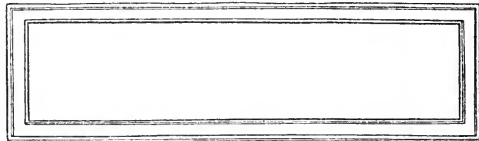
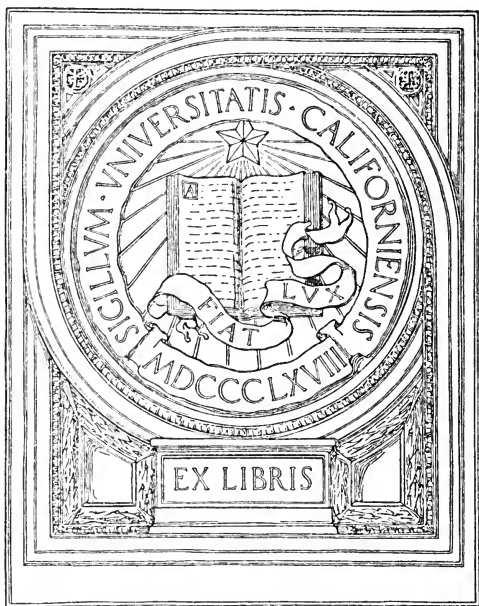


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Principles of
Architectural Composition.

An Attempt to Order and Phruse Ideas
Which have hitherto been only felt by
the Instinctive Taste of Designers.

JOHN BEVERLY ROBINSON.

With an Introduction

By RUSSELL STURGIS.



To

WILLIAM ROBERT WARE

*Professor of Architecture at Columbia University, whose generous approval stimulated
his efforts, this volume is dedicated by the Author.*

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TO THE
ARCHITECTURAL

INTRODUCTION.

BY RUSSELL STURGIS.

It is, of course, a question whether architecture, in our time, will improve in its artistic character, or will deteriorate until that character is wholly lost. There is a tendency in each direction. The evil influences which cause the tendency downwards are numerous, and have been discussed on many occasions—the commercial demands which control nearly all costly buildings, the ignorance of the public men whose opinions control what is erected for the State, the changed position of the architect from that of a salaried artistic supervisor to that of a highly paid fiduciary administrator, and the disappearance from the modern world of the ancient instinct towards ornamental design. The good influence which causes a tendency upward is merely the slowly developed sense of our own short-comings caused by that very self-conscious, comparative study of ourselves and of the past which has injured architectural design in the past but as we believe in the past only ; to help it greatly in the future.

“ Nothing is certain but the unforeseen,” and in like manner, nothing happens but the unexpected. Whatever we prophesy is surely destined not to come to pass ; so much wisdom seems to have come to us from the last two hundred years of political, social and literary prophesying. Tendencies are all that we can judge of ; and even these are difficult to trace, lost as they are to sight and to touch amid the vast complexities of modern Societies, stretching over continents and reproducing themselves beyond seas. For aught we in America can tell, the clearest “ pointer ” towards the unfulfilled promises of the future may be traceable in the country,

houses of some Australian colony ; or equally well in the building and adornment of some steel cage construction now rising in some American town. We are now partly able to judge of the tendencies which were at work in 1850 and in 1865 ; not yet can we say with any boldness what was doing in 1880 ; and as for which way we are tending now, the death of one architect—the breaking up of one firm—the appearance of one rich real-estate man with better taste and more boldness than the rest of his kind—the action of one art Society with more continuity of purpose than the others—and obviously the appearance of one artist of exceptional fixedness of purpose—any one of these things may in a fortnight change the whole aspect of things and reverse what seem to us the probabilities. One thing only we know, and that is that every little influence which makes for progress is to be encouraged to the full. In modern buildings—undertaken in haste, decided on in a scrambling meeting between ignorant committee men and headlong architects, put through in one-fifth of the time which their design and construction require—in modern buildings the artistic problems connected with grouping, massing, sub-division, relation and proportion have but little weight. These problems are indeed always in the mind of the architect, if he is of any native force and of any gained knowledge at all. Let no one believe that the modern architects are indifferent to their needs as artists or to the shortcomings of their work. No man who is rushing a twenty-story office building toward completion but knows that he is, partly under compulsion and partly of his own fault, ignoring all that is best in what should have been his design. Grouping, massing, sub-division, relation and proportion are all felt to be necessary subjects of thought and of study ; and our buildings are perfectly well known to be erected without due consideration of those vital qualities. If, now, it be possible to thrust into the daily life of hurried architects some easily grasped

principles and some visible conclusions about those vital qualities, assuredly there is something gained. It is because those great qualities are needed that the hurried designer turns to plates in which ready-made proportions are laid down:—poor things enough, in which special examples of great ancient art are tortured so as to seem fit for universal application. The most accomplished architect of the day might become more accomplished if he would read and master a statement, however slight and inadequate, of the true principles which control, let us say, the sub-division of a building in its height. The general proposition that a Greek temple spreads wide and has a low-pitched roof while a Roman temple narrows itself and increases its own height, stands upon a lofty podium and gives itself a steeper roof; that this tendency is carried further in the Middle Ages, where the outer walls draw together and push the roof up and the roof itself becomes at least as steep as forty-five degrees with the horizon, and that as the styles develop themselves this height and this upward tendency steadily increase; and all parts increase together—every part sympathizing with every other;—a general statement of all this should be in every student's hand with whatever elucidation and whatever explanation of apparent exceptions the writer's space may allow or the reader's intelligence may super-add. The substance of such a statement of principles should be familiar to every one. A host of these considerations may lie in the mind, unconsciously affecting one's daily practice; and they may leap to light when the time comes for conscious use of them, and vitalize the whole of an important artistic creation.

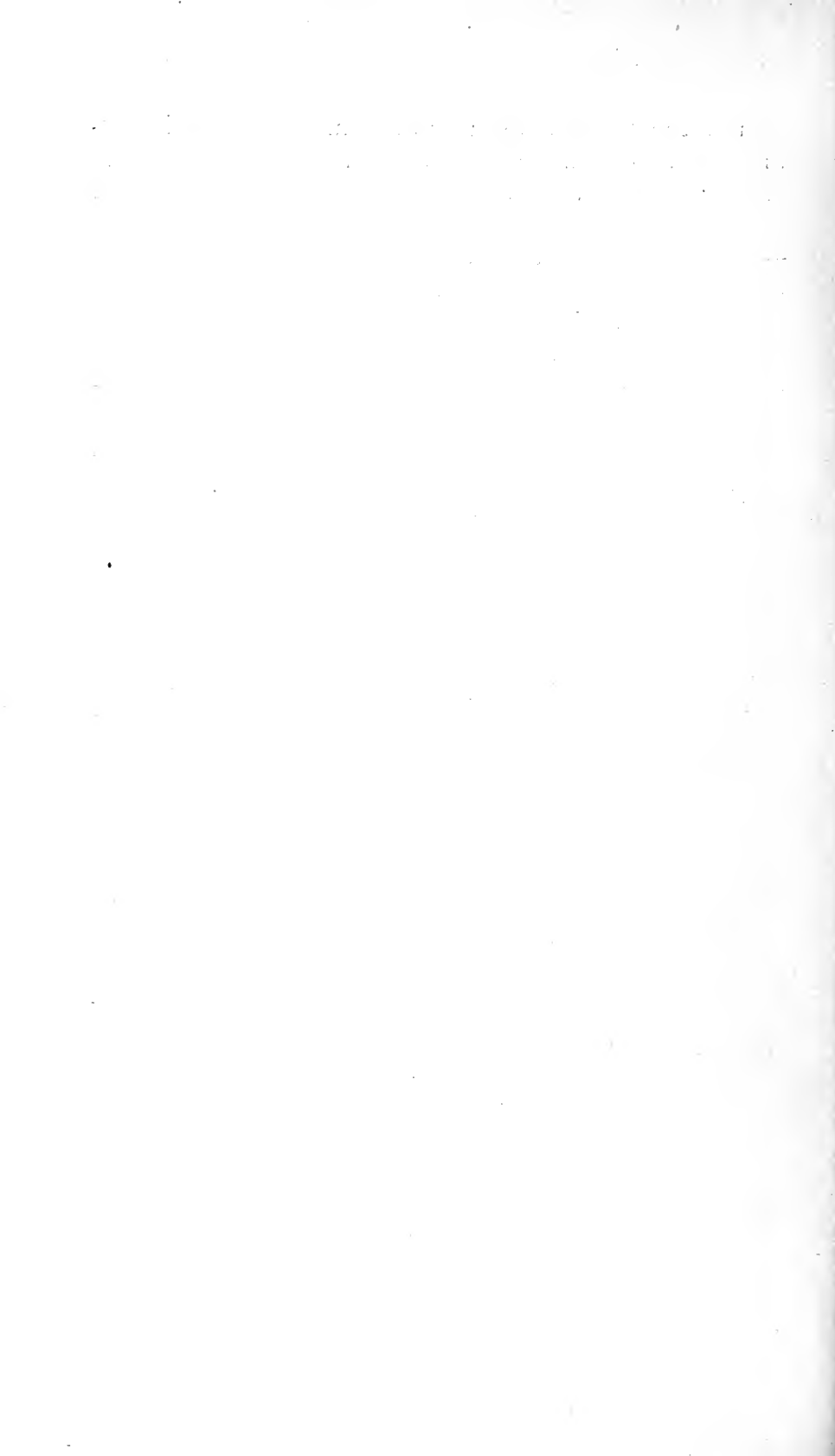
There is another weighty reason why these general principles should be urged, in season and out of season, and forced upon the attention of all. To a limited number only is it given to feel so strongly the fitness of things that a high and narrow building in their hands

will never receive the cornice which is better adapted to a low and broad one, and that the relation between the spread at the basement and the overhang of the cornice will be felt to influence the whole exterior. There are but few persons who feel instinctively that a gable in this place is impossible unless certain dispositions can be made of other gables elsewhere; and that lacking such dispositions the first gable must be suppressed or must be turned into a tower or a flat topped bay-window. The majority of men need much help in these matters; and such help is best given by the reiteration of those general principles which govern architectural design. On the other hand, the few who are specially gifted in this matter of abstract composition are none the worse for the possession, ready at hand, of a clear statement of the theories which underlie their natural practice. Even if the statement of the case does not seem to them absolutely that which they themselves would have made—even if they disagree with much which the writer says (as is inevitable in the case of these little understood, little used theorizings) they will be strengthened by the comparison of their own views with those of a careful and discriminating analyst.

For these reasons the book to which these words serve as preface has been undertaken and is now published. Its perusal and re-perusal are important to practitioners, because they need to think sometimes about their practice, and more important still to students, because they need to think all day long and every day about their future practice—it is recommended to “laymen,” that is to say, to those who do not practice any fine art, because it is quite time that our “lay” public were a better critic of the artist. The non-professional lover of architecture is hardly aware as he passes in review the latest additions to the architectural display of his native town, or as he visits a neighboring city where the architects have been busy, how little of artistic feeling and artistic power has gone to the crea-

tion of the monuments around him. The artistic feeling may, indeed, have been in the designer; but the artistic power was not there, or was not put to use, because whatever may have been the native possibilities—the inborn capacities of the man, there has been no opportunity to develop them. The painter and the sculptor, each one of them, is practicing a still living art, an art not thought to be in its heyday of triumph and yet known to be alive and growing toward still better and higher things; but the art, the fine art, of the architect is in a state not of decadence but of negation.

If, now, the busy architect be reminded, as he will be, forcibly, as he studies this book, of some of the most important qualities that go to make up the work of architectural fine art, he will be greatly helped thereby; for he will find it easier, when next the choice is proposed to him of starting his building with the least possible friction, on the one hand, and of making a finely designed building out of it on the other, he will find it easier than before to choose the more difficult but the nobler way. And as for the student and the beginner in architectural practice, the importance to them of this powerful and intelligent exposition of the great principles of design will enable the first to study in a vastly more intelligent way, and will help the second toward the happy and ennobling career of the artist rather than the less attractive life of him who merely plans and erects buildings to order, as the requirements of convenience and of investment somewhat hastily ordain.



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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 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.

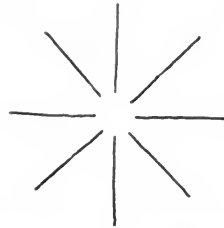
Unity.

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.

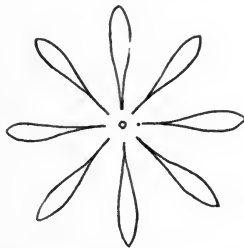


1. Random lines without unity.



2. Lines united by their arrangement.

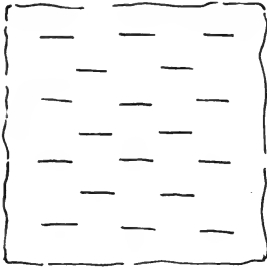
If now, instead of straight marks, we give the parts shapes that are pleasing, we add grace, thus (3):



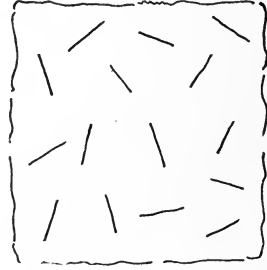
3. Grace added to unity by the shapes given to the parts.

There is another method of arrangement by which separate things may be united; not, indeed, into a whole, but into an unfin-

ished part of a whole that must be otherwise completed. If we arrange our former units, either regularly, like this (4), or irreg-



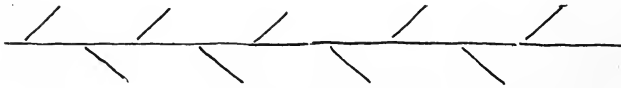
4. Objects evenly disposed, giving continuity to another object upon which they occur, but only when a boundary is marked; otherwise giving a sense of incompleteness.



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,



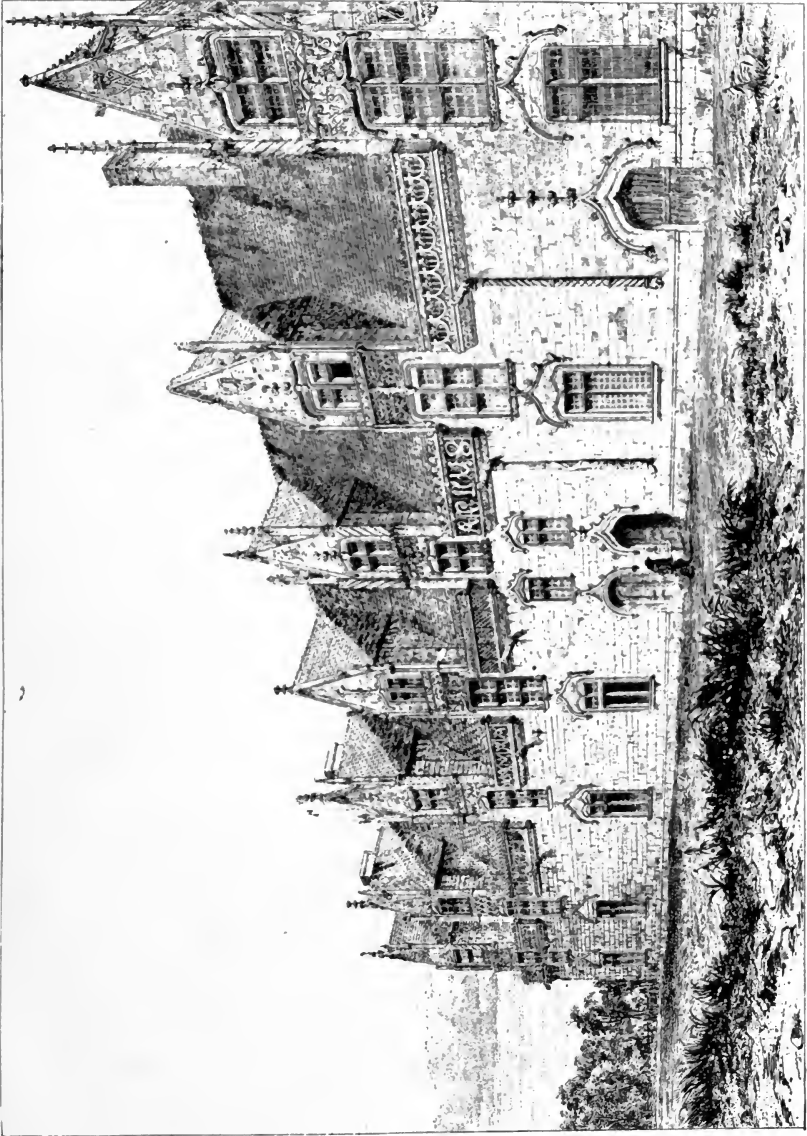
6. Objects, occurring at even intervals, giving a sense of incomplete continuity until the terminations are marked.

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.

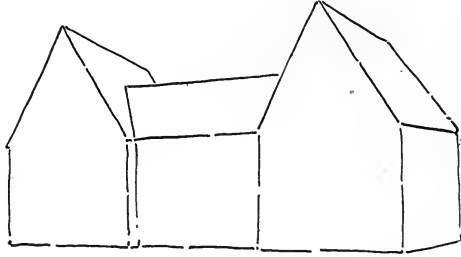
In architectural composition there are two principal processes, in which considerations of unity are paramount—the assemblage of parts that are side by side into a whole, which we may call grouping; and the separation of the building as a whole, when it is a single mass, or of each of the component parts, 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.

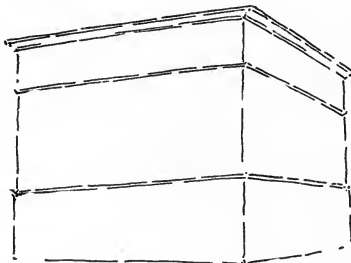
Thus, in figure 8 two masses—joined by a lower connecting link—have been grouped; in 9, the combination has been subdivided horizontally into three parts, by the sill-line and the eaves line carried through; and upon the gables and the connecting link, windows, dormers, and columns have been placed by ones, twos and threes.



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

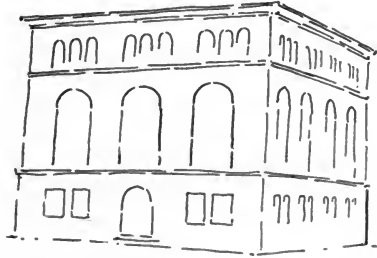
So, again, in 10, the single mass of the building has been subdivided horizontally into three parts, by the sill-line and the eaves line carried through; and upon the gables and the connecting link, windows, dormers, and columns have been placed by ones, twos and threes.

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 II, in each subdivision, windows of different sizes and shapes, and in different numbers, have been grouped.



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

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.

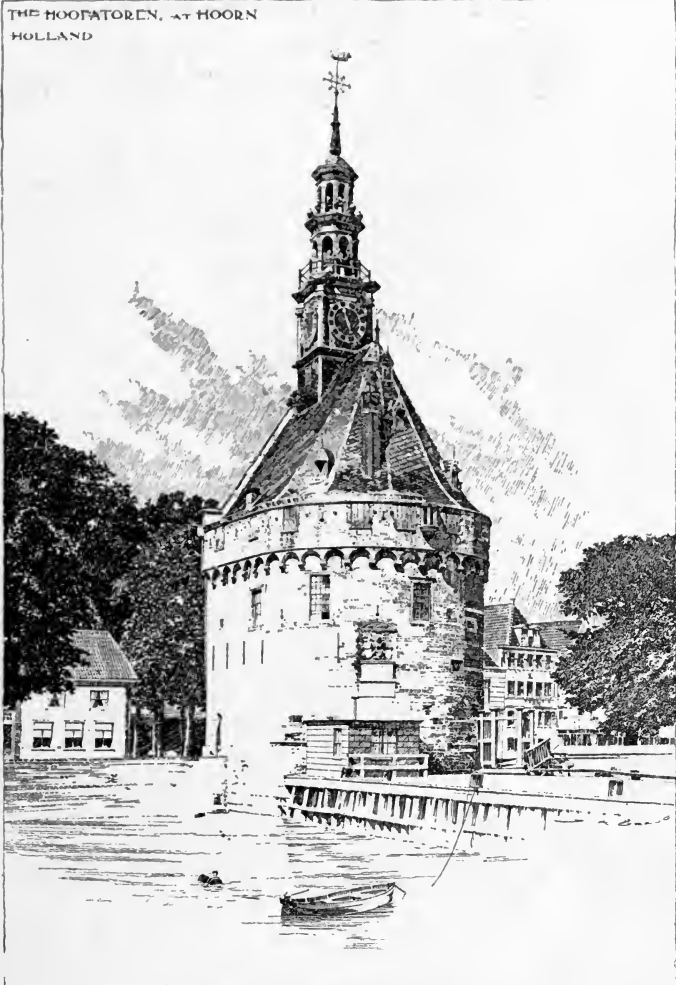
In both, it is essential that one of the three should be the largest; it is also essential that it should be in the middle.

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.

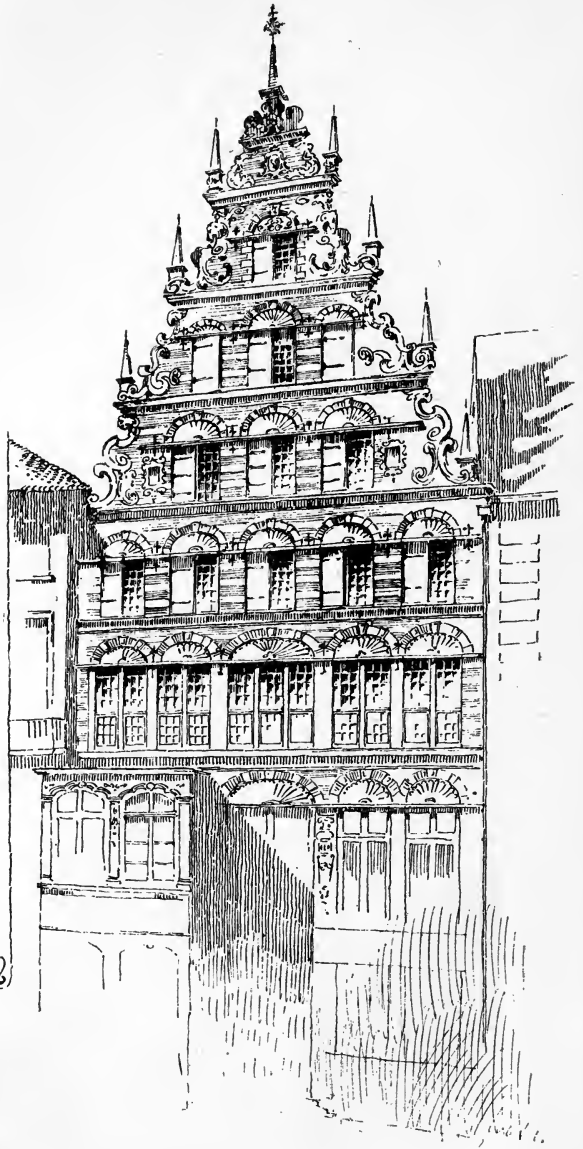


12. A Single Mass. Although sub-divided into horizontal parts by the line of the cornice, it is single in vertical division; that is, it has no other mass standing beside it. The oneness is accentuated, too, by the one big dormer on the roof.



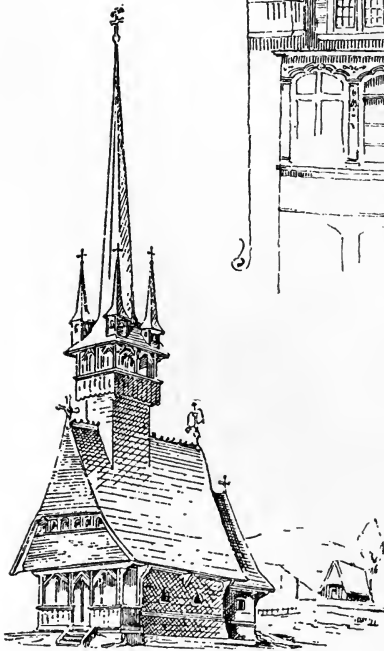
13. THE HOOPATOREN, AT HOORN.

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



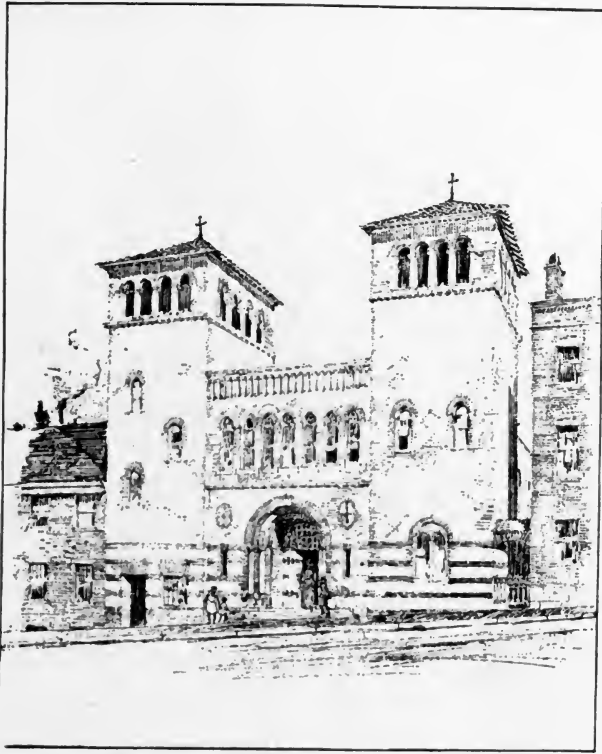
14. THE MARKET, BREMEN.

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.

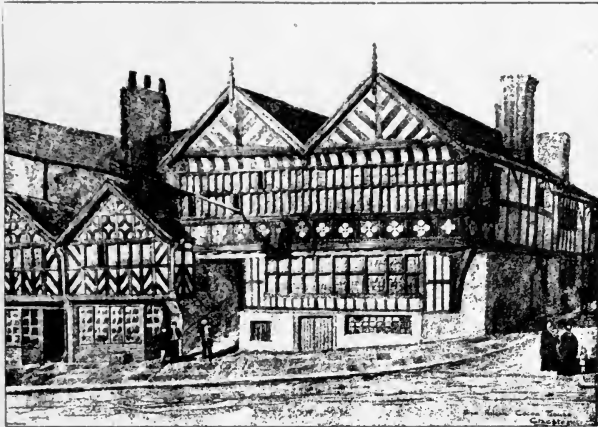


15. CHURCH AT VORÖSMAT.

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

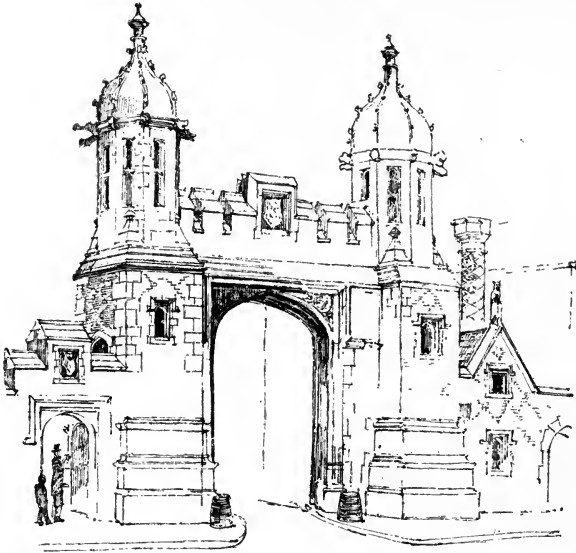


16. MISSION CHURCH OF S. AUGUSTINE.
A group of two objects, connected by a link.



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.

