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No. 1.

PRINCIPLES OF ARCHITECTURAL COMPOSITION.

I.

The Involved Nature of Architectural Design.

DESIGN, in general, as applied to the fine arts, means the disposition of objects so as to please the senses, in contradistinction to the mechanic arts, where design means disposition toward some useful end. To the work of either fine or mechanic art intellectual pleasure may attach.

In all art, design has various aspects. The painter must take into account the intrinsic interest of his scene, its fidelity to nature, and its importance in history or thought, in addition to the work of pure design—the arrangement of forms and choice of colors—regardless of what they represent or suggest.

Perhaps in music alone is pure design possible—the juxtaposition of sounds to give pleasure to the ear alone; but even here, sentiments of dignity, gaiety, and others, are so closely connected with the mere sounds, that not even in music do we find design pure and simple.

Especially in architecture is design complicated with considerations of such magnitude and importance, that they are usually set forth as constituting the whole of architectural design, almost to the exclusion of the essential part of æsthetic design—the determination and correlation of forms and colors in combinations that are intrinsically pleasant.

The most important of these considerations is that of utility. Nowadays an architectural form rarely seeks expression, except as including some useful purpose. Formerly, when architecture was chiefly employed in building houses for the gods, utility counted for less; next to the satisfaction of the eye, the sentiment of reverence chiefly needed to be gratified. But now we must build

It is not intended in the following pages to set forth anything like a complete theory of composition, but only to put together in a coherent form some practical generalizations, to aid the student by formulating in words what he must otherwise acquire by a slow process of unguided observation.

houses, and town-halls, and office buildings, and put forty windows where we would rather have but four, and make our design out of such mundane needs. Sentiment, too, must be taken into account, if not religious, perhaps domestic, or that of public pride, or private ostentation. A hundred utilities and a score of sentiments arise for us to satisfy.

Next to this comes the constructive sense, which, even in the unprofessional mind, shrinks from a post that seems too slim; and in the professional mind, objects to an arch with too slight abutments.

Then, again, there is a sentiment with regard to material, which prefers stone to brick, bronze to iron, marble to plaster.

There are all of these, and perhaps still other considerations, in deference to some of which we may, at times, find it necessary to do what pure design would forbid. Thus, to take a familiar building as an instance—the Doge's Palace, at Venice—to satisfy the constructive sense, sadly needs abutments at the angles, for both the first and second story arcades, while, pictorially, it is quite right just as it is.

Most designers, in fact, dwell chiefly upon utility and construction. Admirers of both the Gothic and the Classic modes will urge that the design must spring from the plan—that is, from the arrangement that utility or construction requires.

They are both quite right: the design should spring from the plan; but it must spring from it, and not remain nothing but plan. Designs must be suggested by the plan; but if no design attaches itself to one way of satisfying the utilities, some other way of satisfying them must be devised, which will suggest a scheme that pleases the eye.

Nor would any one ever have exalted the value of the mere utilities, were it not that each starts with a certain type of artistic results, to which, it is assumed, all utilities must be made to conform. Thus, when the Gothic man talks of plan, he has in mind as a type an unsymmetrical group of parts, apparently thrown together as nature throws the rocks of a mountain, yet really carefully arranged, according to the skill of the designer. In the mind of the classical man, on the other hand, there is an assumption of a different type, to which all of his utilities must adapt themselves. He wants something symmetrical, with horizontal lines predominating.

Just as the mediævalist cannot think of a house as a square mass, the classicist cannot think of one all peaks and steeples.

The truth is that men have not thought of design as a general method, applicable to all styles. They fall in love with some special beauty of the past; justly, no doubt, but without anything like a fair appreciation of the possibilities of the case.

Beyond the utility—beyond even the construction of a building, there is the question of design purely from an artistic standpoint—

the erection of forms that are pleasing to the eye, regardless, for the moment, of whether they are granite or sugar-candy; of whether they are to be lived in, or worshipped in, or worked in.

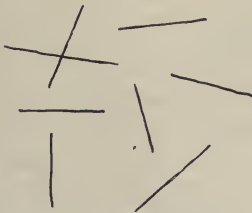
It will, perhaps, never be possible to reduce the art of delineating and arranging pleasing forms to an exact science; but it is possible to analyze and classify these operations, in such a way as to help one to make a simple and pleasing design, or an intelligible criticism, just as a knowledge of counterpoint may help one to construct a simple melody or harmony, and aid him in appreciating and estimating the masters. But we cannot make a master by teaching rules, and design, in its more delicate discriminations, must always remain a matter of talent and temperament.

II.

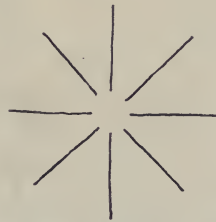
Unity.

In all fine art—that is, art which has as an end the pleasure of the senses—there are two qualities which must be obtained: unity and grace. Unity is the manifest connection of all the parts in a whole; grace is the pleasing form of the parts thus connected.

Draw eight lines at random, thus (1); there is no evident connection among them—there is no unity; but if they are drawn thus (2), unity appears; they constitute a whole by virtue of their arrangement.

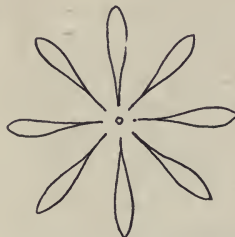


1. Random lines without unity.



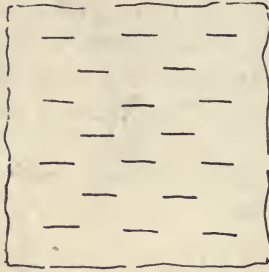
2. Lines united by their arrangement.

If now, instead of straight marks, we give the parts shapes that are pleasing, we add grace, thus (3):

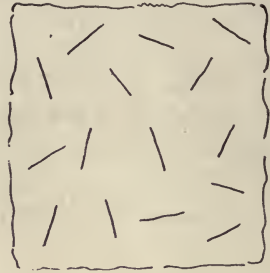


3. Grace added to unity by the shapes given to the parts.

There is another method of arrangement by which separate things may be united; not, indeed, into a whole, but into an unfinished part of a whole that must be otherwise completed. If we arrange our former units, either regularly, like this (4), or irreg-



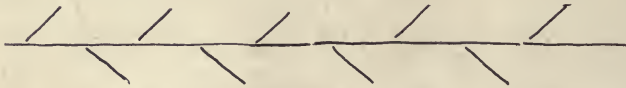
4. Objects evenly disposed, giving continuity to another object upon which they occur, but only when a boundary is marked; otherwise giving a sense of incompleteness.



5. Objects, unevenly disposed, also giving continuity, but less so than when evenly disposed.

ularly, like this (5), with more or less evenness and absence of accentuation, we give a certain sense of continuity to the surface thus covered.

So, again, if we apply our lines to a long line (6), we unite them; yet,



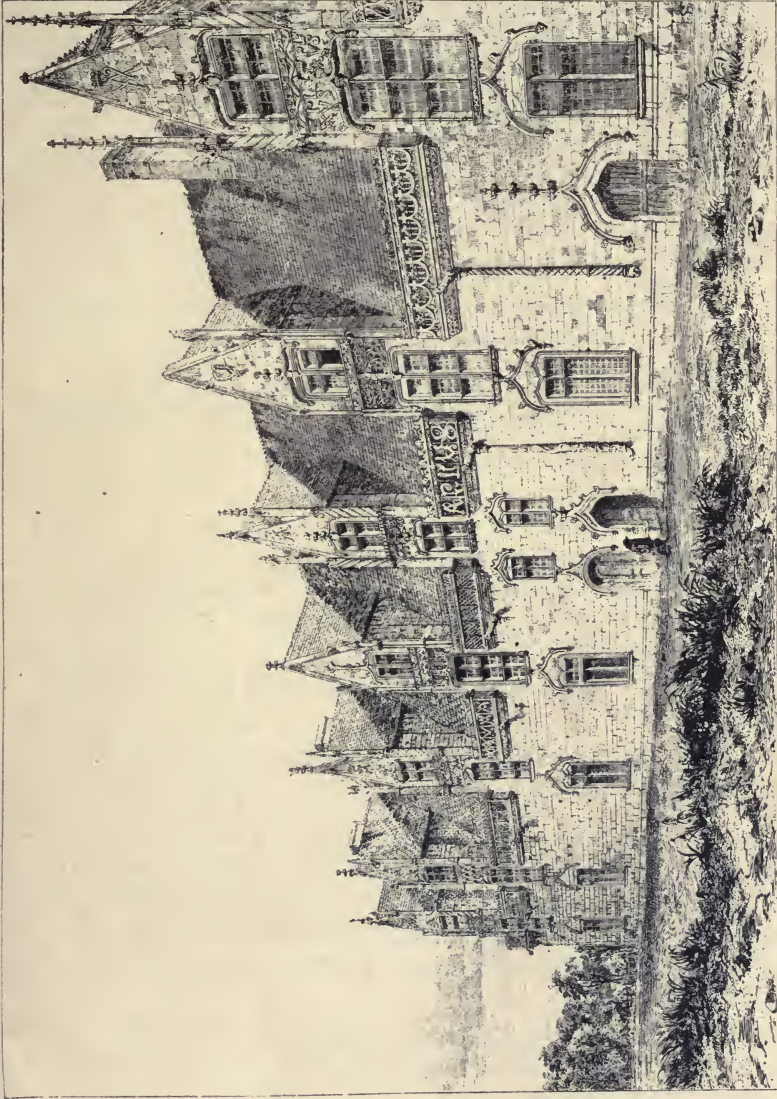
6. Objects, occurring at even intervals, giving a sense of incomplete continuity until the terminations are marked.

without some termination, it appeals to the eye not as a completed group, but as a part of something of which the whole is not yet supplied; this is what we feel in a row of columns, in a wall with dormers at regular intervals, (7), and in almost every ornamental border.

The quality of unity is essential to all objects of art, and to all parts of each; and it constitutes the greater part of architectural design.

In architectural composition there are two principal processes, in which considerations of unity are paramount—the assemblage of parts that are side by side into a whole, which we may call grouping; and the separation of the building as a whole, when it is a single mass, or of each of the component parts, when it is a group of masses, into parts disposed one above another, which we may call subdivision—limiting the word arbitrarily to horizontal subdivision, and keeping the word “grouping” to describe vertical separation, even when it seems to be rather the division of a whole into parts than the assemblage of parts into a whole.

After the arrangement of the main masses of the design, comes a



7. CHATEAU DE JOSSELIN.

Dormers evenly distributed, giving a sense of continuity, almost of infinity.

similar process with each part of which it is composed, whether vertically or horizontally; and the grouping of details—windows, columns, turrets, and the like—for each part, upon the same general principles that applied to the whole.



8. Group of two masses, joined by a connecting part.

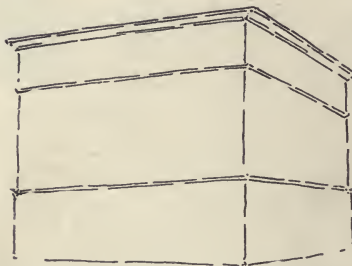
Thus, in figure 8 two masses—joined by a lower connecting link—



9. The same group, sub-divided in height, and elaborated with minor parts.

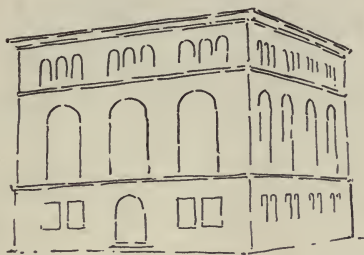
have been grouped; in 9, the combination has been subdivided horizontally into three parts, by the sill-line and the eaves line carried through; and upon the gables and the connecting link, windows, dormers, and columns have been placed by ones, twos and threes.

So, again, in 10, the single mass of the building has been sub-



10. A single mass, sub-divided horizontally by mouldings.

divided by means of mouldings; while in 11, in each subdivi-



11. The same as 10, with minor parts grouped upon the different sub-divisions.

sion, windows of different sizes and shapes, and in different numbers, have been grouped.

We are to consider, first, the number of principal parts that may compose a group, and their sizes in relation to each other; next, the number of subordinate parts which should be grouped, as details, upon the main mass or masses: then subdivision horizontally must be investigated, in the same way, as to both the number and size of parts.

Afterwards we shall try to find some method of determining the relative proportion of length to height, both for masses and for details; and, finally, make some attempt to apply our conclusions to practical cases.

Taken together, these different processes of determining the number of parts, and the size and shape of the parts, primarily for the main masses; secondarily, for the subordinate masses; and, finally, for the details, constitute what is called composition.

III.

Grouping.

In all designs of form, whether it be the design of a finger ring or of a cathedral, there are but three groupings that give satisfaction to the eye by a sense of unity.

Other collocations may please by superadded qualities, by richness of encrusted decoration, by association, historical or sentimental, or by pleasant color; and even the best groups will fail in satisfying the eye, if the parts composing them lack the quality of grace—individual and separate beauty. But, as far as mere number is concerned, the experience of designers seems to show that the available groups are only three.

Rule 1.—One thing looks well.

Clear and conspicuous oneness—characteristic of most of the great buildings of ancient times, when it comes to us, is fundamentally satisfying to the eye, and is not to be lightly cast away. By oneness; we do not mean what has before been called unity, which is the perception that many parts constitute a whole; but it is rather the perception that the whole consists of but one part.

To talk of one, under the head of grouping, may seem anomalous; it is so; yet we must lay all possible stress upon the value of this singleness. Such we see in a Colosseum and in a Parthenon, in a Pisan Baptistery and in a Cheops Pyramid; each is one, as distinguished from a Pantheon that is two, or a Karnak temple, that is three or four, or a modern country house, that may have eight or ten parts. In the illustrations 12, 13, 14 and 15 are shown other instances of single masses.

Rule 2.—Two things look well together.

This is true always, whether the objects be equal or unequal, large or small, twin Notre Dame towers, or coupled columns, or doubled windows. 16, 17, 18 are examples of groups of two masses.

Rule 3.—Three things look well together.

This is also true, but here we reach a qualification. A group of three equal parts is not always pleasing. In certain things, in a triplet window, in a triple arcade, it will do very well; but three equal domes, as the main bulk of the building, or three equal spires, or three equal pavilions, would be impossible.

We may illustrate our rules by a diagram, so: 19.

First, one thing; second, two equal or two unequal things—all always good; third, three equal things, sometimes good; and of three unequal things there are two cases.

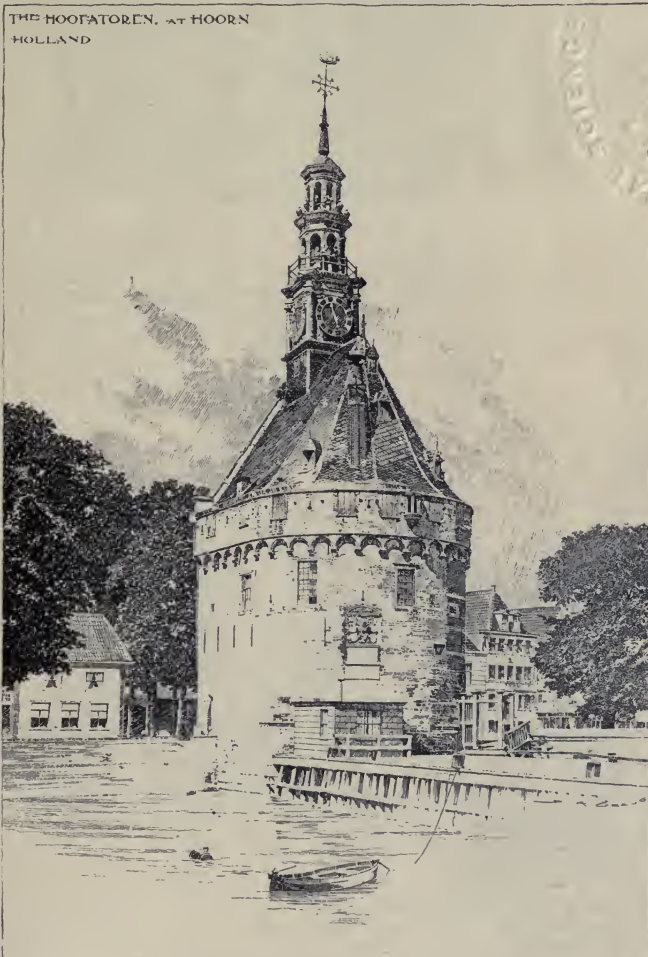
In both, it is essential that one of the three should be the largest; it is also essential that it should be in the middle.

Although the eye may tolerate certain other groupings of three objects, when they are softened by distance, or accounted for by reason, yet when we pronounce a pure æsthetic judgment, we find that the largest of a group of three must be in the middle. 20, 21.

These three rules are the foundation of the art of grouping. All the rest is but to learn ways of doing what these require, when other considerations interfere; of reconciling them with situation and use, and other modifications and adaptations.

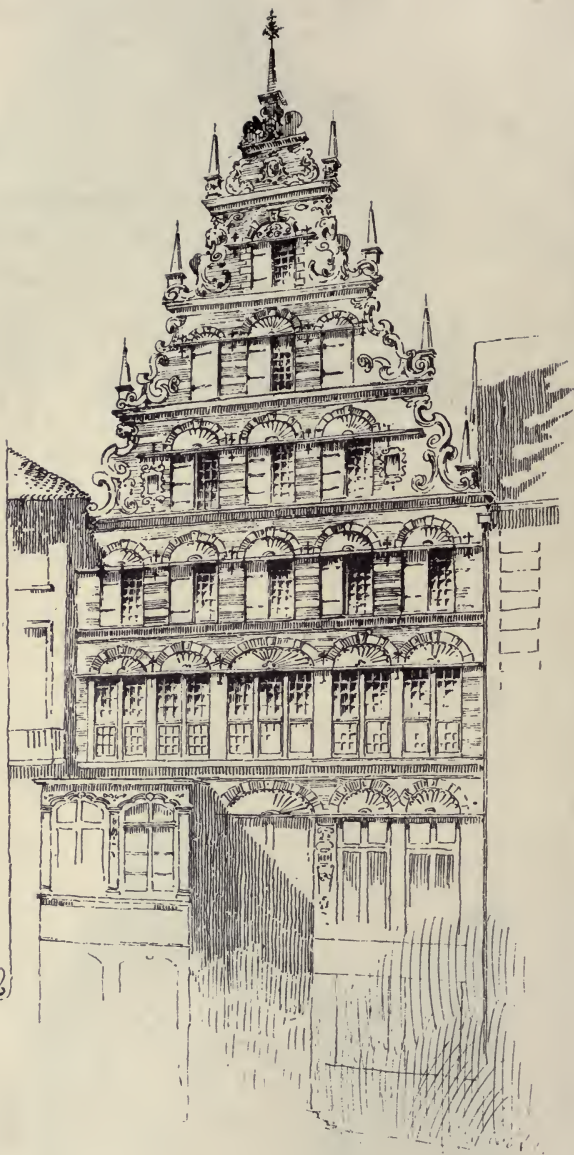


12. A Single Mass. Although sub-divided into horizontal parts by the line of the cornice, it is single in vertical division; that is, it has no other mass standing beside it. The oneness is accentuated, too, by the one big dormer on the roof.



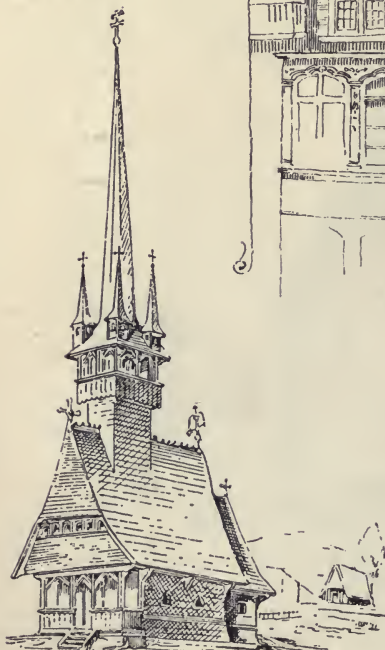
13. THE HOOPATOREN, AT HOORN.

A single mass, standing alone with none beside it, although composed of two parts, walls and roof horizontally.



14. THE MARKET, BREMEN.

A single mass, that is a single large gable, there being no other gables on either side. It is subdivided, however, into many horizontal parts. The pyramidal termination in any composition conduces much to its unity.



15. CHURCH AT VORÖSMAT.

A single mass, the slight chancel projection may be neglected at present, as insignificant.



16. MISSION CHURCH OF S. AUGUSTINE.

A group of two objects, connected by a link.



17. THE FALCON COCOA HOUSE, CHESTER.

An interesting group of two unequal objects, each being composed of two equal ones. In this case the connection is by juxtaposition only. There is no linking part.

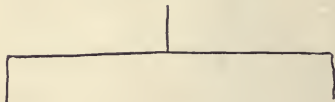


18. GATEWAY TO LINCOLN'S INN.

Two masses, joined by a link of a different character from that in 16.



Single mass.



Double masses.



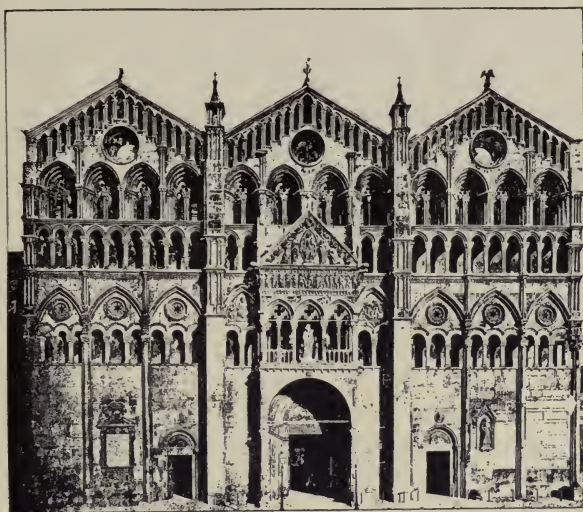
Groups of equal parts.



Triple masses.

