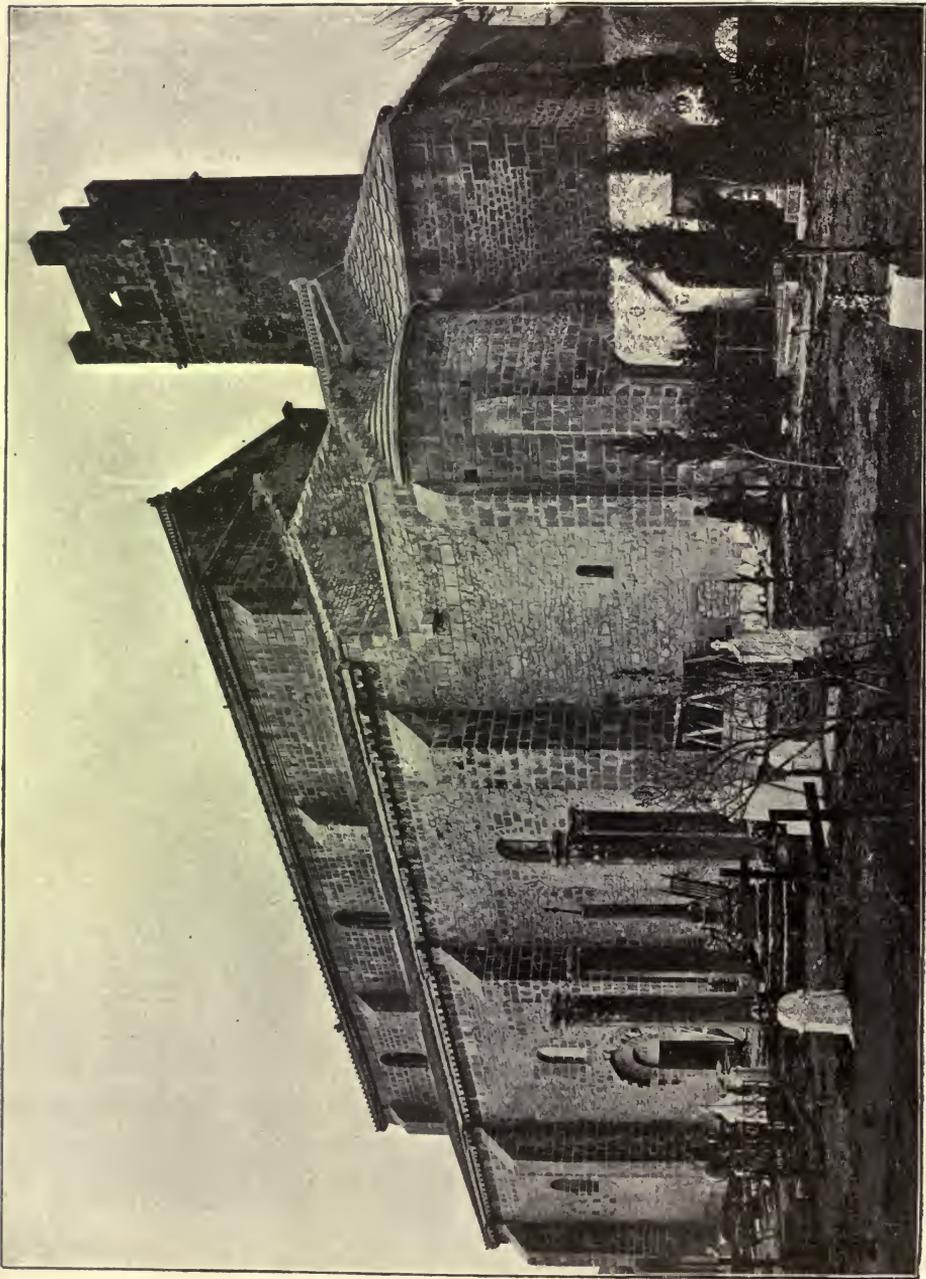
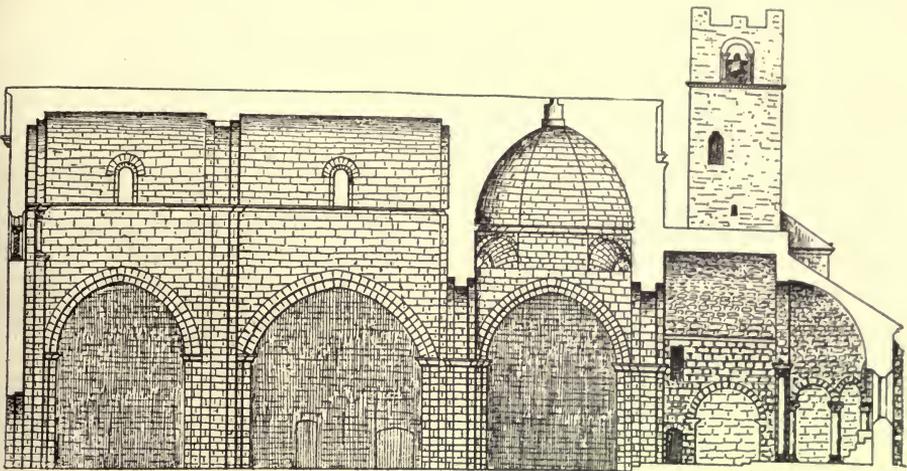


FIG. 12.—SOUTH WALL OF THE PISA CATHEDRAL IN PARALLEL PERSPECTIVE.
Photographed for Brooklyn Institute Survey, by John W. McKecknie.



CATHEDRAL OF VAISON—FROM THE SOUTH.



LONGITUDINAL SECTION OF THE CATHEDRAL OF VAISON. From de Lesteyrie

FRENCH CATHEDRALS.

Part VII.

THE CATHEDRALS OF PROVENCE. III.

THE cathedral of Vaison is generally conceded by French archæologists to be one of the oldest in France. It is a singularly interesting structure, almost homogeneous in design, yet bearing obvious marks of having been built at different intervals of time, considerably separated from each other. Its walls, though continuous, show various sizes and finish of stone, and are clearly referable to distinct epochs. But the interest of the cathedral is more than purely antiquarian.

As you drive into Vaison on top of the stage from Orange—for there is no other way of reaching this sequestered little town unless you hire a conveyance of your own, a most unnecessary expense—you see nothing of the city and its cathedral until you are almost there. Then you see the ruins of the château arising above the High city, for small as the place is, there are two parts, a Low Vaison and a High Vaison; and presently, on turning a corner, there is a small low

cathedral, quite outside the town, in the fields. Both in situation and in general external form it has a somewhat striking resemblance to the basilicas without the walls of Rome. It is, perhaps, only a superficial resemblance, but it is a comparison suggested by no other church in France. The cathedral is small, and nothing survives of its group of buildings save the church and the cloister. Alone in the fields outside the town, it seems more like a deserted chapel than the cathedral church of a once flourishing city.

Though the plan of the cathedral is almost certainly as early as the tenth century, it is a three aisled church, with three apses. It is thus much more complicated than the cathedrals of Avignon and Aix, as well as several other Provençal cathedrals with single naves, whose date may, with the utmost confidence, be placed in the eleventh century.

The most ancient parts are the apses. Those of the aisles are very

small, and semicircular both within and without; that of the nave is larger, and semicircular within, and enclosed within a heavy rectangular mass without, which is probably a later addition. Each is preceded by a deep rectangular bay, built of larger stone that has no junction with the stone of the apse walls, and appears to be later in date. The same construction is seen in the semidome of the nave apse, which is therefore a rebuilding, but still earlier than the western parts of the church. This central apse is an extremely interesting structure. Its wall of rough ashlar work has an internal arcade of five round arches resting on columns of unequal length, the short ones being pieced out below, and all evidently taken from an earlier edifice. The capitals, which are well cut and resemble the work of the fourth and fifth centuries, and reproduce the Corinthian motif, are of various materials; one is of black marble, two of white, two of cipolin, and the sixth is a restoration. Larger columns, pieced at the top, carry the pointed arches that open into the rectangular bays, which have pointed tunnel vaults, slightly higher than the semidome. It is known that the cathedral was rebuilt by Bishop Humbert in 910, and the rectangular bay may belong to that time, the semicircular portion being earlier.

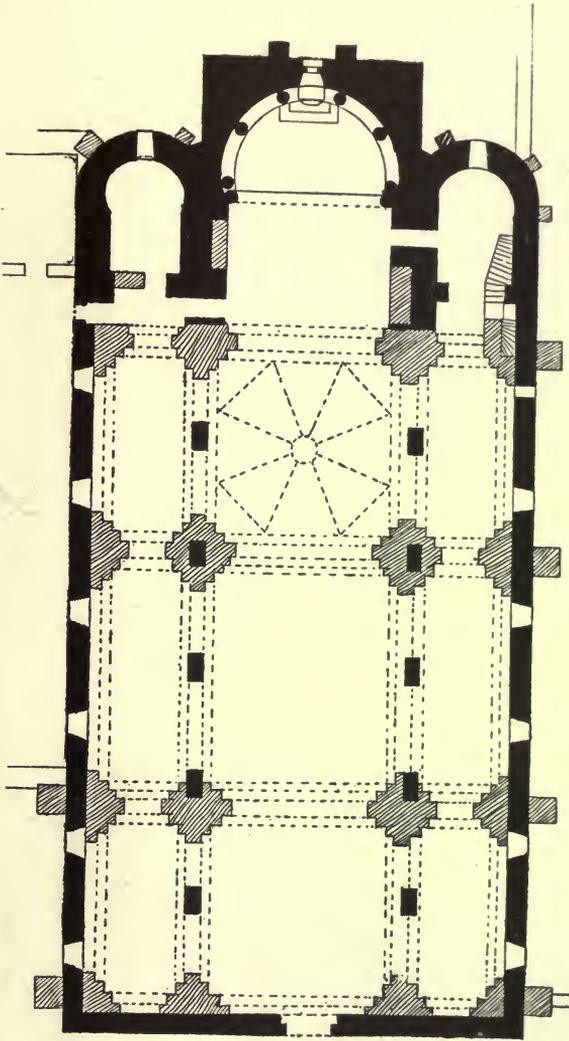
The nave is a short one of three bays, each of slightly differing dimensions which give a peculiar form to its plan. The third, which immediately precedes the choir, has an octagonal dome. Its construction is of the usual type, with small pendentives with the symbols of the Evangelists, but unlike other Provençal domes it does not rise above the roof of the cathedral, and is actually slightly lower than the pointed tunnel vaults of the other bays. The double piers of the vault arches have as capitals, a fine narrow classic band, which is continued as a string at the base of the vault. The arches opening into the aisles are relatively low, with considerable wall space above them; like the nave arches they are double and pointed,

but their small irregular capitals testify to their slightly varying dates. In the first two bays small windows are cut into the vault.

The aisles, as in all ancient churches in Provence, are extremely narrow. They have elliptical tunnel vaults, which, rising on the outer walls at a point below the apex of the arches to the nave, are returned on the inner side a short distance above them. Double arches of similar shape separate the bays, and the enclosing walls have double pointed wall arches, slightly lower than those between the nave and aisles. There are no windows in the north aisle, but the south aisle is lighted by small round-headed windows, which, however, do not occupy the space of the older windows, now blocked up, but clearly discernable in the stone work. The nave is lighted by small round-headed windows cut into the vaulting.

The little blocked-up windows of the aisles are traces of the edifice of the tenth century, rebuilt by Bishop Humbert. Like the present building, it had a nave and aisles. It was six bays long, the nave being formed by a succession of short arches carried on piers, some of which are encased in the present piers, while others have been removed. The absence of external buttresses corresponding to the older bays shows that the church was covered with a wood roof without vaults. The church was the same size as the present structure, the alterations and changes having, singularly enough, been confined to the ancient dimensions. The present form of the cathedral is that of a church of the middle of the eleventh century, to which period the nave and aisles clearly belong.

Though small, low and plain, almost deficient in ornament, and exhibiting only the simplest architectural construction, the interior of the cathedral of Vaison has a real charm of simplicity and antiquity. Against the wall of the nave apse, in its primitive place in the centre of the sanctuary behind the high altar, is the ancient episcopal throne. It is now much injured; the seat and arms are intact, but the columns that once supported



PLAN OF THE CATHEDRAL OF VAISON.*

From de Lesteyrie

*Black shading indicates construction prior to XIth. century; the hatching indicates the later additions and present state of cathedral.

the latter have partly disappeared. It is attributed to the sixth century, from which also dates the altar of St. Quenin, which now serves as the high altar, a work of extraordinary interest, considerably restored.

The exterior of the cathedral is quite as interesting as the interior, though the west front is featureless save for a panel with Corinthian-like capitals and a triangular top piece

placed over the insignificant porch. The side walls are almost as simple, but the outline of the church, viewed from the southeast, is extremely pleasing, and almost picturesque. The aisle wall, in which the various periods of its construction are distinctly visible, is strengthened by four plain buttresses, with sloping tops, which like all the buttresses of the cathedral, save those of the central apse, are ad-



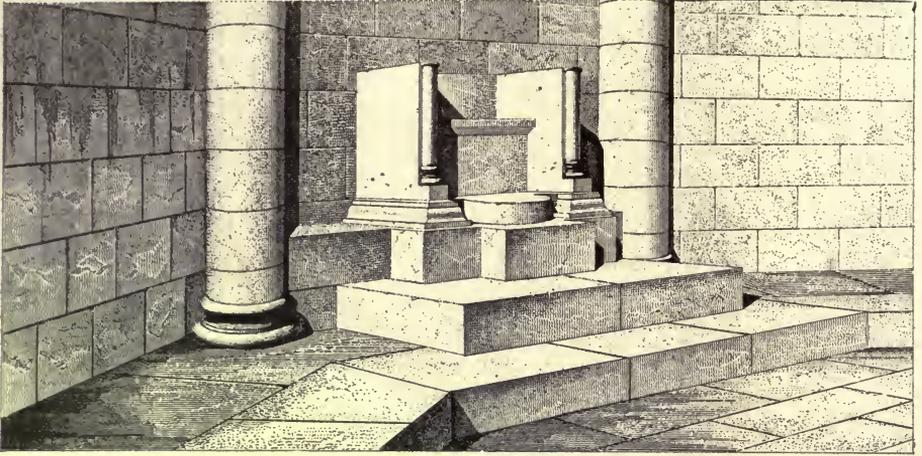
CATHEDRAL OF VAISON—EAST END.



CATHEDRAL OF VAISON—THE CLOISTERS.



CATHEDRAL OF VAISON—NORTH SIDE, WITH RESTORED CLOISTER.



EGLISE ET CLOITRE—DE VAISON.

ditions made in the repairs of the eleventh century. The windows are small and frameless, and the wall is crowned with a dentiled cornice, above a frieze of flowing foliage with rosettes. Both the cornice and the carved band project over the buttresses. The clearstory of the nave rises above the modern red tiles of the aisle roof. Like the lower wall it is plain, with short buttresses and a cornice, formed of a series of narrow flat bands separated by a delicately carved egg-and-dart ornament, with dentiles above. The first two bays have each a small window with carved arches and fluted twisted columns.

The aisle wall is continued irregularly beyond the last buttress. Though the whole of the east end is without ornament, except the small buttresses on each side of the apse windows, the varied levels and shapes of the roofs, and especially a stairway rising just behind the roof of the south apse and leading to a narrow arched opening in the eastern gable of the nave clearstory, produce a somewhat picturesque effect, with utter frankness of construction. The nave clearstory has its side cornice returned across the end, with a chanelled pilaster above supporting the apex of the roof.

The apse of the north aisle has been built up to a height almost equal to

the central apse. The tower, a square solid structure, is behind it, rising a short distance above the nave roof. Over a frieze and cornice similar to those of the north aisle is a crowning member, later than the lower part. It has two round arches on the east and west faces, and a single one on the others, with widely spaced battlements above.

The cloister, built in the eleventh century, is on the north side of the cathedral, and fills all the side, save a small part at the west end, where the aisle wall is strengthened by buttresses as on the south wall. The frieze, however, is much more interesting, and consists of a series of conventionalized leaves, partly the original stones, partly restorations, and partly lost in some places. Below is an inscribed band of the eleventh century with the names of the early bishops of Vaison. The nave clearstory repeats the features of the south side, though there are no corresponding buttresses in the aisle wall below. The columns of the clearstory windows are plain, with several new ones.

The cloister is small, and completely restored, the work being still in progress under the direction of M. Révoil. Restoration here, as is usual in France, means almost an entire rebuilding, and little of the original structure now remains, much of it having been de-

stroyed before M. Révoil began his work, and the side next the cathedral never having been built, or least destroyed to the foundation. It is a rectangle, of which the north and south sides are longer than the east or west, the difference in width being taken up in the piers. The arcade consists of groups of three round arches carried on double columns standing on a low base-wall. On the quadrangle side the arches of each bay are enclosed in a single plain round arch, not repeated within, where each group is separated by heavy piers, decorated with diagonal or vertical lines or, on the corners, with applied columns. There are four bays on each side, and on the north the two central ones,

with enriched arches, serve as entrances to the quadrangle. The walks have round tunnel vaults, forming cross vaults at the corners, but part of the north walk has rude cross vaults. The whole cloister is extremely severe in its architecture, though a good deal of its present effect is doubtless due to the fact that most of the original capitals of its columns have disappeared. Some, indeed, never having been cut, but left in the solid block. But its sobriety is eminently in keeping with the architecture of the cathedral, whose distinguishing characteristics are, however, of the greatest interest, making it, in some respects, one of the most notable in France, though one of the smallest.

Barr Ferree.



Fig. 2.—Hospital Beaune—The Court.

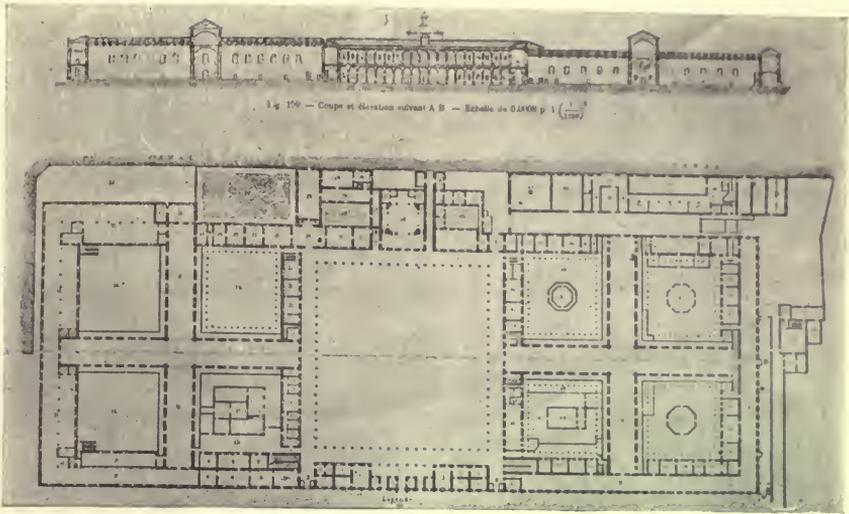


Fig. 1.—Hospital Maggiore, Milan—Plan.

MODERN HOSPITALS IN EUROPE.

DURING the last quarter of a century, and especially during the past fifteen years, hospital architecture has undergone considerable changes—in fact, an almost complete transformation. Formerly, all the departments were collected together; the buildings containing them crowded as closely as possible to each other, and it was thought that perfection had been attained when long wards were arranged on two or three floors around large court-yards, whence they received light and air. Europe still possesses a few examples of this kind of hospital. They are far more remarkable for the facility with which they can be worked and supervised, and for their graceful proportions, than for the strict conformity to hygienic laws displayed in their construction. The best specimens of this primitive hospital architecture are met with in France and Italy. France points with pride to her hospitals at Beaune and at Tonnerre, while Italy claims that at Milan she has the most magnificent edifice of the kind that the Renaissance produced; the one that long served as a model of general hospital for large cities.

The *Ospedale Maggiore* at Milan is a work of the highest class, in which all the improvements known at the time

of its erection were incorporated. As will be seen by the plan (Fig. 1), it covers a large piece of ground of regular shape and consists of a number of long buildings intersecting each other at right angles, with large court-yards or gardens between them. The external aspect is imposing and picturesque. This hospital was founded in 1456 by Francesco Sforza, Duke of Milan, and was designed by Filareta. After the death of this architect, the work was continued by Richini, who at first followed the original plans, but afterwards made certain changes in the style. It was enlarged by Castelli at the end of the last century. It has nine interior court-yards. Its large central courtyard is very fine, but the principal façade is the feature that most merits attention. The large pointed windows are surrounded by elegantly designed bas-reliefs in red terra-cotta, producing a highly original effect. This hospital can accommodate 2,000 patients. It could not be further enlarged without violating the laws of hygiene, which forbid the crowding of so many sick people in one place. Consequently it cannot serve as a model.

The Beaune Hospital, although much smaller, is not less celebrated. It is laid out in a more practical manner,

resembling to some extent the system generally adopted at the present day. Two main buildings extend in the form of a set-square along two sides of a spacious court-yard (Fig. 2). These buildings contain two large common wards, but the beds are placed longitudinally upon a wooden floor which is

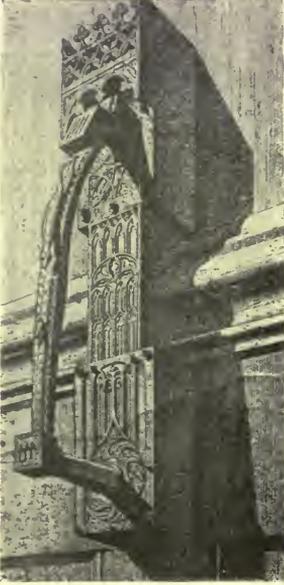


Fig. 3.—Hospital Beaune—Iron Knocker.

raised on each side above the flagstones of the ward. The ceilings of these wards are in wood and have that pointed-arch form which seems best suited to insure ventilation and facilitate the cleaning of the walls. The wards are on one floor only, and they are reached through an exterior covered gallery, which is visible in the view of the court-yard here given.

It should also be stated that this hospital is one of the finest specimens existing in France of civil architecture of the middle of the fifteenth century. Its gateway on the street is original, elegant and picturesque. The patterns of the carved woodwork, the sculptured stone, and the wrought-iron thereof are often copied. An idea can be formed of the elaborateness of the locksmith's work on the knocker, of which we give an illustration (Fig. 3). The generous founder

of this hospital was Chancellor Raulin, counsellor of Philip the Good, Duke of Burgundy. To insure a revenue for the establishment, the Chancellor endowed it with some vineyards, which it still possesses and from which are produced the well-known Volnay, Beaune and Pomard wines. Every year, after the vintage, these wines are sold at auction and the prices realized, which often reach 1,000 francs per cask, serve as a basis for determining the value of the high-class wines of the district.