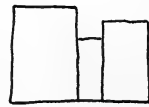
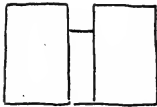
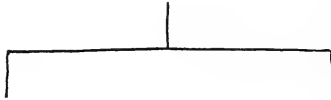


18. GATEWAY TO LINCOLN'S INN.

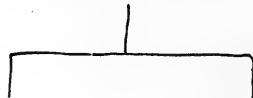
Two masses, joined by a link of a different character from that in 16.



Single mass.



Double masses.



Groups of equal parts.

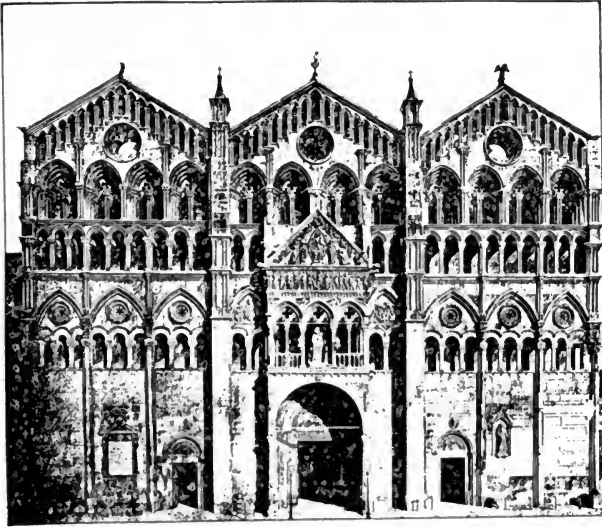


Triple masses.



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.

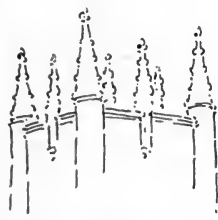
Recall Ruskin's denunciation of the familiar four-pinnacled type of tower, 23, and realize that you know—what he didn't know—namely, why he disliked it. If you think that he was not justified in his dislike, recall the many cases where tower-builders themselves made one of the four much the largest, 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.

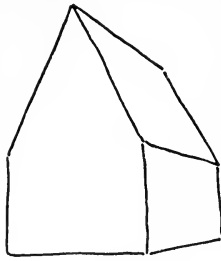


25. Four pinnacles and four smaller pinnacles, giving the effect of a multitude.

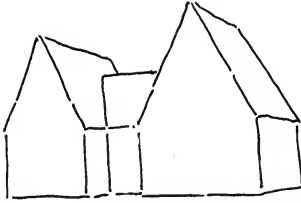
Therefore, in shaping our first thoughts of what our plan is to be, we must remember that the outside, whatever be its character, must consist of not more than three leading parts. If we are going to have high roofs and gables, we may have a single gable, or we may have two unequal gables, or two equal.

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.

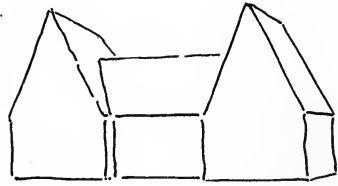
It is just the same if we are dealing with flat roofs and square masses. The single mass of this kind is the usual thing, but the group of two equal is as good; so is that of two unequal or those of three, whether symmetrical or unsymmetrical, and whether the square-topped masses are broad and low, or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



Single.



Double unequal.



Double equal.



Triple unsymmetrical.



Triple symmetrical.

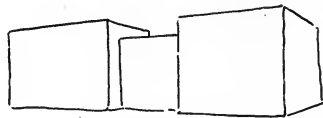
26. GROUPING OF GABLES.



Single.



Double unequal.



Double equal.



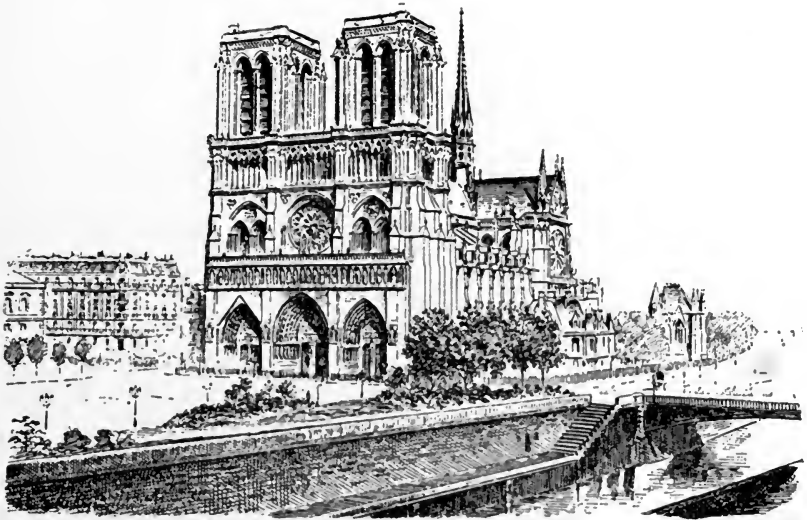
Triple unsymmetrical.



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,



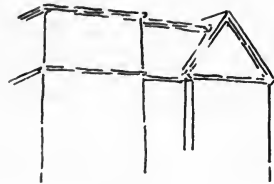
28. NOTRE DAME, PARIS.

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

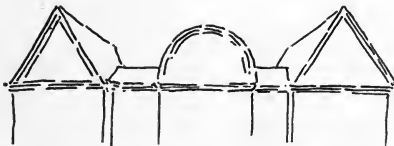
one of three, 29—the former indistinguishable, the latter so much alike that it is long before it occurs to us that the biggest has no pinnacles, while the other two have them.



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 minster, 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 Lisieux 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

34. FACADE OF LISIEUX CATHEDRAL.

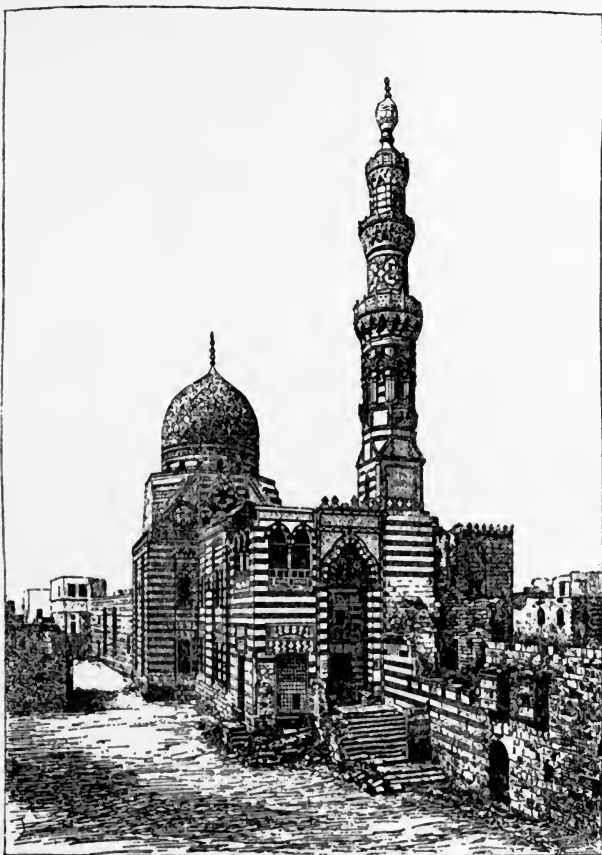
Illustrating the bad effect of unlikeness in two objects grouped together.

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.

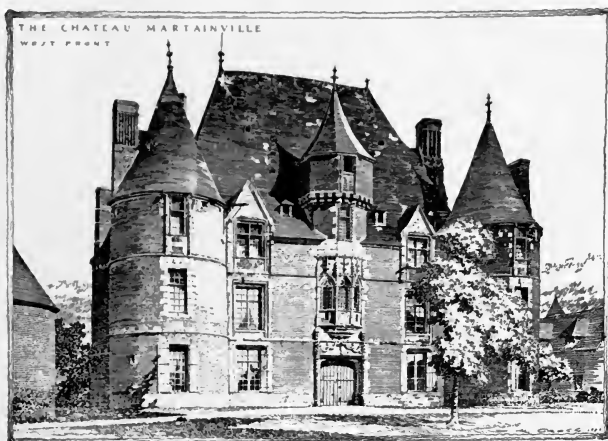
If we mean the main motive to be a single mass, we must abstain





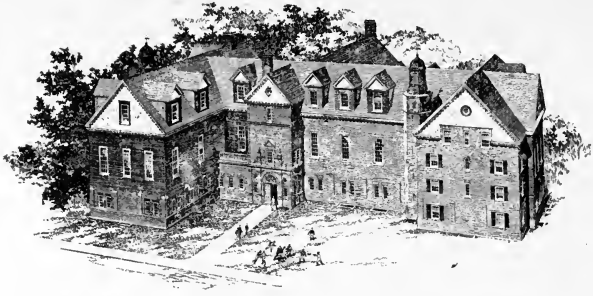
F 35. MOSQUE OF KAIT BEY, CAIRO.

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,

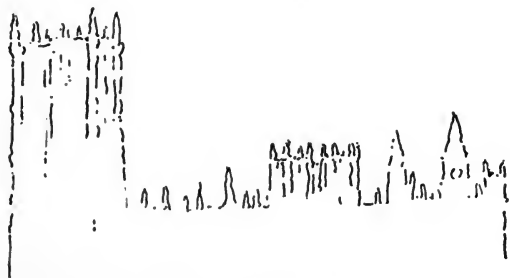


38. A group of three similar objects, one of them predominating. Here again the small turret between the two of the façade, detracts from the effect.

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



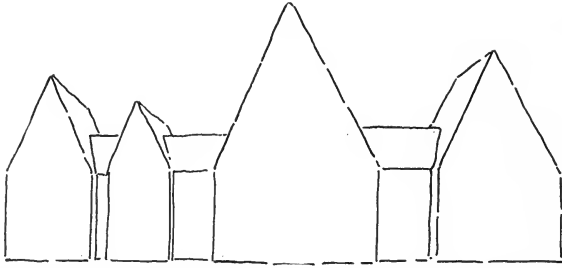
40. Ill effect of triplet of nearly equal size, the largest not in the middle.



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.



45. CHURCH OF BASIL THE HAPPY.

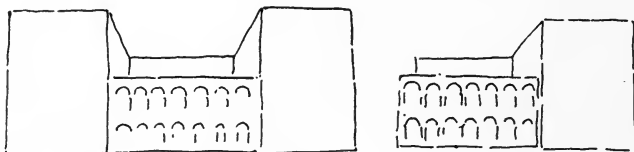
A group of a large number of heterogeneous parts, harmonized by a single very large one.

IV.

Grouping of Subordinate Parts.

HITHERTO, although we have given our rules a general application, we have spoken only of the instances in which the masses to be grouped themselves constituted the building.

We are to speak now of masses that are parts of a building in a somewhat different sense. In the former case, indeed, the masses to be grouped were necessarily parts of the whole; but none could be taken away without leaving the building a fragment only. The Pitti palace, for instance, on one side is a group of two pavilions. If one be taken away there remains, not a building with one pavilion, but a fragment of a complete building, as seen in this diagrammatic sketch (46).



46. Sketch of a group of two principal masses; neither can be removed and leave a complete design.

If, however, the parts are such that they may be removed without destroying the completeness of the main mass or group of masses, they are properly regarded as subordinate parts. Thus the two dormers in 47 may be removed, yet still leave a complete single mass.



47. Old building at Lisieux. A single mass with two subordinate masses, so classed because one or both may be removed, yet leave a complete design.

All that we have said with regard to the grouping of the main masses applies to that of subordinate parts, with some slight modifications.

If, instead of making our two gables the chief part of the design, we apply them to a larger mass which has been previously created, we at once have the second step in a design (49). To begin with, we had a roofed mass, gabled at each end, straight at the side (48). For some reason we wanted to develop further the side. Adding the two gables makes a more complex design of the side, leaving the singleness of the main mass untouched. We may, if we prefer, add



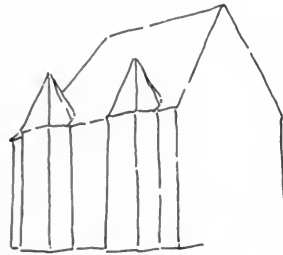
48. A single mass without subordinate parts.



49. The same, with two subordinate gables.



50. The same, with two subordinate bays.

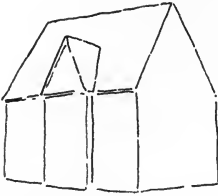


51. The same, both the bays and the main mass having steeper roofs.



52. Chenonceaux. A fine example of both double and triple subordinate masses, the two turrets and the three dormers.

two bay-windows, low and wide, like 50, or tall and narrow, like 51: the homology of the designs is evident at a glance. Here is a view, 52,

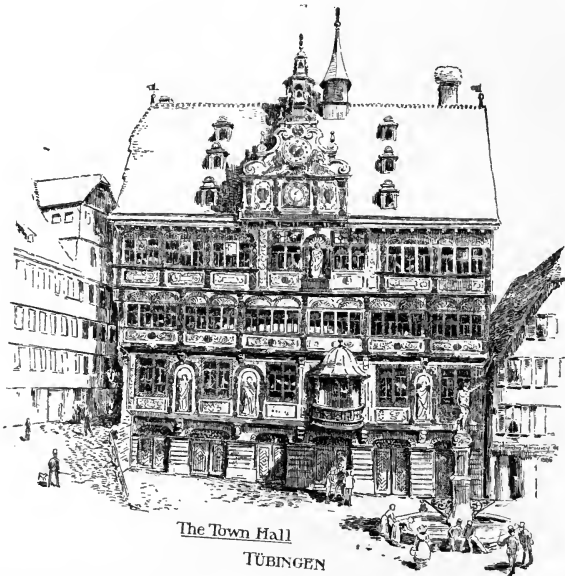


53. A single central subordinate part.



54. A single subordinate part, unsymmetrically placed.

of the Castle of Chenonceaux, showing a double grouping of turrets as subordinate masses, also a triple group of dormers, but nothing that compares with the bulk of the main wall and roof. Instead of two gables or bays, one gable or bay, either central or lateral, would make a satisfactory design, 53, 54, 55; or, if we want to put two subordinate features on the gable end of our main mass, we



55. The large dormer constitutes a single subordinate mass.

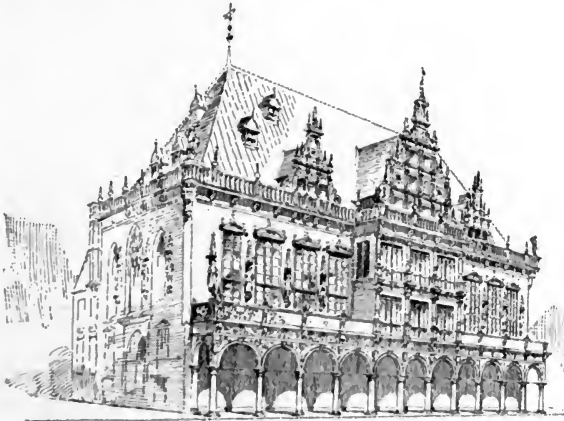
may do so, providing we know what we are about, and either assert our one main pointed mass, by making the two things square-topped (56), or make it a triple treatment out-and-out, by capping all three parts alike as at 57. Here in 58 is a triple group, a gable and two dormers, all treated alike, and in 59 a group of three turrets in which the fault is that they are too big for subordinate masses and not big enough for principal. Hardly anything is more effective than a single large feature upon the main mass. Such a



56. A group of two subordinate bays.



57. The same in plan, converted into a triple group by the addition of the oriel.



58. The Rathaus, Bremen. A group of three gables upon the larger single mass of the building.

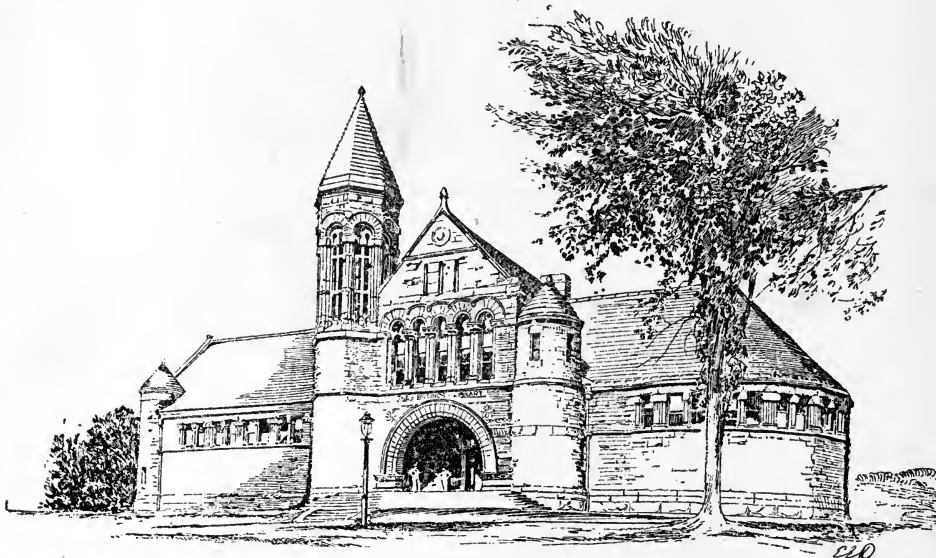




60. A single mass with a single subordinate mass.



61. The same as the foregoing.



62. Billing's Library, Burlington, Vt. H. H. Richardson, Architect. The gable is the principal mass in this composition. The taller tower is a single subordinate mass placed unsymmetrically. It is to be regarded as single because the smaller and rather anomalous tower is not large enough to constitute with the other a group of two.

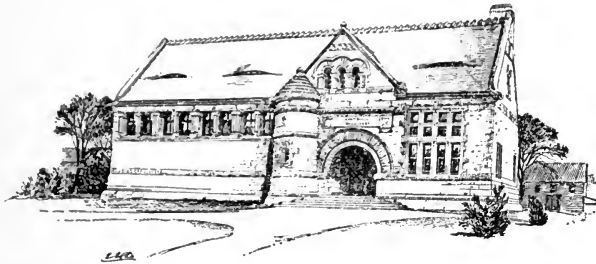
dormer as this (60) is analogous to the single tower upon the Palazzo Vecchio at Florence—the largest thing upon it, yet not large enough to dominate it. Here in 61, is a rustic cottage, redeemed and made beautiful by a single octagon turret-roofed bay.

Such a single feature may also be placed unsymmetrically without loss of either effect or dignity, as the tourelle at 62 and the tower at 63.



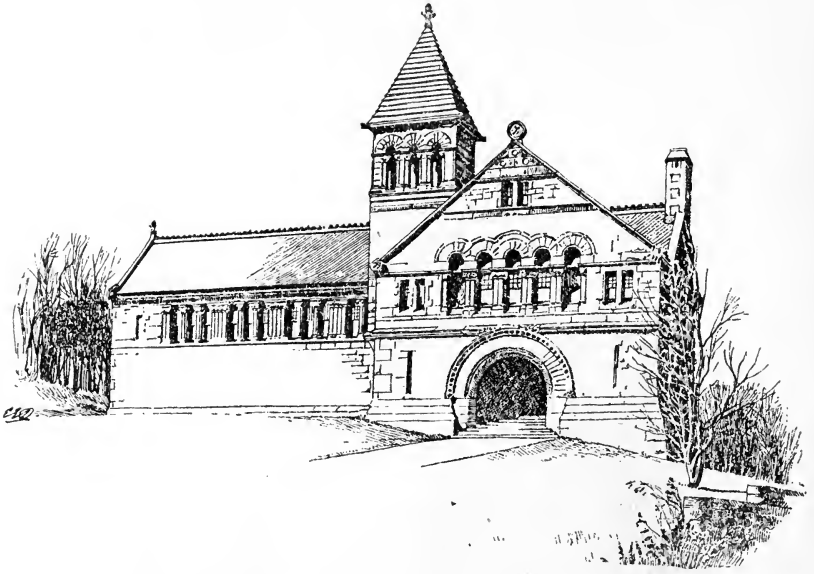
63. A single tower placed unsymmetrically.

Two more instances of a single subordinate feature are shown in 64 and 65.



64. Crane Library, Quincy, Mass. H. H. Richardson, Architect. A much better example of a single unsymmetrical mass than is the Billing's Library, 62. The gable is a subordinate mass upon the building and the turret upon the gable, both arranged unsymmetrically.

Returning, for a moment, to our groups of two—besides the equal couplet, we may use the couplet of unequals even more freely and with even better appearance for subordinate than for main

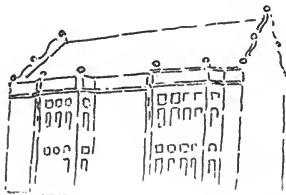


65. Library, North Easton, Mass. H. H. Richardson, Architect. Here again the gable is a subordinate mass upon the building and the tower is the same with respect to the gable.

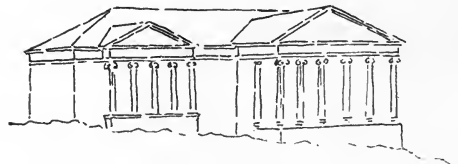


66. A group of two unequal subordinate masses.

masses. Such an unequal couplet is sketched at 66, and it is seen in the well-known Rathaus at Rottenburg, 67. Hardly any motive is more available for modern work; whether it be a shingled cottage with bays suggesting towers (66), or a brick and stone house, with wide English-fashion bays, like 68, or even pedimented masses like these at 69.



68. Two unequal subordinate masses.



69. The same as 68.



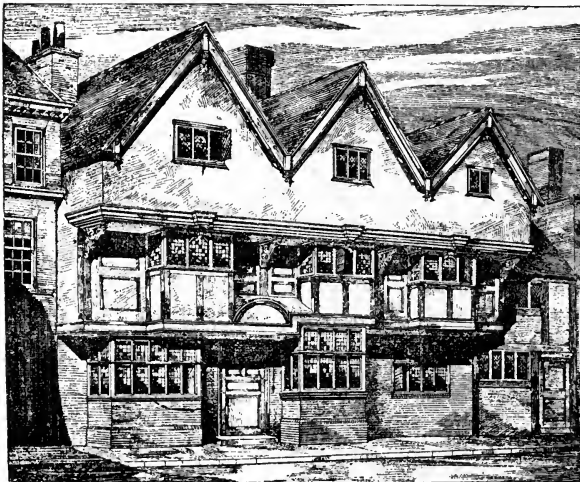
67. Rathaus, Rothenburg. The turrets are double unequal subordinate masses.

So far, the grouping of subordinate parts is strictly analogous to that of main masses. Instead of having to connect them, however, by linking masses, smaller than the main masses themselves, they are already connected by the larger main masses, which serve, as it were, as a background upon which the subordinate parts occur.



70. Residence, Frank Hall, Hampstead, London. An example of three equal subordinate gables.

When we come to three subordinate objects, the analogy maintains, with one difference: in groups of three masses, one must be larger than the others; in subordinate groups, three things of equal size make a harmony, as well as three things where one predominates. Three equal dormers do very well; so do three equal gables, as 70, 71, 72. But here we are on a precipice. Three equal bays (73)

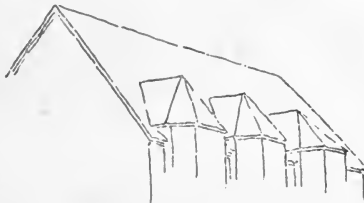


71. An Old House, at Canterbury. Three subordinate gables, equal in effect. The gradation in size is perhaps for perspective exaggeration.

can be made acceptable only by great care. If they are just right, they may be charming; if they are wrong, they will not do at all. Just right and just wrong means this: just right is where the main mass predominates; just wrong is where it fails to predominate. In the latter case the three subordinate masses appear as a group of main masses, and fail to look well owing to their equality.

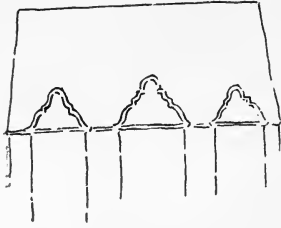


72. House at Cambridge, Mass. The dormers are three equal subordinate masses; the porch a single subordinate mass.



73. Group of three equal bays.

But if we have our group of three with one bigger than the others, all is well. We may do much as we please, all is sure to be well, as far as the number of things is concerned, whether the triplet be symmetrical, as at 74, or unsymmetrical, as at 75.



74. Three gables, the largest in the centre.



75. Three tourelles, the largest in the centre.

There is another sort of subordinate parts that we must call attention to, although briefly, as the same rules apply to it as to the rest, and to reiterate them would be profitless. It comprises main masses that are divided into parts directly, instead of the parts being placed upon them as backgrounds. Such a case is shown at 76, 77, where the mass is cut up into three gables, instead of three gables being placed upon the mass, at 74.



76. Three gables set close together.

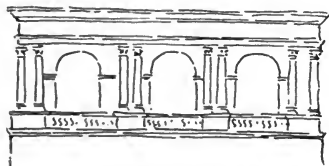


77. Cathedral, Siena. The façade is an example of three unequal gables.

Here is another grouping (78), which we are not yet able to classify, but shall be hereafter; and another (79), perhaps premature, where detail is used to effect the subdivision of the mass. But the great difference between the grouping of main masses and of sub-

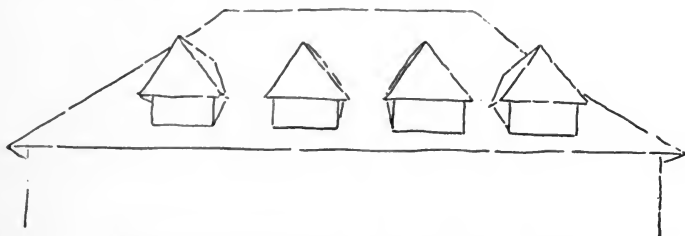


78. Mass with two appendages, to be spoken of hereafter.



79. Three bays.

ordinate parts, is that in the former, more than three parts are not to be used, unless the parts, should they exceed three, are thrown together into groups of twos and threes, as we have said; while in



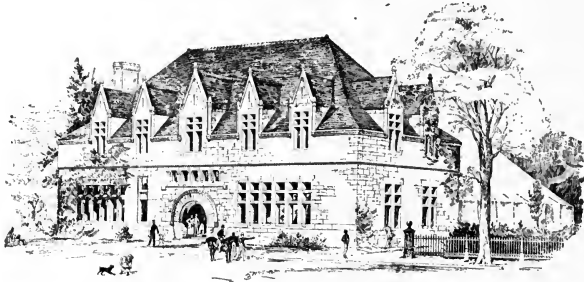
80. The dormers are a row of subordinate masses.



81. The same. The projection of one gable does not prevent its grouping with the others. There is also a group of three bays between the gables.

arranging our subordinate parts, we continually have to use four or more objects. Nothing could be desired better than a row of four dormers, like this (80), for example, and the reason is that we think of it collectively, as one row and not as four individuals. Here, again, is a row of four gables, 81.