Groups of unequal parts.

19. DIAGRAM OF GROUPING.



20. FACADE OF FERRARA CATHEDRAL.

A group of three equal masses, illustrating the unsatisfactory effect of equality in the members.



21. THE ESCURIAL.

A group of three, one larger than the others.

Yet, it will be said, there are many groups of more than three objects. There is St. Mark's with its five domes, and with its four towers; and there are innumerable groups of four, five, and more windows, pinnacles, arches, gables, pavilions. How can it be said that three is the largest possible number for a group?

It is strictly true. Just as soon as we pass three, we begin to lose the sense of a definite number, bound together into a group, and to feel only the vague sense of an indefinite number of things, placed upon another object. Four dormers, or four windows, or as many more as we please, we may have, but as soon as we pass three, we begin to lose sight of the dormers, as objects themselves, and to think



22. CHURCH OF THE NATIVITY OF THE VIRGIN, MOSCOW.

Group of five, of substantially equal size, showing the confused and unpleasing effect.

of the building as a whole, decorated by a row of an indefinite number of dormers.

And so used, multiplicity of subordinate parts is of value in giving continuity to a larger object, and is used in certain situations. 7.

But for plain masses that stand up asserting themselves as inde-

pendent objects, four is a combination that cannot be made to look well.

It is almost impossible to find an actual instance of four grouped masses that affords a fair illustration. In most cases either the body of the building so much predominates that the four towers, or whatever they may be, fall into subordination, as mere sub-masses, or a simultaneous view of all four is impossible, one or more being cut off by perspective.

Here, however, 22, is a group of five, substantially equal spires, which displays, even to a greater extent, the defects of a group of four.

In the grouping of details, four is a number that often occurs, and must always be avoided, or glossed over in some fashion.

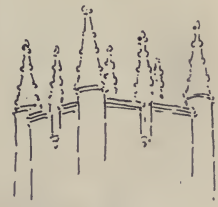
Recall Ruskin's denunciation of the familiar four-pinnacled type of tower, 23, and realize that you know—what he didn't know—namely, why he disliked it. If you think that he was not justified in his dislike, recall the many cases where tower-builders themselves made one of the four much the largest, 24, quite a little turret often; and in the many other cases where they interpolated intermediate pinnacles, making eight in fact, but in practice, innumerable, for you can never count them, owing to their coming one behind another, 25.



23. Four-pinnacled tower, a type to be avoided.



24. Four-pinnacled tower, one much larger than the rest to disguise the equality.



25. Four pinnacles and four smaller pinnacles, giving the effect of a multitude.

Therefore, in shaping our first thoughts of what our plan is to be, we must remember that the outside, whatever be its character, must consist of not more than three leading parts. If we are going to have high roofs and gables, we may have a single gable, or we may have two unequal gables, or two equal.

Or if we find that three will suit our purpose better, we must make the flanking gables either equal or unequal, and the middle larger than either, 26.

It is just the same if we are dealing with flat roofs and square masses. The single mass of this kind is the usual thing, but the group of two equal is as good; so is that of two unequal or those of three, whether symmetrical or unsymmetrical, and whether the square-topped masses are broad and low, or high and narrow, as in these groups, 27.



Single.



Double unequal.



Double equal.

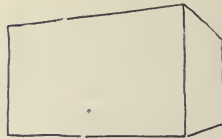


Triple unsymmetrical.



Triple symmetrical.

26. GROUPING OF GABLES.



Single.



Double unequal.



Double equal.



Triple unsymmetrical.



Triple symmetrical.

27. GROUPING OF SQUARE-HEADED MASSES.

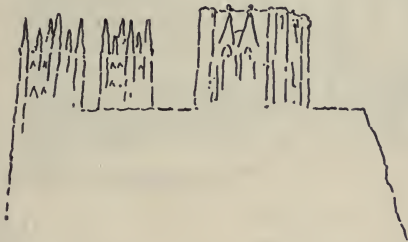
In order to constitute a group, the members composing it must be of similar general appearance; not by any means absolutely alike, but sufficiently alike for the first impression to be that they are exactly alike. These groups of towers, for instance one of two, 28,



28. NOTRE DAME, PARIS.

A very fine instance of a double group. The differences between the towers require close observation and a larger drawing than this to discern.

one of three, 29—the former indistinguishable, the latter so much alike that it is long before it occurs to us that the biggest has no pinnacles, while the other two have them.



29. An example of a group of three, all of like appearance.



30. Group of two equal unlike objects. Never to be used.



31. Group of three equal unlike objects. To be avoided.

Nothing can be more unsatisfactory than trying to link together two equal unlike objects, or three equal unlike objects. It is impos-

sible to join a gable and a square-top, or two gables and a dome, when they are of equal sizes, without giving pain, 30, 31, 32.



32. LICHFIELD CATHEDRAL.

An example of three like masses grouped. It would look better if the central tower were larger.

But, some will say, there are many buildings wherein are grouped together successfully different kinds of masses. Not to look at smaller buildings, of which the excellence might be questioned, what are we to say of St. Paul's, with its central dome and subordinate western towers, or of other domed buildings with minor masses, towers or pavilions; quite different from the dome with which they are placed?

Simply this—that the best of these are verifications of the assertion that the objects grouped must be of the same general appearance.

In every case where the dissimilar objects are successfully grouped it will be found that one of them is much the largest, 33; so large, in



33. TOMBS OF THE CALIPHS, CAIRO.

An example of three unlike objects successfully grouped by the predominance of one of them.

fact, as to make us lose sight, at first glance, of the others, when contemplating the building as a whole. Thus, in St. Paul's the dome appeals to the eye as the single feature of the building, in any comprehensive view; the towers are so much less that they fall in with the mass of the building as a base for the dome. How different is the silhouette of York minister, 29, in which the three towers all stand together, the chief only *primus inter pares*.

But in groups of two, whether equal or unequal, the members must be alike.

One of the best examples of studied inequality and similarity combined is found in the façade of Notre Dame at Chalons. The ill appearance of dissimilarity in groups of two is shown in this front of Lisiéux Cathedral, 34, and again in 35, where neither dome nor minaret looks well.

A word may be said as to what is known as "double composition." This term is applied to some combinations of two objects that are not

pleasing. A double arch with a single column between and plain imposts on each side comes very near the condemnation of double composition. A square-headed opening in which a column is used

as a mullion quite deserves such reprehension. So two entirely separate twin masses standing side by side, without a connecting part never looks well.

But the reason that such double groupings do not look well is not because they are double; the great number of double groupings that do look well quite forbid such a conclusion.

In some cases it is the lack of an adequate connection, and consequently the absence of groupings at all; in others the presence of a linking part that asserts itself as an individual and causes hesitation as to whether we are to regard it as an arrangement of one or of two things, as the mullion column in the square-headed opening, 8.

In groups of three members, as we have said, the central one must be made much the largest if it is different in shape. There

are, however many buildings in which a small central feature is flanked by double principal masses, quite different in character (44). Such arrangements, to be successful, must have the flanking masses so large that it is at once evident that a group of two, not of three, is intended. The small central feature becomes a mere subordinate mass upon the linking part, or upon the whole group, considered as a unit, 36.

In a complex building, all sorts of groupings may be used, as we descend in treatment from whole to part, from part to detail; yet at each step we must be clear in our delineation of our conception.

If we mean the main motive to be a single mass, we must abstain



34. FACADE OF LISIEUX CATHEDRAL.

Illustrating the bad effect of unlikeness in two objects grouped together.



35. MOSQUE OF KAIT BEY, CAIRO.

Two unlike objects. Such a group cannot look well. In order to make it look well either the minaret must be magnified, until it dominates the dome, as the Campanile does St. Mark's at Venice, or the dome must far exceed the minaret.



36. CHATEAU MARTAINVILLE.

A double group in which the appearance is much injured by the central turret. It is so large that the eye takes the group at first glance for a group of three.



37. ST. PAUL'S SCHOOL, CONCORD, N. H.

A group of two unequal gables. The third is so small that it becomes merely a subordinate object upon the linking part.

from groups of parts entirely, or we must make our central thing—dome, or pavilion, or spire, or gable—so big that nothing else at first is seen.

If, on the other hand, we want to make it two, 37, or three, 38,



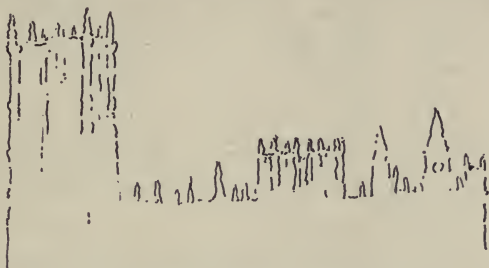
ROSENBORG CASTLE COPENHAGEN

38. A group of three similar objects, one of them predominating. Here again the small turret, between the two of the façade, detracts from the effect.

whatever the things are, they must be of the same shape and stand side by side, brothers in blood, if not in stature.

Observe once more, that the bigger the one thing, the more and more various things may cluster around it, unnoticed, except as part of the mass upon which the big thing rests.

That is the function of the great tower at Westminster, 39, the ap-



39. One very large mass, harmonizing many smaller heterogeneous objects.

parently heterogeneous mass of towers and pinnacles and various things is, when taken at a glance, but an appendage of the large tower. Only when we come closer, and begin to lose sight of the dominant mass from very nearness, the smaller must begin to group themselves, by ones, twos and threes, clearly and coherently, as do the westerly towers of St. Paul's as we approach.

There is another convenience in making one mass predominate. By so doing, we can reconcile groups, even of like objects, that would otherwise be impossible.

Such a triplet as that of 40 is not agreeable; but it is at once harmonized and brought into relation by making one member comparatively very large, 41. By this means, too, we may construct a harmonious quadruplet, otherwise out of the question.

The reason for all this is that the difference in size effects a classification. In the first group there are plainly three objects, ill arranged; in the next, the group reserves itself into two parts, a large one and a small one, which is itself compounded of two, yet counts as one in relation to the large one. It is in effect a



40. Ill effect of triplet of nearly equal size, the largest not in the middle.



41. Good effect, when the largest of 40 is made very much larger than before.

group of two unequals, of which the smaller member is itself a group of two unequals.

So with the third, 42, the predominance of one mass causes the



42. A group of four parts in which the two on the dexter side coalesce, and appear to the eye as one compound object.

others to classify themselves as two things rather than three, one of the two being compounded of two unequals.

In this way almost any collection of objects may be harmonized; and it is a comparatively easy task, when we are able to set clearly before ourselves in words what we are aiming at. We may then lay down two more rules for our guidance.

Rule 4.—In double grouping, whether of equal or unequal objects, the members must be alike.



43. CHATEAU DE MAISONS LAFITTE, NEAR PARIS.

Triple group. It would be improved if the central pavilion were larger.

Rule 5.—In triple grouping, either the members must be alike, or the central must be much the largest, 43.

Counting, you will observe, cases where the central object is much the smallest, as double and not triple grouping, 44.



44. A double group. The central turret becomes a feature of the central link, and does not rank with the twin masses of the wings.

We might similarly reckon those where one of three predominates, as single grouping, and hereafter at times we shall do so; but there are so many cases where this might seem confusing, that we will let it stand as we have written it.

Rule 6.—A group of any number of members may be harmoniously constructed, by making one object very much the largest, and letting the other fall into subordinate groups, but always by twos and threes, as if they were single, 45.

With which general conclusion we may pause.

John Beverley Robinson.



45. CHURCH OF BASIL THE HAPPY.

A group of a large number of heterogeneous parts, harmonized by a single very large one.



RESIDENCE OF W. E. HALE, ESQ.

101-103 Dearborn Place, Chicago, Ill.

A STUDY OF EVOLUTION, PERSISTENCE AND REVERSION IN ORNAMENT MOTIVES.

Trefoil and Palmette.

I.

A COMMONPLACE pattern on an old silver-plated sugar bowl does not at first appear to furnish an inspiring or instructive theme. Yet it may prove, like so many other every-day commonplaces, worthy of careful study. Placing the pattern of Fig. 1, engraved, perhaps, fifty years ago, by some half-trained Connecticut artist, on the bowl of a plated tea-service; by the side of Fig. 2, from a bit of pottery of the fifth century, B. C., we come face to face with the whole question of the persistence and survival of ornament forms in the art of different ages. It is easy to imagine the inexperienced engraver of fifty or sixty years ago, with his slender resources and undeveloped imagination, picking from books of assorted designs the incongruous elements with which he decorated his plated ware, altering and combining them with but moderate skill and little originality. Or we may imagine him to have been simply applying in various permutations and combinations a limited stock of motives, learned in the course of an apprenticeship to some English, French, or German master. But in either case, the motive came originally from antiquity by way of the Renaissance; it is a part of the vast stock of art-forms borrowed by the Renaissance from Roman antiquity, imitated, modified, and bequeathed to modern times; much as Roman art had borrowed them in its turn, from conquered Hellas, two thousand years ago, and, moulding them to its own purposes, had left them to succeeding ages. All this is elementary art history, of course; the peculiar interest of the study lies in its details. How, why, and by what means have such ornament motives been transmitted to us from a remote antiquity? When and where did this particular motive—a group of branching lines, enclosed in a frame—originate, and why should it possess such a potent vitality as to survive all the changes of a score of centuries? To answer this question leads us into some of the most fascinating inquiries in the archæology of art. Whether we follow back the ancestral history of this ornament to the immemorial antiquity of the Nile Valley, or retrace its course thence through the islands of the Mediterranean, through Assyria and Asia Minor to Attica, and thence again

throughout the Roman and Byzantine empires and the Middle Ages to the Renaissance and modern times, the omnipresence and persistent vitality of this motive and its cognate forms surprises and finally astonishes the investigator. We meet with it everywhere, in Protean shapes and variations, but still unmistakable. One receives in time a deep impression of a certain unity underlying all the styles of historic ornament, as though, indeed, the letters of its alphabet were few and simple; or as though in a rich and varied language a limited vocabulary had, after all, sufficed for the expression of a marvelously wide range of thought.

II.

I have spoken of the *persistence* of certain ornament forms. By this I mean their continued use, through long periods and in successive styles, in shapes which never quite lose their original identity in spite of wide variations. Thus the motive of Figs. 1 and 2



Fig. 1. Pattern on sugar bowl.



Fig. 2. From a Greek vase, 5th Century B. C.

belongs to the anthemion class, and I propose to show how the anthemion, with its related forms like the palmette, grew out of a combination in Egyptian art, of the lotus flower and rosette; was used by the Assyrians, by the Greeks, both of Asia and Europe, and by the Romans; that it was by the Byzantines merged into the Roman acanthus, and in this composite form was constantly employed by the carvers of Romanesque times; that it is a common motive in Gothic carving, in which it is often merged into naturalistic foliage forms, and that in the Renaissance it reappears in its Roman dress to run through a new gamut of variations, many of which are in common use to-day. In like manner we shall find the lotus of Egyptian ornament persisting through successive ages in an endless variety of three-leaved motives, of which the fleur-de-lis of Florence and of France is one. But there is also another phenomenon in ornament history less common but more curious and interesting than that of the persistence, which requires to be taken into account, and which may properly be called *reversion*. By this I mean the occasional and sporadic returns towards an extinct type or form, which the student encounters at intervals in tracing the development of ornament forms. They are often puzzling, and almost always surprising; while to the inexperienced observer they are apt to suggest the most erroneous and confusing conclusions.

Their frequent occurrence makes necessary the utmost caution in the investigation of historical sequences in the development of ornament. A complete chain of apparently successive developments by no means establishes continuous descent. Not only must all re-versions be carefully eliminated, but allowance must be made for wholly fortuitous resemblances, and for the vagaries and idiosyncrasies of individual designers. Nothing is easier than to draw plausible conclusions of the most sweeping kind from apparent relations which in reality have never existed.

It is not worth while here to attempt a detailed explanation of persistence and reversion in ornament motives. That is a subject by itself; but it is proper to point out that in decorative designs identical conditions and requirements are constantly recurring, so that there is nothing inherently strange in the recurrence of the same motives as solutions of similar problems. But not only is it true that like reasoning under given conditions is apt to lead to like conclusions, in design as well as in philosophy; it is equally true that often widely diverging paths of development may lead around to the same or to closely similar results. This is illustrated by such cases as that of Figs. 3 and 4—the first a Romanesque capital from

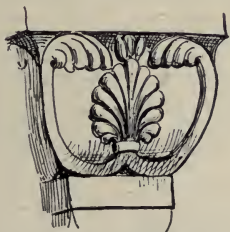


Fig. 3. Romanesque capital from Hersfeld, (Germany).



Fig. 4. Pattern from an Assyrian bronze platter.—Nimroud.

Hersfeld, Germany; the second a bit of Assyrian bronze, from Nimroud. There is a singular family resemblance between them, but it is purely accidental. The mediæval carver had no knowledge of Assyrian ornament, but in applying a more or less familiar motive to the bulbous capital of a square pier he was led, as we see, quite naturally into this singularly Assyrian-looking combination of forms.

III.

For the origin of our sugar-bowl motives we must go back to the lotus forms and rosettes of Egyptian ornament. That the anthemion is descended from this ancestry has been very clearly and conclusively proved by Mr. W. H. Goodyear in his "Grammar of the Lotus," and in an article published in the "Architectural

Record" for the last quarter of 1893.* Whether or not we accept every one of his assertions and conclusions, the main theory may be regarded as proved beyond cavil—that the Greek anthemion (Fig. 5) is ultimately derived from an Egyptian ornament common in jewelry, in amulets and in pattern ornament, which is composed of



Fig. 5. Anthemion motive: Greek antefix.

a rudimentary lotus combined with a half-rosette (Fig. 6). That the diverging scrolls at the base represent a lotus is proved by a long line of transitional forms, of which the trefoil-lotus (Fig. 7), from a pier in the sanctuary at Karnak is the most important link. Thus we are brought back to the lotus of the Nile as the first ancestor of our sugar-bowl pattern.

The lotus is, indeed, the parent of a greater number and variety of ornament-forms than any other motive known. It was the most conspicuous and beautiful flower known to the Egyptians, and its intrinsic decorative value, as well as its importance in their mytho-



Fig. 6. "Lotus-palmette":
Egyptian amulet. (After
Goodyear.)



Fig. 7. Three-leaved lotus
motive from Stele at Kar-
nak.

logical symbolism, gave it an extraordinary vogue as an ornament. Associated as it was with Horus and Osiris, with the idea of Nature's reproductive power, with the life-giving Nile, and with all the solar

*I have in my possession a series of sketches dating from about 1884, in which I had myself outlined a very similar line of derivation from Egyptian lotus-types, for use in my classes at Columbia. Unfortunately, there is no date inscribed upon the drawings, and the precise sources of the various illustrations are not given, so that the definite proof of priority is lacking. In any case, it was Mr. Goodyear who first published the theory and supported it by adequate illustration and evidence; so that I can only claim to have independently noted some of the facts on which this theory and its demonstration rest, and to have personally anticipated in part his conclusions, without realizing their importance or following out in detail the evidence required to support them.

elements of Egyptian mythology, it was in constant and universal use as a symbol and amulet, both in its natural or concrete form, and in decorative representations of the flower. Whether or not its symbolic use as an amulet preceded or accompanied from the outset its decorative use as an ornament, it underwent the operation of that universal law by which ornament forms lose in time their original significance and receive new and diverse applications. In historic Egyptian ornament the lotus appears simply as a flexible and useful decorative device; just as to-day we use the shield, ox skull and garlands without reference to their original Roman symbolism, purely for their decorative value; or as we take the symbolism of the dolphin, or even of the cross, as an excuse for a desired decorative combination. Four-fifths, perhaps nine-tenths, of the ornamental patterns of Egyptian art are based on the lotus. Its symbolism does not sufficiently account for this. The real reason for this extraordinary vogue of a single motive is found in the decorative possibilities of the type itself.

The blue lotus (*nymphaea caerulea*) of the Nile is a species of water-lily having four green calyx leaves at the base of the flower and a mass of delicate blue petals of a slightly pointed outline (Fig. 8). Looked at in side elevation, two or three of the green calyx sepals are visible, partially enclosing the spreading mass of bluish petals. The Egyptian designers interpreted this aspect, as was their wont, by a conventional presentation, in which two lateral and one central sepal, generally but not always colored green, formed the most striking feature; the petals—blue or white—ap-



Fig. 8. Egyptian blue lotus.—
From nature.



Fig. 9. The same, from an Egyptian
painting.

pearing in two groups each of three, or rarely seven, in the spaces between these sepals. The bud was always ovate, pointed at one end, and rarely if ever showing any separation between the closed sepals. Fig. 8 shows the lotus as it appears in nature; Fig. 9, a semi-conventional picture of the same from a temple-painting; and Figs. 10, 11, 12, 14, 26 and 45*a*, various examples of the conventional lotus in borders and all-over patterns.

Now, the flower thus presented contains two decorative elements

of pregnant importance. The first is represented by the three sepals, and may be called the trident or trefoil motive; it consists of three strokes, either straight or curved, diverging from a common nucleus at the end of a stem (Fig. 13a). The second is represented by the sepals and petals together; it consists of a bunch or bouquet of



Fig. 10. Egyptian lotus-pattern; unusually naturalistic form.

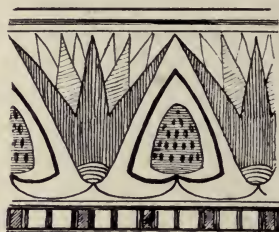


Fig. 11.* Egyptian lotus-pattern; from a tomb.



Fig. 12. Egyptian lotus-pattern; from a tomb.



Fig. 13. Ornament motives from the lotus.

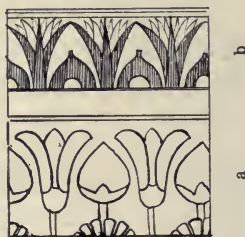


Fig. 14. Egyptian lotus-patterns: a, three-leaved form; b, ordinary form. Showing genesis of "egg-and-dart" motive.

diverging lines—straight or curved—radiating from a common point, or springing from a common nucleus (Fig. 13b, c). These two motives differ apparently in nothing but the number of diverging strokes; yet they are the types of two entirely distinct, though constantly associated, categories of ornament forms, persisting, with frequent reversions, through all the ages to our own. It took many centuries to develop their respective possibilities into clearly distinct types, and all the centuries since have failed to produce anything that could wholly supersede them.