In the Middle Ages the hospitals nearly always consisted of a long room with windows on either side. At

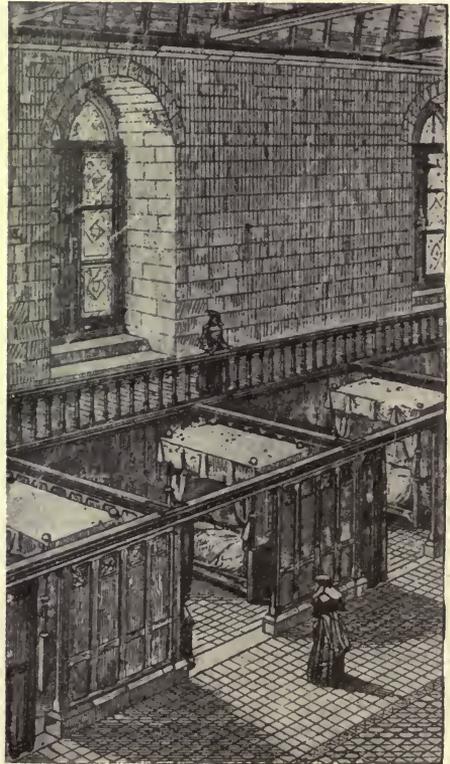


Fig. 4.—Hospital de Tonnerre—View of a Bay.

one end was the chapel, separated from the rest of the room by a grating of iron, wood, or in some cases even of stone. We have a very fine example in the Tonnerre Hospital. But what gives special value to this relic of the past is the manner in which the beds

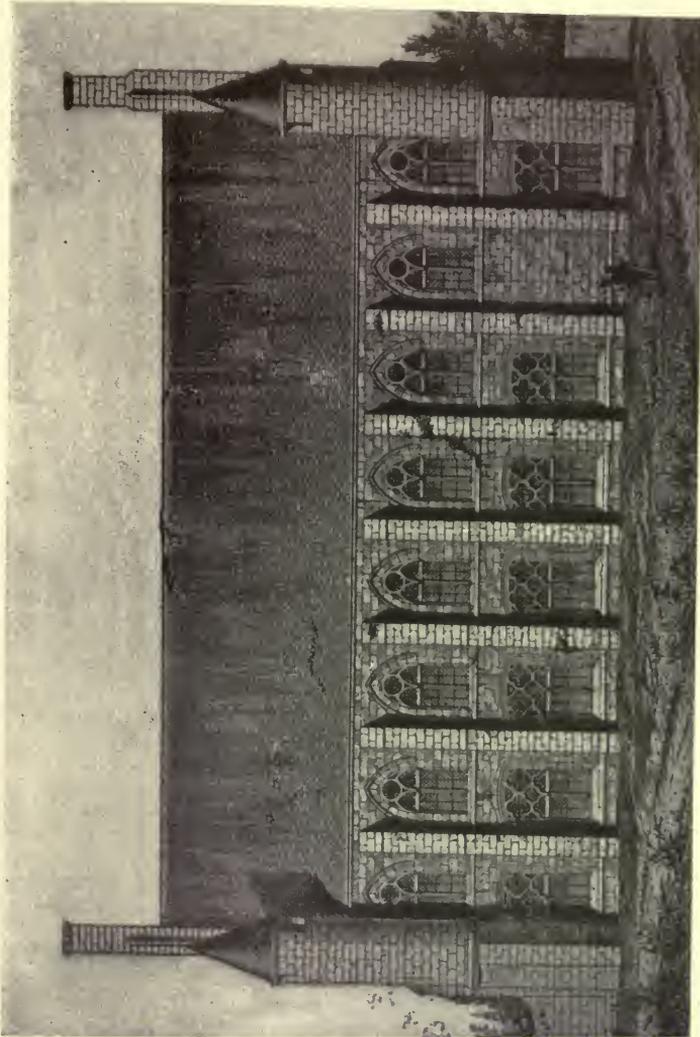


Fig. 5.—Maladierie du Tortoir—East View of Building.

were arranged, each in a sort of cubicle, above which and running round the walls of the ward was an elevated gallery whence it was easy to see everything that went on. The accompanying perspective view conveys an exact idea of one of these cubicles (Fig. 4).

In mediæval times, France, like Italy, indulged in great luxury in the matter of hospital construction. In France, this lavishness was chiefly external. The Lepers' Hospital at Tortoir, the main parts of which still subsist, offers in its principal building,

dating from the first half of the fourteenth century, one of the best examples of this architecture, and we think it worth while to reproduce a lateral elevation of the eastern side of this edifice. (Fig 5).

We will not prolong our investigations into the past; it seems to us more to the purpose to deal with the present.

After Orsini's attempt on the life of Napoleon III., the imperial government undertook the task of providing Paris with a Grand Opera House, and it decided at the same time that the

old general hospital, the Hotel-Dieu, should be rebuilt upon a new and more extensive plan and that every improvement suggested by experience and hygienic science should be adopted, so as to make the new hospital a model of perfection. The architect, a man of talent, brought all his powers to bear on the work, but he paid more regard to the rules of architecture than to the laws of health. Besides, he was required to provide for such a large number of beds that it was difficult to keep within the allotted space without piling up at least three tiers of wards.

with the large ones that run parallel to the long central court-yard, to allow between them courts or gardens having an open outlook on one of their sides. The reader can judge of this from the plan (Fig. 6).

Just when the heaviest part of the work was completed, the war broke out. Building operations were suspended for a couple of years, and upon their resumption partial satisfaction was given to the critics and to the wishes expressed by medical men. Of the three floors of wards, one was suppressed. The height of the build-

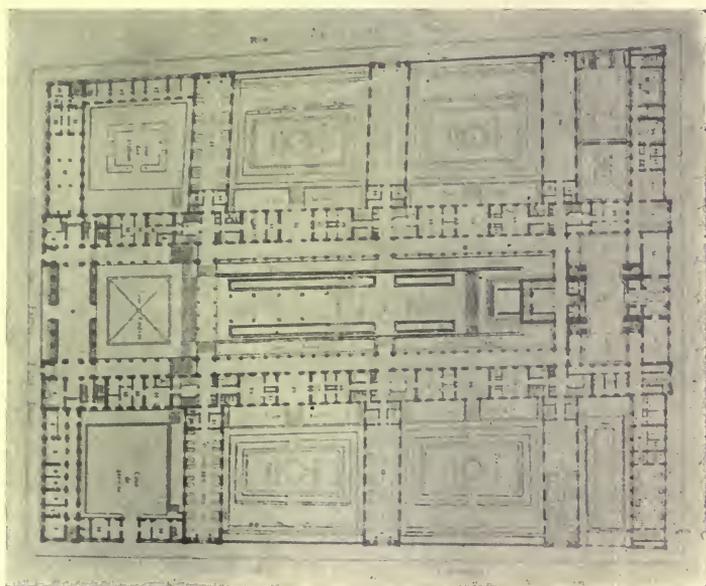


Fig. 6.—Plan of the New Hotel-Dieu, Paris.

The plan did not differ much from the system of buildings placed at right angles to each other around a large central court-yard. It was, in fact, in an elongated form, the plan adopted for the Ospedale Maggiore at Milan. Hygienists did not fail to criticize this system severely, for two reasons, namely: the excessively large number of patients collected on one spot, and the unsatisfactory arrangements of superposed wards. The architect, however, had taken care, in planning the smaller buildings which are lateral

ings was limited to two stories, between the basements and the attics, thus diminishing the number of patients provided for, and at the same time increasing the amount of light and air. The large court-yard was left untouched; it retained its grass plots and flower beds, and the buildings bordering it kept their monumental propylæum. The perspective view given in Fig. 7 will convey an idea of this court-yard.

Important improvements were made in the interior. The ceilings of the



Fig. 7.—Hotel-Dieu—Central Court.

wards were given the form of an arch, the corners were rounded, and the walls oil-painted and polished. Frequent cleaning was thus rendered easy.

The proximity of the Seine allowed of all the drainage being led into it. The hospital was all the purer, but the Seine became so much the more contaminated.

What had been built was in part demolished ; a large amount of money was expended, and yet, after all, the degree of perfection aimed at was by no means attained.

A short time afterwards, the various

states of Europe, as well as France herself, enlightened by the results of the costly experiment made in Paris, applied themselves with contagious ardor to the reconstruction of their old hospitals and the erection of new ones, upon new models, profiting by all the mistakes committed, and in most cases transferring the new establishments to the country, beyond the centres of population.

It was in this way that the new hospital at Edinburgh came to be erected. It is one of the most interesting that we could possibly show our readers.

The ground had a somewhat steep slope. This was not a drawback; on the contrary, it was an advantage for the drainage, and the architect turned it to good account. Over this irregularly shaped piece of ground the architect distributed ten principal buildings, several minor ones, and premises for the staff, with a court-yard in the middle. All the buildings, except those devoted to teaching, machinery, and the laundry, are connected with each other by passages, although they have large spaces between them planted with flowering shrubs. (See

pital in Great Britain as worthy of being copied. The finest in London is St. Thomas' Hospital, since its transfer to the right bank of the Thames. It presents to the river a long line of large buildings. They are very high, as it was necessary to economize space, and the wards are consequently superposed. This is the weak feature in all hospitals erected in the heart of populous districts (Fig. 9).

The Herbert Hospital at Woolwich shows us a better arrangement, although the ward buildings have two floors.

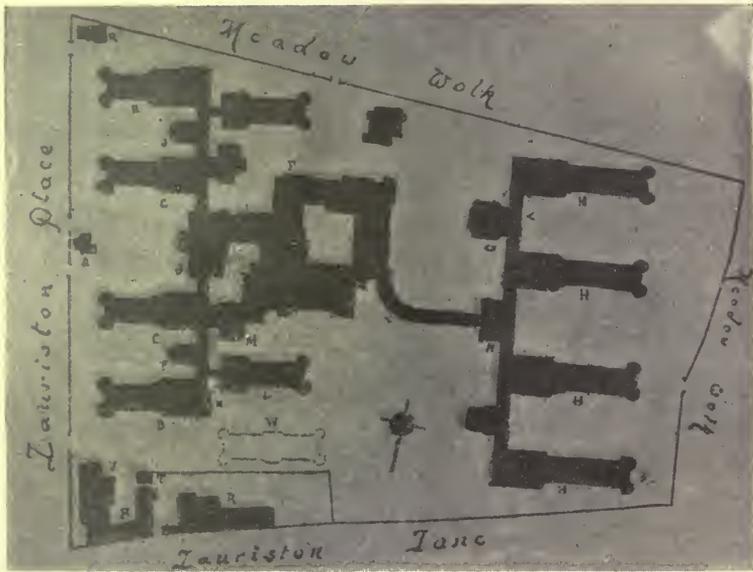


Fig. 8.—Royal Infirmary, Edinburgh.

plan, Fig. 8). All these buildings are in the traditional Scotch style; gables in mingled brick and stone, and numerous square windows. The whole is an original example, albeit not the first one, of hospitals with detached buildings. As far back as the end of the last century this arrangement was applied at Plymouth (England). It has taken more than fifty years to become generally adopted. With the exception of Paris, where space is scarce and routine rules supreme, the system is now followed almost everywhere.

We are unable to point to any hos-

The Norwich Hospital is of imposing aspect, and the plan on which it is built has something to recommend it. At the ends of the buildings there are projections in the form of hexagonal towers.

The English hospitals are very carefully constructed. Their internal arrangements are excellent, the working is perfect, and every imaginable mechanical contrivance is utilized to facilitate the service. The architects have exercised all their skill and ingenuity to produce this result.

The Berlin Civil Hospital was con-

structed between 1866 and 1874, for the accommodation of 600 patients. The architects were Messrs. Gropius and Schmienden. It was wisely decided to erect it outside the city, in the Friedrichshain Park. Besides the chapel, the subsidiary buildings and the offices, it consists of ten distinct buildings, connected with each other by passages. In addition, there are two small buildings, in a corner of the ground, which are reserved for contagious cases. This is one of the most perfectly organized hospitals in existence. Fault, however, is found with it because the buildings have pro-

ing pass underneath the floors and impart a portion of their heat by radiation. This is the principal object in the heating of hospitals.

We think it will not be uninteresting to run over briefly the theoretic requirements which had to be complied with by the architects of the Berlin hospital in regard to heating and ventilation.

1. Every ward must be kept at a temperature variable at will between 15° and 18° Réaumur.

2. From 10° to 15° is sufficient for the doctors' and nurses' rooms, and 10° for the corridors and staircases.

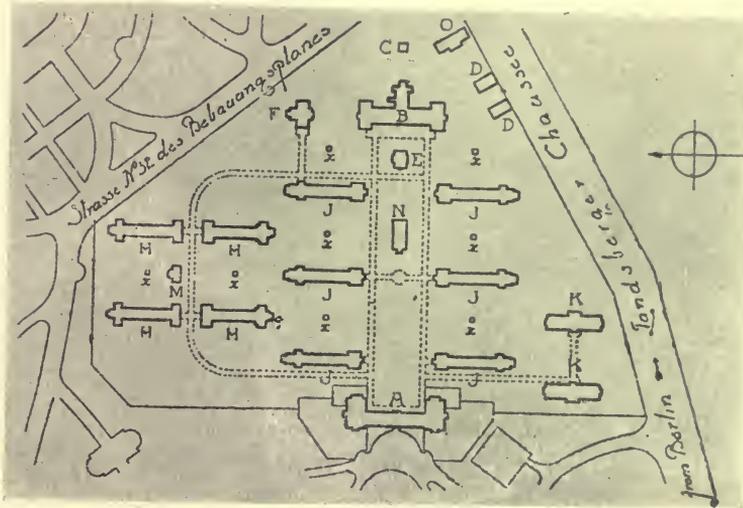


Fig. 10—Civil Hospital—General Plan.

jections, which interfere with the circulation of the air, and exception is also taken to there being two floors of wards. We shall show further on that in the system of M. Tollet, the French engineer, these defects are avoided. The Berlin Hospital is in brick, which appears to be the most sanitary material that can be used. If it were possible, without too great an increase in the cost, to employ bricks that are glazed on one of their sides, the cleaning problem would be solved, as it would be easy to wash the outside walls almost daily. The heating is effected by means of hot water. The twelve pipes which supply each build-

3. The heat of the whole building must be central.

4. The heated air, upon reaching the wards, must not be at a temperature higher than 44° Réaumur.

5. The heated air must contain a proper quantity of moisture.

6. The patients must be able to warm themselves at any time, either at a stove or an open fire. (This condition does not seem to us particularly hygienic.)

7. The air of the wards must be renewed in all seasons at the rate of 100 cubic meters per hour and per bed. In case of need, it must be possible to change it at double this rate.

8. The fresh air must be admitted from the outside in such a way as not to inconvenience the patients.

9. The speed of the air at its points of entrance and exit must not exceed 60 centimeters per second, if the patients would be incommoded by the draught.

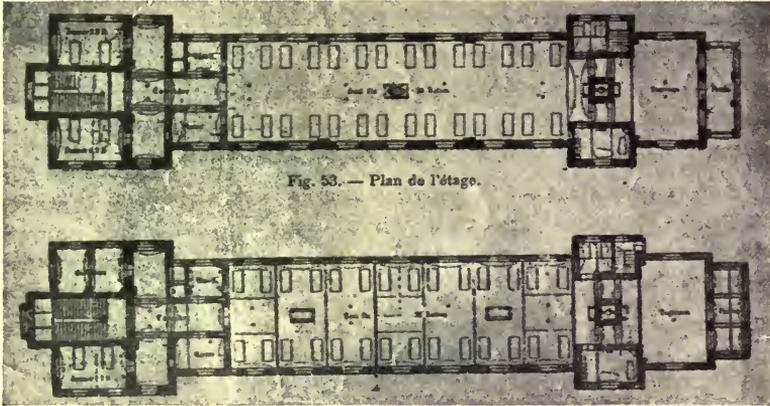
10. The gas-lighting must be so arranged as to assist the ventilation, and the products of combustion must be carried off.

11. The air-holes must not be in contact with the ground, etc.

In order to meet these conditions, the fresh air is brought into the wards through special pipes at about $5\frac{1}{4}$ feet above the floor, and the vitiated

angles are rounded, and that a slope is given to the ceiling in order to facilitate the ascension of the vitiated air. This indicates that the outlet through the gratings was considered insufficient.

The two buildings reserved for contagious diseases are specially interesting. We reproduce plans of the two upper floors and of the basement (Fig. 13, 13a and 13b). The reader will remark the nurses' rooms projecting from the centre of the posterior façade, and also below the level of the ground, the cellars where the heating apparatus is situated. The principal ward contains eight beds. Its width is 32 feet, and its superficial area 843



Figs. 11 and 11 a.—Hospital, Berlin—Floor Plan of a Pavilion.

air is drawn downward by the effect of the heat radiated from below and passes out through gratings placed at the bottom of the lateral walls, behind each pair of beds. The open fire-places complete the ventilation.

The degree of heat required appears to us too high. It is much lower in French hospitals.

In order to abridge these details, we give here three plans, viz.: A general plan (Fig. 10); a plan of the basement of one of the buildings (Fig. 11), and a plan of the first floor of the same building (Fig. 11a). We also reproduce a section (Fig. 12) showing the form of the ceiling of the first floor. It will be observed that the

square feet, or say 105 square feet per bed. Its height is 16 feet 5 inches, and its capacity 520 cubic yards, or 65 cubic yards per bed. The small wards with two beds have an air space of 78 cubic yards.

The buildings face the west.

The objections brought against this establishment, and which we think are well founded, are: the superposition of the sick wards, and the angular projections which intercept the longitudinal circulation of the outside air. The edifice, however, is well constructed, the material used being an excellent kind of brick called Mettlach bricks, which have also been employed for the vaults, and for the

paving in the contagious building. The walls are thick: the style of the decoration is severe. The hospital is surrounded by an open space of large extent.

The same architects, Messrs. Gropius and Schmienden, also constructed at Berlin, between 1873 and 1878, a military hospital to accommodate 510 sick or wounded. This also is located

and the whole edifice is built of brick. As in the civil hospital, there are rooms where the sick or injured can sit, play or converse, which is an innovation unknown as yet in most French hospitals.

In the Dresden hospital, which consists partly of old buildings and partly of new, there are verandas at the ends of the newly erected wards on to which,

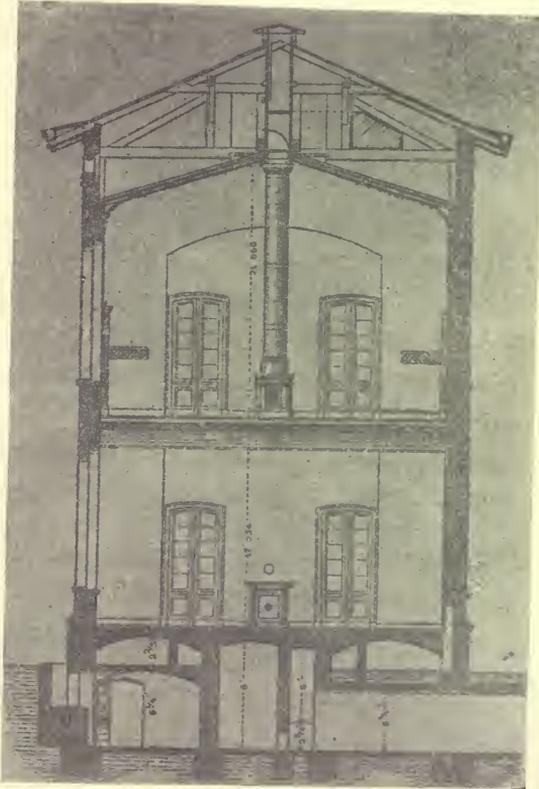


Fig. 12.—Hospital, Berlin—Transverse Section of a Pavilion.

outside the city. We give a plan of it (Fig. 14) which shows that the system of detached buildings has been applied in the most thorough fashion. The principal wards have only sixteen beds, and the others six, three or two. The buildings cover nearly two-and-a-half acres, and the grounds are about fifty acres in extent. The air space per bed is about forty cubic yards on an average. The windows are double,

on fine days, nine beds can be wheeled, thus placing them practically in the open air.

The Heidelberg hospital, like those of Edinburgh and Berlin, is composed of a number of detached buildings scattered over a large park, but connected with each other and with the administrative centre by covered passages.

The military hospitals at Königs-

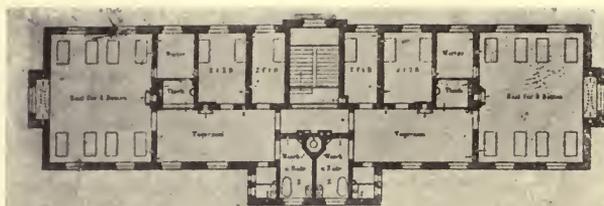


Fig. 56.

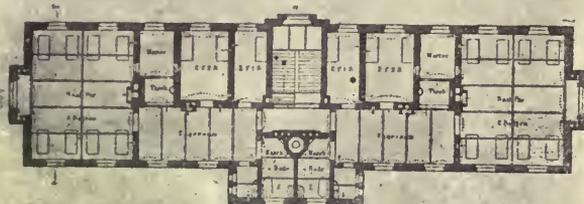
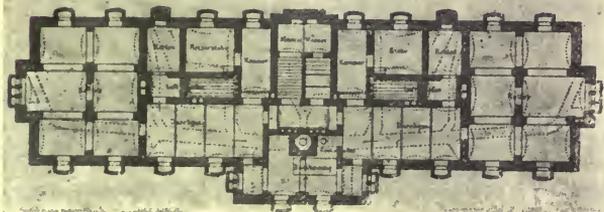


Fig. 57.



Figs. 13, 13 a and 13 b.—Hospital for Contagious Diseases, Berlin—Floor Plans.

