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ORNAMENT

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ORNAMENT

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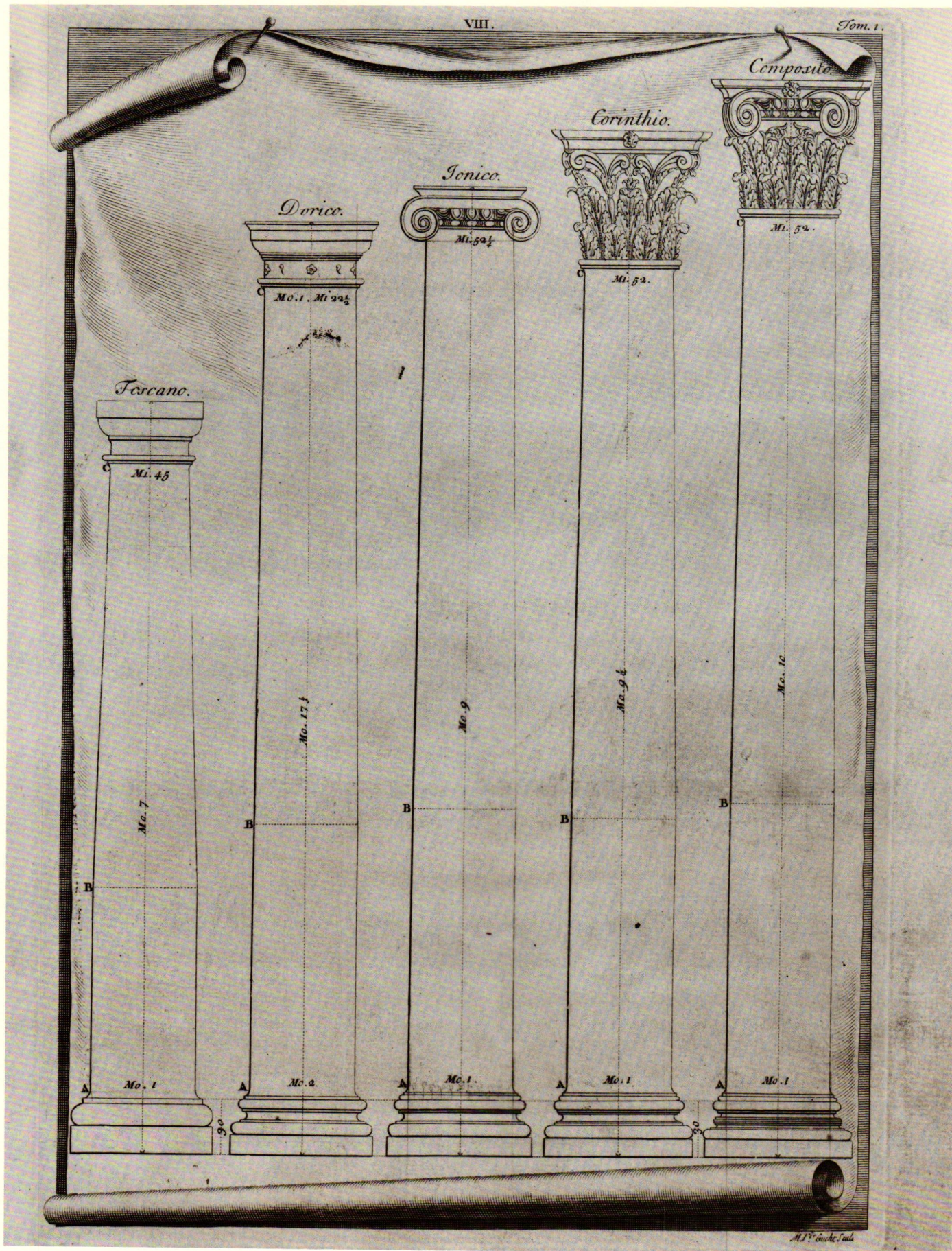
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The five orders of architecture according to Palladio. The Architecture of A. Palladio in Four Books, 1570.

WHAT IS ORNAMENT AND WHAT IS NOT

Sir John Summerson

Think about ornament and the mind darts at once to the nineteenth century, to the Great Exhibition of 1851 and its manifold sequels at South Kensington. Ornament was never a problem till the Victorians made it one. It was never a problem before people began crying for a new style, a style for the age of iron, of the steam locomotive and so on. Then, instead of being what it had been for centuries, an enjoyable and often irrational flowering of rational design, a challenge to invention and skill and a trial of taste, ornament became a matter of conscience. It had to be studied in the abstract. It had to be defined. Here is a fairly typical definition, written by Christopher Dresser, a South Kensington man, in 1862:

Ornament is that which, superadded to utility, renders the object more acceptable through bestowing upon it an amount of beauty which it would not otherwise possess. (*The Art of Decorative Design*, p. 1.)

Today, nearly every word of that statement provokes. "Superadded to utility" suggests an insensitively designed coal-scuttle with rococo ornament smeared on it to render it less repulsive. An "amount" of beauty jars on our sensibilities; beauty is not measured by the kilo. And "beauty" here seems almost to be equated with ornament, which is absurd.

But let us be fair to Dresser, who was no fool and, on the evidence of his work, a sensitive and elegant designer. Beauty, in the sense of enrichment and enhancement, is surely not a bad word to couple with ornamental intention. As to an "amount" of beauty, that too may be forgiven if we read it as implying the use of judgment and not excluding the notion of "less is more." What really does bother us in Dresser's definition is the idea of ornament being "superadded to utility." This is the sort of thing that rankles, the sort of juxtaposition which made the Modern Movement inevitable. Nevertheless, if any one of us were challenged to write a definition of ornament in the same number of words as Dresser used, how much better would we do? Perhaps it is wise not to define.

Still thinking back to the Victorians, there is that grand illusion of theirs that the secret of ornament is vested in the plurality of the world's styles and that by systematic analysis of those styles the secret will be revealed. This idea was promoted by Owen Jones in a sumptuous book mistitled *The Grammar of Ornament*, published in 1856. A grammar is precisely what it is not. It is a polyglot phrase-book and consists mainly of one hundred colour-plates of ornament selected from the historic styles, beginning with "Savage Tribes," going on through Egypt, Greece, Rome, Byzantium, Persia, and India to the Celtic, Gothic, and Renaissance worlds, then something called "Italian" (to us, Mannerist and a bit of Baroque), and finally to a selection of natural foliage, the latter as a sort of assurance of rightness in the whole. In his preface, Jones tells us that the idea behind the *Grammar* was not to offer examples for copying but, on the contrary, to discourage copyism and to show how a union of the world's artifacts might promote innovation. He thought of historic ornament as a "gushing fountain" of inspiration for the use and enjoyment of the nineteenth century. In this way Jones inaugurated a philosophy of ornament which was adopted and elaborated by many subsequent writers in his own century and some in our own. The terms of the philosophy are something like this: Every known race and nation of mankind has produced artifacts which display voluntary, non-functional increments which engage the eye. If all these increments are collected and arranged in sets, certain characteristics of shape, rhythm, and pattern are seen to repeat and, furthermore, to have an underlying relationship to natural forms. Here, therefore, is an absolute basis on which new systems of ornament can be devised. The modern artist has only to absorb experience from the past and proceed to improvise a system appropriate to his own time, temperament, and circumstances.

It was an attractive theory, but it never worked. Designers were constantly swayed by the organic wholeness of this or that historic style—*one* style. Jones himself was obsessed with the Alhambra. For others, the organic wholeness of Gothic claimed special attention, with Viollet-le-Duc as the arch-expositor of a theory of invention by analogy. The organic wholeness of classicism urged in another direction, again with countless analogues resulting. Nearly all the ornamentation of the late nineteenth and early twentieth centuries which is not within one of the recognized schools of stylistic derivation may be accounted for by the operation of analogy—analogy with one style, not abstraction from many.

Today neither abstraction from the many nor analogy with the one is acceptable. Yet the styles are always with us, more fully investigated than ever before and they are, after all, the only evidence we possess for the extended potentialities of ornament. We have no alternative but to consult them. But consult them about what? What do we really want to know? Perhaps in our present state of reawakened awareness of architectural ornament there is one fundamental question which, however often it may have been asked before, is worth asking again. It arises (or may be supposed to arise) from a consideration of Dresser's unhappy phrase about ornament "superadded to utility." It concerns, therefore, not so much ornament as the relationship of ornament to architecture. It is the question: What is ornament and what is not? or, to put it another way, What is architecture and what is not?

Leaving aside all possibilities or impossibilities of definition, let us proceed from a negative axiom: *All ornament is wilfully uneconomic*. By "uneconomic" I mean non-functional and a waste of resources. But now comes the question: *Is whatever is*

uneconomic ornament? Take the simplest instance. Suppose we have a column supporting a beam and suppose the column so dimensioned as to be of the most economical girth which, in the light of experience or calculation, will take the load. Now substitute for this column another of more ample girth and provided with entasis. Does the difference between the cubic contents of the two columns equal ornament? In any ordinary dialogue about these things the answer is surely no. It will be seen at once that I am thinking of architecture in the classical discipline. Let me continue on the same ground. Make our second column Roman Doric. The uneconomic parts of the Doric column are not only the fleshing out of the shaft with entasis but the inclusion of moulded cap and base with mouldings of a kind and sequence made obligatory by convention, just as the arrangement of words in a sentence is made obligatory by convention. To what extent are these things ornament? Viewed strictly within the classical discipline they are not ornament at all; they are the bare elements of what is required to make the column a grammatical form of communication.

Our Doric column may, however, be enriched. A carver may come and carve egg and dart on the echinus, and water-leaf on the cyma reversa of the abacus. (It goes without saying that you can have plain Doric or enriched Doric.) If we bring the entablature into consideration there is almost no end to the adornments which can be brought into play. Various things may happen in the frieze; there may be paterae or bukrania or some other emblems between the triglyphs; the column itself may be fluted, giving a new emphasis to its roundness. All these voluntary extras are very properly to be called ornament. I contend, for the sake of my present argument, that the basic elements of the Doric order are not to be called ornament but something else, and the only word I can think of is "architecture."

Move now from the Doric to the Corinthian. In the Corinthian order we have a column one of whose parts, namely the cap, requires a fairly elaborate arrangement of acanthus and caulicoli. Without them it is not Corinthian. Now are the leaves and caulicoli ornament? If we say that they are (and most textbooks will say that) then the fleshing out of the shaft and the whole rigmarole of cap and base, architrave, frieze, and cornice in any of the orders is likewise ornament, and the concept of a classical language of architecture becomes disreputable. Thus I believe it is necessary to make a distinction between uneconomic elements which are linguistic and uneconomic elements which are ornamental. When we talk loosely of ornament in the contemporary situation I suspect that what we are really groping for is some linguistic system equivalent to the linguistic systems of the past, of which the classical system is one.

Turn to the Gothic, which seems, on the face of it, capable of carrying no end of ornament. But what is Gothic ornament? Where architecture is concerned the question is one upon which theoreticians of ornament have preferred to be silent, turning instead to illumination and textiles. The reason is obvious. Nearly all the richness and elaboration of Gothic is not ornament at all but architecture. Identifiable enrichments of course there are, as in the classical discipline. One would, I think, identify the carved foliage on the celebrated capitals of Southwell chapter house as ornament because, unlike the stylised leaves of a Corinthian capital they have not crystallized into language. They are free, and the capitals would be perfectly acceptable without them. The Gothic language is looser than the classical. There was no Gothic Vitruvius.

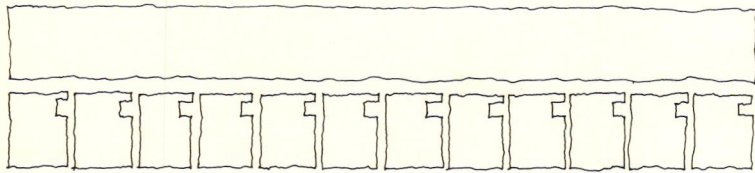
Gothic has, nevertheless, an imposing grammatical structure, most clearly articulated in the early thirteenth century, and here the question of what is ornament and what is not is more difficult to decide than in the case of the classical orders. It is also notoriously difficult to decide what is economic and what is not. Consider the bay design of a French cathedral like Amiens. Look at the shafting attached to the piers. Economic or uneconomic? The answer must be ambiguous because the functional pattern of the system is so distributed that the shafts seem to exercise support for the ribs of the vault. Everybody knows that if the shafts were knocked away the vault would still be there. But the intention to support is present, and it would certainly go very much against the grain to describe those shafts as ornament; they are as much a linguistic part of the building as are the columns in a subsidiary order in a classical building. The linguistic content of Gothic is sometimes close to functional, that is, economic content, sometimes not so close, and sometimes not close at all and in fact constructed as linguistic display. Linguistic display, not ornament. The gables which ride over the windows at St. Urbain, Troyes, are uneconomic but not ornament any more than the canopies built for the honourable shelter of statues at Chartres or Rheims are ornament. If we try to isolate ornament pure and simple in Gothic we find ourselves collecting floral swirls, diapers, crockets, dog-tooth enrichment—a collection like the woodcuts in Parker's *Concise Glossary* of 1846: an over-plus of decoration equivalent to that which we found breeding from the classical orders and neither more nor less important.

These fleeting references to classical and Gothic are made to illustrate the idea which disturbs me whenever, thinking of ornament, I try to identify it as an attribute of architecture. Perhaps my difficulty is a purely semantic one. The very word "ornament" brings with it, as I said at the beginning, a load of nineteenth-century associations which get in the way of perception. I would like to break our inherited concept of ornament into bits and put it together differently. But how? Using the word "linguistic" I have tried to suggest that there is an uneconomic margin in the act of designing which employs itself in a communicative way and is fundamentally separate from everything that the word "ornament" connotes. I have used the word "linguistic" for what emerges from this margin because in the two most familiar instances of architectural style in western experience, classical and Gothic, what has emerged functions in a way similar to spoken language. As to contemporary architecture, the resolute suppression of ornament in the early phases of the Modern Movement has had the effect of drawing architectural language into bizarre and esoteric extremes of sculptural contortion which, because they are so easily misunderstood, are now being questioned.

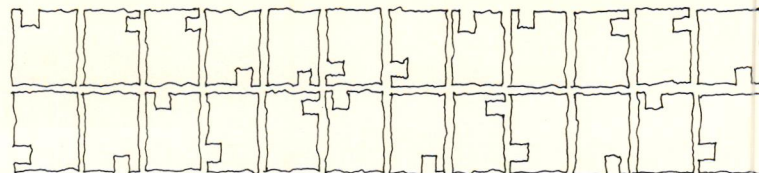
New approaches to the subject of architectural ornament are no doubt on the way. They are likely to take two opposite directions. One will be outwards towards a study of the meaning of ornament—iconographic, metaphorical, or purely psychological. The other will be inwards, a re-examination of how architecture has been and may be a medium of emotional communication. Of the two directions the second is the more difficult and profound since it leads necessarily to those linguistic issues so hard to identify—issues whose beginnings are in the uneconomic waste and wantonness of architectural creation.