*A number of the lotus patterns shown have been inverted from their actual position for better comparison.

IV.

Let us trace in a summary way a few of the episodes in the history of the trident or trefoil motive. Its origin is plainly to be found in the accentuation of the radiating green sepals of conventional lotuses, as in Fig. 11, Fig. 14*b*. In process of time, as the lotus came to be treated less and less pictorially, more and more as a mere decorative form, the petals were subordinated and finally suppressed (Fig. 14*a*, Fig. 15). A new decorative form had come into being, and the original lotus-origin was easily forgotten or ignored. The simplified form was still occasionally used, however, to repre-

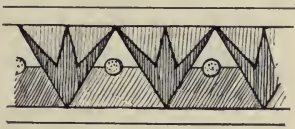


Fig. 15. Geometric pattern derived from the three-leaved lotus.



Fig. 16. Anthemion pattern, from Greek pottery. The same pattern was used as painted ornament on the Parthenon, 5th century B. C.

sent the lotus as an amulet or symbol, rather than as a mere ornament; the most famous example is that on a stele in the sanctuary at Karnak, already mentioned (Fig. 7).

But it was in other lands that this trefoil motive received its widest applications. In Greek pottery, for instance, a large proportion of the painted anthemion bands show three-leaf motives separating the anthemions, in which we clearly recognize the trident lotus motive (Fig. 16). Moreover, the Greek egg-and-dart ornament, with its derivatives, the heart-leaf and water-leaf, is made up of juxtaposed trefoils or tridents, separated by oval masses called *oves*. The original motive is shown in Fig. 17, and its relation to the lotus



Fig. 17. Type of egg-and-dart decoration.



Fig. 18. Egyptian lotus-border, showing egg-and-dart motive with frame or "shell" of egg treated as an independent feature.

tridents is clearly shown by comparison with Fig. 18, and with the earlier Figs. 11, 12 and 14. In these we find the lotus-bud, originally used, both in jewelry and in ornament, to alternate with the full blossom, at last superseded by wholly heterogeneous and irrelevant forms—bunches of grapes in Figs. 11 and 18, nondescript forms in Figs. 12 and 14. This species of inchoate egg-and-dart

ornament occurs not infrequently in Egyptian art. The Greeks seized upon the idea, rejected or ignored its original meanings, joined together the adjacent lateral strokes, painted in the ove—the lotus bud—with a single sweep of the brush, leaving the core blank, and made the units consist of the ove and the two adjacent lateral strokes forming the “shell,” thus suppressing for a time the individual trefoil or trident motive (Figs. 19, 20).

Nearly all the other Greek moulding ornaments are derivatives of the egg-and-dart motive, modified in accordance with the great principle discovered or first systematically applied by the Greeks, by which the elements of decoration on a moulding reproduce approximately its profile. Thus for the cyma-reversa the ove was

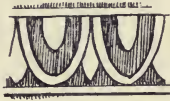


Fig. 19. Painted egg-and-dart motive from Greek pottery.



Fig. 20. Carved egg-and-dart moulding, from Erechtheum, 5th century B. C.



Fig. 22. Rhodian vase-ornament: lotuses and buds, 6th or early 5th century B. C.



Fig. 21. Moulding ornaments based on egg-and-dart motive:

- a. Rhodian lotus-border, from vase, inverted; to compare with b.
- b. Carved Greek heart-leaf or water-leaf moulding. From Erechtheum.
- c. Typical Roman carved water-leaf moulding, treated with acanthus-leaves.
- d. Greek moulding ornament; painted terra-cotta; to compare with e.
- e. Late Roman moulding: Arch of the Silversmiths.

given a leaf-like form (Fig. 21*b*), and the leaf provided with a midrib, probably a survival of the cleft between the sepals of the bud which originally alternated with the lotus. This is suggested by the inverted ornament, Fig. 21*a*, a simplified drawing of an actual Rhodian pottery lotus border (Fig. 22) of the sixth or fifth century, B. C., where the lotus-bud has been converted by the Rhodian painter into a heart-shaped leaf. Strong as is the resemblance between *a* and *b* in Fig. 21, it is due to a fortuitous reversion only. The pottery border *d* in the same figure is possibly derived from old patterns like *a*, but it is more likely an application to pottery of mould-

ing patterns, or at least a derivative from them. It illustrates a curious transformation. The "dart" or down-stroke, instead of starting from the loop between the two heart-leaves to form with the adjacent edges of two leaves the trefoil or trident motive in which the whole pattern had its origin, has been here, for decorative reasons, set in the middle of the leaf—perhaps as a survival of the midrib; and the vacant spaces between the leaves are occupied by half-rosettes. This really inverts the pattern, which, taken upside down, is a fairly good egg-and-dart pattern. No less singular than the accidental resemblance between *a* and *b* is that between *d* and *c*. This last is a very late Roman carved moulding from the Arch of the Silversmiths. In this every feature of the original heart-leaf decoration has been forgotten or ignored. The broken curve of the cusped frames no longer reproduces the profile of the moulding. The original ove, and its next of kin the water-leaf, are replaced by a meaningless stalk and blossom, curiously reverting towards the trefoil or fleur-de-lis type of the lotus in Fig. 7, while the interleaf spaces have, instead of the "dart" of *b*, or the tongue-like intermediate leaf in *c*, a rosette of clumsy design recalling the half-rosettes in *d*, and evidently inserted with a like motive. Seven centuries separate *d* from *c*. The pattern *c* is an example of the enrichments applied by the Romans to the water-leaf motive as a carved moulding ornament; it was



Fig. 23. Roman water-leaf moulding, from Pantheon: (probably from earlier Pantheon, 27 B. C., re-use in present structure.)

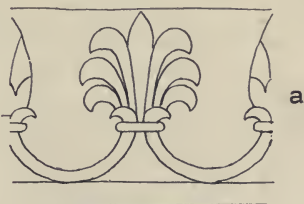


Fig. 25. Assyrian borders: a, palmette ornament with lotus-buds, from Khorsabad; b, lotus-and-bud ornament.

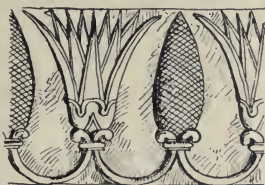


Fig. 24. Assyrian lotus-and-pinecone motive, from Koyanjik.

converted, like nearly everything else, into an acanthus-leaf, whose midrib and diverging carved pipes and veins reproduce the movement, though not the forms, of the elementary lotus-and-bud motive of Fig. 17. Fig. 23 is a Roman water-leaf moulding from the Pantheon, of very Greek character.

The egg-and-dart or lotus-and-bud motive was a favorite pattern in Assyrian art, in which it is found both painted on tiles and plas-

ter, and carved in low relief (Figs. 24, 25b). The lotus bud was often replaced by, or assimilated to a pine cone (Fig. 24), illustrating a very common phenomenon in ornament history: it frequently happens that a motive, derived from a foreign art, is by the artists who adopt it in their own art remodelled into resemblance to local, familiar, or already-existing national types, completely alien to its original significance. The egg-and-dart may be traced through early Christian and Byzantine art, and in Italy it is met with in works dating from every century through the Middle Ages down to our own time, principally in mouldings. In Germany, along the Rhine, and in the south of France it is recognized as late as the latter part of the twelfth century. Elsewhere in Europe it vanished before the naturalistic foliage-work of the lay-builders and later Gothic carvers. But the Renaissance once more restored it to the arts, and it seems destined to persist for centuries yet. The simple trefoil, by reason of its very simplicity, must find application in all ages. A few examples will be recognized in the early mediæval carvings, Figs. 48 and 50.

V.

The second type of ornament-forms furnished by the Egyptian lotus was that of the bouquet of diverging lines springing from a common nucleus (See Fig. 13*b, c*). Although, at first sight, this seems like a mere elaboration of the trefoil motive, it is in fact radically different and capable of vastly wider decorative applications by the very fact that its component parts are not limited to three. Moreover, the tendency with the three-stroke motive seems always to have been to subordinate the lotus itself to the buds or other intervening forms, and to make of these the axial units of the decoration, as in Figs. 18 and 20. The second and more complex motive, on the other hand, could not be thus subordinated and divided up between its alternating or accompanying forms, and we find it throughout maintaining its identity far more completely than the trefoil motive. It is most commonly associated with spirals or volutes; it springs in most cases from a nucleus wedged between two spirals more or less developed (Figs. 5, 16, 24, 25*a*, 26, 27, 40 and others). The decorations from Egyptian tomb ceilings, of which Fig. 26 is one, are, perhaps, the oldest examples of this association of the spiral with the multiple diverging lines of the lotus. But the spiral was not a favorite or typical motive in Egyptian art, nor did the Egyptian decorators ever shake off their conservatism to the point of developing the endless possibilities of this combination. This was reserved for the Greeks, although the Assyrians had taken the first steps in this development, and produced in such border designs as Figs. 24, 25

and 27, very important decorative modifications of the multifoil lotus motive.

The two chief Assyrian improvements on Egyptian practice were: first, the elaboration of the lotus into a more complex and more purely decorative ornament; secondly, the application to its petals of the principle of approximately tangential diverging curves (the type in Fig. 13*b*); and, lastly, the connection of all the units of the pat-



Fig. 26. All-over lotus-pattern, from Egyptian tomb-celling.



Fig. 27. Assyrian palmette ornament.

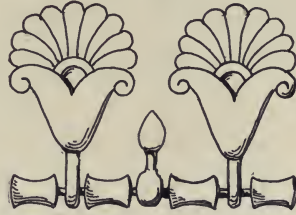


Fig. 28. Egyptian "lotus-palmette."
(Fig. 6 repeated.)

tern into a continuous design by curved bands linked together and ending in spirals meeting under each unit. Comparing Figs. 24 and 25 with 11 and 12, the superiority of the Assyrian examples in organic connection and completeness is very marked.

This motive, however, remained comparatively sterile so long as it was confined to the lotus type. It required the invention of the *palmette* to give it permanent vitality. The true theory of the origin of the palmette has been pretty conclusively established by Mr. Goodyear, as already observed on page 30. There appears to be no evidence of the direct evolution of the palmette from the lotus, simple as is the transformation which this would require. The "lotus palmette," as Mr. Goodyear calls it, was a combination of the simplified three-leaf lotus with a half-rosette (Fig. 28). For decorative reasons the central sepal or leaf was nearly suppressed, and the two lateral sepals curled into volutes. The germ of this transformation is shown in Fig. 7 (page 30). The lotus had in this shape wholly lost its symbolism as a *lotus*, and become a conventional amulet and ornament. In this new combination it was much used in jewelry and in decoration, and passed into the ornament of all the Mediterranean populations. We find it contemporaneously in Cypriote, Phœnician and Assyrian art. Fig. 29 is a Cypriote lotus from a vase, showing the tendency towards emphasis of spiral or volute forms

in the lateral sepals; and the same appears in the inverted *branched* lotus engraved on the bronze stele from Cyprus in Fig. 30, showing manifest Assyrian influence. Fig. 31 is an Assyrian, 32 a Phœnician, example of the same; Fig. 33 is from a Greek vase, presumably archaistic, reproducing the motive with an affectation of Asiatic character; and Fig. 34 shows another variation—at *a* a Cypriote prototype with the volutes curled upwards (compare with the Assyrian palmette, Fig. 27); at *b* an early Greek modification of it from a vase. Figs. 25 and 27 present the two finished types into which it was developed in Assyria, one retaining its resemblance to the Assyrian rosette with chevrons of black and yellow, the "recurved



Fig. 29. Cypriote lotus, with voluted sepals. (After Goodyear.)



Fig. 31. Assyrian lotus-palmette ornament.



Fig. 32. Phœnician lotus palmette ornament.

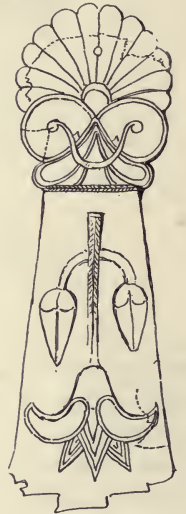


Fig. 30. Cypriote bronze stele, with inverted branching lotus and lotus-palmette capital.

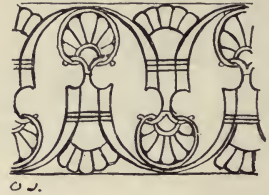


Fig. 33. Archaistic Greek vase ornament, reviving Oriental lotus-palmette type.



Fig. 34. a. Cypriote lotus-palmette with up-turned volutes. b. Early Greek vase-ornament.

sepals" at the base converted into horns having no significance whatever; the other, suggesting more closely the Greek "honeysuckle," has no nucleus at the base, and the "recurved sepals" or volutes are replaced by the curled-over linked bands that tie the whole together (Fig. 25*a*).

Precisely by what chain of developments the palmette motive reached Greece is not capable of exact demonstration, because of its widespread use throughout the Mediterranean countries. Cypriote, Phœnician and Assyrian art and commerce, direct influences from Egypt, the early pottery of Melos and Rhodes, all had probably a share in acquainting the early Greek artists with this motive. Once apprehended, its marvelous possibilities were developed by the Hel-

lenes with a constant and unswerving eye to decorative effects. The process of development is chiefly to be traced on pottery, and the influence of the *technique* of execution appears very plainly in the process, though we have not here the space to follow out this influence. Its main result was to strongly differentiate the two types of the motive which we have already observed in Assyrian ornament, and then combine them into running patterns or borders in which the contrasted types alternated with admirable effect (See Fig. 13*b, c*, Fig. 25*a*, Fig. 27 and Fig. 16; also Figs. 35 and 37). The type of



Fig. 35. Greek anthemion band, with "frame," volutes and "lotus-trefoil" motive: from a vase.



Fig. 36. Greek vase-decoration: anthemions and S-scrolls.

Fig. 25*a* retained always a certain resemblance to the lotus, sometimes with three, sometimes with five or even seven leaves. This ornament in Greek pottery and architecture generally has sharply-pointed slender blade-like leaves, and these in many cases are drawn as though the lower ones partly swathed the next pair, and these, the next, like many stiff-bladed palm-like and grass-like plants; the suggestion being probably drawn from the familiar plant life of Greece. The palmette, on the other hand, was painted with blunter and more closely crowded leaves, very often in later examples treated with double curvature and framed by the adjacent lotus-like forms, as in Fig. 16. The suggestion of a frame produced by these adjacent lateral leaves enclosing the anthemion, was adopted frankly and led to the frequent surrounding of the anthemion or palmette by a wholly independent frame, as in Figs. 2 and 35.

Meanwhile the Assyrian idea of organic connection of the repeated units of design by linked curves ending in spiral volutes—a feature strongly if not exclusively Assyrian—also received in Greek hands a new and remarkable development. With their quick perception of intrinsic beauty of forms the Greek artists realized the value of the spiral, and added to it a new element, the so-called "line of beauty" or S-line. This combination was not unknown to the Egyptians, as proved by patterns like that of Fig. 26. But it remained unproductive and sterile with them; its endless possibilities and its almost measureless decorative value seem to have passed almost unnoticed or ignored. It was a peculiar attribute of Greek artistic genius that it seized upon elements of beauty previously neglected in familiar motives, and pursued their development to the

highest attainable perfection. So it was with this simple combination of the line of double curvature terminating in contrary spirals, with the palmette-and-lotus motive. The substitution of this line for the uniform upturned curves of the Assyrian lotus bands effected a revolution in ornament. The volute became a favorite terminal ornament, and was used to finish the ends of anthemion frames (Fig. 35). Thus were developed all the elements of Greek anthemion decoration; the alternating lotus and palmette forms, the spirals from between which they spring, the S-scrolls which connect them, and the frame around the anthemion; Egyptian, Cypriote, Assyrian, Phœnician, Ægean elements persisting and amalgamating into the perfect Greek product. Reversions are common, not only in decorative returns toward the lotus and lotus-bud, but in other combinations. Fig. 36, for instance, by its alternate inver-



Fig. 37. Carved anthemion-band from Erechtheum.

sions of the same anthemion approximates to the motive of Fig. 26. A similar reversion occurs in mediæval carving, derived from Byzantine imitations or unconscious reminiscences of Greek motives, as in Figs. 48 and 49.

Another great contribution of the Greeks to decorative art was the systematic adoption and development of architectural carving. The painted moulding-ornaments of the Doric order were in the Ionic replaced by carved versions of the same general forms. The antefixæ of painted terra cotta, the painted earthenware eaves-gutters, crestings and acroteria were similarly replaced by carved counterparts in marble. Richness in the play of light and shade was substituted for brilliancy of color, and the result was a progressive elaboration of the forms derived from painted decoration. This fundamental change in decorative methods seems to have been first effected in Asia Minor; it was carried to Greece in the Ionic order and profoundly modified the traditional Doric order in matters of detail during the fifth century, and may be said to have revolutionized architectural art. Form, light and shade, rather than color become the theme of decoration applied to architecture. The anthemion motive was not abandoned but enriched by fluting the S-scrolls, modelling the anthemion-leaves in relief in the most delicate and subtle manner, and adding as a subordinate feature

leaves of acanthus at the branchings of the minor scrolls (Fig. 37). But its most effective application was to the heads of steles or memorial columns. The prototypes of these are found in Cypriote art (See Fig. 30), and in the antefixae and acroteria of temples (as, for instance, Fig. 5); in the stele-caps the type was greatly elaborated and enriched with branching scrolls and acanthus leaves, as shown in Fig. 38.

In Roman art, which adopted bodily all the elements of Greek ornament and subjected them to further elaboration, the anthemion



Fig. 38. Carved stele-cap from Athens.



Fig. 40. Roman carved anthemion frieze. Forum of Nerva(?).



Fig. 39. Late Etruscan terracotta border.



Fig. 41. Roman carved frieze, with framed anthemion.

plays a less important part than in the Greek. Late Etruscan terracotta friezes like those of the Campana collection in the Louvre, show apparently a survival of very primitive versions of the motive, of a quite Asiatic aspect. This is illustrated in Fig. 39, which at once recalls the Assyrian example in Fig. 27, belonging to a period at least five and perhaps seven centuries earlier. The enclosing frame of the Etruscan example, however, seems to prove its Greek derivation, and to stamp it as an unconscious reversion to the ancient type, or a case of traditional persistence. This persistence of the Oriental and primitive type is also illustrated by the "lotus-palmette" motive in Fig. 62 (which compare with Figs. 31 and 32). True Roman art, however, exhibits none of this archaic or archaisitic crudity. Figs. 40 and 41, representing fragments from the Forum of Nerva, show the manner and spirit in which the Romans elaborated and complicated the simple Greek anthemion. The acanthus leaf reigns supreme, and the aspect of the trefoil lotus motive, as well as of the anthemion itself, is completely changed.

VI.

The Middle Ages introduce us to a new era in art. Christian symbolism, the gradual extinction of Roman civilization and the decay of its monuments, the direct recourse to nature for suggestions and models of decorative form and the coming up of wholly novel aims and requirements in architecture, all tended to suppress if not exterminate classic types in ornament as well as in structural art. Yet even in fully developed Gothic art we encounter from time to time surprising instances of the persistence of these types, Figs. 42, 43 and 44 are clearly recognizable versions of the anthe-



Fig. 42. Late Romanesque frieze: type of framed anthemion.



Fig. 43. Transitional early Gothic carving, from Halberstadt Choir. Early 13th century.

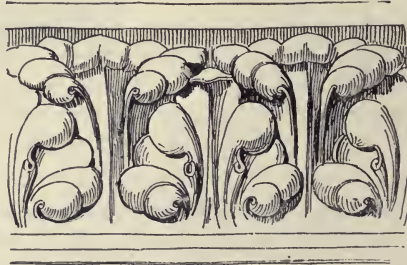


Fig. 44. Carved moulding from triforium of Notre Dame, Paris. Early 13th century.

mion motives of Greek and Roman art. The diverging lines or lobes of the larger leaves, the enclosing frame, the linked spirals or volutes connecting the units, the alternating three-part leaves, tall and spreading like the lotus trefoils of Fig. 16 or their elaborate Roman counterparts in Fig. 40, are all survivals of the various characteristic features of typical classic anthemion compositions. These survivals are traceable, first, through Byzantine carved ornament, then through the various Romanesque styles into Gothic art. In Southern France and in Italy, the abundance of Roman monuments exerted a powerful direct influence over early mediæval art, and in Italy this influence continued all through the Middle Ages, as already observed on page 36.

Byzantine carving is flat, thin, sharp and dry. It is rather a frosting of the surface with intricate patterns than carving in the ordinary sense. The background is reduced to a minimum, and there is no high relief or strong massing. It is essentially surface decoration by incision, and is capable of rich and effective results within its lim-



Fig. 45. Byzantine carved moulding.



45a. Egyptian lotus-band: compare with 45.



Fig. 46. Early Arabian pattern, from Ibu-Touloun, Cairo, 976 A. D.



Fig. 47. Byzantine cross-patterns with anthemion-treatment: a, from St. Sophia, 538 A. D.; b, from St. Mark's, Venice, 10th century.



Fig. 48. Framed anthemion pattern from St. Mark's, Venice.



Fig. 49. Byzantine capital: compare with 36.



Fig. 50. Vaulting-boss from Boxgrove Church, Sussex, 13th century.