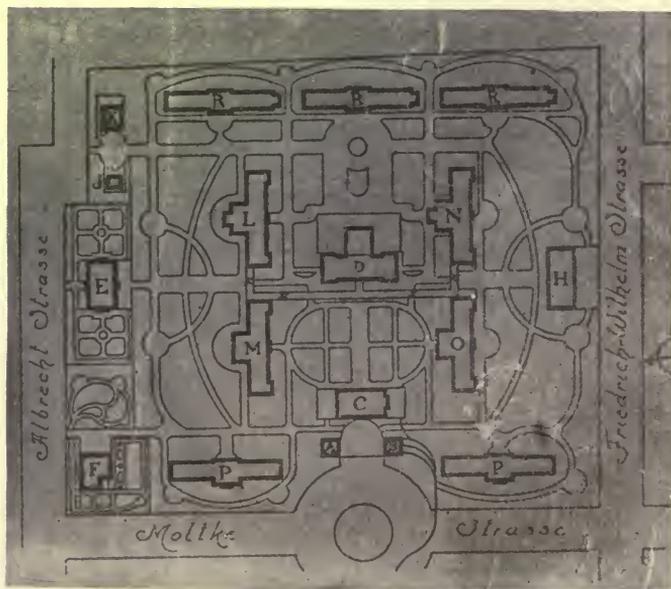
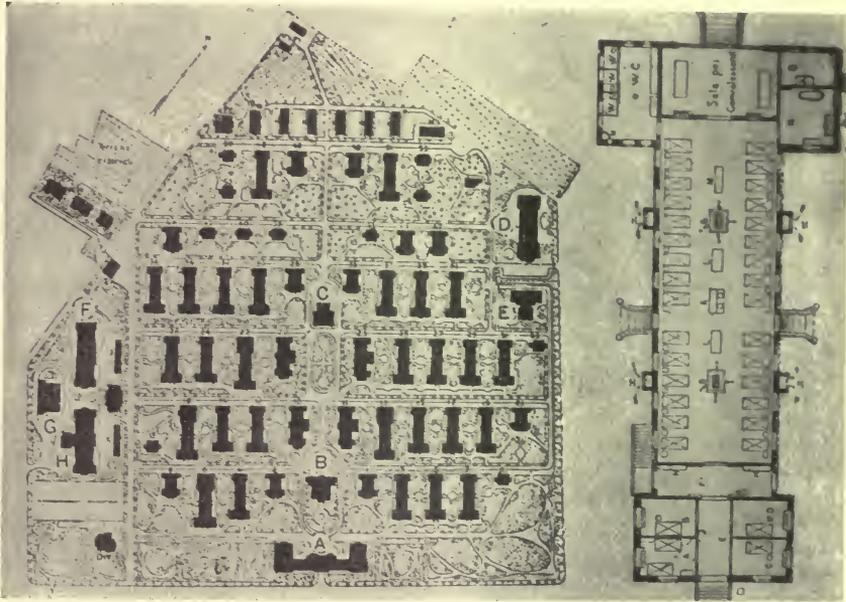


Fig. 14.—Military Hospital, Berlin.

berg and Custrin are laid out on the same plan, as indeed are all the new military hospitals in Germany.

The most curious of all German hospitals is the new civil hospital at Hamburg. The old general hospital, however great the talent displayed in its construction, had always been regarded as unhealthy. The mortality there, notwithstanding the most scrupulous cleanliness, reached 14.70 per cent, that is to say, 3.60 per cent more than obtains in the Paris hospitals. The new hospital at Hamburg is one

standing parallel to each other, and all of them having two projections at each end, which are not calculated to facilitate the circulation of the outside air. These buildings, as well as those for the service of the hospital, are connected by covered ways. In Figs. 15 and 15a we give the general plan and the plan of a patients' building. An excellent feature is that the wards consist of only one floor above the underground basement. This is not quite the ideal arrangement which, as we shall see, has been realized in a



Figs. 15 and 15a.—The New Hospital, Hamburg—Plan of a Pavilion.

of the largest in Europe. It has room for 1,500 beds, which is not conducive to salubrity. It covers, however, an area of nearly 45 acres, equal to 145 square yards per patient. It is situated about three miles north of the city. The buildings, generally speaking, face the southeast, which seems to be the best direction that could have been chosen. This hospital comprises 83 detached buildings, including 10 sheds for epidemic diseases. It contains 55 separate buildings for the accommodation of patients, all being built in brick and

few French hospitals, but it is a notable improvement in German hospitals. The buildings form three series. Those of the first series are intended for 33 patients; those of the second series for 15, and those of the third series for six patients only. This division into large, medium and small buildings seems to have been adopted by the architect with a view of exciting the movement of the external air by varying the dimensions of the vertical surfaces. The most important improvement introduced into this hospital consists in the mode of heating.

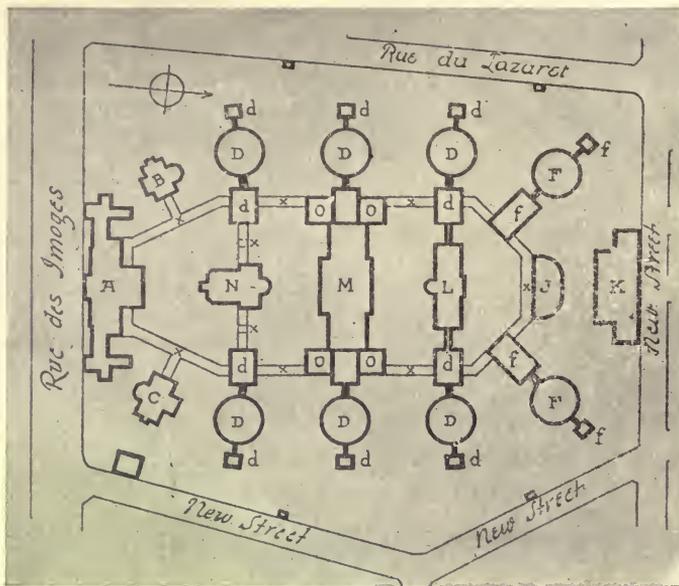


Fig. 16.—Hospital, Antwerp—General Plan.



Fig. 73. — Façade.

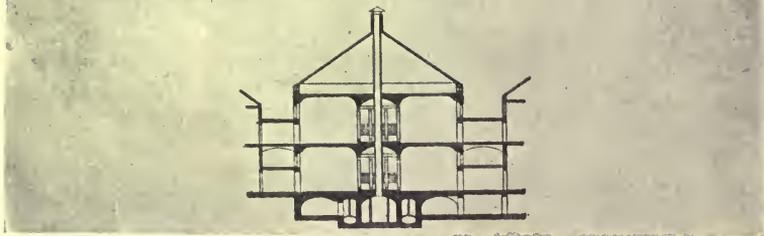


Fig. 17.—Hospital, Antwerp—Principal Elevation

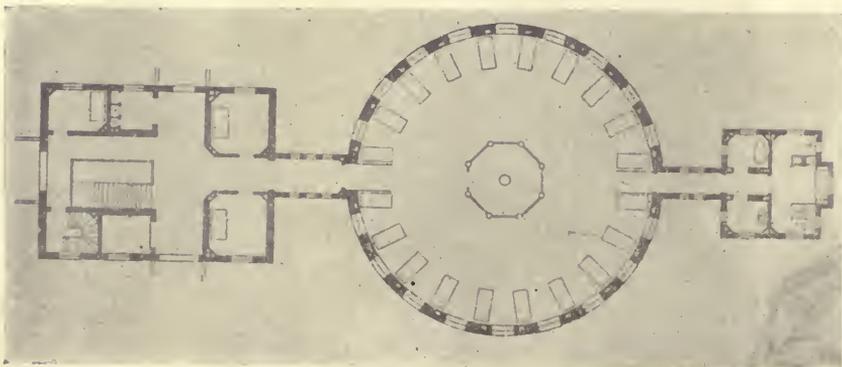


Fig. 18.—Hospital, Antwerp—Plan of a Hall.

This is effected by the circulation of steam through pipes placed beneath the mosaic floors, which are thus raised to a temperature of 20° Centigrade. It is, in fact, a trial on a large scale of the system of heating by radiation, which is the most wholesome of all, although not the cheapest. In spite of its great cost, it is to be hoped that this system will be applied to all hospitals built hereafter. Another improvement introduced in constructing this hospital consists in the use of eleven-inch bricks instead of wood for the sheds for epidemic diseases. Wood is inflammable, easily attacked by humidity, dilatable under the influence of the latter, and a congenial dwelling place for insects, microbes and rodents. When wooden hospitals have been in use for a considerable time, there is but one way of disinfecting them, namely, by burning them down, which operation is not always free from danger.

It is to be regretted that the architect of this hospital, which is planned and constructed with much care, should have been obliged to crowd the beds so close together, and should have placed the lavatories and water-closets in such near proximity to the sick wards. It would have been better to separate them from the wards by two doors.

In Belgium the hospital question has received great attention. Formerly, that country, with its dense population, had scarcely any but old hospitals; numerous, it is true, and noteworthy on account of their architecture and the many works of art that they contain. The new hospital at Ghent, which was erected in 1864 after the designs of M. Paul, marked a distinct step forward. The building has smooth walls, without projections at the ends, a single floor of beds, well-arranged offices, plenty of air, ample space, vaults to support the floors, numerous bath-rooms, sitting-rooms for the nurses and also for the doctors, hot-water heating system, steam engines and centrifugal ventilators changing the air of the wards at 16° or 17° Centigrade by means of a system of underground pipes. Since this

hospital was opened, another has been built at Antwerp which may be considered as one of the most curious of its kind. We give its ground-plan (Fig. 16), face-plan (Fig. 17) and the plan of a ward (Fig. 18). The front is of a varied and original character. The architect has given play to his inventive powers while adhering closely to Flemish architecture of the last couple of centuries. He has enriched it with color by the use of stone and bricks. But it is in the plan that we find most originality. The references accompanying it sufficiently explain the purpose of each of the buildings. They cover 13,000 square yards, the ground covered by the whole hospital being 65,000 square yards, or say 26 acres. There is thus an area of 35 square yards per bed. This, however, is only apparent; if the area is calculated upon the wards occupied by the patients, it is found to be much less.

In France, the Renaissance converted the feudal tower of defense into a tower of ornament, as, for example, in the Château of Chambord. The Belgian architect has transformed it into a tower of charity. Is this transformation a wise one? It assuredly gives the whole edifice an air of originality which borders on singularity. This is perhaps one of the least qualities required in a hospital. On the other hand, if we compare the round form with the rectangular form of equal area, we find that twenty beds contained in the circular ward are separated from each other at the foot by only 5 feet 9 inches, whereas twenty beds contained in a rectangular ward would have a space of 7 feet between them. The circular form is consequently unfavorable to the spacing of the beds. Not only the capacity of the wards, but their ventilation also is inferior in a circular building. The sole advantage of these "towers of charity" in the general economy is that they allow of the separation of all the accessory rooms from the sick wards themselves. This is something, no doubt; but it seems to us that this system should be reserved for epidemics, and even then it would be necessary to place screens, so as to

prevent the patients from seeing their fellow sufferers.

It was not without difficulty that the author of these very original designs, Mr. Baukelman, succeeded in getting them adopted. They have not been followed anywhere else.

As at Ghent, ventilation is obtained mechanically by insufflation. This method, which is based on that used in mines, has never given satisfaction.

The other accessory arrangements at the Antwerp hospital are of the most perfect character.

The total cost amounted to about 9,000 francs per bed.

There is nothing to be said in regard to Austrian hospitals, nor in regard to those of Switzerland, all of them being built according to old-fashioned plans, the point of departure of which is the Ospedale Maggiore of Milan, viz., buildings intersecting each other at right angles and enclosing vast court-yards; two stories of wards, grouped around a central point containing the offices, the apartments of the staff, and a chapel whose belfry is usually the culminating feature of the edifice.

The system has also been followed in the erection of the numerous hospitals of the city of Paris, even the newest ones. There is, however, one remark to be made. The French government having been for the past fifteen years avowedly atheist, the chapels have been abolished, or at least closed. Those in course of construction were left unfinished, or else have been put to other uses. Offsprings of Christianity, the hospitals of Paris have repudiated their paternity and broken, in these latter days, the tie which bound them to the source of their existence.

Buda-Pesth, the capital of Hungary, possesses three new hospitals. St. Stephens' Hospital was opened in 1883. It comprises eight large detached buildings, premises for the staff, a chapel in the centre, and divers subsidiary edifices, the whole being spread over a superficial area of fifteen acres. It can accommodate 656 patients. A peculiarity of this hospital is that each building is al-

lotted to a special class of disease. Its great defect is the superposition of the wards. The "Traders'" Hospital only covers 34,500 square yards of ground, the area built upon being 2,175 square yards. It was designed to hold sixty patients. The architecture is very simple, but evinces great care. The buildings have two stories. The one devoted to surgical operations is, in particular, arranged in the most complete manner and possesses every appliance that its purpose demands. The most curious of the three is St. Elizabeth's Hospital. It belongs to the Red Cross Society, which sufficiently indicates its use. It serves chiefly for wounded soldiers and as a special training school for nurses. There are, however, certain wards for the accommodation of civilians, and also for confinements. It occupies an elevated position on the right bank of the Danube, fifty yards above the level of the river, and is built on the detached system. The various buildings have only one floor above the basement; in fact, several have only a ground floor resting upon underground cellars. A number of buildings still remain to be erected. St. Elizabeth's Hospital might be regarded as one of the best in existence were it not for the absence of connecting passages between the various buildings, which increases the work of the staff. Most of the wards contain from two to six beds. There are two large wards with room for thirty-four. The air space for each patient has been calculated at eighty-eight cubic yards. In the principal buildings each bed is computed to have cost 4,268 florins, while in the secondary ones the cost only amounts to 316.60 florins. In consideration of its twofold character of hospital and training school, we give here a bird's-eye view of this institution (Fig. 19).

To the examples already given we will add the Copenhagen Hospital. The subjoined perspective view (Fig. 20) will suffice to convey an idea of its general scheme. It will be observed that the architecture of the detached buildings is extremely simple. The buildings have only one floor. The



Fig. 19.—St. Elizabeth Hospital, Buda-Pesth.



Fig. 20.—Hospital, Copenhagen—Perspective View.



Fig. 21.—Civil and Military Hospital, Montpellier—Birdseye View.



Fig. 23.—Hospital, Montpellier—Transverse Section of a Pavilion.

removal of the vitiated air is effected in two ways; by draught-chimneys in some buildings, and in the others by a kind of fan (reuterdack) consisting of glass plates worked by motive power. It is calculated that the air is changed at the rate of 148 cubic yards hourly per head. The various buildings have no connecting passages. This hospital is reserved exclusively for epidemic and contagious diseases. Apart from the Leper houses of the Middle Ages and the Lazarettos, it is the first establishment of this kind founded in Europe.

Russia has paid a great deal of attention to the matter of her hospitals. Moscow has two, which would be models of architecture and intelligent arrangement if they had not been planned according to the old-fashioned systems of agglomeration and of buildings intersecting each other at right angles. The Baschruschin Hospital presents a handsome façade, above which gleams one of those oriental campaniles with small globe, the original form of which has been made

familiar to everybody by pictures of the Kremlin. But in addition to this civil hospital Moscow possesses another, exclusively military, which is unique of its kind. The buildings composing it have nothing remarkable about them, but in summer time these edifices are emptied and the sick or wounded inmates transferred to tents erected in an immense and well-wooded park, redolent of resinous odors. This open-air treatment has given such excellent results that it has been extended to most of the military hospitals of Russia—those at Riga, St. Petersburg, etc.—but for tents, wooden huts have been substituted. They can thus be used in winter. We shall show further on that M. Tollet, the French engineer already referred to, has replaced these wooden huts by sheds in brick and iron, the use of which materials does away with the defects of the wooden huts without diminishing their advantages.

Generally speaking, the newest hospitals in Germany and the North of Europe present the plan of a quadrila-

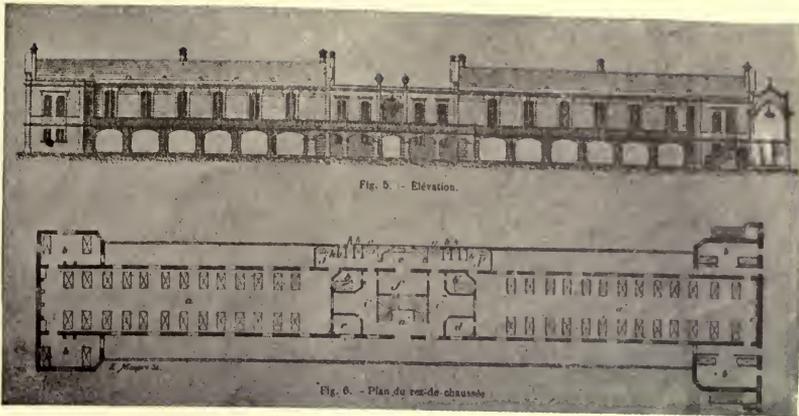


Fig. 24.—Hospital, Montpellier—Elevation of a Pavilion.

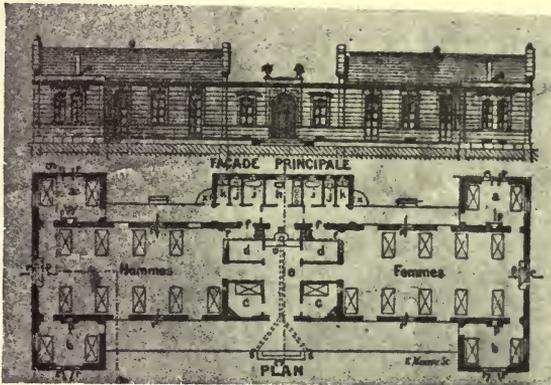


Fig. 25.—Montpellier—Hospital for Contagious Diseases.

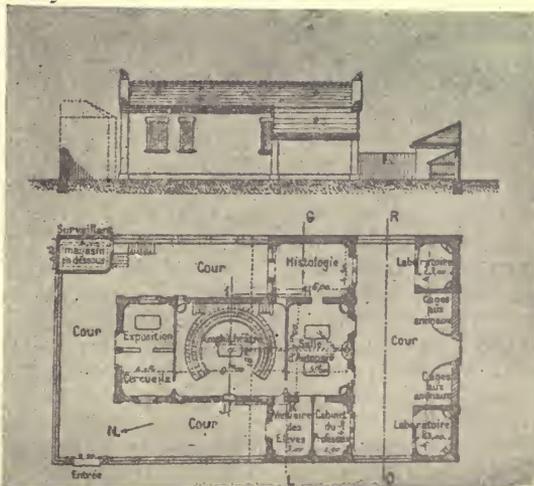


Fig. 26.—Hospital, Montpellier—Plan and Elevation of the Autopsy Pavilion.

teral, open in front. Their regular and symmetrical distribution gives them an appearance which is imposing but dull. The wards are numerous and contain from two to thirty beds each. For protection from cold, the connecting passages form part of the body of the edifice. This arrangement, however, must tend to the propagation of disease. The ventilation is in many cases imperfect, and there is an insufficiency of light. The wards are often superposed, and have low ceilings. The narrow court-yards keep in the heat, but do not facilitate the circulation of air.

In hot countries the conditions are totally different. In Italy great progress has been made. To many old hospitals detached buildings have been added, consisting of a single floor and connected by exterior passages. The Broni Hospital, which was inaugurated in 1893, is formed of a long central gallery, to which are joined, on each side, at right angles, a series of four buildings. First comes that containing the offices and the premises for the staff, divided into two parts; then four sick wards, and, lastly, the servants' quarters on one side and the building for contagious diseases on the other. Between the two is the chapel. All these buildings are separated by large flower beds, unenclosed at their outer end. This arrangement, in spite of its relative superiority over old systems, is not altogether perfect.

In Spain and Portugal the greater number of the hospitals are located in old religious edifices. At Madrid, however, a new hospital is being erected after the system named after M. Tollet.

The City of St. Petersburg has started on the road of progress by putting into practice a general principle which ought to be adopted in every great city of the world. No more big hospitals within the city limits, but only depots for urgent cases, the patients being removed to large establishments advantageously located in the country. This is an excellent system for the patients, but it is one which is very inconvenient for the doctors, who have to leave

their *clientele* and take long trips out of town. It would be particularly awkward in Paris, where the means of locomotion are slow and inadequate, and where, too, the leading medical men often divide their time between lecturing, attending their wealthy patients and giving consultations. The evil would not be greater if the lecturing and practising were divided among a larger number of doctors, of whom there are so many who lack neither knowledge nor earnestness. The means of rapid locomotion tend to increase around populous centres, and even in the outskirts of Paris, crowded and ill-served as they are, healthy spots can be found, spacious enough for the establishment of parks where hospitals could be properly isolated. Under the Second Empire, as also under the old Monarchy, efforts were made to transfer the hospitals beyond the city.

The Salpêtrière Hospital, which was built in the seventeenth century, constitutes the largest establishment of the kind in Europe. It has room for 6,000 beds, which is an agglomeration out of all proportion to its present central situation. At the time it was founded, fields surrounded it on all sides.

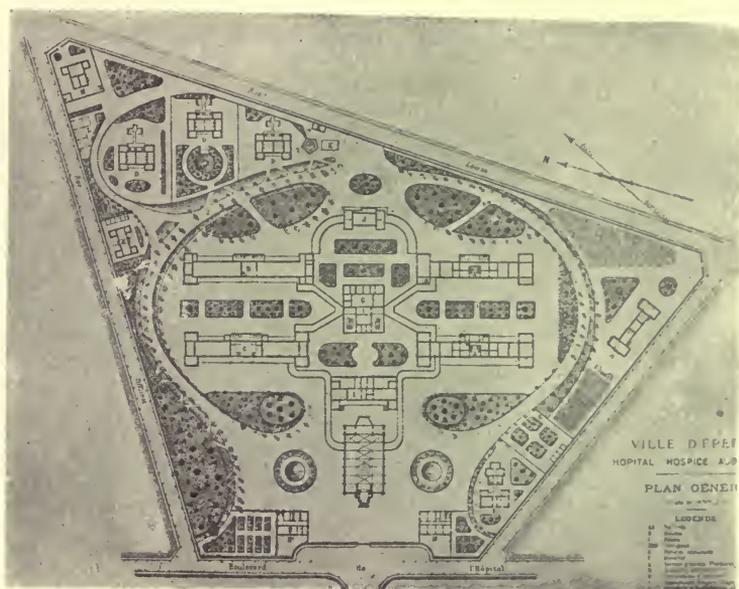
The Bicêtre Hospital is, so far, still in the open country. It was caused to be erected by Louis XIII. upon the site of an ancient castle. This hospital was the first one ever built for disabled soldiers. Since the construction of the Hôtel des Invalides by Louis XIV., the Bicêtre Hospital has, however, been a part of the general hospital service of Paris, and has been turned into an asylum for the aged and the insane. It contains no less than 2,800 beds, which is far too great a number to be collected in one place.

The Second Empire, in its turn, transferred beyond the city various charitable foundations, such as the "Incurables," the "Petits Ménages" and the "Sainte-Sérène," admission to the last-named of which has to be paid for. If the revenues and endowments of the "Assistance Publique" were not deviated in part from their true destination by political exigencies, or

absorbed by unnecessary expenses, Paris would be able in a few years to imitate Saint-Petersburg and transport her hospitals from the heart of the city to a distance of four or five miles into the country, utilizing the old buildings merely as depots and consulting rooms.

