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FRENCH CATHEDRALS.

PART XII.

*THE MARITIME CATHEDRALS.**

I.

ON the shore of the Mediterranean coast of France, directly on the sea, is a series of cathedrals extending from the Italian almost to the Spanish frontier, having certain characteristics in common, owing to their exposed situation, and which may be conveniently classed as the maritime cathedrals of France. Not all of these churches are of the same interest. The cathedral of Aige presents the most imposing exterior because it has been carefully restored to its primitive condition. The cathedral of Maguelone is more characteristic, being outwardly scarce more than a pile of ruins, but restored within in excellent shape by M. Révoil at the expense of its owner, M. Fabrège. In Provence the cathedral of Antibes is the most notable example, the cathedrals of Vence and Grasse being comparatively unimportant; the cathedral of Fréjus has scarcely any visible exterior; the cathedral of Toulon has been greatly modernized; the old cathedral of La Major of Marseilles is hardly more than a ruin. To these might also be added the cathedrals of Montpellier, Béziers, Narbonne, Perpignan and Elne, to complete the series, though being later structures than the first-named they need not be considered in the present connection.

The cathedrals of Antibes, Grasse, Maguelone and Aige reflect very accurately the unsettled condition of the southern part of France at the time in which they were built. As late as the twelfth century the coast was exposed to the ravages of pirates and mariners.

*The line drawings which accompany this article are taken, by kind permission of David Macgibbon, Esq., from his valuable book, "The Architecture of Provence and the Riviera," the most accessible work to English readers on the architecture of the extreme south of France.

who gained a livelihood by preying on the peaceful and unoffending inhabitants of the villages and cities. The cathedrals, as the most important buildings and the most conspicuous, were strongly fortified, both to protect their contents and to serve as strongholds for the citizens in case of need. In these churches, therefore, architecture assumed its most utilitarian form, and the buildings are real



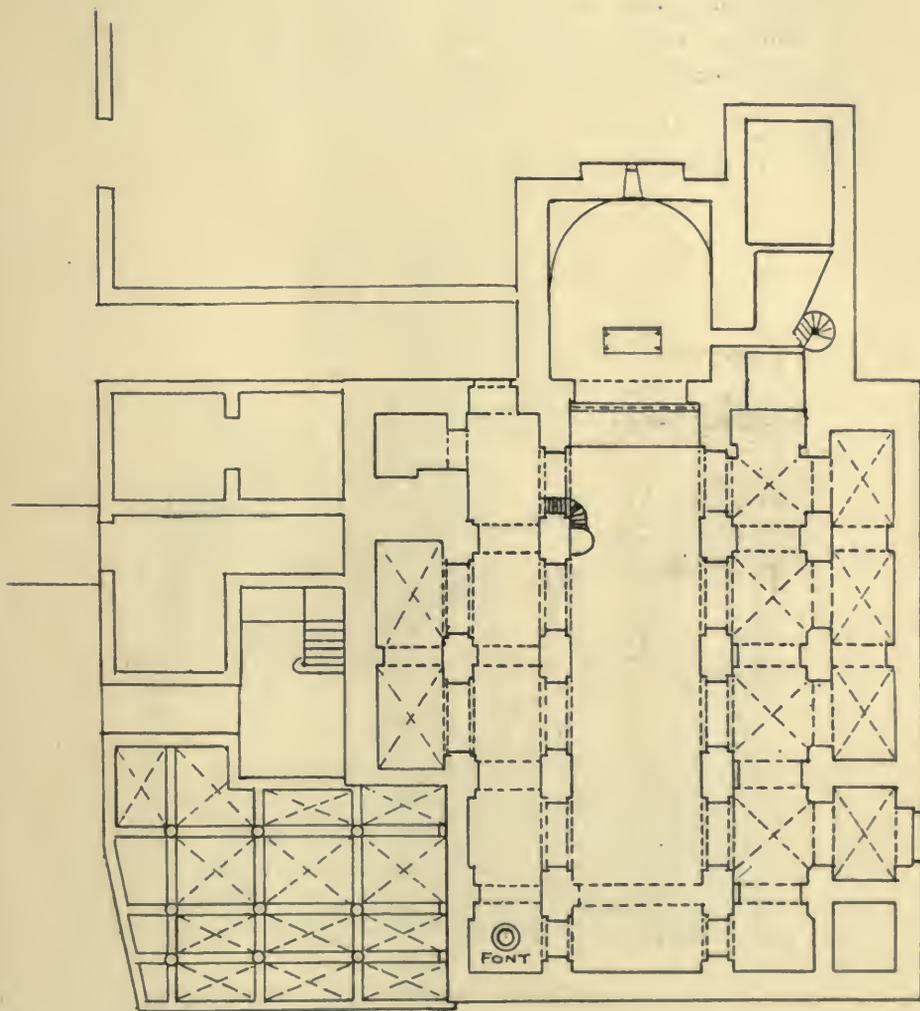
TOWER OR KEEP ATTACHED TO CATHEDRAL.—ANTIBES.

fortifications, with battlemented walls, strong and heavy towers, and small windows, and are provided with the other devices of Romanesque architecture of a purely military type.

Time has dealt hardly with them. The kingly power, being entrenched in Paris, France, developed from the Ile de France; the wealth that once enriched the fertile lands of the south moved northwards, and the great commercial cities of the north became the most important sources of activity. Then the southern towns began to decline; and while in the north the little Romanesque churches were removed to make way for the splendid creations of the Gothic period, in the south they were patched together as best they could, or permitted to fall into decay, and, last of all, repaired and restored in that most unfortunate of all epochs, the seventeenth and eighteenth centuries.

II.

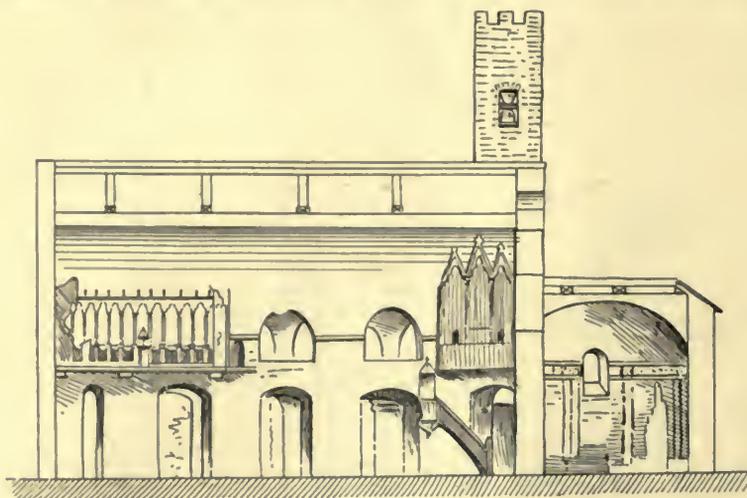
Take, for example, the cathedral of Vence, one of the oldest in France, but now so overlaid with additions and suffering from so many misdirected restorations that scarce a suggestion of its antiquity remains. Yet it is of value in illustrating the successive



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VENCE CATHEDRAL.—PLAN.

steps by which the hall cathedral of the tenth and eleventh centuries was developed into the cruciform cathedral of the thirteenth. In the tenth century its plan was a Latin cross, rather long and narrow, with well-proportioned transepts and a slightly longer eastern arm. The campanile stood close to the north transept, free and distinct from the church. The town is situated in the mountains, and, having been provided with strongly fortified walls, it happened that the barbarian hordes that overran France at various times never con-



VENCE CATHEDRAL.—SECTION

quered the city. The people crowded into it for safety, and in its limited area every spot was closely pressed upon; the tower of the cathedral was occupied by families, and its summit used as a look-out for signs of danger. Soon additions were needed; the transepts were extended along the nave and became aisles; the choir was added to on each side, and the cathedral became a rectangle with a square apse.

Towards the close of the twelfth century further additions and changes were made. A chapel was formed under the tower and outer bays were added to the aisles, at least towards the east end, making the plan a distorted Latin cross. In the fifteenth century new and extended changes were introduced. Galleries or tribunes were built over the aisles; a canon's choir was built at the west end over the nave, which thus lost here half its height; internally the apse was given an oval form and decorated with a Corinthian order. But the end was not yet reached. The beginning of the present century saw further alterations; the nave vault was rebuilt in elliptical form, and the artistic ruin of the cathedral was complete. It is closely surrounded with houses and has little external interest save in its apse

and its tower. Within it is crowded with aisles and arches, and dark almost to dullness by reason of the minuteness of its windows; a cathedral whose evolution has been its ruin and whose greatest misfortune has been its restorers and its rebuilders.

Of its external features only the tower and the apse call for comment. The tower is plain and severe, with a round-headed window



VENCE CATHEDRAL.—EAST END.

near the top for the bells, and crowned with battlements of a simple type; it is a good illustration of the church towers in the extreme south of the eleventh and twelfth centuries, and is typical of the maritime churches. The apse still retains its form of the end of the twelfth century; it is rectangular, with a broad shallow protection in the centre with a small splayed round-headed window and a low gable. Internally, a description would be a bare enumeration of piers and arches singularly devoid of interest. Its qualities are negative, not positive. There is no carving, no decoration, no ornament. The pilasters are plain, the capitals and corbels supporting the arches without artistic interest. There is not even the balancing effect of a

built interior, for every bit of surface has been painted a sickly yellowish tint that entirely covers the structure. The only artistic contents are the fine carved high-backed stalls in the choir at the west end, and a carved Gothic door that stands in the chapel under the tower. Both are good examples of their sort, but they do not relieve the cathedral from its inherent architectural poverty.

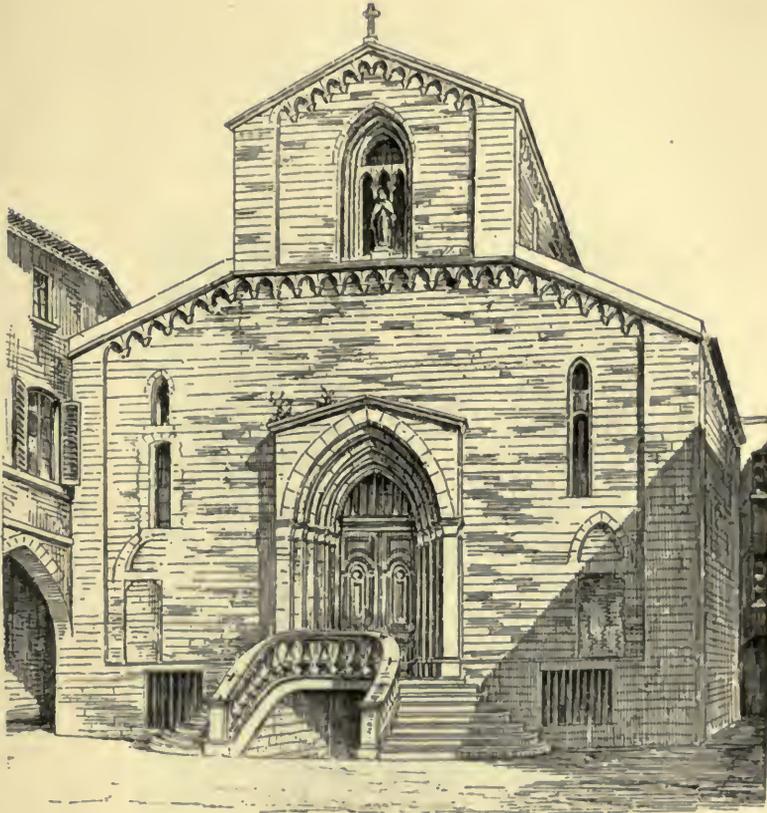
III.

The cathedral of Grasse is more akin to the early Italian Gothic than to the Romanesque of Provence. In a measure it stands be-



KEEP TOWER.—GRASSE.

tween the two, its heavy forms, its lack of carved ornament, its massiveness, belonging distinctly to the Provençal school, as represented by the cathedrals of Orange and Fréjus, while the outline of its façade, its two principal doorways and its towers suggest Italian influence, more clearly seen in the cathedrals of Sisteron and Embrun. Like all Provençal cathedrals it was greatly changed in the seventeenth and eighteenth centuries. Its most notable transformation was the building of the crypt in the last century from the designs of Vauban (done in 1719), consisting of a nave with very narrow aisles,

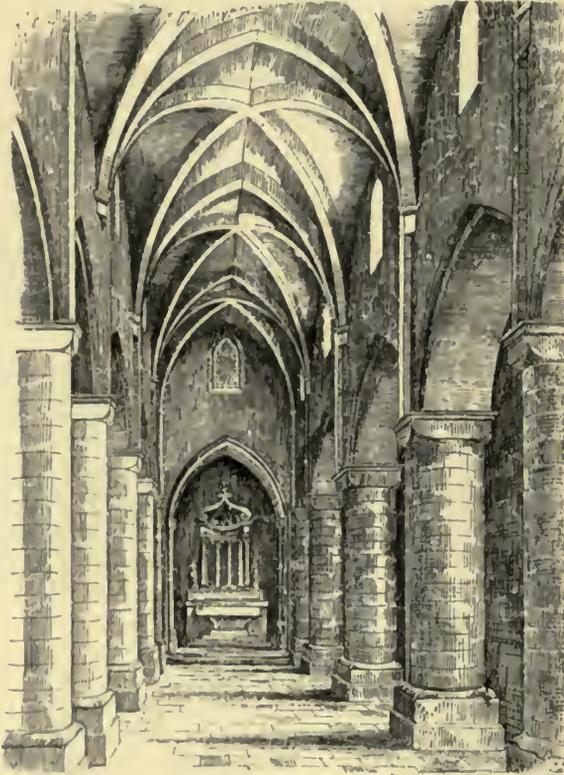


GRASSE CATHEDRAL.—WEST END.

separated by gigantic piers. This tremendous undertaking of building a crypt under a church after it was erected was carried out to provide a place of burial, and the Chapter speedily obtained revenue from that cause. It has no artistic character.

And indeed the same may be said of the upper church. Its nave of six bays, with an aisle on each side of it, leads to a deep rectangular chamber that, in 1680, was built on the site of the original choir or apse. The pointed cross vaults of the nave are carried on large heavy ribs of square section, resting on huge round piers. Mgr. de Mesgrigny, who built the huge crypt, added tribunes over the aisles, giving them flat segmental arches, adding to the area of his cathedral, it is true, but sadly injuring the simplicity of its earlier form. Of the chapels opening from the aisles only one calls for mention. It opens from the fourth bay of the south aisle, and was built in 1738, by Mgr. d'Antelmy, who also carried out some repairs to the choir and to other parts of the cathedral. It is dedicated to the Holy Sacrament, and is richly decorated in the style of its period, with un-

chanelled Corinthian pilasters, an ornamented entablature, and a vaulted ceiling. Plaster statues of the Evangelists by Baillet stand in niches in the walls. The situation of the cathedral, on the apex of a hill that descends abruptly to the east, is such that this chapel is supported on a crypt, which is at a lower level than the main crypt, though it opens immediately from upon a public place surrounded by houses.



GRASSE CATHEDRAL.—INTERIOR.

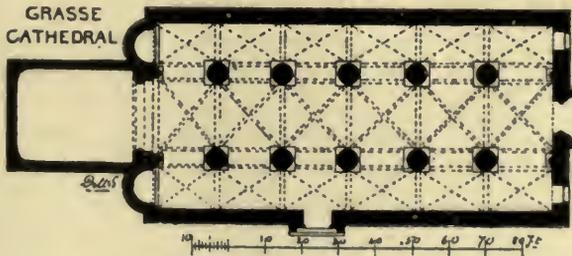
From this point the cathedral rises above the spectator to a really great height, but the architectural forms are without interest.

Fortunately, the general barrenness of the structure is relieved to some extent by the west front, which at first glance seems of so foreign an aspect as to be scarcely French and certainly not Provençal. The nave clerestory has a low, flat-pointed gable, and the aisles are marked by an inclined cornice. There are no vertical divisions between the parts, but at each outer edge the wall is thickened as a buttress or pilaster without capitals. From the inner edges an arcade of small pointed arches is carried on plain triangular corbels, following the sloping lines of the aisle roofs to the beginning of the nave

clerestory, where it is carried horizontally across the front. The clerestory is treated in a similar manner, with a large pointed window in the centre.

There is now but a single portal, a pointed recessed archway in a very shallow projection roofed with a nearly flat gable. When the crypt was built a new flight of steps was arranged, with an opening in the centre leading downwards; at the same time the side portals were walled up, though their outlines are still visible. Not far from the cathedral, on the left of its west front, and connected with it by a modern unimportant building, is a large mediaeval tower or Keep, very plain and severe, and without ornament—a strong and mighty structure, similar in form and in utility to the tower of the cathedral of Antibes, which occupies a similar position. It is the characteristic feature of the coast cathedrals of France.

There is another tower at the east end of the north aisle, whose base is now embedded in the walls of the choir of the eighteenth cen-



GRASSE CATHEDRAL.—PLAN.

tury. Its position is identical with the tower of the cathedral of Sisteron. Restored in 1486, it was destroyed in a storm in 1742, and its rebuilding was begun in 1756. It is entirely plain, its upper part being divided into three portions by strings, the two upper of which have a frameless round-arched window in each face. Apart from the west façade and the towers, the exterior offers little of interest. But the superb view of Grasse and its vicinity that may be obtained from the open place on the north of the church compensates the visitor, to some extent, for the trouble he has taken to climb to this height. The cathedral, however, is only interesting as illustrating the fusion of certain Provençal and Italian elements.

IV.

The cathedral of Antibes is, perhaps, the best type of the maritime cathedral in Provence, though it is surpassed by the churches of Les Saintes Maries and S. Victor at Marseilles, both of which are true fortified churches. Like all the coast cathedrals it is small, with a

nave of five bays, aisles, very short transepts, and three rectangular apses on the east. And, as in the other cathedrals, there is the same barbaric "restoration" of the seventeenth and eighteenth centuries, the same confused interior, with piers, arches and vaults of almost every possible section and form, a veritable conflict of architectural members, not even interesting in its variety. The apse of the nave is a deep chamber, divided into three bays by unchannelled Corinthian pilasters, with two narrow, round-arched, splayed windows, with a circular window in the middle above them, in the eastern wall. The transept apses are smaller, with pointed tunnel vaults and a small round window to the east.

The apses directly face the sea, being separated from it only by a narrow roadway, which is supported by a sea wall. Externally, they are entirely featureless, but the heaviness of the construction, the narrow windows, and above all the tower which rises on the south, a plain, tall, severe shaft, with a single window in each face near its top, are strictly in keeping with the exposed situation. A similar tower, as in the cathedral of Grasse, stands before the west front of the cathedral, separated from it by a double archway of the seventeenth century. It has lost its crowning member, and is solid, save for the round-arched window near its top. The façade of the church is of the seventeenth century, and is in two stories, with Ionic pilasters. All of the external walls are plastered except the east transept walls and the apses, which show marks of some slight restorations.

V.

The cathedral of S. Etienne at Fréjus, though unimportant individually, is a more pretentious structure than the other maritime cathedrals, because it has retained its cloister, and, like the cathedral of Aix, it also has a baptistery, which, though now part of the cathedral group, was once distinct from it. As is to be expected, it has suffered severely from changes made at various times, the latest, and not the least important, dating from 1823, when the façade was demolished and the present severe and simple aspect given to it. The group of buildings, now practically encased in a symmetrical and uninteresting exterior, and in a large part closely surrounded by dwellings, consists of the cathedral itself, the cloister at the baptistery and connecting passages and structures. The church has a wide nave of three bays and a large semi-circular apse. It has but one aisle, on the north, a narrow alley, with two small chapels opening near its centre. At the west end of the nave is a large, heavy tower, whose lower chamber forms an enclosed vestibule connected with a narrow passage which forms the chief entrance to the cathedral. The baptistery is also reached by this passage, and its continuance beyond the



FRÉJUS CATHEDRAL.— DOOR.

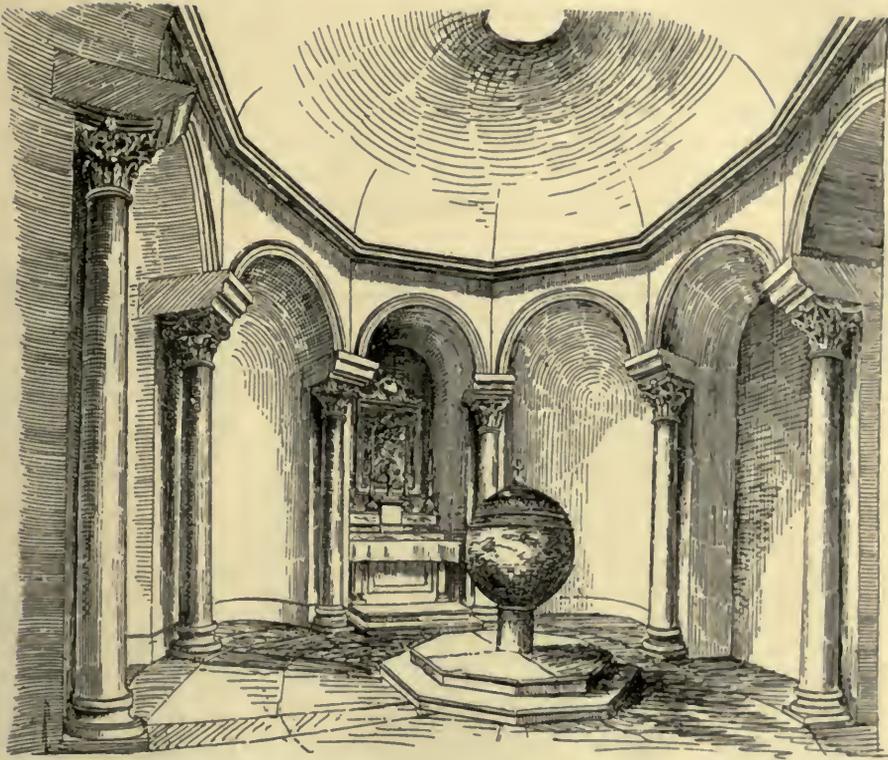


FRÉJUS CATHEDRAL.—INTERIOR.

tower in a narrow flight of steps leads to the cloister, which is on a higher level than the other buildings of the group, and whose dilapidated condition makes it one of the most melancholy monuments in Provence.

A glance at the plan shows a structure of no ordinary interest. The interior of the tower is complicated with vaults, recesses, deep arches and other devices, producing an astonishingly crowded effect in the small space, and yet it is nothing more nor less than a narthex, and the resemblance is heightened by the baptistery just without the ancient lines of the church walls. The building of the cloister on the north of the church, at a time considerably later than that at which these earlier structures were erected, and which, in its origin, is the latest form of the narthex, adds to the interest of the plan, since we have this feature, in a considerably modified form, it is true, present in an early and a late stage in the same building, a circumstance if not unique, at least so rare as to be worthy of special note.

The interior of the nave, with its low cross vault and its heavy piers, the absence of carved ornament, and the irregular manner in which its windows have been inserted, together with the tawdry



FRÉJUS CATHEDRAL.—BAPTISTERY.

wooden wainscoting carried around the lower part of the walls and piers, is somewhat gloomy, notwithstanding the whitewash with which all of it has been covered. Once, indeed, we are told, the interior was much more lofty than it is now, the floor having originally been at a much lower level, but there is no record of the time at which it was raised, nor has modern research been directed to ascertain the truth of this statement.

The nave piers are of great size, large and heavy and capped with a simple band moulding, and may, if we choose, be considered internal buttresses. Each of the three bays has a round cross-vault with square, thick ribs, similar to those in the cathedral of Grasse, and in the nave of the cathedral of Toulouse. A striking peculiarity of the nave arches is that two of them have an inward return at the base giving them a true horse-shoe form. Broad longitudinal arches spring from pier to pier next the walls, but the vault section does not follow them, being of a domical form. All of the ribs and arches are without moulding or ornament of any sort. On the north side the arch of the third bay to the aisle, forming part of the choir, is partly built up and closed, while the aisle, owing to a deep transverse arch

at the beginning of the nave which is omitted in it, is not quite so long as the nave. It is covered with a tunnel vault, with slender transverse arches, and extends beyond the nave parallel with the choir is a bay whose sides are slightly inclined towards the east, where it is closed with a straight wall. The nave apse is of the usual Provençal type, a narrow rectangle, roofed with a tunnel vault forming the arched entrance to the semidome, which is slightly lower and

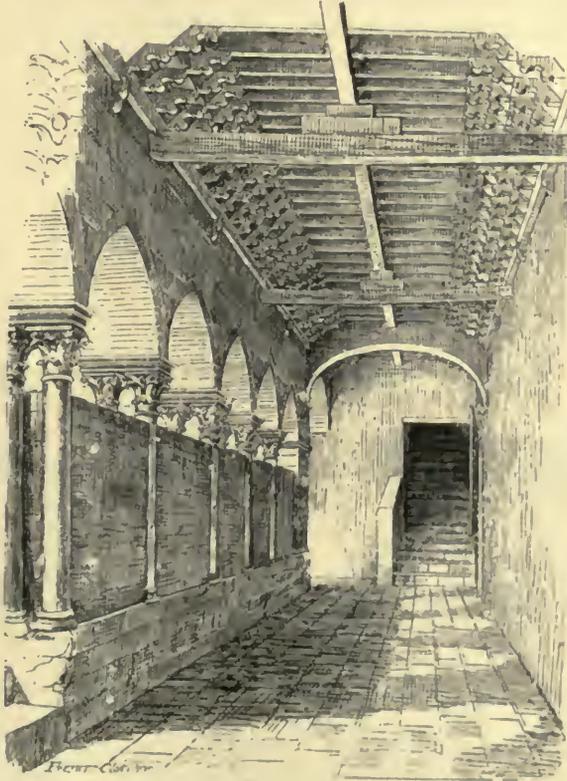


FRÉJUS CATHEDRAL.—CLOISTERS.

of smaller diameter. The altar is in the third bay of the nave, which forms part of the choir, the entire apse wall being surrounded with stalls of carved wood, with flat geometrical designs, which, while good in their way, are not notable examples of wood carving.