Fig. 51. Vaulting-boss from Boxgrove.

ited field. Its motives are Roman in origin, Greek in treatment. The acanthus leaf seems to have furnished the basis of most of the designs; it was generally carved as a perfectly flat leaf, without ribs, pipes or curled-over ends; the lobes were all sharply-pointed without subdivisions, and the leaf was fluted with V-section flutings, one

to each lobe (Figs. 45, 47, 48). The points of the lobes of one leaf were made to fit against the stem or side of the next one. This method of carving the acanthus resulted in combinations of line singularly like those of anthemion motives, and it is possible that some surviving tradition of the anthemion lingered to blend with the universal acanthus leaf, so that it is often hard to tell which of the two forms the designer had most in mind. When such leaves were combined with the symbolic cross to fill a circular or square panel the result was a reversion, perhaps conscious, more likely unintended, towards the framed anthemion (Fig. 47 *a, b*). The alternation of large and small leaves in Fig. 45 is itself an interesting though wholly accidental reversion towards the Egyptian pattern shown in 45*a*, in which a small three-leaved lotus alternates with a large many-leaved lotus. Fig. 45 shows how the idea was copied from Byzantine art by the presumably Coptic artificers of the Mosque of Ibn-Touloon at Cairo (*cir.*, 976 A. D.). This version of the lotus trefoil with incised diverging veins or flutings is not uncommon in early Arabian art. Other varieties of the anthemion are recalled by Byzantine acanthus-leaf carvings, as, for instance, in the capital, Fig. 49, reproducing the motive of Fig. 36 with a lank and sprawling acanthus instead of the anthemion or lotus. In Fig. 48, from St. Mark's, we have the framed anthemion type with small trefoils separating the units, over a row of trefoil acanthus leaves. In this example, moreover, we note the persistence of the divided anthemion, two half anthemions separated by a space without the central leaf: a type especially common in Attic stele-heads of the fourth century B. C., and illustrated in Fig. 38. This feature is not uncommon in Gothic carving, as is seen in Fig. 50, a boss from Boxgove church, Sussex, dating from the thirteenth century. Another boss from the same church (Fig. 51), is strikingly like the cross-patterns from St. Sophia (Fig. 47*a*), dating from the sixth century, and St. Mark's 47*b*), of the tenth or eleventh century. Fig. 52 shows a



Fig. 52. Carved moulding from Hersfeld, Germany. Late 12th century.

German Romanesque derivative from Byzantine motives like that of Fig. 49. It might almost be taken as a carved copy of certain Greek pottery-bands of the type of Fig. 36, while at the same time it irresistibly recalls the Egyptian pattern of Fig. 26. This last re-

semblance is a case of accidental reversion; the resemblance to Greek pottery patterns is probably due to persistence of a decorative idea, not of the specific type; for the five-foil leaves that fill the heart-shaped spaces are demonstrably derivatives of the acanthus, rather than of the anthemion. Another curious case of accidental reversion towards Egyptian types is furnished by Figs. 53 and 54;



Fig. 53. Modified Egyptian form of lotus-palmette. (After Good-year.)



Fig. 54. Byzantine cross with cypress-trees. From Baptistery of Cindals; 5th century.



Fig. 55. Rosette and trefoil pattern: canopy of open-air tomb, Bologna.



Fig. 56. Italian Byzantine framed anthemion motives: a, from Torcello, 1108 A. D.; b, from demolished church of S. Marco del Partecipazi, Venice, 829 A.D.

the first, an Egyptian motive, derived perhaps from the lotus-palmette; the second, a detail from the ancient Baptistery at Cividale (eighth or ninth century), in which the cypress trees flanking the cross are crude variations of the common Byzantine acanthus, treated like an anthemion.* Figs. 55 and 56 are Italian Byzantine details, illustrating the persistence of the trefoil and anthemion motives; the latter being reduced in Fig. 55 (from Bologna, eighth



Fig. 57. Rhenish-Byzantine anthemion-acanthus motive. Reichenaw, 12th century.



Fig. 58. German-Romanesque frieze, 13th century.



Fig. 59. German-Romanesque pier-capital from Geinhau-sen, 13th century.

century) to a half rosette, while the trefoil is almost a lotus once more. In Fig. 56 we have two curious and crude, but decoratively

*The cypress as a symbol of burial is not uncommon in Byzantine baptisteries and churches of the VIIIth-XIth centuries in Venetia. Baptism was regarded as a mystical burial of sin and of the "old man with his works;" hence the funereal symbols.

effective, versions of the framed anthemion (Torcello, early eleventh century, and Venice, ninth century). These should be compared with Figs. 48, 42, 39 and 2. Figs. 57, 58 and 59 are from German (Rhenish) Romanesque buildings, and are strikingly suggestive of Greek motives. Yet they date as late as the thirteenth century! Byzantine traditions were held to with singular tenacity in the Rhine Provinces, where they are sometimes found, almost unchanged, in association with the pointed arch and Gothic vaulting of the thirteenth century.

VII.

The heart-shaped form produced by the juxtaposition of opposed S-scrolls with voluted terminations was never developed into an independent decorative motive. But the S-scroll itself occurs so frequently that we should expect to find, as we do, occasional examples of the heart-form or lyre-form in all periods. We have already encountered it in Egyptian ornament (Fig. 26) and Romanesque ornament (Fig. 52), not as an independent motive, but as an incidental detail of the decoration. It came nearest to an independent development during the later Romanesque and early Gothic periods.



Fig. 60. Ornament from a mediæval manuscript.



Fig. 61. Detail from stained glass window, Canterbury Cathedral, 13th century.

In combination with the five or seven-lobed leaf (as in Fig. 52) it is not uncommon in mediæval MSS. illuminations, as a border (Fig. 60), and in stained glass decoration of the thirteenth century. In combination with the idea of the framed anthemion it underwent a new development in the exaggeration of two of the lobes or leaves of the anthemion, which were extended behind and beyond the frame and curled over so as to partially enwrap it. This motive, common in late Romanesque carving, especially in the Rhine valley, is also frequent in stained glass, of which we give an example from Canterbury in Fig. 61.

The lyre or heart-motive is not common in classic ornament, except in late Etruscan work. There are many examples of it in the Campana terra cottas. One of these is given in Fig. 62, and furnishes an interesting example for comparison with the next figure,

taken from the stucco-work on one of the piers in the court of the Palazzo Vecchio at Florence and dating from 1565. Seventeen centuries separate these two motives, with no continuous chain of connecting links between them. We have here a case of fortuitous re-



Fig. 62. Detail from terra-cotta frieze: Campana Collection (Louvre.)

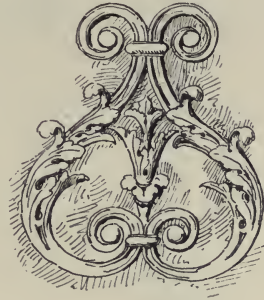


Fig. 63. Stucco decoration from piers in Court of Palazzo Vecchio, Florence, 1565.

version, due merely to the employment of the same S-scroll by designers of different ages.

I have not otherwise touched upon the Renaissance; first, because it repeats classic motives to so great an extent; and, secondly, because the field is so vast. The changes, modifications, and imitations of and reversions to classic themes are endless, and this paper has already reached or exceeded its proper limits. In another article I propose to trace the history of the branching scroll-motive called by the French the *rincau*, and for which we have no specific name in English. It involves a study of the vine pattern and the acanthus, extending, like that of the anthemion, from Egyptian art to modern times, and offers to our attention phenomena no less curious and instructive than those we have observed in connection with the lotus and palmette motives.

A. D. F. Hamlin.



Fig. 64. From an early Greek vase.



THE OLD SOUTH BUSHWICK REFORMED CHURCH, BROOKLYN.



Plan of S. Étienne, Périgueux.

FRENCH CATHEDRALS.—PART XV.

THE DOMED CATHEDRALS. II.

THE CHURCHES, S. ÉTIENNE AND S. FRONT, PÉRIGUEUX.

I.

OF the ancient cathedral of S. Étienne de la Cité of Périgueux, only one of the three primitive bays remains. The easterly bay dated originally from the XII. century, but it was so thoroughly ruined by the Protestants that its restoration in the XVII. century amounted practically to a complete rebuilding on the lower fragments. The western bay has wholly disappeared, except for some fragments that are still attached to the present west wall, which at once makes clear the original plan and enables one to understand the construction of the domes with which all the bays were covered. Beyond this ruined bay was once a tower, that an engraving published in 1575 tells us closely resembled the tower of S. Front.

The misfortunes that have attended this church were chiefly due to the Protestants in the XVI. century. This is the more to be regretted since S. Étienne is one of the simplest and earliest of the domed churches in Aquitaine, and in its original form would have been a monument of great interest. It was dedicated on the 21st of March, 1047, by the archbishop of Bourges, who, on the same day, also dedicated the abbey church of S. Front in Périgueux—a church whose relation to the present church of that name will be discussed presently.

The single early bay that has survived to our time is a structure of very primitive form. Externally its north and south walls are divided into two parts by shallow piers and arches, utterly devoid of ornamental detail. This treatment does not appear within, where the lower part of the walls is decorated with a simple round arched arcade, with two round topped windows above and a small circular window between them near the apex of the arch on which the dome



S. ÉTIENNE, PÉRIGUEUX.
(West front.)



S. ÉTIENNE, PÉRIGUEUX.
(From the northeast.)

is carried. The arcade is now covered with elaborately carved wood altarpieces that once formed the high altar of S. Front. The dome is supported by four deep unmoulded pointed arches, that between the two bays being of great thickness. The construction of the pendentives of the dome, as shown by the fragment adhering to the west wall, is rude and irregular, in very striking contrast with the carefully laid courses in the domes of S. Front, and a valuable piece of evidence tending to show that the date of S. Étienne, 1047, is much too early for the careful work of the greater church, and that, therefore, the building we now know as S. Front could not have been the church dedicated in 1047.

Of the eastern bay, which was rebuilt in the XVII. century, there is little to be said save that, for its time, it is a really remarkable at-



TRANSVERSE SECTION OF S. ÉTIENNE, PÉRIGUEUX.

tempt to reproduce a design of the XII. century. Its general style approximates that of the ancient bay; but its proportions are lighter and higher; its piers are decorated with slender applied columns; its three windows in the upper part of the walls are enclosed within architectural frames; the arches of the dome are moulded, and the dome itself considerably higher than the western dome. Externally, also, the walls are treated in a more elaborate manner, with slender piers and moulded arches.

Notwithstanding its small size the exterior of this church is highly characteristic. The western bay is covered with a very flat pointed roof, from which rises a low circular drum, that, in its turn, is surmounted by a flat conical dome, covered with tiles, and carrying a

small colonnaded lantern on the apex. The roof of the eastern bay is similar, but there is no gable. It is a somewhat remarkable fact that while we must believe all the domed churches of France to be more or less closely related to each other; while it cannot be questioned but that each successive church is a derivation from its predecessor, all of the domed cathedrals have an intense individuality of aspect, both within and without. The cathedral of S. Étienne at Périgueux is no exception to this rule. Its plan does, indeed, approximate that of the cathedral of Cahors, but in its appearance it bears no resemblance to that structure. This arises, of course, in large part from its small size, and the very abrupt form of its general outline; but the domed churches in France of the XI. and XII. centuries are much more individual in their appearance than the domed churches of the Renaissance, perhaps even more individual than the Gothic churches. One cannot regret the expansion and development of the Gothic style, but a continued evolution and progression of a domical form of church building could not have been otherwise than attended with many interesting developments.

II.

No one visits Périgueux for the purpose of seeing the little old cathedral of S. Étienne; but its chief building, the vast cathedral of S. Front, dominates the city and concentrates interest in it, as it raises its lordly walls above the River Isle. It is a church not only great in size and noted in history, but the very strangest church in all France, an exotic growth from the east, in some senses of the word, planted in the far west where, of all places, such a structure could scarcely be looked for. Yet it stands in a region dotted with domical churches, itself the culmination, the most remarkable of them all. No other church more strikingly illustrates the individuality of the domed churches; and certainly few have excited wider controversy or been the subject of more heated discussion.

The initial fact in its history is that no one knows when it was built. No one knows, though many have put forward theories and suggestion without end. It is needless to review these theories here, for not a few of the most probable have, by later analysis and research, been found wanting in probability and accuracy; it will be sufficient to summarize the ascertained facts and to draw from them such inferences as may seem both reasonable and capable of historic support.

That there have been at least two great churches dedicated to S. Front on or at the site of the present church admits of no doubt. The latter of these is the one we now know as the cathedral of S. Front; the earlier, generally called the Latin church as expressive of

its early date, still survives in fragments of its west wall, encased in the walls of houses to the west of the cathedral, and parts of which are also known to be contained within the base of the great tower, as well as in two confessionals that still adjoin the walls of the western arm of the present cathedral. It is possible to reconstruct from these portions the plan of a church that preceded the present structure.

The difficulty with this older church is not its form, its plan, its architectural character, all of which we know with considerable definiteness, but with its date. Which of the earlier churches of S. Front is it? Its date once known, the chronology of the existing cathedral becomes a matter of great simplicity. A few dates are essential to the discussion of this point. In 991 S. Froterius, bishop of Périgueux, was buried in S. Front; in 1000 his successor Martin was also buried there; and in 1031 Raoul de Couhé, who succeeded him. A church of S. Front, therefore, existed in Périgueux in 991, and must have been begun some years earlier. We must look to S. Mark's in Venice as the model from which the plan and design of the present cathedral were derived. The plans of the two churches so closely approximate each other, and, moreover, are so striking and individual, that no other conclusion is admissible. Further, a colony of Venetian merchants settled in the neighboring city of Limoges in 988, though the influence of their native city which they brought with them could scarcely have brought about the designing and erection of so large a church as the present S. Front, ready for burials, as early as 991. Recent research has developed the fact that S. Mark's in Venice is not earlier than 1063, when its rebuilding was begun by Doge Orseolo; by 1120 it was practically built and the panelling of the walls with mosaic and marble had made much progress. It had become one of the wonders of the world and was already enjoying the celebrity it has had from the day of its beginning. In 1120 the monastery of S. Front was burned with all its ornaments, the bells of the tower being melted in the fire. "At that time," says an ancient account, "the monastery was covered with timber roofs."

It has been argued that this refers to the monastery only, not to the church; but this refinement of identification is one that would have occurred to a modern writer only, and is not of great value. The plan of the older church to the west of S. Front is exactly that of a church roofed with timber, and its date is certainly prior to 1120. The pendentives and domes of the present church are built with the utmost nicety and care; unlike many of the early domes, as those of S. Étienne, their construction was not concealed behind plaster. The domes of S. Front, in fact, mark the culmination of dome building in France, and it is quite impossible, in view of the facts that have been

briefly stated here, to admit that the church dates from the closing years of the tenth century. It is impossible to resist the conclusion that the present cathedral of S. Front was begun after the conflagration of 1120, and that year may, therefore, be taken as the date of its beginning. With this date as a starting point, the present splendid edifice ceases to be an archæological enigma, and assumes a natural place in the chronology of architecture. Its extraordinary form and the grandeur of its dimensions must always create astonishment in the mind of the spectator; but it should no longer be necessary to regard its origin as an unsolved riddle.

The visitor to S. Front sees before him one of the most magnifi-

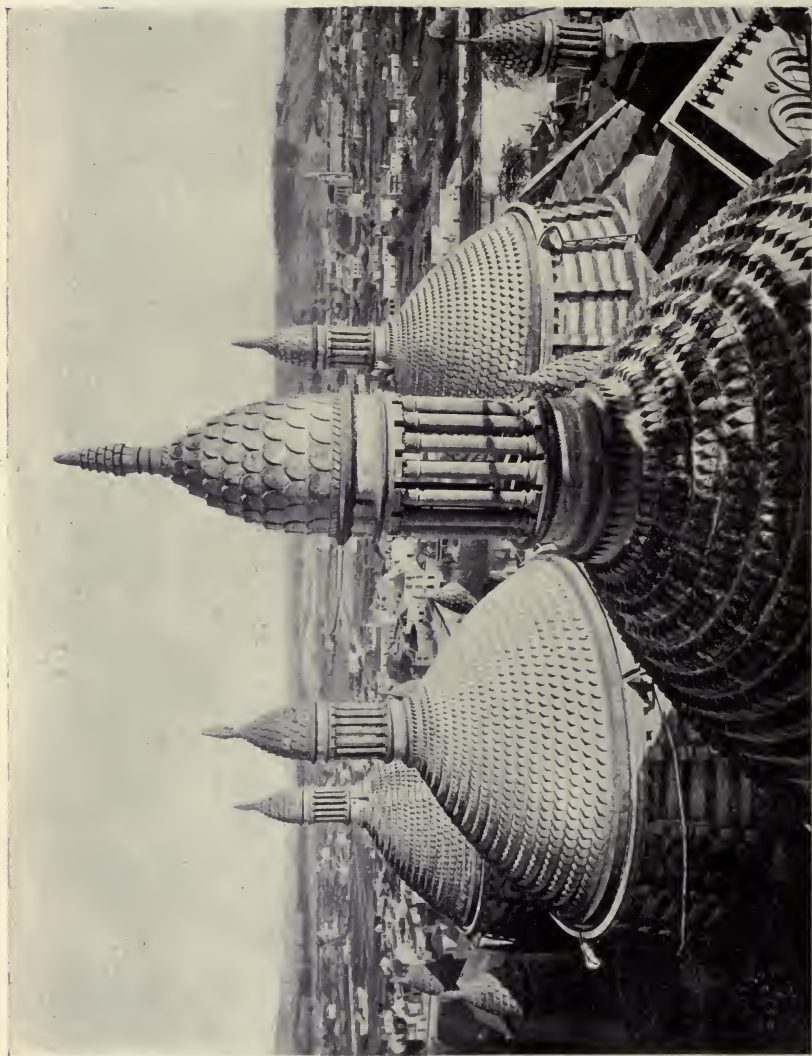


S. FRONT, PÉRIGUEUX.
(View from the northeast.)

cent and most striking churches in Europe. Its high walls, surmounted by a group of five domes, its singular stepped tower, its general aspect, produce an ensemble not readily forgotten. Within it is almost overwhelming in its effect; with its great piers and arches, its lofty domes of enormous size, at once so great and so audacious in their structural significance and architectural impressiveness. Its dimensions are monumental, 120 metres long and more than 120 metres wide, including all outer parts. Within and without everything is in spick and span order. Every surface is true, clean, smooth and white; every moulding is perfect, every arch solid and



S. FRONT, PÉRIGUEUX.
(South Transept and Domes.)



S. FRONT, PÉRIGUEUX.
(View of the Domes.)

firm. There is no hint of age, no suggestion of a stormy history in this astonishing interior or this singular exterior; everything is as though it had been built no later than yesterday.

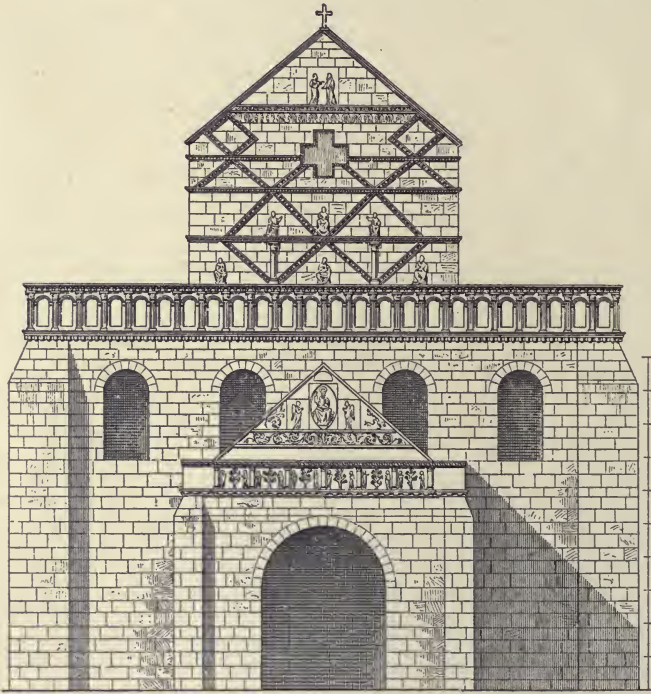
And the truth is not far from this; for the cathedral of S. Front is one of the archæological and architectural scandals of modern France. A church much as we see it to-day was built about 1120 and suffered depredations under the Protestants in 1575, when many precious relics and numberless rich works of art were ruthlessly destroyed. About 1347 the Cardinal de Talleyrand built a chapel dedicated to S. Antoine immediately behind the apse; it was a separate and a considerable church, with clergy of its own; in 1583 it was connected with the cathedral by Bishop François de Bourdeilles, and became the choir of the cathedral, until it was removed in the present century to make way for the present choir which was supposed to be in harmony with the general style of the building. In 1669 the Bishop of Périgueux removed his throne from S. Étienne, and S. Front became the cathedral. All these things are true, and this is the identical church referred to as concerned with these events, but there is no hint of them in the present structure. The fact is that, beginning in 1856, the cathedral of S. Front has been the object of so extended a restoration that it has been practically taken down and rebuilt in our own time. The general plan of the ancient church has been followed. There are the four arms of the Greek cross, with four great central piers supporting the central dome. The dimensions of the plan were not changed nor the relative situation of the parts; only that exceeding care was taken that, in the hands of modern French architects, means the introduction of modern ideals; the substitution of modern detail for decaying ancient ornament; the clearing off of walls; the insertion of new stones; the betterment and improvements which mean simply the doing afresh of everything that, having been done once, might be done again.

All of these things are bad enough; but no architect ever went so far in introducing his own ideas of what should be as M. Abadie did in the restoration of S. Front. There have been many instances of rebuilding, changes, alterations in the restored cathedrals and churches of France; but nothing so flagrantly opposed to actuality as the substitution of round arches for the great pointed arches that formerly supported the domes of S. Front, and which were changed because, to the restoring iconoclast, round arches seemed better in keeping with the domical style of the church than the original pointed arches!