There might be five or six or more, the result would be substantially the same; the exact number to be used if in excess of three being determined by other circumstances. It is as well to note, however, that uneven numbers in rows have more individuality and

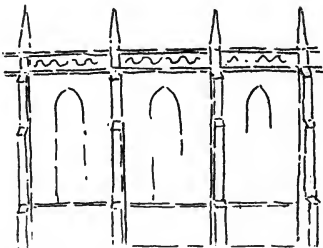


82. Design for Building for Horticultural Society and Park Commission, Boston, Mass. A row of five dormers, the central slightly larger.

less continuity than even numbers; if we had put five dormers, it would have given more sense of a group of individuals, the eye naturally picking out the central object and regarding the rest as grouped on each side of it (82).

In almost all buildings four or more parts are used on the sides, although usually these parts are hardly important enough to be called subordinate masses, but are merely details, windows, arches, and the like. Yet when, by the use of these details the mass is separated into parts, the parts are naturally classified as subordinate parts, and distinct from the details that mark them.

Thus, a wall, cut up by Gothic buttresses or Renaissance pilas-



83. Subordinate parts obtained by separation of the main mass by details.



84. The same as 83.

ters, is separated into parts that are distinct from the details—buttresses or pilasters—that define them, as in 83 and 84.

We may then say as follows:

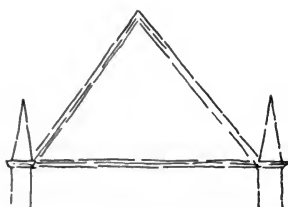
Rule VII. Although four main masses may never be used as a group, four subordinate masses may be used upon a main mass, whenever a sense of continuity is required.

There is one more sort of subordinate parts that we must allude to, besides those that are applied to the front or sides; it includes those that are set upon the top of the main mass, which becomes a sort of base for them—fleches, belvideres, belfries, pinnacles—everything of the sort that is not too big; if it be too large, the objects becomes itself the main mass, as a great dome or tower.

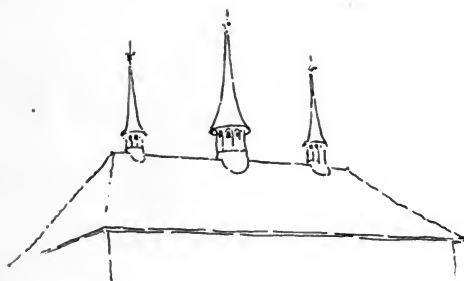
Such things are used in quite analogous ways to those that we have before spoken of; indeed, many dormers, when seen so near as to bring them against the sky-line, are evidently closely allied to such things as belfries. We may plant them on one, two or three



85. A single belfry used as a subordinate mass.



86. Two pinnacles similarly used.



87. Three ventilators, similarly used.

(85, 86, 87), and, by making one much the largest, just as in the case of main masses, we may use various groupings as our fancy suggests, as well with these objects applied to the roof as with the bays, oriels, and other subordinate masses, that are naturally applied to the side.

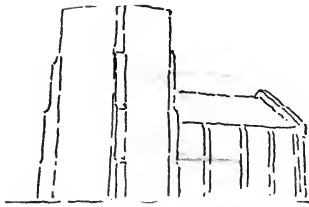
V.

Appendages.

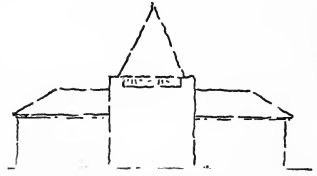
HITHERTO we have spoken of but two kinds of main masses—individual units and the linking masses that we use to connect them. This is not quite all that there are in architectural compositions; we must describe one more kind, and that will comprise them all.

The masses that are now spoken of are those which are attached to a main mass, but do not connect any other main mass with it.

A tower with a building attached, as long as the tower is as important as, or more important than the building, is a case of a mass with a single appendage (88). Where there is one on each side, as at 89, it is a mass with two appendages. Several examples are given of both single, 90, 91; and double, 92, 93, 94, 95, 96, 97, appendages.



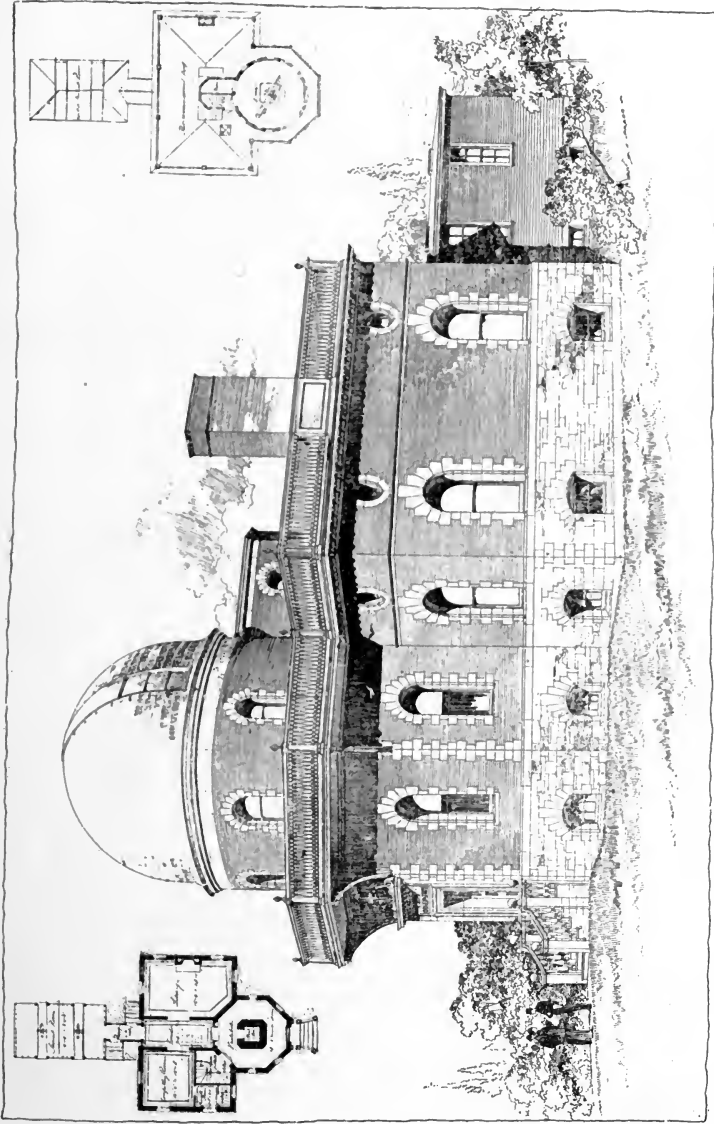
88. Mass, with one appendage.



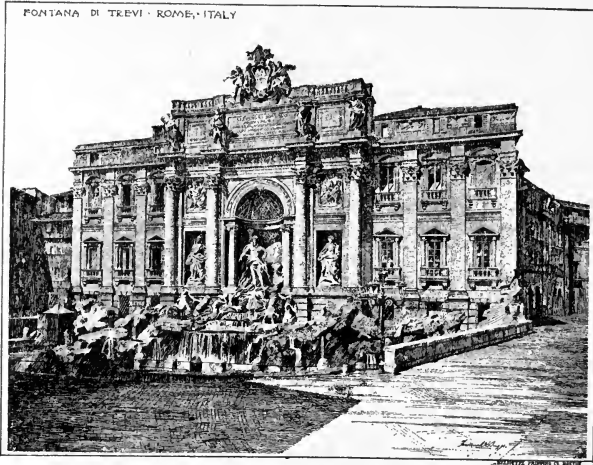
89. Mass, with two appendages.



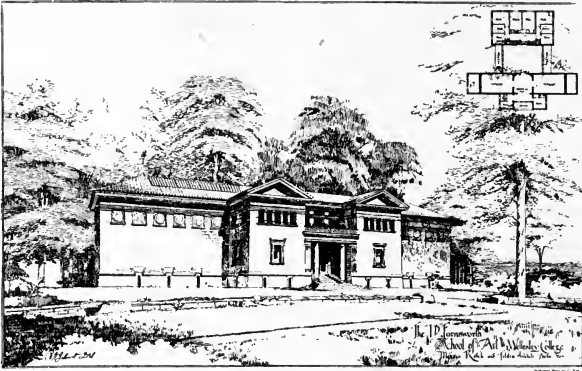
90. Mass, with a single appendage. The one-story portion on the left side is the appendage.



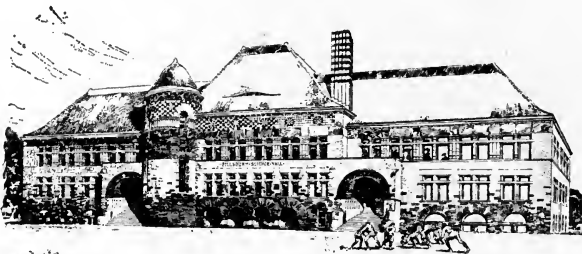
91. Sketch for the Ladd Observatory, Brown University, Providence, R. I. Single mass with an Appendage. The dome is the main mass, the part on the right the appendage.



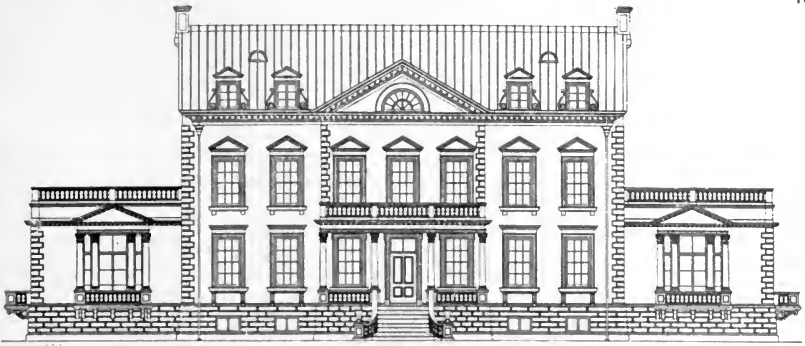
92. Fontana di Trevi, Rome. The central pavilion is the main mass, the wings are the two appendages.



93. The group of double gables with central link is the main mass. The wings are appendages.



94. Pillsbury Science Hall, Minneapolis. The high central part is the main mass. The tower is an unsymmetrical subordinate mass. The wings are two appendages.



95. The Van Rensselaer Manor House, Albany, N. Y. Single mass with two appendages.



96. The Commencement Hall, Princeton, N. J. The same as 95.



97. Norwich Cathedral, East Front. The central gable is the mass; the square-topped aisles are the appendages.

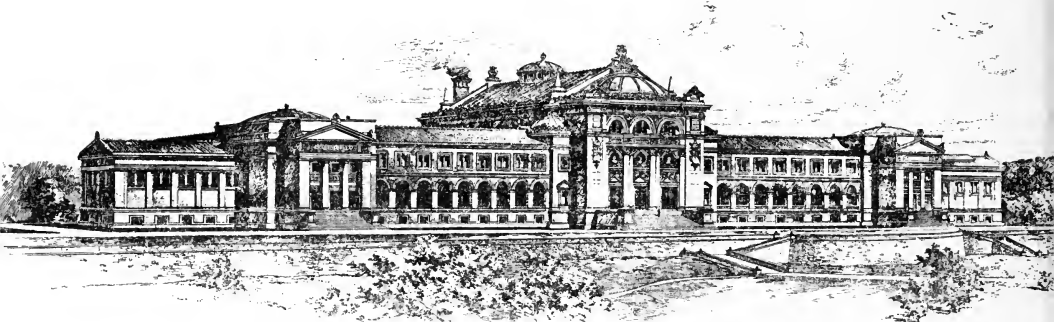
Westminster Palace that we have already spoken of, is, as a whole, an appendage of the great tower, as we remarked at the time; and our own Madison Square Garden is another specimen (98).



98. Sketch of Madison Square Garden, showing how from one point it groups as a mass with one appendage.

Very often a group that from one point of view is a mass with one appendage, from another has two appendages, as in this last case of Madison Square Garden, and in many churches.

Nor is it necessary that the appendages be long and low, 99. To a tower may be added a tall and narrow appendage, as at 100, or to a group of two towers, either one appendage, or two appendages,



99. Triple group, with two appendages—the end portions beyond the flanking pavilions are the appendages.



100. A single tower with a single tall appendage.



101. Group of two towers with two appendages.



102. A tower with two appendages, and one subordinate mass.

as at 101. But more than two appendages we cannot very well manage, because, if we put a third appendage coming out to the front, it is not as an appendage that it appears, but as a central subordinate mass, as in 102; while if it projects behind, we do not see it at all, and it might as well not exist as far as the composition of the front is concerned. We might, indeed, run them out diagonally, and this is sometimes done, but only in special cases, where the main motive is so large that we are at liberty to do anything, or where other special conditions prevail.

To any of the previously enumerated groups, either one or two appendages may be attached, either of the same size and character, or of different sizes and characters; although here we come to the line again, where the increasing complexity of the group requires more skill in adjusting the various parts.

At 103 is a twin group with symmetrical appendages; at 104 a husband-and-wife group with unsymmetrical, and at 105 another double unequal group with one appendage; 106 shows an unsymmetrical triple group, with unsymmetrical appendages; 107 the possibility of doing the same sort of thing with pedimented orders.



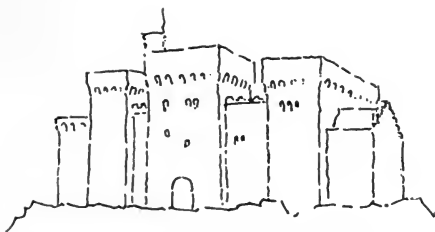
103. Double equal group with two equal appendages.



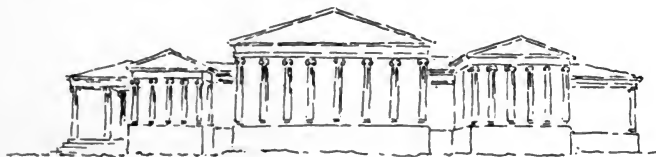
104. Double unequal, with unequal appendages.



105. Hennebont—Notre Dame du Paradis. Group of two unequal masses with one appendage.



106. Triple unsymmetrical group with appendages, also unsymmetrical.



107. The same as 106.

At 108 is a motive for a modern country-house, with open, square piazzas attached; and at 109 a double mass with one appendage, a reminiscence of Messrs. Carrère and Hastings' design for St. John's cathedral church—an extremely fine thing, in its way.

Although less usually attached to subordinate parts, yet, when desired, appendages may be used in much the same way.



108. House with piazzas attached as appendages.



109. Double tower, with the building as a single appendage.

A porch, for example, may be made like 110, a dormer like 111, and so through the list, even unsymmetrical appendages being available with due skill, for details as well as for masses.

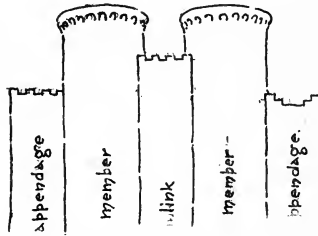


110. A porch with two appendages.



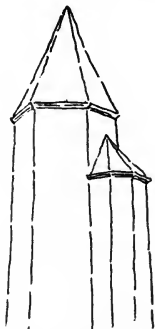
111. A dormer with two appendages.

One or two points to be observed in the use of appendages we may mention. When attached to a group of objects, the appendages must be smaller—not only than any of the objects that form the group, but than the parts which form the connecting links, as at 112.

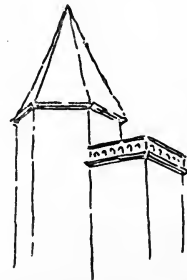


112. Diagram showing relative importance of link and appendage.

Besides this, appendages must usually be different, to some extent, in shape from the masses to which they are attached. Thus, at figure 113, the smaller tower, although of the same relative size, and in the same relative position as in 114, is, just like the large tower, octagonal in plan, and high-peaked as to the roof; while in 114 it is square in plan and square-topped. The effect of 113 is rather that of a group of two unequals, while 114 is plainly a single mass, with an attached appendage.

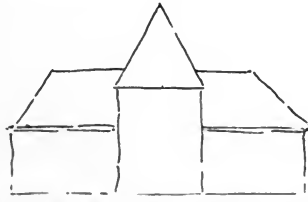


113. An appendage treated like the main mass.

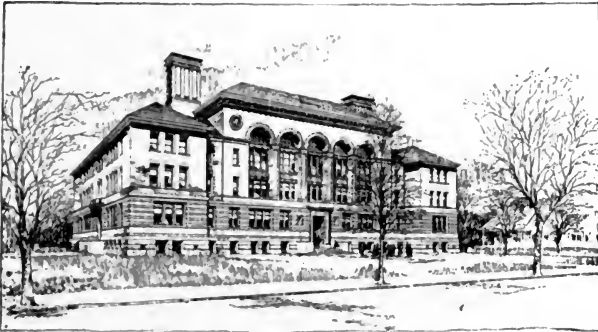


114. An appendage treated differently from the main mass.

Sometimes, however, other considerations require the use of similar treatment for appendages, as in 115 and 116, with the same object of accenting their connection with the principal mass.



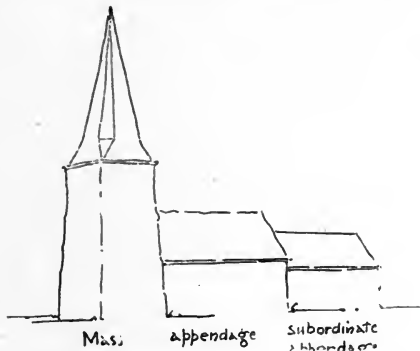
115. Appendages and main mass treated alike.



116. English High School, Cambridge, Mass. Mass with two appendages all roofed alike.

In stating a rule, we are obliged to reserve somewhat. Likeness of treatment must be left, for the time, for the exigencies of the case to settle. But we may lay down the law in this way—good as far as it goes.

Rule VIII. Appendages must be smaller than the members or the linking parts of the groups to which they are attached, and in treatment usually different from the members of the group.



117. An appendage of an appendage.

Finally, appendages themselves may have appendages, as in many a village church, like 117 in general outline.

VI.

Grouping of Details.

WE now come to a part of design-making, which, although less important in theory than the fundamental dispositions, is in practice more important; the grouping of details, such as cannot be classed even as subordinate masses, doors, arches, windows, pinnacles, columns, and ultimately, escutcheons, pateræ, festoons, and all the rest of the minor materials of architecture; omitting for the present, cornices, mouldings and such horizontal details, which we shall leave until we have spoken of horizontal subdivision.

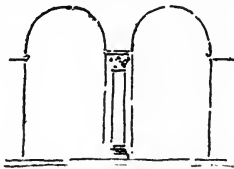
It is, moreover, in practice more important, because very often an objectionable arrangement of masses, forced upon us by circumstances, may be redeemed by skilful detail; and because the volume of possible detail is so great, that the greater part of the time and skill of the architect are necessarily spent upon it.

Details are subject to the same rules, in substance, as principal and subordinate masses, with one important difference and some minor modifications.

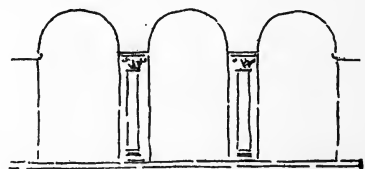
In the first place, groups of details, while composed of individual parts, do not usually have linking parts, but are connected merely by juxtaposition. In the second place, symmetry is almost essential in detail grouping.

The first of these modifications is partly due to this, that the portion of the building itself, upon which the details occur, is a sufficient bond of connection; partly to this other, that the forms of the details themselves usually permit a partial merging of them together, constituting a very satisfactory union.

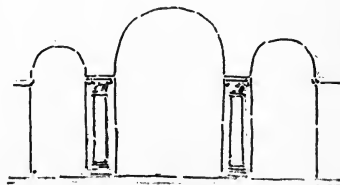
The details to be grouped are, for the most part, openings—doors, windows and intercolumniations; while the solids, the piers and the columns count only as the boundaries of openings.



118. Double window.



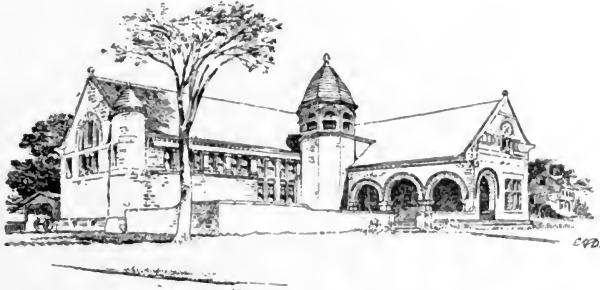
119. Equal triplet window.



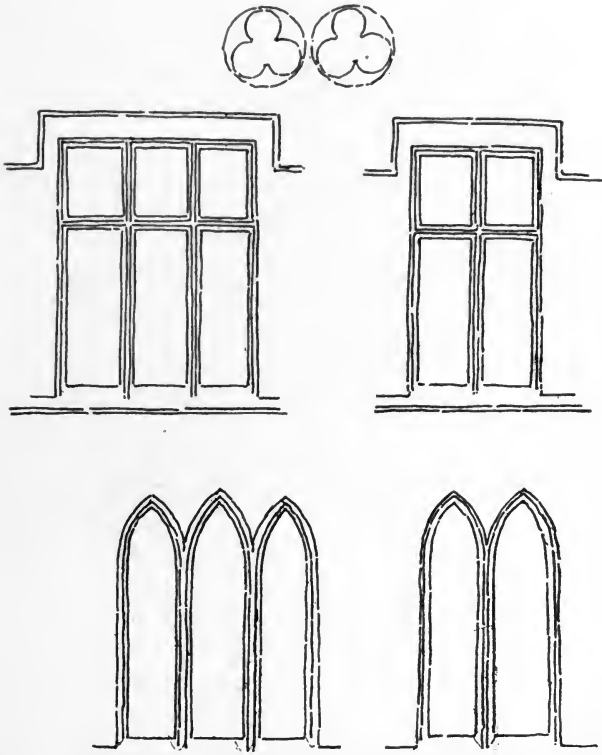
120. Unequal triplet window.

Windows, we may, of course, use singly, or in couplets (118), or in triplets, either equal (119) or unequal, with the largest in the middle (120). Yet, even when we use triplets of equals, so strong is the demand of the eye that the middle one should be the largest, that if we make it precisely equal, it will appear to be smaller than the others; we must make it just a little—unnoticeably—larger, but, to the eye, the same, 121.

All kinds of windows may be thus grouped in twos and threes, square-headed, pointed and round-arched, and even circular, or trefoil, 122.



121. Converse Memorial Library, Malden, Mass. The central arch of the arcade may be seen to be large than the others.



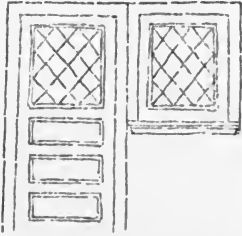
122. Various couplet and triplet windows.



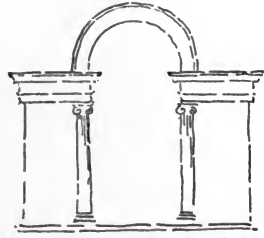
124. House, Place des Halles, Orleans, France. Not only the arches of the first story but the windows above are double unequal groups. It would improve the composition to omit the anomalous niches in the upper stories.

So may doors, if necessary, be grouped, and all other similar details.

In special situations, too, unsymmetrical groups may be formed, like this door and window couplet (123), and compositions more or less elaborate may be made, quite analogous to those of masses. In 124 a rather remarkable instance of unsymmetrical grouping of details is shown.



123. Double unequal details.



125. Triple unequal openings.

In 125, we have the outline of the familiar Palladian window, one of the most graceful combinations ever made. It is a single mass, with two appendages, just the same composition as St. Peter's (126), or any other single domed building (127). And more complex combinations may be made, if required.



126. St. Peter's, Rome. In outline the great dome is the mass, the building appears as two appendages.



127. Outline of domed building resembling that of Palladian window.

As for the grouping of openings and groups of openings upon the building, a vast field opens before us.

Upon a single mass, a very good design may always be made by care in arranging the openings; many designs are nothing more (128).

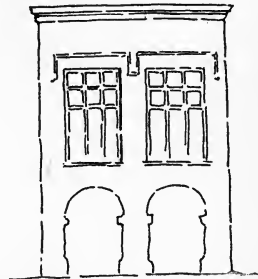


128. A design composed of one opening in the first story and two in the second.

Three openings above, and three below, as here shown (129), always make a good design. So would a single tier of three openings, but it is so simple that mere mention suffices.

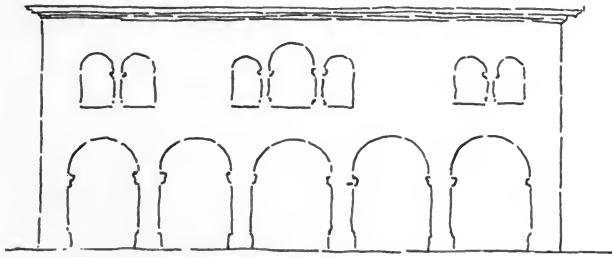


129. Triple grouping of openings.



130. Double grouping of openings. This verges upon "double composition." The label over the windows should carry through.

Two above and two below will also make a design (130), although the danger of "double composition" must be avoided; and there are innumerable other compositions of openings alone, such as figure 131, which give perfectly satisfactory designs.



131. Continuous group below. Triple group above.

But the important difference in the grouping of details is this: that while subordinate masses seldom, and principal masses never, are arranged in continuity, the continuous arrangement of details is required quite as often as that of individual grouping.

When we come to the consideration of subdivision we shall find the continuous arrangement predominating; but even in buildings in which the horizontality is not marked there are certain situations which demand the effect of continuity in the details.

These situations are those in which the indication of connection is needed, rather than of parts to be connected. Thus in 131 a continuous row of arches in the first tier forms a uniting base for a triplet grouping above; just as the lower mass of a principal grouping might form a base for three towers or three domes upon it.

For all linking masses, a continuous treatment of details is appropriate, and as long as they exceed three, whether the number should be odd or even depends upon circumstances; a central link,



132. Uneven number of openings in central link.



133. Even number of openings in links not central.

like 132, demands an unequal number of openings; but, where the link is not central, as in 133, four openings are better than three or two or one; better even than five, for the eye picks out the middle

one of an uneven number, and at once marks its individuality, which is what should not be marked in a lateral link.

It is one of the indications of the superiority of the æsthetic sense of the Greeks to our own, that their effortless perception of odd and even extended to so many more things than does ours. A Greek took as much care to put fourteen or sixteen or eighteen intercolumniations on the side of a building, in order to avoid a central opening, as we take to put the door in the middle of a room.



134. Design for Soldiers' Home, Minneapolis, Minn. Grouping of windows. Triplet windows in mass. Four windows in appendage.

And that may remind us that another place where it is important to have an even number of details, windows or otherwise, is on the side of the building; and still another place is on all appendages. In figure 134, the composition looks much better with four windows, in the appendage to the big tower than if it should have three or five. As an example of what can be done in the way of recon-

ciling antagonistic conditions in the arrangement of openings, look for a moment at figure 135, a Greek monument. The designer



135. Outline sketch of Greek monument.

wanted to have his door in the middle, also to have the statue on top in the middle, also to have a pier under the statue for constructive reasons and to satisfy the constructional instinct.