We have now come to the very kernel of our subject, and will deal with the hospitals most recently constructed in France. These embody all the improvements introduced into hospital architecture during the last

future hospital shall be placed on ground that is permeable, easily drained, in an open situation and provided with good potable water. The area of the ground should increase progressively with the number of patients provided for. Thus, for 100 patients, 120 square yards per patient may be sufficient, while for 600 patients 175 square yards per patient are necessary, which is equivalent to saying that for a hospital intended to accommodate 600 patients, 22 acres, or say 108,000 square yards, are required. It is evi-



sively with the number of beds. There should be 52 cubic yards for two beds, and 85 cubic yards for each pair of beds if there are twenty beds in the ward. The sick or injured should be divided into classes of maladies, as is already done in a few new hospitals, among others in St. Stephen's Hospital, Buda Pesth. Of course, the buildings containing the laundry, kitchen, etc., must be at a distance from the sick wards, and the same remark applies also to the apartments of the doctors and the hospital staff. The various buildings should be well spread over the ground, but it should at the same time be easy to pass from one to another. An important matter is that

modern hospitals by rounding off all the corners, covering the walls with a paint, called enamel paint, which makes a polished surface, and also by reviving the pointed-arch style of ceiling, of which such judicious use was made in the Middle Ages, from the twelfth to the seventeenth century. This ceiling question is very important. The use of iron simplifies it. In these days, when the germ theory of disease has made such remarkable progress, hospital architecture must adapt itself to the laws laid down by hygienic science. To drive into the upper parts of the infected wards all those tiny atoms, ambient and invisible, which propagate dis-

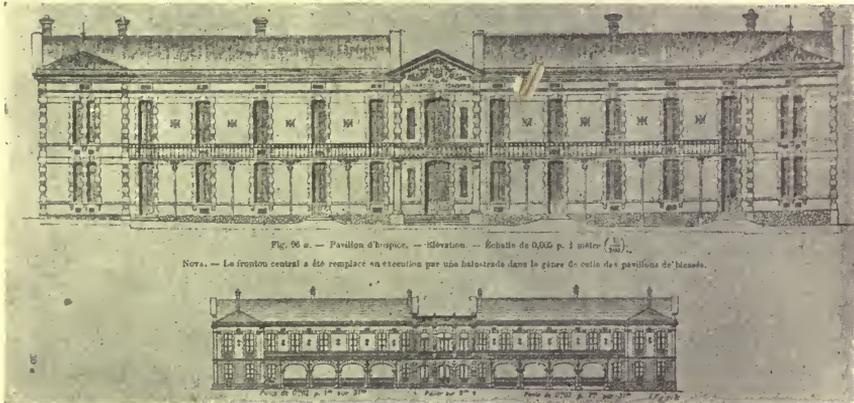


Fig. 28.—Hospital, Epernay—Elevation of a Pavilion.

of the point of the compass which the buildings should face. This can only be settled on the spot, after the usual direction of the wind has been ascertained. A good rule is to profit by the wind for the carrying away of all miasmas. To facilitate this work of nature it is desirable that the outside walls should have a smooth surface, and there should be no parts jutting out from the main block; for instance, no wings at a right angle. The artistic effect may suffer, but the result from a sanitary point of view will be an ample compensation.

Inside, this rule as to smooth surfaces is still more imperative. It has already been followed in several

ease; force them to depart thence into the open air without giving them a chance of hanging on to any ledge or projecting point—such ought to be the architect's principal aim. The ogival form is the one that most facilitates the expulsion of these dangerous guests. Experience has also taught that, to attain this result, nothing should be tolerated on the ground floor, beneath the sick wards, except open galleries, freely swept by currents of air, while above, in the attics, there must be the most complete ventilation, unimpeded either by partitions, store-rooms or sleeping apartments.

The architect's precautions should

go further still. The choice of building materials is of great importance. Well-burnt bricks are better than anything else. It requires ten years for a wall built of Paris limestone to become thoroughly dry, and it always gives passage to the air. Bricks, vitrified or nearly so, are always dry. Mortar joints are not so, but if proper cement is used the walls will be dry within a year. In every European country bricks are now made having one of their sides glazed like earthenware. Those are the most suitable material for the exterior walls. The

prison. Architectural relief and ornamentation being practically precluded, we must fall back on coloration. With enameled bricks nothing is easier than to produce coloration of a light and varied character. But this is a detail which we need not dwell upon at length here.

The first application of the Tollet system was made in the erection of the military hospital at Bourges, although it had been utilized previously for a few barracks. The Bourges hospital is situated in a healthy spot quite in the country. It faces the south-

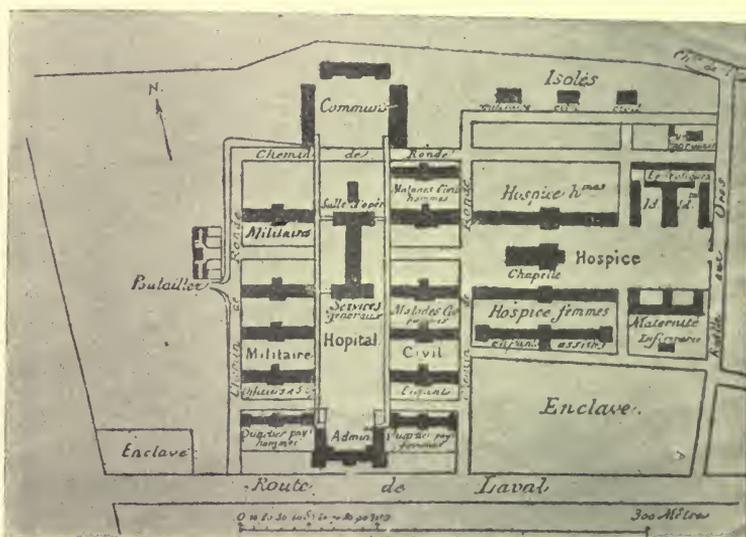


Fig. 29.—Hospital, Le Mans—General Plan.

fire-hose can then make short work of all the microbes that may have taken lodgings there. Any diminution in the average death rate, however slight, would be a full reward for the extra outlay.

We have by no means enumerated all the improvements that ought to be effected in hospital construction. The foregoing outline of them was necessary in order to make clear the ideas which have guided M. Tollet in the erection of some hospitals that may be cited as models. I ought to mention one other point. A hospital should be bright; it should not wear the air of a

west, and was planned to contain 260 beds. The area of the ground is 57,400 square yards, or 265 square yards per patient. The area built upon is 6,000 square yards, and the cost of erection amounted to 22 francs per square yard. The collective wards contain 28 beds each. Each bed occupies a space of 9 square yards, and has an air space of 63 cubic yards. All the conditions proposed by M. Tollet have not by any means been carried into effect, yet the result has been such that the Bichat Hospital, in Paris, which is a branch of the Hôtel-Dieu, has copied some of the essential features of the

structure of Bourges. This little hospital, formerly an old barracks, is of all the hospitals of the great capital the one where the mortality is lowest. But as it still belongs, owing to its plan, to the ancient system of parallel buildings surrounding a court-yard enclosed on three sides, we think it preferable to cite the civil and military hospital at Montpellier, where the Tollet system has been applied in its entirety. At Montpellier we still meet with parallel buildings, it is true, but they are so placed as to facilitate the natural airing of the gardens which separate

centre, 240 square yards in area, serves as a covered court-yard and promenade. In war time it could accommodate the wounded, if it were closed in with canvas or glass. Fig. No. 22 is a reproduction of the face plan of one of these buildings. It shows also the lateral galleries for the accommodation of the attendants. The section (Fig. 23) conveys a good idea of the value of the system. Below, the open, arched gallery, and above, the ogival-shaped ward, with ventilator and chimney for the escape of the vitiated air. To complete the picture, we give the plan

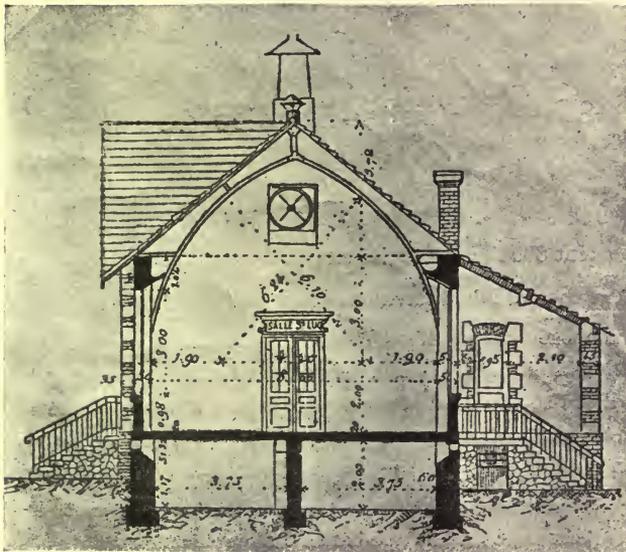


Fig. 30.—Hospital, Le Mans—Lower Section of a Hall.

them. The enclosure itself presents the aspect of a garden (Fig. 21). This hospital is located outside the town and faces in such a direction that the morbid emanations are never carried citywards. The grounds cover 22 acres, and the edifice has room for 610 beds. The ward buildings are of one uniform type, with only a single floor, and are raised about 12 feet above the ground on a series of elliptical arches supporting a floor in brick and iron. These arches are occupied only at either end, and there is a free circulation of air over two-thirds of their surface. The open part in the

of a sick ward (Fig. 24) where, according to needs, either one or two rows of beds can be placed; plan and front view of the building for contagious cases (Fig. 25), and plan and lateral elevation of the building containing the dissecting and lecture rooms (Fig. 26).

The Montpellier Hospital is an annex of the Paris School of Medicine and Surgery. There has been added a maternity section, with special infirmary, court-yards and gardens, and a separate entrance. In the construction of these the same principles have been followed.

Finally, the subsidiary buildings are connected one with another and with the ward buildings by covered passages, where the air is always kept fresh.

The total area covered by all the buildings amounts to 15,850 square yards, or about 23 square yards per patient, being almost double the space they occupy in their wards. The floor area of the wards in use may be estimated at 21,500 square yards, or nearly 36 square yards per patient. There are, besides, 92,000 square yards of court-yards and gardens, or 150 per head. The cost, including the price of the ground, was 2,250,000 francs, being 165 francs per square yard of buildings, say 3,680 francs per patient.

In the official report of the Universal Exposition of 1889 we find the following lines :

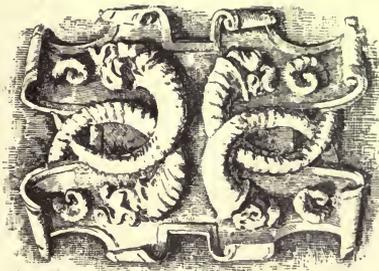
“In the place of buildings consisting of several floors, which offer great disadvantages, as they facilitate the dissemination of morbid germs and the propagation of certain diseases, there have been substituted detached edifices, either isolated altogether one from another

or united together by passages, and containing only a limited number of beds. These ideas are at length being carried into practical effect. The authorities have thought fit to draw attention to them in a special manner by placing before the eyes of the public, near the entrance to the Exposition, a plan of the new civil and military hospital at Montpellier, which is, above all other establishments of the kind, the one where these ideas have been most thoroughly worked out in accordance with the plans of M. Tollet, the engineer.”

Since that time the same system has been utilized for the new hospitals at Saint Denis, Havre, the St. Jacques Hospital, Paris, the Auban-Moët Hospital and Almshouse at Epernay (Fig. 27 and 28), the hospital at Le Mans (Figs. 29 and 30), the one at Bône, Algeria, and the Hospital of San Juan de Dios at Madrid, which contains no fewer than 800 beds.

Various improvements as regards matters of detail have been made in constructing these hospitals, but the essential features of the system remain unchanged. Its value has now been proved by experience.

Alphonse de Calonne.





DR. WILLIAM THORNTON.

DR. WILLIAM THORNTON, ARCHITECT.

THE architects connected with the early development of Washington were men of interesting personality and architectural talent.

Dr. William Thornton, a West Indian, was one of the first as well as one of the most interesting of these pioneers of the profession.

His family were prominent among the Friends in England. His parents moved to the Island of Tortola, in the West Indies, in 1761. Here Thornton was born May 27th of the same year. At this period either Thornton's father or uncle was Governor of the Island.

When five years old Thornton was sent to England to be educated. He studied medicine under Dr. Feld, then with the noted Dr. Brown of Edinburgh. In that city he graduated in medicine in 1784. His studies were continued in Paris.

In the latter city an intimate friendship was formed with the noted Countess Beauharnais, a relative of Empress Josephine's first husband. She was an authoress and held a famous salon.

Thornton traveled extensively on the continent of Europe with Count Audriani, the naturalist. After which he came to this country and formed a temporary residence in Philadelphia.

In 1790 he married the daughter of Mrs. Ann Brodeau, a successful school teacher of Philadelphia. Mrs. Thornton, who was born in England, was a lady of culture, and an artist of some ability, which is proved by a miniature of her husband in the possession of Mrs. Kennon. After their marriage they returned to Tortola, where Thornton had an interest in the estate of his father.

In 1793 he moved to Washington city, where he lived until his death, in 1828. He left no children.

He found it necessary to take a house in Georgetown. Some years afterwards he moved to 1331 F Street, opposite the present Ebbitt house. At

this place he and James Madison were neighbors for eight years.

Benj. Ogle Tayloe says: *"He had a well-earned reputation for letters and taste; . . . he was a wit, a painter and a poet." Dunlap,† whose work was published only a short time after Thornton's death, says: "He was a scholar and a gentleman, full of talent and eccentricity, a Quaker, by profession a painter, a poet and well acquainted with the mechanics, arts; his company was a complete antidote to dulness."

Thornton's duties brought him into close relation with such eminent men of his day as Washington, Madison, Jefferson, Randolph, L'Enfant, Adams, Hamilton and Fulton. He was intimate socially with the Tayloes, Carrolls, Stuarts, Van Nesses, and others who were the features of political and social life at the federal capital in those days.

The acquaintance with Washington ripened into such an intimacy that his home was the president's familiar resort when in the federal city.

The "National Intelligencer," of March 29th, 1828, as well as the Columbian Institute and the Colonization Societies in memorials on his death, pay a high tribute to his ability good fellowship and philanthropy.

The American Philosophical Society‡ conferred the Magellanic gold medal upon him in Dec. 1792, as a distinction for his book on written languages.

As an author he wrote a treatise on the elements of written language, which was published in Philadelphia, in 1793, under the title of Cadmus. There is an extended review of Cadmus in the "Monthly Review" of the date, as well as a note in reference to an article on teaching the dumb.

He published papers on medicine.

*In Memoriam Tayloe, p. 98

†Dunlap, "Art and Design," N. Y., 1834.

‡Trans. American Philos. Society.

astronomy, philosophy, finance, government and art as well as on language.

According to the "Science Record," in June, 1810, he published a long defence of Fitch as the inventor of the application of steam to navigation. This pamphlet was reprinted in the Patent Office Record, in 1850, and is considered an official document of value.

As an inventor he claimed, according to Tayloe, to be the first to apply steam to boat propulsion. He was associated with Fitch in his experiments on the Delaware before Fulton commenced his on the Hudson.

Brissot describes Fitch running a boat from Philadelphia to Trenton in 1789 by steam and notes the fact that thousands witnessed the event.

In his pamphlet (1810) Thornton claims that Fulton was indebted to him for valuable suggestions, as Fulton saw Thornton's drawings when he visited the patent office in 1806. As early as 1788 Rumsey applied for a patent on steamboats, which conflicted with the invention of Fitch. This was proved by Fitch winning the case. Fulton's first patent was not issued until 1809.

Thornton claimed that Fulton's death was due to worry caused by the strength of his pamphlet. While in America the first time Thornton was engaged to build steamboats to navigate the Mississippi (before 1790). This scheme fell through for lack of financial aid. Thornton seems to have had greater faith in the future of steamboats than Fulton, who offered to bet the former that a boat could never go more than 5 miles an hour, while Thornton expected a speed of 12 miles.

Another invention which has recently been revived was the conversion of sawdust into planks.

Thornton received patents for improvements in steamboats, steam-boilers and condensers. Fernando Fairfax gave him £2,000 for a quarter interest in his patents and manufacturing companies.

As an artist, Thornton was more than an amateur. Tayloe mentions a head of Jefferson, by King, as a copy

of a painting by Thornton, and Mrs. Kennon, at present the owner of Tudor house, in Georgetown, who knew Thornton in her childhood, has a miniature of Washington painted by him. Mr. Charles Hoffman, of Frederick, Md., and Mrs. Miller, of Washington, have pieces of his work, among them being a portrait of the Countess of Beauharnais.

He was noted for both philanthropy and bravery. Brissot says: "From conversations with Thornton, although his exterior denotes not the Quaker, yet he professes their principles and practices their morality." *Brissot gives quite a lengthy account of Thornton's efforts to colonize the negroes in Africa; he went to the expense of sending an agent to Africa to locate a colony. Unfortunately, this vast scheme was not accomplished. He became actively interested in negro colonization as early as 1789, and was until his death a member of the American Colonization Society.

When the British captured Washington, in 1814, an officer ordered a gun turned on the Patent Office Building. Thornton rode up and jumped off his horse in front of the gun demanding: "Are you Englishmen or Goths and Vandals? This is the Patent Office, the depository of the inventive genius of America, in which the whole civilized world is concerned. Would you destroy it? If so, fire away and let the charge pass through my body." † By this effort the patent records were saved. Thornton carried the Patent Office records to his farm in the country, so that none were lost. He also placed a guard at the navy yard and capitol during the evacuation. ‡

Several instances are on record where in attempting to protect a wife from a brutal husband he, in turn, found it necessary to defend himself against both wife and husband.

Among his papers are his commission as Lieut-Captain in the War of 1812.

One of his most intimate friends was John Tayloe, the owner of the

*Brissot, *Citoyen Francais*, Vol. I, p. 245. From note in Toner collection.

†The Patent System of the United States, by L. H. Campbell.

‡Private letter.

Octagon house, probably the most noted producer of race horses in this country. Thornton also kept and raised race horses. He imported fine animals from Barbary and England. His account books show quite a number of blooded stock that are valued at more than \$2,000 apiece. By horses and benevolence he is said to have lost large sums of money.

There are three things that connect Thornton intimately with the history of Washington city and the country, and where the excellent character of his work places the people under obligation to him.

First, for his artistic capacity and skill in producing the best scheme for a capitol, which forms the nucleus of the present structure. Second, for his general culture, breadth and capacity as one of the Commissioners of the District, which is shown in the execution of the magnificent ideas of Washington and l'Enfant as to streets, his own and Hoban's ideas as to public buildings and grounds. Third, for his mechanical knowledge and executive ability. The Patent Office, which has fostered and encouraged the inventive ability of the country began under his management.

THORNTON AS A COMMISSIONER OF THE DISTRICT OF COLUMBIA.

The Superintendent of Public Buildings and Grounds has quite a number of volumes, embracing early letters concerning the formation of the District of Columbia, the laying out of Washington City, and the erection of the Federal Buildings, as well as a complete record of the proceedings of the Commissioners, from 1792 to 1802.

The history of Thornton's connection with the City and Public Buildings is to be found in these volumes and in letters in the possession of private parties.

By act of Congress, Jan. 4th, 1790, the President was authorized to appoint a commission to survey the District, purchase, adopt and lay out a plan for the Federal City, and prior to the "1st Monday in December 1800, they were to provide suitable buildings for the accommodation of

Congress, the President and the public offices of the United States Government." All their work was subject to the approval of President Washington.

*The first commissioners appointed, Jan. 22d, 1891, were Thomas Johnson and David Carroll, of Maryland, and David Stuart, of Virginia.

On Sept. 16th, 1794, Thornton received this commission from President Washington: . . . "I hereby appoint said Wm. Thornton one of the Commissioners for surveying the District of Territory accepted . . . for the permanent seat of the Government of the United States, . . . with all authority to proceed according to law.

"Given 12th day of Sept., 1794, of the Independence of the United States the Nineteenth."

"George Washington,
"by Edw. Randolph."

There is nothing in the records to show the time that the Commissioners were expected to devote to their duties. This matter was probably left to their own judgment, and they must have had considerable time to attend to private business.

The salary of a Commissioner was sixteen hundred dollars per annum. After Thornton became a member of the board of commissioners, a decided improvement is evident in their written proceedings and in the business forms and contracts which were introduced in connection with the streets, bridges and buildings that were in their charge. As they appear in the records after his appointment, Thornton should have the credit for the improvement.

The ability of Thornton was appreciated by his contemporaries.

Andrew Ellicott, who was doing the field work in laying out the city, sent a letter rejoicing in Thornton's appointment for the good of the streets and buildings, saying: "The former commissioners were totally ignorant and an easy prey." He warns Thornton to be on his guard. Washington, before retiring from the Presidency, says: †"I think the United States are interested in the continuance of you

*Proceedings of Commissioners, 1791, Vol. —, p. 2.
†Old letters. Feb. 27th, 1797

in the service, therefore I should regret if either of you (Thornton, Scott or White), by resignation should deprive them of assistance which I believe you are able to give."

Thornton's education and disposition caused him to take an active part in all the duties of the commissioners, which consisted in supervising the surveys for the District boundary, the streets of the city and the subdivision of the squares into lots and the location of Federal buildings. The preparation of maps and their reproductions, obtaining plans for the Federal and the arrangements for temporary buildings and bridges, laying out grounds, the opening of quarries, brickyards and kilns, lime-kilns, the cutting of lumber, and the obtaining workmen for brickmaking, quarrying, stone-cutting, as well as brick and stone masons, carpenters and laborers.

Workmen, at this period, were obtained by advertisement and negotiation from England, Scotland, France and different parts of this country.

The commissioners let all contracts and supervised the foremen who obtained the material from the quarry, kiln or forest, and who superintended the work on streets, buildings or bridges. In all cases we find Thornton insisting on the necessary grandeur of scale. He puts himself frequently on record as opposed to some of the narrower views of other members of the board.

*The commissioners, on July 20th, 1795, made building regulations for the city. It would be fair to assume that Thornton, being the architect on the commission, was the prime mover and preparer of these regulations.

The commissioners obtained and disbursed money, bills for even the most trifling objects being submitted for their approval. They attended to the sale and other negotiations in the connection of transfers of lots.

Thornton was delegated to negotiate a loan in Philadelphia and another later on in England. In both cases he was successful.