It is needless to comment on the barbarism that instigated and carried out this radical change in construction. The mischief has been done, and the modern church of S. Front, therefore, only recalls the church as it was less than a half century since. Drawings

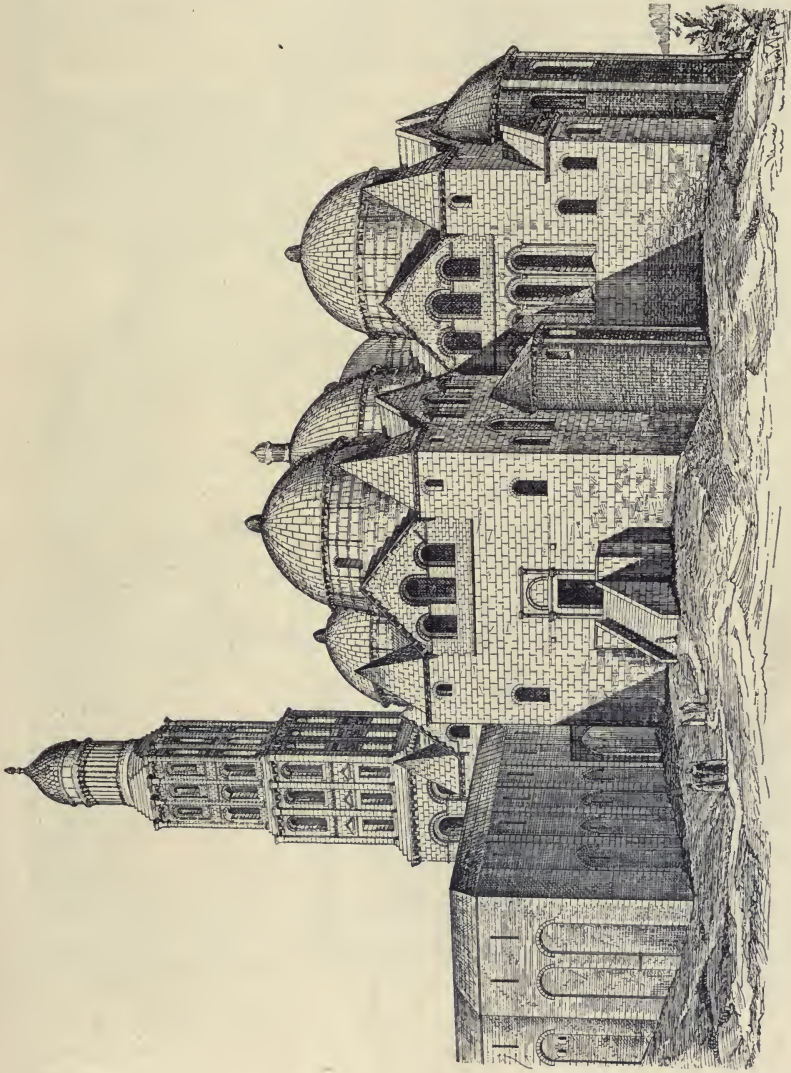
and plans made before the restoration tell us of its original character, and one must, in one's mind, reconstruct many present forms back again to their original aspect before one can conceive of the church as originally built.

The cathedral of S. Front is planned on a Greek cross with five domes. Each corner of each arm and the four corners of the central bay are marked by gigantic piers, carrying enormous supporting arches, now round, but originally pointed. At the outer corners of the arms of the cross they adjoin the bounding walls; in the centre they stand free; and all of them are lightened by arches cut through

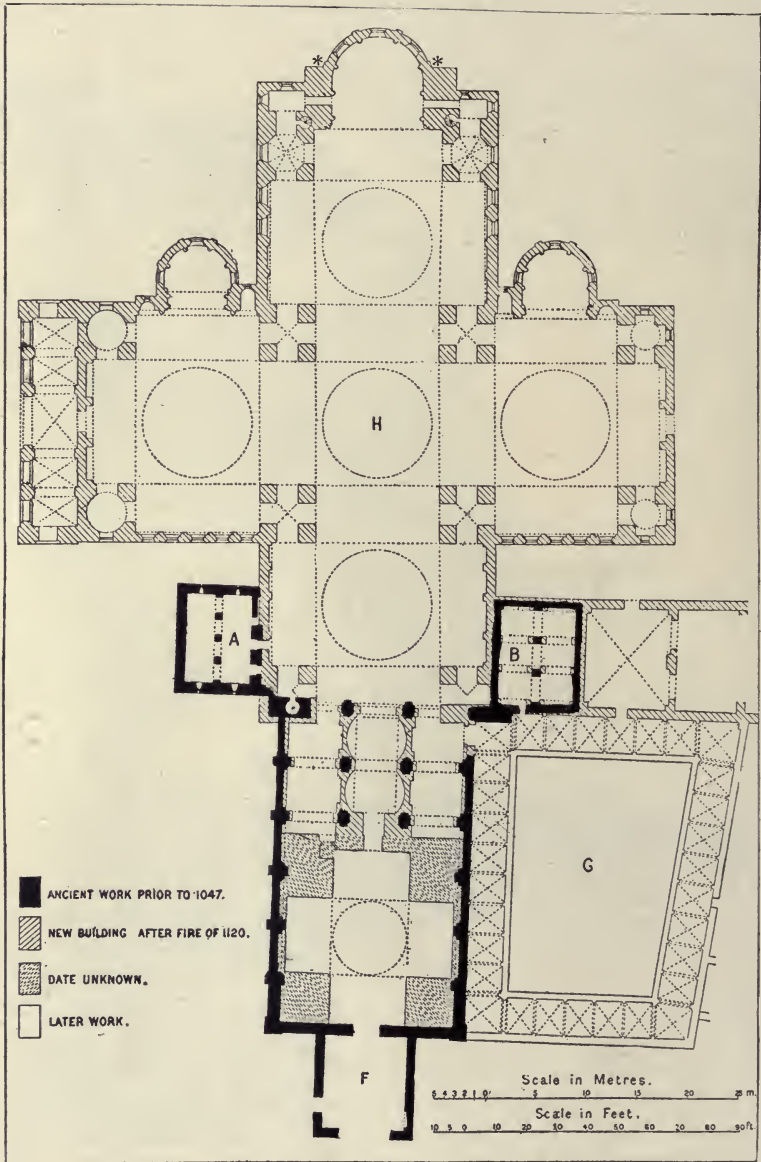


S. FRONT, PÉRIGUEUX—RESTORATION OF THE LATIN CHURCH.

them and so high as to have an effect of extreme narrowness in the openings. In plan, therefore, the interior walls are bounded by aisles, indicated by these supporting piers, but whose covering is simply the main arches of the great vault. The cathedral is entered through a porch, repaired in 1581, built against the northern arm or transept, the west end being closed by the great tower. The north and south arms have each a semi-circular apse on their east walls, of which that in the north transept is entirely modern except the columns at its entrance. And not the least of the ravages committed by M. Abadie has been the building of a deep new central



S. FRONT, PÉRIGUEUX.
(Before Restoration.)



PLAN OF S. FRONT, PÉRIGUEUX.
 Drawn by R. Phene Spiers, Esq.

apse and choir, quite unlike any original or previous feature of the church.

Notwithstanding the regrettable manner in which S. Front has been restored its interior is one of the most impressive church interiors in France. Its walls and arches and domes have that unpleasant freshness of newly-cut stone that is positively horrible in a building of its age; but the faults and errors of its restorers have not been



INTERIOR OF S. FRONT, PÉRIGUEUX.
(Before Restoration.)

sufficient to destroy the impressiveness and sublimity that are imperishably a part of a church of this size; an impressiveness that the simplicity of its parts and the vastness of its dimensions do so much to heighten. The plan is that of S. Mark's; the work itself is that of S. Front. There is no gilded mosaic here, no enamelled decoration, no rich finish; nothing but the bare walls and piers, the simple arches with small, almost insignificant bands of moulding around their tops



S. FRONT, PÉRIGUEUX.
(View of Interior, from the West.)

and the few sculptured columns of the apses. There is nothing else. The interior has sometimes been described as an undecorated S. Mark's; it has nothing, indeed, of the gorgeous decoration of that church; but it has what S. Mark's has not, a distinguishing quality of size and might, an immensity of structure that is almost overpowering in its daring, and which forms the great and distinguishing glory of this magnificent church.

Its exterior is hardly so impressive. It is striking, indeed, as what exterior would not be with five domes carried on low circular drums,



S. FRONT, PÉRIGUEUX.
View from the East.



S. FRONT, PÉRIGUEUX.
(Transept and Chapel.)

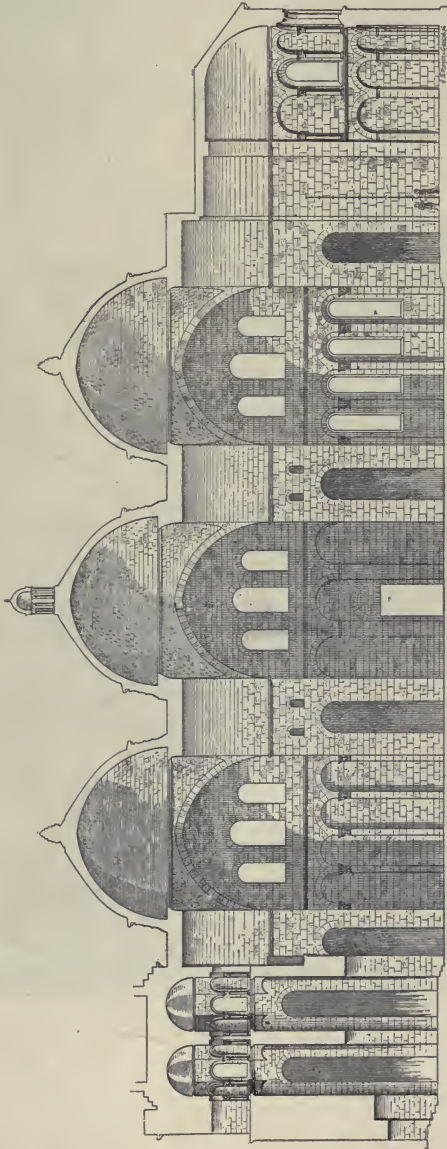
rising above gabled roofs; each dome surmounted with a columned pinnacle with a high conical roof; with pyramids at each outer angle of the gables surmounted with similar turrets, and, in the background, the great tower, in four recessed divisions, marked off with pilasters and applied columns, with many windows, and surmounted with a stepped pyramid bearing a columned circle surmounted, in its turn, with the inevitable conical roof? In the brilliant sun of the southwest the whitened walls of S. Front appear too new and fresh; the roofs are too dazzling, the pinnacles and ornaments too regular and perfect to convey that sense of antiquity that should belong to a church as old as this. Moreover, it is a known fact that only the central dome was originally surmounted by a pinnacle, the others being capped with simple cones; while so far as drawings made before the restoration tell us, the corner turrets were simple pyramids without ornament. The addition of the new apse has, of course, wholly changed the eastern aspect of the cathedral.

A cloister adjoins the older church to the west of the cathedral. It is an irregularly planned structure built partly in the XIII. and partly in the XIV. centuries. It is now greatly ruined and is entered from the market place under an archway, above which are the remains of the facade of the older church, the street leading directly to the cloister roof. It has no architectural interest. The cathedral is built on a steep slope, a little back from the river, and to be seen to best advantage must be viewed from the opposite side, where its walls and domes, turrets and tower form an ensemble that will not readily be forgotten.

One further fact concerning S. Front may be adverted to; its Byzantine character. In cataloguing the Byzantine influences throughout Europe S. Front is almost invariably given a first place. There could be no greater error. The Byzantine influence in this church is discernible in its plan and general form only; it is wholly wanting in its detail, its ornament, its spirit. The carving of its capitals and its string courses is Romanesque, not Byzantine, and might, so far as general appearance go, belong to Elne, to S. Trophime and to other churches unhesitatingly classed as Romanesque. Ornament is the sure indication of style, and the absence of Byzantine character in this feature in S. Front is the best possible ground for maintaining that the cathedral is not Byzantine, but Romanesque. Its form, its plan, were unquestionably borrowed from the East, and quite as unquestionably from S. Mark's. But the men who copied that wonderful plan and re-erected it in the west of France, only borrowed the general idea. They were thoroughly successful in this, it is true, but they were unaware that, to make their copy a real one, they must go further than generalities, and place upon their building the inevitable

earmarks of foreign origin always to be found in the detail. They did not know that, and contented themselves with reproducing the ornamental forms of their own period and country with which they were familiar. S. Front is, indeed, one of the architectural marvels of France, but the mystery of its origin disappears, to a large extent, before the facts brought out by comparison with contemporary monuments.

Barr Ferree.



S. FRONT, PÉRIGUEUX.
(Longitudinal Section.)



RESIDENCE.

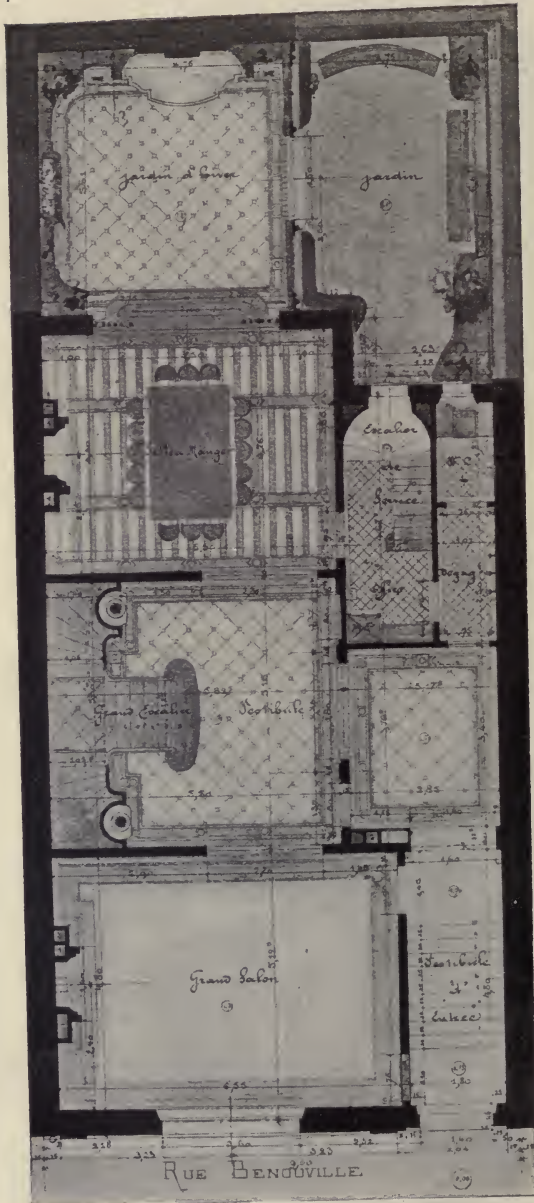
W. W. Hoyington, Architect.



Examples
of

Recent
French
Architecture





PLAN OF RESIDENCE.

Rue Benouville, Paris.

(See page 69.)

Henri Grandpierre, Architect.



Rue Benouville, Paris.

RESIDENCE.
(See page 68.)

Henri Grandpierre, Architect.



BUSINESS BUILDING.

Rue Reaumur, Paris.

A. Walwein, Architect.

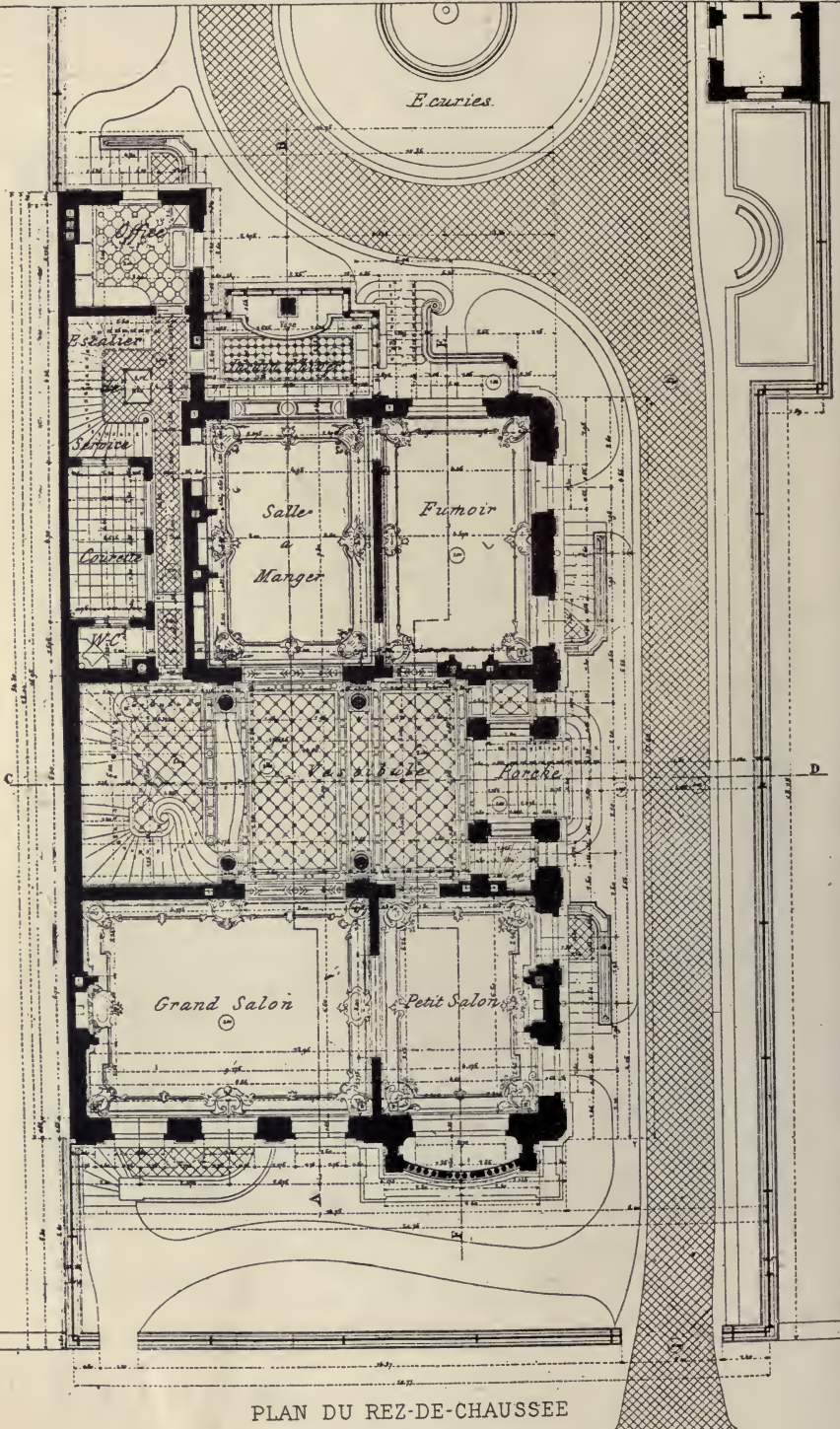


ENTRANCE TO BUSINESS BUILDING.

Rue Reaumur, Paris.

(See page 70.)

A. Walwein, Architect.



PLAN DU REZ-DE-CHAUSSEE

PLAN OF RESIDENCE.



RESIDENCE.

No. 39 Bendler Strasse, Berlin,

(See page 72.)

Henri Grandpierre, Architect.



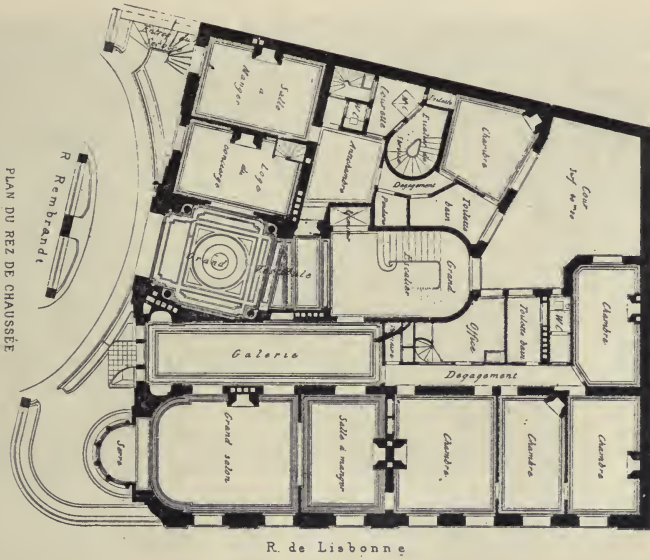
VESTIBULE IN RESIDENCE.

No. 39 Bendler Strasse, Berlin. (See page 73.)



DINING-ROOM IN RESIDENCE.

No. 39 Bendler Strasse, Berlin. (See page 73.)

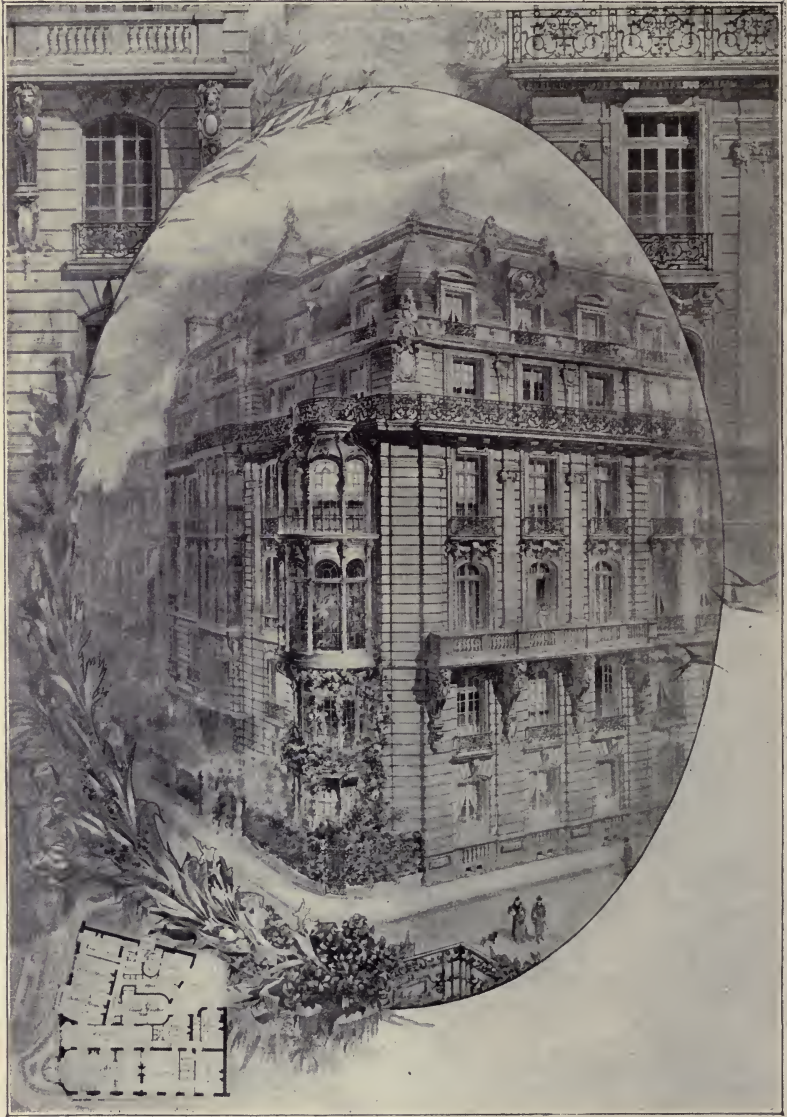


PLAN OF APARTMENT HOUSE.