Impossible, manifestly, to do all, but he does the best that he can with it. The central pier he makes as slim as the eye will tolerate; the side piers comparatively massive, making the inevitable two openings one as much as possible.

The statue on top is in the centre, in no danger of breaking through, with the central pier under. But, over each side pier, the designer has put a heavy square block, adding to the importance of the flanking piers and minimizing that of the central strip.

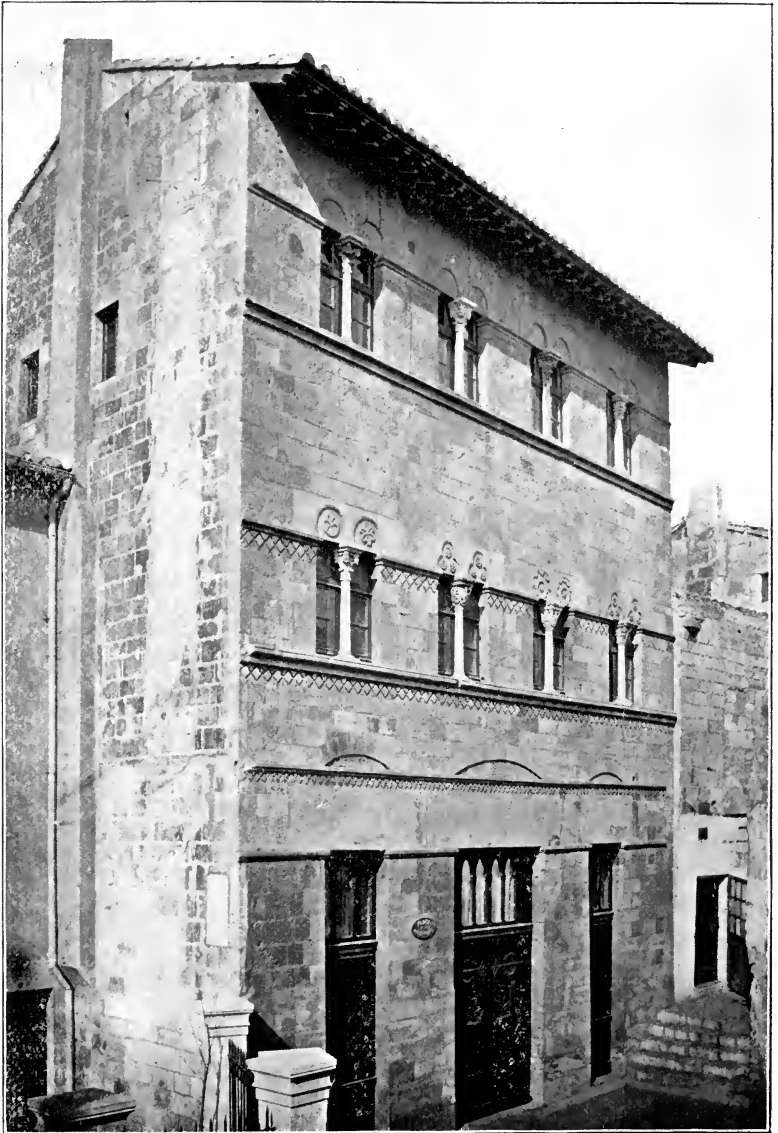
So much of the general arrangement we can penetrate; the methods that enabled the Greek to make everything just right in relative size, we have not yet penetrated.

VII.

Horizontal Subdivision.

WE now approach the second grand division of architectural design, that of subdivision into horizontal parts. Just as the vertical subdivision, which we have called grouping, is effected by the advance and retreat of different parts, and the shadows thereby produced, horizontal subdivision is effected by means of mouldings, and the shadows cast by them.

Mouldings are, doubtless, incidentally useful for mechanical purposes—for shedding rain-water from the face of the building, for bonding or leveling courses, or the like; but æsthetically we are to regard them, as a painter his brush, as means whereby we may draw lines where we want them.



136. Romanesque House, St. Gilles, France. Showing the unifying effect of a single large cornice.

Another means of separation horizontally, is by varying treatment; that is, by differences in the size and shape of the porches, windows, doors, and other objects placed upon the building.

It is in the predominant use of horizontal lines that the classical and Renaissance work is radically distinguished from the mediæval. It is natural and proper that one or the other, either vertical lights and shadows, or horizontal lights and shadows, should predominate. Where a building is composed of many parts standing side by side, it is quite instinctive to avoid running heavy black lines around all the ins and outs.

Such lines as there may be, must be light, not comparable at all with the vertical lines. On the other hand, whenever, by choice or necessity, we are limited to a square, flat mass, we as instinctively construct horizontal lines across it.

Given a box, into how many parts must we slice it to make it look well?

All of the first three formulas apply, as far as the new conditions admit of their application.

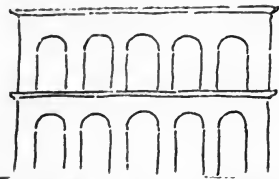
In the first place; one thing looks well.

Mark our box by a big black line at the top, 136; or put some one thing, door, or arch, or window, or memorial tablet, or what not, upon it; or, if possible, do both, as in 137, and it is sure, so far, to look well.

In the second place, in horizontal subdivision, two equal things, of similiar treatment in detail, do not look well, 138. The reason is probably analogous to that which requires an individual member of a group to be symmetrical in itself. Although symmetry in a group is not necessary, in a single member it is usually essential.

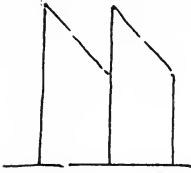


137. A single cornice and a single detail.

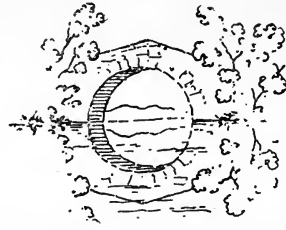


138. Ill effect of similar equal double subdivision.

For in each member of a group the important point is that it be distinguished as an individual, and an unsymmetrical mass appears to the eye but half an individual, as in 139. Now it would seem that two tiers of arches, just alike and placed over each other, as in 90, owed their unsatisfactory appearance to very much the same cause. It is at least certain that if vertical symmetry were constructively possible, it would be as pleasing as horizontal symmetry, as we may observe whenever we see a clear reflection in the water, 140.

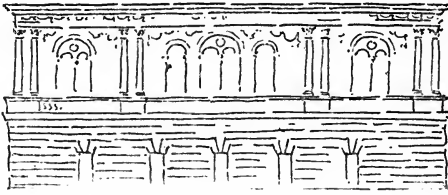


139. Corresponding ill effect of similar double group.



140. Pleasing effect of vertical symmetry.

It is not possible for us to build reflections, so, when we are obliged to cut up our mass into two parts, we must do the other thing, and make them as different in treatment as possible, that

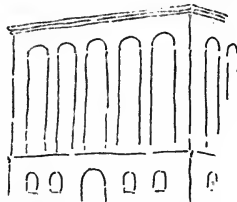


141. Two equal parts differently treated.

there may be no such close resemblance as to seem repetition. We may make our top part with vertical columns and delicately graceful arches, and our bottom with horizontal rustications: anything to make them different (141).

But where the two parts are unequal there is no such difficulty. All gable treatment where the line between the gable and lower part is marked by a moulding, is double; but the gable is intrinsically so different from the square part below, that the treatment is a sort of self-acting treatment, and carries itself out without much effort on our part.

We may have a large lower part, and crown that is less, or we may have a low bottom part, and a high top, as 142, either is capable of looking well, if properly carried out.

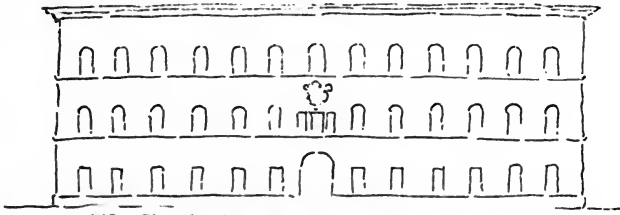


142. Two unequal parts.

Three things look well together when placed on top of each other, whether equal or unequal; but if equal, only when the unity of the

whole composition is asserted by some further means, precisely as in vertical grouping.

In the Farnese Palace there are three parts, substantially equal, as in figure 143, separated by lightly drawn lines, marked by rows



143. Sketch of Farnese Palace, three equal parts.

of windows of a general similarity of appearance. It would be unsatisfactory, were it not for the broad, dark line across the top, which makes it all one.

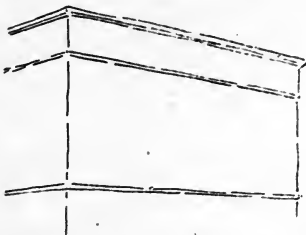
And this is why, in spite of the protests of those who maintain, and justly, that ornament should not be constructed and stuck on, and that one material should not simulate another, the tin cornice maintains its place of honor in city buildings.

City buildings are almost always single masses, and flat-fronted; the simplest way,—not the only way, but the way that requires least effort on the part of the designer,—the line of least resistance, so to speak,—is to draw a big moulding, for that is what it is, across the top. To the mind it is offensive, even when made of stone, to pile up a useless mass, perilously poised; but to the eye it is so satisfying as to counterbalance, more or less, the intellectual objection.

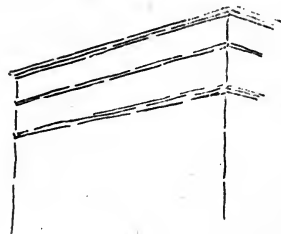
When we come to three unequal parts, we are in free pastures.

We may cut up a building in almost any way, as long as it is into three unequal parts, and can hardly fail to achieve a good result, with respect to the number and size of parts, if we can do as well with the rest of the treatment.

Just as in the case of vertical massing, and for a like reason, the largest must be in the middle, 144. The reason is that if it is not in the middle, the two smaller parts hang together, as in 145, and it resolves itself into a two-part division, one of them being itself



144. Three unequal parts, the largest in the middle.

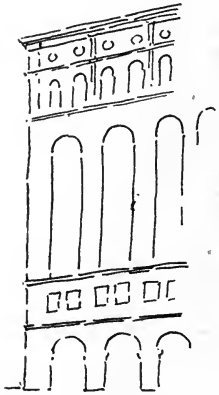


145. Three unequal parts, the largest not in the middle.

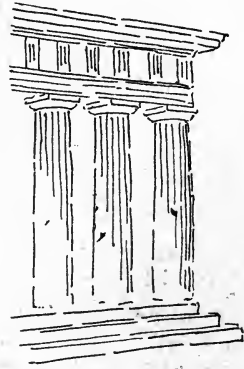
compounded of two parts, which is, indeed, quite manageable, only not so easily managed as a three-part composition.

But if we keep the middle part the largest, we can hardly go wrong; and, after that, we may subdivide the upper and lower parts, but the larger and intermediate part, never; except by lines comparatively light, and excepting, also, the continuous treatment of which we are yet to speak.

This is why it is so natural to put a row of long piers, as the main middle motive, as in 146; and it is the reason, too, why the classics



146. Large middle part formed by piers.



147. Large middle part formed by columns.

fluted their columns, to absolutely deny any subdivision at all to their big middle part (147).

Here, 148, is a five-part division, the same as 146, only divided somewhat differently. And we may carry the process further, and subdivide the top and bottom parts in various ways, but the middle part must be kept undivided.

Beyond three parts, either simple or complex, as we have just said, there is the continuous arrangement of many equal parts over each other, with top and bottom parts added.

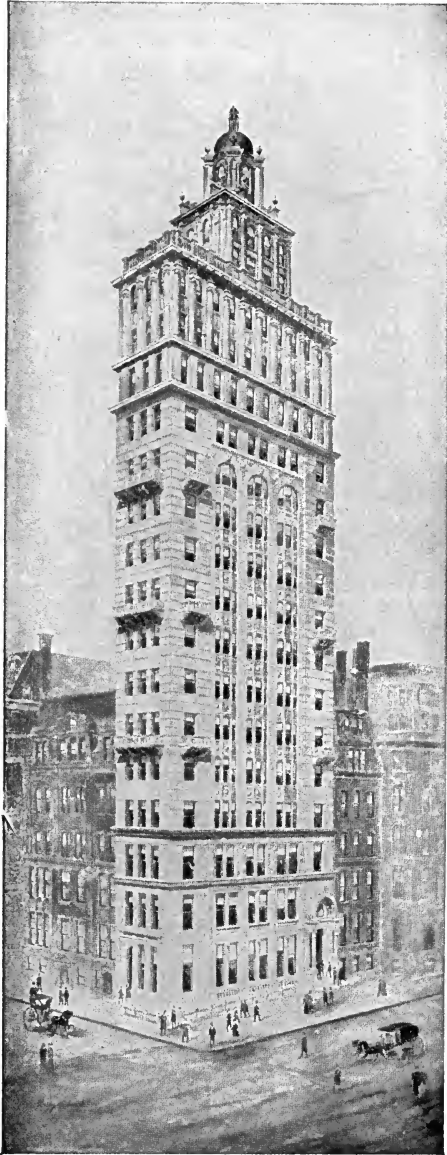
Such is the way that the Leaning Tower at Pisa is done, and many Chinese pagodas; and the same thing may be done where any high building or tower is to be treated; but there must always be a top part and a bottom part; the continuous treatment must be for the middle part only, and even then the equally-spaced lines must not be too strong, nor the parts fewer than four.

So our first rules stand, for horizontal as well as vertical separation, with such modifications as we have described.

Next we come to a region beyond the range of rule, because new and hardly to be reconciled conditions prevail.



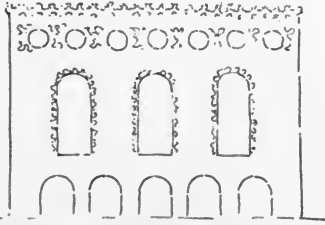
148. The Woodbridge Building. Clinton & Russell, Architects, William Street, New York City. A five-part subdivision.



149. The Gillender Building. Berg & Clark, Architects. A tall office building subdivided into five parts.

We have spoken, so far, of subdivision by mouldings alone; the last few examples, showing some windows and enrichment, bring us to the question of subdivision by treatment with other details.

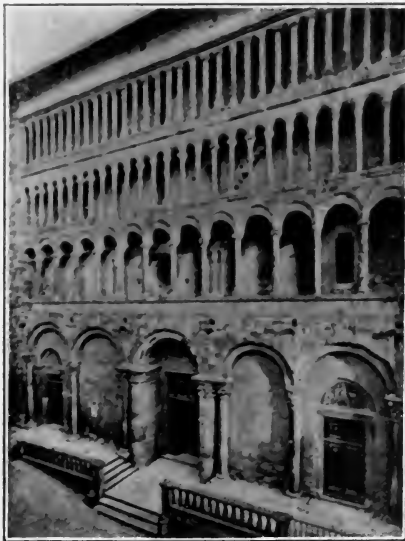
It is possible to subdivide a building, even without the aid of mouldings, by such means. In figure 150, for instance, rows of



150. Subdivision by treatment without mouldings.

differently sized and differently disposed openings indicate the different horizontal parts; and the enrichment between the seven top openings, joining them into a band, to a great extent takes the place of a cornice.

But this result has been reached by a method not always constructively practicable. One of the first dicta of ordinary practice is that piers must be above piers, and openings above openings.

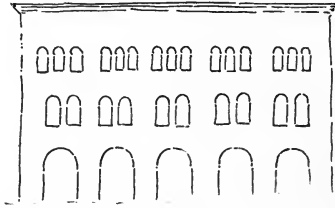


151. S. Maria della Pieve, Arezzo, Italy.

The reason is partly constructional, as it is known that lintels will crack and arches will fail, with too much concentrated weight upon them; it is, besides, partly æsthetic, being exactly the same feeling that led the Greek designer to put his pier under the statue, be-

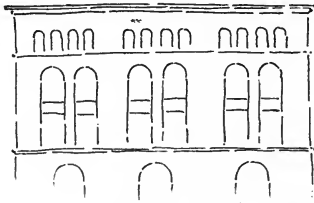
cause, even if his lintel were of iron, a statue would not look comfortable thus suspended.

So that there is really no complete solution. The conditions are irreconcilable. A strongly marked horizontality is aided by rows of openings that are not over each other, so that the eye does not find any line by which it may ascend; and the mediævals have left buildings done thus, as in 151, where there are five, thirteen, twenty-five and thirty-two openings in its four tiers, respectively. The horizontality sought is obtained; but the æsthetic objection to false bearings still exists, though minimized; and the constructive objection too, although apologies may be made for the arrangement on that score. Altogether the system of irregularly spaced openings is certainly more graceful where continuous horizontal effect is sought than the system of piers carried through; yet in most cases we are obliged to use the latter, as in this sketch 152.



152. Variation of openings in spite of the continuity of the piers.

Even with this limitation much may be done in the arrangement of openings to aid the effect of mouldings. In figure 153 the main piers run through, but the horizontal bands are marked by the difference in the number of openings in each bay.



153. Variation of openings with continuous piers.

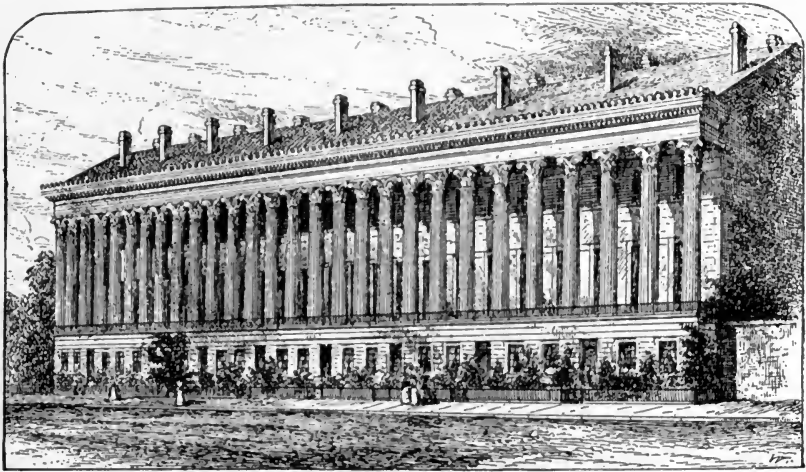
Observe, in the top member, how much the effect of a continuous band is increased by making the small windows four instead of three, although the number of groups of openings is three unavoidably.

Observe further, that in order to make our middle part larger than either the top or bottom, indeed, in order to obtain a middle

part at all, in this four-storied building, we have been obliged to unite the second and third stories under one tier of big arches. This united treatment of two or more stories is often necessary in modern many-storied buildings; and is objectionable only when the detail used for the purpose is inappropriate or exaggerated.

And it is in this that the convenience and availability of the "orders" lie. With the aid of rows of columns of assorted sizes, we can always run a tier through two or three stories, 154, and most effectively and gracefully make them one mass for the requirements of the eye; with the additional advantage of the most delicate and perfect detail, sublimated by the study of centuries.

That some such expedient should be devised, the many-storied



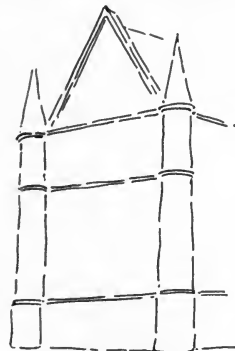
154. Row of houses in Lafayette place, New York. Two stories united by a colonnade.

buildings of modern times required; nor is the vitality of the style remarkable, when we understand how very fit it is to survive.

Bear in mind always that, as we have said, a building should not have many marked vertical parts and many marked horizontal parts at the same time. A series of heavy horizontal bands carried



155. Ill effect of heavy mouldings carried around strong vertical divisions.



156. Good effect of light horizontal lines upon strongly marked vertical parts.

around a series of narrow masses never looks well; nor even a single cornice so used (155).

Invariably, upon comparatively narrow and high parts, rather light lines of mouldings are best used, 156, and the heavily marked horizontal divisions kept for comparatively broad and straight fronts.

Just the same rule prevails in the subdivisions as in the masses. After we have determined upon our row of columns or piers as our middle motive, we must beware of blocking or banding them in any way. And after we have arranged the horizontal lines of our rusticated basement, we shall do well not to break it around the piers, or, if there must be such breaks, to let them be of not too great projection, nor otherwise interfere with its horizontal lines.

For all of this judgment is required, and that delicacy of apprehension which we call taste; to a great extent obtainable by cultivation, that is, by looking at things with the view of judging whether their appearance is pleasing or not; but, in its extreme degrees, inborn, like extreme degrees of other faculties, musical and poetical apprehensions, and even mechanical and mathematical.



157. 158. 159. 160.
Progressive raising of the lines of the gable with the lengthening upward of the front.

VIII.

Proportion.*

THE word "proportion" although commonly used somewhat indefinitely, always refers to the size of objects and of parts of objects, and not to their number.

More precisely, the word should be used as in ordinary arithmetical language, not of what arithmeticians call a ratio, that is of the relations between two dimensions of an object, but rather of the relation between two objects, each having two dimensions related to each other in some way. Thus it is rather vague to speak of the proportions of a column, meaning the relation of height to diameter. Apart from precedent, there seems to be no reason why this should not be anything we may wish to make it. If, on the other hand, we ask what should be the height and length of the lintel, if the height and diameter of the column are so-and-so, we have a true question of proportion.

Almost always, too, the question of proportion is discussed entirely as a matter of precedent. Examples of various styles and periods are brought forward, and we are called upon to admire, in one breath, the exquisite proportions of the low Greek pediment, and the very fine proportions of the high Roman pediment, and the noble proportions of the Gothic gable; without any clear perception of why we should admire low, and high, and higher, all at once.

This is the true idea. The Greek temple—the typical Greek temple—was of considerable breadth of façade and moderate height. Be-

*The following conception of a theory of proportion was suggested to the author by two magazine articles, of which neither the titles nor writers' names can he recall nor trace. The first propounded the principle of exact similarity as indicated by diagonals, and applied it to classical façades; the second announced the theory of musical proportion in place of arithmetical, and worked out the dimensions of the triglyphs and other details of the Greek temple, as well as the principal dimensions, in a very interesting manner.

ing cut up, as to its middle and bottom parts, into long and low horizontal slices, the pediment, quite naturally, and as the merest beginner may feel it proper, shared the same character. (157). The Roman type of temple was quite a different matter. The columns were higher, and the width of the colonnade not so great for the height; the whole thing standing on a lofty stylobate, with imposing stair-flights in front. Quite as reasonably, the pediment was made steeper, in sympathy with the general prolongation upward, as at 158.

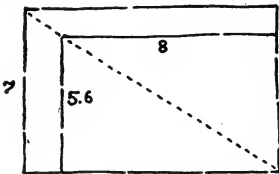
So, when men began to build things higher than they were wide, like a Gothic front, the gable grew likewise, and became itself higher than wide, in effect. (159). Finally, when the rectangular mass below sprouted upward into a tower (160), the pointed part on top stretched upward into a spire. It is as if a Greek temple were drawn on elastic india rubber, and stretched; each part stretches its own share—that is the fundamental idea of proportion.

It is that all parts shall share the same general character—be what geometers call “similar”; that is, that if one part is seven high and ten wide (161), another part that is only eight wide shall be about, or exactly, five and six-tenths high.

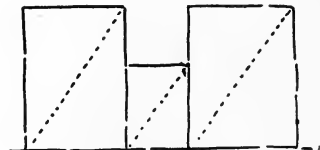
Used in this way architectural proportion becomes equivalent to arithmetical proportion, the dimensions of each part having the same ratio to each other as those of every other part.

There are several reasons why this rule, although sound in its principle, cannot be laid down as a general rule.

In the first place, there are parts of buildings which, from their nature, cannot assimilate their dimensions to those of other parts. A column, for example, must be long and comparatively narrow; the ratio of its width to its height quite different from that of the main dimensions of the building, or from that of the width to the height of the inter-columniation, or of a door, or window opening. So it is also with such things as chimneys, and angle turrets. In 162, for instance, the slender minarets cannot by any means even approximate the square bulk of the mass of the building.



161. Arithmetical proportion of breadth to height, indicated by diagonals.



163. Two masses and a link of similar dimensions.

In the second place there are objects, such as circular windows, of which the ratio of dimensions is fixed.

Beside this, there is the question of the horizontal subdivisions.

which are necessarily of dimensions of different ratios, for the fundamental point in such horizontal bandings, is that they shall have different heights for the width of the façade, which is always the same.

Finally, if it were possible to make all the parts of a building conform to a single arithmetical ratio, the result would be of cast iron stiffness, devoid of the continual variety, which is essential to grace.



162. The proportions of main building and minarets are quite dissimilar.

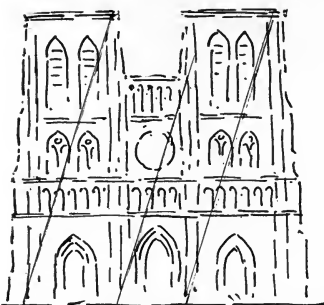
Nevertheless, such variations from the exact dimensions prescribed by rule cannot be formulated; and, in spite of its only partial applicability and other shortcomings, the most practical guide for approximating the proportions of the parts of a building is this rule of similar parts.

The simple drawing of diagonal lines, parallel to each other, is an admirable guide to a satisfactory result, when used with discretion and modified by good taste.

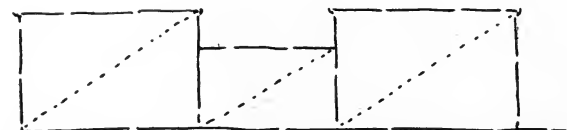
In 163 we have a group of two equal parts, joined by a lower part; the diagonals being parallel, the linking mass is similar, geometrically, to the main masses.

Here is a sketch of a typical church façade, 164, for example, all of which were arranged upon something like this method.

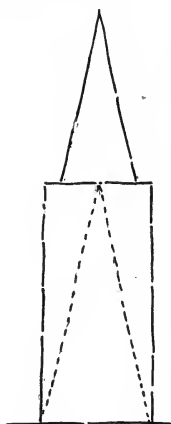
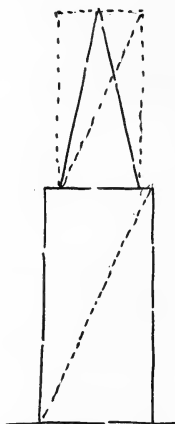
With masses broader than they are high, like 165, the method gives as reasonable an approximation.



164. Typical proportions of many church fronts.



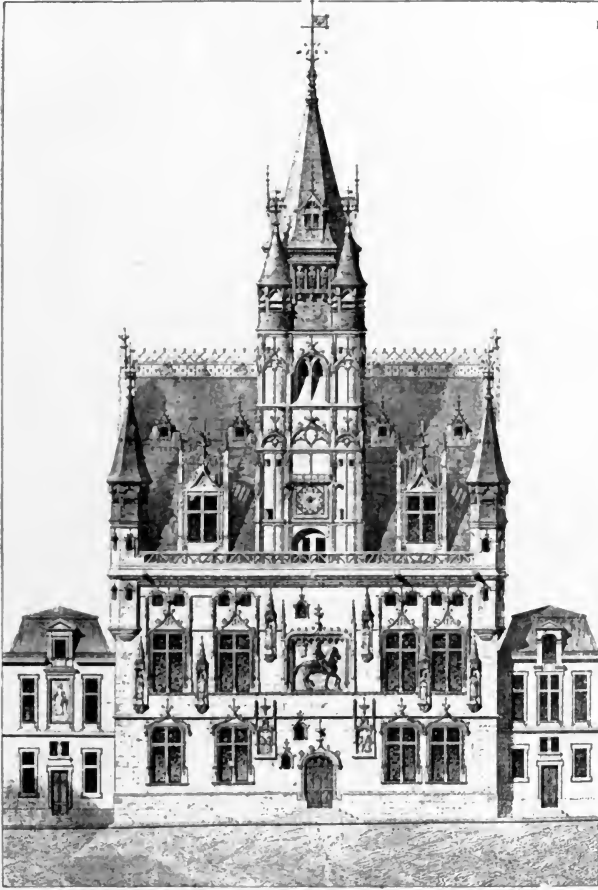
165. Comparatively low and wide masses related to the central link by similarity of dimensions.