The determination of the period at which such an interior as this was erected is a task of no small difficulty. There are no written documents or records, and its present state is not warranted to afford much help. That the city of Fréjus was destroyed by the Saracens in the early part of the tenth century is an established fact, and that towards the end of that century the celebrated bishop Riculfe (about 975) rebuilt it, appears likewise indisputable; but that any considerable portion of the cathedral fabric dates from that time can scarcely be seriously considered. The latest writer on the cathedral of Fréjus, the Abbé Espitalier (*Les Evêques de Fréjus du VIe au XIIIe siècle*, Draguigan, 1894), does not hesitate to assign the

tower and the north aisle to the tenth century, and places the beginning of the nave at the same epoch, basing his argument on an alleged similarity in structure between the two parts, and upon the fact that the vault of the aisle is earlier in form than that of the nave. That the latter part of this argument is true cannot be doubted, but certainly the reasoning is at fault. The aisle is a narrow passage, much too small for a church itself, a circumstance that satisfactorily deter-

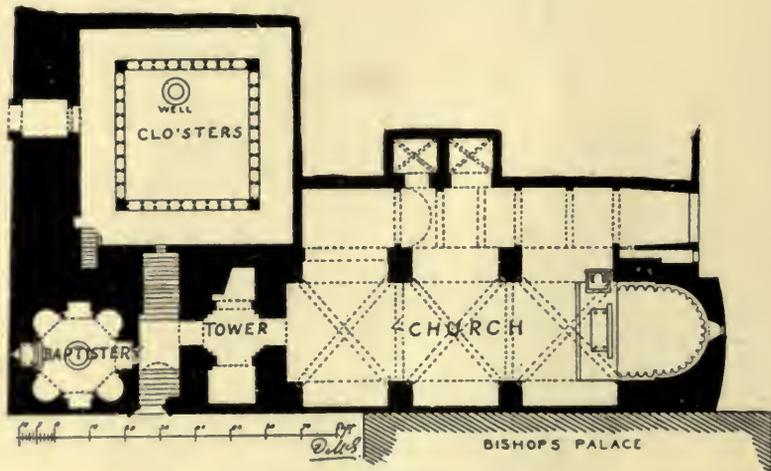


FRÉJUS CATHEDRAL.—CLOISTERS.

mines its non-priority in date. And, moreover, it does not run directly from the tower, as it would have done had the two portions been erected at the same time. No builder would have first finished a secondary part of his structure before undertaking the main portion. There seems, indeed, no reason to attribute the body of the cathedral to an earlier time than the twelfth century. The fact that the lateral edges of the nave vaults do not exactly follow the lines of the transverse arches suggests that they may be later than the lower part of the walls; but the difference in time cannot be great, else a true pointed vault would have been built. It is important to note that the small area of the tower, both in the lower and upper parts

has round tunnel vaults, which certainly antedate the vaults of the nave. The forms of the piers and the width of the nave point only to such a roofing as is actually in place. As for the tunnel vault of the aisle, that was probably determined by questions of economy as well as by the great width of the nave bays. The arches between the nave and the aisle are simply cut in the separating wall and are without chronological value.

A similarity so great as almost to be called extraordinary exists between the cathedrals of Orange and of Fréjus. The plan of the latter, as has been seen, is more complicated than that of the church at Orange, but the essential points of resemblance are very striking. Neglecting its aisle, the plan of the cathedral at Fréjus is almost exactly that of the cathedral of Orange. Both have a broad nave,



FRÉJUS CATHEERAL.—PLAN.

with large internal buttresses connected by broad arches or tunnel vaults. It is true that in Orange the vault of the nave is pointed, while at Fréjus it is a cross vault, but the structure is almost identical in both cases. In the latter church, also, there is no domed bay before the apse, but the tower which at Orange surmounts the dome is at Fréjus above the apse. More remarkable is the similarity in the detail and structure. Both are cathedrals in ancient Roman cities, whose remains are still their greatest attraction to the tourist and the archaeologist. Yet in neither is there hint of this rich suggestive architecture which elsewhere in Provence was incorporated as an integral part of the decoration. In Orange there is nothing at all of it; in Fréjus the only ancient remains in the cathedral—excepting, of course, in the baptistery—are some columns brought from the amphitheatre to support the organ gallery at the west end of the nave. But though there is no Roman detail in these churches their type is

purely basilical and reproduces, almost in identity, the plan of the basilica of Constantine in Rome. The Roman influences would seem, therefore, to have been manifested in these cities in a different manner than elsewhere in Provence. It is needless to add that churches so similar must be of identical date; both belong, therefore, to the time that immediately succeeded the employment of Roman detail in Provençal architecture, and were probably erected in the first half of the twelfth century. It is, perhaps, a useless guess to suggest that they were designed by the same master builder, but certainly the guiding spirit of the one was entirely familiar with the other.

The baptistery is a structure of great interest. It is octagonal in plan, with shallow rectangular recesses in the main axes, and semi-circular domed niches in the diagonal axes. In each angle is a plain monolithic gray granite column, whose capitals of white marble are Corinthian, save one, which is Composite. A stone over them is moulded on the outer edge only, and is a survival of the entablature. The plain, round arches are slightly moulded on their outer edges. The dome is modern, with a small circular lantern. Immediately below it is a globular baptismal font, which rests on a fragment of an antique column. All of the interior, save the shaft of the columns, has been whitewashed. In the seventeenth century this baptistery contained seven altars, as does the baptistery of Aix to this day. Authorities are divided as to the date of this edifice, but it is unquestionably the oldest part of the cathedral group.

There is a close similarity between this baptistery and that of the cathedral of Aix, but an even closer analogy exists between it and the so-called "Pantheon" at Riez. In this building the outline of the ground plan is precisely the same as at Fréjus, but the dome is carried on a series of free standing columns, as at Aix, while at Fréjus they stand against the angles formed by the niches.

The cloister, which dates from the thirteenth century, is on the north side of the cathedral. In its early days it was doubtless a charming and delightful structure. The arcade has eight plain pointed, unmoulded arches on each side, carried on slender double columns, with delicately carved capitals. Now all is changed. The cloister is not only deserted and in decay, but the columns are enclosed in rough walls, which leave only their capitals free with the space above them. Two of the galleries, and none of them appear to have been vaulted, have an interesting flat wooden roof, corbelled out on each side, and forming a series of small squares, which is painted with scenes of various sorts, with figures or with animals—a curious and interesting work, though difficult to see.

This complicated group of buildings is encased in enclosing walls of little interest. On the south, part of the base of the tower and the

whole of the baptistery is faced with a continuous featureless wall. The pointed and slightly recessed doorway which leads to the passage between the tower and the baptistery is a mixture of Renaissance and debased Gothic and was completed in 1530. Much of the remaining walls of the cathedral are enclosed within dwelling houses, and such parts as are visible are without architectural features.

The striking portions of the exterior of the cathedral of Fréjus are its two towers, one of which stands at the west end of the nave, the other being directly over the apse. The western tower has a high, plain, solid, rectangular base, in which the round-arched windows have been blocked up. It is surmounted by an octagonal stage, with plain, high, single, light-pointed windows on the main faces, which, with the spire, covered with colored tiles, was added in the sixteenth century. Though this is the most conspicuous feature of the exterior, it is not so interesting as the tower at the east end. Its base, as has been said, forms the apse, but this is only visible in a slight swelling of the eastern wall, which is entirely plain, save for the apse window. The upper part contains a large chamber, originally used for storing arms and ammunition, and once wholly open to the west—the city side of the cathedral—by a large pointed, open arch, now bricked up. It is crowned with machicolations of small pointed arches or corbelled stones, with a balustrade that has been added recently. The swelling in the outer surface disappears immediately above the apse line, but reappears again in the battlements. It is interesting to note that this tower faces the direction of the sea, and its fortified state is suggestive of its once exposed position. Doubtless, the western tower, the rectangular portion of which is vaulted with a round tunnel vault, was finished in the same manner before the upper stage was added. Visitors to this cathedral should not omit the splendidly carved wood doors at the entrance, which are kept enclosed in rough wooden cases, and are rich and noble examples of a fine style of church decoration.

Barr Ferree.

NEVILL HOLT.

I.

ON one of the highest hills in Leicestershire stands a curious old house, which for centuries has been known as Nevill Holt. Holt signifies not only woods, groves and plantations, but also high hills.

“Ye that frequent the hills
And highest holtes of all,”

says “Old Songs and Sonnets,” and agreeably to this construction of the word, the house occupies a lofty eminence, from which there is an extensive view of a rich and cultivated country. Directly opposite, across the valley, and on an equal height, stands Rockingham Castle, which, generations ago, served King John as a hunting box: history records that he hunted the red deer from there forty-seven times. Holt is mentioned in “Doomsday Book,” and as far back as Henry I.’s reign in 1260, there are records of Reginald Fitzurse having held five *carucates* (or, presumably, hundred-acre lots) of land in Holt. Traces of the old Roman road leading from Chester to Colchester are still visible in the park, while in the village, at the foot of the hill, remains of a Roman bath have been excavated. So beautiful and perfect was the tessellated marble of the bath, that immediately on its discovery it was sent to the South Kensington Museum, where it is now to be seen.

In the year 1448 King Henry VI. granted leave to Thomas Palmer and his heirs to enclose and impark 300 acres of land and wood in Holt. At Palmer’s death his only daughter and heiress married William Nevill, who then came in possession of all the property; and in his family it remained until thirty years ago.

The house itself is very composite, consisting of a long, narrow row of gray stone buildings, one end terminating in a protruding wing and the other in a beautiful old church, which joins the house itself. At right angles to the church is a square structure with an exquisitely carved stone façade. This was formerly a hospice; the carved shell over the door indicating it to have been a rest and shelter for weary travellers. It has since been converted into stabling for hunters, for Holt is situated in the heart of the best hunting country in England. The house was evidently the centre of a small village, and originally must have been a cluster or row of separate



NEVILL HOLT.
(From a road in the Park.)

buildings, which, during the past six centuries, have been joined together and rebuilt by each successive owner, to suit his individual taste and convenience. The front door is built under a porch, whose top, delicately carved in light gray stone, is yet in an excellent state of preservation, the general design being quite distinguishable. To the right of the porch is a beautiful six-cornered window—what to-day we should term a bow-window. On the pillars, separating the



FRONT DOOR AND OLD STONE WINDOW.

diamond-shaped panes, rest male figures alternating with the shapes of fabulous animals; all are battered and worn by the winds and rains of centuries, but remarkable for the vigor and harmony of their conception. We admire the mastery which created these simple yet beautiful lines. So extraordinary is this early execution that, by comparison, the latter seems timid and meaningless. These carvings serve as a constant reproach to modern sculptors. That it is not possible to reproduce them to-day is proven by the modern window on the left of the doorway. The interior of the ancient bow-window finishes in a lofty arch, the stone ceiling carved in quatre-foil pattern and almost black with age.

At the back of the house are dreamy old cloisters, their rounded arches breathing an atmosphere of mystery and religion. Under these arches was the stone perambulatory, and above is still the private chapel of the Nevills, once a great and influential Roman Catholic family. The chapel itself is panelled from floor to ceiling in solid oak, carved with a delicate tracery. On one side three latticed windows look out on the greensward below; at the farther end once stood the high altar. The ceiling is supported by huge oak beams, and the whole is permeated with an air of almost hieratic dignity.



VIEW OF CLOISTERS AND CHAPEL.

Old women in the village maintain that a curse has been laid upon the house ever since this consecrated chapel ceased to be a place of worship.

Quite separate and distinct from the Catholic Chapel, at the back of the house, is the church, dedicated to Saint Mary, which may be seen from the front and which, although attached to the main building, forms no part of the dwelling, as does the chapel. It is a curious little edifice, consisting of a tower with a pretty, slender spire; a south porch; a nave; and a north and south cross, the latter separated from the church by an iron palisade forming a distinct chapel. In this



TOMB OF SIR THOMAS NEVILL.

small chapel are several beautiful monuments of the Nevill family, the most striking being one of Sir Thomas Nevill, extended at full length on his tomb, and dressed in armor. It is done in gilt and colored marble, and, although dated 1560, is in an excellent state of preservation.

At the first glance Holt Church seems to be a fair specimen of the perpendicular order, but the moment the details are examined it proves to be only the shell of a church of the fourteenth century, showing that the whole ground plan must have existed before the insertion of the perpendicular windows. The string course, running all around the building and dipping near the windows, is a proof of this. Here is an instance in which an architect of the fifteenth cen-

tury, while altering the church has not spoiled it. Behind the octagonal oak pulpit, a charming specimen of Jacobean carving, are two hagioscopes or squints from the south transept and the nave.

The churchyard in front was formerly enclosed in a high brick wall, and it is told of one of the Miss Nevills, who was evidently an autocratic person, that once in walking past she got her feet very wet, and, enraged at there being no pavement, ordered the tombstone stones to be torn from their places and laid prostrate on the ground, thus affording a protection for her feet against mud. When the pastor arrived the following day, he was horribly shocked at this act of vandalism, and ordered the tombstones taken up at once and put



VIEW OF CLOISTERS AND CHAPEL.

back in their original places. But as no one knew to which graves they belonged, it was impossible to place them properly. In despair the pastor had them set up at the back and sides of the church, where they have ever since remained, leaning against the sacred edifice. At the present time there are no headstones in front of the churchyard, and the high wall has been removed, being replaced by a low stone plinth.

On passing through the front door of the house one enters a small stone vestibule curiously carved with grinning female heads. Three graceful stone arches lead into a spacious and lofty hall, gaunt and im-

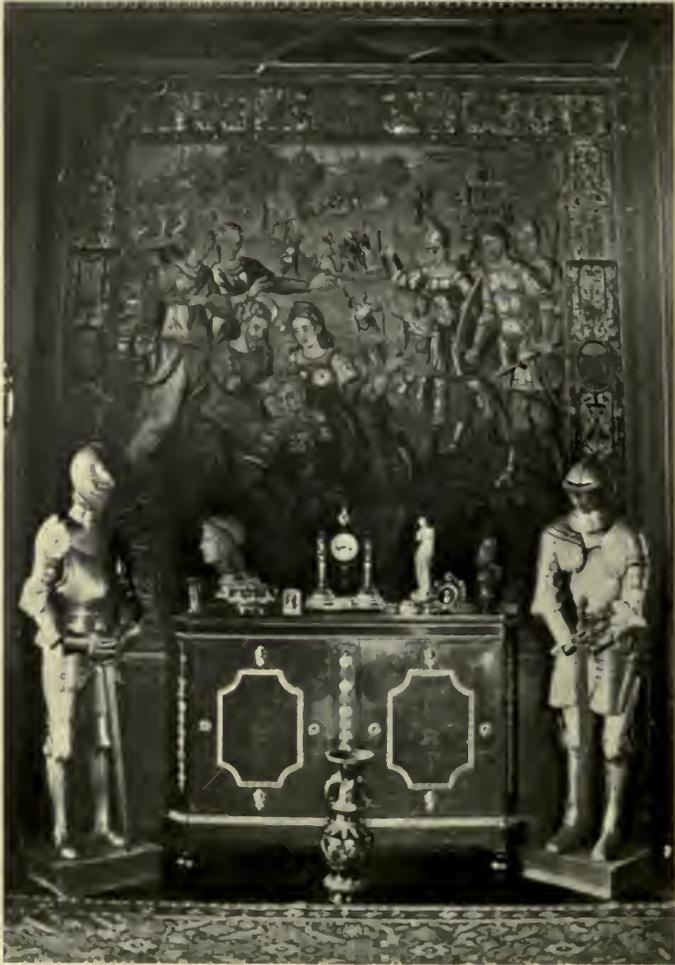
posing, which comes as a complete surprise after the comparatively modest entrance. Ages ago this hall was a council chamber, evidently the place in which the old Masters of Holt received their tenants and the rents for their lands. A stone fireplace almost entirely fills one side of the room. The ceiling is black with time and smoke, and below it runs a frieze of panels done in oils, illustrating Dante's "Inferno," the design showing dark, struggling masses and indistinct human forms. The walls, which, as well as the floor, are of solid stone, and several feet in thickness, are hung with old tapestries depicting the labors of Hercules and the unhappy history of Samson and Delilah. This great hall is representative of several centuries, filled with the products of many countries. The tapestries are from France and Flanders. Old armor of English and Eastern workmanship; coats of mail and engraved helmets hang side by side, with wonderfully wrought silver and ivory guns from Algiers, while a huge tarpon from Florida gives a touch of gilt and silver to the gloom at one end of the room. King John's leather drinking-jack and his iron chest are also to be found in a corner of the hall. A colossal bronze jar, the spoil of some Chinese temple, holds a gigantic palm. Grotesque carnival suits of armor of German origin stand here and there about the room and grin from unexpected corners.

On the left of the vast fireplace, with dim, ancient tapestry for an harmonious background, stands a four-fold leather screen, painted by Angelica Kauffman. The scenes are pastoral; in the foreground Elysian shepherdesses with their delicately attentive swains are indolently tending sheep, while at the back are wonderful trees which never could have existed in nature. Yet they are all the more charming for that, like the trees of Sir Joshua Reynolds. Angelica Kauffman won her fame by a faithful copying of Sir Joshua, whom, besides imitating, she did her best to win. Mr. George Moore says in his "Modern Painting:" "Angelica imitated as a woman should. She carried the art of Sir Joshua across her fan; she arranged and adorned it with ribbons and sighs, and was content with such modest achievement."

But let us return to the hall. The furniture is of heavy carved oak, the chairs are gaunt and comfortless, the cabinets, desks and chests forbidding in their severe splendor. There are rough fur rugs strewn on the stone floor, and above tower the noble heads of moose and caribou from the wilds of North America.

Turning to the left we pass down a long, narrow stone passage, panelled with old Moorish tiles from Spain, rich in gaudy coloring. Armor lines the walls of this passage, at the end of which a long gallery discloses itself. This has been converted into a sitting room for modern comfort. It is panelled almost to the ceiling in dark oak,

obviously robbed from some church. Here again we find a large stone fireplace, filled with soft, flakey ashes, which have probably been there for generations. Let into the wall above the mantle is a delightful marble bas-relief portraying Neptune with his tritons and nymphs disporting themselves in foamy waves. This was prob-



GOBELIN TAPESTRY IN THE LONG GALLERY.

ably brought from Italy at the beginning of the century when everything Italian was *de rigueur* in England, just as now everything French is indispensable in a fashionably furnished British house.

Passing on we reach the state apartments, blue walled and panelled in black and gold, hopelessly uninteresting and modern, breathing an execrable taste in decoration which prevailed some

thirty years ago. But the apartment is redeemed from entire mediocrity by the beauty of its fireplaces and the charm of its arched stone windows. The fireplaces are three in number and made of curious carvings from Brittany. Fluted columns and carved panels reach from the mantleshelf almost to the ceiling. In the centre, let into panels, are two wonderfully good old Dutch pictures. All the arrangement of these fireplaces, though modern, is beautiful and unique in its conception—and provided a thing be beautiful, what matter to which period of art it may owe its origin?

The two paintings are of doubtful origin, but clever in design and execution. They are really beautiful pictures, full of brown shadows and tender backgrounds.

Unfortunately for us, most of the old Nevill portraits were sold and passed into strange hands at the time of the sale of the estate. All the family papers were destroyed too—an irreparable loss, as we can now know little of the real and intimate history of the inmates of this old house. The Nevills, it seems, never wrote memoirs, which is still a greater pity; everybody loves memoirs nowadays, even though they be untruthful ones.

The long gallery to the left on the upper floor was once lined with family portraits and delicately painted miniatures. The gallery, with its graceful arched ceiling, which, like the rest of the house, is rich in oak carvings done in scroll design of vine and grapes, still exists; but the Nevill pictures are gone to grace strangers' walls elsewhere.

Of all the interesting counties of England, Leicestershire and Northamptonshire, or what are known as the midland counties, contain, perhaps, the most beautiful old houses. Here are the really ancient houses, not those erected in the seventeenth century to receive a royal visit from Queen Elizabeth, like Hardwick and Chatsworth; nor yet given to some favorite by Queen Anne, at a later period, like Blenheim and Burghleigh; but ages before, as far back as the thirteenth and fourteenth centuries, in ruder times, before sovereigns paid state visits to their favorites. These houses are all built of lovely gray stone, and many of them were monasteries before Henry VIII. drove forth the monks and disestablished Catholicism. His favorites were rewarded by the gift of these charming old places whose refectories became the rioting halls of warriors. The impression they give is still grave and monastic, an impression extraordinarily enhanced by their architecture, which, though beautiful, is solemn in the extreme.

But I am taking a look into the serious past, and am forgetful of my intention to tell you more of Nevill Holt. Let us make a trip to King John's tower. How darkling and treacherous that sounds! As one ascends the narrow, tortuous staircase, he has visions of all

sorts of dark deeds and unholy crimes committed during the Middle Ages. At the top of the stone staircase, worn by the tread of iron-clad feet, is a landing just large enough to permit one person to stand on it at a time, and here are two curious doors bound with iron, one directly at the top of the stairs and the other to the left.

Pushing open the one to the left a great space right under the gabled roof is dimly perceived, lighted only by the uncertain gleams admitted from the open door. The tower is a labyrinth of huge worm-eaten beams and rafters. It was, without doubt, a hiding place at some remote period and may have been used as a dungeon, although the stone dungeon in the cellar would seem to have been sufficient punishment for any offender. The other door being opened, a small square room reveals itself, lit by a tiny window looking on a pointed roof, not three feet from the aperture. The walls are of solid rock and bear many curious inscriptions, some in Latin, others in old English. Part of this work is attributed to King John, who fled to Holt during one of his many difficulties with his subjects, was concealed by his friends and allies in this little square chamber for many days. Judging from the inscriptions he must have beguiled many a weary hour with his stone cutting. It seems to have been a mania with imprisoned sovereigns to perpetuate themselves by such means. The only way King John had of taking the air was to creep through the diminutive window to the roof, and this could be done safely only at night, after receiving signals that he might venture out without danger to his person.

Without family papers to consult, the task of rendering the history of an old house either veracious or interesting is almost an impossibility. But Holt is not without historical interest, although no actual record remains to us now. In besieging Rockingham Castle, Oliver Cromwell took possession of Holt, using it as a convenient position from which to conduct his operations.

The Nevills appear to have been from the earliest times a people of great daring, personal bravery and devotion to religion. So strong was their sympathy with the Roman Catholics that they actually gave assistance in the development of the gunpowder plot, which, had it succeeded, would have changed the history of England. Between the Catholic houses of Holt, Rockingham, and Stoke Dry, all three miles apart, subterranean passages are by some believed to have existed, by means of which the conspirators and their confederates visited each other, thus enabling them to develop their plans without danger of detection. I have grave doubts, however, of these famous underground passages, since to reach Rockingham from Holt meant tunnelling under a small river, the Welland, a feat which in those days would have been practically impossible to accomplish.

One of the most interesting features of this curious house is the small secret chamber, discovered only some forty years ago. The discovery happened in the following manner: A small pane of glass over the bow-window, of which I have already spoken, caught the eye of some inquisitive person; curiosity being aroused, queries were advanced as to what apartment this miniature window belonged. No one knew; so to solve the mystery, long ladders were brought. Through the aperture a small chamber, completely panelled in dark oak, was disclosed. In the tiny apartment was a winding stone staircase, hardly wide enough for one person, which communicated with the hall below, admission being gained by means of a sliding panel, known only to certain inmates of the house. Without doubt this served as a hiding place for the family priest, who, when the least danger of discovery threatened, would run to the great hall, and touch the hidden, noiseless spring of the oak panel. Then the priest fled up his little stone staircase and was absolutely safe in his hiding place.

This stairway must have seen great service, for the steps are so worn away as to be unsafe in ascending quickly. In all of these old houses are these curious little staircases to be found. The architects of old days must have delighted in building them for the surprise and eternal confusion of mankind. At Holt there are twenty-seven separate and distinct stairways, rendering it unsafe for a stranger to wander about the house alone after dusk.

After the discovery of the secret chamber, search was immediately made for any objects that might give some clue as to when and by whom the room had been occupied. No furniture of any sort or description was found, but on the floor were mildewed papers and a torn letter, yellow with age, bearing the date at the top, July, 1644, traced in a fine, delicate handwriting. The rest was utterly illegible. Some dried bones were also found, covered with dust and damp, but whether human or the bones of some unhappy animal is not known. The discovery of the partial skeleton gives rise to the eternal ghost story, without which no old house seems complete. It is a harmless ghost, but a rather noisy one. People sleeping in the adjoining room occasionally aver that their sleep has been disturbed by curious grating noises, and the clank of chains and armor proceeding from this mysterious apartment; but no one has ever been able to claim the distinction of having seen the spectre itself.

I have not yet shown you the drawing-room. This is truly a house of surprises, for passing through a wonderful door, whose panels are carved with the heads of knights and ladies, and which bears the date 1530, one traverses a short passage, at the end of which bursts upon the astonished vision a long, lofty, arched room which was, in ancient time, a banquetting hall. Unfortunately, the



A CORNER OF THE DINING-ROOM.

minstrels' gallery has been removed. Three great windows at the far end look out upon the lawn and the red-walled garden beyond. No trace of the hall's original purpose remains; to-day it is the most modern of drawing-rooms. When I say modern, I mean in a beautiful sense; it is a *melange* of French furniture, old china, Persian rugs and feathery palms.

On a table at the far end of the room stands a marvelous silver vase, four feet in height, graceful in form and American in workmanship. It was a present given to Sir Bache Cunard's grandfather, over sixty years ago, by the citizens of New York and Boston.