Rue Rembrandt, Paris.

(See page 76.)

G. Rives, Architect.



APARTMENT HOUSE.

Rue Rembrandt, Paris.

(See page 75.)

G. Rives, Architect..



DETAIL OF APARTMENT HOUSE.

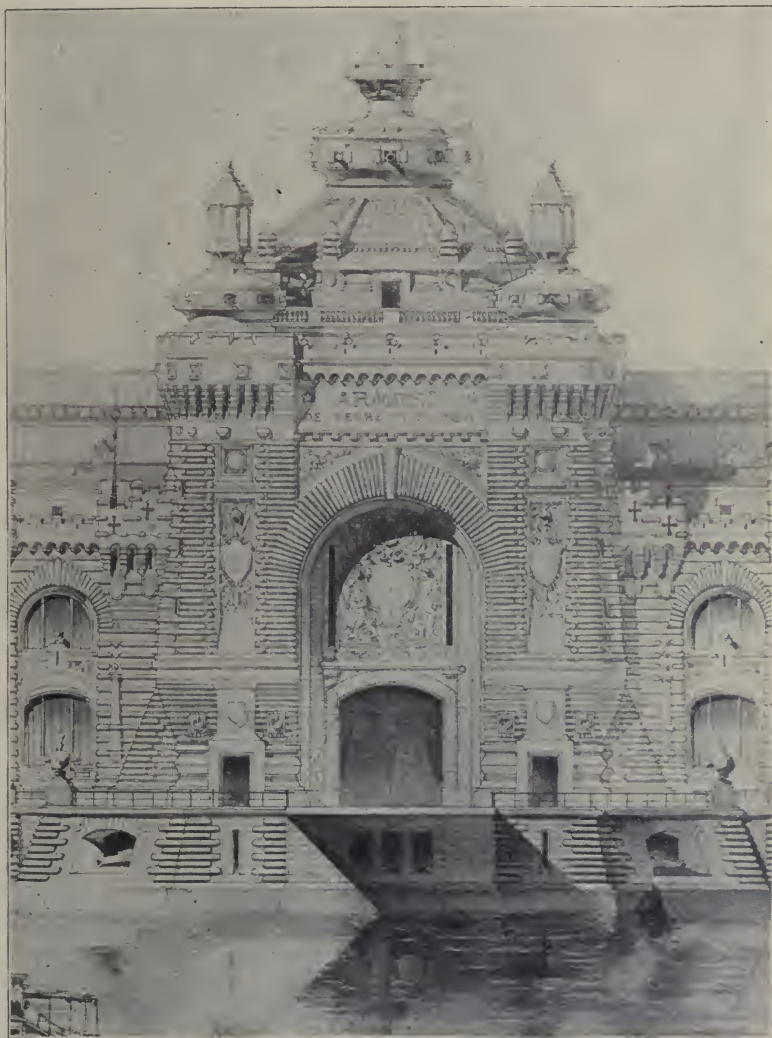
No. 7 Rue Rembrandt, Paris. (See page 76.)

G. Rives, Architect.



DETAIL OF APARTMENT HOUSE.
No. 7 Rue Rembrandt, Paris. (See page 76.)

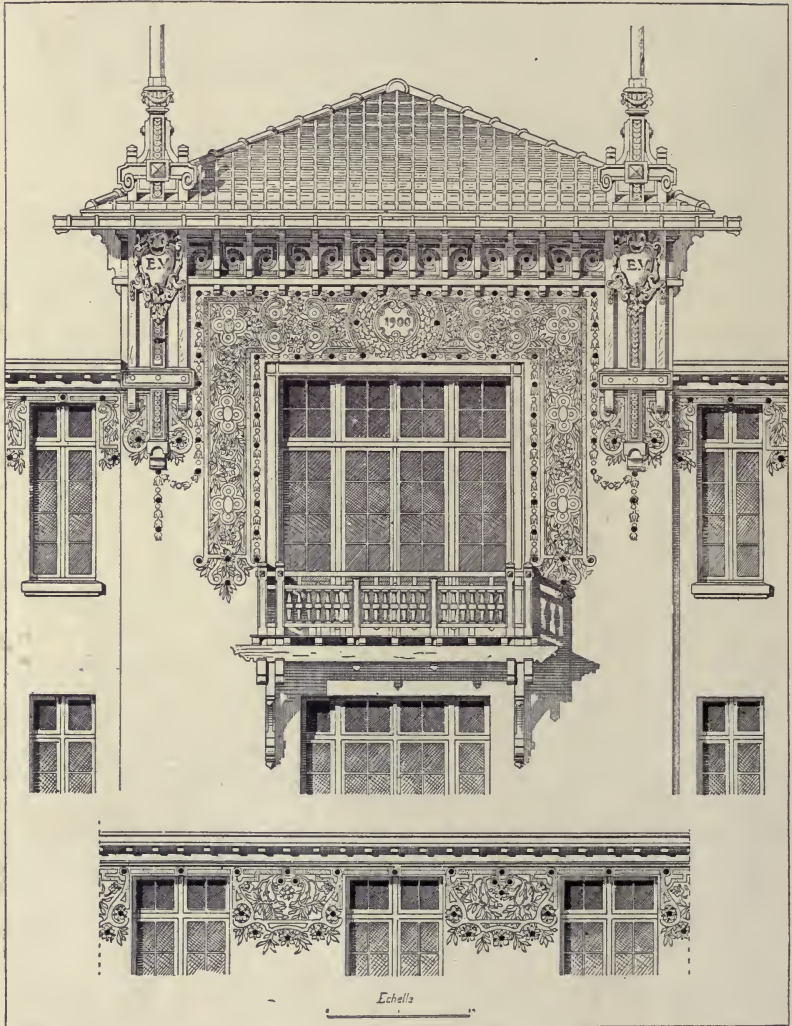
G. Rives, Architect.



WAR AND MARINE BUILDING.

Paris Exposition, 1900.

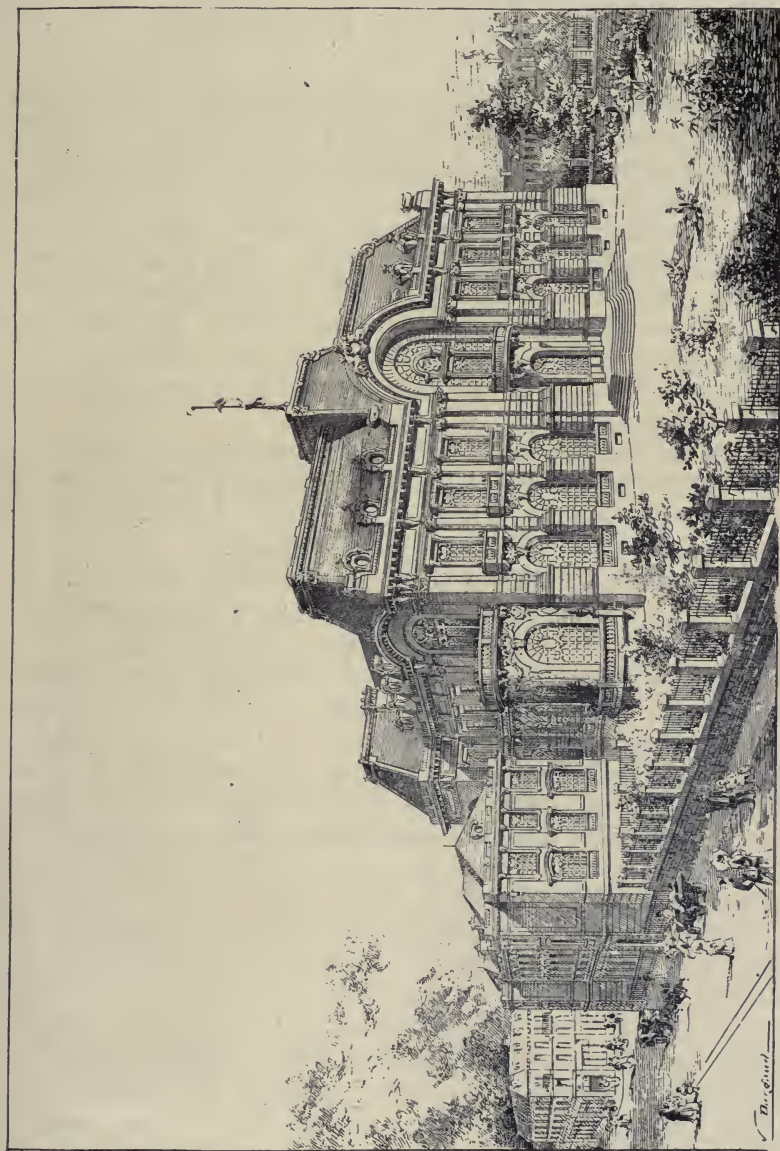
Auburtin & Umbdenstock, Architects.



DETAIL OF ADMINISTRATION BUILDING.

Paris Exposition, 1900.

M. Deglane, Architect.



PREFECTURE.

Limoges, France.

M. M. Vionnois & Valentin, Architects.

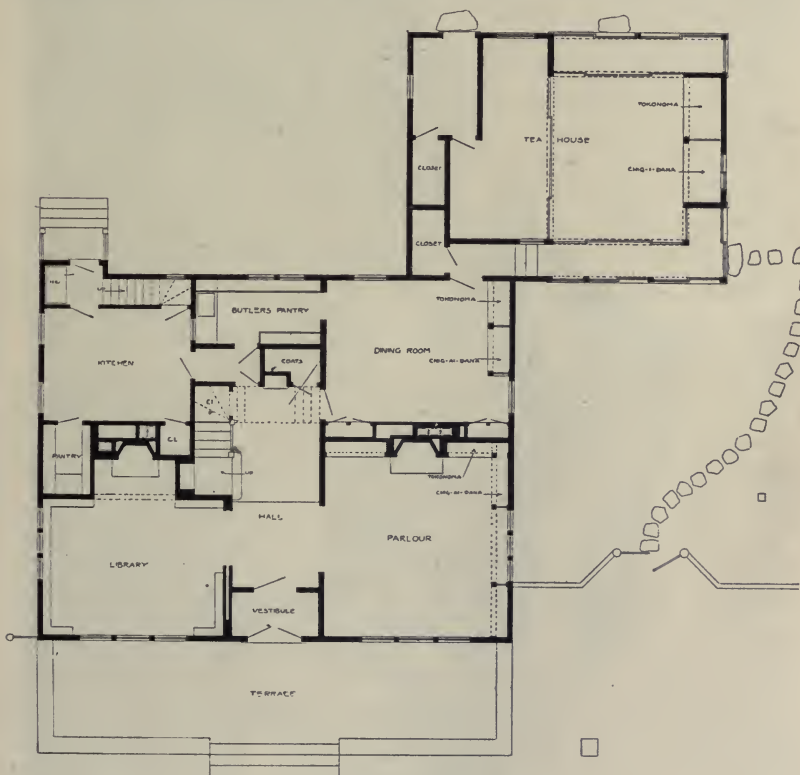
AN ARCHITECTURAL EXPERIMENT.

A FEW years ago a curious problem presented itself to the architectural firm of which I am a member. It was this: An Unitarian minister, but lately returned from Japan where he had been living for the purpose of studying the civilization of that wonderful country, required a house in the city of Fall River, Mass., a city that outwardly gives no evidence whatever of the rather unusual amount of artistic appreciation existing there. The Rev. Mr. Knapp was the possessor of a splendid store of Japanese bronzes, lacquers, porcelains, embroideries, kakemono and all the other manifestations of the extreme civilization of "Dai Nippon." Hence arose the question, how shall these be housed?

At first the decision was in favor of the simplest form of construction with slight "Colonial" details, but immediately the ungrammatical nature of this combination of Puritanical architecture and Oriental furnishings asserted itself, and it seemed intolerable. Suddenly the impulse arose to see what could be done with the architecture of Japan. For a time this seemed fantastic in theory and impracticable. The domestic architecture of Japan is exquisitely adapted to local conditions. Widespread poverty, seismic considerations, a gentle climate, habits of out-of-door living, lack of what we of the West consider domestic habits, have resulted in a form of habitation that seems out of touch with western conditions. The Japanese house is practically nothing but one floor with a wide roof supported on many posts, sliding "shoji" or screens of rice paper serving to divide it into an indefinite number of rooms of no fixed size, though always some multiple of three feet on one side, of six feet on the other; this being the unchangeable size of the thick mats of finest straw that cover the floors. There are no fireplaces, few stairways, few windows—in our sense of the term. Moreover, a Japanese house is bare of all decoration except for the kakemono hanging in the tokonoma, with its bronze or porcelain jar in front holding a spray of blossoms, and the two or three bits of cloisonné, ivory or bronze in the adjoining chigi-dana. The vast stores of precious objects owned by the Japanese collectors are always kept in a godown, one or two being brought out every day for the delight of the owner. In the present case this course could not be followed. We cannot get rid of our western and most barbaric desire to surround ourselves with quantities of gorgeous objects, and for this reason, even if climatic conditions were overcome, it was impossible to create absolutely Japanese rooms, if

they were at once to lose their whole effect of gentle delicacy and dignified reserve by being crowded with works of art.

It seemed, however, that there should be some middle course which would result in an interior that might possess the element of unity and yet be practical and without affectation; this working basis was at last found. Whether the result was or was not a justification thereof the accompanying photographs must show, though they cannot be infallible testimony, for they show nothing of the color or of the varied effects which were obtained by the use of many woods in a



FLOOR PLAN.

natural state. At all events, to the owner and to the many Japanese who saw the work the outcome was satisfactory, and to the architects it was something of a surprise, since it made possible a contrast with other modes, that immediately ceased to appear altogether admirable, revealing certain elements of brutality hitherto unrecognized.

The experiment was made on the following lines: In plan and construction the house was to be absolutely western, arranged for convenience and habitability, all the details, both exterior and interior, were to be studied faithfully from Japanese examples, paint, wood stains and varnish, being unknown in the East, as well as particularly



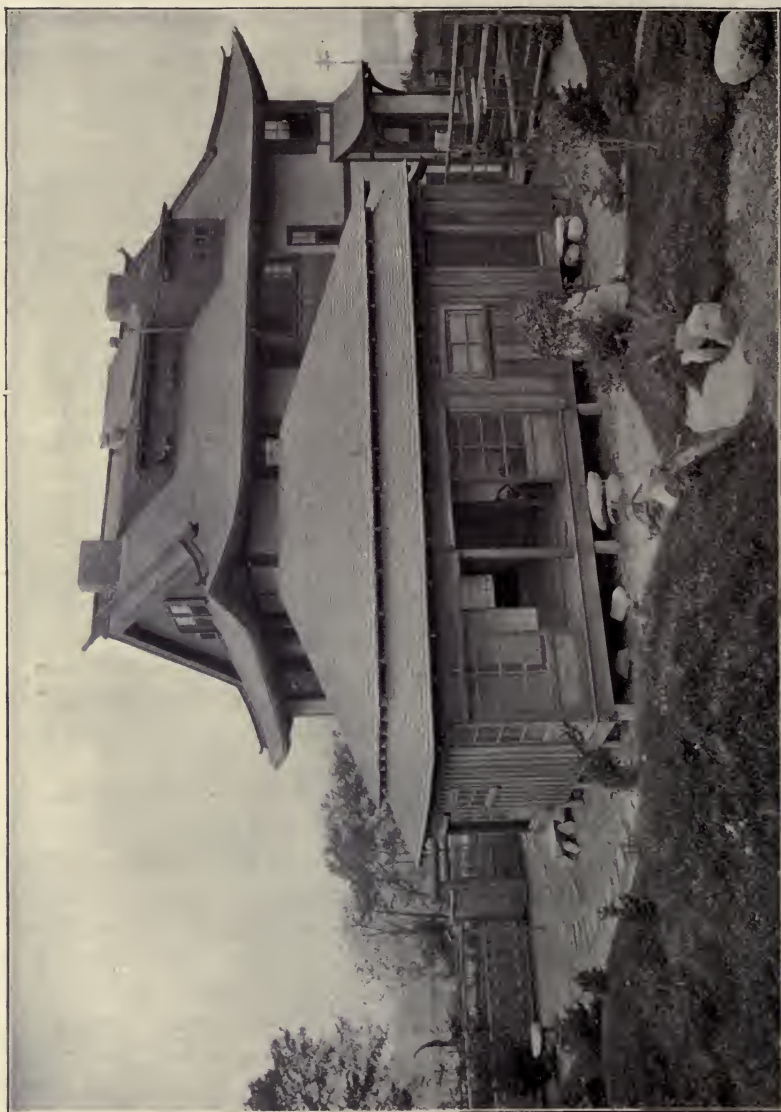
VIEW FROM THE FRONT.

vulgar and hideous, were excluded. Plaster also was largely omitted in the finish of the rooms, and natural woods of twenty different kinds, selected for their color, surface and veining were used instead. The exterior showed beam construction with the intervening spaces filled in with cement in the Japanese fashion. Finally, at one corner of the house was arranged a section absolutely Japanese in design, construction and finishing, and around this lay the little garden designed on the most approved lines, with its miniature mountains, valleys and plains, its lake and cataract, its forest of dwarf trees.

To read of a scheme of this kind gives one an idea of unmitigated affectation; the whole thing seems like a toy house, a thing in which one could not live comfortably or with self-respect unless clothed in kimono, obi and tabii. One would say "this is a silly pose."

In actual fact it was none of these things. People came to wonder, and went away convinced, while to those most interested the experiment has justified itself absolutely. The house was rational and livable. Nor was this due to its western elements. The "tea house" was built more or less as an amusement; no one ever expected it could be used except in summer, and then only as a tea house, or garden shelter. Instead it was by far the most charming part of the whole structure, the coolest in summer, the warmest in winter. In a little while the westernism of the main house became distasteful, and the tea house with its sliding rice paper shoji, its matted floor, its lack of all confusion, its very bareness became irresistible, and instead of serving as a summer house it became the principal living room. Then the owner realized that he (his architects) had been too cautious, and declared that if he were to build again it would be more closely still to the Japanese principles.

All this seems to show that there is something in Japanese domestic architecture which is good apart from its perfect adaptation to oriental conditions, something that could be advantageously adopted in western building. This thing is certainly simplicity. Compare the view of the interior of the tea house with that of the parlor. Does not the effect improve the farther one gets from western suggestions? Contemporary domestic architecture is a riot of complication and over-detail, without reserve, quiet or dignity. Its outward forms are borrowed from stone construction, its bad workmanship is daubed over with coats of paint; wood, in its natural state a material of exquisite beauty, is tortured and hacked into grotesque forms, stained with muddy dyes and smeared with paint and varnish. Windows are filled with single sheets of plate glass until all sense of protection is gone. Walls are covered with gaudy paper hangings, and then loaded with crowded pictures. Our living rooms are turned into junk shops, while the house itself from the exterior looks like nothing ever seen before in the history of art.



FROM THE GARDEN.



DETAIL OF THE FRONT DOOR.

Compare any typical "parlor" of the present day with a corresponding Japanese room—that in the "tea house" for instance, which is simply a copy and for which the architects are to receive neither praise nor condemnation. The posts and frames are of cypress, innocent of stain or varnish, and with a surface like satin. The lattice of the shoji is white pine, the coverings rice paper. The ceiling is of strips of cedar filled in with long thin boards from Japan of a marvelous wood with dark veins; the pierced carvings in the screen between the two rooms are also from Japan, and are of cryptomeria wood. In the chig-i-dana apple, cedar and cypress are used. The floor is covered with straw matting, and the only decoration is in the shape



THE HALL.

of a kakemono, a bronze jar, two pieces of cloissonné and a bit of lacquer. It would be impossible to imagine anything more quiet and delicate than the effect of this room either in winter when the shoji are drawn and it is full of a soft, diffused light, or in summer when they are run back and two sides are open to the fresh air, on one side lying the fantastic little garden, on the other the distant river with the meadows beyond.

That this form of construction and style of decoration is absolutely fitted for certain of our purposes is evident. Nothing could be imagined that would adapt itself so delicately to seaside architecture, and in cost quite as well as in other ways. A house on Japanese lines could be

built for summer use, of the most beautiful woods, and adequately furnished for half what is expended now for a Queen Anne or Colonial horror doomed to most desirable decay. One of the greatest surprises in connection with this house in question, was its cost. It is finished in the most beautiful woods—cedar, sycamore, cypress, apple-tree, white mahogany, curly maple, black cypress, birch, as well as many brought from Japan; inside it is one piece of fine cabinet-work from top to bottom, and yet it cost less than a "Colonial" house of the same size would have done.