166. The Law School, Harvard University, Cambridge, Mass.
The ratios of length to height of mass and appendages are about equal.167. Arithmetical
relation of spire to
tower.168. The same,
compared by diagonals.

At 166, again, the relation of the dimensions of the side pavilions is about that of those of the central pavilion.

So, in 167, the result is good in arranging a spire or a tower; 168 being the same thing, illustrating the connection a little more clearly by diagonals than can be shown by the triangles of 167.

An example is given in 169, where the effective angle of the spire,



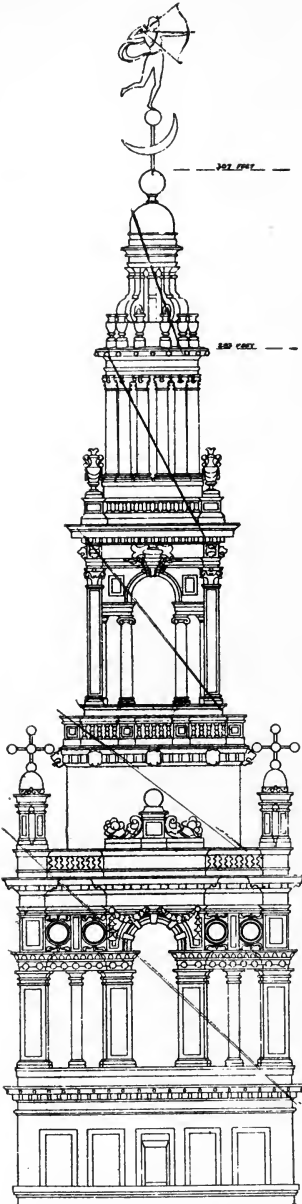
169. Town Hall at Compiègne, France.

Diagonal of tower, from main cornice to base of spire, is nearly parallel with angle of the latter.

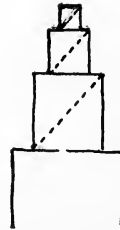
always less in a hipped construction than the elevation shows, nearly approximates the diagonal of the tower.

In 170, the deficiencies of the method are seen. The successive stages of a storied tower, when proportioned by this method, are always wrong; the farther up you go, the more squat they seem. Such stories should be each a little higher than the rule would indicate, as shown in 171. The upper part of the tower of the Madison Square Garden, which well illustrates this prolongation upward of the ascending stories, is shown in 172.

Yet there is no doubt that the rule approaches the truth, the ques-



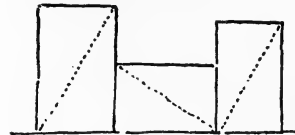
172. Upper part of tower of Madison Square Garden. Each story, above the lowest, is elongated upward beyond the arithmetical ratio.



170. Failure of the method of similar dimensions, as applied to a storied tower.



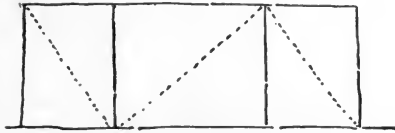
171. Correct method of proportioning a storied tower.



173. Reciprocal relation of masses to link.

tion only is as to the rule for divergencies from it; for which we are compelled, for the present, to trust to the vague faculty called taste.

The rule, moreover, as rules ought to do, works both ways, for horizontal parts in connection with vertical, as well as for horizontal and vertical parts in connection only with each other. In 173, where we have two unequal masses, connected by a low part, the



174. The same where the link is distinguished by retreat in plan.

diagonals are drawn perpendicular to each other, dividing each part into similar triangles, although the middle triangles lie on their sides, instead of standing on their ends.

In 174, again, we have two pavilions, joined by a central mass of equal height, which must be supposed to retreat from the plane



175. Châlêt at Deauville sur Mer.

Shows the reciprocal dimensions of mass and link of mass and appendage, and of link and whole front.

of the pavilions, for proper subordination. The method gives fairly good results in every case.

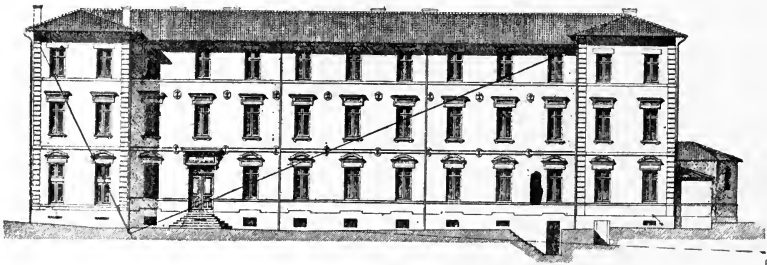
A French country house is shown in 175, wherein such relations obtain. The ratio of height to length of the linking piazza, is about that of width to height of both gables, measured to the chopped-off part, as shown by the diagonals. The ratio of the link

from rail to eaves is almost exactly the same as that of the whole front. Here again, the effective angle of the roof nearly corresponds with the diagonal.

At 176 another French design is shown, in which the relation of the pavilions to the link is a reciprocal arithmetical one, the link being relieved in plan.

At 177 is an excellent example of assimilation of both horizontal and vertical parts, as shown by the diagonal lines.

The method is equally available for the details of a design. If



176. Night Refuge for Poor Women, Marseilles.

The relation of the pavilions to the link is nearly a reciprocal arithmetical ratio.

the doors and windows of a front are made similar rectangles to the front itself, as in 178, it can hardly fail to give a good result.

The Farnese Palace is shown in 179, in which the general dimensions of the windows and of the doorpiece closely approach those of the whole front, with a reciprocal relation.

Valuable suggestions often occur. Over the doorway, in 178, the space seemed too crowded for three windows; two would not look well; neither would a huge horizontal window, as high as the rest, and as broad in proportion as the front of the building is to its height. But, by a lower and narrower rectangle, still similar, the problem is solved; a central semi-circle defining a central portion of the same relative dimensions as all the windows.

For a tower, too, as in 180, the method suggests, what at once recommends itself to the judgment, that the dimensions of the windows in relation to each other should be about those of the tower itself.

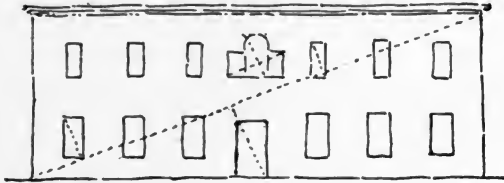
In the matter of cornices, a new light is shed. The usual view is that the projection of a cornice is determined by the height of the building, regardless of its length. At a time when the general dimensions, in relation to each other, of all monumental buildings were much the same, all being on the same columnar model, such a doctrine might be held.

But, carried out on tall and narrow buildings, it leads to such un-

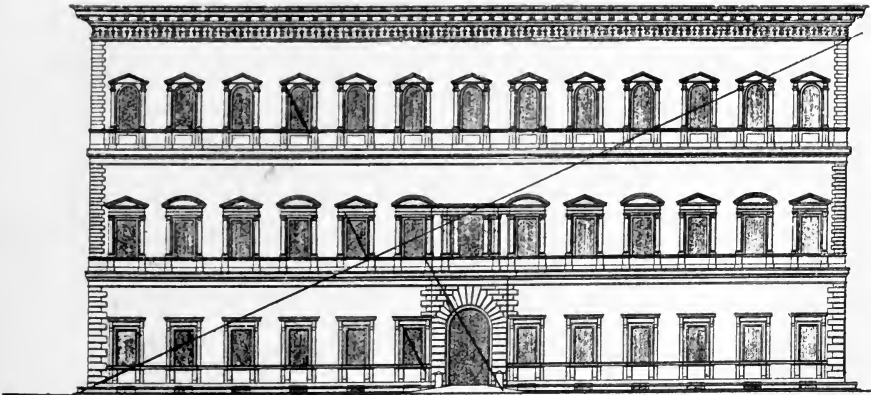


177. Cambridge City Hall.

The front of the tower and of the building, also the central subdivision of each wing, are approximately similar rectangles.

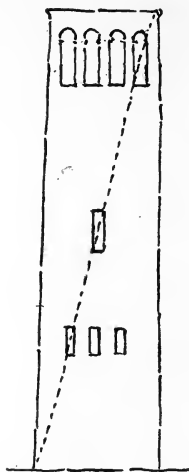


178. The openings are of reciprocally similar dimensions, compared with the whole front.



179. Farnese Palace.

The diagonal lines show the general approximation of door and window forms to that of the whole front.



180. The windows of a tower made narrow and high to correspond with dimensions of whole tower.

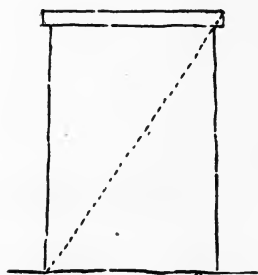
happy endings as this (181), a huge classical cornice poised on top of a mass, of which the dimensions are very much the classical dimensions reversed, stood on end, so to speak. The reasonable thing to do, is to stand the cornice on end too—to make the projection of it to the height of it on the same diagonal as the diagonal of the building (182).



181. Bad effect of cornice of heavy projection on a tall and narrow front.



182. The proper cornice for such a front is the high one of slight projection.



183. The same for a building where the height exceeds the width.

Our method thus guides us to the eminently reasonable result, that the height and projection of the cornice should be to each other about as the height and length of the building—a low and wide cornice for a long and low building (184), a high and narrow cornice for a high and narrow building (183).

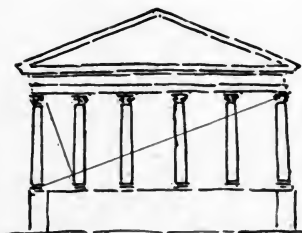
So again, between the short and high rectangle of the Roman front (185), and the comparative wide intercolumniations, there seems to exist some such relation; and a parallel relation between



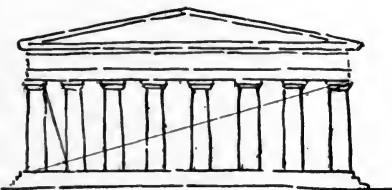
184. Rectangle of cornice the same as that of front.

the long, low front, and the narrower intercolumniations of the Greek (186).

In each case, the general dimensions were assimilated, although perhaps not geometrically similar.



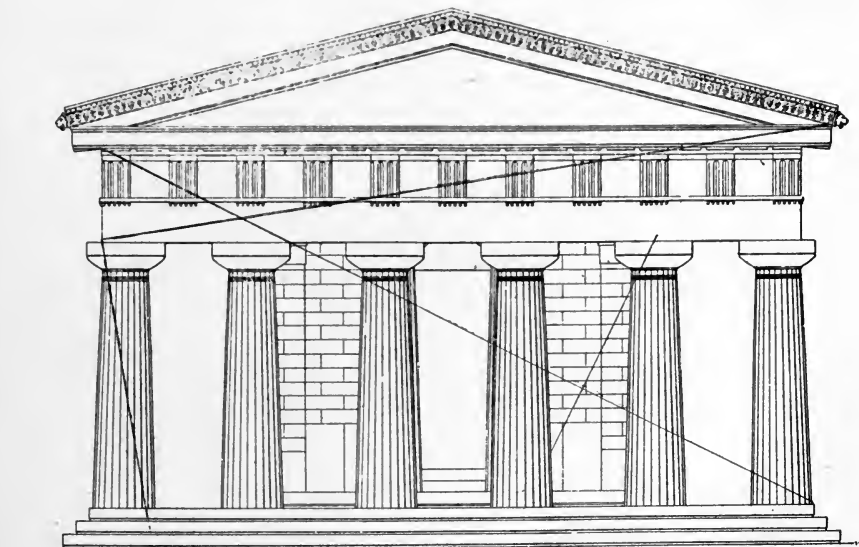
185.



186.

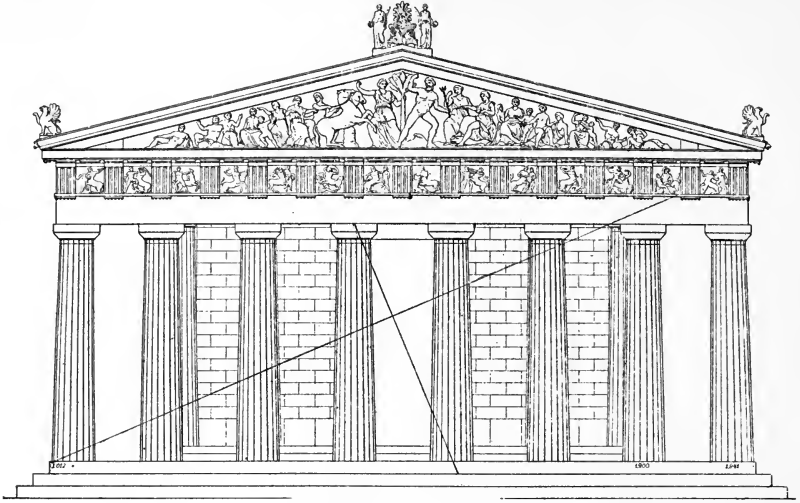
Diagrams suggesting, in an exaggerated manner, the relation of parts to the whole.

The temple of Poseidon, at Pœstum, is shown in 187. The spacing of the columns on centres seems to correspond reciprocally to the dimensions of the front; while the ratio of height to length of entablature is nearly that of diameter to height of column.



187. Temple of Poseidon at Pœstum.

The diagonals indicate the approximate relations between the parts.



188. The Parthenon.

The relation of the general dimensions of the front to the spacing of the columns is shown by the diagonals.

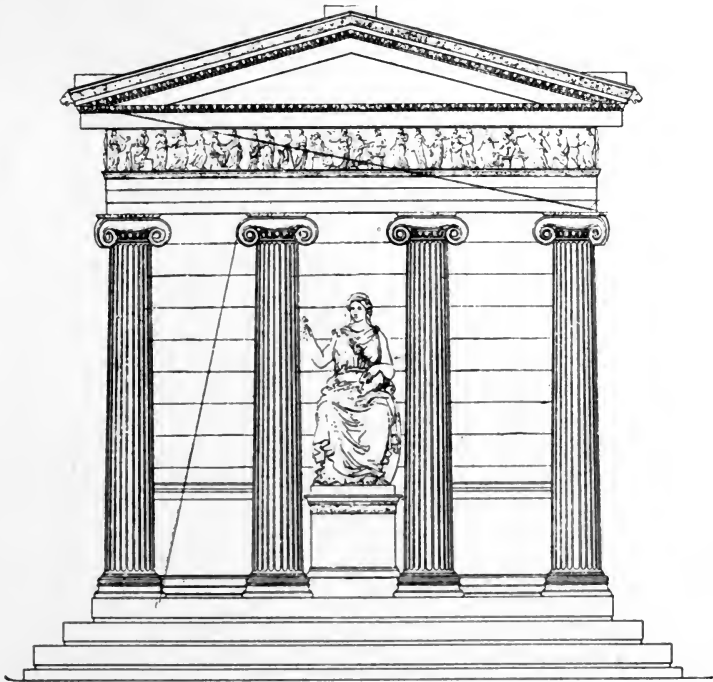
The Parthenon is shown at 188. Here again the centring of the columns closely matches the rectangle of the front. No other simple relation, however, seems traceable. Although the columns are slimmer than in the Pæstum example, the entablature is even more elongated, so that, whatever relation there may be, it is not that of reciprocal proportion.

Notice, too, how the face of each abacus is an elongated horizontal parallelogram, suggestive of, but not similar to, that of the front. The triglyphs, too, are upright oblongs, more or less like those formed by the centring of the columns.

At 189 is the front of the Nike Apteros temple, of which the general outline is a square. Here the intercolumniation is nearly similar to the entablature, although this relation is perhaps accidental.

It will be observed that no attempt has been made to show anything like a minute or precise relation in any case that has been quoted. Nothing like precision in such matters is possible, nor even desirable. It is not possible, because in a constructive art like architecture, other than merely theoretical considerations must have some weight accorded to them; and it is not desirable because the excessive formality and stiffness that would be produced by an insistence upon exact similarity of parts, would be fatal to beauty in the completed work.

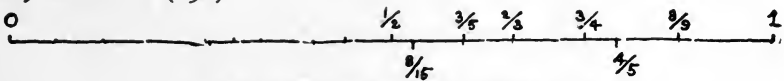
Indeed, the Greek examples shown would indicate what reason would appear to confirm, that some rule is to be desired which would produce general conformity to a certain ratio of dimensions, combined with a continual avoidance of an exact coincidence.



189. Temple of Nike Apteros.
Diagonals show relation of intercolumniation to entablature.

It is possible that the theories of musical intervals, which we know were used by the Greeks in architecture, may have produced this result. As to this use, much has been surmised, but little is positively known. Although in the nature of a speculation, perhaps an attempt at a practical interpretation may not be out of place.

The divisions of the stretched string that produce harmonious musical notes have been known from antiquity for their simplicity. They are these (190):



190. Musical Divisions of a Vibrating String.

If the length of a stretched string be called one, half of it will give the octave above; a quarter, the octave above that; an eighth, and a sixteenth, the octaves still higher up.

Taking any one of these octaves—the first, let us say—from one to one-half, the subdivisions as shown, will give the notes of the gamut: 1-2, 8-15, 3-5, 2-3, 3-4, 4-5, 8-9.

The noticeable character of this succession is that most of the fractions advance by adding one to both numerator and denominator. We have 1-2, 2-3, 3-4, 4-5, and 5-6, although not in the diatonic scale, constitutes the minor sixth. Six-sevenths and 7-8 are wanting—numbers involving 7, 11 and 13 are not found in musical intervals.

Now, the important point about a series formed by adding the same increment to both terms of a fraction, is that the ratio thereby continually approaches unity. We may begin with what fraction we please, and form such a series :

1-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, 9-10, 10-11, 11-12.

1-3, 2-4, 3-5, 4-6, 5-7, 6-8, 7-9, 8-10, 9-11, 10-12, 11-13.

1-4, 2-5, 3-6, 4-7, 5-8, 6-9, 7-10, 8-11, 9-12, 10-13, 11-14.

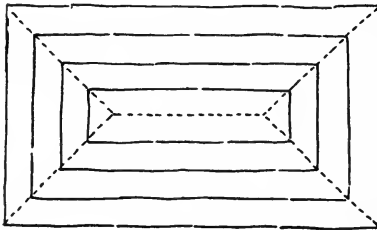
1-5, 2-6, 3-7, 4-8, 5-9, 6-10, 7-11, 8-12, 9-13, 10-14, 11-15.

Each series approaching unity, as 10-11 is nearer one than 2-3 or 3-4.

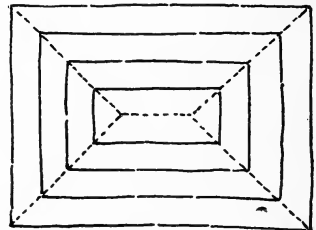
If these ratios be regarded as the sides of rectangles, each series will give us a succession of rectangles less and less elongated—more and more approaching a square, each one nearly similar to its neighbors, the next larger and the next smaller, but totally different from the extremes either way.

To lay out such a series geometrically is simple.

Draw a straight line of a certain length. From the extremities draw diagonals of 45 degrees. Using these as mitre lines surround the line with rectangles at intervals of half a unit. The result is as desired, a series of rectangles of which both dimensions differ from those preceding and those succeeding by a unit ; yet all connected by a regular system (191, 192).

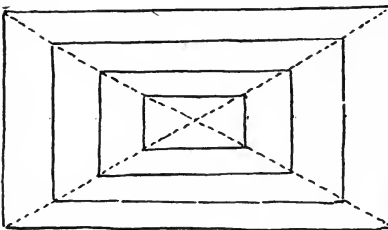


191.

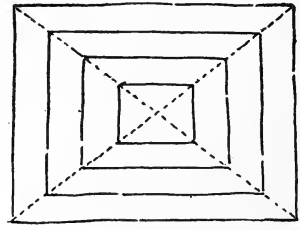


192.

Geometrical interpretations of musical ratios.



193.



194.

Geometrical interpretations of arithmetical ratios.

The first described system of perfect similarity is shown in 193 and 194. In this, instead of starting with a line, we start with a point, and draw our diagonals at any angle.

The resulting rectangles are all of the same character, all elongated or all shortened; while in 191 and 192 there is a general similarity with continual variation.

Arithmetically this means a series of ratios related to each other by a different connection than that of equality.

Instead of having $1 : 2 :: 2 : 4$ we shall have $1 : 2 :: 2 : 3$, the ratio proceeding by addition instead of multiplication. The greater the difference between the first terms of the series that we determine upon as the basis of a design, the more delicate will be the resulting variations. Begin with the ratio $1 : 11$, we have this sequence: $2 : 12$, $3 : 13$, $4 : 14$, $5 : 15$, $6 : 16$, $7 : 17$, $8 : 18$, $9 : 19$, $10 : 20$, and farther if we please. Now, if the dimensions of our front be $10 : 20$, or $1 : 2$, our windows, instead of being precisely $1 : 2$ may be $9 : 19$ or $7 : 17$, and our columns may be the first term, $1 : 11$.

Just what variation to make in each case we can find no rule to determine; we may only say that some such variation is to be desired.

IX.

Classification of Buildings.

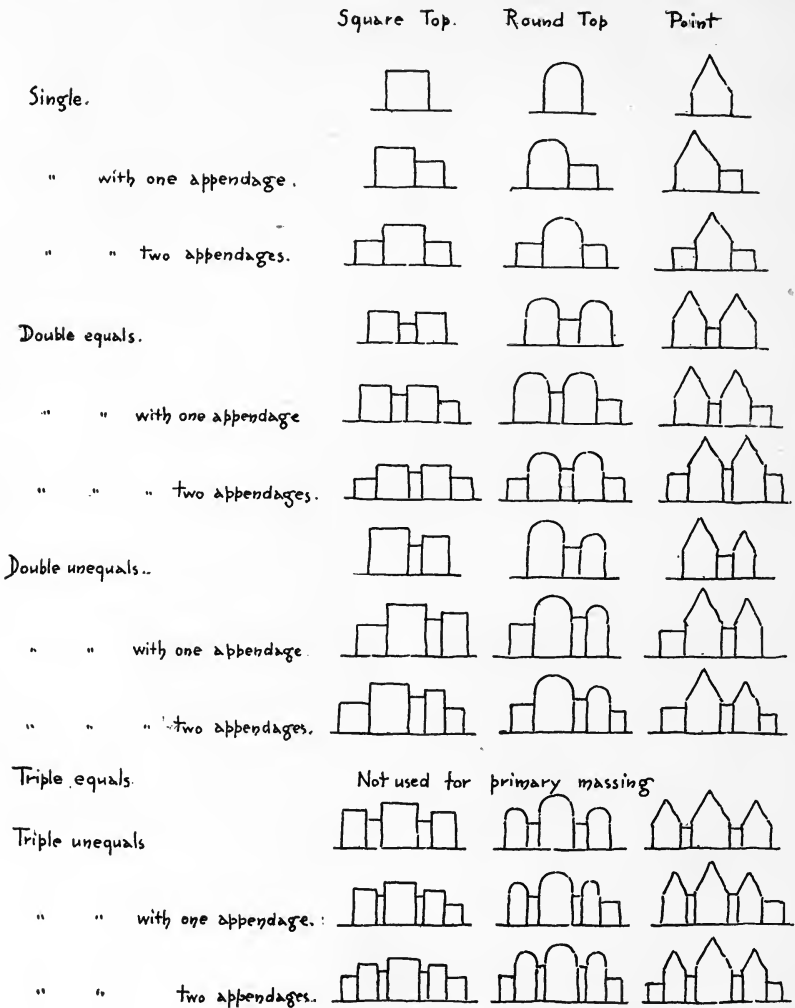
WITH the aid of the fundamental rules that we have laid down, we are able to classify buildings, according to the disposition of their parts.

Such a classification must be only approximate, and is of service chiefly in helping us to a clear conception of what we are going to do, when we are about to make a design, by setting in order our knowledge of what has been done.

195 is a diagram of classification that will present the facts to the eye, more clearly than words could to the ear. We have divided buildings, roughly, into three classes, square top, round top, and pointed. Under the first head, we may include, not only all undoubtedly square-topped buildings, such as those with cornices, but many whose general effect presents a horizontal sky-line, in which, although there may be gables in certain aspects, the general horizontality is characteristic.

Under the head of pointed top, we must class all spires and pyramidal terminations, as well as all gables, and pavilions tapering by stages to an apex. Mansard roofs are difficult to classify, but they may be placed under the head of square tops or of points, according to the kind of mansard roof in question—square top for the customary mansard of a façade; pointed, for that of a pavilion or bay, or main roof, for that matter, which gives more an impression of a tapering than of a square object.

Round topped main masses, except domes, are rare, but there are



195. Diagram showing classification of buildings.

some round gables, ends of railroad stations perhaps, which would come under this head.

Almost every building of any size or complexity, that stands isolated, or is more than a façade only, must be classified more than once. The first classification is of the building as a whole, conceived as if seen from a distance, in silhouette. After that, each front may be separately classified; and it would be possible to carry out in the same way the classification of the details of each part of each front. In the case of simple buildings, where there is nothing but the arrangement of details to the design, this may well be done; otherwise, it is unnecessary.

For all façade designs, and for a good many that are meant to be

seen from one principal point of view, although something more than mere façades, the first distant, silhouette classification is superfluous.

If we include all the buildings in existence, we must count a very large number under the first head in the diagram—single, square topped. Of all the vast volume of modern buildings, however, in all the miles of rows of private dwellings—not even to mention tenements; among the solid blocks of portentous stores and offices, in fifty cities of two continents, there is but here and there a rare specimen that even pretends to challenge æsthetic criticism.

Including only those of some artistic pretension, there must still be a considerable proportion of all buildings that we must classify under the first head, as single, square topped masses.

Among buildings meant to be seen from a distance, there are few square topped; most of such are topped with a dome or a spire. Nor are there very many of the square topped so simple as to come under the first head of our classification. The most important are all isolated, corniced buildings, such as many of the larger Italian palaces that are more than façades, as the Palazzo Strozzi, at Florence, and the Farnese, at Rome. This latter ranks as a single mass in the first classification, although in the subsequent classification of the façades, one is composed of double, equal masses.

Next to these are the isolated Greek and Roman temples, and buildings modelled after them, of simple rectangular plan. All of these are classed as square topped, notwithstanding their pediments, although in the classification of each front, the pedimented fronts will be accounted points.