The nave of Amiens Cathedral, 1220-36.

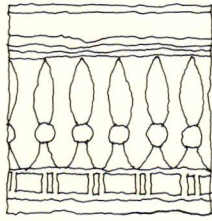


1. TRANSLATION

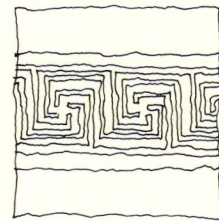


2. ROTATION

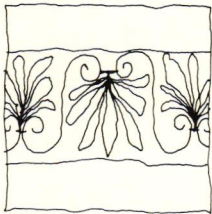
1. Ornament from tomb at Gourná, Thebes. Owen Jones, Pl. VII, no. 4.



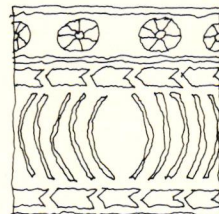
2. Ornamental Mosaic pattern at Pompeii. Owen Jones, Pl. XXV.



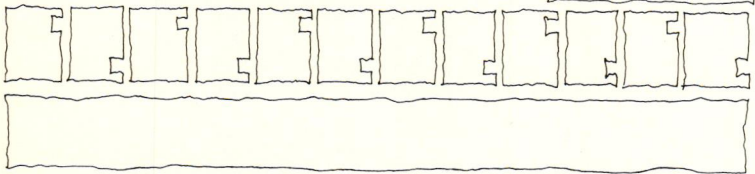
4. Ornament from a Greek vase. Owen Jones, Pl. XVI, no. 15.



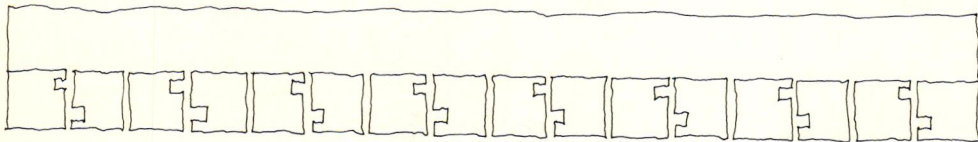
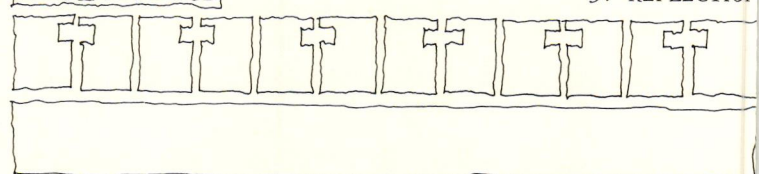
3. Ornament from tomb at Gourná, Thebes. Owen Jones, Pl. VIII, no. 16.



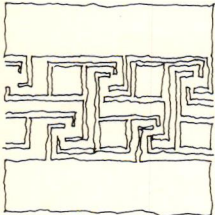
4. INVERSION



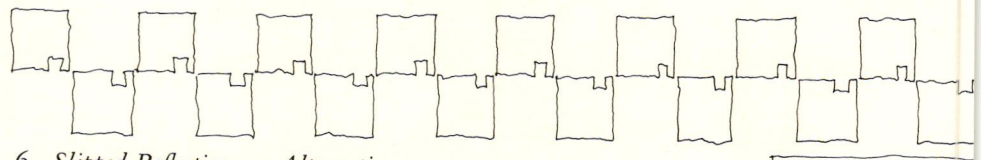
3. REFLECTION



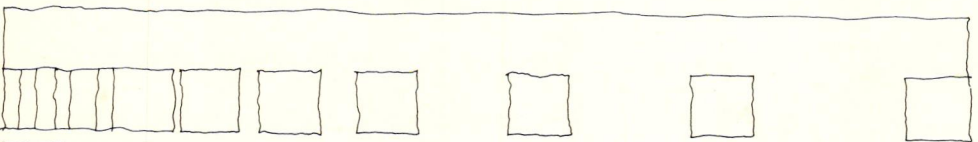
5. Translation and Reflective Inversion



5. String course over the Panathenaic Frieze, Parthenon, Athens. Owen Jones, Pl. XXII, no. 18.

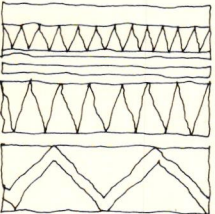
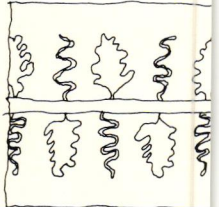


6. Slipped Reflection, or Alternation

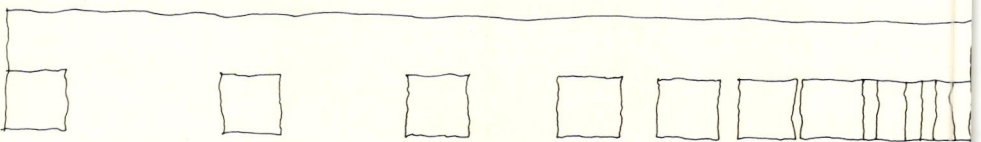


7. Acceleration

6. Band ornament from Greek vase. Owen Jones, Pl. XVII, no. 58.

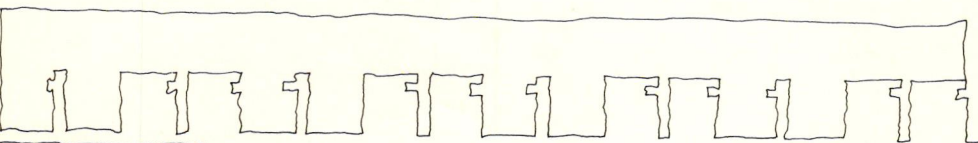
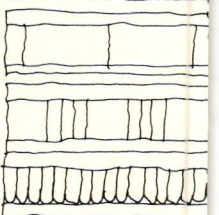


7. Ornament from Egyptian mummy case. Owen Jones, Pl. VIII, no. 17.

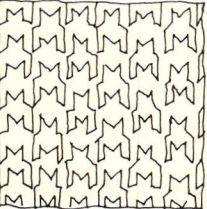


8. Deceleration

8. Ornament from Egyptian mummy case. Owen Jones, Pl. VIII, no. 12.



9. Figure-Ground



9. Plaited straw from the Sandwich Islands. Owen Jones, p. 15.

[All drawings accompanying this text are by the Author after the sources noted on page 111.]

THE GRAMMAR OF ORNAMENT/ORNAMENT AS GRAMMAR

Thomas H. Beeby

not. Behold the true greatness of our age, that it can no longer bring forth ornament. We have vanquished decoration and broken through into an ornamentless world.
Adolph Loos, *Ornament and Crime*, 1908

The revolution that occurred in architecture and the arts at the beginning of this century was founded on a rejection of previous modes of expression, morphology, and methodology. The onslaught of a new technology and changing social conditions prompted a complete re-evaluation of architecture and resulted in what was believed to be a more rational building process based on program, construction techniques, and hygienic considerations. The symbolism of traditional form no longer had meaning for a "new world" and was consequently discarded.

The validity of this argument is currently being examined with growing suspicion as the initial fervor that accompanied its inception rapidly dissipates. Unfortunately, however, the present generation of practicing architects has been thoroughly indoctrinated in the canons of modern architecture in isolation from the tempering influences of the architecture of the past. The originators of the Modern Movement possessed, as a part of their heritage, an understanding of the formal, symbolic, and manipulative elements of historical style, even if they chose to turn away from them. The architect of today, however, has not inherited these formal and aesthetic components, for they were consciously eliminated from architectural training by his immediate predecessors. One of the results of this disassociation with the past is that ornament has surely been washed from the architect's vocabulary. But whether ornament as a process has been destroyed is a debatable topic.

Western civilization has seen a steady progression of architectural revivals. During the nineteenth century, most of them were resurrected in a series of revivals, involving intricate arguments explaining the adequacy and correctness of each style. After the mid-nineteenth century, the moralistic fervor of the successive waves of stylistic revivals began to abate. The wavering, accompanied as it was by an attempt to formulate principles expressing visual and sensational phenomena, resulted in the idea of architecture as a system of composition. Freed from the compulsive moralism of the first half of the century, the architect could develop what was thought to be a true catholicity of taste. He would now be able to combine elements from previously disparate styles into a new synthesis of universal composition, transcending style. Although the logic of the historical process was abandoned, the validity of historical precept was sustained.

To attempt to build up theories of art, or to form a style, independently of the past, would be an act of supreme folly. It would be at once to reject the experiences and accumulated knowledge of thousands of years. On the contrary, we should regard as our inheritance all the successful labours of the past, not blindly following them, but employing them simply as guides to find the true path.¹

In this statement from his preface to *The Grammar of Ornament*, published in 1865, Owen Jones expressed a sentiment that was almost universal at that time. He even went so far as to predict a new architecture:

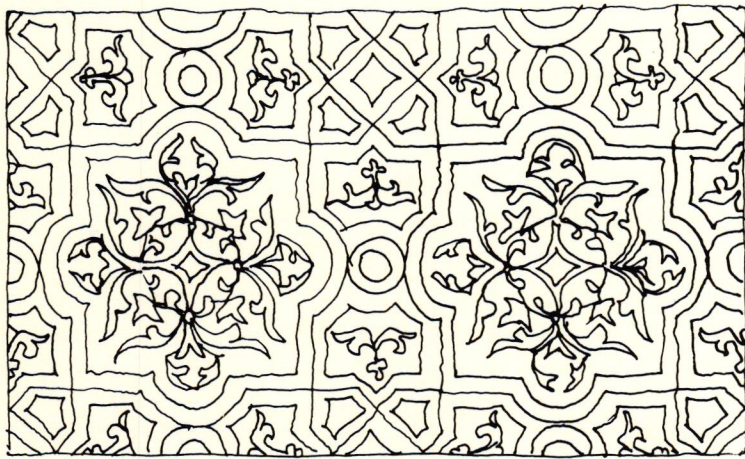
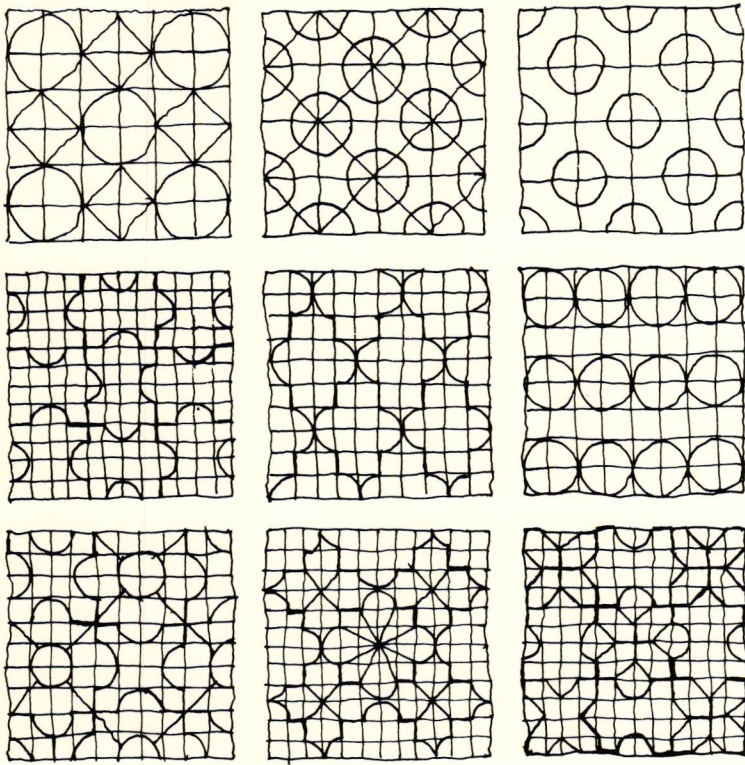
From the present chaos there will arise, undoubtedly (it may not be in our time), an architecture which shall be worthy of the high advance which man has made in every other direction.²

The Grammar of Ornament expresses a way of thinking which affected the entire generation. Once ornament had been codified, it became only one of the many elements in the composition of a building. Through an all-inclusive tolerance, history was neutralized and the individuality of particular styles disappeared. This process seriously weakened the common assumption that ornament was a manifestation of a particular style. When Norman Shaw could apply ornament from the School of Wren to a structure that had Gothic Revival massing, it was evident that ornament had acquired a heretofore unknown freedom; ornament had become a dressing that had no particular relation to the structure involved. Instead of instigating a new synthesis, as he had hoped, Owen Jones unintentionally contributed to the contextual disassociation of ornament from structure.

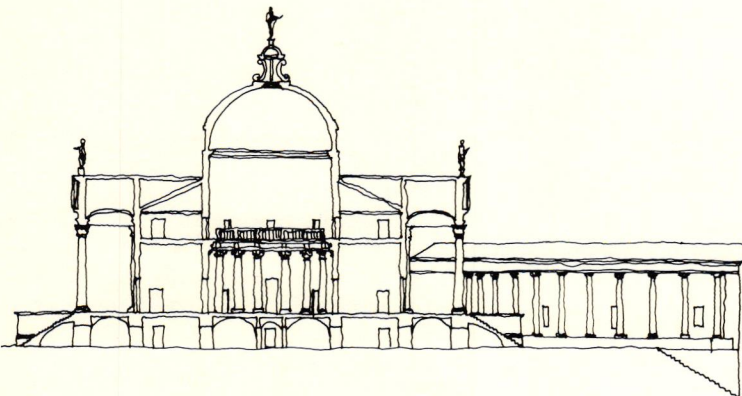
In the preface to *The Grammar of Ornament*, Jones maintained that although the different forms of ornament are based on the "laws which regulate the distribution of form in nature, . . . the leading ideas on which they are based are very few."³ He enumerated thirty-seven principles for arranging form and color which are prerequisite to superior ornament. The principles cover the appropriate role of ornament in architecture; the value of harmony, proportion, and repose; the process of ornamentation; color harmony and usage; the morality of imitating materials or designs; and the need for educating the general public in the civilizing aspects of art. Jones maintained that the process of ornament involves working deductively through division and subdivision from the general form to the particular. The design must flow out of a parent stem. Every ornament, no matter how distant, must be organically linked to the parent stem through its branch. The form must unfold like vegetation in gradual undulations with no excrescences. Harmony results from a careful balance and contrast of the straight, the incline, and the curve, with the curved joining the straight line only tangentially. Owen Jones purposely eliminates the use of truly naturalistic forms, insisting on conventionalized images, in order to avoid disrupting the geometric unity of the design.