And still there remains the dining-room to be shown. This again, like so many of the rooms, is panelled in dark oak carved almost to

the ceiling. Some fine old sideboards in oak bear the date 1620, and to the left, on a richly carved Dutch pedestal, stands a life-size fox in solid silver, a gift to Sir Bache Cunard from the members of his hunt, when he gave up the hounds eight years ago. The Princess of Wales was the recipient of one about one-third the size from the members of the Norfolk hunt; but with that exception this at Holt is the only one in England, and probably in the world. It is modelled from life, and is perfect in drawing, the whole figure being full of a sense of life and energy.

I could dwell on other beauties, both inside the house and out, but I think enough has been said to convey a vivid idea of the character and charm of this old English abode. As I stand on the terrace in front and gaze at its pointed roofs, delicate spires, graceful towers and lovely stone carvings—the *ensemble* a delightful dream of architecture past and gone—I cannot help thinking that in the old days the artist's motto must have been: "Beauty for beauty's sake."

Maud' Cunard.



ANTIQUÉ FURNITURE IN THE MODERN HOUSE.

IN furnishing a house we are not entirely governed by our own judgment. We may have our own ideas as to what we want, but what we find in the stores is the result of the prevailing custom, and we are obliged to buy, perhaps, accordingly.

Besides this, we are influenced largely by what our neighbors or friends are doing or having. There is a fashion in furniture as much as in dress, and it changes almost as frequently, particularly among the wealthy of our large cities.

This desire from time to time for some new style of furniture and house decoration is not entirely independent of the changes in costume, but it is in a large measure influenced by them. In the early stages of furniture development we find that costume had an effect on the shapes of the chairs, causing them to be wider and deeper to accommodate the dress made of heavy clothes with large folds, and in later times the use of hoops first resulted in the introduction of the chair without arms, and then produced a modification of the arms of the chair whereby the dress did not interfere with them. Court etiquette has also had an influence on furniture, for it at one time dictated what should or should not be the form of seats used during an audience at court. First, seats were absolutely prohibited except for the king or queen, and later stools were granted to the auditors. The number of shelves or steps above the top of the table—or, as we would call it, sideboard—on which dishes were displayed was fixed by court etiquette, each individual having the proper number according to his rank.

These customs were carried from the palace to the castle of the lord, and thence to the peasant's dwelling, each observing them to the extent of his means, resulting in certain fads or fashions.

The desire to imitate the acts of others, together with the love for curiosities, serves to bring into our households many articles which

are not wholly adapted to our use. In mediæval times the Merovingian kings had furniture imitating that used by the Romans during the Empire. At the present day it is much the same. The wealthy imitate royalty; and the poor, the wealthy. Each man apes his neighbor. If Mr. A. has a Louis XVI. parlor, Mr. B. must also furnish his parlor in the Louis XVI. style. We find many articles of furniture and bric-a-brac brought from foreign lands that are strangely out of place among their more serviceable companions. Most of such articles are bought as curiosities and have a certain value as such, but their use as furniture is not always pleasing. Even this custom has a precedent in most early times; but not to go back too far for an example, we may call to mind that Charles V. used furniture either imported from India or copied from Indian examples. In England during the eighteenth century Chinese articles and furniture imitating Chinese forms were used. The French lacquer work is but an imitation of the Chinese or Japanese.

It is this habit of imitation and love for curiosities which formed one of the seeds from which the modern "craze for antiques" grew. There was, however, another cause.

About a quarter of a century ago the American dwelling was not furnished with any special regard for aesthetic effect. It was understood that certain articles were necessary to furnish a house properly, and it was the fashion to have many of them made of black walnut. There was some attempt at color decoration, but this was usually left to a person who had no especial training or knowledge of true color effects. Perhaps none was needed, for everyone wanted his rooms nearly a monotone; everything was a shade of the same color, without contrasts. Furniture was coarse in detail and often lacking entirely in design, though there was at times a crude attempt to imitate some of the forms of elegant French pieces. No true copy was made, as then the furniture would have been much too expensive for the average person, and no manufacturer had the knowledge or the courage necessary to make furniture which was rationally constructed for its use, and ornamented according to its purpose and value. The entire furniture trade, in fact, household art, fell to a very low artistic level. Many articles of furniture were covered with some sort of tracery, inlay or metal work, under the supposition that it was ornamental because the beautiful model costing five or six times as much had its surface nicely decorated by carving, or chiseled brass work. It did not seem to occur to many that such work was elaboration, and not ornamentation; that it was bad in every way, bad in appearance, bad in workmanship, bad in taste. A few realized this, and if they had sufficient means they employed artists of merit to superintend the construction of furniture made to order.

Several wrote papers or books denouncing the bad artistic sense of the times, and cried for a reform. Among them was Mr. Eastlake, who advanced many ideas, some of which could be followed even to-day with profit. Perhaps he was one of the first to really make an impression on the public. At all events, his work gave a certain impulse to a movement just started towards an improvement, and increased the desire among the public for household goods of a simpler and better character.

Among those who knew how bad in every respect was the furniture of that period were the artists, architects, and those who from observation abroad had some artistic instinct. It was they who first of all gathered from the garret or woodshed some old chair, table or desk which, after cleaning, repairing and polishing, was placed in their rooms to do service.

Why did they do this? Why did they seem so pleased at bringing to light an article that had been discarded as old-fashioned? In the first place, they saw a much better article than the average workmanship of the time produced. It was, perhaps, not so elaborate, but the quality of material, design, workmanship and its truthful simplicity made it appear much more elegant than the showy sham next to it. Whenever an opportunity presented itself such furniture was purchased, till often the whole studio became furnished with it. A studio or office thus furnished, together with the odds and ends usually found hanging about in a place of that kind, certainly gives a pleasing impression as one enters, and this impression is not always destroyed by familiarity.

Then the amateur began to imitate the artist. He, too, bought "old things," but not with that knowledge with which his friend had acted. Though sometimes he bought a good article, it was more the result of accident than wisdom; and as the good pieces became scarce many a poor article was bought under the impression that it was valuable.

But what is good furniture? First, it must be useful, for if not serviceable it becomes merely an ornament, or an encumbrance. Next, it should with its usefulness have a certain artistic quality; but this usually follows as a result if the natural conditions of the problem set before the designer have been followed. When we say artistic we do not mean that it should display some peculiar shape, some odd construction or eccentric ornamentation. Freaks are not artistic. We mean it should be well-proportioned, neither too large nor too small; that it should not only be actually strong enough to serve its purpose, but it should also appear so. What is more inartistic than to see a cabinet, a table or a chair with legs which appear too slight to hold it up, even though in reality they are sufficiently strong? The form of the article should be pleasing to the eye, and not obtrusive

so as to demand one's attention immediately on entering the room. Yet, when it is noticed it should be such, that the more we see it the better we like it, and it ought never to become an eye-sore, even though it remain in the house a lifetime.

When we say it should have a pleasing form we do not mean that all its lines are to be curved wherever possible, or that any curves need be introduced. There is an impression among many persons that if curved lines are introduced in a design it is much improved. Such curves often bid defiance to all the natural laws of the structure of wood. This is noticeable in much of the Rococo furniture where chair and table legs are so curved that they cannot be made without crossing the grain of the wood, rendering them weak and impracticable, violating the most important principle in a good article of furniture.

Good furniture is not overloaded with ornament, for if highly decorated, especially by carving, it becomes too delicate to stand the hard service of daily usage. Then good furniture must be well made, strongly constructed on rational principles, and well finished. It need not follow some old-fashioned method of joining because an heirloom has stood the ravages of time for a hundred years or more, if modern machinery and ideas have introduced easier and possibly better methods. But it should always be made with a consideration of the materials employed, and how they act under varying conditions of climate.

Finally, it should be understood that the age of an article does not imply its artistic value. It is not good because it is old; it is not artistic because it is old. It may be old, very old, and be both poorly made and extremely ugly. On the other hand, it may be direct from the shop, well made, and a beautiful example of the cabinet maker's art.

It often occurs to-day that a copy of some old article is better than the model itself, for at least two reasons. It is usually better made; and it differs from the model sufficiently to adapt it to our modern usage. Some may be inclined to doubt the statement that it is better made. To those we say, stop and think! They will recall tables with the tops warped all out of shape; drawers with unplanned bottoms shrunken so they are loose or open on the front edge; drawers that stick because they are too loose and twist on the slides, and when closed they have shrunken so as to leave an open joint; the absence of dust panels between the drawers, shaky table and chair legs, etc. These and many more faults will come to mind to those who have had experience with antique furniture. They may claim all these faults are found in modern furniture. But new furniture, rightly made by a reputable manufacturer, will have none of them, not only when first made but even years after.

There are articles of antique make which are quite as appropriate for use to-day as when first made, and may in many instances serve their purpose equally as well. Especially chairs and tables, which even if out of repair when purchased may readily be made over.

A word might be said here regarding the use of veneers. There are those who have an idea all old furniture is of solid wood, especially if of mahogany, and for that reason it is better made. In the first place, veneers were often used in olden times, and in the second place veneered work, properly made, is better than solid wood. A top of a table or a panel of solid wood is sure to warp or crack, but if veneered there is little danger of either accident. Nor, if the veneer is properly put on, will it blister, as we are so often told. No modern manufacturer would consider using solid wood in the places above mentioned, except in cheap work, where native woods are employed.

The color of mahogany is another point at which the amateur often stumbles. Only certain kinds of mahogany have a reddish tone when in the natural color, the majority varying from a bright yellow to orange. With exposure to light and air, when oiled, mahogany gradually assumes a dark reddish color, which often has a beautiful tone. But much of the old work was stained, and the very dark, almost black, color of old pieces of furniture is largely due to dirt and repeated coats of varnish. The modern method practiced by many furniture houses of staining wood with a filler is greatly to be deplored, the filler destroying the fine satin-like appearance which gives so much beauty and richness to the wood, when stains and varnish alone are used for a finish.

We said above that a copy, when adapted to modern usage, was better than the old piece itself. Of course, the character must be retained and all the good qualities, while every modern improvement is added and all the poor parts rejected. We then have a most excellent piece of furniture, and it is for this reason that modern designers employ traditional examples as models.

A cheap, poor imitation of an old article, because fashion calls for that style of furniture, is worthless. The making of an article with seat too shallow and back too upright, with drawers inconveniently placed and too deep, because they used to do so, is certainly wrong. Then there is the copying by some cheap process the elaborate articles seen in foreign museums, in which all the elaboration is retained, but so poorly executed as to lose entirely the character of the original. This is decidedly bad taste. It is not the quantity of ornament that gives beauty to the article, but the quality. The modeling and drawing should be the best, even if we can afford to have but little of it.

Many of the antiques imported to this country are articles that, when new, were not considered good examples of the class they

represent. They are inferior copies or imitations made to meet a certain popular demand. Why, then, should a person purchase such articles at a price that is really extravagant? Is it not better to have a modern, possibly less elaborate, well-designed, artistic example? We have seen homes in which one or more rooms were furnished entirely, or nearly so, with "old furniture." There were the shallow cane, and rush seat chairs with a high back, uncomfortable to sit in, and with loose joints squeaking most annoyingly as we take a seat. Nearby was a table with many turned legs more or less defaced, and the top warped or split. In a corner a cheap "Boule" pedestal with the marquetry breaking loose, etc. Everyone can recall such houses. New in all particulars except the furniture, which is clumsy, broken, and most ill adapted to modern use. Everything seems out of place, and in bad form. There is nothing handsome or even interesting in a house thus furnished, and we cannot help feeling sorry for the owner who has thus deceived himself in thinking he has something unusually good. He has disregarded nearly all the fundamental qualifications for proper furnishing that we have mentioned above, and simply made a junk shop of his home. On the other hand, we have visited houses which were furnished entirely from top to bottom with family heirlooms, and have felt that nothing was out of place, or that there was any violation of good taste. We have been charmed, delighted in every way and inclined to tread softly as we move through the rooms, and to handle each article tenderly, as if it were something to be looked at, admired, but not to be roughly utilized. Possibly, much of this furniture is of the same sort as we have seen in the residence above mentioned, yet the sensation produced on our feelings is quite different. What is the reason of this?

In the latter home everything is in keeping with its furniture. The house itself is nearly if not quite a century old, though it has been kept in good repair, and shows little or no evidence of decay. It is freshly painted and papered, but in strict accordance with the surroundings. The ceilings are low, the windows small and divided into small panes. Even before we enter the door, on approaching the house, we almost feel what we are going to see within; and did we find it filled with a miscellaneous collection of modern cheap furniture, how great would be our disappointment. But here we do not find that comfort has been sacrificed for effect; there has been no pretense or attempt to produce an impression. Everything is adapted to its purpose, even though of ancient manufacture. The stiff-back chair is pushed off in the corner or relegated to the bedroom, where it is used but occasionally. In the sitting room are comfortable chairs that have been in the house a lifetime, but they are in good order, and are all of similar pattern. Around the room are daguerreotypes, Copleys and Stuarts. Even many of the books in the case,

a modern one, by the way, built in the room in strict harmony with the surroundings, are a generation old. It is this harmony of surroundings, this fitness of things, all just what we expect and anticipate, without finding anything which seems foreign to the place or that jars on our sensibilities, which causes us pleasure. There is a certain reverence, possibly, because the objects are several decades old, which appeals to us somewhat, but it is secondarily and not primarily the reason for our satisfaction. Were everything new and the harmony the same our pleasure would be as great. We know this from experience, and can recall many modern residences where architects have directed the furnishings and insisted on its being in keeping with the building. Such furniture may be somewhat similar to antique pieces, but it has been modified, if necessary, to adapt it to modern demands.

What has been said thus far may lead the reader to think that antiques should not be used at all in a modern house. Far be it, however, our intention to give such an impression. Quite the reverse is the case. If an article is suited to the place, let it be old or new, it makes no difference, the result will be pleasing. There are occasions, too, when associations may make it desirable to retain some piece of furniture which is not quite what we would use to-day. But such being the case, it is an easy matter to arrange a place where it will neither be in the way nor produce any discord in the surroundings. Such an instance is very different from lumbering up a building with articles bought at a "second-hand store" because they were old. Then there is the residence of the collector of antiques, who is making a study of their history, perhaps, or something of the sort; we expect to find it filled with a variety of styles and kinds. But even here a little judgment used in arranging will do much to produce a good effect.

One of the excuses given for furnishing a house with antiques is that they are cheap. The cost of old furniture is often no less than new of the same character and quality. Of course, it must be understood that the quality and character of the old piece is to be retained. It is to be constructed in the same manner, and left in a half varnished condition, for antiques invariably are but poorly finished. If an article as poorly made and in as bad condition as much of the antique furniture sold at the shops was sent home to the purchaser, even at the same cost as the antique, it would not be received. No one would think of accepting such rickety drawers, and such poor finish, such patched woodwork.

But to take an antique from the stores and have it properly repaired and finished (by finish we mean varnishing, painting or gilding), is an expensive as well as long process in most cases. Refinishing, particularly, is slow work when properly done, as the old work has to be removed first and then the labor of finishing is the same as

that for a new article. Often the repairing requires taking the piece apart, and putting it together again, making double work. This is what occurs in the majority of cases where antiques are purchased of dealers in such articles, for they rarely make anything more than a pretense at repairing or finishing. The result is that by the time the old furniture is ready for use it has cost at least as much if not a large per cent. more than new furniture of the same pattern.

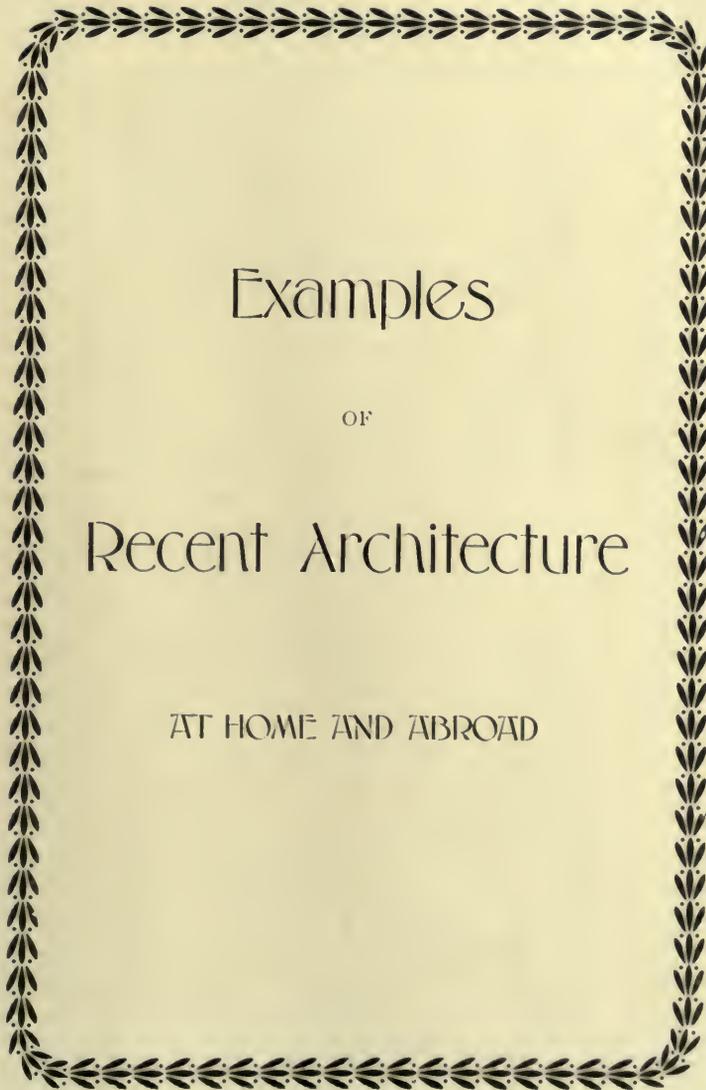
There are exceptions to the above, such as when one is fortunate enough to be present at a sale of household goods, away from a large city, and the furniture offered for sale happens to be in a fairly good condition. Such instances are not the rule nowadays, however, and the person afflicted with the "antique fever" seldom has the patience to wait until he "runs across" something really good and cheap.

Alvan C. Nye.





IN DR. HAYDEN'S HOUSE, PORTSMOUTH, N. H.

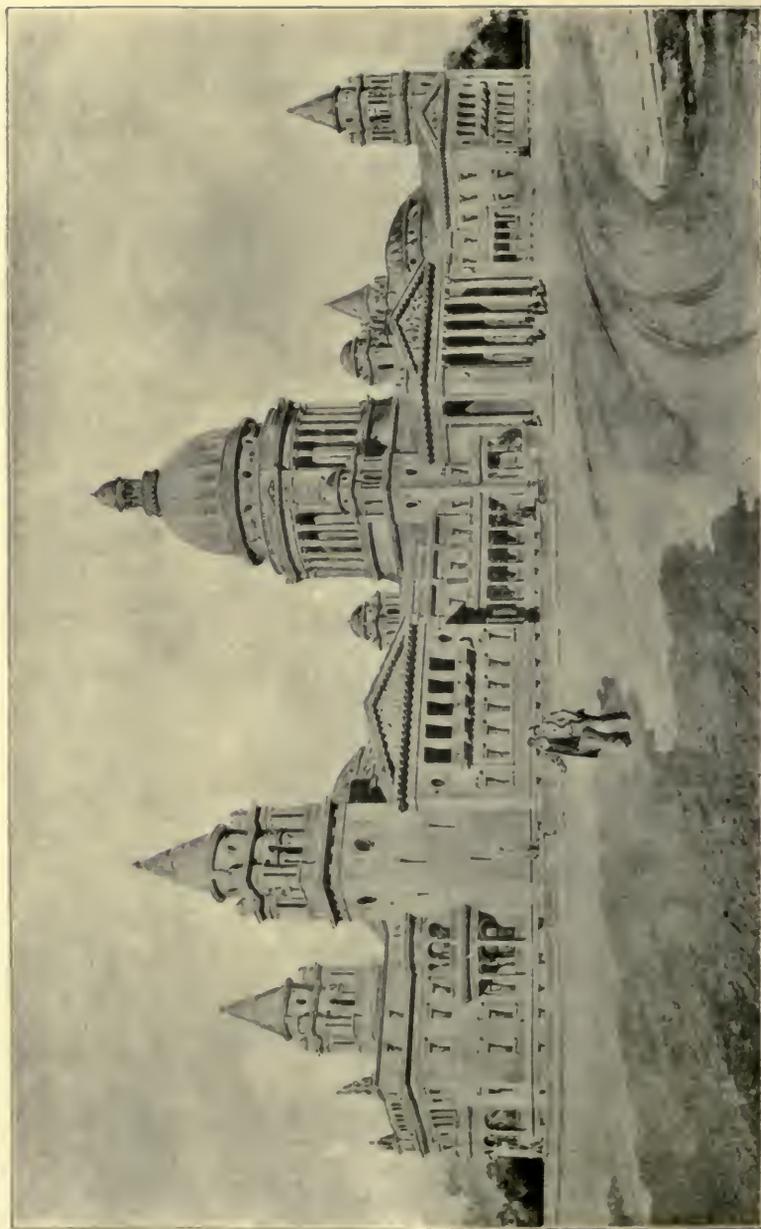


Examples

OF

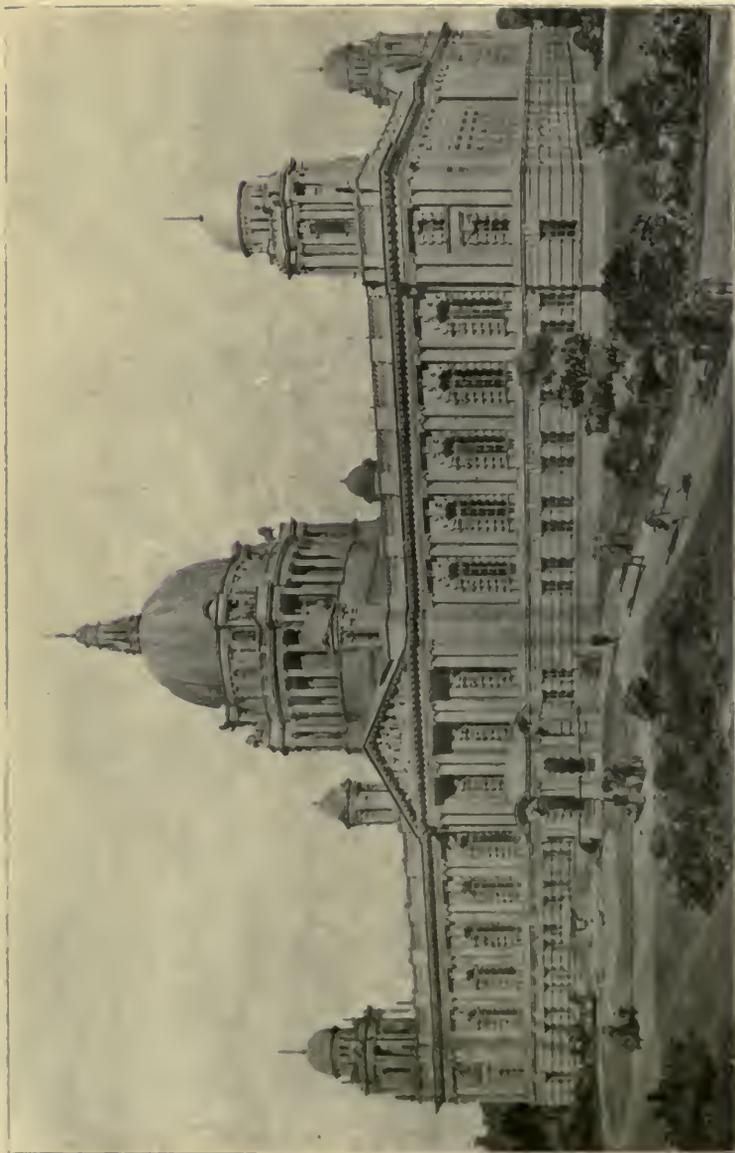
Recent Architecture

AT HOME AND ABROAD



NEW PARLIAMENT BUILDINGS, SYDNEY, NEW SOUTH WALES.

W. L. Vernon, Architect.



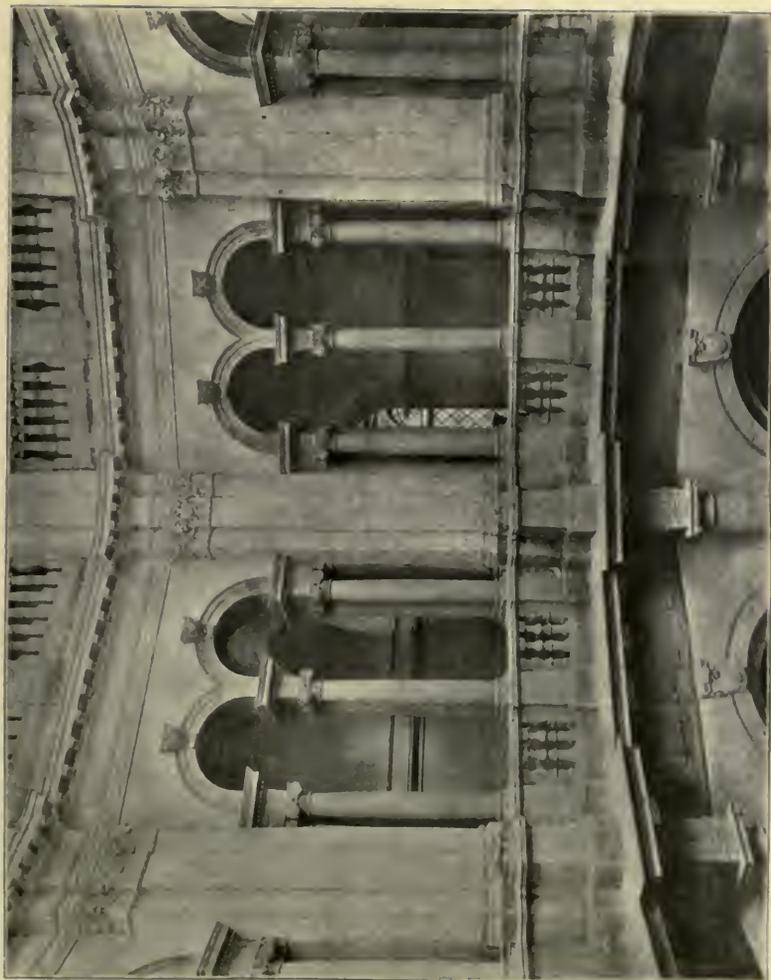
SELECTED DESIGN FOR CITY HALL, BELFAST, IRELAND.
Messrs. Thomas & Son, Architects.