196. Lusthaus at Stuttgart—a single pointed mass.

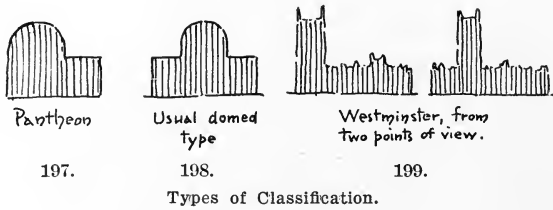
Circular plans, also, like the Castle of St. Angelo, and the tomb of Cæcilia Metella (although the latter once bore a pyramidal termination), we class as single, square tops, and oval plans as well, as the Colosseum, must be included in this class.

Of single round tops, we may instance the Baptistery. at Pisa and of pointed tops, here at 196 is an example.

The only round top that occurs at once to the mind which has but one appendage, is the Pantheon, at Rome (197).

Pointed tops with single appendages are many, almost every church with a western spire is to be so classified.

The most frequent type of domed building, such as St. Peter's or St. Paul's, or the Invalides, is to be classified as a round top, with two appendages, the building which constitutes the base appearing thus (198) in silhouette.



Westminster Palace is a square top, with one appendage, when the tower is seen at one side; with two, when it shows a part of the basal mass on each side (199). Of a similar double classification is our own Madison Square Garden; but in this case the dominant mass is a point.

Twin objects alone, as the motive of an isolated composition, are infrequent, it being difficult to avoid the condemnation of "double composition"; but with an appendage, namely the whole mass of nave, transepts, and aisles, are the scheme of most of the large French churches, and of the typical Egyptian temples, in which the twin pylons take the place of the twin steeples. Twin steeples are found both as towers, and with spires—the former, the square topped towers, are best for a twin composition. The reason is that a pointed mass is so much individualized by the point, that two such masses cannot be so perfectly welded together into a compound mass as they can when topped by a horizontal line.

A church like Notre Dame, in Paris, is classified in mass as double with one appendage. The front is double simply. Each side is single with one appendage; while the rear, giving the outline of the apse and aisles, is single, with two appendages.

Buildings like St. Mark's, at Venice, and the Taj Mahal, in which a central dome is surrounded by smaller domes, are classified in general, as triple, because, in silhouette, only three domes appear. In classifying each façade, the retiring parts are neglected; in the case of the Taj, the central dome, which leaves each front a double motive.

The Capitol, at Washington, in general classification is a single, round topped mass, with two appendages, these being the whole of



200. Santa Maria Della Salute, Venice.
The domes are of unequal size.

the building below, from whatever point it is viewed. Separately, the principal front is double; the rear is triple; and each end is single.

Of double, unequal, round topped groups, the Salute, at Venice (200), is a good example. 201 is a square topped mass with two symmetrical appendages, although these last differ in detail.

This is a very frequent motive. It appears again in 202, in which the oblique plan does not affect the grouping. The semi-circular bays are subordinated to the main ridge line, and do not



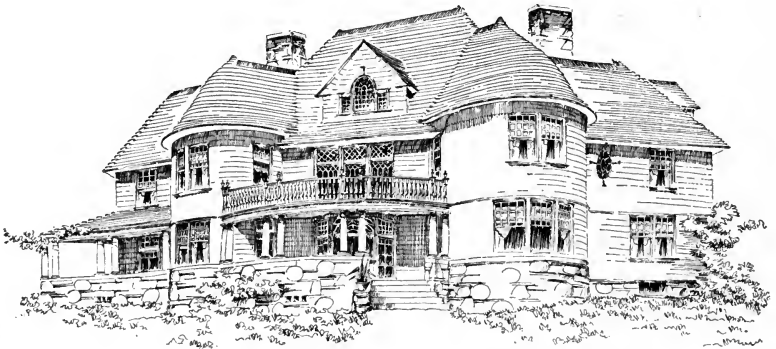
201. A square-topped mass, with two symmetrical appendages.

count in general classification. 203 is nearly the same motive, the appendages being unsymmetrical, and 204 is the same as 201, and is furthermore an instance of very unfortunate lack of proportion between the central mass and the wings.

205 is a double pointed group, and 206 is a triple one.

207 is a group of two unequal points, with a complex appendage at the left, and 208 is a triple group of points, of which the central exceeds the others in size, and differs in treatment, being itself a group of two equal points.

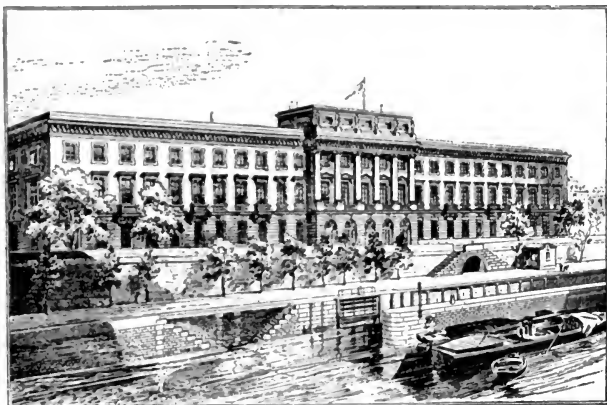
Enough has been said to indicate the general applicability of the system, and to serve as some guide in determining the motive of designs.



202. Square-topped mass with two symmetrical appendages.

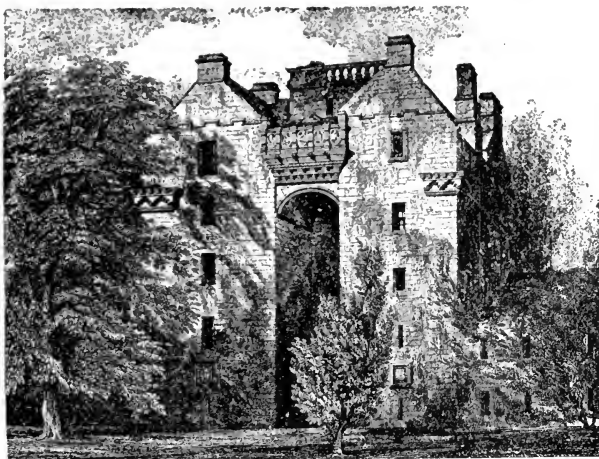


203. Square-topped mass with unsymmetrical appendages.



204. The Mint, Paris.

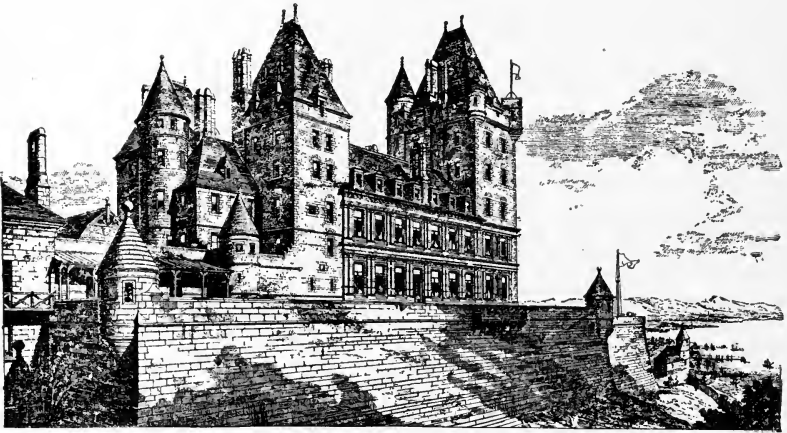
A single square-topped mass with two appendages.



205. Craigston Castle.
A double pointed group.



206. State Normal School, Moorhead, Minn.
A triple group of pointed masses.



207. Chateau St. Louis, Quebec.
Unequal double group, with one appendage.



208. Marine Hospital, Stuttgart.
Triple group of pointed masses, of which the central is a double group.

X.

Practical Examples.

WE are now ready to try our hand at making a design by the use of the rules that we have laid down.

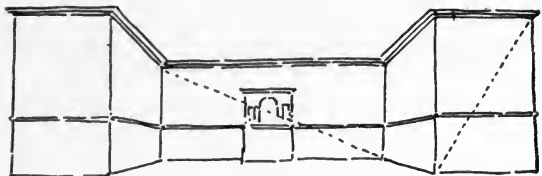
A general conception of the result that we wish to reach must be formed in the very beginning. Even before we think much about the plan, we must make up our mind as to the general character of the exterior that we are about to try to create. And a clear idea of a good motive for an external design is quite as much of an aid in working out a plan, as a good plan is in working out an exterior.

In practice, both go together. The skilful designer knows by experience what plan will work out easily; what will require labor and study.

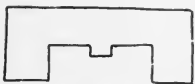
Every designer knows instinctively that a plan like this (209) is always the basis of a good design, in any style. Every designer knows, too, that, if a narrow middle projection must occur (210) it will require extraordinary effort and skill to make it look well, if it must be equal to the wings in height. He will either try to make it only a porch, one or two stories in height, and much lower than the wings, as at 211, or he will try to increase its breadth, as at 212, giving either 213 or 214 externally; that is, making the whole,



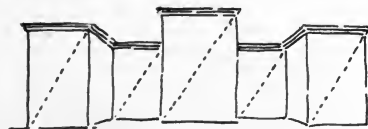
209. An available plan.



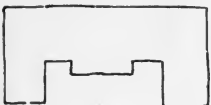
211. Front corresponding to plan at 210.



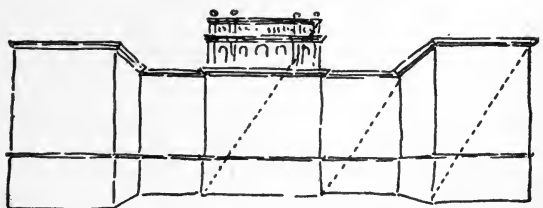
210. The same plan with a narrow central projection.



213. Front corresponding to plan at 212.



212. The same plan with the central projection made wider.



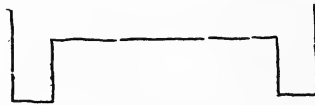
214. Another treatment of front corresponding to plan at 212.

definitely, either a double or a triple group. Instinctively, too, he will keep his central and side members, and the parts between, of somewhat similar dimensions, either all one way, as at 214, or some horizontally and some vertically, as at 211.

Observe, incidentally, that in order to make the central mass of 214 higher, we have been obliged to add an attic treatment; and something of the sort is necessary where the horizontal lines are strongly marked. It is necessary, above all things, in strong horizontal treatment, that the lines be carried all the way through; nothing is more fatal than any infringement of this rule; but the requirements that the central mass shall be larger than the flanking masses, and at the same time, of like character, are, when both are enforced, incompatible with carrying the lines through. To make the masses of similar character, we should have to lift the cornice of the central mass, as at 213, thereby failing to carry our lines through; while, if we carry the lines through, as at 214, we cannot possibly make masses of similar character.

In making the first sketch, there is usually either some favorite treatment in the mind of the designer, to which he tries to bend the exigencies of the plan; or there are certain data, as to the plan, of requirements that must be fulfilled, to which, sometimes only after long struggle, a practicable external design is reconciled.

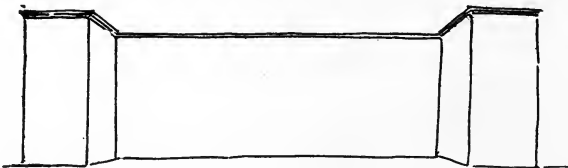
Given, a building to design; the requirements of the plan being



215. Plan required by the exigencies of a certain problem.

like 215, a front of 200 feet, with two pavilions each of 25 feet frontage, and 40 feet projection.

It is a difficult matter to handle this, on account of the narrowness of the side masses, compared with the magnitude of the central link. Any direct carrying out of the plan, with a straight cornice, would mean something like 216—an anomalous group, the side



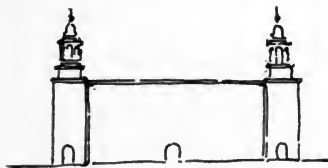
216. Front corresponding to plan at 215, showing the difficult proportions resulting.

masses being too small in proportion to the connecting part for it to be reckoned a double group; and too large in proportion to it, for the central part to seem a single mass, with the side masses mere bounding turrets.

If we could do anything to accentuate either the central part or the side parts, we could solve the problem.

First, we wrestle with the plan; and try to find some way of widening the side masses, not at the expense of the plan, but so as to improve that as well. Often, indeed, such careful study discovers some unthought-of and welcome idea, that makes a plan, before only passable, very much more to our taste, and at the same time makes a good external design easily attainable.

In this case, however, we wrestle in vain; no enlargement of the wings is possible. Next, we try to reduce the projection of the wings, having in mind something like 217, with an idea that we



217. Showing what might be done with 215 if the projection of the flanking masses could be reduced.

can put an entrance for each tower, and one in the centre, quite appropriately for our purpose.

Here, again, we fail; the wings must stay as they are.

Finally, we relinquish our attempt at a double motive, and manage a projection in the centre, less in depth than the wings, but of greater width, and determine to use a triple motive (218).



218. Ultimate treatment reached for plan 215.

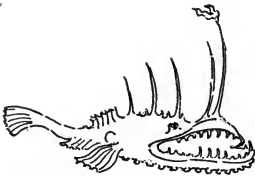
Partly because it would not do to spend money upon useless erections of towers and things on top, partly because we think it really looks better, we determine to make the three objects gables, and not towers, with as steep roofs as we dare, so that we may not lose too much room.

With all our efforts, we cannot make our gables of at all similar dimensions. What we should like to do, would be to lower the side gables to about the point where the diagonal strikes; and it would manifestly improve the design if this were done.

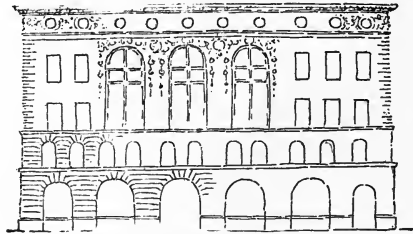
But it may not be; space is of vital moment, and to cut down the height of the wings is not to be thought of. We manage, however, to run a light string course above the first story; which leaves the part of the side gables above it somewhat similar in dimensions to

the whole of the central one. Although far from what we should like it to be, we let the design go, as about the best that can be done, under the cast iron conditions of plan; adding only the necessary three doorways, and the windows, which are determined more by the need for as much light as possible, than by any considerations of appearance.

Almost all designs have to be executed in a partially developed, incomplete and unsatisfactory condition. The skill of the designer is exhibited in his aptitude for reconciling practical requirements with the demands of beauty; yet the former may be so stringent that genius itself cannot relax them nor adapt the design to them. It is futile to urge that practical requirements fulfilled constitute beauty; for not even in nature is this true. The practical requirements that have produced the Gila monster, the horned toad, and the sea-devil (219), have certainly not produced beautiful results.



219. The Sea Devil, illustrating the incompatibility in some cases of beauty and utility.



220. Design for a Town Hall.

Taking another problem, let us suppose a town hall, of which the plan is limited to the usual rectangle. We may adopt either a horizontal treatment, with a flat roof; or a vertical treatment with a pitched roof; let us take the former; (220).

The hall proper is to be a large room, two stories high, and in the upper part of the building, being used but rarely; this prevents us from placing our three large windows as the middle horizontal division. The main stairs is at the rear, immediately opposite the doorway, and, after reaching the floor of the hall, quite naturally divides into two flights, one to each portion on each side of the hall. These, nevertheless, are unavoidably unsymmetrical; not altogether to our regret, as assymetry is not always offensive; often interesting rather.

The lower part must be designed with continuity of treatment, as we should have preferred to treat the upper part too, had not the two-story central hall almost forced upon us a single central motive.

We will, therefore, space the openings as nearly equidistant as possible, and make them all of as nearly the same width as may be, remembering that slight variations are not easily detected by the eye.

Under the central large window we put a couplet, which is unavoidably wider, as a whole, than the large window above.

This forces the couplets under the two large windows on each side of the central still more off centres, yet we still manage to retain continuous vertical lines of pier. Two more openings on one side, and three on the other, come pretty nearly under the windows above. The effect of the incomplete coincidence is to attract the eye rather to the horizontality of the band of windows, than to the verticality of the uncentred piers between, which is precisely what we expected to do.

Our first tier of openings gives us more trouble. The doorway must come under the central large window, which is fortunate, and we determine to put an arch on each side, of not quite, but nearly, the same size as the doorway itself.

On each side of this, the space baffles us. There is room for about half an arch, only, on one side, the dexter, and an arch and a half, scant, on the sinister. On the latter, we finally put one more arch of like size with the others, and another much smaller, which we arrange to serve as a special private doorway that we had desired; while on the other side, we put one not so small as this postern, and not so large as the row of large arches.

Although we should have preferred a row of more nearly equal arches, that which we have worked out looks fairly well.

The arches, we have made all of about the same height; the doorway arch two inches higher, and five inches wider than the others alongside of it; the extreme dexter arch three inches lower, simply because it is unavoidably so narrow; the postern, sixteen inches lower, for the same reason. Yet with even as much variation in width and height as this, the first impression to a spectator approaching from any direction, except directly in front, would be that of a row of equal arches.

In the same way, we make the large, central, two-storied arch four inches wider and two inches higher than the others, a difference only distinguishable by the most minute observation, yet having a wonderful effect on the feeling of the whole front.

Although we have secured a triple horizontal division, our largest part is at the top, and not in the middle, as we should have preferred it to be. We must, accordingly, do all that we can to divide the whole front into two parts, throwing together the two lower by sameness of treatment. Rustication, we determine upon, executed in brick, the only available material.

Fortunately we are able to procure a soft-brown brick and we make the enriched parts of terra-cotta matching in color.

The cornice we make as small as we dare; with its profile upon a diagonal of the whole front, and its height increased by an enriched band under it, with bull's-eyes that serve as outlets for our ventilation system.

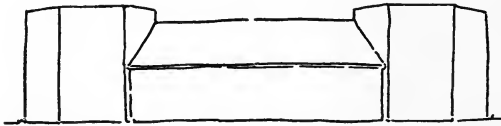
In originating a design, the requirements of utility will usually guide us in the choice of a motive. Once chosen, the important thing is to carry it out completely, and not bungle it with features that contradict the leading idea with which we began. Should it prove impracticable, it must be relinquished, and a different motive adopted.

Let us suppose that a design is required for a large country house. The owner is a man of wealth, having no occupation. His tastes are for hunting, shooting and other out-of-door sports, and he entertains a good deal. The situation is to be in a flat country, not far from the ocean, with not many trees, and such as there are, low and scanty.

The first hazy glimmer of an idea that comes to us is that we have long had a desire to make a large, low tower, like that which distinguishes Windsor Castle, the keynote of a design.

This is our opportunity: why not take something of the sort here and use it, internally, as a large dining-room, perhaps forty feet across and two stories high, round or octagonal?

The next idea is that such a house would require a ball-room at least as large as the dining-room. Why not, then, take these two towers, make each of them octagonal, and fit the rest of the house to them? Something of this sort is what we first sketch (221).



221. First conception of a motive for a large country house.

Well enough, so far. Our two big rooms can be made very magnificent; and, in the link between, we can put all the libraries, breakfast rooms, drawing-rooms, and, in the second story, bedrooms, dressing-rooms, boudoirs and suites, that we may need.

Still it looks crude and unfinished. Stiff, too, those great, square-shouldered masses; yet they are too good in themselves to give up just yet.

So we add, on each side, a very much smaller mass, keeping the oblongs of both roofs and walls of about the same character as those of the main building. One of the appendages must be appropriated to the kitchens, and the other we may use for the more retired parlors and music-room of the ladies of the family.

Then, coming diagonally out into the foreground, another appendage for the billiard-room, smoking-room, and gun-room of the men, and our design is much improved (222).

It is really nothing but two very large, equal masses; so large that

almost any number of smaller things can be placed around them; and, indeed, requiring irregularity in the setting to counteract the excessively formal character of the motive.

Therefore we deliberately put the entrance porch on one side of the centre, and a big dormer not quite the same distance the other side of the centre. The openings in the central link we dispose in a continuous row, entirely avoiding any break in the connecting lines. We expect to have some trouble with the chimneys, as they must

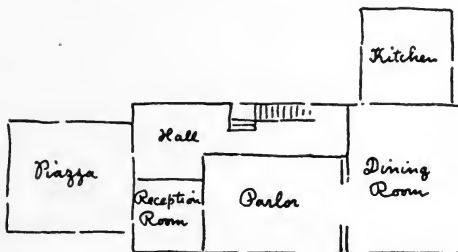


222. Completed Design of Country House sketched at 221.

be kept as low as we dare to make them; the design would be better with none at all.

Let us take another house, of quite an opposite character.

The cost is limited to four thousand dollars. The lot is irregular, and shaped so that we must place the broadest side toward the street. The special requirements are that there shall be a small reception room on the first story, and that one of the bedrooms shall have a small room attached to it, as a study. The piazza must be at the side, as the house fronts north, and the summer breeze is from the south; and something of this kind, in plan, is the first result (223).

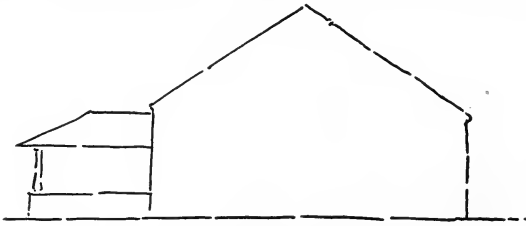


223. Conditions of plan for a small country house.

As for the exterior, we are quite at sea. Either a gabled roof, or a hipped roof it must be; it is too narrow for a gable at the side; a hipped roof will leave no space for a servant's room; there is noth-

ing for it but a gable facing the front, not at all a bad motive to begin with; but not very beautiful yet (224).

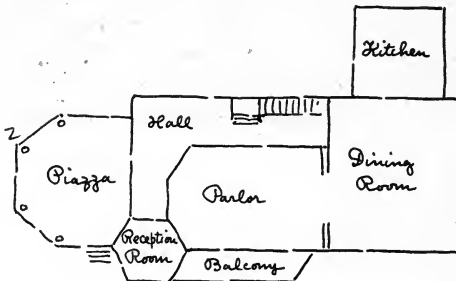
As we cast about for an idea, it occurs to us that the reception-room is far from satisfactory. Could we not put it, we ask ourselves,



224. Conditions of elevation resulting.

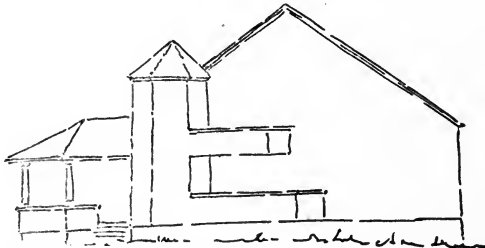
outside the rectangle of the plan, and make a single feature of it, which, as we have said, may be placed upon any part of a mass, and make a harmony.

Accordingly, we overhaul our plans thus (225), put our reception-room, and it just strikes us, the study in the second story over it, in an octagonal turret, attached to the main gable.

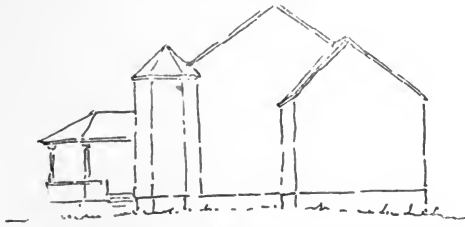


225. The same plan as 224, so modified as to obtain a single subordinate mass in elevation.

The result is good, as long as the large gable is higher than the turret (226). To raise the latter would make a group of two equal and unlike objects; to add a smaller gable, as shown in 227, would make a group of two subordinate unlike objects; either of which combinations does not look well. If we wanted to add another turret we might do



226. Elevation resulting from 226. The balconies are details, serving to connect the subordinate tower mass with the chief mass.



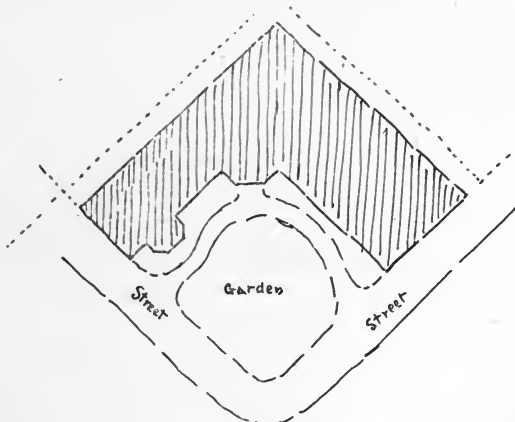
227. Unfortunate effect of a second and different subordinate mass.



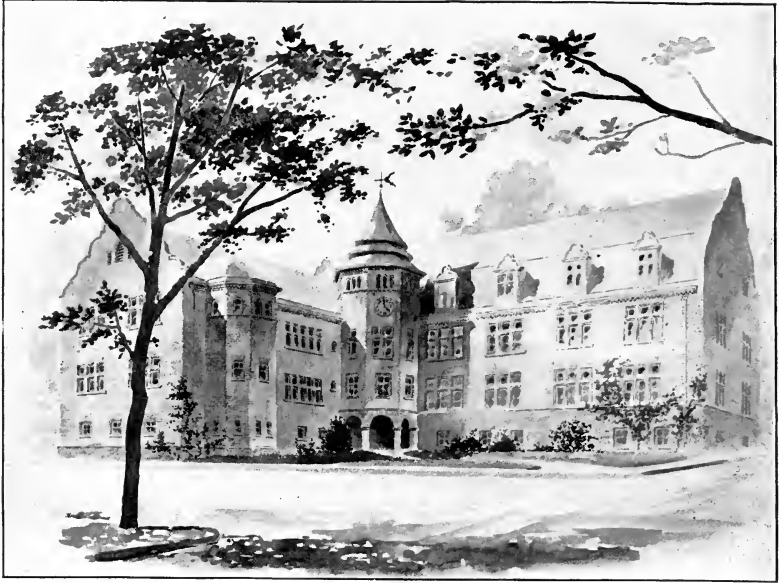
228. Small country house, a single mass, with one subordinate mass and one appendage.

so ; but it is better to preserve the original motive, a single mass, with one subordinate mass, the tower, and one appendage, the piazza.

228 is a photograph of the building as completed. The next example we take may be that of a school in a rural town. The plan, after much study, we conclude to make two sides of a quadrangle, on the inner sides of our corner lot (229).



229. Block plan of school building.



230. Design for Country School.

A single mass with a subordinate mass—the turret—and an appendage, the wing on the left. This appendage itself has a subordinate mass, resembling the turret in its octagonal plan.

One of these parts is naturally larger than the other; and it remains only for us to join them by a low turret, in the angle, to obtain a most effective arrangement (230).

At the same moment, it occurs to us that this turret will be just the place for the main entrance; and that over it, on the second story, will be a convenient situation for the principal's room, commanding outside a full view of the garden, and inside of both corridors.

The motive is a single mass, the larger block, with a subordinate mass, the turret, and an appendage, the smaller mass; the same grouping, in fact, as the small country house just described. This use of towers and turrets in re-entrant angles is always capable of being made effective. The essential point to be observed is that the tower must be lower and smaller—much smaller—than the chief mass.