The detailed illustrations in *The Grammar of Ornament* offset the complete lack of geometric construction or analysis in the text. The mathematical clarity of ornament is immediately apparent in the glorious colors and construction of the illustrations. The simplest band motifs are displayed, as well as dense fields composed by manipulating units to create intricate, interlocking patterns. As a source for the self-education of a designer it is unrivaled; an examination of the plates reveals the manipulations of ornament, even to the untrained eye. These plates demonstrate that ornament is based on a unit and the finite number of different geometric manipulations that can be enacted upon it to produce the various types of symmetry and rhythm which lie at the heart of ornament. In ornament, symmetry results from a proportional relation of the parts to the whole, and rhythm is produced by the dynamic repetition of proportional parts to a uniform beat. Like Greek geometry, ornament requires counted motions in a specific order, and from the basic motions, other, more complicated, counted motions can be developed.

There are four basic manipulations of a unit to create ornament: translation, rotation, reflection, and inversion. The simplest type of band ornament, translation (illus. 1), is the repetition of the unit, always in the same orientation, along a horizontal axis. Rotation (illus. 2) is the repetition of the unit around the point of intersection of two adjacent sides. It accounts for pinwheels and other spiral configurations. With translation



10. Grid derivation of ornament. Italian mural from the Church of San Francesco, Assisi.



11. Palladio, section of the Villa Trissino, Meledo, 1566-70.

and rotation, the unit merely slides along the surface of the plane, straight line or in a circle, but in both reflection and inversion the unit is flipped over in space to present its under side. With reflection (illus. 3), unit is flipped over one of its edges, producing bilateral, or mirror, symmetry. Empathy, or the identification of the self with an object, explain the predominance of this rather limited form of symmetry. With inversion (illus. 4), the unit is flipped over its central horizontal axis.

More complex configurations are derived from a combination of two or four basic operations. Translation accompanied by reflection is probably the most familiar. Translation accompanied by reflective inversion is another typical operation (illus. 5). The complexity increases through devices such as shifts along the horizontal axis, or glide line, leaving gaps between units to produce slipped reflection, or alternation (illus. 6). Simple bands can be extended to cover an entire field by first subdividing the area into a grid ornamented with a lattice of regulating lines. The geometrical manipulations then follow this grid as the design of the ornament unfolds. Also, by accelerating (illus. 7) or decelerating (illus. 8) the rhythm through decreasing or increasing either the size of the units or the distance between them, one can transform scale. Figure-ground relationships (illus. 9) can also be exploited to heighten the subtlety of a pattern. These patterns are often extremely rich and complex but can always be traced back to the basic ornamental manipulations.

When ornament is applied to a building, the geometric exactitude must be maintained (illus. 10). First, the surface is divided by a grid. The extent of the field is determined by its relation to the surrounding elements. The grid establishes the perimeter of the area to be ornamented and insures that the exact dimension of each unit will be maintained. Since the ornamental manipulations are made on the same unit, or multiples of this unit, the grid is never violated. It forms a modular base for the ornamentation. Even in the case of naturalistic ornament, the grid is always used as a foundation and is often a foil to the serpentine line generated by naturalistic forms.

Until this century, ornament was conceived of as a primary aspect of architecture, and a building was constructed as a structural vessel to receive the veil of surface ornament. The symbolic importance of the building determined the type, extent, and richness of the ornamental program. In the case of classical architecture, evolving from Greece, through Rome to the Renaissance, to neoclassicism, the rules governing the placement and disposition of ornamental elements became quite elaborate. Each part of the building had an exact geometric relation to the others (illus. 11). The elements that made up the classical orders were proportioned to a module which was a division of the column diameter (illus. 12 and 13). The hands of a master such as Palladio, the plan, section, and elevation as well as the progression of spaces, were all locked into a system of geometric ratios. In the process of designing, the architect manipulated the whole matrix of relations at once, from the largest space to the smallest ornament.

In January of 1869, four years after the publication of Owen Jones' *The Grammar of Ornament*, concern for the eclectic predicament of the day prompted Robert Kerr, critic and teacher, to deliver a strange prophetic lecture to the Royal Institute of British Architects. In his lecture, Kerr satirically redefined architecture as a cloak with which the architect transformed a dull structure into an eloquent *objet d'art*. He maintained that this art, known as architecture, would be more fittingly referred to as the "architecturesque." The means available to achieve this miraculous transformation, Kerr noted, were primarily ornamental and could be categorized under four possible approaches: "structure ornamented"; "structure ornamentalized," or rendered in itself ornamental; "ornament structuralized," or rendered in itself structural; or "ornament constructed."⁴

Although Kerr's contentions were satiric, their realization is common enough to make Kerr one of the minor oracles of the Modern Movement. For ironically, in attempting to castigate his contemporaries, Kerr brought to light three possible approaches to ornament that had been suppressed by previously held moralistic and dogmatic beliefs. Before Kerr's lecture these beliefs had limited architects primarily to "structure ornamented" that is, applied, historically derived, surface ornamentation. Eclecticism had separated ornament from its contextual significance, and encouraged, albeit unwittingly by Owen Jones, ornament to become an independent element of composition.

It is at this point that the first stage of modern architecture appeared simultaneously in Europe and the United States. *Jugendstil*, or

beau, was the first conscious rejection of historicism. By insisting on mental renewal rather than on the assimilation of new technological or social forces, it was, however, doomed from the start. Art Nouveau was persistent in its total obsession with applied ornament. Kerr's theories had proven to be true on one count: already, architecture had become the architectesque, infatuated with surface decoration as an art in itself. This tendency was carried to extreme lengths by Horta and Van der Velde in Belgium, Wagner and Hoffman in Austria, and Louis Sullivan in America.

At this point the apocalyptic voice of Adolph Loos was raised suggesting that ornament was actually crime. Loos wrote:

I have evolved the following maxim, and present it to the world:
The evolution of culture marches with the elimination of ornament from useful objects.⁵

Loos's hysterical battle with ornament reached its climax with the publication of *Ornament and Crime*. In this book Loos arrived at the following conclusion:

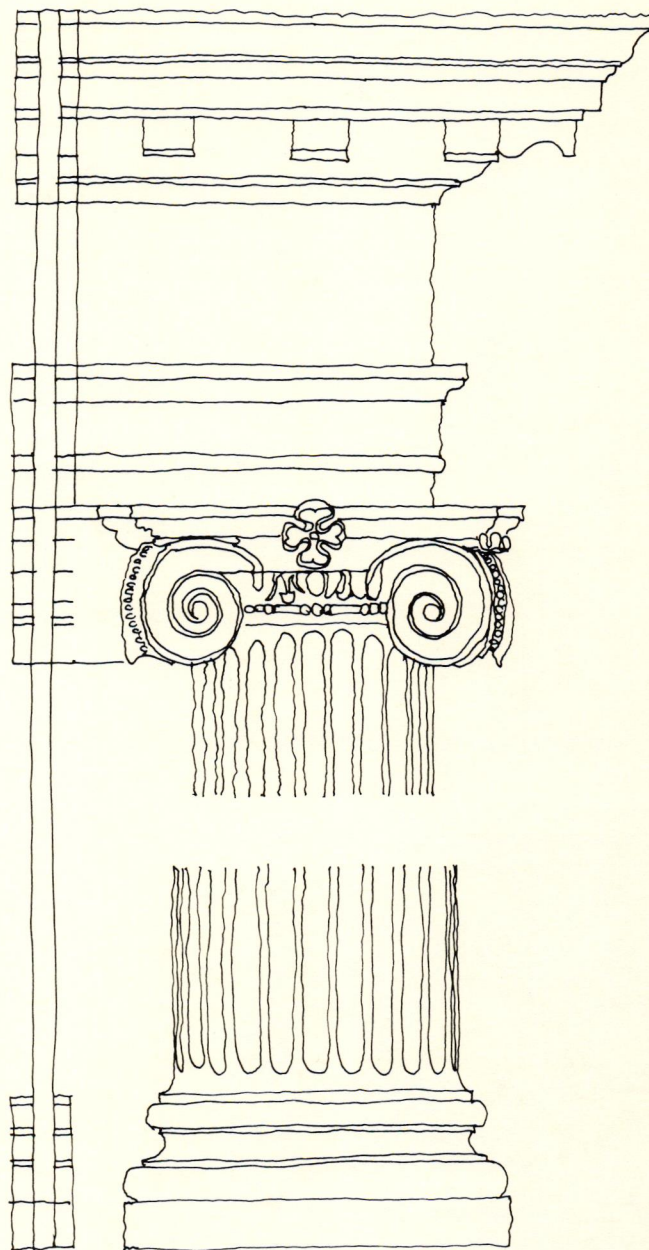
Children are amoral, and so, for us, are Papuans. If a Papuan slaughters his enemies and eats them, that doesn't make him a criminal. But if a modern man kills someone and eats him, he must be either a criminal or a degenerate. Papuans tattoo their skins, decorate their boats, their oars—everything they can get their hands on. But a modern man who tattoos himself is either a criminal or a degenerate.⁶

Loos proved, at least to himself, that ornament is a crime and suggested to all those who design ornament are perverse. His influence rapidly spread with the publication of *Ornament and Crime* in Germany in 1912, in France in 1913, and again in *L'Esprit Nouveau* in 1920. The end was in sight; Art Nouveau was losing its impetus and sensitive creators like Josef Hoffmann and Peter Behrens were already searching for alternatives. Ornament seemed to have reached some sort of impasse.

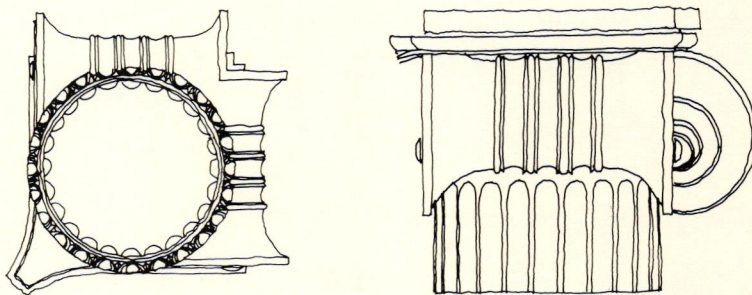
Loos, however, never really ended ornament; he simply forced the end of "structure ornamented." When Loos closed the door on "structure ornamented," he unintentionally released the architects of the following decades from the prohibitions regarding the other three possibilities of the architectesque. When applied ornament was equated with crime, the only course left to the future was the manipulation of the rationally derived elements of building to produce the effect of ornament. After "structure ornamented," the second possibility defined by Kerr was "structure ornamentalized," or rendered in itself ornamental. That is to say, the necessary structural or constructive elements are arranged so as to have an ornamental effect. The most obvious approach is the application of ornamental methodology to the entire building. Utilizing the elements required by the demands of the program, the architect establishes a basic grid or proportioning system to control the manipulation of elements for ornamental purposes. Mies van der Rohe's work and some aspects of the work of both Frank Lloyd Wright and Le Corbusier fall into this category. Loos's third possibility, "ornament structuralized," or rendered in itself structural, requires that the design process begin with the ornament rather than with construction. The building is conceived as an ornament and built in a manner that the structure and method of construction do not detract from the ornamental impact of the conception. While programmatic and structural requirements are satisfied, they are secondary to the ornamental manipulation of space, volume, and detail. The work of Le Corbusier and Wright best illustrates this approach. With Kerr's fourth and final possibility, "ornament constructed," the ornamental quality of the building is secondary. Structure and program are ignored or completely distorted. The same nature of this type of architecture obviously limits the number of buildings built. Some works of modern architecture, however, tend to have a decorative quality worthy of this category.

The modern architect who has had the most success utilizing ornamental principles is Le Corbusier. From the beginning, Corbusier understood the implications of the principles of ornament.

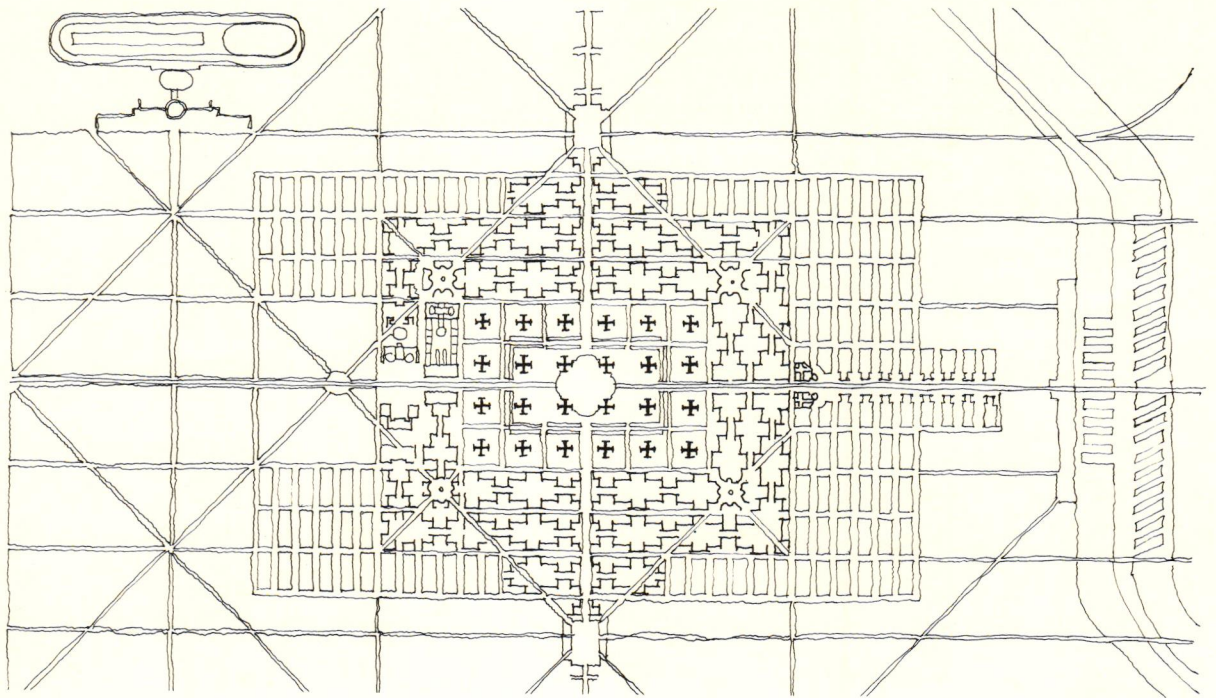
There was a magnificent book in L'Eplattenier's class library: "*A Grammar of Ornament*" by Owen Jones. Decoration is a debatable topic, but "ornament" pure and simple is a thing of significance; it is a synthesis, the result of a process of putting together. Making ornaments was a necessary discipline imposed by L'Eplattenier on L-C.⁷



12. Geometric construction of the Ionic order.



13. Plan and elevation of Ionic capital.



14. Le Corbusier, plan for A City of Three Million Inhabitants, 1922.

Corbusier further described his education:

"New Section" of La Chaux-de-Fonds School of Art: L'Eplattenier, director and master of this very modern class of instruction. Direct inspiration of natural things: 1900 to 1910. Studies of rocks, plants, roots. . . . The fir became one of the basic subjects for study—that intractable tree! In a purely accidental and spontaneous way it guided the young Charles-Edouard Jeanneret (the future Le Corbusier) as far back as 1904, to considerations of a mathematical kind which were to lead forty years later to the "Modulor."⁸

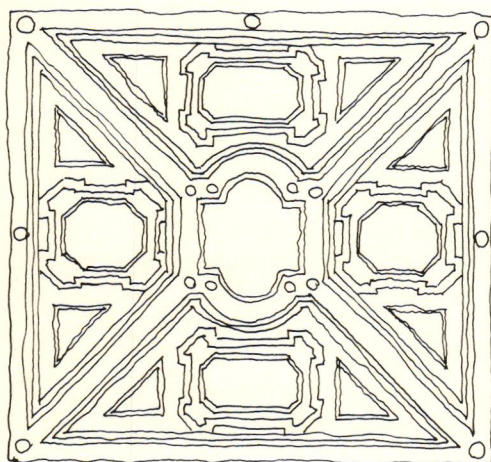
Corbusier's education was part of a general trend to purify art through study of nature.