(From the *Builder*.)

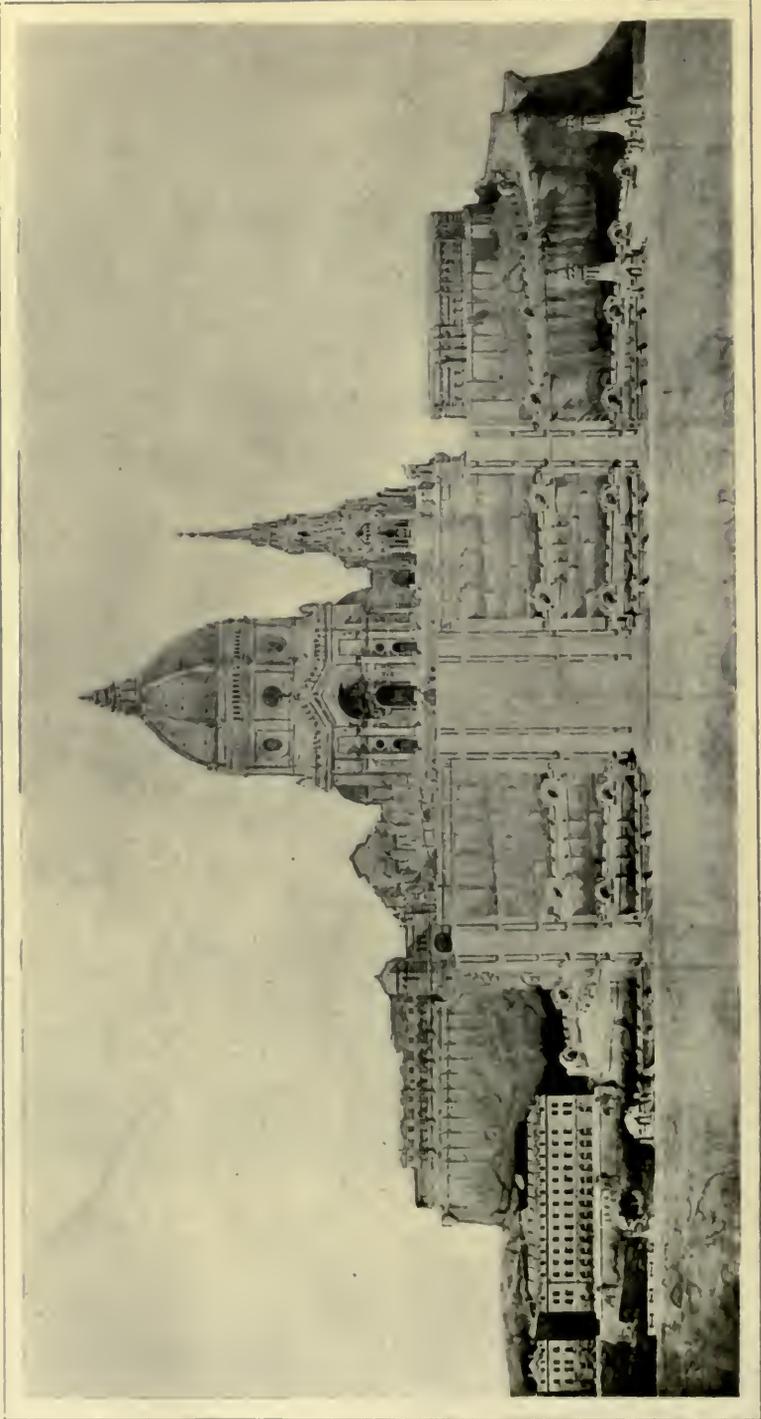


THE NATIONAL GALLERY OF BRITISH ART, LONDON.
Sidney R. J. Smith, Architect.

(From *The Architect*.)

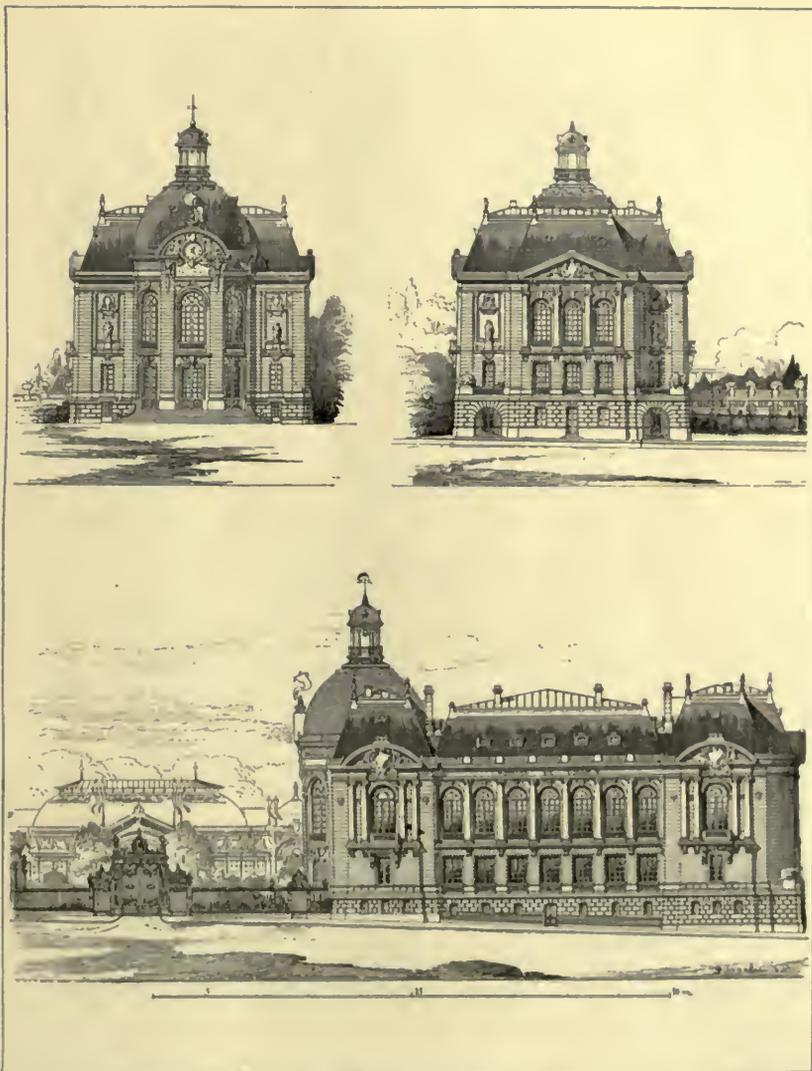


THE NATIONAL GALLERY OF BRITISH ART (VIEW ACROSS DOME), LONDON.
(From *The Architect*.)
Sidney R. J. Smith, Architect.



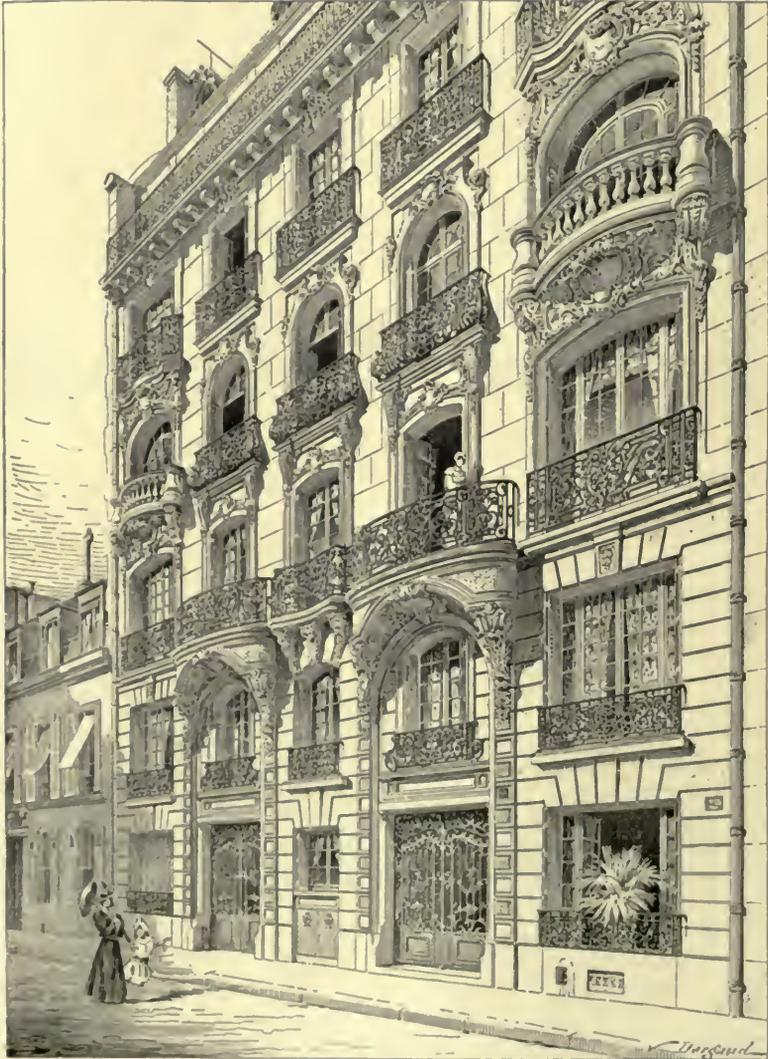
THE "PRIX DE ROME" 1897 (FIRST PRIZE).

M. Duquesne.



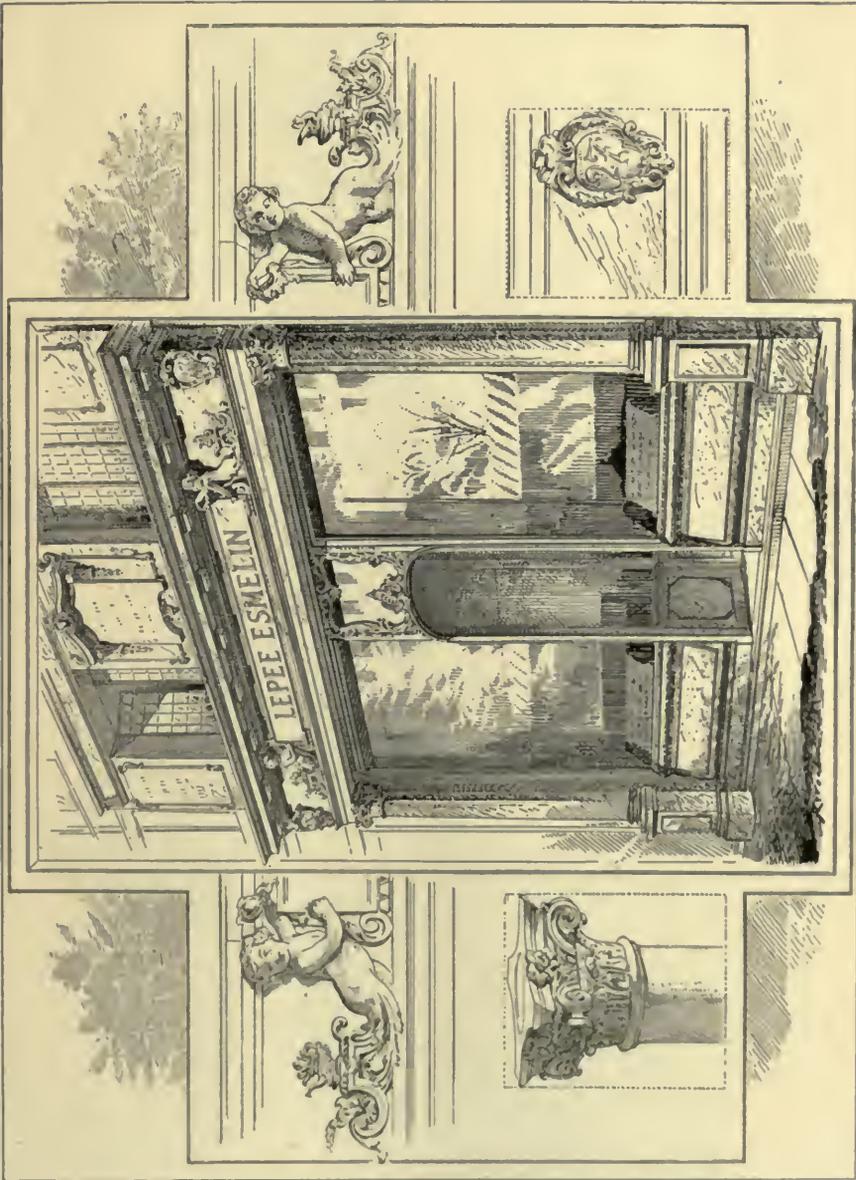
MAIRIE, VERSAILLES, FRANCE.

Design by M. Bréasson.

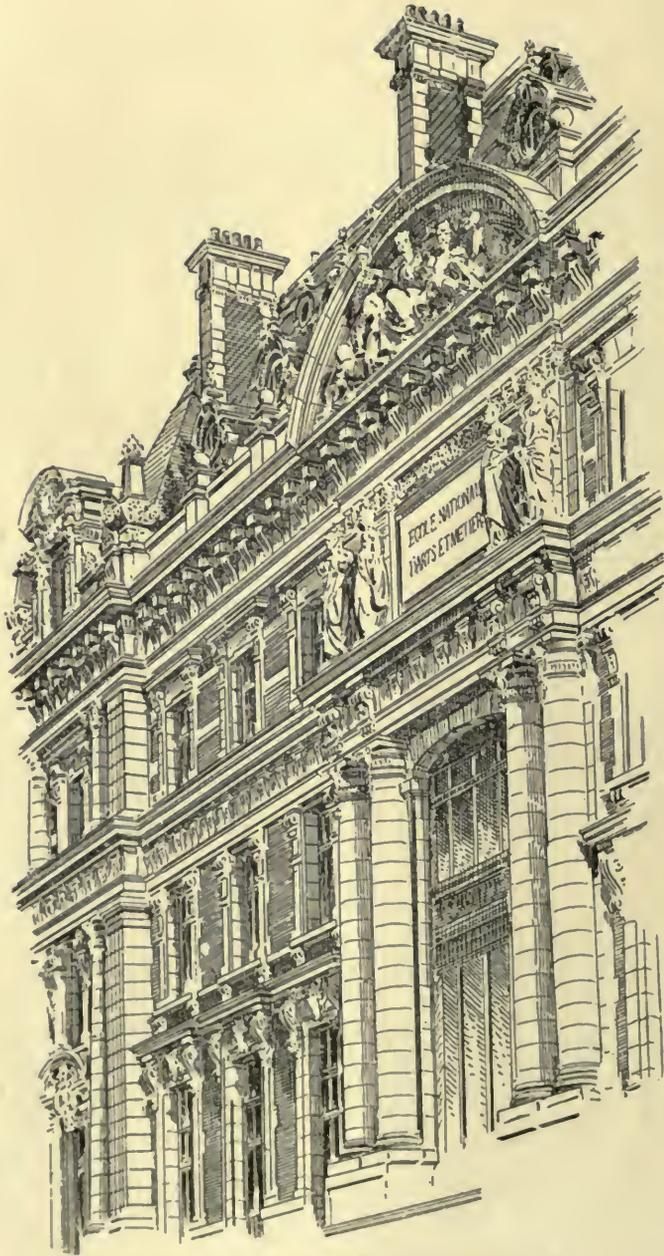


RESIDENCE, RUE DE BERRY, PARIS.

M. Sergent, Architect.

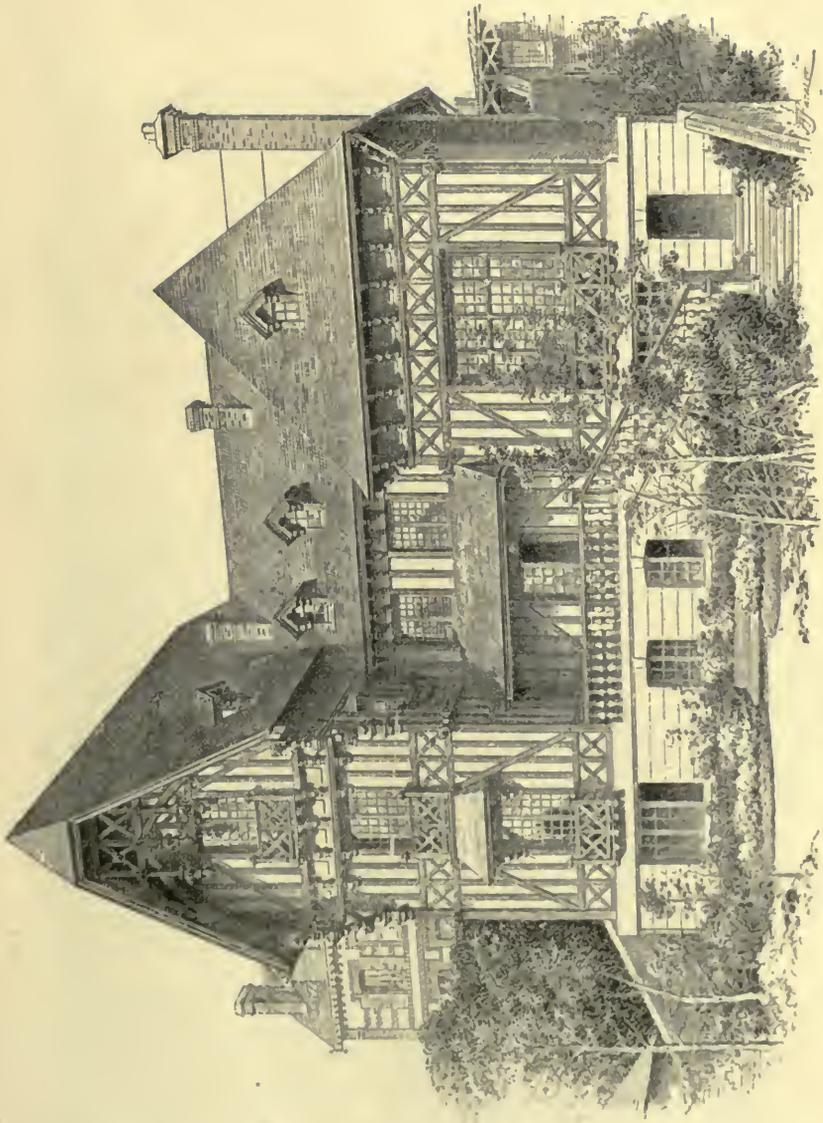


STORE FRONT, BOULEVARD DES ITALIENS, PARIS,
M. Groleas, Architect.



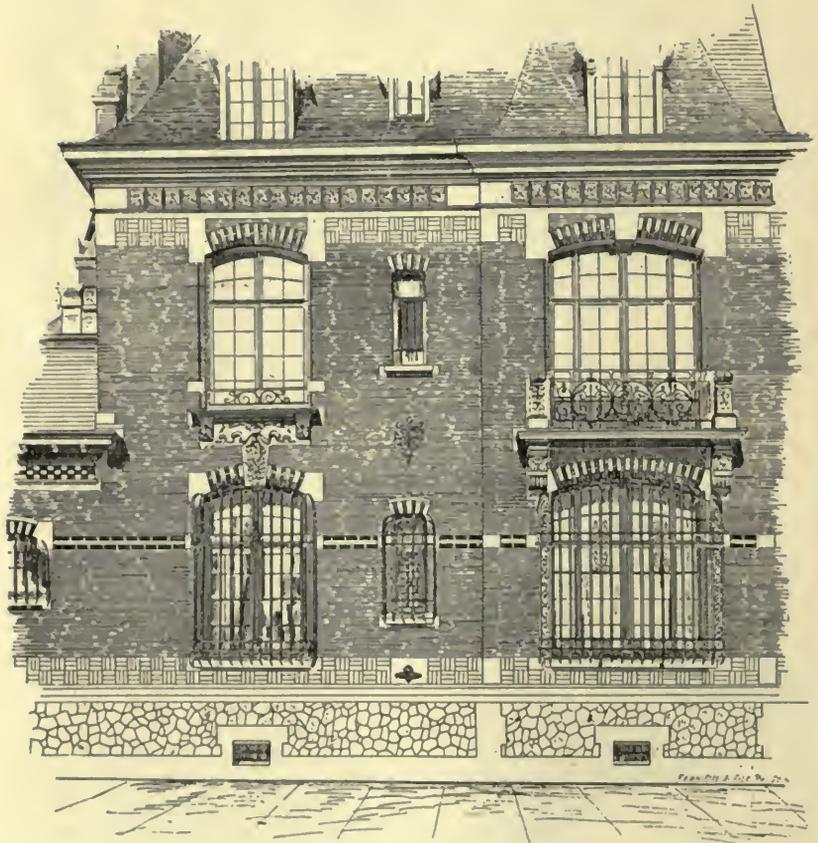
ÉCOLE DES ARTS ET MÉTIERS, LILLE, FRANCE.

M. Batigny, Architect.



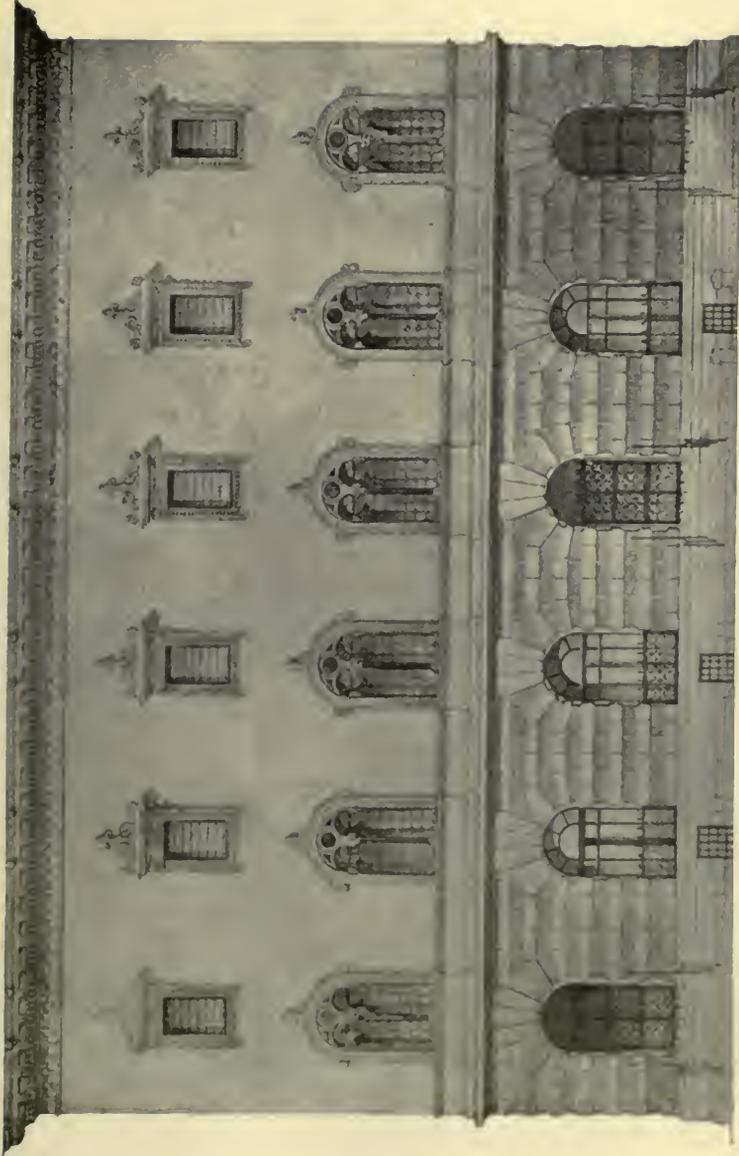
RESIDENCE, MONTIVILLIERS (S. I.), FRANCE.

M. Pasquier, Architect.



RESIDENCE, LILLE, FRANCE.

M. Cordonnier, Architect.



THREE RESIDENCES FOR MESSRS. VAN RENSELAER, ALBANY, N. Y.
Marcus T. Reynolds, Architect.



FIREPLACE IN RESIDENCES FOR MESSRS. VAN RENSSELAER, ALBANY, N. Y.

Marcus T. Reynolds, Architect.



FIREPLACE IN RESIDENCES FOR MESSRS. VAN RENSSELAER, ALBANY, N. Y.

Marcus T. Reynolds, Architect.

AN ECHO FROM EVELYN'S DIARY.*

I.