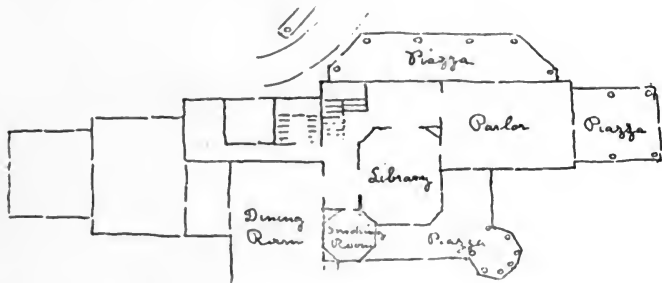
Let us take another example of a house of moderate size, since such constitute so large a part of a modern architect's field.

The problem, in this case, is complex. The site is the top of an open hill, with a fine mountain view on the south and west, which the owner wishes to command from as many of the rooms as possible. On the east are woods and rocks, and on the north a potato patch, belonging to somebody else. This last is, by all means, the place for the kitchens; all of the three remaining sides should be available frontage for family rooms.

The requirement that most of the rooms should command the view, leads us, finally, to a plan of rooms, en echelon, as it were, thus, (231), the long side being the principal front, and the entrance being on the opposite front.

The plan does not look promising for a design. Moreover, it is a most unscholarly plan, having no axes to speak of; yet there are some good diagonal vistas inside, and everywhere a glimpse of the beautiful out-of-doors.

As for treatment, we recur to the useful double group (232), making one large gable, and one somewhat smaller, the larger with a low turret, as a subordinate mass, very much as in the school design; except that here the individuality of the gables forbids us to regard one as the appendage of the other, and causes us to class them as two unequal members. On each side, however, we have a compound



231. Plan of house arranged to command double view from every room.



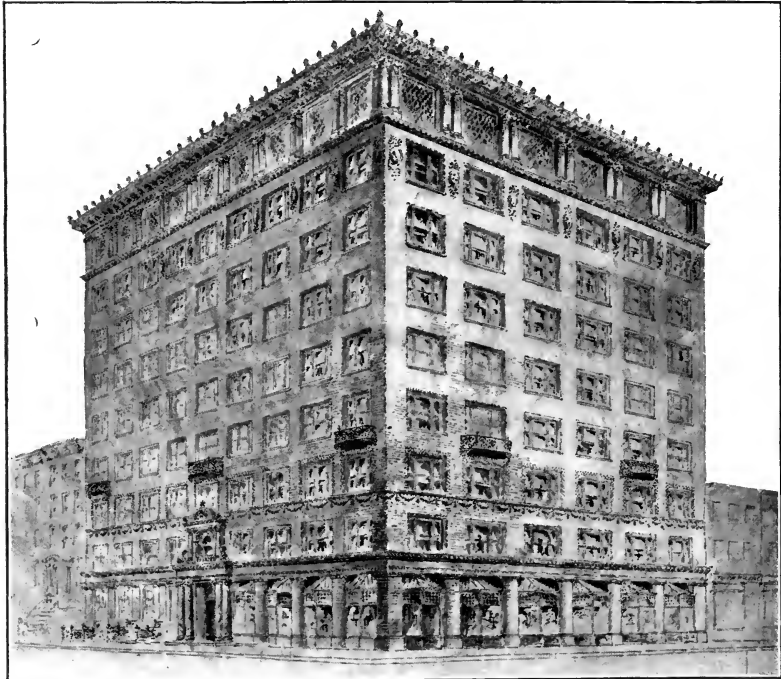
232. Design for Country House.

Two unequal masses—the main gables, with two unequal compound appendages. The turret is a subordinate mass upon the main gable.



233. Design for Small Library.

A single mass, the gable, with a subordinate mass, the turret, and an appendage—the whole portion to the left.



234. A City Building.

The fronts are subdivided into three parts longitudinally, and the openings in general dimensions are similar to the façade.

appendage, which, with a little, anomalous, octagonal pavilion in the foreground, complete the design. The two gables are, of course, similar; and all the rectangles, in both stories, have some relation of approximate similarity.

Let us now try our hand at a small library, belonging to a modest educational institution.

It is the wish of the management that class-rooms, in two stories, and two in each story, shall be attached to the library; and that the latter shall be somewhat monumental in character, directly communicating with the class-rooms, and also provided with an entrance for outsiders from the street.

The parts are as shown (233) almost similar, and the composition, as a whole, is a main mass—the gable—with an appendage, the library, and a turret again as a subordinate mass. The appendage is larger than is desirable, but this seems unavoidable. Notice the suggestion of the outline of the turret in each window of the appendage.

The next problem is a block of city stores, with apartments above, quite the usual thing in cities (234).

Our plan is unimportant; being determined by light courts, sizes of rooms, spacing of iron columns, and such considerations. The important thing is that the whole lot must be covered, the building must be eight stories high, and the top story is to be used for studios.

This last condition gives us a clew to the treatment.

We divide our fronts, for it is on a corner, into three parts horizontally. The lower one comprises the stores, and the story over them; the upper one is the studio story. Both we arrange with columns, the lower stout and plain, determined more by constructive than æsthetic propriety; the upper, slim and rich, and crowned with a moderate, terra-cotta cornice. In between, we keep it all plain; carry up the piers unbroken; an intermediate horizontal line would be fatal here; we venture only to hang a few garlands, like a fringe, below the upper story, making them, in effect, a part of it; and to put a few light, iron balconies, taking care that they shall not form a marked horizontal line.

This is all that we can do. The heights of stories determine our subdivisions for us; and no thoughts of similar or dissimilar rectangles may be entertained. Only, we have been able to group the windows in triplets, each group approximating the squareness of the façade in its general dimensions.

XI.

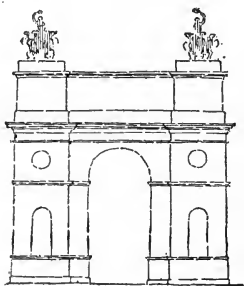
Theoretical Basis.

It may seem to some that in the foregoing pages an undue stress has been placed upon the number three. Our insistence upon it has not been a reminiscence of the superstitious reverence that has in the past attached to the number, but is based upon certain qualities therein inherent and easily explicable.

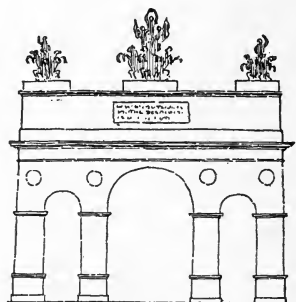
As used in composition, the only mystical property assignable to the sacred number is the fact that two and one are three. That is to say, that, by a slight difference in accentuation of parts, a single group becomes a double one, and a double becomes a triple; it is in the power of the designer to pass from one to the other often without destroying, or even injuring the design for practical use or in constructive facility.



235. A single arched opening. The niches in the piers count merely as details in their treatment.



236. By an increase in relative size the piers count as the elements of a double group; the arch is reduced to a link between them. The arch should be still smaller than here shown, for due subordination.



237. The niches in the piers are here increased until they count as members in a triple group of arches.

At 235 we have the outline of the ordinary triumphal arch. It is clearly a single arch; the abutments, although there are two of them, are quite subordinate, nothing more than the support of it. But, should we need to change the scheme, we may, at any moment, shrink the arch, and magnify the abutment masses into a group of two—towers, or something of the sort—with a moderate gateway to connect them. The sides have become the leading motive; the central part subordinate, 236.

Or we may do still a different thing by increasing the side parts, leaving the central undiminished, 237, the niches growing into

archways, comparable, though not equal, to the central, the whole constituting a triple group of arches.

In the desire to maintain the identity of the object through the different variations, regard for the proportions of the parts has been relaxed, leaving the sketches rather crude, but sufficient to illustrate the point in question.

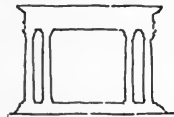
These transformations shed light upon the just-mentioned mystical property of the number three. Every architectural object consists of a central part and two sides, the central usually a void, the lateral solids. Architecture is, indeed, in its essence, the surrounding or limiting of voids with solids. The building itself is a part of space, surrounded by walls and topped by a roof; while the most important architectural objects are the holes made in the walls—windows, or doors, or intercolumniations—each of which is a void flanked by pier or column and topped by lintel or architrave.

Thus it is that three leading parts, one centre and two sides, become a definite category of architectural thought, to which the mind intuitively reverts, even though the central object cease to be a void and become a mass, or the laterals cease to be solids and become openings; and even though the sides, in the case of double grouping, become more important than the central part.

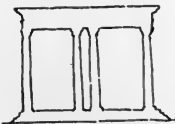
So again a group of three intercolumniations, as at 238, by the shifting of the intermediate columns toward the sides, becomes a single opening between coupled columns, 239; shifting them to-



238 Triple openings.



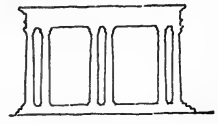
239 The same, with intermediate columns moved so as to leave a single opening.



240 The same, with intermediate columns moved toward the centre, leaving double openings.



241 The same as 240, with exterior column.



242 The same as 240, with exterior-coupled columns.

ward the centre gives double openings with a double column in the middle and single at the sides, 240, not a very satisfactory arrangement, certainly, but perhaps as much so as that with three single columns, 241. But if we double the columns at the sides, as at 242, a perfectly satisfactory result is obtained.

In passing we may glance at 243, a Greek example, in which the designer seems to have hit off precisely the amount of widening that the central opening will bear, with the corresponding reduction of the side openings, without reducing the latter to spaces between coupled columns and with distinct preservation of a sense of three openings.



243. Gate of the Agora at Athens.

The middle opening is widened as much as possible without losing the identity of the lateral as members in a triple group of openings.

Through all the different stages of composition we have it in our power to pass from one accentuation to another, to express the centre and subordinate the sides, to make the sides the most important and to suppress the centre, or finally to give full force to all three, either equally or with the middle predominating.

This seems to be the real reason why three leading masses is the largest number that can be coherently united. This reasoning applies to unsymmetrical groups as well as to symmetrical, for in the former as well as in the latter it is essential that the objects should be nearly the same size and nearly of the same general appearance. The double unequal group at 244 depends for its proper expression upon the approach to equality of the unequal members, as well as upon their general similarity of appearance. This studied difference in size was a favorite device of the mediæval designers to add interest and poetry to their creations. At 245 is a modern instance of the same sort of thing, although upon a much humbler scale. Here the general similarity of each mass—house and barn—is very marked. Each has a hipped roof, of equal pitch, with an appendage similarly attached to each, and with a small dormer upon each. Each



244. St. Jean des Vignes, Soissons.

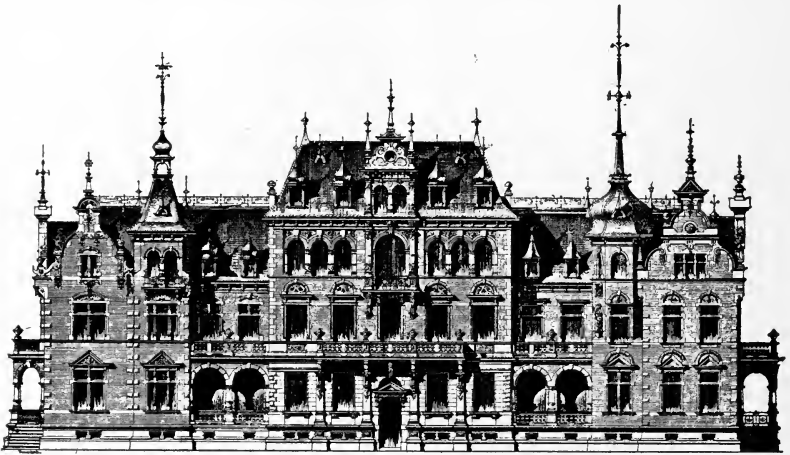
Group of two unequals. Such a group must have the members approximately equal and nearly similar in treatment. In this case each feature above the upper string-course is repeated and shortened in the smaller tower. The lateral buttresses are so arranged as to give the effect of greater width to the higher tower.

also has a single subordinate mass, with a difference; that upon the house being a round tower, carefully subordinated in height, while that upon the barn is a ventilator on top. This example carries the subordination of the central part to an extreme point, nothing being left of it but a fence, yet from a pictorial point of view the result is quite satisfactory.

An unsymmetrical triple group is shown at 246, where again in spite of the lack of symmetry the sense of centre and sides is very marked. Another example is at 247, although in this the central gable has a subordinate tower grouped with it. The wings are very different from each other, yet the sense of one being on each side is distinct.



245. House and Stable at Bethlehem, Pa.
As in 244, the treatment of both members is very nearly alike.



246. A Double Private House in Heidelberg.
The entire lack of symmetry in the lateral members does not in the least detract from the sense of triplicity in the group.



247. Union Passenger Station at Ogden, Utah.
The sense of triplicity in the grouping of the gables is not diminished by the asymmetry of the terminal gables.

Incidentally, it might be desired that the tower should either be a little smaller and stand on the same plane as the middle gable, and a little closer to it; or else should be much larger, large enough to dominate the whole group, and stand somewhere back, allowing the central gable to be completed.

Such a group as 248, although it exhibits three objects, is not properly a triple group; the unlikeness of the members renders such a conclusion antagonistic to sense. It is a single object of predom-



248. Entrance to the Antwerp Exposition of 1885. Although there are three objects, their dissimilarity in size and shape forbids classing it as a triple group.

inating size, with a subordinate double group, corresponding with a single opening flanked by coupled columns; the spaces between the columns do not count at all as openings, on account of their lesser size and different proportions. Each of these groups passes into another with perfect flexibility in the hands of the designer, and to make such transitions he must always hold himself ready.

XII.

Transformation of Motives.

THE classification of a composition depends upon the predominant group, and this is often determined by a very small difference. A very frequent motive for small houses is shown in 249, in which the main body of the house is a single object, the front gable a single subordinate object upon it.



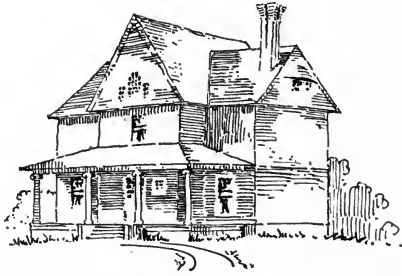
249. Motive for a small house. A single front gable as a subordinate mass.



250. Same as 249. Ridge of subordinate gable raised to level of main ridge. A faulty composition.

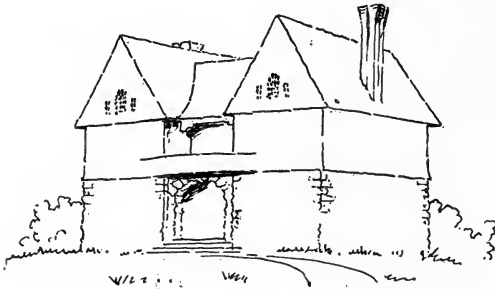
If the ridge of the latter be raised to the same height as that of the former, 250, we have the elements of a bad composition. There is no telling, as we look at it, which is the leading part. Many carpenters' houses that might otherwise be fairly satisfactory are spoiled by this very fault.

But as soon as the ridge of the front gable overtops that of the house behind, 251, we have a new and excellent group, the front gable becomes the dominant single mass; the rest of the house is reduced to two appendages.



251. Same as 249. Ridge of front gable raised still more, until it has become the principal mass.

So, again, in the case of a double group, as 252. It is necessary for a satisfactory result that the ridge of the link should be lower than those of the two masses. If the need for garret room, or other exigency, require the ridge of the link to be higher than this limit



252. The ridge of the link must be lower than those of the members of the group.

it is hardly permissible to raise it to the same height as those of the members of the group. Under certain circumstances, as where there is sufficient relief of the masses in plan, it may be raised to an equal height; but if the conditions demand a still greater elevation we may raise it higher only by changing the motive, prolonging the building until the ridge of the link becomes the main ridge, 253, and the two gables are reduced to subordinate masses upon it.

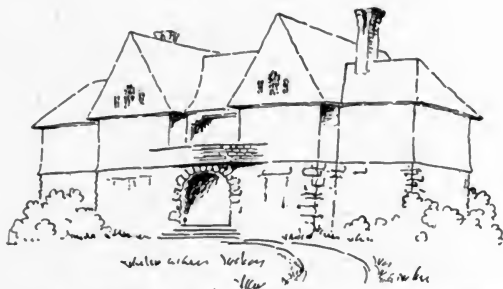
Or, if we need added length, without any more height, we may leave the link as it was, and put the additional length in the form of appendages, taking care to keep the ridges of these even lower than that of the link for proper effect, 254.



253. Ridge of link raised above those of members; the latter becoming subordinate masses upon a single main mass.

In each case it is the predominance of the ridges that determines the group, and it is essential that one arrangement or the other should be defined unmistakably as the principal motive of the composition.

In this way the designer who understands, or feels without understanding, the rules of combination by which he must be guided, holds his problem fluent in his hand; adding here, to accommodate



254. Ridge of link not raised. Building extended by appendages, whose ridges are yet lower than that of the link.

any unprovided-for room by an unsymmetrical appendage, or a subordinate mass projecting boldly forward; but always maintaining a proper dominance of the motive which he has adopted, or, if occasion require a change of motive, insisting as clearly upon the new one.

Not for a moment must it be supposed that anything like the inflexible stiffness of the last half-dozen sketches is the ideal of the designer. In elucidating the principles, simplicity of grouping must be the first thought, and stiffness is the inevitable accompaniment.

But in practice it is quite a different matter. As long as the leading motive is explained and not obscured by them, uncatalogued

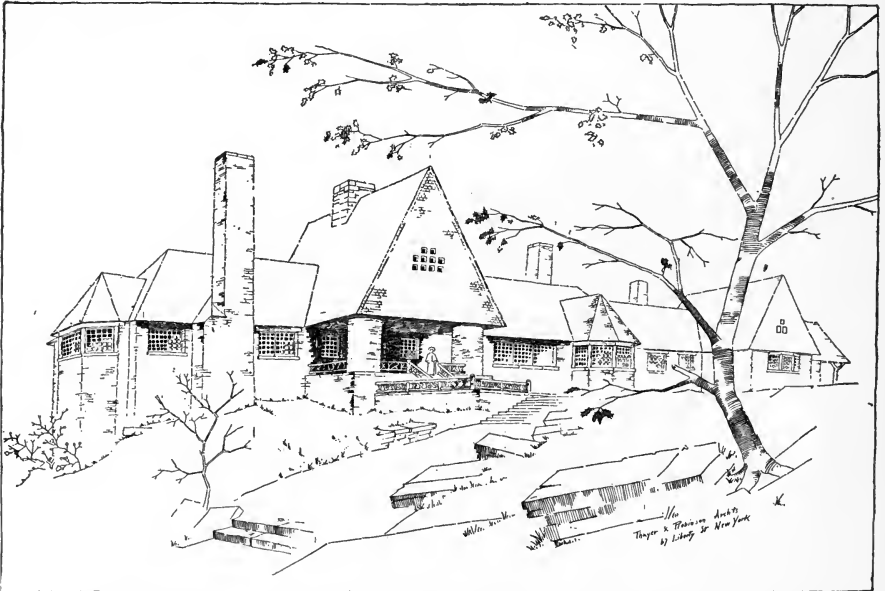
and uncataloguable variations are not merely permissible, but add grace and charm to what might be without them prosaic and cold.

The house shown at 255, for instance, is, in its leading motive, a single mass, with two unequal gables as subordinate masses. There is, however, another almost symmetrical subordinate group of two turrets, set quite unsymmetrically with reference to the gables.



255. Double unsymmetrical group of gables, with an additional double symmetrical group of turrets.

One of the gables, too, runs down on one side, quite regardless of anything else, yet notwithstanding all these irregularities, the main motive of the two gables is not in the least obscured.



256. The smaller gable, upon the right-hand appendage, suggests a double group in connection with the gable of the principal mass.

In 256 the primary group is the large single gable, with the rest of the house attached on each side as appendages. The addition of the smaller gable, giving in connection with the main gable a faint suggestion of a double unequal group, adds interest to the whole composition.

Another complex group is at 257. It is a group of two unequal masses, differing from each other in elevation and even more in plan. The largest mass is at the left, and it is composed itself of two unequal masses, the gables, also irregular in plan, and a subordinate mass, the octagonal turret. The smaller of the leading masses is a



257. Denby Hall, Bryn Mawr College.

A complex double group; the larger member is itself a double group with a subordinate turret.

simple gable, elaborated by a single gable placed on the return as a subordinate mass. Although so irregular, the group is as articulate and coherent as the most absolutely symmetrical combination could be.

On the other hand, a symmetrical grouping is shown at 258, in which each of two equal masses is combined with a tower as a sub-



258. Another complex double group. Each member has a tower attached as a subordinate mass.

ordinate mass. Incidentally it may be remarked that the slight variation in detail in the disposition of the openings, upon the fronts of both the wings and the attached towers, does not at all detract from the symmetry of the whole composition. Again, at 259, is another compound symmetrical group. The principal mass is a group of two gables and there are two appendages; the more distant scarcely distinguishable, except to permit us to say that it is quite different, in plan as well as in elevation, from the nearer. The latter, the appendage on the left, is compounded with another appendage, marked by a break in the roof line, and by a subordinate

ferent: it would have been better if the smallest might have been mass, which is a double gable like the principal mass. The roof of the appendage is rather muddled with three detailed gables, all dif-



259. Piggot's Manor, Hertfordshire.

A complex group of single principal mass with two appendages, all parts asymmetrical and compound.

thrice repeated. The distant appendage also seems to have the ridge a little too high, although it is too much obscured by the principal mass to speak positively. The whole is a coherent and pleasing composition.



260. House at Chestnut Hill, Mass.

The main gable and those of the dormers are alike in treatment.



261. House at Chestnut Hill, Mass.

Here again the hipped dormers correspond to the hipped main roof.

In the disposition of details upon the principal and subordinate masses, the most general caution to be observed is that the same general character should mark both the details and the masses. Thus, in 260, the gables of the dormers repeat the gable of the building; in 261 both mass and dormers are covered with hipped



262. Buchan Hall, Sussex.

The treatment of all the gables of main roof and dormers is as much alike as possible.

roofs. In 262, which, by the way, is another admirable example of a coherent, although unsymmetrical group, all the gables, both of masses and details are treated as nearly alike as the difference in size will permit. Every one is crowned with a small pediment, flanked by two pinnacles, divided horizontally by mouldings and perpendicularly by colonnettes.



263. House at East Orange.

Another example of the happy effect of similar treatment of parts varying in size and importance.

A more simple, and as marked, example is at 263, where the similarity and the excellence of effect thereby produced are conspicuous.

For certain definite purposes, however, precisely the opposite course must be pursued, and treatment must be used, varying according to the circumstances of the case.

At 264 is a composition of a double group, the two large gables, united by a link. To this is added an appendage, the lower wing at the right, and a single subordinate mass, the tower. The dormers upon



264. Passenger Station at Cheyenne, Wyo.

In this case the dormers of the appendage are suppressed as much as possible, to mark it as an appendage.

the link are treated with hipped roofs, and not with gablets, in order to more clearly limit the height of the wall of the link to one story, thereby distinguishing masses from link as perfectly as possible. Upon the appendage, the dormers are kept low, flat and inconspicuous, to aid in asserting the subordination of this part of the building.

Sometimes, too, details are grouped upon the background which the building itself affords, very much as if they were an independent composition. In this case, again, they must be of such a character as will make clear the grouping that is intended.

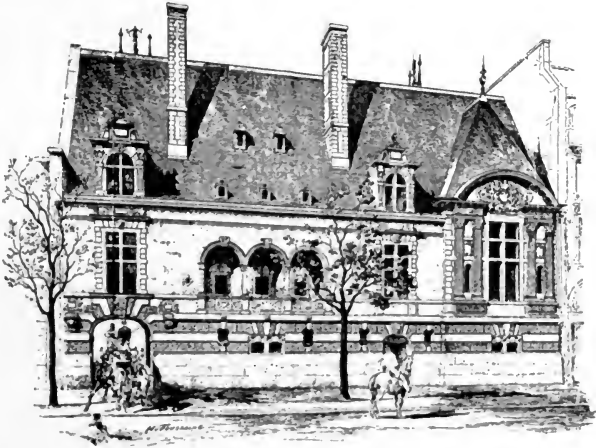
Such a treatment is at 265, the datum given being an unmanageable second story projecting through a gambrel roof, presenting a continuous vertical wall, of the height of the second story windows,



265. House at Little Harbor, N. H. The dormers are arranged as an unsymmetrical triple group.

or a little more, which must be gracefully roofed. It has been skilfully done. The character of all the dormer roofs, as usually befits a minor composition upon a larger mass, is different from that of the main roof. That is a gambrel gable; these are hipped, square or octagonal, and they form a group of three members, the central octagonal, the side square, connected by a low, straight line produced by

bringing the main roof down at a lower pitch. The same sort of thing might have been done in several different ways. Two octagons might have been formed, the present and another on the left, in place of one



266. Private House, Paris.

The pavilion is a single subordinate mass; the dormers and other details are separately composed in a double grouping.



267. House at Hampstead, England.

An interesting parallel to 266. Here, however, the details are a triple group.

of the square dormers. Or the present octagon dormer might have been enlarged, which would not have looked well, and so on, but a more pleasing result it would have been hard to reach.

266 and 267 are a pair of rather curious examples of parallel motives in quite different styles, one modern French and one modern

English, both good of their kind and both quite characteristic. Both high pitched straight are single masses, with straight front walls and roofs, ending at gable walls, actual or potential. Each is provided with a single subordinate mass; that in 266 being at the extreme right hand of the façade, a graceful French Renaissance pavilion with hipped roof; the other at the extreme left hand, an unpretending English bay, also with hipped roof.

The rest of the detail in both examples is treated as a separate composition, in the English specimen, a group of three equal members, in the French, a composition of two members joined by a link, the openings in the first story and the dormers on the roof being suitably modified to carry out this impression.

Such examples as these, in which designers of schools so opposite as to be almost antagonistic, have arrived at so nearly the same solution of a problem, indicate how closely such schools are really connected, notwithstanding superficial separation. They show, too, how necessary it is in laying down the law in such matters to avoid dogmatism, as a skilful designer will always be ready to avail himself of new and untried combinations.

But where no special difficulty is to be overcome, the handling of the masses of a design, with the aid of the rules that have been elucidated, becomes almost a mechanical matter.

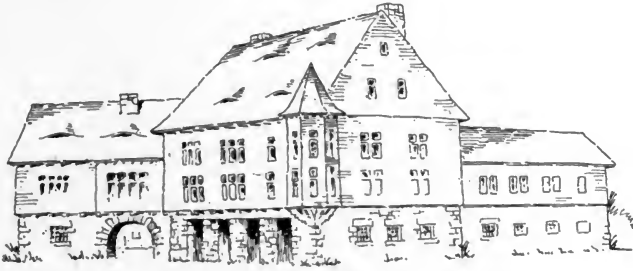
Each group that we have indicated becomes clearly fixed in the mind, with its variations and modifications; one gliding into the other by such easy changes, and the limits of possible changes being definitely fixed, that we are restrained from false steps, and soon learn to instinctively assign to each new plan its appropriate treatment.

Each arrangement, too, we learn to think of as independent of "style"; as indeed, practicable in any style, although some may lend themselves more readily to one sort of treatment than another.

Thus the three designs shown on page 119 are all of the same motive, adapted in treatment to different styles. The motive of each is a single mass, with one subordinate mass placed unsymmetrically, and with two appendages, one of which also has a subordinate mass, placed also unsymmetrically.