The call was for a renewal of the decorative elements by the direct study of plants, animals, the changing sky. Nature is order and law, unity and diversity without end, subtlety, harmony and strength: that is the lesson he learnt between the ages of fifteen and twenty.⁹

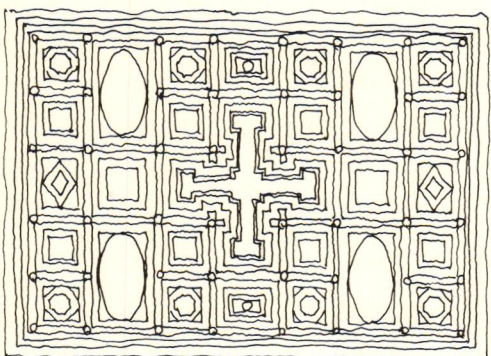
Corbusier's master, L'Eplattenier, shared the then current predilection equating nature, mathematics, and art. The nineteenth century witnessed a renewed interest in natural phenomena. In 1859 Darwin's *Origin of Species* appeared; it was followed by such works as Haeckel's *Challenging Monograph* of 1887 and *Kunstformen der Natur* of 1899, D'Arcy Thompson's magnificent *On Growth and Form*, Jaeger's *Lectures on Symmetry* with application in natural science, Hambridge's *Dynamic Symmetry*, Cook's *Curves of Life*, Speiser's *Theorie der Gruppen von endlicher Ordnung*, Ghyka's *The Geometry of Art and Life*. All these works reflected and increased the general interest in nature; all of them deal with the application of principles of symmetry in the arts as well as in nature. They form a continuous investigation that spans the schism that appeared in the art at the beginning of this century. Corbusier was undoubtedly familiar with many of these works. He was in correspondence with Ghyka and Speiser as well as with several notable mathematicians. The Modulor is actually an extension of the theories found in earlier works, such as Hambridge's *Dynamic Symmetry* and Ghyka's *The Geometry of Art and Life*, although Corbusier's ignorance of Schoeninger's work deprived him of a valuable shortcut toward the discovery of the Modulor.

Corbusier understood the basis of ornament, sympathized with its geometric and mathematical characteristics, and as an architect profited from its lessons. When shown a piece of Egyptian ornament, he said:

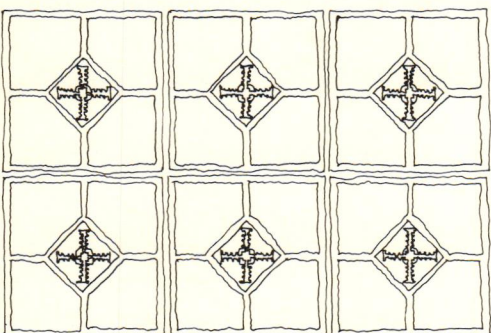
I am a worker in the plastic arts; if you tell me to design a border of this kind to go on an ornament, I am bound at some time to hit upon this particular ornamental arrangement because it is one of the inevitabilities of ornamentation; it forms part of a very short series of solutions, the key to which is geometry itself, conditioned by the spirit of geometry which is in man as it is also in the very law of nature.¹⁰



15. Seventeenth-century ceiling Saint Peter's, Rome.



16. Barozzi da Vignola, coffer ceiling, Farnese Palace, Rome.



17. Le Corbusier, plan for A City of Three Million Inhabitants, 1922. Drawing by author.

Le Corbusier seems to have needed an overall urban concept before he could begin designing individual buildings. In 1922 he completed his *Plan for a City of Three Million Inhabitants* (illus. 14). Although he warns architects of the fallacy of plan devices, his design is unbelievably ornamental. Composed on a diagonal grid, the plan is a study in rigid symmetry. Cruciform towers are clustered in a rectangle around an airport which resembles a medallion. The entire city has become an exercise in position—a rectangle on a diagonal grid, a familiar ornamental preoccupation (illus. 15, 16, and 17).

Le Corbusier's reliance on ornamental principles is further demonstrated by the development of his continuous buildings. The buildings in the *Plan for a City of Three Million Inhabitants* display bilateral symmetry along both horizontal and vertical axes (illus. 18). The buildings are in a pre-ground relation with the surrounding spaces, and the result closely resembles Greek geometric designs (illus. 19). After an excursion into freedom in the plan for Algiers of 1930–34, Corbusier returned to a more metric approach in his 1933 scheme for Antwerp. The continuous elements in this plan are arranged according to a more complex form of symmetry. The configurations continue to resemble Greek border ornaments, but the spaces between the continuous buildings are no longer so readily conceived. The *Ville radiuse* of 1935 returns to the tighter symmetry found in Corbusier's first plan. It is reflective on both vertical and horizontal axes.

After the war, Le Corbusier designed the plan for the reconstruction of Saint-Die (illus. 20). It is at about this time that his preoccupation with the fret pattern began. The plan includes housing, a civic center, and an industrial development. The housing plan displays the simple translation of slab buildings in two rows, each in a different rhythm. The interjection of the civic center interrupts this beat, but in another sense strengthens the rhythm and establishes a hierarchy of form. The industrial plants are arranged in a continuous building which displays simple translation along the horizontal axis with slipped reflection, or alternation. This is a frequent motif in band ornaments and is also found in nature when leaves are arranged alternately on a shoot. The plan for Saint-Die also contains a spiral museum and a space-defining building on the town square based on reflective inversion.

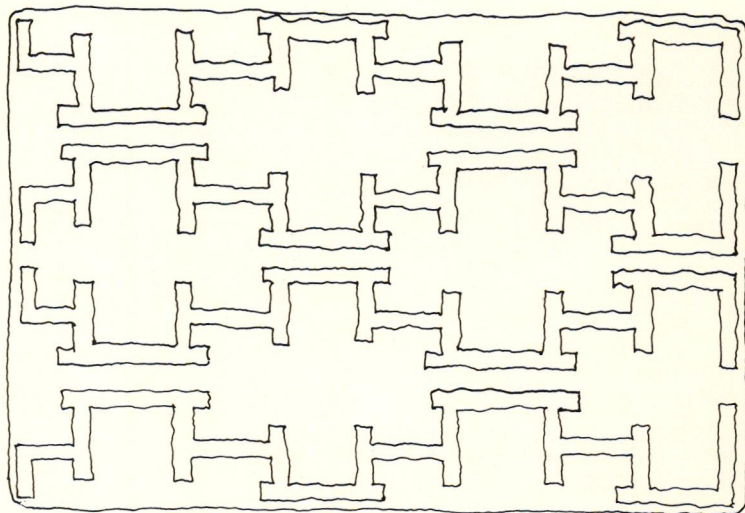
All of Le Corbusier's city planning schemes reveal the same kinds of manipulations that are characteristic of ornament. In a section on window dressing in his *Foundations of Modern Art*, Ozenfant alludes to this characteristic of Le Corbusier's work:

For a long time the Viennese, through Hoffman, have cultivated their shop windows.

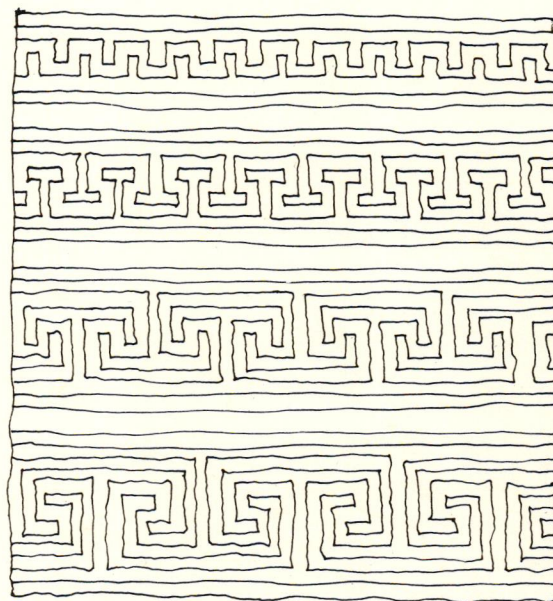
Among those who contributed to reorganize window-dressing, mention must be made of Paul Iribe (whose influence was very great around 1908), Fauconnet, etc. Nowadays the window-dressing of small or great shops is very agreeable to see. A sane geometry derived from Purism and Léger directs the composition: dresses, boots, casseroles, all play their eager parts in the equations to which they provide a solution.

The art of window-dressing is an important factor in that town-planning to which Le Corbusier brought so much clear vision and power.¹¹

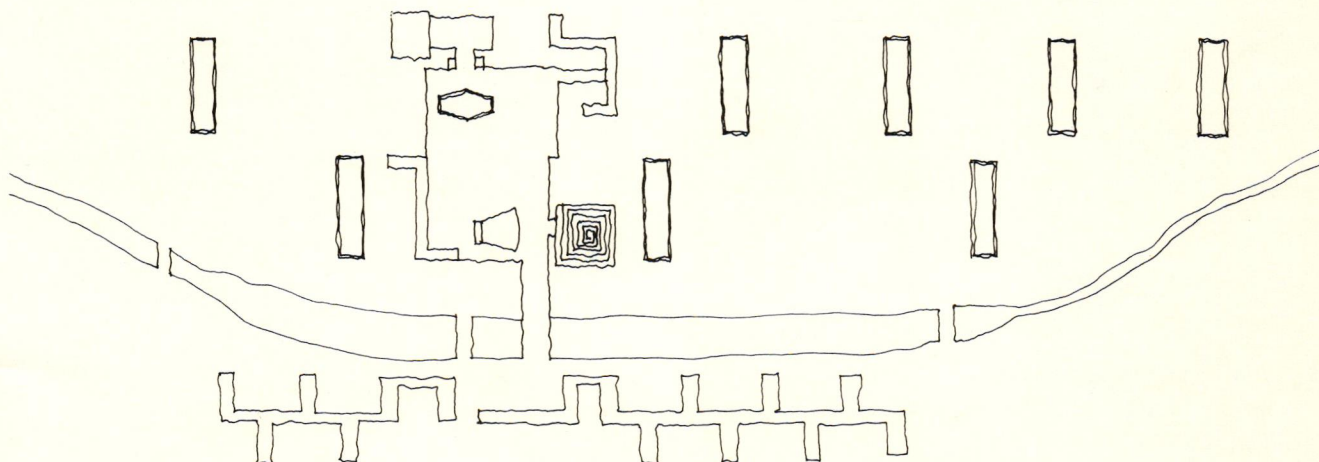
The photograph accompanying Ozenfant's comment shows athletic equipment displayed on the diagonal grid of a stretched tennis net.



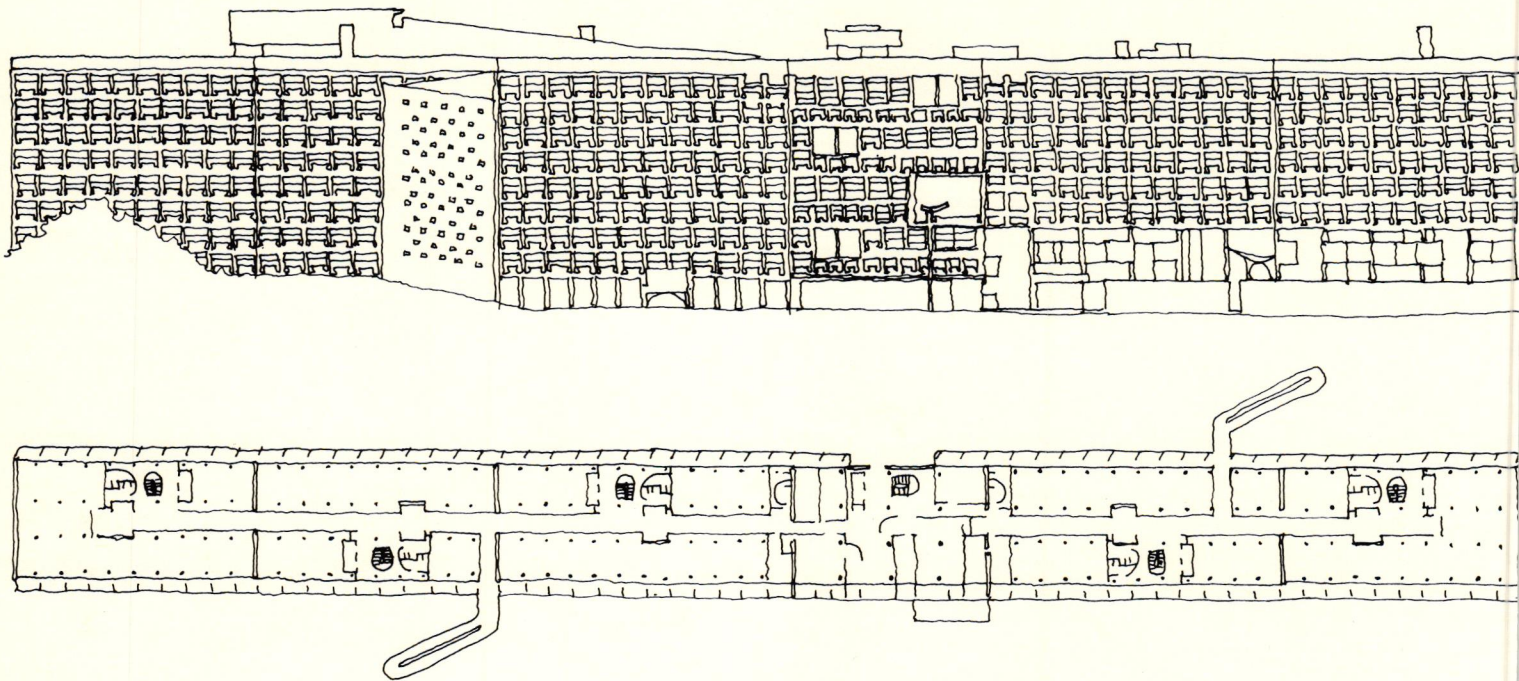
18. Le Corbusier, plan for A City of Three Million Inhabitants, 1922. Drawing by author.