THE diary of John Evelyn, written during the reign of Charles the Second, and covering the years 1641-1705, is a well-known English classic. In this book, under the date of July 27, 1665, the following entry will be found regarding the old Gothic church of St. Paul, which was soon afterward destroyed by the fire of London and replaced by the Renaissance building of Sir Christopher Wren:

"I went to see St. Paule's church, where, with Dr. Wren, Mr. Prat, Mr. May, Mr. Thos. Chichley, Mr. Slingsby, the Bishop of London, the Deane of St. Paule's and several expert workmen, we went about to survey the generall decay of that ancient and venerable church, and to set down in writing the particulars of what was fit to be don, with the charge thereof, giving our opinion from article to article. Finding the maine building to recede outwards, it was the opinion of Mr. Chichley and Mr. Prat that it had ben so built *ab origine* for an effect in perspective, in regard of the height; but I was, with Dr. Wren, quite of another judgment, and so we entered it; we plumbed the uprights in several places." The passage then continues: "When we came to the steeple it was deliberated whether it were not well enough to repair it onely on its old foundation, with reservation to the 4 pillars; this Mr. Chichley and Mr. Prat were also for, but we totally rejected it, and persisted that it required a new foundation, not onely in regard of the necessitie, but for that the shape of what stood was very meane, and we had a mind to build it with a noble cupola, a forme of church-building not yet known in England, but of wonderfull grace: for this purpose we offered to bring in a plan and estimate, which, after much contest, was at last assented to, and that we should nominate a Committee of able workmen to examine the present foundation. This concluded, we drew all up in writing, and so went with my Lord Bishop to the Deanes."

The second clause of this quotation throws some additional light on that which precedes. From the first clause it appears that two English architects of the seventeenth century asserted a constructive existence, and an optical purpose, for an outward divergence from the perpendicular in the vertical lines of the nave of the given Gothic cathedral, and this in opposition to the opinions of two other

* All photographs used in illustration were taken for the Brooklyn Institute Survey by Mr. John W. McKecknie, excepting Nos. 13, 15, 17.

experts, viz.: the author of the Diary and Sir Christopher Wren. From the second clause it appears that Mr. Chichley and Mr. Prat were the conservatives of the committee, favoring the preservation of the Gothic building as far as possible, and that Evelyn and Wren were advocates of a Renaissance cupola as superior to the "meane" effect of the Gothic steeple.

In the preceding article of this series (Vol. VII., No. 1) a note has been made of Evelyn's general antagonism to Mediaeval style, and his habit of speaking, during his travels through France, of the French cathedrals as "only Gothic." It is unnecessary to refer to the similar tastes of Sir Christopher Wren and his well-known distinction as the great leader, after Inigo Jones, of the overthrow of the Gothic style in England, and of the taste of which followed the Italian Renaissance fashion of despising and condemning mediaeval art.

We are, therefore, privileged to find, in our quotation, one ground of faith in the views of Chichley and Prat as against those of Evelyn and Wren. The former were evidently better fitted by temperament and sympathy to judge of Gothic work than the latter. In view of the facts to be brought out by this Paper it is not an extravagant suggestion that we find in the views of Chichley and Prat a survival of traditional knowledge regarding a mediaeval practice of constructing "the maine building to recede outwards." If, moreover, it should appear to any readers of this article that its writer has gone too far in asserting constructive intention for the outward leaning piers of certain mediaeval churches, it may at least be said in defence that English architects, and experts in construction, of the seventeenth century have shared this error.

II.

The mediaeval entasis of the pier, on the side facing the nave, described in my last Paper, is occasionally found in piers which lean outward from the nave, either directly from the base or in their upper construction.

These leans are most easily and most naturally ascribed, as they evidently were by Evelyn and Wren, to a thrust of the nave vaulting. That such thrusts have operated in certain cases to produce such leaning piers is probable, and the most natural recourse of the expert is to extend this explanation to all cases.

It was impossible in the limits of a single magazine article to consider those cases of an entasis in the profile of the pier facing the nave in which the problem of thrust had to be seriously debated. Such cases, for example, are those of the Cathedrals of Cremona and Pavia and of S. Ambrogio at Milan, which will be noticed in this article.



FIG. 1. NAVE OF S. MARK'S, AT VENICE; FROM THE FACADE GALLERY.
Showing an outward spread of about three feet in the upper portion of the piers. Compare the outline tracing, Fig. 2.

On the other hand, there are a number of churches showing the outward spread in the vertical lines of the piers in which no entasis is found. Among these cases are St. Mark's at Venice, S. Maria della Pieve at Arezzo, and the Cathedral of Trani. The church of Ss. Giovanni e Paolo at Bologna shows a case of the clerestory walls and pilasters leaning outward, into which the entasis enters only to a slight extent.

As the greater includes the less, so it may be suggested that the more remarkable phenomenon, if proven for construction, makes more probable the constructive existence of the less remarkable. Therefore, if the case be proven for the leaning piers, which also have an entasis, and in certain cases it be admitted that thrust has not operated to produce their leans, it will go without saying that thrust has not produced their curves. On the other hand, if the constructive existence of certain leaning piers, without curves, be admitted, this proof will carry with it a probability in favor of the constructive existence of the leaning piers, which also have an entasis.

On the whole, then, this article may be regarded partially as a

supplement to the last one, and partially as calling attention to a still more extraordinary and almost incredible phenomenon.

To nineteenth century minds the practical dangers and inconveniences of building out of the perpendicular are so obvious and apparently unavoidable that even the suggestion that this has ever been done intentionally, in the Middle Ages, savors of extravagance. It may appear, however, from the facts to be brought out by this Paper that the exaltation and enthusiasm of the mediaeval artistic spirit

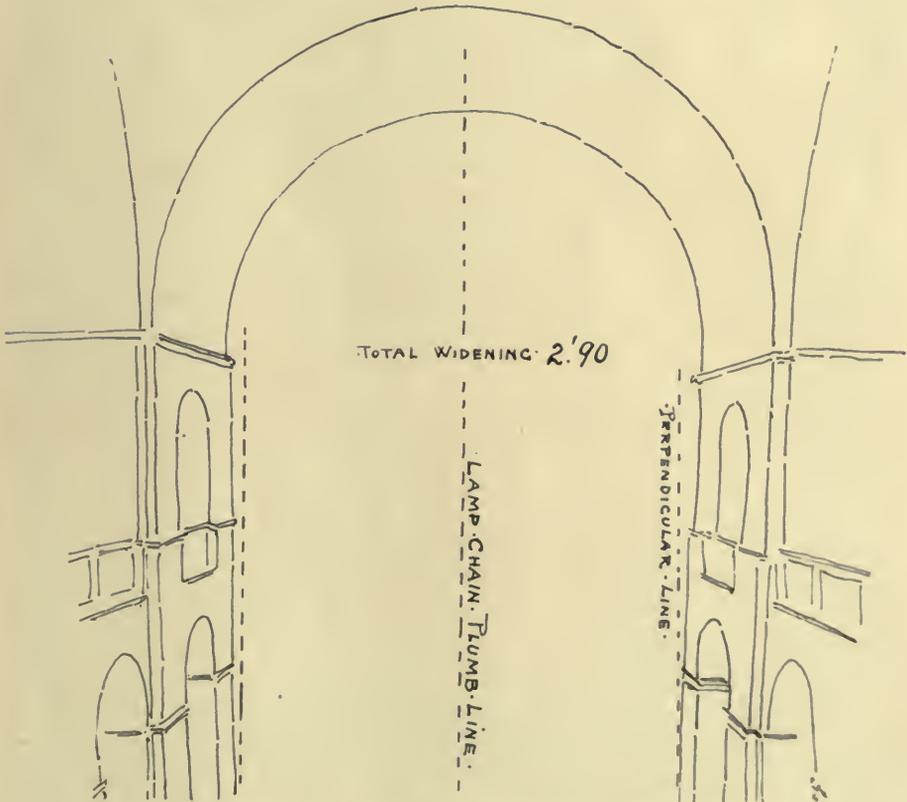


FIG. 2. OUTWARD LEAN OF THE PIERS IN S. MARK'S AT VENICE.
Tracing from the photographic original of Fig. 1.

found expression and satisfaction in setting at defiance the ordinary laws of physics, as far, at least, as appearances are concerned, in favor of certain optical effects.

What these effects may be is not wholly clear to the writer, in spite of the suggestive opinions of Mr. Chichley and Mr. Prat. On this head it seems wise to consult the opinion of optical and artistic experts after the facts have been brought to light, and it is to the announcement and illustration of the facts that this article will be

mainly devoted. It would, however, be affectation to ignore one obvious explanation, which appears to come within the terms of the interpretation quoted above. In the lofty naves of mediaeval churches, the convergence of lines and walls, due to perspective, tends to an appearance of contraction and narrowness overhead which would be corrected by a slight outward divergence of piers and clerestory walls. These would consequently appear perpendicular, when they really lean outward, and so the correction is naturally overlooked.

III.

As has been usually the case in these articles, the buildings appealed to for proof are in Italy; but, as has also been usually the case in these articles, there are not wanting indications that there are many mediaeval buildings in Northern Europe which will supply additional examples of the given phenomenon. It is my impression that the church of Mont St. Michel will prove to be one of these, but this impression is based on the examination of photographs, which is a very uncertain guide, as repairs of the masonry or indications of settlement and thrust, which instantly strike the eye in a building, are not offered by the photograph. A tilting of the camera might also produce the effect of divergence, and the care taken to avoid this tilting in the Brooklyn Institute Survey pictures will be mentioned again.

Some facts regarding the Cathedral of Glasgow, which has been personally examined, will be mentioned later, and we have seen that the Gothic Cathedral of London was supposed by experts of the seventeenth century to be an example of "the maine building receding outwards."

My first observation of outward spreading piers was made in S. Mark's at Venice in 1870, Figs. 1, 2. Although offhand presumption will naturally ascribe all the irregularities of this church either to carelessness or to the settlement of the foundations, the observations then made of the masonry led me to a contrary conclusion as to the cause of the leaning piers in that church. There was no opportunity to test the conclusions reached for this church until 1895; but meantime, in 1886, the inspection of photographs in the Architectural School of Columbia College led me to believe that the church of S. Maria della Pieve at Arezzo might offer another instance. This turned out to be the case in 1895. Other instances found by the Brooklyn Institute Survey* have just been noted, to which may be added peculiarly convincing cases at Borgo San Donnino, and in the side aisles of S. Eustorgio at Milan and S. Francesco at Pavia.

We will begin our account of this phenomenon by quoting all the

*For a preliminary account of this survey see Vol. VI., No. 1. Other results in three preceding numbers.



FIG. 3. NAVE OF S. MARK'S AT VENICE.

To supplement Figs. 1, 2, 4. The rising curve of the pavement toward the centre of the nave is shown by this picture. Compare text at p. 27.

illustrations used in this Paper for the constructive facts, with approximate measurements or estimates of measures, and rapid mention of the argument against thrust, which holds for the given instance. We will then, in certain individual cases, consider more in detail the points which appear to make the suggestion of thrust untenable. If even one case be proven a fact of construction, the reaction of this proof on other possibly less certain cases (or less certain to certain minds) need not be dwelt upon. Considering the number of good cases to be quoted, the undoubted and universally accepted proof of intentional construction in one single instance may be said to settle the whole question and to add a most remarkable and novel feature to our conceptions of mediaeval architecture. Hence the following list:

Fig. 1. S. Mark's at Venice, photographed from the gallery above the entrance in "parallel perspective." This and all following photographs (which were made by our survey) were taken with all scientific precautions necessary to ensure the accurate representation of the amount of deflection from the perpendicular and in such a way that the amount of the lean can be measured from the photograph itself, given the knowledge of any one dimension on a given perpendicular plane.

All photographs in which the camera plate has the slightest accidental deviation from an exact perpendicular will represent leaning lines which are due to a tilting of the camera. Hence Mr. McKecknie's use of a level attached to the camera, by means of which the exact horizontal and the exact perpendicular could be obtained. In addition to this his camera had a "swing-back" attachment of unusual length, in order that high altitudes in church interiors might be reached with the perpendicular plate and without the intentional tilting and consequent distortion which would otherwise be necessary.

Thus this photograph shows with mathematical accuracy what Evelyn has described as "the maine building receding outwards." The piers and upper walls of the nave lean outward and are out of perpendicular to the extent of about eighteen inches on each side. Mr. McKecknie's estimate of the total outward divergence of the two front piers in Fig. 1 gives the amount of 2.90, feet and decimals, or, approximately, three feet.

Fig. 2 is a diagram tracing from the photographic original of Fig. 1. Without such a diagram the facts are as easily overlooked in a photograph, as in the original buildings.

The preliminary argument against the suggestion of thrust in Fig. 1, is that an accidental spread of three feet in these piers and walls would have resulted in the disintegration of the arches supporting the dome and the downfall of the building. Even were such



FIG. 4. NAVE OF S. MARK'S AT VENICE.
Showing outward lean of the right pier.

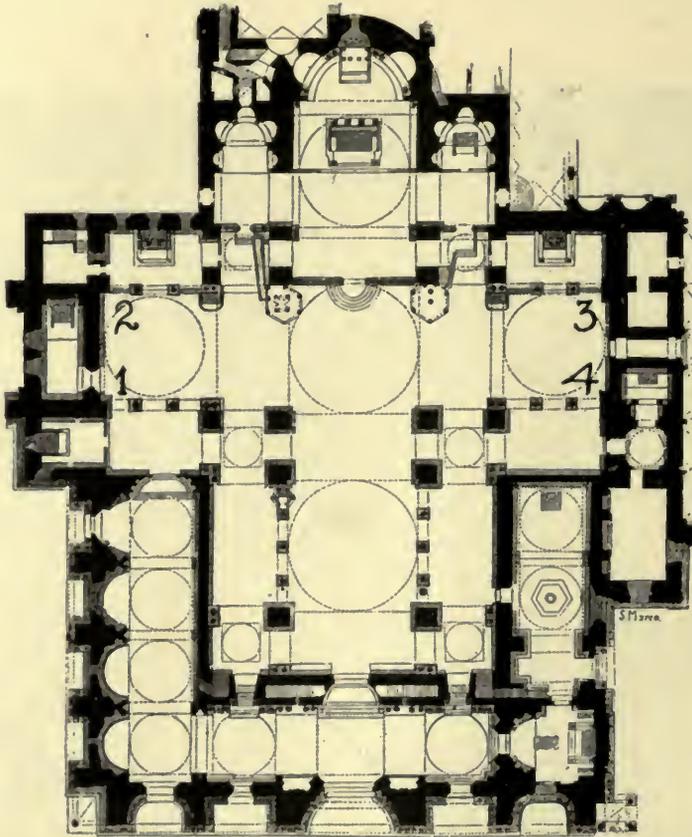


FIG. 5. GROUND PLAN OF S. MARK'S AT VENICE.

Showing the conditions of thrust in the nave piers and at the angles 1, 2, 3, 4.

a downfall escaped, the destruction of all the ceiling mosaics would have been inevitable in case of such fissures in the upper masonry as this spread would involve. These ceiling and dome mosaics notoriously in many instances, and aside from obvious and well-known restorations and exceptions, go back to the time of original construction and original decoration. The proposition that so considerable a yielding of the supports should have taken place before the mosaics were undertaken, without any subsequent movement having taken place, seems hardly tenable.

Fig. 3. View of S. Mark's at Venice, taken from the pavement to supplement Figs. 1 and 4, and showing the outward spread of piers and wall surfaces, especially on the right. In Figs. 1, 3 and 4 the chains of the chandeliers offer a series of natural plumb lines and measurements can be taken from them at various points on the pictures to illustrate the amount of outward leaning away from the perpendicular.

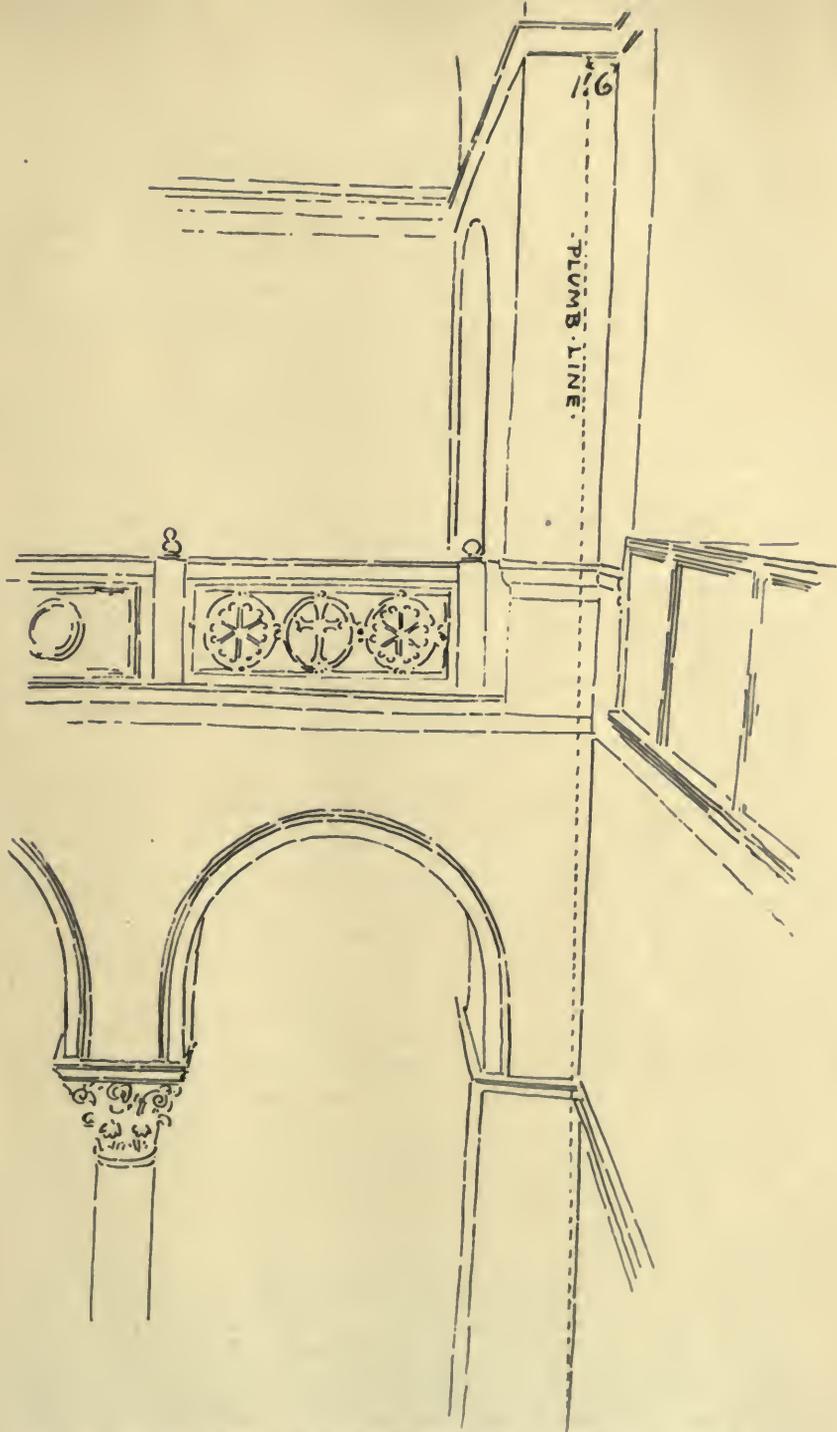


FIG. 6. TRACING FROM A SURVEY PHOTOGRAPH; NORTH TRANSEPT OF S. MARK'S.

Taken from the gallery at 2 and looking toward 1, in ground-plan, Fig. 5. The Survey has similar photographs for the angles 2, 3, 4. The masonry casing is intact, ancient, and closely fitted, and is shown in detail by these photographs.

Fig. 4. View of S. Mark's at Venice, showing the lean of the pier at the right of the choir railing, and of the engaged column beyond and above that pier, which supports the arch there spanning the church. The facts are more easily seen in the 8x10 photographs than in the reductions to page size. The Brooklyn Institute owns enlargements to 18x22, which are still more available illustrations. The Survey has exhibited at Liverpool and in Brooklyn 200 enlargements, including these and other refinements.

Preliminary arguments against the supposition of thrust at these points are: (a) The capital of the mentioned column is built to the horizontal, and does not lean over with the column as it would if thrust had taken place. (b) The outward lean of the pier on the right of the choir rail will be obviously to every expert a constructed lean, as far as the casing and profiles are concerned, and the casing masonry here is as old as the completion of the building. (c) The thrust in the gallery is against a practically solid transept wall, with one inconsiderable piercing. See ground-plan, Fig. 5. This ground-plan makes clear that in all the piers considered the gallery thrusts are against practically solid transept walls, whose resisting power is not affected by the inconsiderable piercing arches, as seen in Fig. 1.

Fig. 6. View in the left (north) transept of S. Mark's, looking west, toward the piazza. The point represented is marked 1, on the ground-plan, and the view is taken from the gallery at 2. On the right it shows a wall whose outward lean, away from the centre of the church, was plumbed by the survey as measuring a foot between the gallery rail and the pavement. The estimate for the entire lean as 1.6, feet and decimals, is a computation of Mr. McKecknie's.

Preliminary argument against the supposition of thrust: (a) In the given case there is no force to exert thrust, on the face of the right lower (north) wall which leans north uniformly, from 1 to 2, in ground-plan, Fig. 5, and this outward lean of the wall is connected with a corresponding lean of the piers at the angles (marked 1 and 2 in the ground-plan, Fig. 5). These piers are a portion of the solid transverse walls of the vestibule by which this transept is entered on the north. The survey has photographs showing corresponding facts, as regards the leans, for all four angles of the two transepts, marked 1, 2, 3, 4, on the ground-plan.

Fig. 7. Drawing from a photograph, representing the face of the wall just described and the gallery and arch above it, with plumb lines to indicate another pair of leaning faces in the angles 1, 2, of the ground-plan, Fig. 5.

The conditions of thrust and resistance are represented by the ground-plan. When Figs. 6 and 7 are related to one another for the vertical construction of the angle marked 1 on the ground-plan

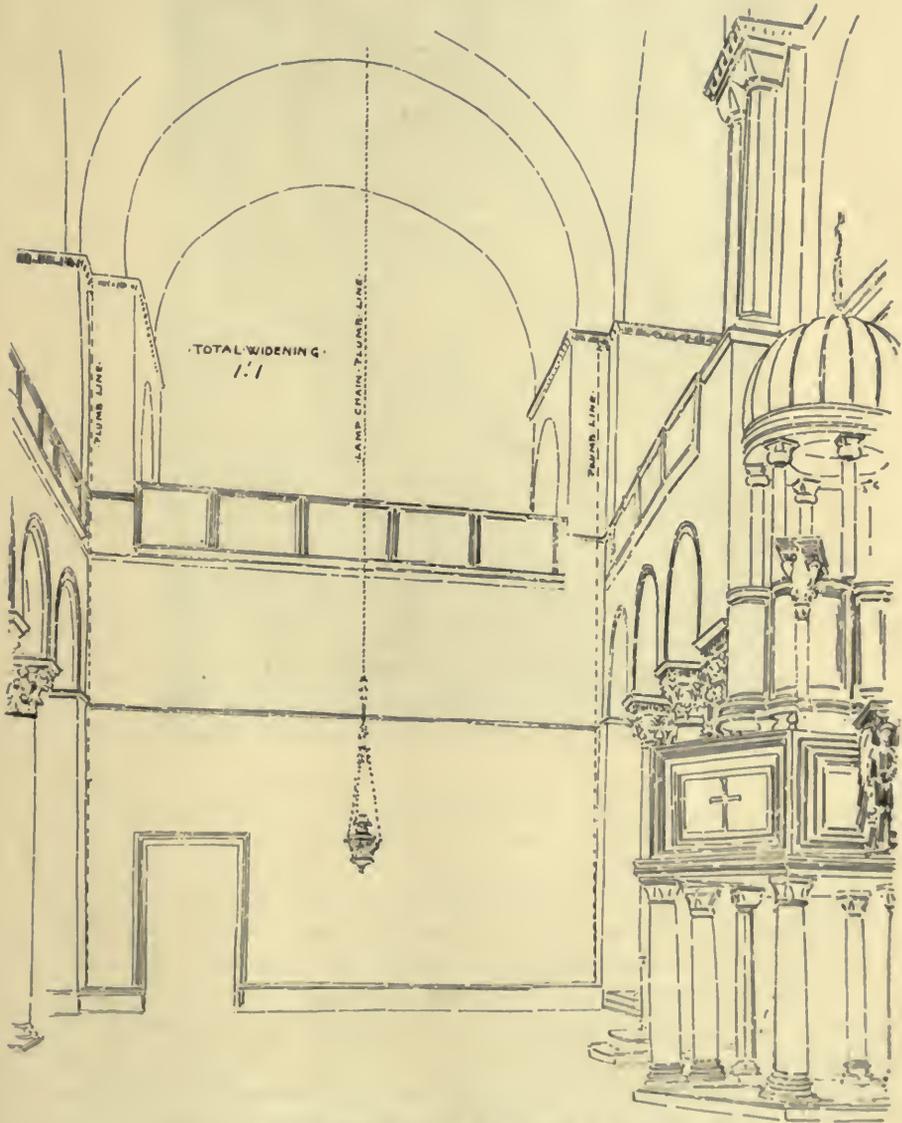


FIG. 7. NORTH TRANSEPT OF S. MARK'S, FACING NORTH.

The wall in face leans north, including the angle piers, which are portions of solid walls in the vestibule. Compare Fig. 6 with ground plan, Fig. 5. These piers also lean east and west as shown here by the plumb lines. The measurement entered above is an approximate estimate by Mr. McKecknie, based on the known width of the transept. The south transept shows the same construction.



FIG. 8. NAVE OF CATHEDRAL OF TRANI.

Showing an outward spread of about a foot in the first pair of transept piers. The thrust is wholly taken up by solid transept walls.

it appears that there is a diagonal outward lean in this angle, and it has a counterpart at the angle 2 of the ground-plan. In other words, we are dealing with a systematic method of leaning outward the piers and walls which support the terminal arches of the transepts; similar facts occurring at the points 3, 4, of the ground-plan, which again shows at these points the conditions of thrust and resistance. If now the facts which hold in the angle 1 of the ground-plan, as shown by the examination of Figs. 6 and 7, taken together, be considered, it will be apparent that a diagonal lean is wholly inconceivable as result of two thrusts which meet at right angles. It is inconceivable for one angle and wholly inconceivable for four angles.