In answer to a letter from Washington concerning a National University,

two commissioners write, Feb. 18th, 1797: "Dr. Thornton has long had in contemplation to lay before the executive such a one."

In 1801 the Commissioners of the District became offended at some report of Congress which reflected upon their management. By request, a committee of Congress examined their accounts and it was proved that the commissioners had served with perfect integrity.

An act, May 1st, 1802, abolished the office of the commissioners, their principal duties being complete, and the President appointed Thomas Monroe to perform a part of the duties of the commissioner.

THORNTON AS AN ARCHITECT.

He early displayed a talent for drawing. When a lad at school in England, he showed his uncle two five-pound notes, asking him to select the one which was best engraved; this proved to be the one young Thornton had just copied in pen and ink.*

When or where Thornton prosecuted his architectural studies is not recorded. It has been asserted by some writers that he was simply a dilettante in the profession. The only way in which we can judge of his attainments is by an examination of his work, and a knowledge of the estimation in which he was held by his contemporaries. His drawings show skill in draftsmanship, as well as education and refinement in design. His executed work compares favorably with the best of the period, in design and construction. He was trusted in a professional capacity during long periods by such astute men as Washington, Jefferson, Madison and many others.

Adolf Cluss, in an address in 1869, calls him an amateur. J. H. B. Latrobe, in an address delivered before the American Institute of Architects in Washington, in 1881, states that Thornton had only two weeks' study in the profession. Trumbull gives him the credit of having studied three months. To have accomplished so

*Proceedings of Commissioners, Vol. 1, p. 407.

*Science Record, 1872.



Wm. Thornton, Architect.

HOME OF PRESIDENT MADISON—REAR VIEW.

Montpelier, Va.



Montpelier, Va.

HOME OF MADISON—FRONT VIEW.

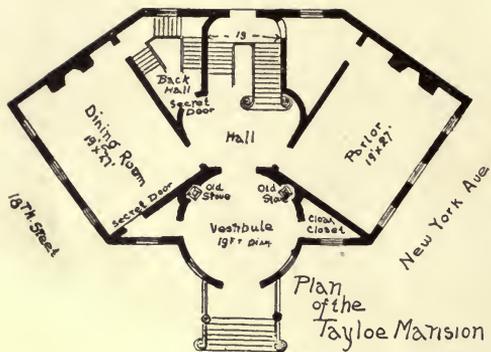
Wm. Thornton, Architect.



OCTAGON HOUSE—COMPLETED IN 1800.



OCTAGON HOUSE.



OCTAGON HOUSE—PARLOR MANTEL.
Wm. Thornton, Architect.



OCTAGON HOUSE—MANTEL IN MADISON'S HOUSE.

Wm. Thornton, Architect.

much with so little study, he must have been a truly remarkable man.

THORNTON'S PRIVATE ARCHITECTURAL WORK.

Washington erected a building on North Capitol street, between B and C streets, Washington, D. C., which at the present time is known as the Hillman House. Dr. Thornton was the architect and superintendent, as shown by letters of Washington. The exterior of the building has been altered and additional stories have been added. Some of the interior work still remains intact and shows the skill and refinement of the architect in detail. (See Figs. 3 and 4.) An old sketch gives

an idea of the exterior of this building as it appeared in 1793.

Montpelier, Orange County, Virginia, the country residence of James Madison, was another piece of Thornton's work, which in dignity, simplicity and refinement compares favorably with some of the best modern residences. In a letter to Mrs. M. H. Smith, September, 1830, President Madison says: *"The only drawing of my house is that by Dr. Wm. Thornton, it is without the wings now making a part of it." (See Fig. 5, Montpelier home of Madison.) The interior of Montpelier has been remodelled out of all semblance to its original self.

*Writings of Madison, Vol. 4.

The Octagon house, Washington City, one of the most interesting old residences in this section of the country, was built by John Tayloe and completed in 1801. Geo. Washington took a lively interest in its erection as it was by his advice that the owner of the Octagon selected Washington for his home. Thornton was the architect.† (Fig. 6—Exterior view of Tayloe's Octagon house.)

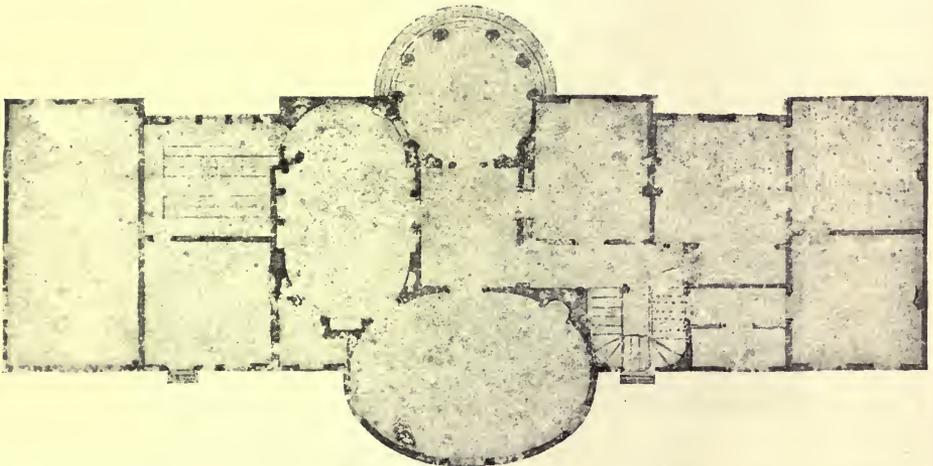
This house on the exterior is simple and dignified, being built of brick, with sandstone trimmings. The entrance porch had stone columns with Ionic caps. The plan is peculiarly interesting. It can be easily understood from the illustration. (Fig. 7.—Plan of Octagon house.)

Tayloe being wealthy, could have indulged his taste in such things.

*This house is interesting also from its historical associations. Madison having occupied it after the White House was burned by the British in 1814.

The Tudor House, Georgetown, D. C., was built about 1810, by a Mr. Peter. Although an imposing old structure, the work does not compare with that shown in the Octagon House.

The interest in this house centers in the fact that one of Thornton's original sketches for both plan and elevation are still in existence. (See Figs. 13 and 14.) The exterior of this house is very nearly in its original condition. In the



Tudor Place—Ground Plan.

Wm. Thornton, Architect.

The interior work, such as mantels, cornices, pilasters and doors, were rich, elaborate, refined and thorough in their construction. They are still in an excellent state of preservation, although the house has been indifferently cared for for many years. (See Figs. 8 and 9, mantel in parlor; 10, mantel in bedroom; 11, detailed measured drawings.)

The doors and trimmings in this house are mahogany. The figures on the parlor mantel are so good that they must have been made by some of the noted sculptors of that day, possibly Canova, or Thorwaldson; John

plan will be noticed the elliptical form of room which Thornton first used in his plan of the Capitol. While the exterior of this house is an improvement on the sketch, the alterations in plan, probably to save money, is decidedly inferior to the original.

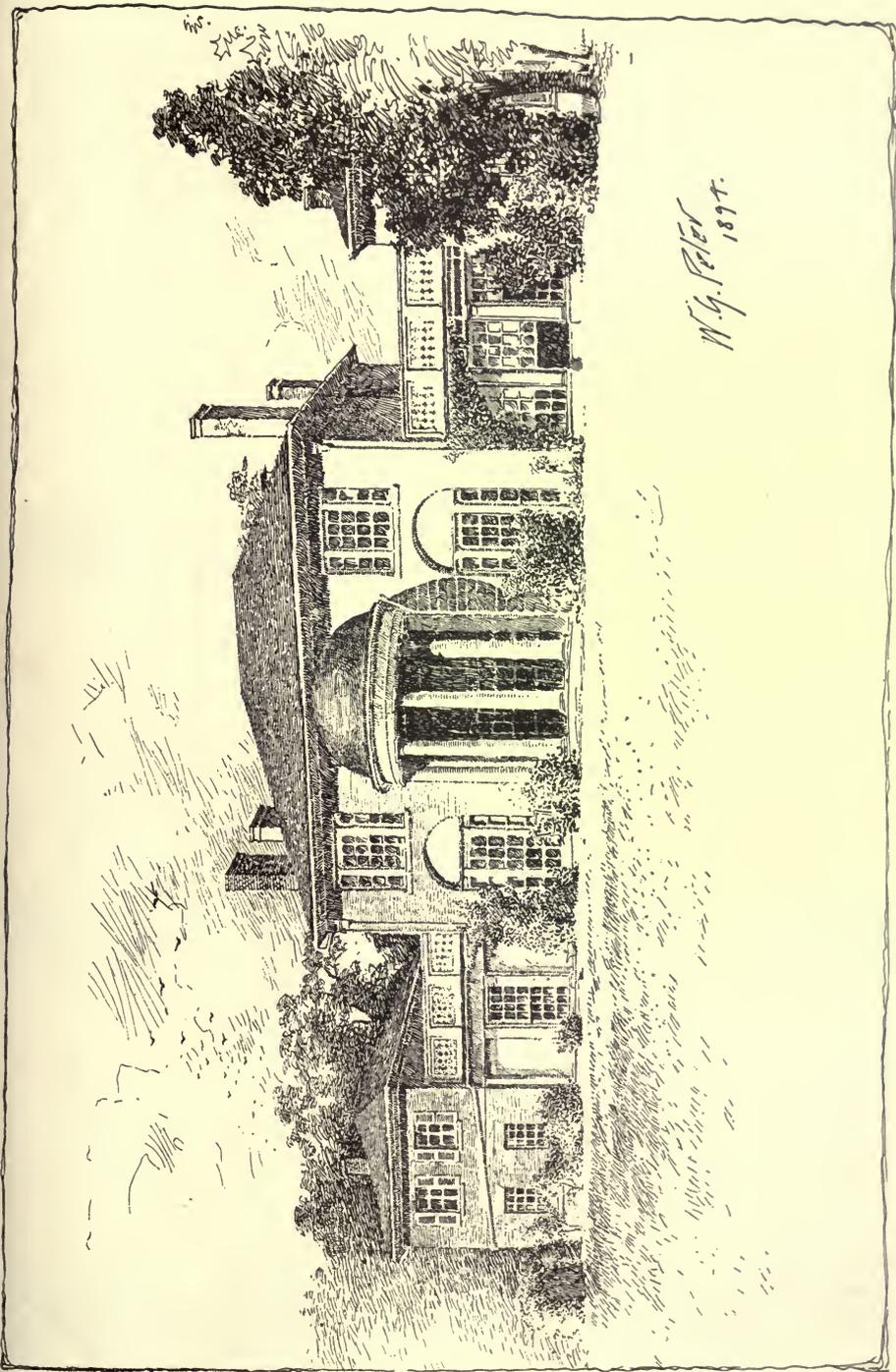
There are several of Thornton's sketches for private houses in my possession.

THORNTON'S PUBLIC ARCHITECTURAL WORK.

He made Jefferson a design for the Va-Mace, in which he used the rattlesnake as the principal feature, because

†In Memoriam, Tayloe.

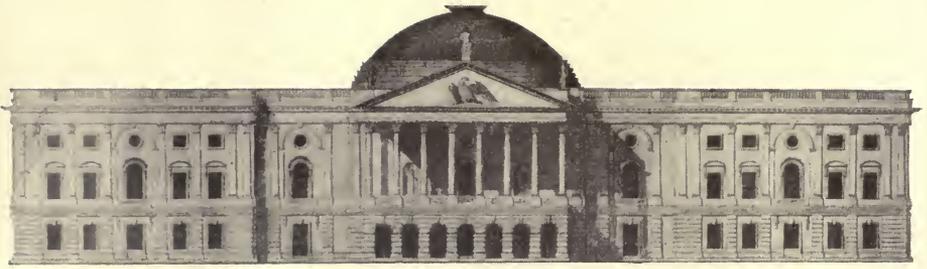
*See Article by Author on Octagon House, American Architect and Building News



Wm. Thornton, Architect.

TUDOR PLACE—AS ERECTED.

Georgetown, D. C.



Modified Elevation of the Capitol—North Wing Completed Under Thornton's Supervision.



Thornton's Competitive Design for the President's House—Modified View of Wing.



Competitive Design for the President's House, Made in 1792—Rear View.



Competitive Design for the President's House, 1792—Front View.

it is peculiarly American, is peaceful until hurt or aroused for self-defence, and only strikes after giving warning.

He made an elaborate scheme for a Washington monument, a description and rough sketch of which are among his private papers. The sketch shows a mound of massive natural boulders, on and around which are grouped many typical and natural figures, Washington surmounting the whole.

THORNTON'S COMPETITIVE DESIGN FOR
THE PRESIDENT'S HOUSE.

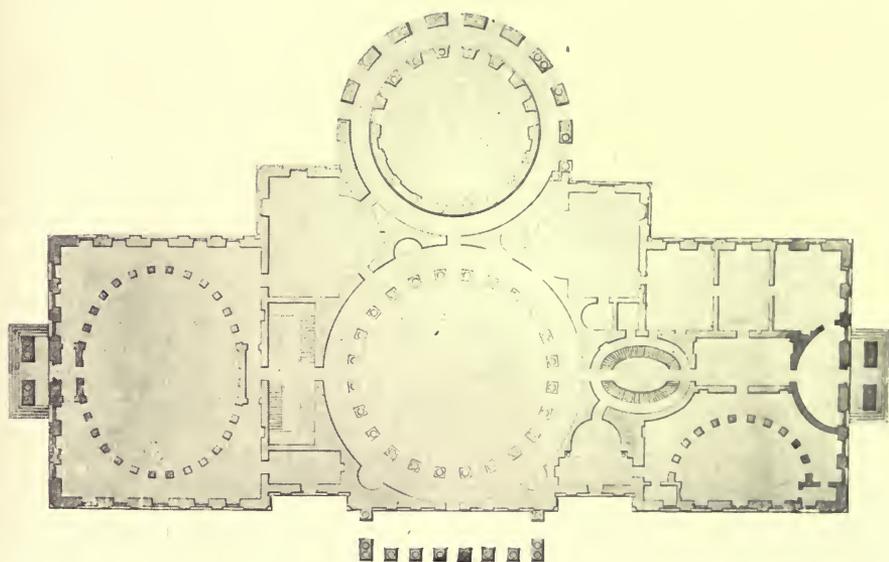
Among the drawings of Thornton's which Mr. Edward Clark has loaned me, is evidently his design for the

design, it will be readily seen that this could not have been prepared for any other purpose.

This sketch, as can be seen by the illustration (Figs. 18 to 20), shows a well executed wash drawing of good proportion, dignified and simple in its treatment. The alternate flap (Fig. 19), suggests a decidedly improved form for the wings.

It is difficult to understand the plan of the building from the elevations, although it is clear that official, private and social duties were each intended to have an apartment to themselves.

It is difficult to compare this plan



Thornton's Sketch Plan of the Capitol, Washington, D. C.

President's house. Thornton wrote from Tortola to the commissioners at that date, 1792, stating that he had made designs in conformity with the advertisements soliciting competitive plans for the President's house and Capitol. In an answer to this letter, Nov. 15th, 1792, the commissioners state that the plan for the President's palace had already been selected.

This design of Thornton's conforms with the requirements of the advertisement which suggests a central building and wings, built of brick and stone. Knowing that Thornton made such a

with the present structure, of which only the central portion has been erected. The central portion of Thornton's design will compare favorably

THE CAPITOL OF THE UNITED STATES.

Decidedly the most interesting piece of Thornton's architectural work was the successful design for the Capitol. An advertisement solicited competitive plans for the Capitol and President's house, in March, 1792. During July of the same year, plans were submitted. None was found suitable for the former building. In July, Thorn-

ton wrote to the commissioners that he had not heard of the competition in time to prepare his drawings, but as the first drawings submitted would most probably not fill the requirements, he requested that his designs might be examined. On December 4th, the commissioners requested Thornton to send his plan of the Capitol to the President. The period between July and December was given by the commissioners and Washington to the consideration of the modifications of the plans submitted, Mr. Hallet, whose plan was most successful, working under the direction of the commissioners. They waited three weeks after the expiration of the time Hallet promised his modifications and requested Thornton to send drawings to the President at the same time. Feb. 7th, 1793, the commissioners state the general satisfaction of the President, themselves and others in the plan of Thornton. Washington says: "Grandeur, simplicity and convenience seem so well combined that I do not doubt it will meet the commissioners' approbation."

April 15th, 1793, Thornton received a formal notice of the acceptance of his plan, for which he received \$500 and a building lot in the City of Washington.

Thornton would not agree to devote his whole time to superintending the work, and Stephen Hallet, George Hadfield and James Hoban were employed at different periods as superintendents.

Hallet, almost as soon as he received his appointment, endeavored to engraft upon the work his own ideas. For this reason he was discharged. To prevent further attempts of this kind was probably one of the reasons why President Washington appointed Thornton one of the commissioners (Sept. 12, 1794). The commissioners had full power over the Federal buildings, and as Thornton held this position until 1802, he was able to prevent further tampering with his design for that length of time. Hadfield was appointed to take Hallet's place, special note being made of the fact that he was only to act as superintendent. In spite of this warning one of his first

efforts was to induce President Washington to allow him to change certain features which he considered improper. He was curtly notified to attend to the duties for which he had been employed. As he seems to have been unable to accomplish this end, he resigned, but was re-employed on making special agreement to confine himself to superintendence. He retained the position until 1798.

James Hoban was employed as superintendent of the Capitol, in addition to his duties at the President's house, whenever the Capitol was without its separate superintendent. Hoban and Thornton seem to have been excellent friends, as each attended to his proper duties. Hoban's duties at the White House prevented his employment, except in an emergency.

Thornton's actual connection with the Capitol ceased when the office of commissioner was abolished in 1802. Latrobe was appointed by Jefferson to take charge of the Capitol. Just before Latrobe's appointment, Thornton objected to changes which Jefferson wished to make, saying: "They would not be in accordance with his (Thornton's) plans of the Capitol." Whether this persistence in adhering to his own ideas was the cause of his further services in this connection being dispensed with, there is nothing to show.

Although his advice was not asked in connection with changes, he still took a lively interest in the slur Latrobe cast upon the plan, design and workmanship of this building, and wrote an effective answer to Latrobe's private letter to Congressmen (a printed document) in which the facts stated by Thornton are proved either by the documents on file in the office of Commissioners of Public Buildings and Grounds, or by letters in the hands of private individuals.

Government documents prove the following facts in reference to Thornton's connection with the Capitol. His design was selected in a second competition. This design was modified principally to make it cost less, and use some less daring methods of construction than were suggested in Thornton's

*Old letters in the hands of private parties.

original sketches. The modified design made by Thornton was commenced and carried out until the abolition of the board of commissioners, practically without any change. Many attempts were made to modify this plan. Hallet put in a foundation for a square centre in place of the contemplated dome. When Thornton was appointed commissioner, Washington requested him to see that everything was rectified so that the building would conform to the original plan. Thornton at this time drew another elevation and restored the dome on the plans; he made new sections and other drawings some of which he thought improved the appearance.

When Thornton retired from the work the old north wing was completed, this is the portion of the building in which is situated the Supreme Court. The foundation of the rotunda was nearly if not completely laid and the foundation and basement walls of the old south wing were in place (present Hall of Statuary).

Latrobe complains in his private letter that he must necessarily conform the exterior of the (old) south wing with Thornton's (old) north wing. Latrobe made changes in the Hall of Representatives (this is neither the present Hall of Statuary or of Representatives), which were decidedly inferior to form shown in Thornton's plan.

This room was destroyed by fire in 1814.

The central portion was not completed for years afterwards, but from the plans and descriptions extant it must have been largely on the lines laid out by Thornton in his accepted plan, with the exception of the semi-circular western porch.

THORNTON AS SUPERINTENDENT OF PATENTS.

When the Board of Commissioners was abolished, Thornton was placed in charge of issuing patents. The first patent legislation occurred in 1790. The Secretaries of war, State and Attorney General were authorized to grant patents.* It is stated that over

the issue of the first patents Jefferson, Secretary of State; Knox, Secretary of War; and Randolph, Attorney General would hold special conferences. In 1793, this law was changed, putting the matter in the hands of the Secretary of State. In May, 1802, President Jefferson appointed Wm. Thornton a clerk, at \$1,400 per year, to take charge of patents. At one period he was given \$2,000 a year as Superintendent of Patents, at the same time acting as Justice of the Peace, being entitled to certain fees, a Commissioner of Bankruptcy and a member of Levy Court. He was the first to have charge of patents. His salary, with other positions, was supposed to be \$2,400. Madison urged Congress to give him this amount for his patent office work.

In 1810, Thornton moved models, records, etc., into Blodgett's Hotel. The government had purchased this building, located on the north side of E Street, between 7th and 8th Streets. Into the east end of this building the Patent Office was moved. The U. S. Patent and Postoffice remained in this building until the fire of 1836.

In the Blue Book of 1821 Thornton is recorded as Superintendent of Patents. Mr. Campbell says: "During many years of his superintendency, he freely exercised his discretion in issuing patents.

"In a communication to the Secretary of State, Jan. 16th, 1818, Thornton defined equities and limitations of a reissue as concisely and luminously as has ever been done by any court or text writer."

From Thornton's practice grew the Act of July 3d, 1832, providing for the reissue of a defective patent. Thornton held this office until his death, March 28, 1828.

When the present Patent Office was being erected, Mrs. Thornton requested Robert Mills, the architect, to put either a niche or bracket in the building for the reception of a bust of Thornton, because he had done so much for the good of this department. No notice seems to have been taken of this request.

In 1873, Mrs. Adelaide Talbot, a half niece of Thornton, presented to the Patent Office the portrait of Thornton.

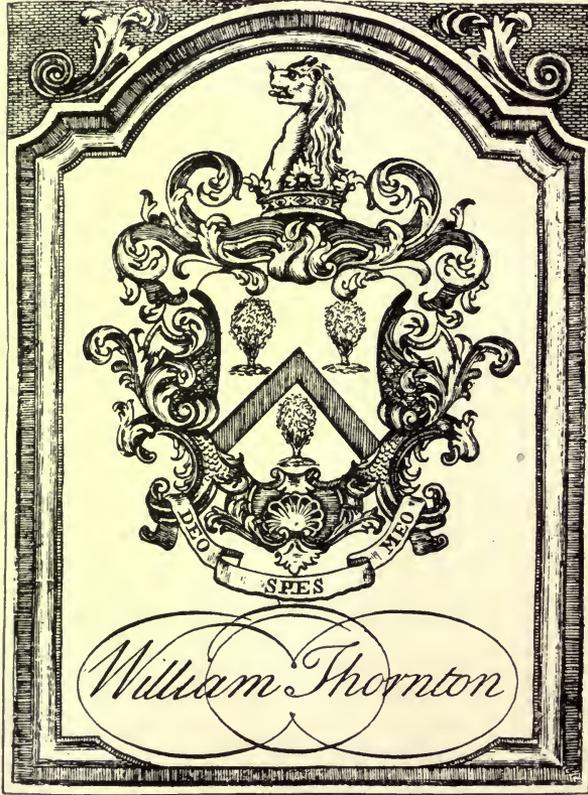
*Patent System of the United States. L. H. Campbell.