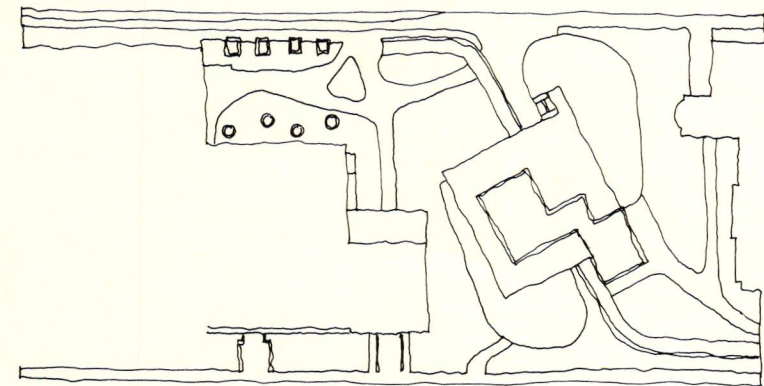
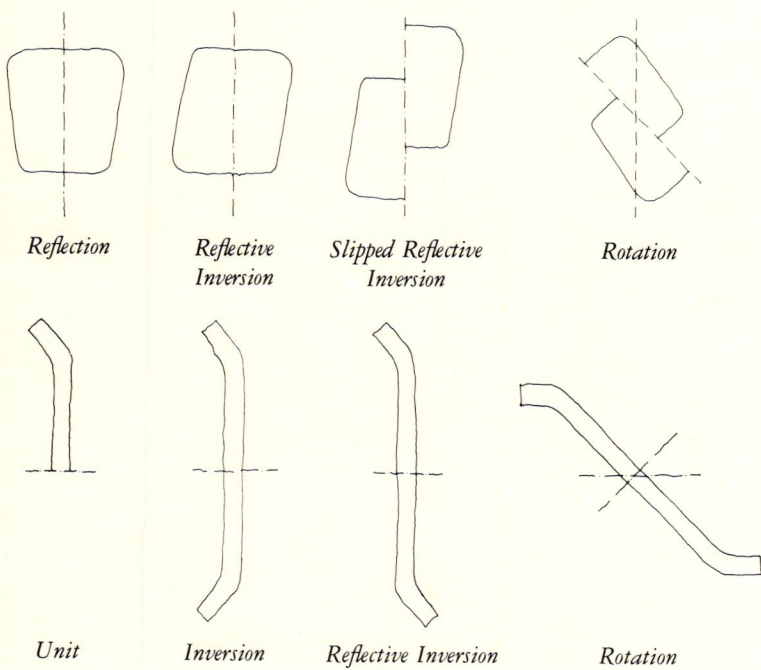
19. Reciprocating Greek fret patterns.



Le Corbusier, plan for the reconstruction of St.-Die, 1945.



21. Le Corbusier, elevation and plan of the Secretariat, Chandigarh, 1952.



22. Le Corbusier, plan for the Carpenter Center, Harvard University, Cambridge, Massachusetts, 1961-64. (Diagrams by author, plan after Le Corbusier.)

The final step in the development of Le Corbusier's urban experiment is found in the Secretariat at Chandigarh (illus. 21). The building is divided in plan and elevation into six units defined by the fire walls. The fire stairs and toilets are arranged according to the operation of translation accompanied by slipped reflected inversion. The entrance segment is distorted in plan and elevation. This is the same device that he employed at Saint-Denis to stress the hierarchic center of the design. The emphasis on the entrance panel is further heightened by the position of the two exterior ramps which display slipped reflective inversion. The *brises-soleil* in the entrance panel is also arranged along their vertical axis by slipped reflection. Just as in plan, one segment of this arrangement is differentiated to express a hierarchy in the function of the spaces. The Secretariat shows a fusion of many of Corbusier's early ornamental manipulations. It is the continuous building of the *Ville radiieuse* pressed into a slab and elaborated ornamentally.

A further review of his work reveals that Le Corbusier introduced ornamental composition into all of the major aspects of a building. Carpenter Hall at Harvard University involves slipped reflective inversion as a major plan device (illus. 22). The inverted studios lock the central block of the building onto the site. Le Corbusier obviously could never have ordered his creations "fit" into the Neo-Georgian environs of the site. Rather than try to accommodate the surroundings, he created maximum tension by rotating his block onto the diagonal. Then, to accommodate the adjacent buildings, he took a familiar purist shape, shifted it along its vertical axis and inverted the two segments. These two curvilinear volumes intersect through the center of the block, which has been bisected by a reflected and inverted ramp. The two studio volumes are also shifted in section, increasing the complexity of the building. It is visually a rich structure realized through the basic manipulations familiar to a designer working with ornament.

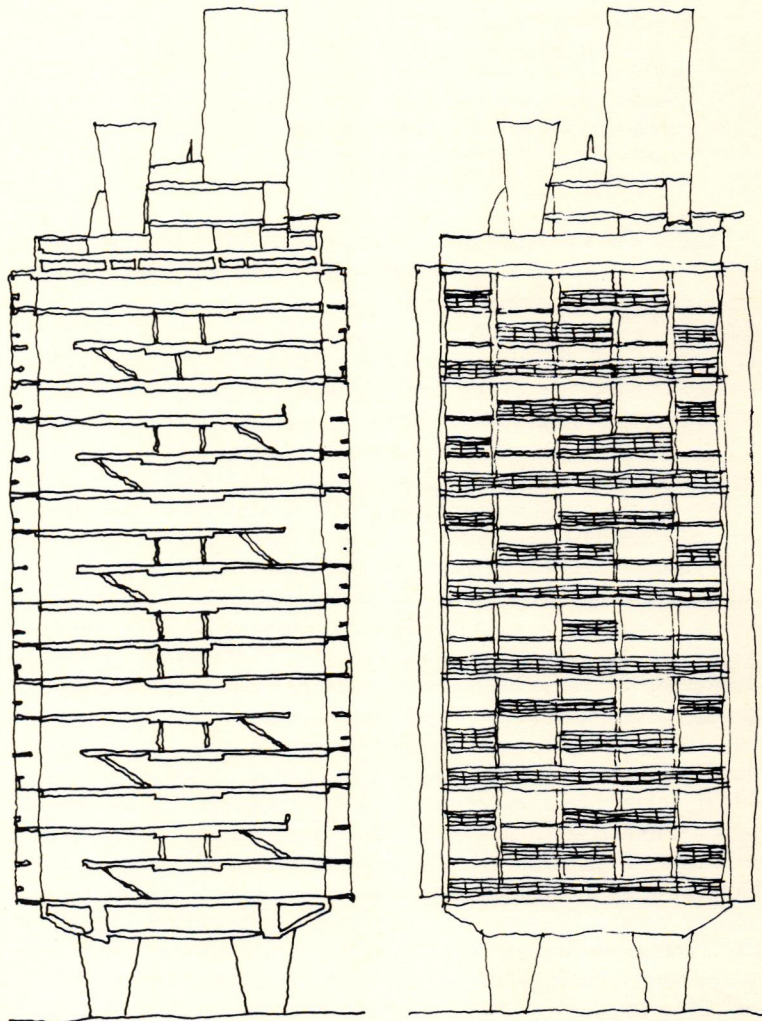
In section Le Corbusier often employed ornamental methodology in a revolutionary manner. In the *Ville à Carthage* of 1928, Corbusier explored the interlocking aspect of band ornament to create a complete continuous space. This section was employed later, with necessary revisions, in *Unité d'habitation à Marseille* of 1947-52 (illus. 23). The elevations of Corbusier's buildings are the clearest examples of decorative manipulation, especially his later buildings with *brises-soleil*. The south elevation of the Marseilles block (illus. 24) is separated into six intervals by string balconies stretching across its entire width. Within these intervals, single and paired balconies alternate in an intricate pattern of reflective inversion through the central vertical axis of the building. The third unit from the bottom is differentiated to express a functional change from residential to commercial space. This facade of the building is balanced about its central vertical axis, which is expressed by an unbroken vertical line of balconies. With its complex manipulation of a single functional element, the balconies on the south facade is a beautiful example of the richness of ornamental composition.

The fourth and final path open to the architectesque as defined by Owen Jones. "Construction should be decorated. Decoration should be purposely constructed."¹² Museums have consistently displayed a highly ornamental character in modern architecture. The demand for a continuous unbroken circulation pattern has resulted in spiral configurations in the hands of Wright and Le Corbusier. The modified pinwheel configuration was finally chosen by Corbusier for museums in Tokyo and Medabab. All these buildings are extremely ornamental, but not so much as the structures found sprinkled around Corbusier's museums, in particular, the building finally constructed in Zurich for Heidi Weber (p. 25).

This peculiar building developed out of Le Corbusier's earlier exhibition projects, which were always large-scale cantilevered structures. The building was originally designed as a house, but it is now used as a display center for the work of Corbusier. It uses two building systems: a steel canopy which straddles the prefabricated housing system (226/226/cm) that was developed earlier by Corbusier. The steel screen consists of two square plates joined along one side. Both plates are folded and one is rotated 90 degrees in relation to the other to give alternating triangular patterns as the building is viewed in the round. This alternating pattern is reinforced by the differentiation of the structural supports on major and minor axes, resulting in an alternation of the rectangular columns on the major axis with the round columns on the minor axis. The beams are rhythmically arranged in a highly decorative fashion, but they are only held to from below by the one triangular cutout in the roof plate. The ornamental quality of the folded plate is heightened by the polychrome painting of its under surface.

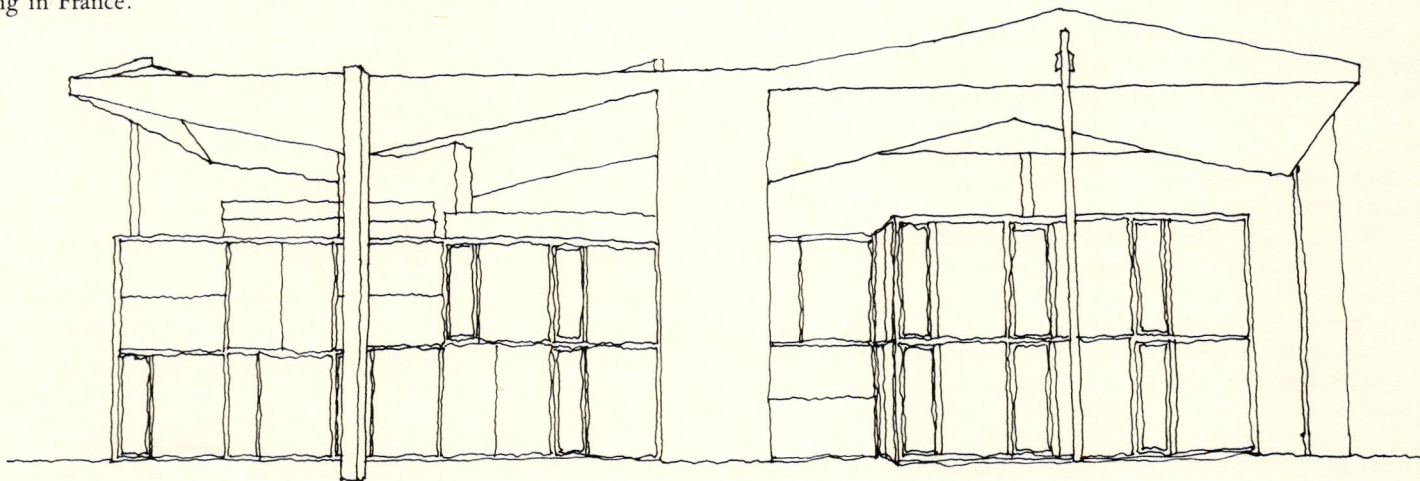
The system of prefabricated framing elements utilized in the lower structure reveals a masterful application of the modular grid. Here the work is the framing system itself, with no differentiation between horizontal and vertical framing members. The entire structure is an assemblage of structural cubes bolted together in a uniform system of attachment. The minor beams fall in a regular pattern as do the enclosing panels. In the composition of the enclosure the manipulative mastery of Le Corbusier can be seen again at another scale. The plan displays Corbusier's selection for spatial alternation with a Z-shaped configuration, emphasized through his placement of the windows. The solid enclosure panels are multicolored and arranged to form an ornamental composition by rotating them alternately 90 degrees. Operable sashes are introduced as a major subsystem, changing the rhythm of the verticals and forming a grid shifted and superimposed on the structural frame. The virtuosity displayed in the ornament overshadows all other aspects of this building. It is a audacious example of "ornament constructed" as outlined by Kerr.

Le Corbusier's early training in ornament placed a valuable method of thinking within his grasp. The principles found in Owen Jones and transmitted to Le Corbusier through L'Eplattenier remained with him throughout his career. This training was available to many others, for the quasi-scientific vision of art as an extension of the principles of nature was most universal in education at that time. In America, the early training of Frank Lloyd Wright bore striking similarities to Le Corbusier's early training in France.



23. Le Corbusier, section of *Unité d'Habitation, Marseilles*, 1947-52.

24. Le Corbusier, elevation of *Unité d'Habitation, Marseilles*, 1947-52.



25. Le Corbusier, elevation of the *Zurich Pavilion*, 1964-65.

Frank Lloyd Wright's career encompassed all phases of the Modern Movement. Through his apprenticeship to Louis Sullivan, Wright was involved in the last frenzied phase of applied decoration. Louis Sullivan was a master builder and a genius of ornamentation, especially the latter. In the words of Wright,

Where before, I ask, in surroundings so peculiarly poetry-crushing (or, for that matter, in felicitous circumstances either) was there ever a man who *out of himself* devised a complete beautiful language of self-expression as complete in itself as Wagner's music or the period ornamentation of any of the great styles which took so many ages to perfect? The Sullivanian philosophy, so far as it was personal to him, is written in that chosen language of his most clearly and if you are going to read *him* at all, it is there to read at level best. Not in the remarkable buildings built by the firm nor in his own writings (so I felt then and now think) were the perfect expressions of Louis H. Sullivan to be found. As I could see even then, the buildings were often far from it.¹³

Sullivan received his formal education at the Ecole des Beaux Arts in Paris. Prior to this, he had been employed by Frank Furness while the ornament for the Pennsylvania Academy of the Fine Arts was being designed.¹⁴ The geometric basis for Furness's ornament and the abstraction of floral forms reveal their origin in Owen Jones. A drawing that Sullivan executed in Paris after leaving Furness's office and later gave to Wright is indicative of the influence of Owen Jones, through Furness, on Sullivan.