We have undertaken generally to avoid in this Paper theories of explanation, in favor of proof of the facts, but we cannot overlook here the remarkable habitual oversight of the outward divergence of the uprights in S. Mark's. That the eye tends to discount these leans cannot be denied. They would, therefore, seem to be intend-

ed, here and elsewhere, to give an open and spacious effect to the higher parts of the building, and to counteract that feeling of weight and oppression which would result from the narrowing in of the upper lines as due to natural perspective. I conceive that the purpose is to correct this natural effect, which suggests that the walls are falling inwards, and that the walls in consequence, appear perpendicular, when they really lean. Hence the device is generally overlooked and thus in a double sense, it accomplishes its end.

According to this suggestion the interpretation offered by Chichley and Prat of "the maine building receding outwards," that it was so built "for an effect in perspective in regard of the height" should be construed as referring to a correction of natural perspective.

Fig. 8. The nave of the Cathedral of Trani, showing an outward spread or lean, of the piers supporting the nearer transept arch, amounting to five or six inches on each side. This measure is a computation by Mr. McKecknie, based on other known dimensions of the building.

Preliminary arguments against the supposition of thrust: (a) A spread of ten or twelve inches in the supports of the arch would have perceptibly lowered and flattened the crown of the arch. This argument presumes the arch not to have been repaired. (b) The supposed thrust operates against solid transept walls of great depth and is wholly taken up by the given resistance. (c) No supposable thrust could operate from top to bottom of the given pilasters in such a way as to produce the uniform and even deflection from the perpendicular which they exhibit.

Fig. 9. Interior of the Church of Ss. Giovanni e Paolo at Bologna. This church belongs to the complex indexed in Baedeker, under the general title of S. Stefano, and a section of it appears in my article on perspective illusions (Vol. VI., No. 2, Fig. 16) under this name of S. Stefano. The cloister of the Celestines, whose curves in plan were shown in Vol. VI., No. 4, Figs. 19, 20, also belongs to this complex.

The drawing is accurately made over a photograph taken by Mr. McKecknie, and shows an outward spread of the upper pilasters and walls, whose total sum is estimated by him at ten inches; six inches on the right wall and four on the left.

Preliminary argument against the supposition of thrust: The outward leans continue in the side walls as far as the transverse wall at the apse and their lines enter this wall in such manner as to make the suggestion of thrust impossible. The leaning side walls are tied in by the transverse wall and must always have remained in one immovable position.

Fig. 10. The Church of S. Maria della Pieve at Arezzo (republished from the first article of this series, Vol. VI., No. 1, Fig. 2). This



FIG. 9. NAVE OF SS. GIOVANNI E PAOLO, BOLOGNA.

Accurately drawn over photograph showing clerestory walls tied in by transverse wall at the apse, and having an outward spread of ten inches.

view shows a spread in the piers of the nave at the transept amounting (by careful estimate) to not less than fourteen inches on each side in the nearer pair of transept piers and considerably more than this in the farther transept pier on the right.

Preliminary argument against supposable thrust: The given deflection, and all others, in this church, are verified by the local experts of Arezzo as constructive facts, although mysterious to them; as regards purpose, and having no counterparts elsewhere within their knowledge.



FIG. 10. THE LEANING PIERS OF S. MARIA DELLA PIEVE AT AREZZO.
Accurately photographed. Compare Figs. 11, 12.

Fig. 11. Another view of the same church illustrating the exaggerated lean of the farther transept pier on the right and also showing the leaning pier on the left. As usual in the survey pictures, this is an accurate representation of the actual facts. The hanging curtain ropes in this and adjacent pictures also offer natural plumb-lines, by which the leans may be tested.

Preliminary argument against supposable thrust. By observing the arch above this right pier, as shown by the preceding picture, Fig. 10, it will be seen that a thrust from it operating as far down as the base of the pier, in Fig. 11, is inconceivable. The pier leans against the stairway, and is built into the raised choir. Fig. 12 is another view of the same church looking toward the entrance.



FIG. 11. THE LEANING PIERS OF S. MARIA DELLA PIEVE AT AREZZO.
Accurately photographed. Compare Figs. 10, 12.



FIG. 12. THE LEANING PIERS OF S. MARIA DELLA PIEVE AT AREZZO.
Accurately photographed. Compare Figs. 10, 11.



FIG. 13. S. AMBROGIO, MILAN.

The entasis and lean which hold generally for the main piers are best seen at the choir on the right. Compare the diagram tracing, FIG. 14, for the lean.

Preliminary argument against supposable thrust: The capitals of the piers here seen are built to a horizontal, and do not tilt down as they would have done if the pier had been thrust over. Compare, also, the upper capital in the farther right pier shown in Fig. 11. It is built to the horizontal.

Fig. 13. Interior of S. Ambrogio at Milan, from a photograph, kindly loaned the "Architectural Record" by the firm of Heins and La Farge. Although this photograph was not made for the purpose, it successfully illustrates the facts. The plumbs which I took in this church for the piers at the choir showed a leaning outward of five and a half inches on each side, as measured from the capitals. The entasis described for other churches in Vol. VII., No. 1, is also seen here.

Fig. 14 is a diagram taken from a tracing over the photograph, and showing the right pier at the choir.

Preliminary argument against supposable thrust of the nave vaulting. The given piers lean outward from their bases against a counter thrust of the aisle vaulting and are otherwise so reinforced by surrounding masonry that thrust seems out of question.

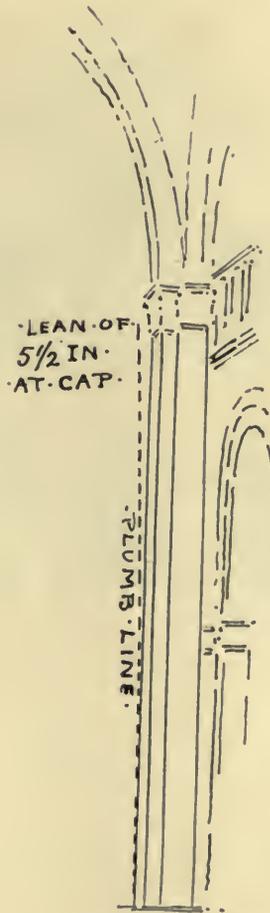


FIG. 14. RIGHT PIER, CHOIR OF S. AMBROGIO.
Showing lean of the pier. Compare Fig. 13.

Fig. 15. Façade of S. Ambrogio at Milan, showing in the upper central arch of the front, the "spread" and also the entasis. The spread also appears in the slender pilasters which frame this arch. There is some new masonry over the arch, but the general condition of the masonry and of the surrounding construction may be held to argue constructive purpose.

Fig. 16 is a diagram from a tracing taken over the photograph.

In San Eustorgio at Milan, the exterior aisle piers lean back five inches against solid ancient chapel walls. In San Francesco at Pavia, the outer aisle piers lean back against ancient chapel walls twelve feet deep.

The facts illustrated by Figs. 13, 14, for S. Ambrogio are very strongly marked in S. Michele at Pavia, both as regards the entasis



FIG. 15. FACADE OF S. AMBROGIO, MILAN.

The entasis and "spread" are seen in the upper central arch and in the adjacent pilasters. Compare the diagram, Fig. 16.

and the leaning piers. Both these churches were examined after Mr. McKecknie's five months' time with the survey had expired, and after he had left Italy, and his photographs are, unfortunately, therefore, not available for them. The same deficiency holds, for the same reason, of the Romanesque church of Borgo San Donnino, near Parma. In this church the constructive stepping back (in the rising direction) of pilasters under the arch spanning the apse is very marked. I have a rough sketch of this detail in one of my note-books.

Fig. 17. Interior of the Cathedral of Cremona. Here, again, Mr. McKecknie's assistance failed me for the reason already given, and I am obliged to use a picture made by a local photographer after my departure, which was subsequently mailed to me. This picture shows the usual distortions of ordinary photography, and the standpoint which I directed to be taken in order to illustrate the profiles of the piers and pilasters was neglected, or not understood by the photographer. The picture will, however, make clearer an account of the facts and of the estimates for measures made here. In this church we have a very exaggerated phase of the entasis described in the last article. The piers lean forward into the nave up to their capitals; by careful estimates, about six inches. Above these capitals

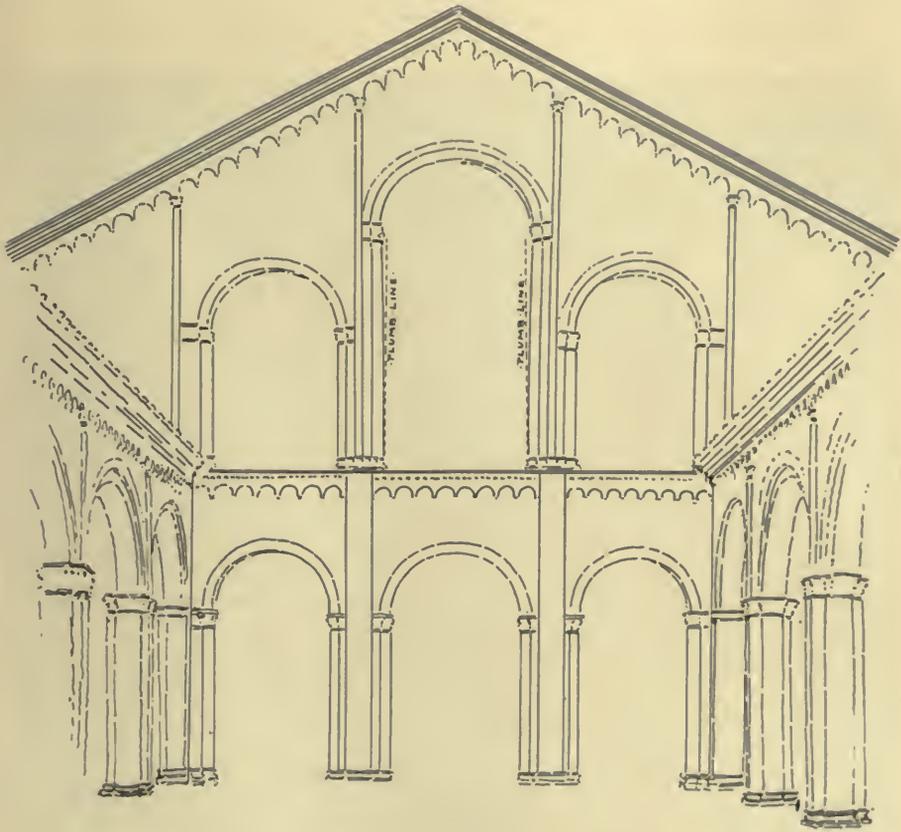


FIG. 16. FACADE OF S. AMBROGIO, MILAN.

Diagram tracing to show entasis and "spread" in the upper central arch. Compare Fig. 15.

the pilasters lean away from the nave as far as the spring of the vaulting arches; by careful estimate, about one foot. Potentially, the forward lean of the piers might be due to thrust of the aisle vaultings, although the piers are very massive. On the other hand, two considerations militate against the supposition that the outward leaning away from the nave of the walls and pilasters, which begins above the capitals, can be due to thrust of the nave vaulting. The pointed arches of the groined ceiling are in magnificent preservation, and very sharply defined to the eye. They are without the least indication of such a settlement or depression at the crown as a spreading apart of two feet in the upper walls of the church must have involved. A second consideration against an outward thrust of the nave vaulting is that this thrust could not have operated against the counter thrust of the aisle vaulting as low as the pier capitals, at which point the backward or outward lean begins. My note-book contains the



FIG. 17. INTERIOR OF CATHEDRAL, CREMONA.

To assist descriptions in text. Made for the author in Cremona, but not a Survey photograph.

remark that although these lower piers lean into the nave their capitals are built to a horizontal.

The tie-rods which appear in the picture of S. Ambrogio (Fig. 13) are probably modern. They indicate a dread on the part of a modern or Renaissance restorer of disintegration from thrust; which dread may have been wholly due to a misapprehended appearance of spreading in the piers. It is such a resort as would have occurred wise to Evelyn and Wren in the old St. Paul's. There are indications in many Italian buildings of Renaissance or modern repairs which have not been actually needed or not to the extent supposed. I am not familiar with the records of the Cathedral of Glasgow, but it has occurred to me that the removal of the vaulting here may have been prompted by threatening appearances which were at least partially due to construction. This Cathedral offers an instance of an outward lean in its clerestory piers, but the vaulting has been removed. It is a curious fact that the buttresses on the exterior of the façade lean outward in lines corresponding to those of the interior piers, excepting in one right buttress, which has been restored above a certain height and there tends to the perpendicular in the modern masonry. It is inconceivable that any forces of thrust operating from the old vaulting within, should have extended through the façade into these exterior buttresses, which repeat the same lines of divergence; and, in so far, we have a hint that the inner leans are also constructed.

IV.

Admitting the possible irrelevance of these last remarks and returning to our more valued, because more carefully examined, Italian examples, it may be in place to say a few additional words about the question of thrust in general, not as an expert, but in record of the views of such.

The opinions of architectural experts do not seem wholly in unison as to the degree of movement which the piers of a church may experience without palpable evidence of strain or dislocation. Theoretically speaking, no pier of stone masonry can be bent by thrust without an opening and cracking of the joints on the one side and without grinding of the joints on the other side. Positively no arch or vaulting can cause by its thrust a movement in piers without itself settling at the crown and without tending to become insecure through fissure. It is held by some experts that a pier, composed of small materials joined by a good deal of mortar may undergo considerable bending without palpable dislocations or breakage, and there is no doubt that an arch or vaulting may settle to some extent without falling in. The Cathedral of Vezelay, which I have not personally examined, would appear to offer an instance of this.

The following points are, however, to be carefully insisted on, in anticipation of the time when engineering experts shall have passed on the facts in face of the individual buildings here quoted; and some time may elapse before this is done for all of them. It is conceivable that some piers built up of small materials and using much mortar may bend or lean outward without palpable cracking or parting. It is conceivable that some arches or vaultings may settle without falling in. But is it conceivable that the facts should be as I have shown them to be in so many buildings, and that none of them should show parting or grinding of joints or settlements at the crown of the arch? Our survey in Italy was most conscientious in looking for the signs of dislocation and of accidental masonry movements and in noting the signs of modern repairs. Indications of accidental masonry movement were only found in one case (as regards the spreading piers or the entasis); viz.: in the piers of the unfinished portion of the Siena Cathedral, which have consequently been omitted from my list. I have also omitted quotation of some cases of the entasis in piers, such as are offered by S. Trinita in Florence, because the masonry is not of very fine quality, and the sceptic could assert thrust in consequence, without the possibility of positive disproof.

There are many churches in which the use of stucco or paint might conceal the settlements or dislocations of masonry, and there are still other churches whose masonry has been repaired to such an extent that an argument from close-fitting masonry is simply an argument from modern repairs. At Cremona, for instance, the modern coloring and stucco would certainly conceal every indication of fracture, but the estimated measurements here would seem to imply a downfall of the building if the upper leans were not due to construction. Moreover, as stated, the outward lean begins at a point where the thrust comes from the opposite direction.

On the other hand, in S. Michele at Pavia, and in S. Ambrogio at Milan, the original masonry, which is very massive, is wholly bare to inspection.

In advance of closer personal tests and examination, experts are requested to give the Brooklyn Institute survey credit for careful examination and weighing of all these points in every individual case.

The phenomena under discussion are certainly such as to provoke scepticism, and they are certainly such as to demand, as far as possible, a personal examination of the masonry by a number of engineering experts. It must not, however, be forgotten that an expert was expressly employed by the survey to pass upon these questions. Mr. McKecknie is not only an architect and surveyor, as well as a scientific photographer, but he has been employed in New York by an architectural firm as an engineering designer. I can speak for his

unswerving rectitude, his great personal honesty of character, and his anxiety not to allow any appearances in Italy which might be due to accident to make their way into my list of constructed irregularities. For instance, he has attributed the leaning piers of the Cathedral of Perugia to thrust, although there are no visible indications of it, and I have consequently not quoted this building in the list of good examples. When this cathedral was examined Mr. McKecknie had not seen, however, the convincing cases at Arezzo, Venice, and Bologna, and neither of us were then aware of the fact at Trani, Cremona, Milan, Pavia and Borgo San Donnino. The piers of Perugia were so closely covered by drapery that they could not be examined for parting or grinding of the joints and my memory is that they have also been stuccoed. The maximum amount of lean in the piers of the Perugia Cathedral is estimated by Mr. McKecknie as about eight inches (for one pier).

The points at which Mr. McKecknie was not present with me have been mentioned, viz., Pavia (S. Michele), Milan (S. Ambrogio), Cremona (the Cathedral), and Borgo San Donnino. As to the buildings quoted so far, which we have both seen together at Trani and Bologna, and the crucial cases of S. Maria della Pieve and S. Mark's, his opinion is distinctly in favor of a constructive existence of the given phenomena.

The following opinion has been furnished by Mr. McKecknie for these last two churches:

"The piers in S. Marco at Venice are of such tremendous size and such ample strength that it seems almost impossible that they should have been spread apart by the arches which they support. The dome is so small comparatively that its weight is not a large factor. If it be assumed that the spreading of the piers was occasioned by the uneven settling of the foundations, due to the tendency to gyration, then it is hard to understand how the building has stood at all.

"In the church of S. Maria della Pieve at Arezzo the spreading of the piers seems to be intentional with the builders of that queer church. The mason work is laid with great skill. The piers are of great strength, and the thrust is carried over to the heavy side walls. Had this lean in the piers been caused by the superimposed weight there would certainly be some evidence of displacement in the finely cut stone work. Moreover, this feature of spreading, or widening out, is again employed in the plan of the lines of columns of which these leaning piers form a part (Fig. 19). Here there cannot possibly be any suggestion of displacement, and still the phenomenon is not less strange, not easier to explain away, than the lean of the piers."

JOHN W. McKECKNIE.

V.

It is a very general and a very natural presumption of visitors to Venice that its buildings are unusually exposed to the movements due to weak foundations and to settlement after erection. The great wave lines in the pavement of S. Mark's are, to a casual observer, sug-

gestive of such movements in this church. In Fig. 3 the photograph gives some effect of the great rising swell of the pavement between the nave piers. Its downward dip may be seen in this picture on the left of the pulpit which stands on the left of the choir rail. The same downward dip is seen at the same point in Fig. 4, which also shows the beginning of the corresponding downward dip under the other pulpit at the right.

In Vol. VI., No. 4, pp. 503, 504, there will be found an extended quotation from Street's "Brick and Marble in North Italy," giving Mr. Street's reasons, from his examination of the crypt, for supposing that these wave lines of the pavement are constructive, and asserting that S. Sophia, at Constantinople, once had the same peculiarity. My own view coincides with his. Observations were independently made by me in 1870, long before my acquaintance with Mr. Street's book, to the same effect, and were announced at the Century Club, New York, verbally and by printed syllabus in 1879. That the minor and irregular depressions found all over this pavement are due to accidental causes is certain, of course.

Offhand examination or offhand knowledge of S. Mark's pavement may certainly suggest that the foundations of the piers have yielded to pressure since construction. It is, therefore, a peculiarly important fact that Mr. McKecknie (who did not examine the crypt and its ceiling) holds the main wave lines of the pavement to be due to settlement, differing on this head with Mr. Street, and with me. But he holds that the piers have not settled, and asserts that their inclination is not related to the deviations of level in the pavement. It is wholly conceivable and wholly probable that more attention was given by the builders to the foundations of the piers than to the substructure of the general pavement, and the fact should, therefore, be emphasized that the expert in construction employed by the survey holds the deflections of the pavement to be accidental, and, notwithstanding, holds the inclination of the walls and piers to be intentional.

An opinion from an expert in thrusts is naturally based on computing the visible amount of thrust and the visible amount of resistance and comparing the two forces. There is no doubt that the amount of resistance offered by the construction of the galleries of S. Mark's to the thrust of the nave arches and cupolas is unusually strong. (See Fig. 1.) It is also clear that the two pairs of piers on both sides of the transept lean against transept walls which would be regarded by an expert as solid walls for purposes of resistance.

The following points are offered as my own and not as those of an expert in thrusts:

Whatever be the facts regarding the pavement they are not in question as effecting the piers. If Fig. 3 be examined it will be seen that the piers on the near side of the transept are erect, as far as the

spring of the arch. (Compare the natural plumb lines offered by the chain of the chandeliers.) By comparing Figs. 1 and 3, it will be seen that the outward divergence, on the near side of the transept, begins at the spring of the nave arches and has, therefore, nothing to do with causes affecting the foundations. On the other hand, if we examine Fig. 4, the spread of the piers at the choir rail begins lower down, but here the lean is against the thrust of an adjacent arch on the right (compare the left side of Fig. 4) and the profile of the pier curves back against this thrust.

We need not repeat here the facts already noticed for this right pier in Fig. 4, regarding the cutting of the casing blocks, the horizontal position of the capital, which does not tilt over with its leaning column and the resistance of the transept wall of the upper story; but it may be well to add to these points that in the interior there have been no repairs worth mentioning, of the ancient Byzantine casing, or of the ancient Byzantine details (below the mosaics, which have themselves been extensively repaired).

As the leaning faces and surfaces are found in all parts of the interior to an extent which would render complete descriptive illustration the affair of a volume, this general point may be made for all the interior leans of S. Mark's. There is no point at which any parting or cracking of the closely-fitted interior facing is visible. This interior casing is as old as the building. Therefore, it is necessary to assume, on the theory of accidental movement, that all the movement took place before the casing was put on and that no movement has taken place since that time, which would be a very odd state of affairs for as rickety a building as S. Mark's would prove to have been on the theory of accidental movement.

These remarks also hold of the casing beneath the gallery curves, described in Vol VI., No. 4. A direct movement downward, of the piers *might* have caused these curves, but an examination of the cutting of the casing blocks will show that there has been no movement of the piers since the casing was put on, and the casing is as old as the building. (Observe the angles in Fig. 18, Vol. VI., No. 4.) The survey has at least six similar photographs which are much more convincing in their original dimension than in the reduced size of the magazine page.

It would be a mistake to overload a good argument with too many details. Probably our best appeal is a return to Fig. 1, to observe again that many portions of the arch and dome mosaics date from the completion of the building and bespeak a strong and sturdy survival, since that time of the original walls and surfaces—such a survival as an outward accidental divergence of three feet in the upper supporting walls would have made impossible. There is no such sinking in the crowns of the arches as this divergence

would have caused, supposing even that the ceilings and domes could have maintained their existence after it had taken place, which appears impossible.

Some few additional remarks may be made as to the general stability of other churches in Venice. As to pavements, there is only one of all the old churches of Venice which shows a disruption due to settlement. This is the eighteenth century church of the Gesuiti. Making all allowances for occasional repairs and restorations this fact is significant when we come back to the pavement of S. Mark's. No deviations from the vertical have been observed in walls or columns at Torcello or Murano, whose old churches are about as old as S. Mark's, and whose church foundations are presumably equally insecure, and are certainly laid in the same kind of soil. The same observation holds for the old Gothic churches of Venice, the Frari and Ss. Giovanni e Paolo. It may be added as another negative argument that the soil of Ravenna is very marshy, but that the church of S. Vitale, which is four hundred years older than S. Mark's, has perfectly erect piers.

As to the question of the strength of the foundations of S. Mark's and their general ability to resist settlement under the conditions of frequent inundations as high as the church pavement and the supposably unstable soil beneath, there is still something to be said. The argument is indirect, but is of telling force.

In 1885 an American architect, Mr. C. H. Blackall, made a critical examination of the foundations of the Campanile of S. Mark's. Excavations were made which laid bare the foundations, and the results were published in detail in the "American Architect" for August 29, 1885.

Mr. Blackall estimates the Campanile to be "one of the heaviest buildings in Europe for its size," the height being 322 feet, and the estimated weight 13,000 tons. The stone foundations rest on a raft composed of a double layer of logs, one row laid crosswise on the other. This timber was found to be in good preservation and not to have rotted. Below this was the piling proper. The piling directly under the foundations was surrounded by an exterior fencing of piles, at the same level, wholly separate from the foundations and bearing no weight whatever. By comparing the height of these exterior piles with those supporting the Campanile, as well as by examining the foundations proper, it was found that the latter had experienced no settlement whatever. "The foundations have stood the test for centuries without yielding an inch." Mr. Blackall's advices as to the soil of Venice are that it consists of a stratum of heavy black clay, "quite firm" in consistency, ranging from a few inches to a hundred feet in depth, resting on a substratum of sand. He holds the secret of piling in Venice to have been not to carry it through to

the sand but to confine it to the clay, which appears to furnish in itself a very stable support. In the case of the Campanile, Mr. Blackall considers the use of the exterior fencing of piles to have been that of binding the clay around the foundations and the piling itself is held to have served the use of compacting and strengthening the clay. He reports the stone foundations of the Doge's Palace to have been laid on a mud raft, composed of two horizontal layers of larch logs, placed crosswise, without any piling beneath, and supposes this method to have been due to the presence of a thinner layer of clay, in which piling would have been inadvisable, because it would have gone through to the sand. Mr. Blackall makes no remarks on the foundations of S. Mark's, but we have already quoted Mr. Street's argument as to the pavement, based on an examination of the crypt. It follows, however, from Mr. Blackall's investigations, that the supposedly unstable soil of Venice has sustained the tremendous load of the Campanile for centuries without any settlement whatever. It is reasonably certain that no less care was paid to the foundations of the famous church and positively certain that the pressure on any pier of the church is a mere fraction of that which holds for the Campanile. All of which goes to show, and especially in view of the stability of the adjacent Doge's Palace, which has no piling whatever, that the supposed weakness of the foundations of S. Mark's is a pure myth and a wholly unsupported assumption. Mr. Blackall adds that "for more modern Venetian buildings" than the Doge's Palace and the Campanile, "the work is not as careful." To this fact we may ascribe the occasional yielding of foundations which may be noticed along the canals in some of the Venetian Renaissance palaces, which nowhere, however, assumes any alarming proportions. This may also explain the settlements in the pavement of the Gesuiti.