It hangs in a place of honor in the Commissioner's room.

Thornton is buried in the Congressional Cemetery, under a tomb similar in form to those erected to Senators

and Representatives. The President of the United States, members of the cabinet, and of Congress, followed his body to the grave. On his tomb is chiseled his motto, "Deo Spes Meo."

Glenn Brown





AUTHORITY IN ARCHITECTURAL DESIGN.

WITH the revived interest in architecture, and with the knowledge of it that has come within these latter years to the inhabitants of the United States, there have come innumerable notions, more or less wise, more or less persistently expressed, each one demanding some restriction upon the doings of architects in order to suit the views of its especial advocates.

The restrictions are either statutes enacted or demanded, or deference to certain ideas expressed with the boldness of authority, and tending always toward the use of legal force to maintain them.

Outside of building laws, which are, ninety-nine hundredths of them, politicians' tools for party aggrandizement, special enactments are continually demanded. Chief among these is the law to limit the height of buildings and the law to regulate their height by that of adjoining buildings, so as to secure as far as possible a uniform height of all the buildings in a street. Not less important is the bill to give politicians the power to prevent architects from practising at all, based, I presume, upon the well-known ignorance, incompetence and dishonesty of architects, and the intelligence and incontaminability of politicians. Add to these the various art commissions upon statuary, paintings and so on, that it is proposed to establish, that in some cases have been established, perhaps without legal power, yet

claiming to be the voice of alleged authority, and ready at the earliest opportunity to enforce their views by law.

Two causes, one general and one special, yet closely connected, are discernible. One is the general reactionary tendency observable in this country to forsake the ideas of the founders of the Republic, that government should be reduced to a minimum; that it was the privilege of the members of a free government to do what constituted for each of them the pursuit of happiness, whether others regarded it as moral or immoral; that only to repress attacks upon this freedom should governmental organizations be used. Forsaking all this, the tendency of the moment is to make the acts of each, however clearly non-aggressive, subject to the censorship of the mobile vulgus.

The special cause is the growing number of those who obtain their education in Europe; who, carried away by the grace and charm of the older civilization, admirably and laudably wish their friends to share their pleasure; and to that end would erect in a moment here what a thousand years has there slowly ripened; would build for us a dreamland with what sticks and canvas and paint may be obtainable; would construct for us thankless ones, a diadem with Dutch foil and quartz sparks, a sunset with lanterns and colored glass.

For up to the very last point we

may hold with this Europeanizing school, agree with them, admire them, love them. They are true and sincere lovers of the worthy, the beautiful, the refined.

They say, and they say truly, that American architecture is for the most part barbarous. They show, and it is undeniable, that our public works of art, statues and parks, are mostly monstrous.

Let us acquaint you, they say, with better things, such as you yourselves, when you come to know them, will admit to be better than what you have hitherto done.

However much we may be disposed to deny, fair and candid dealing will compel us to admit all that these men charge. We are as a nation, half-baked and barbarous. Moreover, we are commercialized, in this commercial age, beyond any other country. Others have traditions, feudal and ancestral, or ethical and religious, that mitigate the asperity of a purely commercial regime, traditions of noblesse oblige, for both prince and peasant, of affection for ancient landmarks, monuments and customs, that do much to maintain the harmony of a past time through the present chaos of transition. But here there is no consideration for the mass of us but dollars and cents.

If a building is handsome, that is to say if it is costly and elaborate, we care not for logic or beauty, we do not even know, most of us, what beauty means. It is indeed astounding to discover how far among us the aesthetic sense is atrophied. It is as though in cookery we had lost the sense of taste; as perhaps we might indeed be thought to have lost that also, were it not for the distinct appreciation that we show of French cookery.

So our lack of a sense of beauty has evolved for us an atmosphere which reacts to still further dull us to beauty. How, from an entourage of tenement houses and elevated railroad skeletons, shall an artist emerge?

Although other nations may excel in particular points, yet for aesthetic sense, the French are first. In architecture, especially the French once did, what no other nation but the un-

qualified Greek has done, pushed an architectural style—a style in the highest and best sense, the reasonable adornment of a logical system of construction—to the extremity of perfection.

But, admitting all this, what shall we do to advance ourselves to the plane of the more developed nations?

Will it suffice for us to set up for ourselves as the ultimate authority, methods and ideals that they have evolved? Is it possible for us to graft upon the thousand branchlets of our growth a new species of fruit? And, if it be possible, are we sure that cultivation and selection of the seed of our proper stock may not perhaps excel in quality the scions offered?

The supremacy that I have spoken of as achieved by France in architectural development, the perfecting of the Gothic style, the only style besides the Greek that ever reached perfection, was achieved not by the methods of the schools, but by cutting loose from the methods of the ecclesiastical schools that then ruled, and rejoicing in the spring breeze of a newly found liberty. It was not by churchmen, but by laymen, by the people of the free cities, that the culminating glories of French architecture, during the latter part of the thirteenth and the earlier part of the fourteenth centuries were built. Since then, although the new discovery of antiquity and the decline of religious ecstasy made the Renaissance inevitable, nothing but the genius of the French people has prevented it from degenerating into a mere ossification.

For, in judging of French ideals, even of modern French ideals, too much dependence must not be placed upon their champions here. The reduplication of classical colonnades, the frontispieces of pilasters and cornices, tier upon tier, in unexceptionable Ionic or Corinthian orders, perfect enough in their way, but a little wearisome after we have seen them several thousand times, these are not by any means the ideals of the most conservative French school. On the contrary, they know as well as anybody what logic and good sense mean in design, but an unfortunate spirit of chauvin-

ism leads them to copy themselves, over and over again in the details of ornament, resulting in a degradation which nothing but their innate French good taste saves from failure.

It is to be regretted that I am unable to obtain illustrations to show what I mean. Let me try to describe one typical instance.

Serving as a support to the spring of a certain arch in the Palais de Justice, in Paris, is a hybrid Ionic capital, of a pattern often seen, the volutes springing perpendicularly from the necking and joining each other by a horizontal band just above the necking. Above this is a detached piece of a hybrid architrave. The whole stands upon a corbel of hollow quarter circle profile, bearing in the hollow a sculptured female head. Although the profiles are refined and the carving and modelling excellent, such a curious compound cannot be regarded otherwise than as debased art.

Many similar instances might be brought to warn us not to sit too humbly at the feet of any master. Moreover, no amount of authority can justify such decorations as the familiar festoon, the mask and the escutcheon as intellectually tolerable.

Somewhat revived in our self-esteem by the discovery that we too have some little taste, some little intelligence. Let us ask ourselves whether we have not abased ourselves too much, whether there may not be virtues hidden under our uninviting exterior, seeds of flowers yet to bloom.

We are encouraged in this view by the expressed opinions of French writers themselves. Says a contemporary French periodical, speaking of Americans and American art: "One might be willingly tempted to think that a race so absorbed by business and commerce would be entirely deprived of artistic sense. It is not so; the Americans are better endowed, in this respect, than the pure Anglo-Saxon race. Their painters appear with honor at our exhibitions, and one may listen to a girl from New York or Washington sing without stopping his ears. As for their architecture, in the midst of imitations of all styles, one

encounters, often an attempt that is happy—original.

"But what is peculiar to them is the construction of their lofty buildings, of which we have on several occasions given characteristic specimens. In this order of ideas they have known how to answer to new needs with novel inventions, which by their originality often present both good proportions and a certain majesty in their mass."

"Nos confrères des Etats-Unis ont une science de confort que nous ignorons absolument."
Moniteur des Architectes Nos. 71-72, p. 119, 1893.

Nor is this a single note of approval; on the contrary, the habitual attitude of the French press joins to its expressions of disapproval of the horrors that we do perpetrate, an outspoken wonder at, and admiration of, great gifts beneath.

Thus, in speaking of American interiors, another writer remarks: "Our fellow architects in the United States have a knowledge of comfort of which we are absolutely ignorant."

On serait volontiers tenté de croire qu' une race aussi absorbée par les affaires et le commerce est entièrement dépourvue du sens artistique.

Il n'en est rien; les Américains sont mieux doués sous ce rapport, que la race anglo-saxonne pure. Leurs peintres figurent avec honneur à nos expositions, et l'on peut entendre chanter une miss de New York ou de Washington sans se boucher les oreilles. Quant à l'architecture, au milieu d'imitations de tous les styles, on rencontre souvent une tentative heureuse, originale. * * *

Mais ce qui leur est propre, c'est la construction de leurs hautes maisons, dont nous avons donné, à plusieurs reprises des spécimens caractéristiques. Dans ce ordre d'idées, à des besoins nouveaux ils ont su répondre par des créations nouvelles, qui, par leur originalité et présentent souvent des proportions heureuses et une certaine majesté dans leur masse.

La Construction Moderne, 1 July 1893.

More noteworthy yet is the attitude of the French critics of the World's Fair, at Chicago. In that, all of the large buildings, except one, were avowedly designed upon the system supposed to be inculcated by the Ecole des Beaux Arts; and embodied some of the principles which the law is now to be invoked to force upon us, such as the uniformity of the line of cornice.

One great building stood apart, the Transportation Building, done by the gifted Sullivan, a man of original thought in other directions as well as in architecture.

In general effect it might be said to approach Romanesque, the especial antipathy of the advocates of French methods, so far as the presence of

round arches and a total avoidance of Renaissance detail counts; but the detail was something by itself, elaborated by the peculiar invention of the designer, and as individual as Richardson's was in its way. Moreover, in color also this building stood apart.

Eschewing the general whiteness, which is held to be most suited to the conventional Renaissance type, it boldly strove for a brilliant external color treatment, all the outside detail being enforced by the richest painting. Yet the French critics picked out this heterodox building for commendation, and sneered at the rest of the buildings, unconscious of the flattery of French orthodox design that a sincere attempt at imitation might be justly held to imply.

Estimating ourselves then, not by our own opinion of ourselves, which is more than modest, but by the opinion of those whom we have recognized as worthy of our greatest esteem and of all the encomiums of their champions, we find, when we consult the authorities themselves, and not the champions, that the authorities admire in us the very things that their champions condemn. Our high buildings which Continentalizers want to suppress by law, are picked out by actual, live Parisian critics as one of our few virtues. Our interiors, although not distinguished by those marks of a clear intellect in design, pilasters and pediments transplanted from exteriors, are yet again praised for the embodied spirit, the highest praise for any design.

All through it is for our breaking away from precedent, our direct shooting at new targets, that we are applauded, and we begin to think that our crudity may be but the crudity of boyishness, as becomes our youth, that recklessness and vigor and frankness and courage and everything most removed from grandmotherliness may be a better foundation for the coming manhood than the powders and perukes, the cocked hats and dancing master's graces of Versailles.

"How often," says Arsène Hous-saye, the noted antagonist of scholasticism, "How often, in a civilized age there has been but a clever handling

to take the place of the architectural grandeur of a barbarous age. * * * We walk upon heaps of bones, we lean upon piles of rubbish, we build only with broken fragments."

"* * * Que de fois, dans un siècle civilisé, on n' a qu' un manœuvre savant pour remplacer l' architecte grandiose d' un siècle barbare! * * * Nous marchons sur des ossements, nous nous appuyons sur des décombres, nous ne batissons q' avec des débris! * * * " Arsène Housage, Quarante-unième Fauteuil."

There are at the bottom of all social development two principles of action, imitation and initiative; both of them means for gratifying desire, the one by the sure and tried course of what has been done before; the other, risking failure on the chance of greater success. Although alarmists are forever warning us against novelties, pointing out the risk, minimizing the possible gain, yet experience shows that it is actually safer to be too progressive than too conservative. Nations have perished over and over again from conservatism, never yet one from progressiveness.

Still the two principles of action survive, the one conservative, holding up always the past as the model, perplexed with fear of change, striving for the most part to use the dead force of the majority to resist change; on the other the advanced guard, seeking, like the Greek, to hear or tell some new thing, the progressive misunderstood, rejected by academies and institutes, sometimes crushed, but, if he survive, always leading the way to a future better than the past.

What chance is there that an academy will receive an Ibsen, that a conservatory will recognize a Wagner or an institute a Corot?

Against such organizations the new idea must always struggle. And one reason why the French are less oppressed by their institutions, is their profound confidence in themselves, which leads them finally to accept and glory in the new idea which has been able to assert itself. The French ideal is not the past, it is the present, their own present, hence they suffer less than would a nation constitutionally less progressive.

Excellent as may be the ideals held up by any school, lofty as may be their standard, we shall always do well to

reserve our own deepest admiration for the man that advances that ideal or raises that standard by little or much, rather than for him who contents himself with mere contormity.

So the organizations that have achieved the greatest celebrity are those that have continually accepted and assimilated men of new ideas, although always resisting them to the last. Thus the French Academy refused for a long time to admit de Musset and Hugo; yet at last admitted them, as it now tries to keep Zola out, but will doubtless soon do itself the honor of accepting him. Yet the ranks of French literature are filled with great names which the academy has rejected, from Pascal to Theophile Gautier. The influence of such an academy in conserving the past is trifling, compared with that of an organization which undertakes to instruct as well as to recognize merit.

American architecture is doubtless open to severest criticism, but its faults are not those which legislation or authority can correct.

In the first place, all over the modern world architecture is necessarily heterogenous a mixture of many and often discordant styles. How can it be otherwise and yet be truthful? In the past the architect of Cologne traveled as far as Amiens, saw there the greatest and best that men had devised, and could but copy, with what improvements he might hope to add. Nowadays, in photographs, if not in actual travel, we roam over the known world; we are as familiar with the pagodas of India, the temples of Japan, as with the theatres and palaces and churches of Spain and Russia and Mexico. All history, past and current, is at hand.

Persia and Assyria we have dug up and now wander through their ruins. Greece and Rome are as familiar to us as Boston and Philadelphia: The Forum and the Via Sacra as the Avenue des Champs Elysees and the Court of the Louvre.

What can we do but reflect our minds in our deeds? How can we build without betraying our world knowledge? If the historical styles have each represented the events and

ideas of its time, how can the architecture of this strange, heterogenous, chaotic, anomalous nineteenth century, culmination of a great past, vestibule of a new and more glorious future, be other than strange, chaotic and anomalous? How, in the absence of the unifying idea that is to come, can it be other than a more or less skilful statement of the fact that men know now the whole world.

Only twice in the brief history of the world so far, has a great idea given a soul to stones; once when the Greek worshipped the beauty of the present, once when Christendom worshipped the beauty of a fancied future.

The third time it will come no doubt, but its coming will not be accelerated by school methods nor by academic restraints, these will only delay it.

Along with the inevitable variety is an equally inevitable crudity. Just at present we care very little for beauty, we are striving for material advance. We content ourselves with the roughest imitation of the adornments that past ages devised. Just so, as Graeco-Roman ideals and arts declined, did the world labor through a long period of material struggle, while its art was but a rough reminiscence of the past.

Political and social problems now press upon us, and the exigency forbids the calmer artistic study of a more stable period.

Yet, in the midst of the clamor where is it that we see most promise of the future?

Is it in such "manoeuvres savants" as the typical modern French "hotel particulier," or in the freer, if less symmetrical, homes that such men as Ernest George plant amid the London monotony of ugliness? Is it in the modern French villa or the country house that the best American architects delight in? Is it in such a design as the recently exhibited permiated French Ecole project, correct and studied, but cold and definitely ugly, or in the approximately similar design of French bred American architects for a country house at Greenwich, which was exhibited at the same time, which showed equal study, equal polish, and in addition instead of ugliness, beauty, instead of coldness, charm.

Two kinds of restraints upon architectural practice a temporary wave of reaction is bringing with it: The one, that which expresses itself by attempting to impose its standards upon others by law, that is by force; the other, which contents itself with advocating its standards by voice, pen and example.

Against the first, for men who know what the free life means, there can be nothing but war. Unfortunately for themselves there are too many Americans who have not learned the supreme dictum of freedom, to go their own way and let others go theirs, who are still held by the spirit of domination which enjoys compelling others do its own fancies.

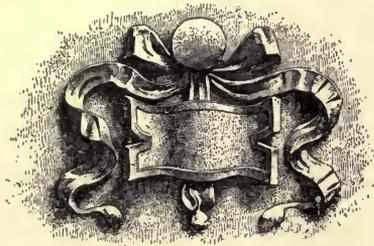
Against the second, no one can have any fair quarrel, except in so far as it tends always to assimilate its methods to the compulsory methods of the former.

An Institute of Architecture in New York, drawing its membership, not from a licensed and ticketed assortment of its own graduates, but from the brilliant spirits that it might gather from within or from without, such an Institute broadly conducted, might add refinement to progress and could do little damage to originality.

Such an Institute might well become, and might well deserve to become, a model for all future schools, establishing its classes, its prizes, its medals, as worthy goals for the pupils of the architectural schools throughout the country.

For such an Institute, abjuring the ways of politicians, preaching eclecticism rather than chauvinism in design, catholicity rather than provincialism in sentiment, there could be none surely but admirers and well-wishers everywhere.

John Beverley Robinson.





ARCHITECTURAL ABERRATIONS.

THE SALVATION ARMY BUILDING.

TO construct a building for the uses of the Salvation Army is undoubtedly to incur a strong temptation to perpetrate an architectural aberration. Consider what is the "basic principle" of the organization in question, so far as that principle can be expressed in building. Is it not that, in order to regenerate a man's spiritual nature, you need not improve him in any other respect? He needs no more mental culture, no more social culture than is already in the possession of the humblest. He does not even need a change of linen or an application of soap and water. More specifically, the method of the society is to vulgarize religion in order to convert the vulgar. The same vulgarity and foolishness that appear in the "knee drill" and the big drum should appear in the façade of a building devoted to the uses of the Army.

Really, suppose that by inadvertence the Army had applied to an accomplished architect to design a building for it, would he not have been justified in concluding that duty to his clients, and fidelity to his problem forbade him to design anything refined and quiet and harmonious, and required him to design something coarse and noisy and discordant. As a conscientious artist should he not cause the thing to reek of vulgarity?

Now, nobody will dispute that the actual building—what the Salvationists in their military-religious jargon would doubtless call the "headquarters"—of the Army fulfils these requisites. Nothing could well be cruder

or nosier or more discordant. It would be hard for anything to exceed it in vulgarity. And yet it may be that the qualities which the edifice shows are not at all to be imputed to the architect. We have not the pleasure of knowing him by any other of his works, but it may be that he is perfectly aware of the value of refinement, of the value of harmony, of the value of repose, and that he might show these qualities in a structure which in his professional judgment offered proper scope for them. He may have been doing himself a continual violence in composing this front, just as he does a momentary violence to the sensibilities of every cultivated passer who is forced to look at it. In that case, his work is successful nearly to the point of triumph, as in any other case it is a dismal failure. But in any case whatever it is clearly an aberration.

We are not doing psychology, it is true, but architectural criticism, but nevertheless the question keeps recurring, in considering the front, whether the architect "wrought in a sad sincerity" this painful front, or whether he was a satirist in masonry, and did it on purpose. One reason for taking the former and less flattering view is that it would have been practicable for the architect to make the satire so much more broader, and the work so much more outrageous, without exciting the suspicions, nay, even while increasing the enthusiasm of his clients. But on the other hand is the consideration that perhaps he could



THE SALVATION ARMY BUILDING.

West of Sixth Avenue, New York City.

not afford it. The easiest and more effectual way of vulgarizing a building, as we may see every day, is by adding things to it. These things, even when they are obvious imitations of more expensive things, thereby enhancing their vulgarity, do yet cost money. But still he has overlooked some very inexpensive ways of making the front more loathsome. The contrast of color, for example, might have added much to its outrageousness without increase of expense. His basement is a mild gray and his superstructure a tepid buff—a timid combination that has been employed in many inoffensive buildings, and that is in itself entirely inoffensive. For the same money he might have made a red basement and a good strong gamboge in his brickwork, interspersing it with other violent crudities of color. In the matter of form, too, he has behaved with moderation. The middle part of his building, for example, is the mere series of tiers of cells in which the steel-frame construction naturally issues. Left alone, such a series, though it would not be impressive, or attractive, or artistic, would have been quiet and inoffensive, and he has very nearly left it alone. True, he has broken in upon the repose it would have had by projecting the centre of it, between the main entrance at the bottom and the tile-roofed tower at the top. This projection undoubtedly has the result of distorting the effect of quiet produced by the expanse of wall. This result is enhanced by the grouping by twos of the openings on the flanking walls instead of leaving them equally spaced, and also by the long corbels introduced at the top of the central projection to carry a balcony which is apparently not a balcony. But upon the whole, in this middle of five stories, which seems to be intended for rental, the architect has not lived up to his privileges, but has produced a piece of wall, which, far from being the outrage upon decency, we had a right to expect, is only a rather huddled, rather vulgar and still very dull piece of work.

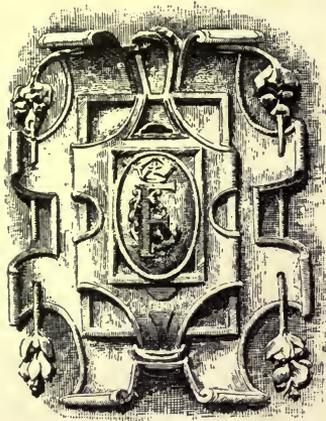
But at the top and bottom we admit

that he is entitled to turn upon us and declare that whoever demands anything worse than these is unreasonable and impossible to satisfy. The large arches at the sides turned between abutments that are manifestly inadequate to contain them are examples of feebleness pretending to be strength, which are unhappily too common to excite the resentment they deserve. But there is a peculiar and individual infelicity in the treatment of the central entrance, with the projected face and battering sides of its enclosing wall, the superfluous and preposterous corbels of the transom become a balcony, and especially the absurd little suggestion of mediaeval military architecture in its crowning member, become another ostensible balcony. The silliness and vulgarity of this are much enhanced by its execution in sheet metal. This feature, in conjunction with the row of quatrefoils of ecclesiastical Gothic in the balcony below, is an architectural version of what we have already called the military-religious jargon of the architect's clients. The military pretension is still more completely developed at the top, where nothing could exceed the absurdity of the crowning parapet, or its inappropriateness to the commonplace shop-front it crowns, with its barbicans and its crenellations and its loop-holes, from which the besieged Salvationists must be imagined to pour physical melted lead upon their spiritual besiegers. At the centre the military pretense is lost sight of, unless the lonely apartment in the tower be conceived as the sentry box of the watcher on the walls of Zion.