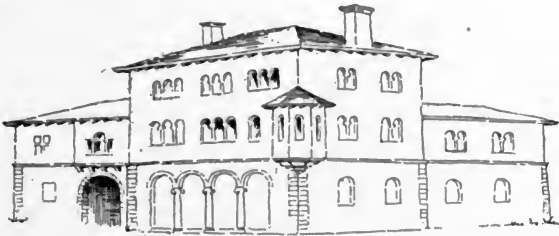
The first, 268, shows the motive treated in modern rural style, a design suited, perhaps, for a country hotel. In this case one of the appendages is placed diagonally in plan, without influencing the motive. All of the three roofs of main mass and of both appendages are made with gables and long ridges. Hipped roofs for all might have been adopted just as well, as far as the unity of the design is concerned, or the main roof might have been gabled, and the appendage roofs hipped. The single subordinate mass is applied in the form of an oriel turret. This turret is not started from the ground, because

such treatment would destroy its proportion to the masses. These latter are all open rectangles, rather "chunky" in build, and the chunkiness of the turret which is obtained by shortening it is quite



268. A composition of a single mass and two appendages, with one subordinate mass.

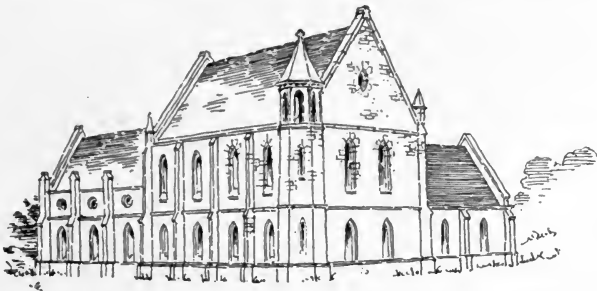
in keeping. Moreover, keeping it up from the ground accentuates the line above the first story, which runs through mass and appendages, subdividing the design horizontally into two parts, an effect



269. The same composition as 268, in an entirely different style.

which would be antagonized and spoiled if the tower were carried to the ground.

The next, 269, is an application of a horizontal Italian style, to the same motive. Deference to precedent urges us to straighten out, in



270. The same composition as 268 and 269, but differing in style from both of them.

plan, the appendage that was before diagonal. The treatment of all the roofs is low and flat, scarcely showing above the cornices; and the projection of the latter is somewhat more than in proportion to the dimensions of the separate members, rather to those of the group as

a whole. It would be fatal to allow this to be cut into by a turret: the subordinate mass accordingly is chopped off at the top as well as the bottom, and the roof of it flattened to match the other roofs. At 270 is the same motive again in Gothic treatment.

The detail appropriate to that style cuts the masses up into narrow vertical slices, quite subordinating the horizontal lines. In harmony with this the turret is prolonged both downward to the ground and upward above the main roof. All the roofs are of steep pitch, and the subordinate oriel window which adorned one of the appendages in the two preceding examples is omitted, as more in keeping with Gothic work.

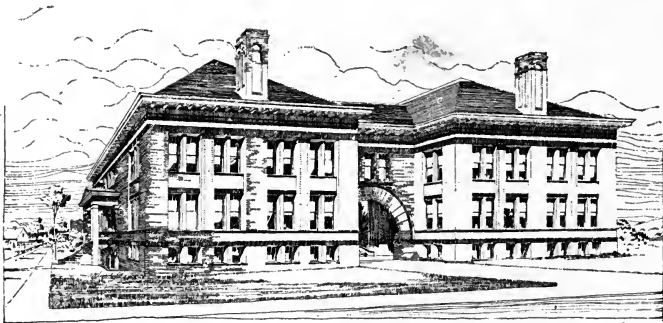
XIII.

Double Composition.

A FEW words of further explanation upon the question of "double composition," once before referred to, may be in place.

It is well known that two like objects set side by side, unless the junction is properly managed, look exceedingly ill. This fault is called "double composition," and is so well recognized that it is not easy to find very good examples.

The chief cause of error in this respect is the failure to make the connecting link sufficiently evident. A fair example is at 271. From



271. The too great retreat of the link renders this almost a case of "double composition."

the point of view of the picture the link is quite visible, and the "doubleness" not so striking, but if the spectator should stand a little further on one side the link would pass out of sight and the "doubleness" become manifest.

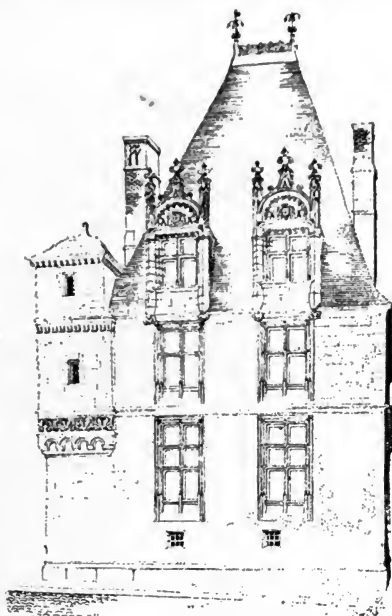
A similar fault often occurs in New York apartment houses, where two houses standing back to back occupy the whole frontage at the end of a block. Sometimes the defect is partly remedied by the addition of a colonnade to connect the two buildings.

So in 272 the two parts of the building would not look well were they not connected by the porch, which the architect has, very judiciously, carried through two stories.



272. This design is rescued from the charge of "double composition" by the prominence of the projecting porch.

These two are examples of principal masses, with reference to the defect in question. As for subordinate masses and details it is much



273. Hotel de Ville, Ambroise. The double treatment is united by the high roof of the building.

easier to avoid "double composition"; because they are so well united by the background of the mass upon which they occur, that often

no other connection is needed. At 273 is a pair of dormers, which would certainly fall under condemnation were it not for the large roof behind them, which ties them together; as it is they barely escape it. Another instance, which is scarcely redeemed by the pres-



274. Parish School, Charleton, Devon.

The main mass behind is barely large enough to properly unite the two gables.

ence of the principal mass behind, is at 274, the two gabled masses not looking so well as if they were connected by something flush, or nearly flush, with the face of them.

Sometimes the welding is done by the addition of a subordinate object, of which a particularly fine instance is at 275; the two gables

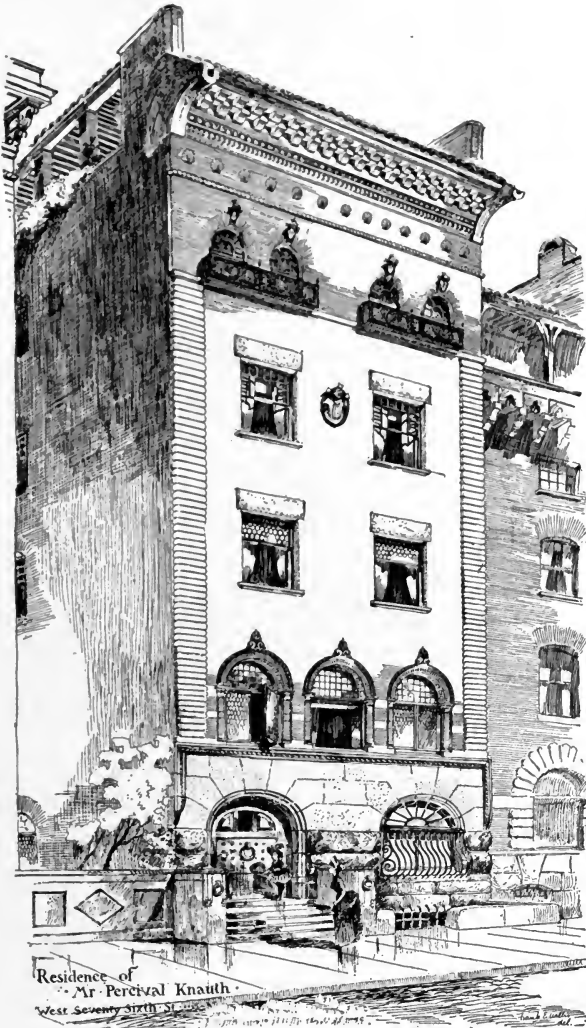


275. Church of English Martyrs, York.

The two gables, which without it would be a flagrant case of "double composition," are admirably united by the central tourelle.



276. Postoffice, Surbiton, England. The central doorway serves to unite the double treatment.



211 Private House, New York. The wreath in the fourth story unites the double treatment of third and fourth stories.

would look badly without the clever turret between, which "pulls them together."

Very often the addition of a central detail of this kind will have the desired unifying effect. 276 is a case in point, where the central doorway is so used, also the window above it has some effect of connecting the double motive, although this effect would be greater if the window were oval, or circular, or a cartouche, or something differing more from the windows on each side. 277 is another case, in which the wreath between the two fourth story windows has a wonderful effect in connecting the two windows of third as well as those of the fourth story; and again, at 278, the canopied balcony connects



278. Rathaus, Ratisbon. Double treatment united by central balcony.

the double motive of the front. There are other ways of uniting two objects that are not sufficiently well connected. Two gables standing side by side are apt to fall under the charge of "double composi-



279. Llewellyn Almshouses.

Double gabled treatment united by heavy overhang of gables.

tion" unless measures are taken to join them. Usually a heavy projection is managed, either just below them, as is seen in the double gables in 279; or a series of marked horizontal lines in the mass below, as at 280, forms an adequate bond. Sometimes they are



280. Double gables united by marked horizontal lines.

laid together bodily, as at 281, 282, a part of each being chopped off in order to unite the two into a whole.

In one frequently recurring requirement of design "double composition" is imminent. In every couplet window, with a central



281. Private house at Detroit, Mich. Double gables united by juxtaposition and merging together



282. House at Interlaken, Fla. Same as 281.

mullion, the tendency to double is felt. If in any way the individuality of the mullion is too marked, as by making it a column, it is almost sure to involve "double composition."

Accordingly in almost all arched couplets we find three columns or columns are used, and in the rare cases in which a colonnette is used for a mullion in a square-headed opening, the situation is often

rescued by putting a row of such openings together, and overcoming the effect of individuality, that with one column would detract from the desired effect of a duplex opening, by the appearance of continuity in the succession of both columns and openings.

XIV.

Criticisms.

WHEN such a design as 283 is presented for our opinion as to its merits, it is easy to speak the word of condemnation without hesitation; not so easy to name and classify our objections,



283. A design for critical analysis.

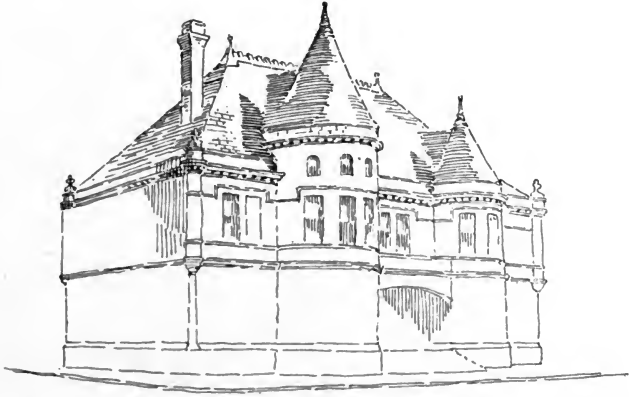
and show how the faults discovered may be removed. By the aid of what we have learned, however, we may hope to succeed in the attempt.

The first really critical thought is that the mass of the building predominates; all of the towers and other projections, whatever their merits or defects, are subordinate to the building itself.

Our next thought is that the arrangement of octagon tower roof, dormer and circular bay upon the front is hardly clear; there seems some intention of uniting the tower and bay in a group of two by the balcony at the second story, but the dormer is so large and self-assertive that, above, it looks more like a group of three. Do away with the dormer entirely, let the attic go without light if need be—light has nothing to do with appearance—and it is at once much improved.

The tower and bay are still at variance, and they must be made of similar character before they can be united. The conception of the

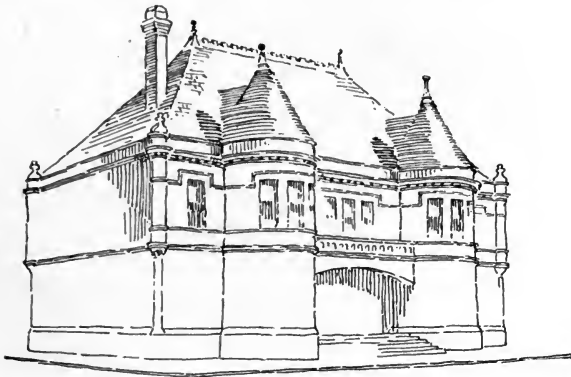
designer seems to have been that of a group of two unequals, and this is quite practicable. In order to make such a group we must widen the large tower in order to make its dimensions proportionate to those of the bay, and we must also make both bay and tower either circular or octagonal in plan, thus, 284.



284. The same as 283, with the large front dormer removed, and the towers made similar in treatment, although of different sizes.

Incidentally, we abolish the octagonal bay on the side of the building. It is rarely advisable to use anything like the same treatment on the side and front of a building. One or the other should receive the principal treatment, not both the same. So if we must have a bay at the side we should take off the roof and terminate it with a balcony only; or, better still, stop it at the second story.

Even as we have made it the design is not yet satisfactory. The reason is that, in making the larger tower proportionate to the



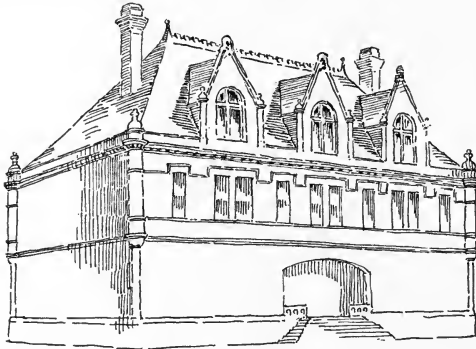
285. The same as 284, but the towers reduced to a group of double equal subordinate masses.

smaller, we have made it too large to appear quite as a subordinate mass. We must give up the idea of a double unequal group and make a double group of equals as at 285. The composition now is

much improved, although the details of windows, corner tourelletes, and others are yet susceptible of improvement.

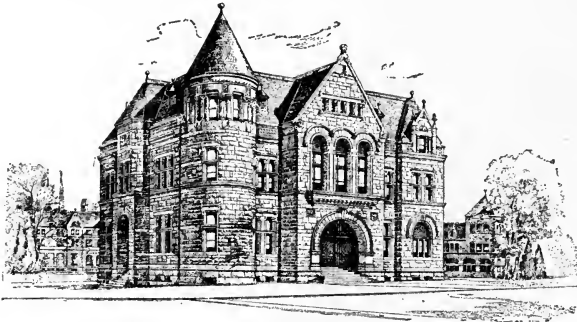
As for lighting our attic, it must go unlighted, or at the most receive a glimmer through the smallest possible roof slits, none at all would look best. If a brilliant light is indispensable we must put three large dormers on the front slope of the roof and take away our bays entirely. The two treatments cannot be combined, 286.

A very fine example of hesitation in subordinating the members of a group is shown at 287. Here are three objects—a tower, a gable, and a pavilion, all of about equal size, none of the three pre-



286. The original design of 283 modified in an opposite direction, the towers omitted and triple dormers developed.

dominating sufficiently to enable us to say whether it is a group of one, two or three parts. Nor is any of them large enough to be regarded as subordinating the main bulk of the building to a mere ap-



287. Another example for critical analysis.

pendage; nor small enough to reduce itself to a subordinate mass upon the building.

So that we must first make up our minds as to this latter point, whether the objects are to be principal or subordinate masses—whether the composition is to be one large thing, with several small things upon it; or whether it is to be a group of things of varying sizes, each properly related to the other.

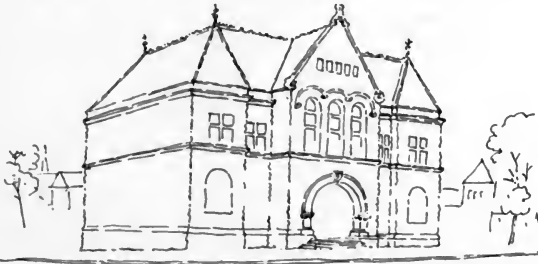
Beginning with the former arrangement we have as a foundation a perfectly straightforward, square building—very safe and satisfactory as a motive at all times, 288. It has a mansard roof, somewhat



288. The base upon which 287 is composed.

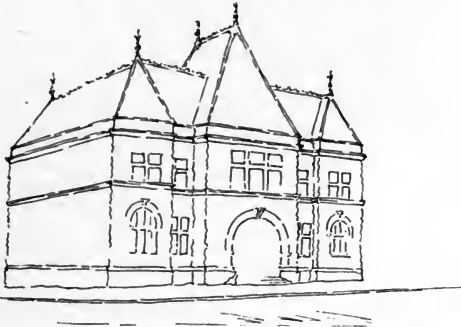
difficult to treat—more difficult upon an isolated building, such as this is, than upon a façade. Moreover, the proportions of the stories and of the roof are unsatisfactory.

Leaving these for the moment, for we must not lose sight entirely of the building that we are analyzing, we endeavor to restore some



289. An attempt to recompose design of 283. Round tower omitted and replaced by a symmetrical pavilion.

of the objects, as in 289, wherein we have changed the round tower into a pavilion, knowing well that three unlike and equal objects cannot be united in a group. We hope by doing this to obtain a



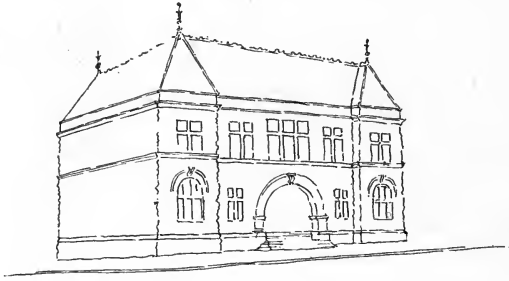
290. The same, with the central gable abandoned and a pavilion like the sides substituted.

group of three, the central unlike the sides, and predominating over them. Our hope fails us. The central mass is not big enough to dominate the group; besides, there is a painful lack of similarity be-

tween its slope and that of the side pavilions: we must assimilate it to the others, and make a group of three like masses, 290, which is fairly practicable, although the details and proportions need much further study.

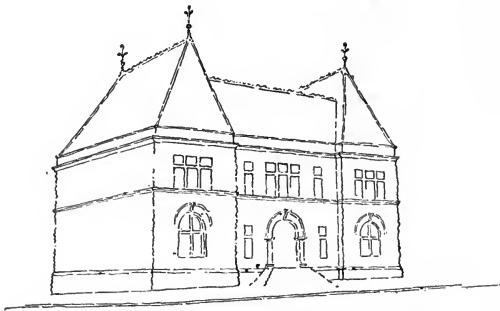
As to faults of proportion, one thing especially comes to our attention—the narrowness of the link walls, and the lack of similarity between their dimensions and those of the pavilions. The windows, too, seem to be crowded in, but the idea of being crowded is an intellectual and not an æsthetic one; the real æsthetic defect is the comparative broadness of the pavilions contrasted with the narrowness of the curtain walls between them.

With the view of obtaining a broader link space we determine to try a double grouping as at 291. This promises better results. The



291. Central pavilion omitted and composition changed to double motive.

effect of the pavilion at the nearest angle, however, is unfortunate: it is not clear whether the pavilions are subordinate or principal masses. We therefore relinquish the motive that we have hitherto pursued and determine to make them definitely the latter by raising their ridges as in 292.



292. The same as 291, with the members increased and the link subordinated.

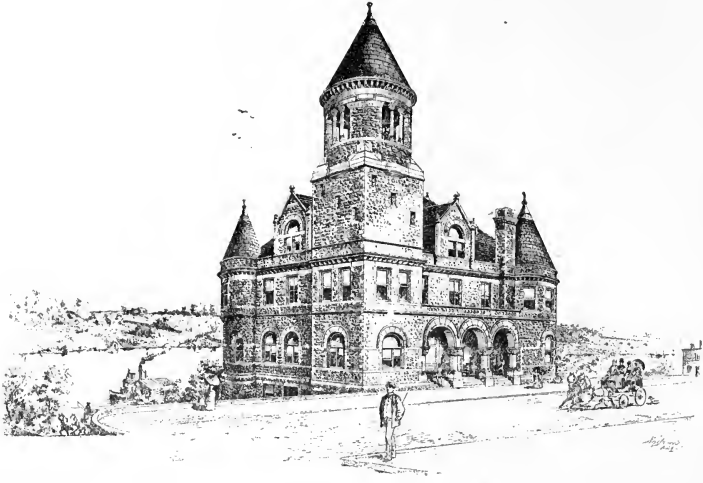
Not one of the motives that we have thus obtained is satisfactory until much more study has been given to it than we can afford to give here. Enough has been said to indicate the methods by which our efforts at improving the design should proceed.



293. Another example for critical analysis. Masses not properly subordinated.

In 293, apart from the lack of grace which occurs in all parts, the fundamental error is the same as in 287; the pavilions and other parts that are upon both front and side are either too large for the building or the building is too large for them. They must all be very much lessened and properly disposed upon the building as subordinate masses; or else very much increased; and, in this latter case the number of them must be diminished. Besides this the treatment of the side must be less individualized: it is almost impossible to treat successfully both a front and an adjacent side with important central masses.

So frequent and so fatal is this last error that one or two added examples may well be examined. An excellent illustration is shown in 294. Although there are other points that might be criticized, by far the most interesting is the ill effect of the exactly similar treatment of front and side. The reason is that the whole art of obtaining unity in a design is the observance of a due subordination in the various parts. One side or the other, either front or return, must in some way predominate in treatment. If our design is a simple pedimented or gabled mass, the pediment or gable is sufficient to give predominance to the side on which it occurs: if, on the other hand, one side is distinguished by a certain grouping of subordinate



294. Illustrating the unfortunate effect of treating both front and side alike.

masses, some entirely different treatment is needed for the adjacent side.

There are innumerable houses of the most modest dimensions and extremely bad design, that are erected every year by builders who regard themselves as architects, but lack the chief requisite to justify such a view—the power to make an agreeable composition. At 295 is an instance of which the faults may at once be pointed out;



295. Design for critical analysis. The front dormer is excessive, if it is meant to be a subordinate feature.



296. The same as 295 with the excessive dormer reduced.

the most serious is the excessive size of the front gable. This is clearly meant to be a subordinate mass, as indicated by its bracketed support; its excess in height above the main ridge, however, quite contradicts this assumption.

In order to make it tenable we must lower the front gable as in 296. This is an improvement, but it still leaves us in trouble with

our piazza. Any marked horizontal line which stops short as this does of the horizontal lines of the principal mass, is difficult to manage. It is almost as bad if it is returned at one end and not at the other. Perhaps as good a solution as can be reached without an entire restudy of the plan is that shown in 297, where the piazza is carried across the entrance front, the roof of portion on the return being omitted. The flat-roofed one-story part must be treated as an ap-

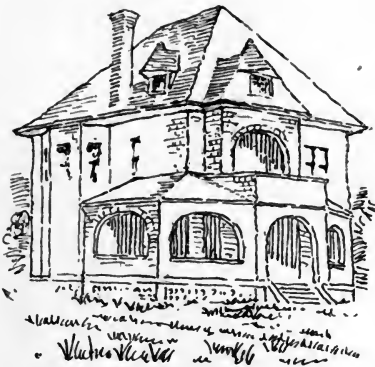


297. The same as 296 with dormer and main roof united by similar treatment.



298. Design for critical analysis, Almost incorrigible.

pendage, and the back wing separated from the main house by a break in plan, which will make it compose as an appendage from a side view.



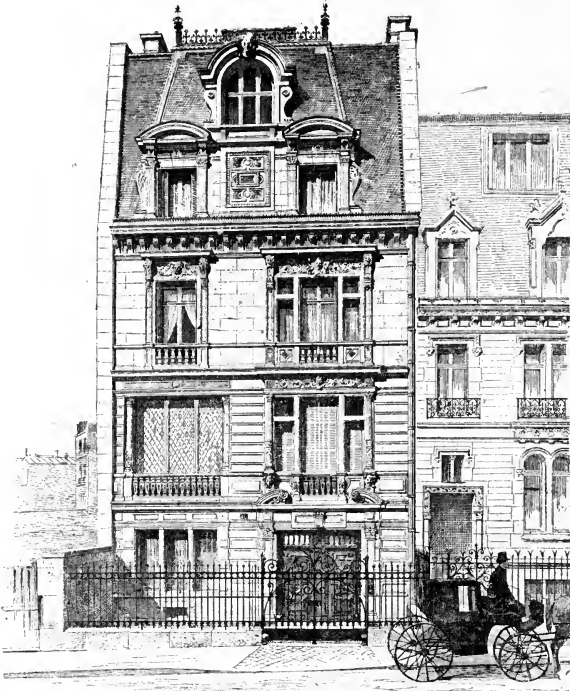
299. An attempt to improve upon 298.



300. The same as 299, farther modified, but not yet successful.

A still finer specimen of a bad composition is at 298—so bad indeed that it is scarcely possible to suggest improvements without beginning with total erasure of all that has been done. The main building appears to be meant for a hipped roof, but the various subordinate parts are so disposed that the outline of the roof is barely discernible. This is the most serious fault: we proceed to radically

extirpate it in 299, where we have restored the main roof, leaving the lower part much as it was. The single subordinate hipped part that remains is very unmanageable, because it is at variance with the heavy horizontal line of the overhanging eaves. Moreover, on so small a building, it should be in the centre or else still more to one side. Besides this the unsymmetrically placed piazza will not do without further study. We make an attempt at 300 to right these matters, by putting both piazza and upper projection on the corner of the building, making them octagonal to excuse the asymmetry. The result is not happy, the vertical lines of the turret are still at variance with the eaves, and its proportions fail to harmonize with those of the piazza.



301. Example for critical analysis. Faulty composition of details.

Further study would give us a new and satisfactory motive, but not without losing the identity of the design that we are criticising.

At 300 we have a specimen of faulty arrangement of details, less offensive, indeed, than some of the foregoing faulty examples, as a façade is hardly capable of being either as beautiful or as ugly as an isolated building.

Such a spacing of windows, with an excessively narrow pier on one boundary, as occurs in the basement and first story, is not to be excused on any grounds of convenience of internal arrangement.

Not because a narrow pier suggests constructive weakness: this may be true, but it is not with such criticisms that we now busy ourselves: simply because of its entire dissimilarity with any other part of the building, especially with any other pier, such a narrow pier as this the eye cannot tolerate.

If the conditions are inflexible, we must seek a solution by making the other piers also narrow, which would look badly enough, but not so badly as at present, because one serious æsthetic objection would be removed, though new ones of lesser importance might be presented.

A still more serious error is in the grouping of the three dormers on the roof. In the first place the roof itself offered a suitable background, without cutting it up with hips apparently intended to suggest a pavilion, but having too little relief to look well. In the second place, if pavilion there must be, its sole function was to be a background to the three dormers, which is negated by starting the hips from the top of the lower dormers, instead of from the main cornice.

In the third place the topmost dormer should be of the same character as the two below; or if it must be different, it should be very much more different than it is, and if possible, much larger.

In the fourth place the panel between the two lower dormers is most unfortunate; there should be no panel there, but only roof surface: if panel there must be it should have less individuality, so as to unite the dormers rather than assert itself.



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