The fact that the Campanile of S. Mark's "has never sunk, even by a hair's breadth," is reported by Vasari in the life of Arnolfo di Lapo, and is there attributed to the able construction of the foundations. Is it likely that the famous church was less carefully founded? In a recent meeting of the Architectural League of New York, which I was privileged to attend, the use of piling in Venice was mentioned as a natural cause of settlement, to which one of the ablest engineers in this country responded that this would be a very good cause why a building should not settle.

VI.

Following this more detailed examination of the divergence of piers in S. Mark's, from the perpendicular, we will return to S. Maria della Pieve at Arezzo.

My first visit to Arezzo was made, in 1895, in company with my

nephew, Mr. Nelson Goodyear, while Mr. McKecknie was developing negatives in Naples. No observations of leaning piers in Italy had been made up to that time, aside from those in S. Mark's in 1870, and my visit was inspired by the memory of a photograph seen in 1885, in the Architectural School of Columbia College.

My nephew, who has since completed a course of architectural study in Paris, had already made serious studies for the architectural profession and consequently had at this time some pretensions to pose as an expert in construction, and had been of great service by his discovery of horizontal curves in S. Agnese. at Rome, and several other buildings. As we entered the church I said to him: "I don't want to look at those piers, go you and see what they look like." My feeling was that I might be a prejudiced observer on the question of construction. The report was forthcoming in a few moments, to the effect that the phenomena were constructive. This examination was followed by an interview with the Sacristan of the church, who assured us that the leaning walls and piers were known in Arezzo to be an intentional construction, but for unknown causes. He gave me the name and address of Professor Gamurrini, director (and founder) of the excellent Museum of Arezzo, as qualified to give farther information. This gentleman enjoys a world-wide reputation for his Etruscan researches.

The next morning I presented my credentials from the Italian Ministry of Public Instruction to Professor Gamurrini, who received me most cordially, and invited me to re-examine the church in his company. He had contributed to its repair, and had been intimately acquainted with the architect, now deceased, who had in recent years restored the building. There is much new masonry about the church; the lower courses of all the piers are modern; a suspicious circumstance to one who is looking for evidence of grinding and parting joints near the bases; and there is a great deal of fresh masonry in the arches, which is also a suspicious circumstance. Professor Gamurrini's advices are, therefore, very important. According to his information, the original Romanesque church had been timber-roofed. It was vaulted and domed in the time of Vasari (sixteenth century) and changes were then made in the level of the pavement, as related to the raised choir. (See Fig. 10.) It farther appeared that all recent repairs had been made to the end of removing the Renaissance additions and vaultings, and restoring the ancient appearance and condition, and that the architect who carried out these repairs had recognized the remarkable leans of the piers and walls as facts of construction. Professor Gamurrini was not acquainted with any other similar or related phenomena, and was unable to offer any suggestions as to possible motives in such construction. The views of the restoring architect, as repeated by him, would thus appear to



FIG. 19. CHOIR GALLERY OF S. MARIA DELLA PIEVE, AREZZO.
Showing a bent column.

have been wholly based on the constructive facts, without reference to theories or hobbies or other mediaeval eccentricities.

At a later date of the survey Mr. McKecknie went with me to Arezzo, and his own verdict on the constructive facts coincided with that just recorded. It should be added that all the masonry of the piers is old, above the lower courses mentioned, up to and including the capitals.

It need hardly be mentioned that the phenomenal leans at Arezzo are much more easily noticed in photographs than in the building, because in the actual dimensions the lines tend to converge in natural perspective and the piers, therefore, appear to be perpendicular unless close attention be given them. The facts are, however, more

noticeable at Arezzo than elsewhere, and they are, generally speaking, wholly inconspicuous. That the three feet spread in S. Mark's is universally overlooked need scarcely be repeated.

The survey possesses about a dozen pictures of the Arezzo piers, from various points of view, as well as the remarkable plan published in the article containing my first announcements of points to be proven. This plan is repeated here (Fig. 18). It belongs properly to the article on Constructive Asymmetry (Vol. VI., No. 3), and is there referred to. The eccentric column on the exterior upper gallery of the choir is also repeated here from the first article of this series (see Fig. 19). I shall connect this column with some other capricious and eccentric phases of mediaeval art in a following article. Meantime, it seems to show, when united with the ground-plan and the leaning piers of S. Maria della Pieve, that there are more things in heaven and earth than are dreamed of in the philosophy of some Horatios.

VII.

"Finding the main building to recede outwards, it was the opinion of Mr. Chichley and Mr. Prat that it had been so built *ab origine* for an effect of perspective, in regard of the height; but I was, with Dr. Wren, quite of another judgment, and so we entered it."

Wm. H. Goodyear.

(To be continued.)

ARCHITECTURE MADE EASY

NOTICE.

It is not our practice to admit commercial reading into these pages of the magazine, but, in the case of the circular that follows, we have deviated from our fixed policy because of the substantial benefits the "Classical Design and Detail Co." offers to the architectural profession and to the cause of classical art. We are sure nobody will deny that the present conditions of practice demand the formation of a concern like the one just incorporated, which certainly fills most satisfactorily "a long-felt want."—Editor
ARCHITECTURAL RECORD.

PROSPECTUS

OF THE

CLASSIC DESIGN AND DETAIL CO.

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YOU GET THE JOB, WE DO THE REST.

To the Architectural Profession:

It is well known that the chief drawback to the successful practice of architecture in the United States is the enormous burden imposed upon the architect by his office expenses. This is so great that the common computation is that an architect does not receive the benefit of more than half of his commission, even in those cases in which he does not find it necessary, in order to secure employment, to make some abatement from the nominal professional rates. Even our most successful architects find that their personal incomes bear a ludicrously small relation to the amount of business they do, and to the amount of money that passes through their hands. Those whose business, though less in extent, should suffice to maintain them handsomely, if they received their fair proportion of their earnings, have difficulty in making a decent living.

The explanation of this is simple. "Office expenses," when analyzed, are found to consist mainly of the expenses of the draughting room. It is on account of these that an architect finds himself reduced from the position of an independent business man to that of a mere disbursing agent, who, in fact, takes only a commission upon what is nominally his commission.

This condition of affairs is entirely unnecessary, in the actual condition of architecture in this country. If it were customary for an architect to design the detail of his own work, and to have the drawings for it carried out under his own direction, then, undoubtedly, the expenses of his draughting-room would legitimately absorb a great part of his commission. But notoriously this is not only not customary; it is not even permissible. Thanks to the beneficent influence of "The White City" at Chicago, and to the increasing number of graduates of the Beaux Arts embarking in the profession, the

classic revival in this country is now securely established. Not only is it no longer necessary for an architect to design anything. Every practical architect knows that if he ventured to deviate from the accepted forms of classic and Renaissance architecture, he would thereby injure his chances in a competition, or, in work for which he might be selected without competition, would impair his professional standing. There is still, no doubt, employment for designers, properly so-called, in the "allied arts" of decoration. But in the detail of architectural work there is no longer any room for designers. The plan of a building once made, and the style designated, the function of the architect is simply to select from among what may be called the canonical examples of that style, those which are most suitable for his purpose, and to have these adjusted to the proper scale and copied in detail by his draughtsmen.

This being the case, it is perfectly evident that the work of an architect's office is now done in the most wasteful way, and could be economized with the greatest advantage. In very large offices, where the extent of the business warrants the employment of a superintendent of the draughting-room, the waste may be less than in smaller offices. But even in these few cases, business is evidently conducted less economically than it could be if the draughting were committed to one great, centralized and highly organized establishment, such as we have now established. In smaller offices, the work of superintendence of the draughtsmen must be done by the architect himself, and here the waste and loss are manifest. The business of an architect, it is more and more clearly coming to be recognized, is not to design buildings, but to get buildings to design. The power of doing this successfully largely depends upon having nothing else to do. It is impossible for a man to give to it the time which in these days of keen competition it imperatively requires, if his attention is distracted by the necessity of personally conducting the design and detail of buildings, when it is also distracted by the necessity of making contracts with builders and material men and enforcing the execution of these contracts.

No doubt the present prevalence of classic architecture is largely due to these considerations. In old days, when old fogies were contented to have one important job on their hands at a time, it was possible for them to spend their time in pottering over drawing-boards

and actually designing the work that went out of their office. But under those conditions a moderate income was all that an architect could expect, and the profits of architects could not suffice to raise them to that high position in the business and social world which successful architects enjoy to-day.

It is in view of these facts that the Classic Design and Detail Company has been formed. The intention of its founders has been to establish a common draughting-room for architects, which, by reason of its scale, the completeness of its organization and the singleness of its purpose, can be conducted far more economically than any private establishment.

It is not our intention to interfere to the slightest degree with the artistic originality of our customers. When desired, we undertake from a verbal description to produce a design in plan, elevation and section, ready for estimates. But our main purpose is to do precisely what is done in the offices of architects, at from one-third to one-half the expense to them of the present obsolete method. From a small-scale pencil sketch of plan and elevation we work out a complete set of drawings. Here, again, we do not trespass in the slightest degree upon the architect's artistic function. Our professional library and collection of photographs stands absolutely unrivalled in this country. We are able to supply drawings to any scale desired of authorized detail of any school or period of Grecian, Roman, Renaissance, or Modern architecture. Reproductions of entire buildings reduced, enlarged or modified as desired. In pure classic a mere verbal indication on the sketches, such as "Order of the Parthenon," "of the Erechtheum," "of the temple of Jupiter Stator," etc., will suffice to effect the desired result. In Renaissance work, we purpose to facilitate the studies of the architect by keeping on hand and issuing to our customers sheets of all details, arranged by countries and periods; with each detail, plainly marked ("A.1," "A.2," etc.), from which the architect may without loss of time select the forms which best carry out his artistic conception, and these will thereupon be transferred to his design accurately reproduced and properly adjusted in scale, with neatness and despatch. Nor are we unmindful of the necessity of keeping abreast of the progress in architecture. Our agent in Paris will forward monthly photographs and measured drawings of buildings and details which may

fairly be considered as established, and added to the architectural repertory. We have also made arrangements to add to our office force each year several pupils of the Beaux Arts, so that our patrons may be absolutely sure of being "up to date," and that their work, where it does not adhere absolutely to the detail of the classic masterpieces, shall show their familiarity with "la mode Parisienne."

It will be seen that what we propose to do is precisely what is done now in the offices of our architects. The difference is that by reason of the advantages already enumerated we shall be able to do the draughting work of architects far more cheaply than they can do it for themselves and not less effectively. The slight sketches which are all with which a busy architect has time to concern himself personally, can be done with the assistance of a single draughtsman. We guarantee to our patrons a saving in this respect of not less than 25 per cent., and we believe that in most cases 50 per cent. would not be an excessive estimate. We also call the attention of the profession to the additional saving of office rent which they will effect by accepting our service. These two items are the largest in the architect's expense account. There will also be a notable economy in the professional library of books and photographs, the cost of which is now, in many instances, a very serious tax. This outlay can be entirely saved. We cannot, of course, make a regular schedule of rates for our services, in view of the wide differences in richness of detail and extent of ornament in different buildings. We shall, however, be happy to return prompt estimates upon the carrying out of architect's designs, requiring only the sketch plans and a memorandum of the style, as above indicated, as a basis. But we are confident that if the current computation to which we have referred is correct, that half the amount of an architect's commission goes out in expenses; this proportion will be raised, on the average, to three-quarters by the adoption of our plans. We offer a saving in time, as well as in money, and release our patrons from the drudgery of the drawing-board to the vitally necessary part of their professional work—the securing of professional opportunities. And all this not only without detriment, but, by reason of our unequalled professional library, and of our special arrangements in Paris, with positive benefit to the correctness, fashionableness, acceptability and architectural merit of their work.

Very respectfully,

THE CLASSIC DESIGN AND DETAIL CO. (Incorporated.)

ARCHITECTURAL ABERRATIONS.—No. 16.

585-87 Broadway, New York.

CHESTNUT STREET, Philadelphia, used to be known as the scene of the most outrageous commercial architecture in the United States. Indeed, it was and is extremely bad, and it is rendered the more irritating by the fact that the worst buildings seem to be the most admired. The promiscuous Philadelphian will point you with pride to the municipal disgraces.

The bad eminence of Chestnut street is at present, however, loudly challenged by what used to be the pride of New York. Not that Chestnut street is any less outrageous than it used to be, but Broadway more. The good things that have been done in Philadelphia within the past fifteen years, and there have been many of them, have been erected in outlying quarters, far from the ignoble strife of the madding crowd of edifices that loudly swear at each other along and across the chief commercial thoroughfare. This is not to be regretted. One good building, a dozen good buildings, would be overwhelmed and submerged in the confusion of bad architecture. Indeed, there are buildings there which, if not very good, show some sense of the value of peace and quietness, but they are lost and do not disturb the general impression of a museum of architectural freaks.

But middle Broadway, Broadway from Canal to 10th, has become quite as awful a spectacle to the sensitive eye as Chestnut street can present. It is a full generation since it was really the pride of New York. Then it made the effect really of a broad way, being lined with buildings of a maximum altitude of five stories, and showing on each side a nearly level cornice line, along a vista pleasantly stopped to the northward by what was then the dominating spire of Grace Church. The buildings were not often worth looking at in detail. They were conventional and dull in design, but not clamorous, and vulgar only so far as they were vulgarized by the signs. The marble front to the left of the structure we have chosen for illustration, is a fair sample of old Broadway, which, forty years ago, singular to reflect, was the fashionable promenade of New York. Architecturally, it is evident from this specimen, the street was neither here nor there. The worst fault of the buildings was that, from the commercial exigencies of show-windows, most of them seemed to stand on

basements of plate-glass. Not to have any visible means of support is a very serious privation for a building. Nevertheless, and, although the walls were thin, and the detail commonplace, decency was maintained. The uniform sky-line enforced the perspective, and the occasional expanses of brownstone, as in the St. Nicholas and the Metropolitan hotels, or of red brick as in the utterly featureless New York hotel, was effective in the prevalence of a veneer of white marble, or even of cast-iron painted to that effect.

In its prime, beyond decency the architecture of Broadway did not aspire, but in the later days of its glory, there were some efforts to secure animation and individuality without loss of decency. One of them is shown on the extreme left of our illustration. Another, more successful, still stands at the north corner of Bond street. But decency and gentle dulness continued to characterize Broadway until, some twenty years ago, the elevated roads and the new channels of traffic and the up-town movement deposed it from its place as the chief thoroughfare of New York, and converted it from a shopping street to a jobbers' quarter.

The architectural results have been very awful, but it is only since the cable brought Broadway once more conspicuously into the public eye, or the public eye into Broadway, that there has been any general apprehension how awful they are. There is such an apprehension now. At least, and this is the one redeeming point, at least New Yorkers are not proud of it, as it is a tradition for Philadelphians to be proud of Chestnut street. Chestnut street is in another way the more discouraging thoroughfare to the thoughtful patriot, because there is no denying that the development of it has been autochthonously American. Broadway, on the other hand, is an architectural Babel, a confusion of tongues. The present development of it corresponds to the latest phase of immigration, as attested by the names on the signs which still farther variegate and vulgarize its architecture, and bespeak not only an Anglo-Saxon and a Celtic and a Teutonic but a Semitic and a Slavonic population.

Indeed, it is the heterogeneity of the part of Broadway of which we are speaking that makes this mile from Canal street to 10th perhaps the most horrible stretch of architecture on the face of the earth. Everything has conspired to make it so, but most of all the facility which the steel frame has afforded of carrying buildings twice as high as it used to be possible to carry them. It is this baleful invention that has enabled the later builders to destroy any possibility of unity of effect which had been left by the variety of materials and the miscellany of styles. The majority of the building is still, perhaps, of the pre-elevator era. But at all manner of irregular intervals there came to interrupt it the gaunt sky-scrappers, with their bald, ungainly flanks and their architecturesque ungainly fronts, of which it is



NOS. 585 AND 587 BROADWAY, NEW YORK CITY.

difficult to say which aspect is the more revolting. The mere absurdities and outrages of detail, such as tying up stumpy granite columns with brass cords, and the rearing of huge pediments of sheet metal over plain fronts are trivial and harmless in the general nightmare.

It follows that it is futile as well as invidious to pick out any single building for especial animadversion. It is like relating one episode of a bad dream to explain the horror of a nightmare, when on horror's head horror accumulates, and it is in the accumulation that the horror chiefly consists. An artistic architect could do nothing to abate the awfulness of the spectacle, unless he had a whole block-front to himself, and even then one would have to limit the field of view to the block-front in order to enjoy it. In the case of a narrow front inserted in a block, it would be impossible for an architect intrusted with one of these to set an example of conformity, for there is nothing left to which to conform.

But the rebuilders of Middle Broadway have kept clear of artistic architects, and the architects to whom they have had recourse have had nothing less in view than conformity. The main notion of each has been to secure the visibility of his own work. Each one has cried aloud and spared not, and among them they have filled this mile with a shrieking dischorus.

If one must select a single aberration from a street full of aberrations, No. 585-7, does pretty well. The illustration hardly does justice to its specific demerits, which a full front view would bring into more prominence. But, on the other hand, the point of view of the illustration is very well chosen to bring out its rasping discordancy with its surroundings, and the manner in which it converts a block front of merely stupid and unnoticeable building, and, as on the extreme left, even better than that, into a spectacle to set one's teeth on edge.

It is quite true that the problem presented by a twelve-story building only fifty feet wide in a block-front of buildings of five stories, is very difficult. Quite possibly it is insoluble—that is to say, it is impossible in such conditions to produce a merely inoffensive ensemble. Certainly it is impossible to produce such an ensemble while the building remains provisional, as in this case, when the flanks of it are left unfinished, because there is no telling when the next owner may avail himself of his right to put up a building twelve stories high, or, for that matter, twenty-four. When he does that he will nullify not only whatever pains you may have taken to make the flank of your building presentable, but whatever pains you may have taken to secure light and air. If you make a distinct recess, however, in the middle of the flank you will put some pressure upon him to make a counterparting recess on his side, and through the shaft thus reserved

some light will trickle down into your interior. But no such forethought complicated the procedures of the author of 585-87 Broadway. He built to the limit, and cut in the veneer of the sides provisional openings to be closed whenever the next man takes it into his head to build a wall against them in the exercise of his right to do as he likes with his own.

In the meanwhile, this flanking veneer is a dismal object. It is evidently not a wall, for the shallow "reveals" reveal enough to show that it is too thin to stand alone, while they conceal whatever of adequate structure there may be behind it. The smooth meaningless expanse, with holes cut in it apparently quite at random and the only variation in its outline the jog in the sky-line apparently equally at random, although it amounts to a proclamation of weakness and incompetency, is entirely artless and undesigned. It is perfectly irrelevant to architecture, good or bad, although it is equally conspicuous with the architecturesque front.

It is a dismal object, and yet not so dismal as the architecturesque front, to which it is preferable as mere vacuity is preferable to obtrusive vulgarity. The architectural front is quite as devoid of ideas as the flank, which does not pretend to have any, while the false pretence that it has them makes it more irritating. It is noticeable for the completeness with which everything that has been learned about the design of high buildings is ignored by the author. There is no leading motive, there is no subordinate motive, there is no relation of one part to the other. Any story or group of stories might be interchanged with any other without injury. To attain "variety" is the only purpose that can plausibly be imputed to the designer, and in the pursuit of it he has attained a jumble.

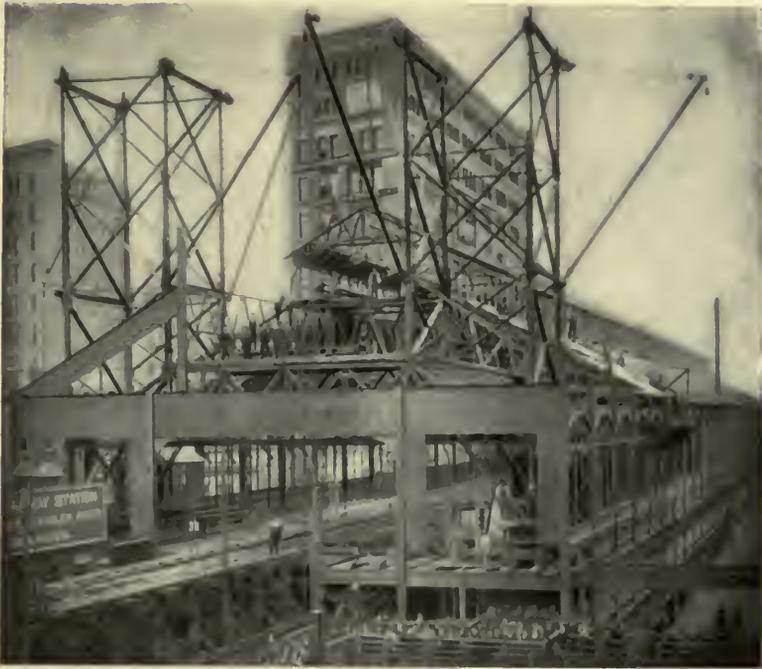
It is really curious how a structure which does at least stand up can be made to appear so dislocated and precarious. The openings are aligned over each other. Every few stories there are horizontal lines belting the front, and yet the total result is mere higgledy-piggledy. There is no beginning, no middle, no end. The two stories, the fifth and sixth, in which the architect has abstained from architecture constitute the only part of the front which is as inoffensive as the side, in which he has abstained altogether. If he had abstained further, and left the two stories below these and the three above as plain as themselves, a relation would have been established between the parts of his building, and the base and the crown might have been developed so as to form a front, which would have been agreeable to look at by itself. But here the fate of the unreasoning architect befell him. He could not let anything alone. There is in the actual structure, the aborted germ of an architectural arrangement. The five stories, from the fourth to the eighth, inclusive, would have formed a middle, and the inclusion of another plain story

by raising the arcade to the ninth would have put this in fair proportion to the top and bottom, if he had only let it alone. But he really couldn't, poor man. He was compelled to "finish" the arches of his third story with level architraves. He was compelled to variegate the level openings of the seventh story with keystones. Finally, lest some unity might still be perceptible in his miscellany, he had to interpose a projecting string-course between the sixth and seventh stories. When he had done this he had so effectually obscured what there was of a motive that it is only by searching that it can be detected. The arrangement of stories which would have appeared if he had let it alone was 3, 6, 3, which is not a bad proportion. The apparent arrangement after he has done is 1, 2, 3, 2, 1, 2, 1, which is no proportion at all.

Still, his "undistributed middle" is the least offensive part of the front. The most offensive is doubtless the basement. The lanky order which occupies and includes the second and third stories is a terrible object in itself, and it is rendered yet more terrible by the manner of its superposition upon the first, and the signalization of one bay of this by the free standing columns. The top escapes equal offensiveness partly by its remoteness, so that one is not obliged to look at it. But when one does look at it nothing could well be uglier in itself than the two-story order cut by the protruding pediments of the lower story, and enclosed, above and below, by single separate stories, while nothing could be more completely irrelevant to the rest of a front which is an aggregation of irrelevancies.

Perhaps this is not the worst thing in middle Broadway, although nothing could be worse. Indeed, the most discouraging thing about it is that there should be a street in which such a thing should not be very noticeable. But there is nothing more exemplary in the helot way, nothing which vulgarizes its surroundings more thoroughly. There is nothing which more completely exemplifies how unneighborly and uncivil the sky-scraper may be, how "*ferae naturae*," and how necessary it is that it should be brought within the reign of law. No document could be better adopted than this photograph to prove to the legislator that something must be done. Such a sky-scraper not only violates the Roman maxim that a man must so use his own as not to injure another's, but it also shows how one greedy owner may authorize an incompetent architect to vulgarize a quarter and nullify the efforts of those who are trying to make a seemly and handsome city. Such a building cries aloud for some representative of the public, some prefect, aedile or what not, who shall be empowered to prevent the erection of more such. And that is why it is worth while to sully the pages of an architectural periodical with a view of 585-7 Broadway.

TECHNICAL DEPARTMENT.



NEW YORK TERMINAL OF THE BROOKLYN BRIDGE.

SKELETON CONSTRUCTION.

THE system known as Skeleton Construction is without doubt the greatest innovation that has been made in the science of building in recent times, for without it the modern high building or "sky-scraper," which has already begun to revolutionize the appearance of American cities, would be impossible.

But skeleton construction is far from having reached its fully developed form. The few years that have elapsed since its incorporation in any buildings of note have witnessed changes, improvements and developments that are indicative of what may be expected in the future.

The continually increasing height of the modern building has developed methods of foundation construction that were unknown a few years ago, and the use to which steel has been put in these foundations, and its adaptability in connection with concrete for such foundations are among the wonderful discoveries of the past decade. Thus



BIRD'S-EYE VIEW NEW TWELVE-STORY BUILDINGS, 594-596 BROADWAY,
SHOWING ERECTING PLANT.

the steel skeleton becomes the progenitor of the "steel grillage foundation" in its multiplicity of variety, the metal no sooner gaining a firm hold in one department of construction than it enters another important field in competition with other other materials and in its latest application shows its superiority.

Thus it is that to-day the "iron work" is by far the most important part of the modern building, and demands for successful or even adequate treatment the expert of unusual capacity and abundant experience. Architects will testify that there are few such. Indeed, in the designing of his building, the architect finds that the iron work presents to him his most difficult problem. His observation shows him that most of the expensive delays that have occurred of late in the construction of large buildings have been due to some difficulty, error, or mishap with the iron work.