Sullivan's treatise, *A System of Architectural Ornament*, published in 1924, presents the mystical logic and methodology behind his ornament. In this work the exquisite drawings are much more revealing than the text (illus. 26). The reliance on nature's laws as a basis for design is stressed in a manner similar to Owen Jones's in *The Grammar of Ornament*. In addition, Sullivan makes no mention of the method of application of ornament to a building. Ornament is examined as a completely isolated component of architecture. The drawings themselves reveal a straightforward approach to composition hidden behind Sullivan's romantic rhetoric. He deals primarily with the design of individual ornamental units, not their extension to a field or band. Design begins with the choice of a particular geometric form. This form is then subdivided and manipulated, according to the innate geometry of the figure, and developed along its inherent axes. The original geometric form is envisioned as a container of radial energy with a potential for growth along its primary and secondary axes. As the figure develops through a series of manipulations, a multitude of possible configurations becomes evident. This phase of design was considered mechanical and self-evident by Sullivan and was termed "inorganic." On this scaffolding of pure geometry, the organic forms develop along the radial axes of growth. Sullivan's stress on the necessity of a primary axis with sub-axes attached is reminiscent of Owen Jones's insistence on a primary stem. Sullivan offers a series of abstracted leaf shapes as a basis for the organic forms which evolve. He emphasizes the importance of keeping in mind the seed-germ with its primary axis. Out of this energy source will grow the luxuriance of organic forms following the laws evident in nature. This growth, termed "efflorescence," follows the "directrix of energy" developed in the inorganic phase of design. As Owen Jones recommended, the ornament unfolds in gradual undulations and forms new subcenters of activity, or growth. At the end of the process, the original geometric figure vanishes into what Sullivan refers to as "a mobile medium." For Sullivan, the completion of the design process represents the will of Man to bring the inorganic to life. The repetition of ornamental modules is illustrated in a plate that stresses the importance of parallel axes. Simple linear translation is the only geometric progression illustrated in the treatise. It is important to note that most of Sullivan's ornament was executed in pre-fabricated terra-cotta tiles, designed for use in a repetitive fashion. Modularly coordinated components in construction could well be conceptually rooted in ornament rather than in the necessary elements of construction. This methodology for creating ornament has had an effect which extends beyond the limits of ornament to the core of architecture itself. The work of Frank Lloyd Wright is a lasting testament to the power of this process as a basis for architectural form.

Just after Wright arrived in Chicago, he came across Owen Jones's *Grammar of Ornament*. In his autobiography he mentions taking the large volume home from the library of his Uncle's church:

I . . . traced the multi-fold designs. I traced evenings and Sunday mornings until the packet of one hundred sheets was gone and I needed exercise to straighten up from this application.¹⁵

It was inevitable that Wright should be taken with this book on ornament. The training he had received from his mother had already prepared him for the geometries and provocative polychromy of ornamentation.

Mother learned that Frederick Froebel taught that children should not be allowed to draw from casual appearances of nature until they had first mastered the basic forms lying hidden behind appearance. Cosmic, geometric elements were what should first be made visible to the child-mind. . . . For several years I sat at the little kindergarten table top ruled by lines about four inches apart each way making four inch squares; and, among other things, played upon these "unit lines" with the square (cube), the circle (sphere) and the triangle (tetrahedron or tripod). . . . All are in my fingers to this day. . . . The virtue of all this lay in the awakening of the child-mind to the rhythmic structure in Nature—giving the child a sense of innate cause and effect otherwise far beyond child-comprehension. I soon became susceptible to constructive pattern *evolving in everything I saw*. I learned to "see" this way and when I did, I did not care to draw casual incidentals of Nature. I wanted to *design*.¹⁶

The Froebel system was conceived in the same spirit as *The Grammar of Ornament*. The result was an opportunity to investigate the nature of ornamental design as a form of play. It is no wonder Wright felt a strong empathy for the patterns found in Owen Jones's book.

Wright became Sullivan's closest collaborator and self-proclaimed disciple. He later recalled that Sullivan

did not like to work unless drawing designs for ornament. . . . And soon (after a year or two) I could draw so well that later in his life "lieber meister" sometimes failed to distinguish between my work and his own.¹⁷

It soon seemed to Wright, however, that there was a fallacy in the architecture of Sullivan:

Not until toward the end of my service to Adler and Sullivan did I perceive that the nature of materials meant no more to "lieber meister" than their nature had meant to the ancient Greeks but with a nameless difference. Materials, all alike, were only grist for the marvelous sensuous rhythmic power of imagination he possessed. . . . but, whether executed in stone, wood, or iron, all materials were "clay" in the master's hands and—well—that was enough?¹⁸

Wright came to believe that the ornament which he so admired was merely a dressing, covering the structure of the building. He was bothered by the conventional dichotomy between the interior and exterior of a building. It slowly became apparent to Wright that a building should have the plasticity found in Sullivan's ornament.

I know now that many a long lifetime must be spent to find the proper technique—each man for himself—to put into actual building practice the implications of the great philosophy to which the lyric poet (Sullivan) dedicated himself in this sensuous efflorescence so peculiarly and absolutely his own. But if a building was ever to be organic in the same sense that this deeply individual expression of himself was so and prophesied it, this lifetime, at least, is only a beginning.¹⁹

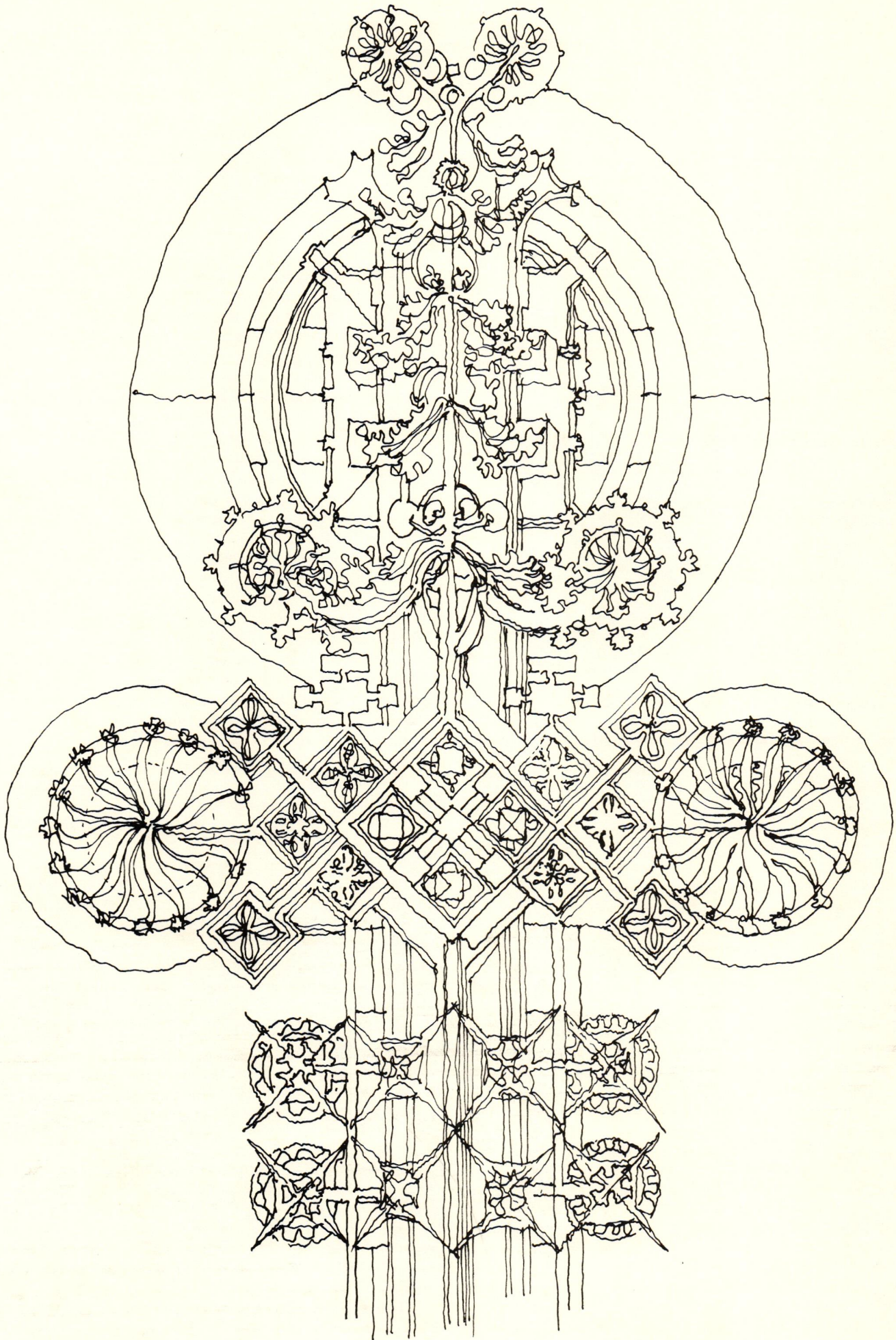
Wright was becoming impatient under Sullivan's direction. He began to alter Sullivan's buildings to incorporate his own ideas:

I would try to practice in structure by way of point, line, and plane the rhythms that he preached so well in plastic clay whenever he was completely free of the complex restraints of the actual building process.²⁰

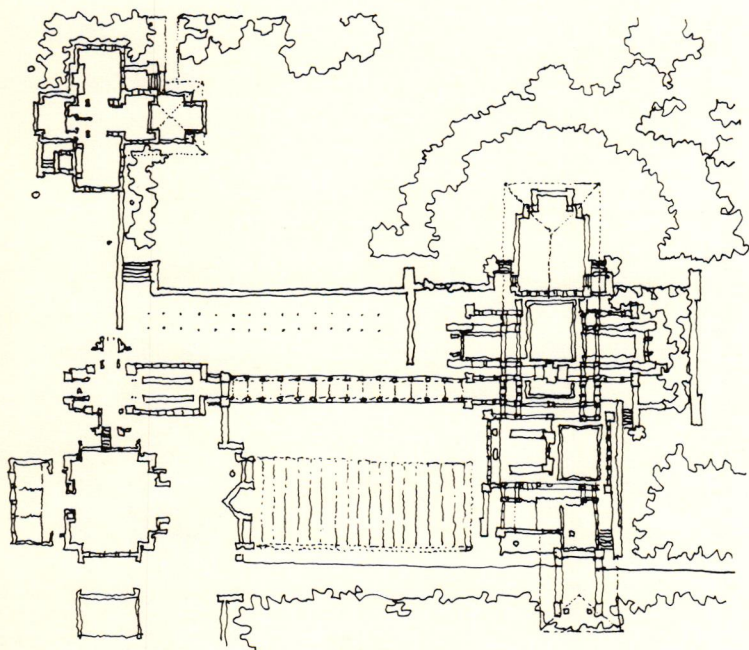
Wright was ready to leave Sullivan's control. It was inevitable that they should clash and separate; in 1895 Wright opened his own office.

Many years later as I lived, drew and built I found in what I conceived and drew that the element I now called plasticity (the master had rendered it so completely in clay) carried in its own nature implications of unexplored structural continuity and could exemplify, simplify and even prove the aesthetic validity of structural forms themselves.²¹

Architecture put to the test of ornament!



Louis Sullivan, design for ornament, 1924.



27. Frank Lloyd Wright, plan of the Martin House, Buffalo, New York, 1904.

The first buildings produced by Wright, such as the Winslow House, maintain the basic character of Sullivan's work, but a new quality soon began to emerge. Wright was attempting to command technology, incorporate prefabricated elements and exploit their repetitive quality. He was concerned about the nature of materials and their clear expression. In 1902 Wright's deep concern for the systematic visual aspects of his buildings led to a general meshing of ornamental moldings and structure. In his drive for unity, he blurred the line which had separated ornament from structure. Wright's design process seems to have started with a spatial configuration, the void, and followed with a general interest in the massing of volumetric containers. After integrating these two aspects, he would then determine the appropriate construction. This process would lead directly into the category of "ornament structuralized" as offered by Keck.

The great houses of this period, particularly the Coonley, William Martin, and Robie houses, share some interesting characteristics. First, the plan is determined on a square grid system and the window divisions and proportions derive from this grid. With this device, the framework of construction and ornament are established in one stroke. Next, the great mass of the fireplace is firmly rooted in the center of the construction. Wright envisioned this as the heart of the house. "It comforted me to see the fire burning deep in the solid masonry of the house itself."²² The masonry mass serves as the parent stem. All lines flow out from this axial radial activity to the furthest line of construction. To accomplish this, Wright eliminated the room as a box and allowed the ceiling, walls, and floors to flow together in one continuous surface. At the perimeter, he removed the enclosing walls and replaced them with "light screens," thus destroying the house as a closed volume. The roof planes intersect at a central spine. Windows are voids between necessary construction; they never punched into walls. The trim is two flat horizontal bands of molding, one running continuously at the top of all the windows and doors and the other at the floor. These directrices of energy radiate from the central spine to the furthest extremity. Vertical bands are introduced between these continuous horizontal bands, subdividing the wall surfaces geometrically and completing the window and door openings. The ceilings are brought down onto the walls by positioning the top trim piece well below the junction of the ceiling and the wall. Both wall and ceiling are painted the same color to insure visual continuity.

Let walls, ceilings, floors become *seen* as component parts of each other, their surfaces flowing into each other. To get continuity in the whole, eliminating all constructed features just as Louis Sullivan had eliminated background in his ornament in favor of an integral sense of the whole.²³

Wright had accomplished the task he had set himself; he had evolved a three-dimensional architectural system that achieved what Sullivan had mastered in his ornament. The floral exuberance found in Sullivan has its equivalent in the tracing of trim lines through the symmetries of space developed by programmatic needs. The comparison of a plate from Sullivan's book on ornament and the plan of the Martin House reveals a marvelous consistency of formal development (illus. 27).

In a building such as the Unity Temple of 1906, Wright reached a total synthesis of ornament and structure. It is like a fine piece of ornament from Owen Jones, for

there are no excrescences; nothing could be removed and leave the design equally good or better. The general forms being first cared for, these should be subdivided and ornamented by general lines; the interstices may then be filled in with ornament, which may again be subdivided and enriched for closer inspection.²⁴

Here the basic grid is even more evident, for the predominant structural elements provide the grid for the ornament. The structure is designed to have an ornamental quality, an example of "structure ornamentalized." The tension created between the regular aspects of the structure and the freedom of the applied ornament activates the space. This building, more than any other, is the exact equivalent, in three dimensions, of Sullivan's ornament.