For serious purposes, for permanent habitations in the country for instance, the style would hardly be admissible in its entirety, but a



THE PARLOR.

study of its nature, better still, an attempt to work in it, cannot fail to show the absurdity of some of our modern customs. We build constantly in wood, but we show no appreciation whatever of this material; we can't let it alone, but are impelled to try to make it look like something it is not, by the use of paint, stains and varnish. The Japanese understand it perfectly, and their houses are marvels of beauty, just because they make of each post, each beam, a thing to admire by reason of the natural beauty of its grain, color and texture. Here in America we have a great variety of exceedingly beautiful woods, if we can be content to use them in their natural state. American oak is not a fine wood, and there is no very good mahogany in



IN THE TEA HOUSE.

the market, but we use these ad nauseam, quite ignorant of the fact that white pine, sycamore, gum wood, birch, maple, cedar, Canadian elm, and above all, black cypress, are incomparably more beautiful. One of the ceilings of Mr. Knapp's house was of cypress and white mahogany, and the color effect was singularly beautiful. The hall was finished wholly in wide plain boards of black cypress wonderfully veined, and perfect in color—the delight of all the Japanese, who declared it equal to anything their own country could offer.

Another lesson to be learned is that windows are in most cases to admit light, not to afford a view of what is without. In our vaingloriousness over plate glass we fill every opening with it, whether there is anything to be seen from the window or not. The Japanese are wiser; they furnish sliding paper screens that admit the softest, most delicate light imaginable, and when they wish to enjoy the view without, move them to one side. Between a great shapeless window filled with a sheet of glass, and then half hidden by voluminous draperies, and a Japanese window shoji with its delicate network of dark lines against the pearly rice paper, there is just the difference between barbarism and civilization.

There are many things of this nature that one may learn from Japanese architecture, but if nothing was acquired but a sense of the sanctity of wood and the beauty of fine workmanship, the study would be worth while.

It is possible to write of this experiment now, for in a measure it is a thing of the past; the owner has found it impossible to live in the West after a taste of Eastern civilization, and is now a citizen of Tokyo. The house is dismantled of all its treasures, the rooms are empty, the little garden is running wild, and the bare shell alone remains, a forlorn relic of a delightful attempt to graft an alien civilization on a tree grown rank with too vigorous life, and already showing signs of decay.

R. A. C.

GOOD THINGS IN MODERN ARCHITECTURE.

BUILDINGS designed upon the old lines may be the prettiest buildings, but they are not the most important to us when we are considering the matter artistically. Those designs which are the most nearly the result of old tradition are easier to keep within bounds, easier to invest with propriety, easier to keep within the limits of good taste; but these are not the buildings in which students should take the most interest. If, indeed, any artistic traditions were unbroken, then the student should be encouraged to follow that and should refuse to listen to anyone who might bid him study other styles. There is no such tradition as that. Those buildings which are the most nearly the result of unbroken tradition are probably the large English country houses which still arise in many parts of England, and which the weekly and the monthly illustrated journals publish, and also those American country houses designed by Mr. Robertson, Mr. Haight, Messrs. Peabody and Stearns and others, and in which the same Elizabethan or Jacobean tradition has governed the designer. The American wood-sheathed frame house is another such tradition; and if the good taste and refinement which marks much recent work had been more general and had been continued longer, here would be a style fit to rank with anything which was of necessity so simple and domestic. Let it be admitted once for all that our constant demand for originality has something unreasonable about it. Let it be admitted that the true system of architectural design is not to ask for originality but to build on the lines laid down by one's predecessors and let originality come if it will. Let it come if it will in spite of your best exertions to exclude it! That might be thought the wiser maxim for the architect than the contrary one which would bid him seek originality at all hazards. Again, however, this is not the course likely to interest the student. There are, indeed, three excellent reasons why he can hardly be expected to work as builders worked when tradition was strong and unquestioned. All recognized styles are more or less discredited by the sad misuse which they have undergone at the hands of our own generation and the preceding one. Many modern requirements are absolutely opposed to the pursuit of design according to the old principles. Many modern materials and methods of building, important and not to be disregarded, compel the introduction of new forms and new combinations. These are the three reasons which

are going to compel us to develop one or more new styles which may or may not be valuable as matter of fine art. It follows that in very many designs, for large or for small buildings, for city or for country, for residence and for money-making, to be built at high cost or for a few hundreds or thousands of dollars—the old styles simply do not apply to us, and we are compelled to disregard them.

We cannot build in the Gothic style because we cannot afford to vault our buildings, and because we are absolutely without any power to produce Gothic sculpture; moreover, a Gothic style, in which large single-storied buildings something like churches should not be the prevailing type, would be an absurdity. No man can conceive of a Gothic style based upon many-storied buildings divided into small rooms. No form of strictly classic or neo-classic style is of any use to us, because, as the orders have no relation to our systems of building, it follows that no architect knows how to handle those orders. No one now holds the orders plastic in his hands as the builders of Roman baths and Herculanean villas held them. No one feels free to deal with intercolumniations and with the proportions of entablatures to columns as the men who invented them and those who re-invented them felt free to handle those details. The boldness of our predecessors, the men of the eighteenth century, who in Germany and in France, tossed the orders about and refashioned them in detail and in composition—that boldness is held up to our students as altogether heretical, and the dash and verve of the Rococo men, which was, indeed, mingled with much bad taste, is denounced as if it were nothing but bad taste. Romanesque architecture has been tried by good men, by patient and thoughtful men with much capacity for design, but it has not succeeded. The Romanesque style seems inseparable from its primitive ponderosity. Every attempt which we have yet seen at creating a lightened and less massive Romanesque—a Romanesque in which skilful building should render unnecessary the monstrous thickness of the old walls and the resulting deep reveals of the little windows, has ended in a comparative failure; and a curious look as if the building were a pasteboard model, such as made the delight of idle people a century ago, pervades all these structures.

Things might be better if architects were allowed to build very plainly for awhile. If no one was held bound and committed to perpetuate the usual amount of architectural detail the designer might get on better with his masses. If no sculpture were asked for, something like dignity and a true severity not suggesting raw and bare nudity might be obtained. If the architects were compelled to fall back upon their building, their construction, their handling of material as their sole source of architectural effect, a new and valuable style might take form, unpleasing as some of its earlier examples



Fig. 1.
ÉCOLE DE DROIT, PARIS.
(Detail of New Building.)

might be. Take the example of the new buildings of the Paris Law School. Fig. 1 is an interior view of a part of the library of the *École de Droit*. Allowed to use excellent masonry, not stinted as to his method of building and not bullied into finishing his wall faces with plaster on iron lath, or any similar patent device, the architect has treated his interior in a dignified and massive way, and little as we may admire the lines produced by the setting of the roof upon the walls, we are bound to recognize the possibility of great things in the future. Note the use of the two niches in which, by a simple device, the surface-staircases are put well out of the way and yet remain most conveniently located. Fig. 2 is the exterior of the same pavilion used as a reading-room. As in the interior, a little architectural ornament and a little sculpture has been applied to features which seem to call for it, especially; so in the exterior the symbolical shield of the City of Paris adorns the two large piers, and the student approves this, only wishing that they were nearer the eye, for they seem to be delicately sculptured. The slightly or-



Fig. 2.
ÉCOLE DE DROIT, PARIS.
(Detail of New Building.)

namented band which passes along at the spring of the arches in the interior and the exterior alike, seems to tie the structure together and to unite the stone facing of the inside, and that of the outside, giving a harmony which our buildings with their plastered interiors cannot possess. The placing of the triple window of the pavilion in a recess between piers is not particularly happy, but it is partly excused by the insertion of the great inscription beneath the windows ;

a look being given to it as if the inscription were the main thing in this pavilion and that the sheltering of this panel from the weather was a matter of special pains. The design is not of especial charm; it has no peculiar grace; the resulting lines are not very beautiful, but clearly there are possibilities here and a designer of



Fig. 3.

CHURCH, CASTELLANE.

Basses Alpes, France.

M. Paul Lorain, Architect.

great ability might do surprising things with this simple programme. Note that the ugly cowl which seems in the picture to emerge from the top of the pinnacle over the dormer is not there in reality, but rises from the large pavilion beyond. Note also that the dormer is a door leading out upon the terrace roof. No view can be got by means of photography which would rightly explain the general masses of the building; but, indeed, it is with detail only

that we are concerned at this moment. Many similar partial views could be chosen from this interesting structure, each of them exemplifying this frank acceptance of the twofold conditions laid down by requirements and materials.

The above cited building is mainly neo-classical in feeling, as if its design were based upon a century or two of academic schooling, but many of the recent French structures of radical and rational build are mediæval in general character and that from obvious reasons. The system of corbelling which many French constructors have elaborated, each improving upon his predecessor's practices, is obviously more or less mediæval in its origin, nor can one push that system far without imparting a still greater Middle Age look to his work. Thus, the very interesting little church of Castellane, in the department of the Basses Alpes and near the Italian frontier, is not only constructional, it is also almost Provençale Romanesque or Provençale Transition in its design. Fig. 3 is copied from the rough drawing published in some recent periodical whose name has been forgotten. The southern look of it is caused partly by the tunnel vaults set at right angles to the main vault of the nave, these vaults covering a narrow aisle of mere communication—a passage aisle, as the English builders are calling it. These subsidiary vaults spring from those buttress-like piers which take up the thrust of the main vault, and these piers are given a form which allows their material to be used in the most economical way. A similar piece of rational building is shown in the design by a well-known architect of the church at Rambouillet in the department of the Seine et Oise. Here the system of corbelling used to counterpoise the thrust of the main vault, at least in part, is carried very far, and the vertical supports are furnished by the slender shafts of cast-iron occupying as little as possible of the floor of the church and affording a secondary passage or ambulatory between the main piers and the floor of the nave. In this church the vault is of a character never used in the Middle Ages or in antiquity, a vault which it is easier to point to in the illustration, Fig. 4, than to describe. In like manner, Fig. 5 shows how Mr. Baudot has undertaken to carry off the rain water from a church of mediæval design though erected at a time when the public would no

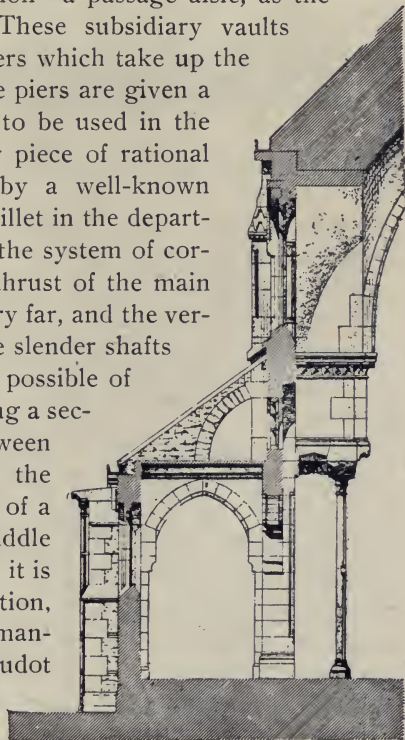


Fig. 4.
CHURCH, RAMBOUILLET.

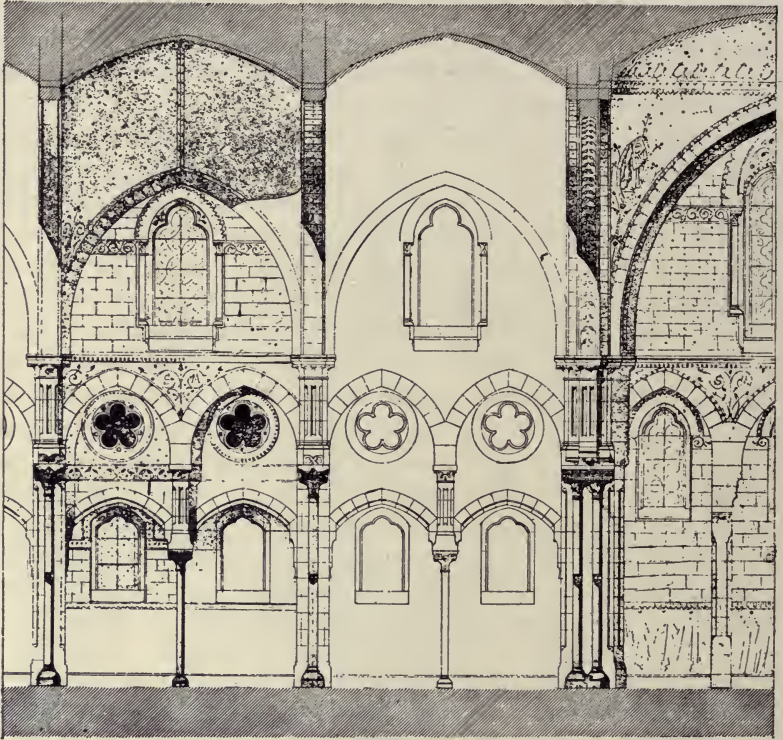


Fig. 4a.

Seine-et-Oise, France.

CHURCH, RAMBOUILLET.

A. de Baudot, Architect.

longer endure the throwing of the water from the mouths of gargoyles directly into the street. Vertical leaders combine with horizontal gutters cut in the stone cresting of the buttress to carry the water in the most humble and domestic manner to a sewer beneath the street, while at the same time the character of the buttress may be thought to be accentuated by the utilitarian device.

It is noticeable that in all these three buildings masonry is used with a freedom which we hardly understand in the United States, and this is in itself a great advantage for such builders as are not thought extravagant if they use cut-stone, rubble and bricks and mortar freely where the unfortunate builders of the United States, inheriting carpenter traditions, now translated into iron, are disguising their real means of support and resistance by simulacra and shams. Obviously it will be much easier to push a system of design if it is based upon solid mason-work than if it is to be carried out in boxing with slender iron uprights and ties, metal lath and coatings of plaster to conceal the whole. The man who is designing in a rational way in masonry has rational designing in masonry to follow,

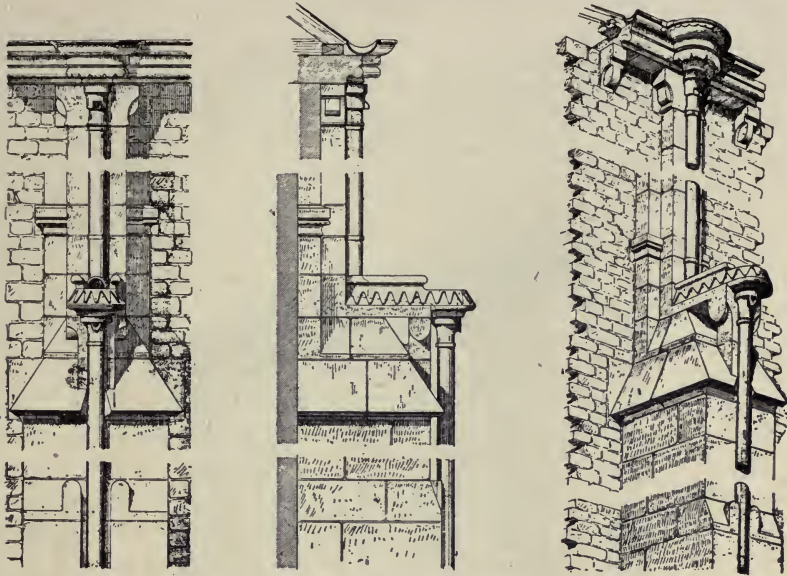


Fig. 5.

Ardeche, France.

CHURCH, PRIVAS.

A de Baudot, Architect.

in principle if not in detail; twenty centuries of such designing and more if he searches the past. The building man takes to it intuitively, handles it aright without any especial training—no engineering science is needed for sensible and beautiful building in masonry. The metal building which the American has committed himself to has no such artistic past and its right use requires a scientific teaching which tends to destroy his native sense of architectural design.

If we turn to instances of American building in a rational way, in the way suggested by the material, we are very apt to bring up against a structure of wood and iron covered with thin metal. Such are the bay-windows and loggie which project from many of our new house fronts. Such are some of the domes and lanterns which cap our skyscrapers. Such is the recently built ferry house of the Pennsylvania Railroad Company, at the foot of West 24th street, New York City. There the whole exterior is composed of thin copper, which, as it has never been painted, has already taken on a beautiful tone, passing from dull green to dull red, with pleasant modifications of both colors. The fact that the exterior is, although a mere metal shell, punched and stamped into a quasi imitation of a semi-classical order of pilasters, only shows how little way we have gone as yet in our use of these new materials. The capabilities of the method used in this building are equally evident. The interior is partly sheathed with thin metal, probably patent steel panelling, which covers the ceilings and the upper parts of the walls, the lower part being either sheathed with



Fig. 6.

BAYARD BUILDING.
65 Bleecker Street, New York.

Louis H. Sullivan, }
Lyndon P. Smith, } Architects.

Geo. S. Hayes, Consulting Engineer.

wood or opened up into large windows, forming glass partitions between large waiting-rooms. Such a building as this, if carried out in fireproof material, the metal sheathing fixed to metal frame, and even the flooring incombustible, would be an extremely interesting structure, and we put on record the present ferry house merely as a step in the right direction. In like manner the new Bayard Building, Fig. 6, just approaching completion on the north side of Bleecker street, opposite Crosby street, exemplifies the growth of modern American building connected with the steel cage construction. Here the metal construction is covered and completely enclosed in tile and brick and the whole façade consists of a series of slender uprights running from top to bottom and consisting of the actual construction piers where steel columns are jacketed by baked clay laid in mortar and, alternately, slender mullions built in the same way but without constructional value. The mention of this building, the design of Mr. Louis H. Sullivan, of Chicago, with whom is associated Mr. Lyndon P. Smith, of New York, is not to be taken as implying an intention here to criticize it fully. Mr. Sullivan's great power over floral and foliated design must receive notice elsewhere. We are using the building now merely as an example of rational building as Americans most commonly understand it. There is here no pretense that the building is a massive structure of cut-stone, and no pretense that it allows of treatment in the modern classical way with orders and with classical proportion. The whole front is a careful thinking-out of the problem, How to base a design upon the necessary construction in slender metal uprights and ties. Were it not for the most unfortunate treatment of each great opening between the uprights with an arch and a seeming system of tracery in the head, this front might be pointed to as completely realistic in design. Even as it is, if the reader will eliminate by a mental process those five great arches with their subordinate arches and the oculi which fill their heads, he will have the architectural treatment of the future metal building of our cities in the form which it must pass through if it is to reach any serious architectural success. In like manner, Fig. 7 gives an excellent piece of wooden building, a dwelling house at Orange, N. J., the design of Messrs. Babb, Cook & Willard. There is here no pretense at construction anywhere different from the one actually existing. The frame is, indeed, concealed by a sheathing of wood, but as the system of building by means of corner posts, studding, sills, plates and inter-ties is understood by every American; as it has prevailed over the whole continent and as, moreover, the sheathing outside with wood and the sheathing inside with lath and plaster are essential to its peculiar characteristic of being a system of building warm in winter and cool in summer, so it is the reverse of a fault to be



Fig. 7.

Orange, N. J.

RESIDENCE. Babb, Cook & Willard, Architects.

criticized that this concealment of the actual framework should be carried out in the familiar way. Buildings much larger and more pretentious could have been chosen, in which the sheathed and concealed frame would be equally the central idea. The present sensible house is chosen because the photograph shows its details clearly, and because the little building is most beautiful and appropriate. Let no one despise the American way of building, whether in the old-fashioned way as the country carpenters worked it out two centuries ago, or in the newer system which the engineers have adapted from what the carpenters had given them. The American system of slender uprights and ties, whether of wood or iron, is one out of which the architects should try to make all that its very peculiar character allows.

At the same time it is to be regretted that masonry is not more familiar to us in America. A year or two of life among the people of southern France or of central Italy would do a world of good to an architectural student in this, that he would learn there how much can be done by masonry alone without the intervention of wood or metal. If you are resident in a city of central or southern France at a time when a street is being cut through the ancient, too compact and too closely crowded masses of dwellings, you will see, where houses are being cut in halves, just how they were built in their main masses and in detail. You will not see as much vaulting as in Italy, probably because space has been more valuable and because the

haunches of the vault which encloses a room and the walls which carry those heavy haunches represent more space, both vertically and horizontally, than the owner could afford to surrender. You will, however, see solid masonry walls, and floors made very largely of blocks of stone laid upon wooden floor beams, which beams are plainly visible from below, and which are out of the reach of fire from the very absence of wood to communicate fire to them. The stairs are of stone; and the balustrading of iron even if the handrail itself be of wood. The cellars of such a house are, of course, vaulted. The floors of the chambers are probably of plank laid upon wooden beams, but these floors are isolated; that is to say, they are never continuous from room to room, but are separated by the very massive stone and mortar walls which divide the rooms. Moreover, and here comes in the essential peculiarity of these houses, there is no wooden door-trim, window-trim, or wainscoting. The doors themselves, the mere swinging valves, are of wood, but the iron hinges which hold them are built into the solid masonry of the door-jamb and not the slightest pretense of a wooden door-frame appears, except as an upright of wood is provided for the door to strike against. In some elaborately finished houses there will be on one side only of the twelve inch or fourteen inch partition of solid masonry a light wooden casing or trim upon which the swinging door is fitted in slight relief on its hinge side and on the side where the lock is and also at the head. That is to say, the edge of the door is rabbeted and projects a little beyond this trim and the trim serves as a means of making the joints more tight and the door-piece less inconvenient and more tasteful in appearance. This wooden trim is, however, applied, as we have said, on one side only of the wall and the jambs are not covered with wood, but are left in the plaster-faced slope or splay which the mason has given them. In short, the wood which enters into the construction of one of these houses in Avignon, in Nimes, in Montpellier, and even in Marseilles would make but a small bonfire even if it were all brought together. It is our misfortune as Americans that when we seek for an example of how the older societies of Europe, the more traditional, the more organized peoples of Europe build, that we should turn first to Great Britain, for in the British Isles building has never been as thorough and never conceived on so great a scale as on the continent. Wood has always been comparatively abundant in England and building has always been undertaken, it is difficult to say why, with less abandon—with less disposition to build massively and for all time. At the same epoch, the parish churches of France were being vaulted in solid masonry while those which Sir Christopher Wren was building in London were covered with a mere simulacra in wood and plaster. Nor is this an unusual device resulting in consequence of the need

of rapid and inexpensive rebuilding after the great fire of 1666. English monuments, national and ecclesiastical, and the homes of the great nobility have always been built on a smaller scale and in a slighter way than those of France, Germany, Spain and Italy.