As a consequence it is natural that the important contracts for this part of a building are passing into the hands of a few firms that have made special preparations for executing them, and who, with their experience, their well-developed organization of men accustomed to each part, and their extensive plant for the erection of the frame, are

peculiarly fitted for such work. As an example of this tendency, the readers of this magazine will see that the iron work of the following structures illustrated or described in this issue: The Fahys Building, 29 and 31 Liberty street and 54 Maiden lane; the Woodbridge Building; the Graham Building, Duane and Church streets, and the Rhineland Power House, 232-238 William street, was done by the firm of Levering & Garrigues. That one house should be entrusted with the iron work of so many, almost contemporaneous buildings, is significant of the capacity, experience and influence which it possesses. The recent work of the firm includes not only the buildings above mentioned connected with the name of Clinton & Russell, but numbers of equally large edifices for other leading architects.

The members of this firm are justly proud of their record for erecting the class of work described with promptness, coupled with a freedom from accidents that it is thought is not surpassed, if equalled, by any other firm in the same line of business. As general contractors for the New York terminal of the N. Y. & B. Bridge, they recently removed the old station and simultaneously erected the new building while an average of 150,000 persons were each day passing through and under their work without serious accidents to a single traveler.

Levering & Garrigues are not only iron contractors; they are also trained engineers, and with their large, well-equipped staff of employees it has been possible for them to render services to architects beyond the capacity of other firms. They have contributed to the development of skeleton construction, and possess the scientific knowledge which is to-day absolutely necessary, if iron construction is to be economical as well as sound.

This firm was the first in New York City to erect the skeleton framework of modern buildings by means of boom derricks, now so common on all large buildings, and in consequence of which it has been possible to reduce the time of erecting such frames by at least one-half. A great deal of thought and ingenuity has been expended in making these derricks proof against accidents. The masts are made of heavy steel piping, secured to the sills through steel forgings, into which they are screwed and riveted, thus being able to resist tension, as well as compression. Similar care has been exercised to avoid accidents in all other appliances.

But this novel and highly organized iron structure, with its superimposed architectural finish of brick, stone and terra cotta is not yet a completed building, and much is needed in the way of ornamental iron work to make it so, and here, again, those firms, such as Levering & Garrigues, who have their own shops for the manufacture of this finishing work also, are at a great advantage. The concentration of all the iron work, structural and ornamental, into the hands of one intelligent, experienced firm, having their own shops for the fitting



THE WOODBRIDGE BUILDING IN PROCESS OF CONSTRUCTION.

and finishing of the work, is a condition on which all prudent architects now insist; and having attained which, they can feel secure regarding the execution of the most important contract connected with the modern building.



THE WOODBRIDGE BUILDING,

William, John and Platt Streets, New York.

Clinton & Russell, Architects.

AN IDEAL ELECTRICAL EQUIPMENT.

PERHAPS in no other building on Broadway has the electrical lighting received more attention than that given the Hudson Building, and no little praise must be given to the Brooklyn Electric Equipment Company, the electrical contractors, for the readiness and ability with which they carried out the ideas of Messrs. Clinton & Russell. The abundance of light, which the tenants will doubtless appreciate, is furnished by a direct connected plant, located in the sub-basement, consisting of two 75 k.-w. and one 50 k.-w. generators. The switchboard is located conveniently near, and consists of highly polished white Italian marble slabs, mounted on a substantial iron frame. The space behind the switchboard is surrounded by a grille work, having a suitable door for entrance. On the switchboard are mounted in a symmetrical, yet convenient, arrangement all the instruments and switches necessary for the control of the 2,000 odd lights in the building.

In choosing the method of distributing the current, the unusual depth of the building was particularly kept in mind, and each floor was divided into two distributing centres, one for each half, supplied by their respective feeders direct from the switchboard, the hall, corridors and toilet lights being supplied by an independent feeder. At each distributing centre is placed a marbleized slate panel on which is mounted a knife-switch for each circuit radiating therefrom. These panels are surrounded by a marbleized slate box, around which, with a three-inch air space intervening, is a hardwood box. All wires are of the very best rubber-covered, moisture-proof insulation, and are run in insulated heavy iron-armored conduits. These conduits were installed as the building was erected, and from the improved method of fastening them they are really a part of the building itself. At each outlet is placed a Mezger "Universal" cast iron outlet box, into which the conduits terminate and are rigidly fastened. In the installations of Lord's Court Building and the Central National Bank Building, the Brooklyn Electric Equipment Company has given other evidence of its skill and ability to grapple with electrical engineering problems. In these buildings the then experimental, but now highly approved "vertical system" was installed. In Lord's Court Building, where there are more than 4,000 lights, they demonstrated the practicability and efficiency of supplying all these lights from vertical circuits originating at distributing points in the basement. The vertical system originated and has been much advocated by Reginald Pelham Bolton, C. E., but it was

the good fortune of the Brooklyn Electric Equipment Company to demonstrate the merits of the system, as may be seen in either of the last two named buildings. Of course the vertical system cannot be used where the tenants are required to pay for their own current, but with the "drainage system" as introduced by this company it is different. Another example of their excellent work can be found in the Brooklyn Institute of Arts and Sciences, Messrs. McKim, Mead & White, architects; the New York Wool Exchange, corner of West Broadway and Beach Street, New York. The Academy of Music, Brooklyn, is a striking example of how much can be done with a limited sum, if placed in the hands of a practical engineer. This theatre possesses an electrical equipment second to none in the country, and which probably cost not more than half of its equals, and it is probable there is nothing in the business career of the Brooklyn Electric Equipment Company that gives them more pride than the following letter from the chairman of the building committee:

Brooklyn Jan'y 16th 1895.
The Brooklyn Elec. Equipmt. Co

Dear Sirs

I am directed, by the Committee in charge of the Electric lighting of the Academy, to say that after the examination of the wiring and extra work done by you without orders, they have decided that the things charged for were not called for in the Contract and are greatly, to the benefit of the Academy, making the lighting perfectly satisfactory.

In view of this, I have the pleasure to report, they have voted you the sum of five hundred and fifty dollars

Yours truly

John J. Piccepoint
Ch. of Committee

The system of stage lighting employed was entirely original, and the switchboard, which was especially designed for the purpose, is very simple for the control of nearly 3,000 lights, only one person being required to operate it, and is but an example of the ingenuity displayed by the company in dealing with some of the difficult problems in electric engineering.

PROPER PROTECTION FOR ARCHITECTS.

THAT it is "stuck together" is not the first impression that occurs to one in regarding a piece of masonry. Somehow or another, in the ordinary notion of what goes to the makeup of a building, one of the most important elements is ignored. The iron and the brick and the stone and the timber all figure prominently enough, but cement is almost forgotten.

It is a curious fact that this slurring of one of the most important constructive materials in the common understanding of the makeup of the building finds in some degree a counterpart in the lack of scrupulous attention to cement which marks some architects' specifications. We don't mean to say that the architect is in the least degree unaware of the important part which cement plays in his buildings, but it is fairly open to question whether he gives attention to that material proportionate to the extreme care with which he considers his iron work, the stone he employs, or the particular make of dynamo that he installs for electric service.

We have seen, for instance, specifications wherein the cement called for is designated simply as "Rosendale." Good! But what brand of Rosendale? There is good and bad to be dealt with in Rosendale, as in all other materials, and a looseness in this matter must be taken as indicating, in a way, a certain indifference regarding an important item of construction.

Another fact pointing in the same direction is this: The architect keeps himself thoroughly posted regarding what is going on in the manufacture of iron, elevators, electrical apparatus. He knows all about novelties in decorative marbles, or mosaics, or hardware, or plumbing, but when it comes to the progress that has been made, and to the changes that have occurred during the last few years in so important an article as cement, he is, if not ignorant, at any rate, less well informed.

There has been no natural reason why the immense building market of this country should draw on a foreign supply. The proper materials we have always had in abundance.

The American product ranks with the best made abroad. The commercial reports tell the story. American cement has been dislodging the English and German article. It does every bit as good work, yet we fear American architects are not fully aware of the saving they may effect for their clients by using the American product. Engineers are much wider awake to the facts.

Great improvement has been made in what are technically known as Rosendale cements. The word Rosendale covers a number of brands of different manufactures, some of which are not as good as

others, but the best of the Rosendale brands are as good as anything in the market, and the use of them is a big economy in a building.

The best of these cements is that known as "The Brooklyn Bridge Brand," and when the architect is making his specifications, he should be specific in naming this make of cement. It is absolutely hydraulic, dark, finely ground, uniform, reliable, and will permit the use of the largest proportion of sand. It will stand high tests and give better satisfaction than any other brand. It is especially adapted for use under water or out of water where tensile and compression tests are required. It is carefully made from selected stone. The fineness, on a sieve of 2,500 meshes to the square inch, is 95 per cent.

It is manufactured only by the New York and Rosendale Cement Co., the New York office of which is at No. 280 Broadway.

The quality of this cement, its uniformity and economy, is established beyond dispute, because it has been so extensively used, not only by the United States Government, but by engineers and by many leading architects and builders. It was used, for instance, in the New York and Brooklyn Bridge, in the Great Washington Bridge over the Harlem River, in the Monongahela Bridge at Pittsburg, Pa., in the Williamsbridge reservoir, in the Brooklyn Post Office, in the Gas Works at Stamford, Conn., in the Fidelity and Casualty Co.'s Building, in the great Astoria Hotel, the largest hotel in this country, and in the tallest office building in the world, now in the course of construction on Park row.

One hundred thousand barrels of this cement were supplied for the New York Croton Aqueduct, and as a supreme test of its hydraulic qualities, mention should be made of the fact that it was used by the Central Gas Light Co., in their gas-tank foundations, at the foot of 138th street at Port Morris. The foundations of this work are forty feet under ground, and at high tide thirty-five feet of water surrounds them. In this position the cement has proved to be of a notable excellence. The Equitable Gas Light Co. have also used the cement for their foundations at the foot of 41st street and East River.

These are only a few instances of where the cement has been used and by whom it has been used. Pages of names and locations could be given, and in all cases the cement has been satisfactory. A great many architects have used it. Firms like McKim, Mead & White, R. H. Robertson, Cyrus L. W. Eidlitz, Clinton & Russell, R. W. Gibson, Cady, Berg & See, H. J. Hardenbergh, W. H. Hume, Ernest Flagg. Stronger facts for its excellence cannot be adduced, and it has been found that it is especially adapted for heavy masonry and for sewers and concrete work. But to be sure of getting this brand and the guarantee of excellent work which accompanies the use of it, architects must specify "The Brooklyn Bridge Brand."

SUCCESSFUL BUILDING.

IN looking through the review and illustrations of the work done by Clinton & Russell, published in this magazine, many practical persons are likely to find themselves interested in other matters than the artistic side of the buildings discussed. There are a great many questions, we are sure, which many would like to ask about the constructive problems, and the economic problems involved in these buildings. What was the nature of these? How were they overcome? Who did the work?

It is, perhaps, impossible to touch upon all these points in a magazine article, but we venture to believe that they are none the less interesting or worthy of treatment. Indeed, we will venture to assert that to-day the artistic problem in a big modern building, is, we won't say less interesting than others, but at any rate it is of less practical consequence and receives, upon the whole, less attention. The making of a design has become only a very small part of the architect's work. For the owner it is the least important part. The paramount questions now are questions of finance, questions of equipment and questions of workmanship and superintendence. It is in these that the architect and owner have to be most concerned in order to insure a successful building.

Yet, strangely, these matters are very rarely discussed in any architectural publication. We might say they seem to be avoided. Is this because they savor of "business?" If this is the reason it is a poor one. Business is every bit as legitimate as art. It is as legitimate a topic for discussion, and we venture to assert, for a majority of the human race, it is very much more interesting.

Indeed, how intensely interesting the "business" part of building becomes is known only to those who engage in building operations. Some time ago we asked an owner who was putting up a building what interested him the most, and he answered promptly: "Trade Literature." He went on to explain that this was because it touched upon the question of who could do the work he needed done and what the market offered for construction and equipment.

These are the main questions also for the architect. We are sure, therefore, that an article of immense interest could be written, setting forth the details of construction in the work of Clinton & Russell, speaking as well of the firms to whom the work of construction was intrusted.

If this were done, one of the first matters that would have to be touched upon would be, who did the actual work of constructing the buildings. One firm, of course, has not done it all, but it happens that one firm has done the greater part of it. Take the Woodbridge Building, for instance, the Laight street stores, the Rhineland Building, at Duane and William streets; the Rogers Estate stores, 47 and 49 West 13th street; the Sheldon Building, on Nassau

street; the Stuvvesant warehouses, on East 13th street; the Stokes Building, in Cedar street. These were all intrusted to the well-known firm of mason builders, McCabe Brothers, whose offices are at Nos. 33 and 35 West 64th street.

Obviously, the builders who did this work are of the highest rank. For the construction of these large modern buildings needs great resources of capital and experience, and the architect can take no chances in those whom he trusts. He must select with care—and the continued employment of the same firm is the strongest kind of recommendation of the complete satisfactoriness of their work. They started in business nearly thirty years ago, and for the last twelve years they have stood in the first rank. The firm has made a specialty of high class work and have devoted their attention to modern office buildings, expensive residences, large churches, halls and club-houses. Many of the largest buildings in the city, designed by the leading architects, stand to their credit.

We have already spoken of some of the work they have done for Clinton & Russell, but outside of that office they have been equally successful in obtaining contracts. For R. H. Robertson they built the Van Ingen Building, Nos. 5 and 7 West 29th street; the Mohawk Building, 5th avenue and 21st street; the McIntyre Building, 874 Broadway; the Holland Building, Broadway and 40th street; Academy of Medicine, West 43d street; the New York Clubhouse, 5th avenue and 35th street; the Mendelssohn Glee Clubhouse, 6th avenue and 40th street; St. Paul's M. E. Church, West End avenue and 86th street; Chas. T. Yerke's residence, 5th avenue and 68th street; the Van Ingen residence on East 71st street; the Stokes residence, 37th street and Madison avenue, and the Blair residence on East 61st street. For McKim, Mead & White, McCabe Brothers built the famous Century Clubhouse; for Barney & Chapman they erected Grace Church buildings, on East 13th and 14th streets, as well as the Revillion Building, 13 and 15 West 28th street; for DeLemos & Cordes they built the Boskowitz Building; for Jardine, Kent & Jardine, the Bonfils Building, 5th avenue and 21st street; for Parish & Schroeder, the Y. M. C. A. Building, 56th and 57th streets, near 8th avenue; for George Harney, Clinton Hall, Astor place and 8th street; for F. H. Kendall, the Methodist Book Concern Building on 5th avenue; for Harney & Purdy, the Lincoln warehouses; for William Schickel, Ehrich stores, on 6th avenue, and for C. C. Haight, the professor's houses in the General Theological Seminary, and for the same architect, the Five Points Mission Building.

In going over this list of buildings, the reader will observe that the architects named are the best known in the city, and the buildings some of the largest and most important that have been erected. All this work has been done in the last twelve years, and few building firms, if any, have a superior record. It is one to be proud of.

MODERN BUILDING.

IT is a curious fact in connection with the building trade that, although the number of builders has experienced an increase during the last few years, the percentage of those occupying places in the front rank has grown gradually smaller. The reason for this is that the standard for high-grade building has advanced to such a place that comparatively few of those who were formerly considered first-class builders have been able to successfully fulfill the new conditions.

This new standard has been set by the builders themselves, or, rather, by a small portion of them, who, realizing that the recent revolutionary changes in building demanded a corresponding advance by those who were to accomplish successful and satisfactory work under the new conditions, undertook to meet the new requirements. Not but what there has been a general advance all along the line, for the building trade is by no means stationary, but it is a natural law that when a certain number of people start on terms of equality, the equation will ultimately be destroyed. This is what has happened in the present instance, and the result is that we find a little group of builders isolated, to some extent, from their fellows.

Among the New York firms who may be mentioned as being in this smaller division is that of S. McMillan & Co. This firm was founded some six years ago by Samuel McMillan, James W. Pacey and William Young. Each of the partners having been in a separate branch of the building trade, the union of the three made an exceedingly strong combination. This specialization along certain lines has been of considerable advantage to them and their clients. It can be readily seen that a firm which is able to make such a division of expert knowledge possesses an unusual opportunity for doing the finest work.

Their work may be seen at Long Branch, Llewellyn Park and Orange, New Jersey; Tarrytown and Port Chester, New York; Jamaica and Brooklyn, Long Island—in fact, at many of the well-known suburban towns and watering places. Although they have also erected many dwellings in this city, they have by no means been confined to this class of work. Among the office buildings which they have put up are the Chase Building, at 481 5th avenue and the entire remodelling of the Brandreth House, Broadway and Canal street, for the Brandreth Estate, the work being quickly done without any disturbance to the tenants. They have built for the best archi-

fects in New York, including such firms as Clinton & Russell, McKim, Mead & White, Cady, Berg & See, John H. Duncan, Jardine, Kent & Jardine, William J. Fryer and Cleverdon & Putzel. For the last-named firm they have erected the buildings 657-659 Broadway, 7 Lafayette place and 3 and 5 West 18th street.

They are at present engaged in the construction of a model tenement for Miss Mary Van Allen, of Newport, R. I. The work is being done under the supervision of Messrs. Clinton & Russell. They are also doing the two Goodwin houses, in West 54th street, for McKim, Mead & White. Mr. McMillan, the senior member of the firm, is president of the Board of Park Commissioners for the city of New York. He is also vice-president of the Mutual Bank, and a member of the Real Estate Exchange.

The foregoing partial list of the buildings already erected by S. McMillan & Co., and those in process of construction, shows the resources of the firm. The scope of their work, embracing, as it does, private dwellings, office-buildings, and many used for other purposes, is an indication of their complete mastery of the science of building.

On inspecting a factory we can, almost at a glance, form some idea of the size of the entire plant. Not only can we see the finished product of the huge and complicated mass of machinery, but we can follow it, almost from its inception, through its various stages of manufacture. This gives us a realizing sense of the size of the firm, of the capital necessary to carry on such a work and of their facilities for doing business which we could never have gotten by simply looking at a sample of their production. In the building trade, on the contrary, we consider, as a general thing, the results. The vast plant is there, as in the factory, but it is intangible and invisible. In the construction of a large building, the stonemasons, bricklayers, carpenters, roofers, and others, each have their separate allotted time for work, so that we really see but one stage of the building. Consequently, we do not realize the skill of organization and nicety of calculation which is necessary to put in their proper places the huge masses of stone and the heavy iron girders. This is done, too, with but comparatively little interruption of street traffic.

To carry on work like that done by S. McMillan & Co. means much more than the mere procuring of the contract. It requires experience, skill, executive ability and, something which is absolutely necessary, sufficient capital. That S. McMillan & Co. meet these requirements is indisputably shown by both the quantity and quality of the work done by them during their six years of business existence.

Their offices are at 327 West 42d street, New York City.

THE "PERSONAL FACTOR" IN BUILDING.

IF any one had told an architect of twenty years ago that within a few years he could run a building up to a height of twenty stories, or superimpose such a structure upon a first story of no greater thickness of wall than the twentieth, he would have been laughed at for his pains.

It is the advent of the use of iron that has worked this great change. A huge skeleton of iron is the basis of the modern building, while the walls have ceased to be the supporting element and have become merely an envelope.

The increasing complexity of these latter day structures and the corresponding need for greater responsibility on the part of the builder has given rise to a new condition of things in the building world. For the more important kinds of work there has been a demand for only the builders of unquestioned ability and integrity and those upon whom the architect may place the dependence which is so absolutely essential.

The importance of this need for reliability on the part of the builder can scarcely be overestimated. While it is true that the work is done directly from the architect's plans and under his personal supervision there are many points on which he must needs put trust in some one, and that man is the builder. True it may be argued that the builder must in his turn place the same dependence upon his workmen. Of this there is little doubt, yet at the same time a builder of a certain grade in time builds up a force of workmen upon whom he may rely. In the same manner, it is true, that a man who is careless or unscrupulous is a large factor in developing those qualities in the men who are in his employ.

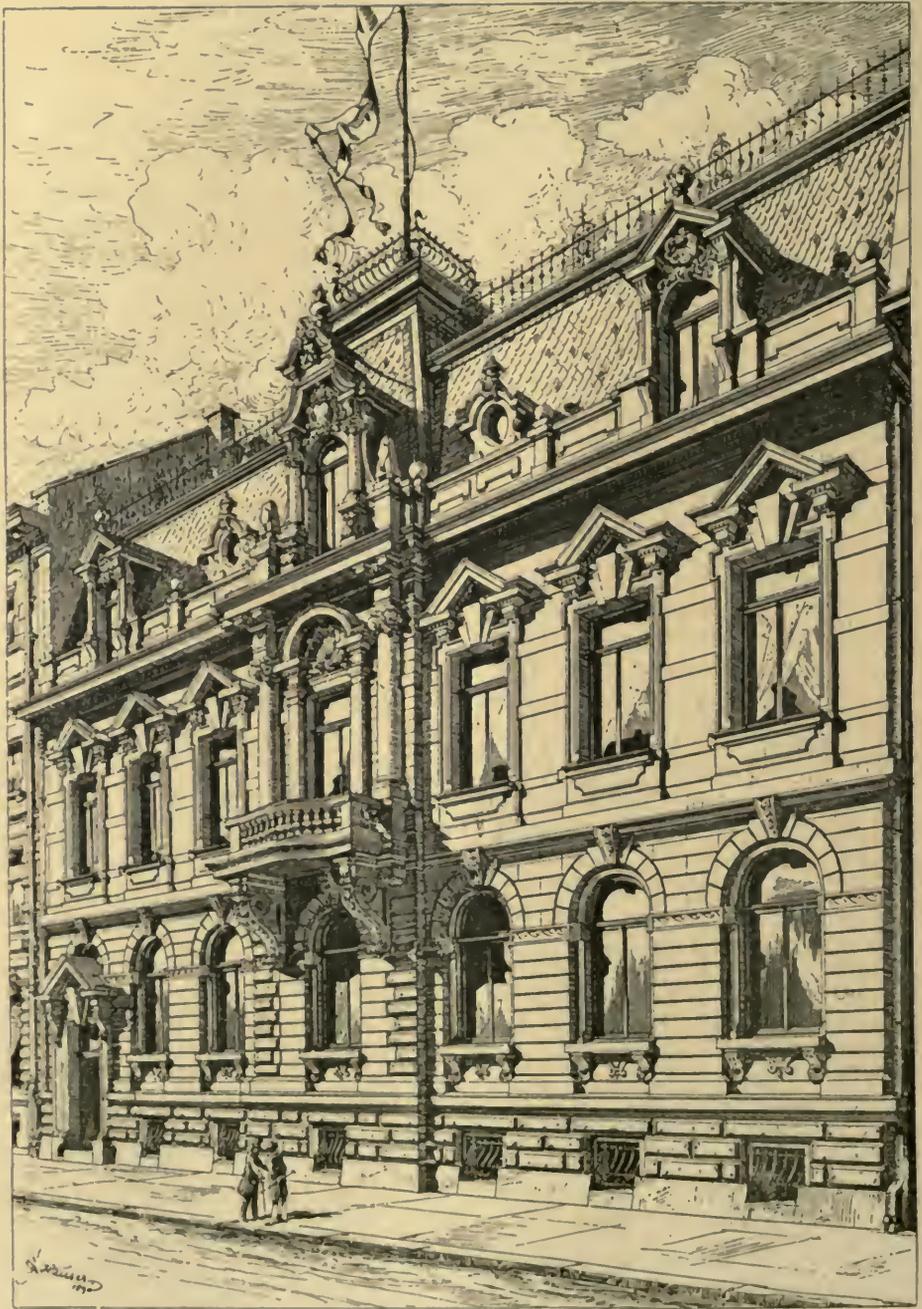
Again, the builder should be more than a mere machine to fulfill the technical requirements of the specifications. He should be a man with some knowledge of the possibilities of his work and of sufficient ability to take advantage of them. There are many opportunities that arise during the erection of a building, which, if used properly, would cause a saving of time or labor, or, perhaps, correct an element of weakness. In the interpretation of plans the builder should be able to understand many unexpressed but at the same time important points.

An evil that is no inconsiderable one is too low bidding on contracts. By this is meant the securing of work at such a figure that absolute and honorable compliance with the architect's specifications is practically impossible. The result of this is easily seen. The builder

finishes a portion of the work and it is not in accordance with the plans. The architect objects and holds him to the original. This is continued through the entire process of construction or until it results in the inevitable shortage. As it is contract work this shortage must be borne by the builder. Consequently, there is a retrenchment on that part of the work which, either from accident or oversight, has escaped the architect's eye. This may never become known, or, again, it may be found out, but the defect may be of such a nature that to remedy it is an impossibility.

It would seem that the need for trustworthy builders and honest workmanship would be satisfied, for to apply an axiom of political economy, the demand creates a supply. This is exactly what has occurred, although it has come in this way: the builders have gradually become separated into grades. A few firms have drawn away from the others, and, by virtue of the quality of their work, enjoy the patronage of the most prominent architects. A glance at the vast amount of work Mr. Richard L. Walsh has done for the architects, Messrs. Clinton & Russell, showing as it does the confidence placed in him by one of the largest architectural firms in New York, says everything, so far as his ability and integrity as a builder is concerned. This firm of architects do business on such a large scale that a builder who is favored by them has little time for other work.

A fair specimen of Mr. Walsh's may be seen in the Woodbridge Building, which occupies the entire block front on William street, between John and Platt. Among others he has built are the Samson Building, Nos. 63 and 65 Wall street; Stokes Building, Nos. 45-49 Cedar; Stevens Building, Nos. 3 and 5 Maiden lane; Sheldon Building, Nos. 68 and 70 Nassau. On Broadway, between 8th and 9th streets, Mr. Walsh built, practically, the whole block, including the large store of John Daniel & Sons. This work was carried on without interruption of their business. Mr. Walsh has built principally for private owners, a class of work which requires the greatest care and finest workmanship. His office is in the Stokes Building, at Nos. 45-49 Cedar street.



LÄMMERT RESIDENCE, MANNHEIM.

Prof. Adolf Hauser, Architect.