The processes of design in Wright's Unity Temple and in Sullivan's development of ornament illustrated in Plate 4 of *A System of Architectural Ornament* are clearly analogous (illus. 28).²⁵ First, the geometric figure chosen, a pentagon by Sullivan, a square by Wright. The manipulations emanate from the geometry of the figure chosen. Sullivan introduced a series of circular segments at the perimeter, while Wright applies a series

to the square, making it a cube—four columns placed symmetrically at the corners but free-standing. This divides the room into a central area and a band of space around the perimeter in a manner similar to Sullivan's. The balconies are slung between the columns and the exterior wall, and the upper floor is raised to differentiate it from the enclosing volume. This step in the process closely resembles Sullivan's further elaboration of the area at the pentagon's perimeter. Next, Sullivan's corners become centers of radial activity. Similarly, Wright places the stairs at the corners, concentrating the activity of vertical access at these points. Next, Sullivan subdivides the center of his figure according to the innate geometry of the pentagon. Wright similarly divides the ceiling into a grid of open beams, again based on one plane, a square, of his chosen geometric figure, the cube. At this point, Sullivan introduces the free-flowing organic luxuriance of his stems and foliage. Wright, having subdivided the basic volume with the structural elements called for by the program, applies his ornament in the form of strips of wood that run from column to wall to ceiling. This ornament has the same visual qualities as Sullivan's foliage. It creates a contrapuntal rhythm that recognizes, yet contradicts, the original geometries already established. In a sense, the ornamental strips are in direct contrast to the structure since they flow freely throughout the space, independent of the logic of the structure. They create a continuity of surface and space which is directly opposed to the rigid placement of columns, walls, and platforms. These lines, sometimes singly, sometimes in great batteries racing through space continuously, now horizontally, now vertically, turning corners at breakneck speed, racing toward the enclosure, create a dynamism lacking in the structure. "The rigid pentagon has vanished in a mobile medium,"²⁶ wrote Sullivan. Wright has accomplished the same in three dimensions. It is an astounding performance by Wright, yet quite predictable.

Wright produced few multistory buildings, although he completed numerous studies for them. Saint Mark's Tower of 1929 in New York's Battery Park and the Johnson Wax Tower of 1936 both have a central structural spine from which the horizontal floors radiate. This central spine, first seen in his earlier houses, again meets Owen Jones's requirement of a parent form from which all parts radiate. Wright could never bring himself to use the Chicago Frame even when the program would seem to call for it.

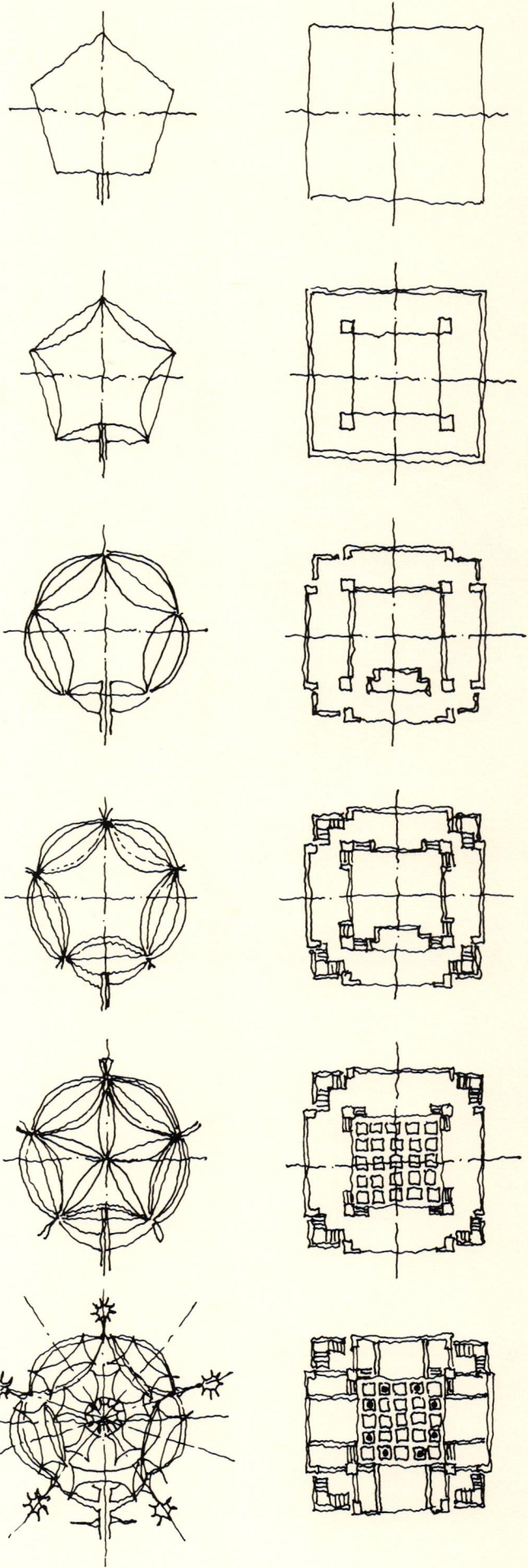
The early work of Frank Lloyd Wright had an extensive influence on architects, especially in Europe, where there seemed no escape from historical style. His influence was particularly strong in Holland and Germany, where his philosophical concepts and plastic form became the cornerstones of a new way of building. One of those influenced most by Wright's work was Mies van der Rohe, who was reaching maturity when the importance of Wright became apparent.

Ludwig Mies van der Rohe was born in 1886 in Aachen, Germany. He was the son of a master mason and received his education and technical training at a local trade school. He had no formal architectural education. Instead, he gained experience through apprenticeships on building sites. There followed a period as a draftsman and designer of stucco ornament. In 1905 he left Aachen for Berlin, the center of architectural experiment in Germany at that time. In Berlin he was apprenticed to Bruno Paul as a furniture designer.

Mies van der Rohe's first independent design was begun in 1907 for Joseph Riehl, a philosopher, who insisted that Mies visit Italy before commencing the design for his house. Thanks to this commission, Mies was exposed directly to Rome and the buildings of the Italian Renaissance. He was particularly interested in the work of Brunelleschi and Palladio. In 1909 Mies went to work for Peter Behrens, one year before the arrival of Le Corbusier at that same office. Behrens's interest in industrial building and Shinkel's architecture both had a profound influence on Mies. The unresolved conflict between classical forms and the new technology was the paradoxical basis for Mies's search for a truly modern architecture. While employed by Behrens, Mies executed the Perls House in the manner of Shinkel.

At this moment, so critical for us, [Mies wrote], the exhibition of the work of Frank Lloyd Wright came to Berlin. This comprehensive display and the exhaustive publication of his works enabled us to become really acquainted with the achievements of this architect. The encounter was destined to prove of great significance to the European development.

The work of this great master presented an architectural world of unexpected force, clarity of language and disconcerting



Sullivan

Wright

richness of form. Here, finally, was a master-builder drawing upon the veritable fountainhead of architecture; who with true originality lifted his creations into the light. Here again, at long last, genuine organic architecture flowered. The more we were absorbed in the study of these creations, the greater became our admiration for his incomparable talent, the boldness of his conceptions and the independence of his thought and action. The dynamic impulse emanating from his work invigorated a whole generation. His influence was strongly felt even when it was not actually visible.²⁷

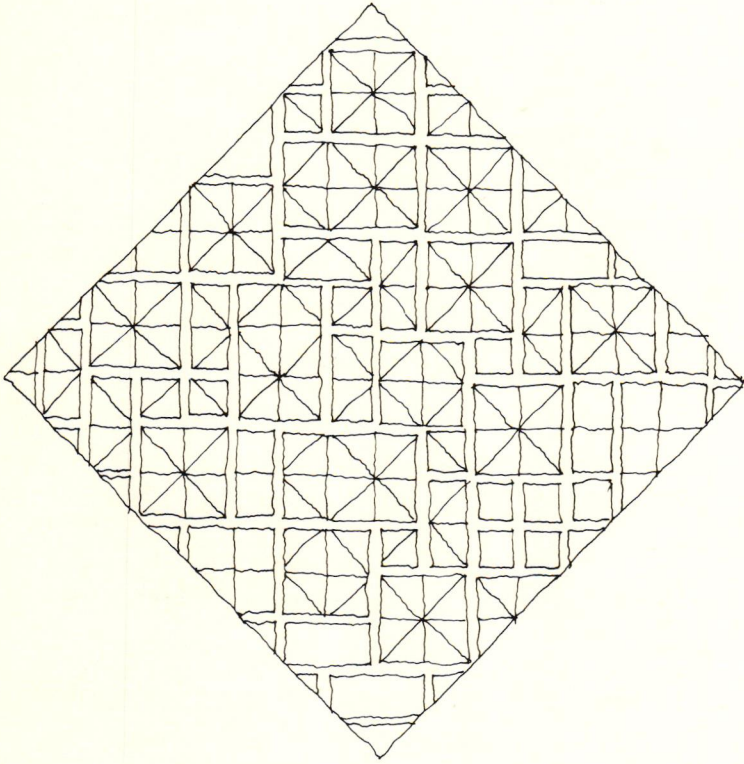
Wright's work displayed a direct confrontation between technology and aesthetics: a studied use of machine-made parts thoughtfully assembled in an orderly, artful fashion. The use of open planning and modular construction instituted by Wright was to become a continuing theme in Mies's work.

There was little building in Germany during the war years or so after. Much theoretical groundwork was done at this time. Mies had his own practice of his own, having left Behrens's office in 1911. He directed the architectural program of the *Novembergruppe* and contributed to the magazine, *G*. The individual members of the group, known as *G*, provided an interesting insight into the influences brought to bear on Mies at the time. In 1923 Hans Richter, Werner Graeff, Van Doesburg, and Mohr founded the group and were soon joined by Gabo, Lissitzky, and Moholy-Nagy. Together, they represented both the Russian version of Constructivism and the Dutch version, known as *De Stijl*.

Prototypes for Constructivist imagery had appeared for centuries in the geometrical decoration found in the minor arts. This abstract imagery was based on non-illusionistic constructions. Mondrian is particularly interesting, for his work developed from naturalism, through geometrical grids, to the arrangement of lines and planes by eye, in his later work. The last phase is most often associated with the work of Mies van der Rohe. His earlier paintings executed around 1919, such as *Composition* (illus. 29), however, reveal a more systematic approach closely related to ornament. Mondrian utilized an overall grid based on the proportions of the canvas to organize his compositions. He then chose certain lines for emphasis from this modular network. Mondrian's system bears a striking resemblance to the methodology for the construction of ornament, particularly medieval masons' marks, and to certain aspects of Mies's later architecture. It was not until this century that the neutrality of such an approach would become a viable principle for a significant group of artists and architects.

In the 1920s, the Bauhaus became the gathering point for the Constructivist artists. The Bauhaus attempted to put an end to the schism between trade schools and the schools of fine art. The emphasis on craftsmanship and objectivity of creation, common to both trade schools and Constructivism, brought to the artist and architect the respect previously relegated to the artisan. The sensibility taught in the preparatory course at the Bauhaus was similar, if not identical, to that of the craftsman in the creation of ornament. The notion of design as a process that begins in a detailed fashion and progresses to a larger scale had a profound impact on the finished product. The emphasis on geometric form in Bauhaus teaching was also seen in the training of craftsmen and artists, not artists. Geometry is inherited from the classical world, and classicism insists on putting ideas into strict form. Constructivism and the work emanating from the Bauhaus both display this strictness. The architecture of Mies van der Rohe begins with the classicism of historical form, rejects the classicism of Constructivist form, and finally resolves the difference in a brilliant synthesis.

In 1919 the first of a series of extraordinary theoretical works by Mies appeared, the *Project for a Glass Skyscraper*. In the first scheme the building is prismatic in plan, divided into triangular segments and sheathed entirely in glass. The reflective and transparent qualities of glass and their power to produce shifting images dominated the conception of the scheme. A second scheme followed in 1920. This time the plan is polygonal, with a continuous undulating surface which further exploits the visual qualities of glass. Models were used to study optical phenomena that could not be rendered in a drawing. A frame construction, which enabled the architect to sheath the exterior in a veil of glass, produces a visual effect of total weightlessness. As the light conditions change, the unadorned structure appears and vanishes in reflections of the sky and surrounding buildings. This project is certainly one of the most ethereal conceptions of modern architecture. It was only partially realized in Mies's later work.



29. Piet Mondrian, *Composition: Light Color Field with Grey Lines*, 1919. Rijksmuseum Kröller-Müller, Otterlo, Netherlands.

The Concrete Office Building project followed in 1922. This time stressed the solidity of the structural system by setting back the glass walls to reveal the structure. As in the preceding tower projects, the structural system appears unadorned, and the entire building exists as pure construction. The columns and beams fall on a grid, and the windows are framed by the structure, producing an even distribution of fenestration. The building is evenly divided in plan and section into structural segments, with a raised ground-floor level to allow light into the basement. This forces a distortion of the system at the entrance, a bonus of a higher ceiling at that point, and a raised entry stair. As in all of Mies's work, the logic of both structure and usage goes hand in hand with formal solutions of the greatest sensitivity.

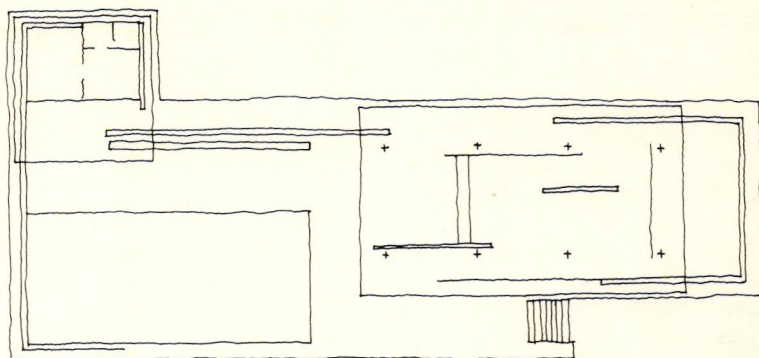
The Brick Country House of 1923 utilizes the revolutionary spatial developments found in Wright's last Prairie Houses. Again the solution is tied to a particular material and exploits the method of construction it demands. Brick, the most mundane of building materials, unchanged in form for hundreds of years, here becomes something quite unexpected. The structure is developed on the module of a brick and therefore allows its unimpeded use in strict geometric relation to all building elements. The use of brick always interested Mies. Structural bonding insures ornamental patterns in an absolute and ordered fashion. The fenestration is evenly divided except for the necessity of entrances. The balance of vertical elements with the horizontal floor and roof construction and the enclosed volumes reflect the influence of De Stijl, as well as of Wright.

The last of Mies's early projects, the Concrete Country House, completed in 1924, utilizes concrete bearing walls to provide blocks of space which allow free arrangement around exterior courtyards—an extension of an idea found in the Brick Country House. The structural system permits windows to be cut in the walls where light is needed. The solution is symmetrical rather than planar. It expresses the continuity of the material by rounding the corners from the volumes, while the flow of space is freely maintained. A column grid is introduced in the large spaces to avoid long spans which are difficult to achieve in concrete. Again, the fenestration is symmetrical, except at the entrances and vertical access elements.