Perhaps, after all, the architect was right, considering him as a satirist, in confining the nonsense to the beginning and the end of his composition, and allowing the central part to appear as a commonplace, baldly utilitarian shop-front. Thereby he has made it possible for persons not connected with the Salvation Army to take quarters in the less shameful parts of the building without exposing themselves and their business to ridicule, while at the two extremities he has held up his clients in their true

light. Also he has produced a front which in its general aspect is quite sufficiently vulgar and absurd. To see how vulgar and absurd, compare it with what is visible of its neighbor to the right, which is a specimen of the

domestic architecture in New York City of forty years ago, vulgarized only by the signs, and shudder at the transformation that has come over Fourteenth street between 1856 and 1896.



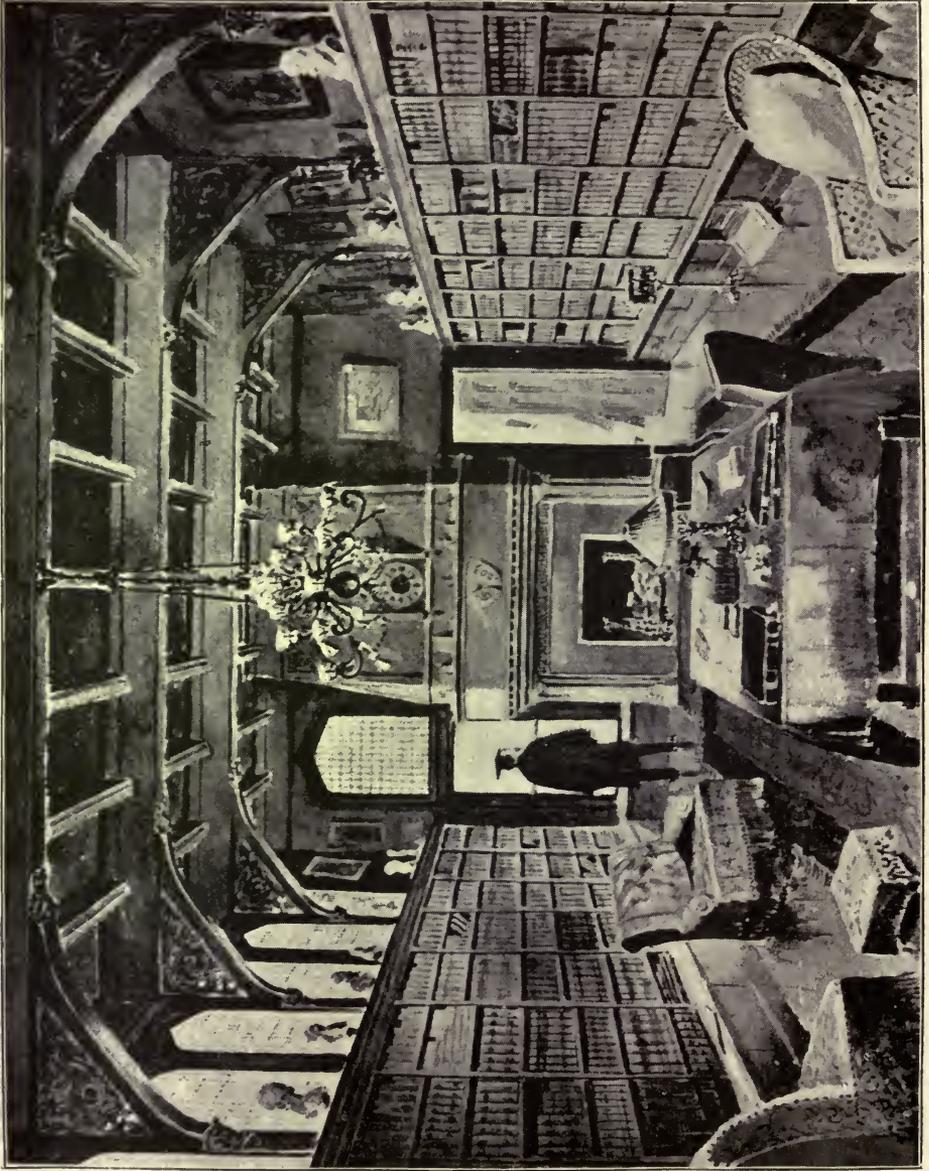


Vol. VI.—1—6.

Henry Ives Cobb, Architect.

HOUSE OF PROFESSOR J. L. LAUGHLIN,
Facing University Grounds.

Chicago, Ill.



Chicago, Ill.

LIBRARY IN THE PRESIDENT'S HOUSE.
(Chicago University.)

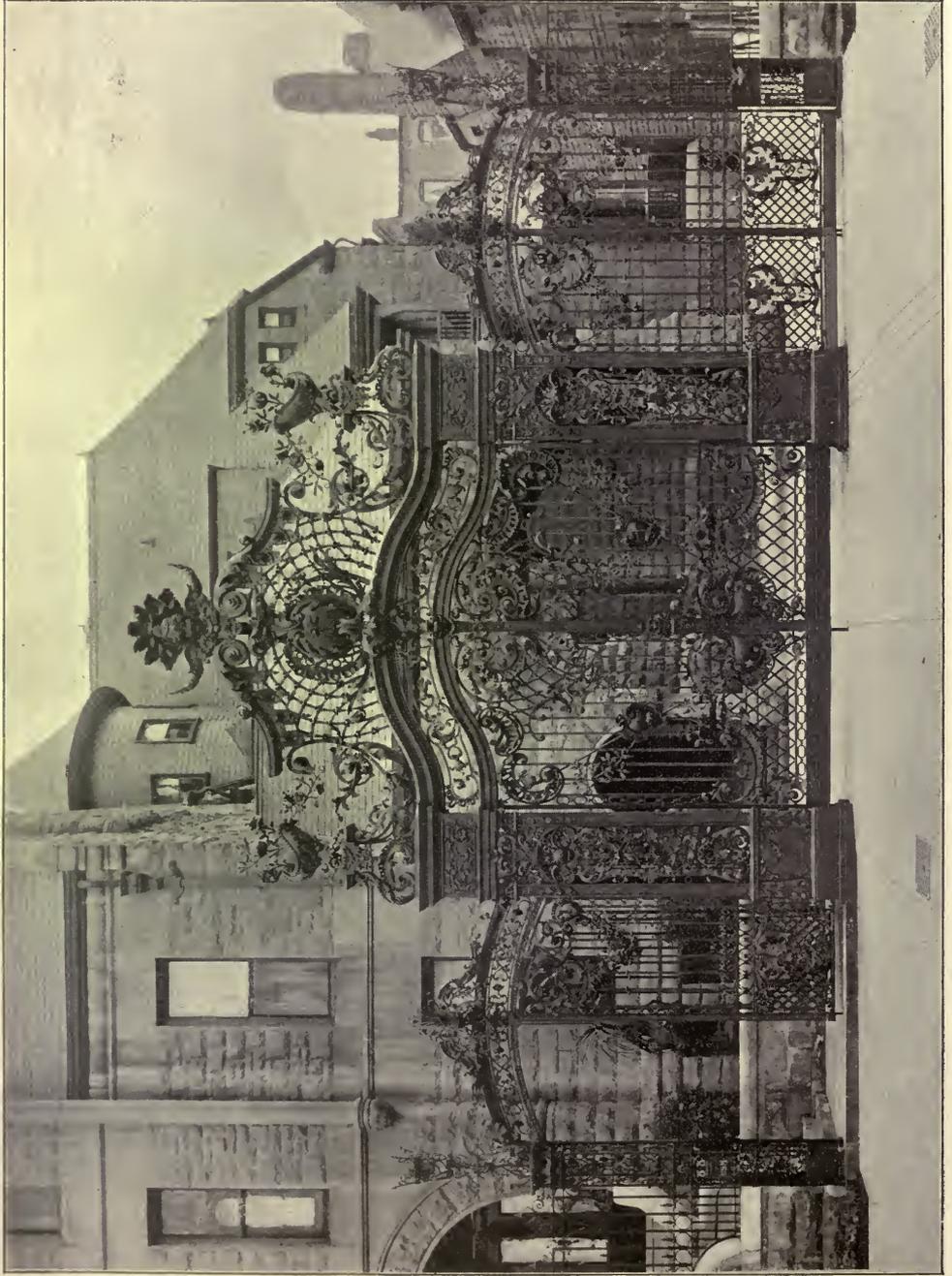
Henry Ives Cobb, Architect.



Chicago, Ill.

RESIDENCE OF J. J. GLESSNER,

H. H. Richardson, Architect.



WROUGHT-IRON GATEWAY.
Designed and Executed by Winslow Bros. Company.



Ardmore, Near Philadelphia, Pa.

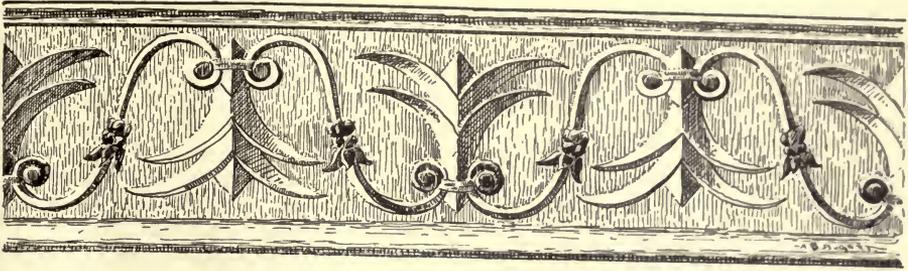
RESIDENCE.

George C. Mason & Son, Architects.



Brooklyn, N. Y.

RECEPTION HALL IN RESIDENCE OF MONTROSE W. MORRIS.



NEW BOOKS.

London Churches of the Seventeenth and Eighteenth Centuries. A selection of the most remarkable ecclesiastical buildings, including St. Paul's Cathedral, erected within and around the ancient city walls between the years 1630 and 1730, from the designs of Inigo Jones, Sir Christopher Wren, Nicholas Hawksmoor and James Gibbs. A series of sixty-four plates, and numerous other illustrations. With historical and descriptive accounts, by George H. Birch, F. S. A. London: B. T. Batsford. 1896. Folio, pp. xvii, 165.

This book is noteworthy as being a nearly exhaustive treatment of an important subject. For convenience it may be considered as consisting of two parts; first, twelve plates, a number of text illustrations, and twenty-four folio pages less those illustrations, all devoted to S. Paul's Cathedral; second, fifty-two plates with text and text illustrations proportionately devoted to thirty-five of the minor churches of the metropolis, with some remarks upon a score of those not thought worthy of more ample treatment. This division into two chief parts is worth insisting on, because the importance of the cathedral is so much greater than that of all the small churches in London of the epoch covered by this volume, even when taken in the aggregate and presented together, for comparative study, as here. The cathedral is one of the three or four most important structures, artistically speaking, of the years since the decline of the early and original Renaissance, but no importance at all comparable to this can be predicated of the churches, singly or collectively.

The large plates are of surprising importance. Mr. Charles Latham, the photographer, is well known to those who have studied on the spot the architecture of the south of England and who have needed the aid of an artistic and skilful maker of architectural views and details, but even his previous record seems to be surpassed by these extraordinary pictures. The interiors

are especially noteworthy. S. Paul's Cathedral is unusually well lighted, of course; but still, to produce these views of the interior under the dome from two different points of the south aisle and nave looking westward, of the northwest chapel, of the choir aisle, of the choir stalls, the Bishop's throne with the splendid iron gate which forms the south entrance to the choir, and finally the organ case, is to achieve something admirable in the way of photography. There is a fine interior view of S. Catherine Cree; four views of S. Stephen, Walbrook, besides one of the dome taken vertically from below; two of S. Mary-at-Hill, one of S. James, Garlick Hithe; two, more in detail than for general effect, of S. Lawrence, Jewry; one of S. Nicholas Cole Abbey, one of S. Swithin and one of S. Bride, two of S. Clement Danes, about the name of which interesting church authorities differ, as there are those who insist that it should read S. Clement's Danes, that is to say the Danes of S. Clement, and eleven more interior views of equal importance taken together, besides some pictures of curious details which carry with them general views of greater or less extent. In all this series of pictures taken within doors,—an unusually extensive series as any one who knows architectural books will admit,—there is no sign of the artist having met with serious difficulties, nothing of importance lost in darkness, nothing made ugly and unsightly by disagreeable effect of light and shade except where in minor details the uncompromising shadow thrown by a pulpit or a font, which receives light from a single window only, must needs swallow up what comes within it. There are two or three interior views given in half-tones in the body of the text which should be mentioned as showing the general wealth of illustration. One of these, on p. 132, without being at all pleasing is easy to understand and is a really valuable picture. To return to the large plates; the font cover in the church of Allhallows, Bark-

ng, a piece of carving in oak of Grinling Gibbons' time, if not certainly by his hand, is as fine a piece of decorative art as one is likely to meet with in an architectural book. and the wrought-iron sword rests and hat-racks of 1726 and following years are even more important to the student as being more unusual and more stimulating in their character. These are plates 63 and 64, and form a sort of appendix to the book, but other such minor objects of ornamental art occur in many of the plates, and here again it must be mentioned that the text furnishes us with small prints, photographic and other, of sword rests, hat stands, fonts and font covers, pulpits, and even large and semi-architectural altar pieces like that at S. Vedast's Church.

Admiration has been expressed above of the brilliancy of these interior photographic views. It will be urged that the glass in the London churches is not generally very rich or dark and that the interiors are thoroughly lighted, as thoroughly as the atmosphere of London allows; and that is true, but how about the atmosphere of London? This brings us to the question of the exterior views and to the fact that these show a uniformly gray sky, a dull and smoky air, a complete absence of the effects of sunshine. These pictures are nearly all of steeples, as indeed the steeples are the pride and glory of the special admirers of Wren, and yet these pictures of the upper air, where spire shows beyond spire in fortunate groupings, with the dome of S. Paul's, perhaps, looming hazy in the far distance, have in them fully as much the effect of pale and generally diffused light as that of the interiors themselves. And the conclusion is that this is the photographer's art—his fine art, or one phase of it. Just as the selected point of view is generally most fortunate and conveys strongly the idea of infinite trouble taken and of innumerable difficulties overcome, just so the reduction of all these photogravures to the same gray uniformity gives a strong idea of a deliberate choice of effect having controlled them all. It is curious to see that no view of either flank of S. Paul's has been obtainable. There is, indeed, among the large plates a view of the south transept from the southwest. One of the same transept from the southeast, with a little of the south aisle and the great south chapel showing beyond, has not been given us in photogravure, and the half tone is inadequate. The flanks of the church are of course almost inaccessible to one who must have a few yards of distance for his point of view. The same conditions exist with

regard to the smaller churches, and it is therefore fortunate that we get what is best in these churches when we get so much of the steeple as rises above the roofs around. The spire of S. Bride, Fleet street, and that of S. Leonard, Shoreditch, and S. Giles-in-the-Fields, and that of Christ Church, Newgate, and that of S. Magnus, London Bridge, and that of S. Mary-le-Bow, and that of S. Stephen, Walbrook, rise clear of all surrounding buildings.

That of S. James, Garlick Hithe, not a very lofty or aspiring structure, is dominated by the great dome of S. Paul's five hundred yards away to the northwest. Beyond the steeple of S. Clement Danes is seen the great irregular and unorganized mass of the London Law Courts, with its courts and gardens seen in bird's-eye view. The photographer might in this case have obtained a view from below; namely, from those very courts and gardens; but preferred wisely, to remain in the air among the steeples and not to break into his system or destroy the uniformity of his plan with regard to the steeples in question. That of S. Vedast Foster is a little overpowered by S. Mary-le-Bow seen a quarter of a mile distant. Finally, the churches of S. George, Bloomsbury, S. Martin-in-the-Fields, and S. Mary-le-Strand, are given complete, at least as far as one point of view allows; and so is Christ Church, Spitalfields, though this is too hideous to be allowed so fine a plate.

An article in the last number of this journal, and devoted to Mr. Daniell's interesting book on *London City Churches*, has said what needed to be said about those buildings, considered as architectural monuments, with one exception. The steeples, however low their average of size and dignity, contrast with those of the continent in being nearly all of the refined and severe rather than of the fantastic variety of the later revived classic. The strong existing tendency toward building in the "high Roman fashion," or in what the designers suppose to be that fashion, leads towards churches as well as civic buildings, and students of church architecture in the columnar style may certainly learn from these examples left them by Wren, Gibbs and Hawksmoor. S. George's, Bloomsbury, has been stripped of the strange monsters which once gave a heraldic character to its odd pyramid, but the lovers of classic architecture will prefer it as the restorer has left it. Including this one, there are a dozen towers given in these plates, all crowned with spires or lanterns, all classical in detail without *baroque* extravagances

and all worthy of study. To these may be added at least one steeple, which is given only in a small elevation in the text—that of S. Antholin, Budge Row.

The text illustrations include plans of nearly all the churches, and the towers of several; but sections of the churches and other constructional drawings are very uncommon. Architects will regret this, for it would be curious to know how these groined and barrel vaults, these cupolas and pendentives, are shaped out of wood and plaster and hung from the roof timbers. On the other hand, what is more important in London churches than their sham vaults, namely, their monuments and memorial tablets, are given rather freely, and often with carefully drawn details, such as sections and profiles of their mouldings. The fine oak carving, too, which in some cases decorates the apparently constructional parts, is illustrated in some of the plates and drawings.

To turn now to the monograph on S. Paul's Cathedral; it is not long and does not profess to be technical, but it is full of interesting facts and contains some valuable suggestions as to plan and design. The serious fault of S. Paul's, the one unforgivable sin committed by its designer, namely, the erection of the second story with a second order concealing the clear-story and denying the fact that there is a clear-story rising above aisle-roofs—this the author does not mention, absorbed as he is in consideration of the interior. This interior, which is really one of the finest things in neo-classic art, Mr. Birch judges wisely and writes of critically. He puts his finger on the one serious fault it has, "the four subsidiary arches of the dome, where the arch breaks into the entablature, dividing it up into detached pieces." Otherwise his warm praise of the interior everyone can sympathize with, and it is not necessary to look too closely into his restatement of the queer arguments that Englishmen are fond of about the superiorities of the London church over S. Peter's at Rome. That the interior, in its nave and aisles, choir and transept, is really far finer as a piece of refined architecture than the interior of S. Peter's, judged in the same way, can hardly be questioned.

A Hand book of Greek Sculpture. By Ernest Arthur Gardner, M. A. Macmillan & Co., London, and 66 Fifth avenue, New York. 1896. Pp. xvi., 268. Price, \$1.25.

Here is at last what has been needed; a brief account of what is really known of Greek

sculpture, carefully distinguished from what is inferred, what is suggested, and what is supposed. The tone of careful and conscientious agnosticism is admirable and most praiseworthy. Bold suggestions, which as the discussion goes on become more and more assumption, the apparent truth of the theory growing continually into positive truth in the eyes of its advocate, may have their place in detail works on individual monuments of art, or on separate schools. They are dangerous even there; but without them progress in research would be more difficult. Even there; even in the books of archæologists addressing archæologists we have too much of quiet assumption that what seems probable is certainly true. In the hand-book addressed to the student at the beginning of his studies and to the public of persons interested who are only students for the occasion, this taking things for granted is to be most carefully avoided; and yet it is in just these hand-books that we find the almost universal dogmatic assertion and the rare suggestion of any uncertainty. The value in a book for beginners of this tone of tentative explanation is seen by contrast in the confidence the reader may feel in positive assertions when they are made. For instance, in the description, pp. 254-258, of the two statuettes generally assumed to be copies of the lost Athena Parthenos, the lost gold and ivory statue of Phidias, it is a satisfaction to see that here the author's unwillingness to be certain disappears, and to infer from this that there is reason enough for the universal agreement that both the Varvakeion statuette and the Lenormant statuette are really copies, however wretched in artistic style, of the masterpiece. So in the account, pp. 157-160, of the painted limestone sculptures found in 1884 and the following years on the Acropolis, the confirmation by the present author of the restorations made by putting together fragments, is a help to every student. It is clear gain that Mr. Gardner should have indorsed them.

In his careful and reserved way of treating attributions, Mr. Gardner is of the best modern school and he is of this school equally in the frank acceptance of the novel facts which are fairly established. Thus the account of the extraordinary collection of painted statues in the Acropolis Museum at Athens, some of which were found in 1882-3, some in 1884, and the greater number in 1886, is as decided in its expression of the entirely chromatic character of these sculptures as could be asked of the most hearty advocate of polychromatic sculp-

ture, ancient or modern. He is talking of sculptures worked in soft and coarse-grained stone, and he says: "The surface of this coarse stone was always covered by a thick layer of paint, and thus the sculptures executed in it are to be distinguished from those made in any material meant to show. As the color has to a great extent disappeared, what we now possess must be regarded merely as the core upon which the visible surface was to be overlaid. Before judging artistically of any such work, we must restore in our imagination, with the help of the vestiges of color that still remain, the varied polychromy of its original state. When thus considered, it resembles work in glazed or enameled brick or in painted terra cotta, rather than any sculpture in stone or marble with which we are familiar." That, now, is exactly accurate. The few pieces of full colored sculpture which have been made in recent times, such as the monument to the Prince of Kohlapore and the chromatic busts by Charles Cordier, cannot be said to be "familiar." The heads of the Hydra in the Hercules relief were as brilliant a green when first found as a Chinese vase. The beards of the Typhon's three heads were of a gorgeous blue in 1884 and perhaps are so still. And on page 161 we come upon the suggestion that this blue is intended as a "conventional substitute for black;" and this will do very well because it is not improbable that a solid black over a surface as large as that of these beards and of the horses mentioned by Mr. Gardner would have been felt to be a deformity in a chromatic design. The fascination of the subject leads us away from our theme and on to the painted marble statues found also on the Acropolis and in the same years which are mentioned above. Mr. Gilliéron made admirably careful water-color drawings of these; their resemblance is really startling and one or two have been published in the *Antike Denkmäler* while a nearly complete set is to be found in the Boston Museum of Fine Arts. The account of these and the critical examination given to them occupies the ten pages, beginning at page 164; and this is first rate artistic criticism as well as archæology.