The future of American building should really be marked off into two great divisions. There should be the buildings of solid masonry



Fig. 8.
LIBRARY, OLD COLUMBIA COLLEGE.

C. C. Haight, Architect.

with wooden roofs where it is not possible to substitute iron construction, or with vaulted roofs beneath the outer shell of wood or of iron, and secondly, the buildings of iron. From the buildings of either class wood should be excluded as far as possible. People must learn to make themselves comfortable on floors of cement, tile or mosaic; and they will not find this as difficult as they suppose. People must learn to dispense with wooden wainscoting of any sort, whether lining a whole room or serving as ornamental and protecting dado; with wood used anywhere except for doors and the mere sash of windows, and frequently to abstain from wood altogether, even in such familiar and such minor appliances as these. Fig. 8 gives

the exterior of the very beautiful library of Columbia College which has just been relinquished by the college for its new buildings, but which still stands on 49th street, near Madison Avenue. The lower stories of the building were occupied by the Law School, but the whole upper part, forming one large room, was the main hall of the library. Here, of course, there is no sham construction at all, nor any concealing of the construction. Here the stone and brick wall surface without and the brick wall surface within are merely the two faces of the massive wall in which, indeed, there is a narrow open space kept for dryness, but which is otherwise a solid piece of masonry. Upon this the roof of wood and iron rests in the most simple and obvious way, as the photograph fully explains. This is a really beautiful design, one of the finest things which New York contains, and it may defy criticism as to the matter of constructional sincerity and of rational design. It may, however, be thought more difficult to carry out such straightforward building in houses of many stories, and used for business and for habitation. It may be more difficult, but it has been proved feasible. The other buildings of Columbia College, such as Hamilton Hall and the basement and ground floor of the Library Building itself are instances of exactly such work applied to low stories and small rooms.

Those admirable buildings of old Columbia College were, however, built without special effort to avoid the use of wood. They would be very hard to burn; but yet there are wooden floors and wooden stairs in them. The problem which Americans should set themselves is rather to eliminate wood as much as possible. Fig. 9 shows one of the work-rooms of the Boston Public Library built from the designs of Messrs. McKim, Mead & White. The whole ceiling of this room, or more correctly the whole floor of the story above, the under side of which forms the ceiling of this room, is built with flat, dome-shaped vaulting resting upon arched ribs which go from pillar to pillar. The pillars are of stone, the arches are of brick or tile, the vaulting is of masonry, and, like the arches, of some light modern variety especially introduced for the purpose. The upper surface of this floor is smoothed with cement masonry and the flooring of tile, mosaic or the like is laid directly upon this. There can be no better floor for any purpose, private or public, when the supports beneath can be brought near enough together to allow of flat segmental arches like these of reasonable dimension. Without knowledge of the exact dimensions, and speaking from memory only, these columns may be said to be sixteen to eighteen feet apart. It is obvious that in most private houses supports could be obtained as near together as this by the simple device of springing the arch from wall to wall across any ordinary room. If the thrust of the arch is to be feared, that is to



Fig. 9.

ROOM IN BOSTON PUBLIC LIBRARY.

McKim, Mead & White, Architects.

say if the load upon the wall which resists the thrust of the arch is not sufficient to resist that thrust, then a slight pier may be advanced into the room or a corbelled construction may be built inward from the wall at a height above the height of the arch sprung from this. It is not necessary to explain in detail the constructional device here hinted at. The suggestion is merely that almost any building, public or private, may have large parts of its floors built in this way, and that only great halls for the gathering of numbers of people would require a totally different treatment of their roofs.

The building of the Mechanics' and Farmers' Bank, in Albany, erected in 1873, has a banking-room twenty-five feet high, into which opens a cashier's room twelve feet high and a lobby of en-

trance of the same height; and above these small divisions is the directors' room, also twelve feet high, occupying all the horizontal space of the cashier's room and the lobby together. Above this are rooms for storage, for the preservation of the books of the bank and for such other purposes as might be suggested thereafter, and the cellar contains toilet-rooms and compartments for fuel. The bank vault built up from the cellar floor as a pier of solid granite stands in the bank as a mere burglar proof iron box open on all four sides, with passages in constant use separating it everywhere from the walls of the building. In this building there is no wood used whatever. Not one piece of wood as large as the lead pencil which you hold in your hand, enters into the whole fabric in any form more permanent than the movable tables and desks in the cashier's and directors' rooms, and the sloping and also movable desk tops used by some of the clerks behind the bank counter. The counter itself is of stone, marble, bronze and glass. The outer walls are composed of a twenty-inch wall of solid brick, faced within with ornamental brickwork and a little cut-stone, which wall carries the floor beams; while an air-space separates this from the outer face-wall, eight inches or one brick in thickness, the cut-stone which is abundant in this eight-inch wall, being backed off to exactly the same thickness as the brickwork, so as not to encroach upon the air-space. The roof is a steep gable-roof, and is composed of iron beams which run horizontally from gable wall to gable wall and upon which iron beams brick arches rest, as in the floor, while the whole is cemented on top and the cement covered with sheets of copper left free to swell and shrink. The heavier partitions are of brick, faced with marble, where a dado was required; the lighter partitions, such as those which enclose the private rooms for depositors and for those who use the Safe Deposit Company, are made of iron grillage filled in with obscured glass. The windows have hollow iron frames and the sash are also of iron, the ornamental glass being set in copper bars. The doors throughout are made of light iron frames upon which leather is stretched. The building being thus free from combustible material is thought not to require fireproof jacketing for the iron beams of its floors which are the only large and constructional pieces of iron visible. It is not thought that heat from outside alone could injure these beams to the extent of bringing down the floors, while at the same time there is nothing within the building to make a fire, even as hot as that which one makes in a grate on an autumn day. Under these conditions an elaborate decorative treatment has been given to the building within and without. There is no plaster introduced into the building except where the arches of the ceiling are smoothed with a thin coat of plaster to receive painting. It is not, however, implied that any objection exists to plas-

tering which is a perfectly legitimate and respectable building material, and which in some of its modern forms is admirably durable and capable of excellent decorative treatment. With the appliances introduced during the last twenty-five years such a building could now be built somewhat more cheaply and it would be quite fitting, quite proper, quite realistic to treat with Keene's cement or other hard and solid plaster work such parts of the interior as might be thought too retired and domestic in their character to allow of rough brickwork, or of such staterooms as seem to demand high polish and delicate finish. The materials and aspect of this interior, and of the recitation rooms, halls and passages of old Columbia College might certainly be used, unchanged, in the twenty stories of a business building; nor need the requirements of an elegant dwelling house be essentially different.

It is to be observed that safety against fire is not the principal nor the primary good to be sought in masonry building with iron used where masonry is inapplicable. All that is good in solidity is to be had in such building as that; the unyielding, non-shrinking floor which allows of the solid and well-jointed pavement and upon which the workmen in marble tiling will gladly lay their best and most closely-jointed floor, the partitions without hollow flues to carry smells and gases from bottom to top of the house; the compact structure without inaccessible chambers where mice and rats can expatiate and in which corruption and disease may linger, a system of building which is closely allied to all the great building of the past and which allows of immediate application, both indoors and out, of whatever system of design, of whatever details, or appendages the past has given us and which we now desire to use again in altered forms. Moreover, the custom of building in solid masonry allows of liberties to be taken with the decoration without hindrance; without question; it allows of wood-work when wood-work is needed for the ornamental design, nor will any strictness of building laws or requirements of municipal departments be likely to forbid such decoration when all around is permanent and proof against the evils which lie in wait for such houses as are common with us. The writer knows a great Paris house, *à loyer*, in which the two state parlors of the chief apartment were lined with that elaborate panelling in white and gilded wood which has been fashionable in Paris for more than a century, and in which it became necessary to provide a private corridor. This was done by the simple process of taking up one whole wall of the wainscoting and pushing it four feet outward from the masonry behind it, diminishing the salon by that much and leaving a passage nearly four feet wide. With such houses as we build in New York, the Department of Building ought to find a rule forbidding any such alteration of the interior as that would be, but in

Paris where buildings are not built of quite such combustible stuff and where fires are very rare, objection could hardly be made. The wooden lining of these two large drawing-rooms is in itself as combustible as material can be, and is also, in itself, open to objections as to insects in the joints of the wood-work, "dry rot" in the wood itself and the disagreeables of a small and inaccessible space between the woodwork and the brick. So far as that goes the wood lining is, indeed, inferior to a lining of tile or plaster applied directly to the face of the brick; and greatly inferior to an exposed and decorative facing of the wall itself. The point of the argument is that



Fig. 10.

DWELLING HOUSE—VESTIBULE AND STAIRWAY.

Paris, France.

where the building is, almost as a matter of course, solid and permanent, such liberties as these may be taken with interior design and little harm ensue.

Still, however, that design which is independent of the necessity of such sheathing and facing and lining and disguising is superior and in every way to be preferred. Fig. 10 shows a modern vestibule and staircase hall in Paris, one of no very great pretensions. To build such a vestibule and staircase of Caen-stone is immeasurably cheaper in Paris than it is here. High prices are the result of our American system; there can be no doubt about that in the minds of

the most ardent patriots. The possibility, however, of such a structure as this, the staircase built and the walls faced with soft cream-colored stone of the Paris basin while the wall itself is, according to all Parisian custom, a fairly well laid solid structure of brick, unless, indeed, it is of stone throughout, as is very often the case; such a possibility as that we have now to insist upon. It will be the subject of future articles to consider how nearly some pieces of American and foreign building of the past few years may be found to approximate to such a standard as we are trying to set up.

Russell Sturgis.



BURNT CLAY FIREPROOFING AND ITS SUBSTITUTES.

WITHIN the last seventeen years forty-four tall buildings have been erected in the eleven blocks bounded by Beaver street, Battery place, Trinity place, Pine and William streets—the district which houses the bulk of the city's financial business. The average number of stories in the old buildings that were destroyed to make room for improvements was 4 3-11. The average number of stories in the new buildings is 11. The average in the buildings erected since the introduction of skeleton construction, say since 1890, is very much higher, inasmuch as twenty-story structures are, at the present day, not uncommon. During business hours each of these mammoth steel cages contains a population equal in number to that of a sizable village. In case of fire, if a panic, due to real or fancied danger, were to seize simultaneously upon the inhabitants of several contiguous modern buildings in the heart of the financial district, the street would not afford standing room for the crowds struggling for egress. In a community where such overcrowding is established, and where each successive new building intensifies the existing congestion, the imperativeness of the duty of excluding all but the most approved fireproof construction known to science, for the purpose of reducing to a minimum both the danger of fatality from fire and the danger of fatality from panic, is self-evident.

The forty-four tall buildings in question have added fifty per cent. to the rentable office space comprised in the financial district delimited. In other words, the district contains fifty per cent. more of rentable office space than it did in 1880, and the percentage increases with every sky-scraper that goes up. During the past seventeen years, on the other hand, the city's commerce has increased less than thirty-two per cent. As a consequence, according to the best

information obtainable, rentals have decreased fully one-half. At the same time land has risen in value until it has brought as much as \$330.70 per square foot. It is doubtful whether, owing to the introduction of the elevator and skeleton construction, the demand for mercantile housing on Manhattan island will ever again exceed the supply. Real estate is bringing a fair return on capital invested, but the landlord is no longer in a position to exact monopoly rents. The decline in the net income producing power of real estate necessitates the keenest economy in running expenses, precisely as in any other competitive business. The chief item of possible saving is in the matter of insurance. The better the fireproofing, the lower the insurance. When the Siegel-Cooper Building was erected, terra cotta arches were used in the floor construction, but, to save space, the columns were covered with wire lathing and plaster. The effect on the insurance is explained in the following letter from the manager of the New York Tariff Association to the secretary of the Central Fireproofing Co.: "Replying to your inquiry of the 7th inst. (Nov., 1896,) as to the effect of inferior column protection upon the rates of the Siegel-Cooper Co.; if the column protection had been made satisfactory to us, the rates on building and contents would have been about fifteen per cent. lower, which would probably have saved them over \$3,000 per year on their insurance."

The tendency of the elevator and steel construction to congest population on the one hand, and to reduce the net income producing power of real estate on the other, is especially striking in the district we have been considering. But, in varying degree, it is noticeable elsewhere throughout the city—in the residential as well as mercantile sections. Self-interest and regard for human life, therefore, combine to make it desirable for the real estate owner, in improving his property, to employ the most approved constructural material for resisting fire which the market affords. There are practically only three fireproof materials: burnt clay, cement and plaster. Each of these has been in use for an indefinite period, and, as the result of years of experience, the weight of expert opinion, both here and abroad, has long since pronounced in favor of burnt clay.

The leading plaster product is a compound of plaster of Paris, carbonate of lime, and cinders or wood chips. The fatal defect of this compound is that it absorbs and retains moisture, qualities which prevent wall decoration, afford a lodgment for disease germs, and cause wood to rot and steel to rust. The unfitness of this compound for constructural use has recently been demonstrated in two conspicuous instances, namely, the Corcoran Art Gallery, at Washington, and the Elliott F. Shepard residence, at Scarborough, on the Hudson.

Cement, whether plain or mixed with some foreign substance, as

cinders, is open to the supreme objection that, when subjected to a thorough fire-test, it loses its cohesive properties, both on account of the loss of its water hydration and the internal strains caused by the expansion of one side under heat. A thoroughly tested cement arch is found to have lost its load sustaining power, and after a period of progressive disintegration falls to the ground of its own weight. Exhaustive tests have shown that a fire of ordinary intensity is sufficient to completely ruin a very large covering of concrete. The risk involved in the use of such material is apparent when it is known that the claim is made for cement floor arches that they give additional strength to the floor beams.

Mr. Francis C. Moore, president of the Continental Fire Insurance Co., in a publication entitled "How to Build Fireproof and Slow Burning," quotes with approval the following passage from a recent writer: "The question of fireproof material is really a very simple one, and anyone who is so disposed can make the most convincing sort of test by taking a small fragment of ordinary porous terra cotta and a small fragment of the cinder concrete, which is usually employed for concrete construction, and holding a piece of each in his hands, expose the other end to the flame of a blowpipe. He will drop the piece of concrete first. Some time afterwards he will have to drop the terra cotta. If, while hot, they are dropped directly into a bucket of water, the most casual inspection will satisfy anyone that what is left of the concrete is hardly the material that is most desired for the protection of a building. Concrete is cheap, terra cotta is not; therein lies the secret of the possibilities of the use of the former material."

Some twenty-five years ago hollow concrete blocks were in common use in the United States as a fireproof material. Since the invention of the hollow tile, shortly after the Chicago fire, concrete blocks have been completely driven from the market. The Chicago fire demonstrated beyond peradventure the inefficiency of concrete as fireproofing and established the superiority of burnt clay to all other known structural materials. Burnt clay in the form of hollow tile precisely answered the requirements of fireproofing as interpreted in the light of the Chicago fire, and has been employed in perhaps more than ninety per cent. of the notable buildings erected since the introduction of the elevator and skeleton construction. Much money and ingenuity were expended in efforts to rehabilitate cement—to correct its vital defects by the admixture of some foreign substance. The most thorough and scientific experiments, covering a period of many years, were, for example, conducted by the Dalton Chemical Co., organized under the laws of New Jersey, in 1890, for the purpose of inventing and marketing some efficient fireproof substitute for terra cotta. But these experiments merely served to rein-

force the lesson of the Chicago fire. This lesson, it was thought, had been thoroughly learned. But of late years, manufacturers of expanded metal and wire lath have sought to find an increased sale for their product by combining the same with cinder concrete and other compounds in floor arch construction. In every thorough test of such arches the component metal has been found to have been so far burned away as to destroy its effectiveness as a support to the arch. In fact, the use of metal in combination with concrete merely emphasizes the danger from the defects inherent in the concrete.

Invariably, in all the tests that have been made in this country, either by Building Departments or by the manufacturers of the various concrete systems, the suspended ceilings of wire, lath and plaster, used for the purpose of giving a flat ceiling construction, have disintegrated, and have fallen by the action of the fire, or the water used in extinguishing the fire. Where the tests have been at all severe, incrustations have been found, demonstrating that the iron beams had been heated to a red or white heat.

It would perhaps be unnecessary to consider seriously the claim of the cinder concrete arch to equal the hollow tile arch for fireproofing, were it not for the aggressive advertising campaign in favor of the former which has been inaugurated on the strength of a specious fire-test conducted under the auspices of the New York Building Department, November 19, 1897. At this test a floor arch consisting of tiles of an antiquated pattern and not all of the same make was constructed by the manufacturers of the concrete arch, whether accidentally or purposely, in such a manner that the arch was not properly keyed. The result was a foregone conclusion. The terra cotta arch collapsed after less than three hours' firing under a load of 150 pounds per square foot, whereas in a previous test, conducted under the auspices of the Building Department, an arch of similar pattern sustained six hours' firing under a load of 150 pounds per square foot, and, after being quenched with a regulation fire-hose, showed a maximum deflection of only 2-16 inches. This test occurred on September 29, 1896, the arch being composed of end-construction, hollow tiles. This identical arch, far from falling in, was loaded on September 30 with a load of 600 pounds per square foot; October 20, the load was increased to 611 pounds per square foot; and on October 21, to 1,175 pounds per square foot. On the 22d of October, at 2.30 p. m., the load was shifted to cover an area of only 9x4 feet, which made an approximate load of 1,960 pounds per square foot. The deflection was then observed to be 3.41 inches. As the arch was still intact the test was discontinued. The advertisements of the manufacturers of the concrete arch state how their arch acted under the fire and water test of No-

vember 19, 1897, but volunteer no information as to the condition of the arch, say six months after the test.

Long observation of the conduct of porous terra cotta arches in artificial and natural fire-tests has established the fact that this arch gives a more thorough protection to the steel framing in a building than any arch composed of one or other of the several substitutes for burnt clay fireproofing. The numerous small air spaces in the terra cotta arch between the steel floor beams, in conjunction with the highly non-conductive character of the terra cotta itself, tend to retard the progress of the heat in a fire more completely than any competing floor arch, no matter what the non-conducting virtue of its material, as in all other arches the entire space between the beams, the floor, and the ceiling, is given to one large opening. The skew-backs of the tile further protect the soffits of the beam—the most vulnerable point in a fire—both by a thickness of terra cotta and an air space in the tile itself. In the concrete arch, if any protection at all to the soffit is attempted, the concrete is made to adhere directly to the metal in a solid mass. That there is something in the character of the porous terra cotta arch, other than the mere non-conducting qualities of the material itself, to stay the progress of heat, is recognized by the makers of rival fireproofing, and it is doubtless for this reason that they refuse to submit to a comparative test of more than a few hours' duration.

The terra cotta arch possesses a decided structural advantage in the circumstance that it is of greater thickness than the arches of cement or plaster. The floor system plays a very important part in the transmission of wind pressure and in the matter of lateral stiffness of narrow, high buildings. "It acts as a horizontal truss, and should be considered as a horizontal plate girder, which, if too thin and flexible (liable to spring or buckle), fails in the fulfilment of a most important function."

In constructive work with a simple material, like terra cotta, fraud is impossible, whereas the contrary is the case with cement and plaster compounds. In compounds, implicit trust must be placed in the contractor, and he, in turn, is at the mercy of his men. It is an easy matter for a laborer, for example, to slight his work through want of appreciation of the critical nature of the process of putting a cement arch in place. The cement which the contractor uses may be unreliable, not necessarily because of fraud on the part of the manufacturer, or unskilful manipulation on the part of workmen, but because of injury from exposure in transportation or storage about the building. A properly set terra cotta arch, to keep in place, does not depend entirely on the mortar used, while a concrete arch is necessarily altogether dependent on the quality of the cement. A defective hollow terra cotta block is readily detected. In construc-

tion work of such importance as a concrete floor arch, to secure reliable results, it is necessary to test every barrel of cement. Concrete that has lost its tensile strength in part, can, of course, be used at times as a mortar, or in other ways in a building, without serious danger, but in the construction of an arch, defective cement can never be used without the risk of serious consequences. Those who are familiar with the use of cement in plastic or monolithic work are aware that occasionally mixtures which at the time the work is in progress seem likely to prove good will, later on, go to pieces unexpectedly; frequently after several months have elapsed. Knowing the uncertainty of cement, the makers of terra cotta arches exercise unusual care in lowering the centering of an arch, for fear that, should the arch chance to depend on the cement to any great extent, it might give way.

But the great source of danger in cement arches arises from the tendency to use too little cement in the concrete mixture, because of the cost of the cement; keen competition among the concrete fireproofers forcing contractors constantly to do cheaper work. Cement sidewalks, when first introduced, served their purpose so well that they soon came into extensive use, but now, in the days of keener competition, it is rare to find a good piece of cement work in a sidewalk, and it is only natural to expect that the same results will follow in the case of the cement arch. An expert interested in hollow tile construction states that frequently, when looking at cement work in progress at a building, where he knew, from the price at which the work had been taken, that it could not be done in accordance with the architect's specifications, he has seen barrel after barrel of cinders or sand surreptitiously turned over into a mixture of concrete just passed by the architect's representative as right. This was done as soon as the inspector's back was turned, or after he had left the building. Besides, it is well known that bribery is frequently resorted to in like cases to secure the contractor against loss.

There is no better known fire fighter than Chief Charles W. Kruger, of First Battalion Fire Department, New York, who has just completed his twenty-fifth year in the service, and his recent experience in the large fire that swept clean the west wing of the sixth floor in the Postal Telegraph Building, is a case in point which illustrates the futility of using plaster or concrete in fireproof construction. The columns were covered (as in the Siegel-Cooper Building) with wire lath and plaster in order to economize room and save expense. The wooden studding, placed for its support back of the wire lath, was found to be in flames, and instead of acting as a protection simply added to the difficulties of extinguishing the fire.