The introduction, containing 44 pages, is devoted to the discussion of the sources of our knowledge, literary and monumental; to the materials and processes; to a brief summing up of the different characters and of the different associations of Greek sculpture; and to the chronological division of the subject. Now, it is in such preemphatic statement as an introduc-

tion like this requires that what seem errors are to be looked for. Accordingly there is to be found in the third of the divisions above described, that the assumed relation of sculpture to architecture would have to be reconsidered very carefully before it would commend itself to the student of decorative architecture or of architecture and sculpture taken together. There is, for instance, page 36, the curious assumption, that not only Greek architecture does generally avoid sculptural decoration, but also that it ought to do so, in all "those parts of a building, which are essential to its structure or stability. In the columns for example, and the architrave which rests upon them, we see the fundamental forms of Greek architecture; and to weaken these in appearance by carving is clearly inappropriate." In this passage there are indications of a very questionable view of the whole subject. The very next sentence mentions the Assos Epistyle and the Ephesus columns as exceptions to this assumed general rule. Now in these cases the sculpture is in relief upon the broad surface of the marble lintel and the lower drums of immense marble columns; it is not in sunken panels but projects from the main exterior face which would have been the usual flat or rounded surface of the architectural member but for these unusual reliefs. In either case can these added embossings be said to weaken the member which they adorn. It is of course a fact that the working parts of a Greek building are less often richly sculptured; the exceptions being mainly the richer Ionic and the Corinthian capitals which do not come within the limits of "sculpture" as Mr. Gardner is using the term. It is equally a fact that sculpture in relief is applied chiefly to metopes which have no constructional work to do and that sculpture in the round is chiefly set up in the panels of the pediments or on the edge of the roof, standing upon the geison and the acroteria as upon shelves. The distinction between this absolutely free sculpture of the pediments and the roofs and the relief-sculpture of other parts does not seem to have struck Mr. Gardner and yet it is essential. The necessary examination into the question, how far the Greeks used architectural sculpture at all, has been avoided by Mr. Gardner, and while this is a natural and obvious expedient in the attempt to write a small book on a very great subject it is none the less to be regretted.

The small volume before us deals only with the introductory matter, as above described, and with early sculpture down to the time of Phidias.

The text stops abruptly in the middle of Chapter III. The second part is to comprise all the rest of the story, including Græco-Roman sculpture, and it is to be hoped that a somewhat larger volume will be given. The one subject of Græco-Roman sculpture in the hands of so judicious a critic is to be looked for impatiently, and is needed as what has never yet been given to the student.

Early Rhode Island Houses. An Historical and Architectural Study by Norman M. Isham, A. M., Instructor in Architecture, Brown University, and Albert F. Brown, architect. Preston and Rounds, Providence, R. I. 1895. Small quarto; pp. 100, and 60 plates serving as appendix.

The Old Colonial architecture, of which so much is said and written, is a somewhat elegant and town-bred style. It has a great deal of added decoration; porticos of columns, rows of pilasters, pediments at the roof-gables and frontons over doors and windows; and indoors a very handsome show of ornament modelled in plaster or carved in wood. It is, in short, a modification of the more elegant style of the time of George II., or even in some cases of an earlier style than that. It is traditional only in the sense that its way of working and its manner of design were brought from England by men who had used it there. It is really the architecture of the London studios; a reflex of the work of professional architects.

There is, however, another Old Colonial which is traditional in a truer sense. The very clever writer who has furnished the account of English architecture for Planat's *Encyclopédie de l'architecture et de la construction* insists upon the radical difference which he finds between the native English architecture which lingered on long after the Middle Ages through the reigns of the Stuarts and into the "teacup" times of the Hanoverians—which was handed down from father to son and for which no architect made plans—between this native and traditional building, and the sophisticated and self-conscious art imported from Italy in the volumes of Palladio. The first, he thinks, was the building of the conquered English and the latter the art of the Norman conquerors; that is to say, of their descendants in each case.

The half-timbered house with overhanging upper stories, gables, wooden verge-boards, small and narrow windows grouped in threes and fives, and deep enclosed porches; this was the lingering mediæval and purely English feeling showing itself in the mediæval forms but

slightly modified. Even when it was a spacious and a many-windowed manor-house, it was still the building of country-side traditions and untraveled simplicity. The architecture of colonnades and classical proportions, in which the country mansion seems to put on a London look is that of the court noble, a member of the privy council, the man with the traditions of the followers of William the Conqueror. This may be fanciful enough as a theory of origin, though indeed there are suggestions within it; but it is simple truth that the two styles exist side by side, as late at least as the early years of the eighteenth century. And it is simple truth that both these styles came to this country, and that relics of both are still to be found here. The earlier to manifest itself was the more popular and purely traditional style, and this because it was the humbler and poorer houses that were built.

It is these houses; it is this simple and traditional style which Messrs. Isham & Brown have reported upon in the volume before us, adding to our slight knowledge of American early building the contents of an admirable monograph on one little corner of the country. The oldest Rhode Island houses are of the forty years from 1636 to 1675; there are only two of them, one in Providence and one in Cranston. There are only five left of the last quarter of the seventeenth century. In all of these, alterations have been made which change the original character very greatly, or else they are in ruins. Alf contain masonwork and woodwork worthy of that close and accurate study which our authors, with the aid of Mr. Edward Field, the Record Commissioner of Providence, have given to them. The drawings are minutely careful, plotted and figured with obviously ideal accuracy; and small perspective sketches of parts of the framing, ironwork, sashes and chimney top, are put in on the margins or are on separate leaves. In all this there is nothing of the Palladian architect or of the architect of any sort, as the seventeenth century knew that being, then newly recognized in England and her colonies.

Here are the posts more nearly square in the main, broadening out to twice their width in one direction where they have the ends of girders to carry, the posts spreading out into a pair of corbels where they are needed. Here are the corner posts of the overhang, shaped at the lower end into a graceful enough "drop" or pendant. Here is chamfering of many kinds and of many sections, some of it moulded with elaboration and nearly all of it worked with spirited stops.

In short, here is the English house-carpenters traditional work shaped out of mediæval forms by passing through the century of Elizabeth and James, but mediæval still in its shapes and ways. With this is a little ornamental masonry-work, admirable chimney tops with decoration in brick pilaster-like breaks and simple stepped-out caps.

Then come the houses of the third period embracing the first quarter of the eighteenth century; one in Providence, one in North Providence, one in Johnston where the famous elm tree is, immortalized by the Autocrat, and one in Buttonwoods where there ought to be some good trees. These houses are somewhat larger; one of them has formidably high and sharp gables, but the same system of building with all the larger timbers exposed indoors goes through them all.

The chapters on "Construction," and on the "Relation of Colonial Architecture to English Work" explains precisely how the American clap-boarded exteriors are to be accounted for. The old houses were built at first as their models in England had been built, the timber framing showing on the exterior and the spaces between the timbers filled with rough brick and mortar masonry or with "wattle and daub," but the sun of the summer shrunk the timbers and the cold and snow of the first winter found easy entrance, and clapboards were called for.

Chapters V. and VI. deal with the towns of Newport and Narragansett, which have not been dwelt on in the previous pages; and some larger houses are described here, of which one at least is quite a mansion in its exterior effect and its accommodations.

Plate I. gives a curious record in eight figures of the development of the Rhode Island plan, in two directions, out of one-roomed houses with end chimneys; one of these along the line of chimneys in the outer wall becoming more and more elaborate with fireplaces and flues; the other through the well-known New England middle-chimney house, with its staircase in the front lobby and backed up by the great stone mass of the chimney. Plate II. is a curious map of Providence as it was in the seventeenth century, with the names of the residents appended to their houses, some of which houses are preserved in the plates of this book. In a pocket of the cover is an almost equally attractive map of the State of Rhode Island at an unnamed early date.

Enough has been said to show how interesting and how valuable a book we have in

this small quarto. It is to be hoped that the work will be pushed on by the same enthusiastic students. They have given us here what we take to be the most important contribution so far made to the history of American art, and it will be a pity if their work stops here.

A Text-Book of the History of Architecture.
By A. D. F. Hamlin, A. M., Adjunct Professor of Architecture in the School of Mines, Columbia College. Longmans, Green & Co., New York. 1896. Pp. xxv., 441; 229 illustrations in the text. Price, \$2.00.

To the student outside of the class-room it may well appear that the chief value of this book is in its tables of monuments and dates and its brief lists of books preceding the different chapters. That is to say, it will appear on first examination to be a book of reference rather than a book to read. This, however, will be a mistaken idea and one that the reader of this notice is advised not to entertain.

Some of us are convinced that the history of art is more likely to be written as it should be written, by Americans than by the scholars of any European nation. The monographs will of course be by Europeans, in almost every instance. In Europe are the traditions; there are the scholarships, the Professorships and the Fellowships; the habit among men of some leisure of devoting their time and energies to specialized study. Few are the Americans who come into the field of scholarship prepared to vie with their brothers of Western Europe in this matter of minute and continued research. But in the way of summing up the conclusions and the making history out of detached historical facts, the American has an advantage, which is greater than at first sight seems possible, in his capacity of treating with equal comparative respect the researches of men of all nationalities. It is strange, but it is true, that very few books published in Europe are free from vexatious instances of national pride interfering with the historical sense. The tendency which leads to such phrases as "Our History,"—"with us, it has not been so,"—"we were enabled to repel the invasion,"—and the like, recurring again and again in the gravest historical works and in all languages, is an example of the nationalizing spirit to which we refer. In treatises on architecture this is as prominent and as visible as in political and social history, and nothing is more ludicrous than the never-ending troubles of the would-be historian of architecture to explain to his readers, assumed

to be his countrymen, that after all and in spite of everything his and their country leads the field. The only nation of Western Europe which may be supposed free from this curious ambition is the Swiss nation, and the Swiss history of European architecture we are yet to receive.

Mr. Hamlin's text shows very neatly the un-biased kind of judgment which we expect from the future American historian of art. It is not merely that he is indifferent what nation or people is proved to be the inventor of this style or that, his unprejudiced largeness of view enables him to see the essential tendencies at work in each epoch and every land. The few words allowed to each branch of the subject as treated in this very small book are the right words nearly always. It would make our readers laugh if there were printed here the statements which we mark as perhaps erroneous, so few they are and so trivial. Such brief treatment can never be very interesting reading, at least to the comparatively uninformed reader, but such readers may be advised safely to learn by heart each chapter on European architecture and then look at all photographs they can find, belonging to that epoch, with the certainty that these will have a new meaning to them. As to the architecture of the far East, the subject has as yet been too little studied to make it safe to write hand-books about it, and as to the Mohammedan architecture treated in Chapter XII., Professor Hamlin perhaps overrates its importance. In India only is Mohammedan architecture of any great comparative value.

A History of Architecture for the Student, Craftsman and Amateur. Being a Comparative View of the Historical Styles from the Earliest Period. By Banister Fletcher, F. R. I. B. A., Professor of Architecture in King's College, London, and Banister F. Fletcher, A. R. I. B. A., Instructor in the Architectural Studio, King's College, London. With 115 plates, mostly Collotypes, and other illustrations in the text. B. T. Batsford, London. 1896. Imported by Charles Scribner's Sons, New York. Small octavo, pp. xvi., 313. Price \$4.50.

This is a small and thin hand-book, swelled by the insertion of 115 plates on thick paper to the form of one of those "dumpy" bibles which Englishmen loved in the seventeenth century. The plates are really of importance in any estimate of the book, for although such collotypes as can be printed on a page four and one-half by seven inches cannot be wholly satisfactory, yet a series of well-selected pictures, in-

cluding some plans and some measured details, but generally made up of photographic views, has an inherent value which is not to be mistaken. The selection of buildings is indeed very good. There are not as many interiors as could be wished, but there are some which it is really a pleasure to see in a popular book of this kind. It is hard to make them tell in small photographic process plates. It seems that to provide a good interior view for a book recourse must be had to large and costly plates, such as those described in another page as illustrating Mr. Birch's book, or else drawings made by hand in which of course the draughtsman's personality comes between the builder and the student. Thus the views of the interiors of S. Sophia at Constantinople, S. Mark's of Venice, and S. Peter's of Rome, are of little avail to the student, but the Basilica of S. Maria Maggiore and the Cathedral of Pisa have simpler interiors which the lack of distinctness does not so greatly injure, and the vaulted roof of Henry the Seventh's Chapel, as a large-scale detail is easy to render and is a very useful illustration. The exterior views serve their turn well. It is pleasant to find among them several fine buildings which are not known as well as they should be, such as the south front of Hatfield House, which is certainly one of the best pieces of Renaissance designing, properly so-called, in all the North of Europe, the admirable Town Hall at Antwerp, and the Paris Pantheon, so given as to show its windowless walls. There are some Spanish examples too, which, though less unknown than they were fifteen years ago are still less familiar than they should be; and the interior of San Juan de los Reyes at Toledo is well-worthy to be chosen on account of its interesting management of the central tower as seen from within. This should be compared with the similar and better known example of Burgos Cathedral, and these two plates are given in 114 and 115.

The text of this work is arranged rather for reference than for reading. A large part of it is devoted to elaborate comparisons between styles. Announcement is made on the page facing page one, that each style is considered in five different ways; first, as to the Influences,—Geographical, Geological, Climatic, Religious, Socio-Political and Historical,—which have shaped it; second, as to its Architectural Character; third, as to the Buildings, which serve as examples of it; fourth, as to the Comparison of each with other styles; and fifth, as to the Books which may be consulted. The reduction of a complex and subtle theme,

such as the critical history of architecture, to a series of brief and positive statements, brings with it this danger, that statements will often be made which cannot be perfectly maintained. This danger is greatly increased when much is made of the influences of race, climate and religion. The working of these influences is so very hard to trace and is so tempting to the bold theorizer, that the student should always be warned against architectural conclusions founded upon such non-architectural reasoning.

Evolution in Art, as Illustrated by the Life-Histories of Designs. By Alfred C. Haddon, Professor of Zoology, Royal College of Science, Dublin; Corresponding Member of the Italian Society of Anthropology, etc. With 8 plates and 130 figures in the text. London: Walter Scott, Ltd., 1895. Imported by Charles Scribner's Sons, New York. Pp. xviii., 364. Price, \$1 25.

This volume is one of the Contemporary Science Series, edited by Havelock Ellis. It consists of an introduction and four principal divisions, which, in their turn, are subdivided. Thus the first of the main divisions is devoted to the art of British New Guinea, considered as an example of the method of study to be followed, and this part of the book is subdivided as follows: I., Torres Straits and Daudai; II., III., IV. and V., Other geographical subdivisions; VI., Relation of the decorative art to the ethnology of British New Guinea; and VII., Note on the scroll designs of British New Guinea. The second main division is entitled "The Material of which Patterns are Made," and the third and fourth are, respectively, "The Reasons for which Objects are Decorated" and "The Scientific Method of Studying Decorative Art." The purpose and intent of the book is obviously and avowedly to approach the study of anthropology through the investigation of those ornamental patterns and those rude works of representative art which savages not of the lowest condition produce in great abundance. It is found that certain figures in ornamental patterns resemble certain objects, necessarily well known to the savages who have produced those patterns. There is then the natural disposition on the part of the investigator to infer that those figures are copied from the objects in question. Now, this inference is of different degrees of reasonableness in the different cases given. There can be no doubt, when a part of the human face is indicated by strongly marked lines, what those indications mean, and the scientific students of pattern-designing among

savages have a perfect right to lay side by side patterns which show a continuous gradual divergence from the perfectly well marked human face to figures which have but little resemblance to the first, and which seem, when taken separately, not to be derived from natural forms at all. The case is different when the triangles in a complicated geometrical pattern are stated to be copies of a garment used by the women. Once in the hands of a decorative designer, one triangle is much like another. The use of this figure may be in any given case suggested by a garment or the shape of a fish, or by the spaces left between blades of a shark-tooth weapon, or by the interstices in a zig-zag; while the zig-zag itself comes natural and unbidden to every idle man who has drawn two nearly parallel lines, on the sand or elsewhere, and who scrawls between them.

The truth is that study of decorative art and its origin is as yet in its infancy, and is likely to remain there until persons having a practical knowledge of decorative design shall devote themselves to the scientific study of it. The fact well known to all students of fine art that the arts which appeal to the eye are nearly always misjudged by students in other departments, greatly retards advance in the branch of anthropology under consideration. The literary student and the scientific student insist on judging works of that fine art which appeals to the eye from literary and scientific standpoints. They are not to be blamed, for it is rarely seen that a master of the graphic and plastic arts, one knowing their theory in practice well, writes with any fullness, or indeed gives any attention whatever to research in the mysteries of primal decorative art. It fails to interest him, just as the rudest compositions in verse fail to interest the enthusiastic student of the loftiest poetry. Occasionally and incidentally the man who knows and lives with that art which is the most highly developed and most stimulating may turn to consider the earliest gross and feeble strivings of undeveloped humanity, but continued and comparative study of them is not his to undertake. Those who accumulate facts relating to this novel subject of study and who reason upon them are nearly always persons to whom fine art is a sealed book. This, indeed, is indicated in the Introduction, where it is stated that the facts are collected in large numbers "by missionaries and others or seen in large ethnographical collections." Therefore, for years to come books will be written which, like this one, are full of suggestion, but which will

mislead at times by assuming as true that which every advanced student of decorative and representative art knows to be false or extremely improbable. This book and Mr. Balfour's interesting little treatise, "The Evolution of Decorative Art," are important and praiseworthy attempts at laying the foundations of a study which may prove to be, in the future, mainly scientific or mainly philosophical. In the meantime its proceedings are scientific in their character, pursued along the lines of direct observation and comparison of facts and that is well.

The Ecclesiastical Architecture of Scotland, from the Earliest Christian Times to the Seventeenth Century. By David Macgibbon and Thomas Ross. Edinburgh: David Douglas. 1896. Vol. I., pp. xiii., 483.

The authors of this book are also the authors of "The Castellated and Domestic Architecture of Scotland" in five volumes, which came out three or four years ago, and is one of the most interesting and valuable of modern books on architecture. Mr. Macgibbon is by himself the author of "The Architecture of Provence and the Riviera," which was published in 1888, and which is a book to class with Butler's "Coptic Churches of Egypt" and Jackson's "Dalmatia, The Quarnero and Istria," as a product of personal experiences and minute observation. These octavo volumes printed in large type and illustrated, and yet sufficiently light in the hand, have a peculiar value to busy students; especially when illustrated as fully as those of our present authors. Architects in particular not gifted with much leisure for patient and long continued archaeological studies should find books of this form peculiarly valuable—for who reads or can read the pages of a folio? The mere fact that there is never a table free to receive it destroys the value of a folio except as a book of plates.

Of these octavo volumes, then, devoted to the personal study of architectural subjects, eleven have been cited and Messrs. Macgibbon & Ross are preparing to give us three or four volumes more; and those upon a subdivision of the history of architecture which many of our readers will think more immediately interesting than any of those which have been mentioned. The only drawback to Scottish ecclesiastical architecture, as a matter of pressing need to all students, is the fact that it has never been very splendid nor in the highest sense of the word original. No single style of the last importance has ever originated in Scotland, nor are its cathedrals

very magnificent, nor its minor churches very rich in architectural design or in sculpture. This is made up for, very largely, by the fact that they are not restored. No where will the student find a larger amount, proportionately of absolutely unaltered and nearly uninjured work. Round arched and early Gothic is to be found in great abundance; central and later Gothic also with all their strange and quaint experiments in vaulting and attempts at getting sculptured decoration at small cost. Moreover, all this is found in a country, which abounds in stone, fit for delicate cutting and solid building, and most of it is intact and un-restored. The authors of this book have treated their subject as a series of monographs; long or short, according to the importance of the subject in each case. Thus, Dunfermline Abbey Church has nearly thirty pages devoted to it with no less than twenty-six illustrations, by means of which, with a little comparing and referring backwards and forwards, an excellent idea of the whole building with its almost unique buttress system is to be had. The first illustration among those referred to is a general plan of the buildings of the Abbey; several of the cuts give parts of the subordinate buildings and a reference on page 256 sends us back to the work on Castellated and Domestic Architecture for the Palace which was intimately connected with the structures of the Abbey. In like manner the church celebrated in song and story, as St. Magnus' Cathedral at Kirkwall, is described in twenty-four cuts and a proportionate number of pages of text. Whether we take Sir Walter Scott's view of the town of Kirkwall, as held in 1805, that Kirkwall was "fair," or his opinion as held in 1814,—after he had seen it,—

"And needs must I stare
When I think that in verse I have once called it *fair*:
'Tis a base little borough, both dirty and mean—
There is nothing to hear and there's naught to be seen."

we shall not find it hard to appraise the cathedral. That, indeed, is a thing upon which Sir Walter was not highly qualified to speak; he lived and died before the dawn of the archaeological day. The church is really a very interesting piece of Romanesque and Transitional architecture with Gothic vaulting of a simple type, but of an epoch nearly a century later than that of the walls which it surmounts and with a most interesting central tower in its original condition.

Some of those famous abbeys which we associate rather with England, and which are the best known of all mediæval buildings to many travelers and many lovers of the picturesque

in architecture, are really "over the border." These, of course, are treated with proportionate care in the book before us. Thus Kelso Abbey Church is treated in twelve cuts and an interesting chapter of text; and this affords an opportunity to say that these ruined monastic buildings have never had justice done them by the archæologists. No one will suspect us of wishing to depreciate the admirable work done by Edmund Sharpe, but what he has done leaves still undone the much needed exact survey and measurement and exact setting down of the ruins as they stand. Let the future give us if it will, complete excavation and thorough resulting research; what is needed now and without delay is a trustworthy record of what exists above ground and within reach of a tape-measure and the camera-lucida. This work is in the way of being done by Messrs. Macgibbon and Ross, as may be seen in the monograph of Kelso and in those devoted to Dundrennan, Jedburgh, Kinloss and Dryburgh.

That which has been described is a part of the body of the work, and of this it should be said that it appears to be arranged in a sense chronologically. The transition from Celtic to Norman

architecture is followed by the Norman, that is to say the Romanesque style, and that by the Transition style. The perfected and the later Gothic are left for future volumes, although, of course, the buildings treated in this volume contain many fragments of later architecture. There is a separate series of papers on the very early churches of the Orkney and the Shetland Islands, made up from plans and drawings, made forty years ago by Sir Henry Dryden. There is a similar treatise on the earliest ecclesiastical buildings of Scotland, derived from the studies of the late T. S. Muir, and attention is especially called to these as the work of an antiquary of extraordinary enthusiasm and trustworthy devotion. The fact is insisted on that these very early buildings have suffered very greatly since the drawings and measurements in question were made from them. An introduction gives an account which is well worth reading, of the evolution of European architecture during about 400 years, namely, from 1050 to 1450 A. D., the years of the Romanesque architecture, the development of Gothic and its changes; English examples being always preferred.

Russell Sturgis.