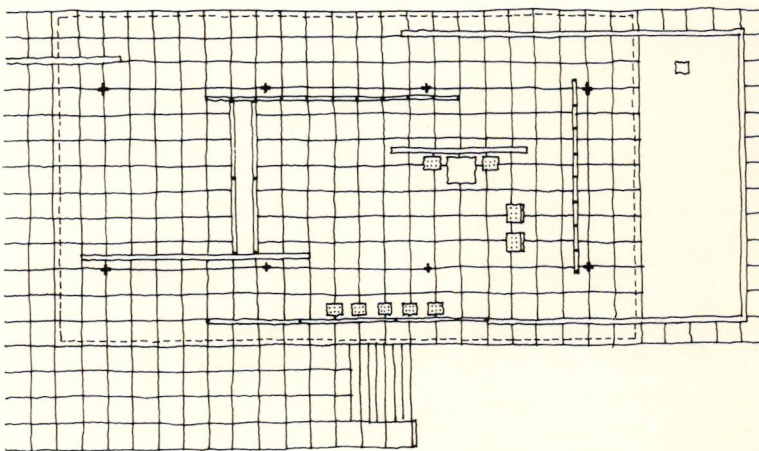
The consistency of thought in these projects is countered by the variety of form developed. Through his concentration on materials and techniques of construction, Mies discovered a new architectural language. The remarkable invention of these projects has its roots in a seemingly simple approach. By always insisting on structural integrity and good construction, Mies was forced to work by an inductive rather than a deductive process. By starting with the constructive elements and then proceeding to larger elements and massing, Mies could ensure absolute control over the final geometric relations among all the parts. This methodology is exactly the procedure used in designing a classical building. In a villa by Palladio, the geometry of interlocking parts forced the architect to know the relation of the ornament to the whole as he planned the villa. Only then could he ensure that the constituent elements would be metrically related. The realization of Mies's first buildings in the modern idiom illustrates this procedure, as well as the inherent conflict between Constructivist space and classical detailing.

The Barcelona Pavilion (illus. 30) was designed in 1928. The fact that it was a structure with no particular program allowed Mies to exhibit fully his vision of architecture. The roof of the structure is supported by a regular column system based on a grid, with a cantilever in both directions. The walls are clearly separated from the columns to express their non-load-bearing capacity: they define space. The building sits on a base which is paved in square travertine plates. The continuous flow of horizontal space between the planes of the roof and floor is modulated by the apparently free arrangement of vertical screen walls. The balance of the parts, the strict bilinearity, and the freedom of arrangement clearly follow Constructivist guidelines.

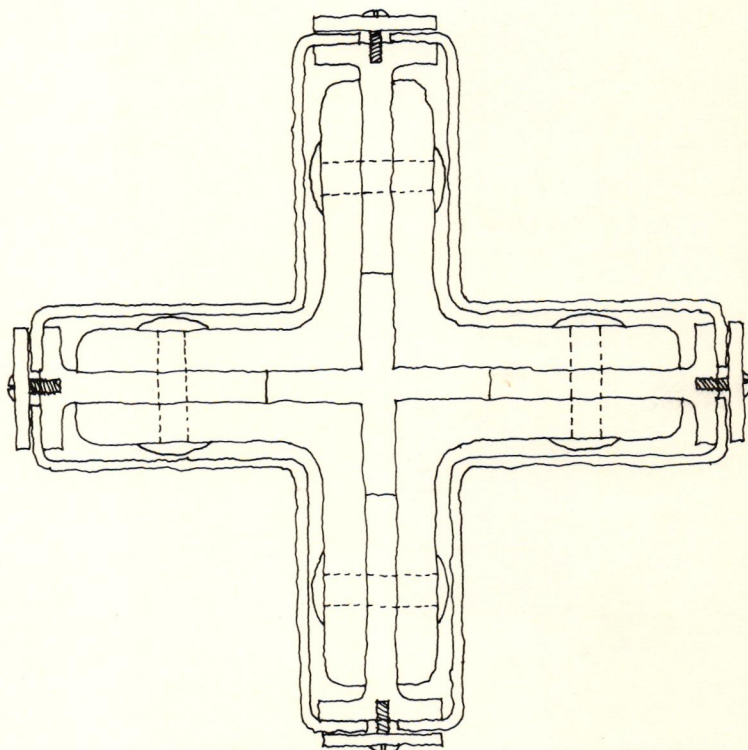
The similarity in plan to the great Prairie Houses of Wright is clearly evident, but a second system of composition is at work, at another scale, in the detail plan (illus. 31). The placement and detailing of elements conflict the freedom of the overall arrangement. The columns are cruciform in plan, thus expressing their construction from four steel angles (illus. 32). They are clad with chromium-plated sheet metal; the attachment screws are visible, centered, and evenly spaced. The window frames are detailed in the same manner; they are also regularly spaced within each glazed panel. The line of the mullions are aligned with the paving joints, some are not, but



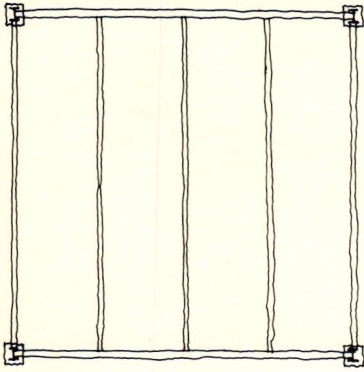
30. Mies van der Rohe, plan of the Barcelona Pavilion, 1929.



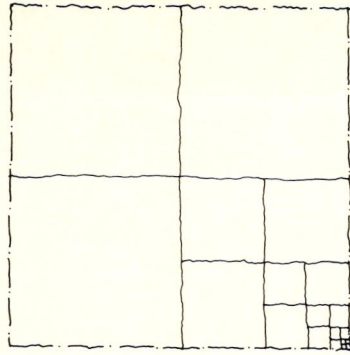
31. Mies van der Rohe, detail plan of the Barcelona Pavilion, 1929.



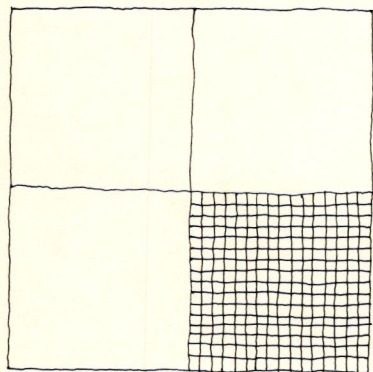
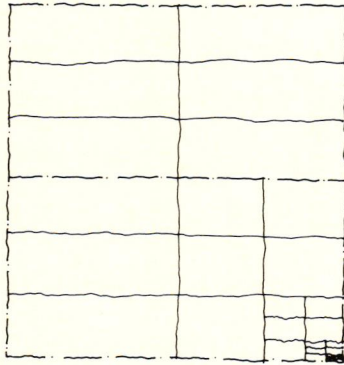
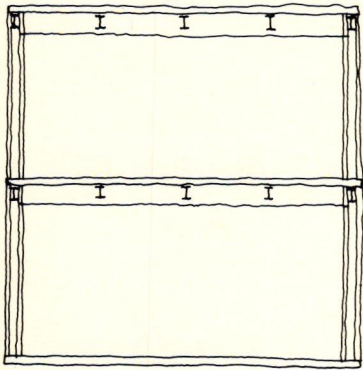
32. Mies van der Rohe, column detail of the Barcelona Pavilion, 1929.



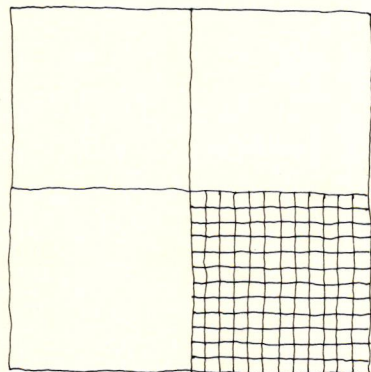
33. Mies van der Rohe, plan and elevation of IIT classroom structural grid, 1938-58. (Drawing by author.)



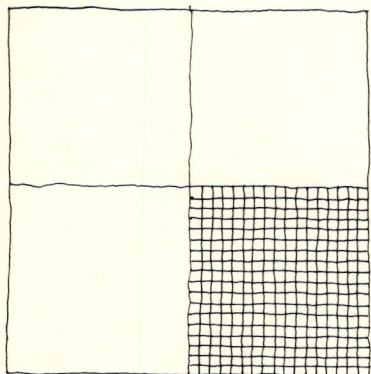
34. Mies van der Rohe, plan and elevation of IIT classroom modular grid, 1938-58. (Drawing by author.)



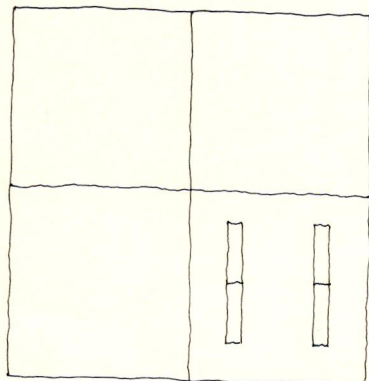
Vinyl asbestos floor tile



Acoustic ceiling tile



Brick walls



Fluorescent lighting

35. Mies van der Rohe, modular relationship of elements in IIT classroom, 1938-58. (Drawing by author.)

in all cases the glass-screen walls are centered on the floor pattern and not randomly placed. The solid walls are made up from figured stones which bookmatched vertically and horizontally, varied in color, incredibly rich pattern, and highly ornamental. The benches are stone, their supports evenly spaced blocks, again centered on the floor joints. The movable furniture, specially designed for the exhibit, is as meticulously rendered as the building. The chairs have chromium-steel supports and immaculate white leather cushions, and their detailing is precise, with evenly spaced leather support straps and a gridded upholstered seat and back. The furniture is evenly spaced within any grouping and is always centered on the floor grid. The proportions of all elements are carefully controlled and their arrangement in a consciously ordered system of planes is beautifully studied.

In the Barcelona Pavillion it is obvious that great care and end time have been spent on the detailing and that every effort has been made to relate all elements to the general plan. Mies did not actually begin design until he had located an onyx block that satisfied him. He established the ceiling height by doubling the dimension of that particular block so that all elements could be matched. It is also evident that what is usually referred to as architectural detailing is actually a process of decoration in the hands of Mies. The visual characteristics of materials and their method of application are conceived in ornamental terms. Also the use of a grid to establish relations among elements is a process associated with ornamentation. The floor plane is gridded by the joints in the stone—a constructive necessity. The grid is directly related to the structure; the corner columns fall precisely on the intersection of the module lines. The screen dividing walls, although freely displayed, are all centered on this same grid, as are the furniture groupings and benches. All the elements of the building are related to the grid; it is a geometric ordering device of the utmost importance in the plan, section, and elevation of the building. The problem of developing this scheme is exactly the same as the one used in the making of ornament. Only here, the constructive elements supply the visual effect previously derived from applied ornament. Mies has succeeded in solving a seemingly impossible problem. He has attained classical ornamental order within a structure that satisfies the ideological program of rational construction, while maintaining a freedom of arrangement specified by the rigorous Constructivist aesthetic. Other buildings of this same period in Mies's career use the same approach, but few achieve the resolution found in the Barcelona Pavillion.

In 1937 Mies van der Rohe emigrated to the United States to become the director, in 1938, of the Department of Architecture of the Illinois Institute of Technology. He was offered the commission to plan the entire campus of the newly formed university. In the planning for the campus, his methodology resulted in a building type apparently quite different from his previous work. It was obvious that the program for a total university could not be solved through open planning. The buildings would be more than one story in height and classrooms would necessarily be closed volume spaces. In addition, the buildings were to be constructed over a twenty-year period. The budget was low enough to necessitate the use of standard elements of construction. Therefore, Mies set about developing a system that was as flexible as possible and capable of solving all functional problems while utilizing a rational structure and prefabricated parts.

Mies's concern for the ornamental resolution of the building elements again forced him to begin inductively. He had to fit each element into a proportioning system that would guarantee its systematic integrity when combined with all the other elements in the building. The modular system that appears in rudimentary form in Mies's European work suddenly became an element of prime organizational and visual importance. The building is interlaced with a three-dimensional latticework of lines that determine the position of every item. This armature is essentially the same device that is found in a classical building. Classical pilasters become structural columns, coffers are replaced by acoustical tile and fluorescent lights, and moldings become reveals. In one brilliant stroke, the geometric ornament found in classical ornament and the modular grid initiated by Wright were fused into an integrated system.

The design of the campus at IIT began with the placement of a modular grid over the entire area of the site. The size of a standard classroom determined the structural grid (illus. 33). This was then subdivided to form the grid for the planning module (illus. 34). All partitions fall on this modular planning grid. The columns and be

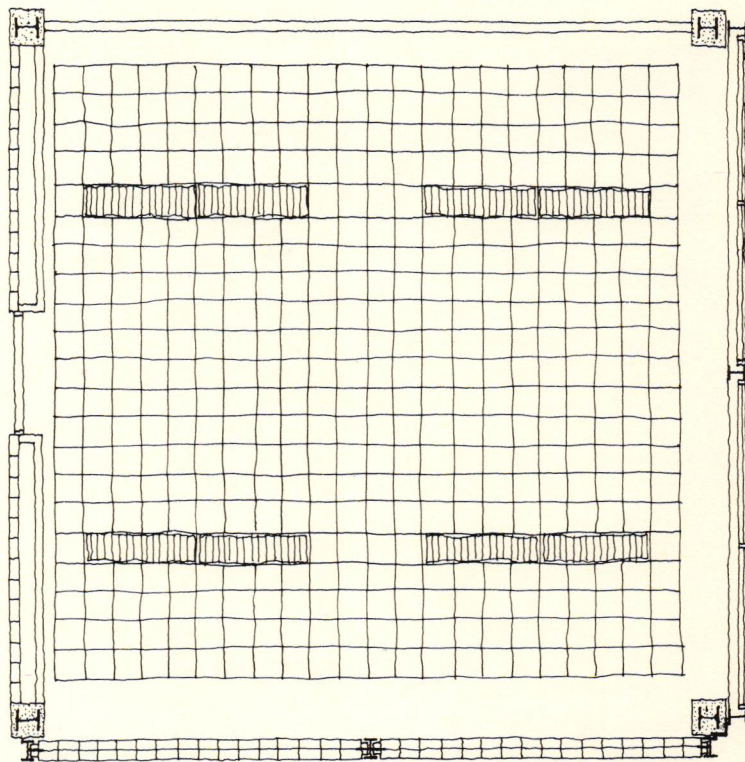
essarily coincide with the planning grid, so partition loads are carried directly on beams. The next step was to place all those elements that did not coincide with partitions and structure, such as lights, diffusers, and doors, in the center of each module. This guarantees that regular grid spacings can be maintained, thus avoiding visual conflicts between systems. Next, the elements that make up the surfaces, both vertically and horizontally, were related to the basic planning module, as were the bricks themselves (illus. 36).

Each element of the building has a direct relation to the planning grid to every other element. Although the brick and ceiling tile are both multiples of the planning module, their joints would not directly align. For this reason, the tiles were held back from the perimeter of each room so as to form a plaster band to separate the two grids that do not directly coincide. The tiles are a perfect rectangular field in the center of each room. They avoid the columns, which project into the space at the corners. Great concern for detail heightens the ornamental perfection of these buildings (illus. 36).

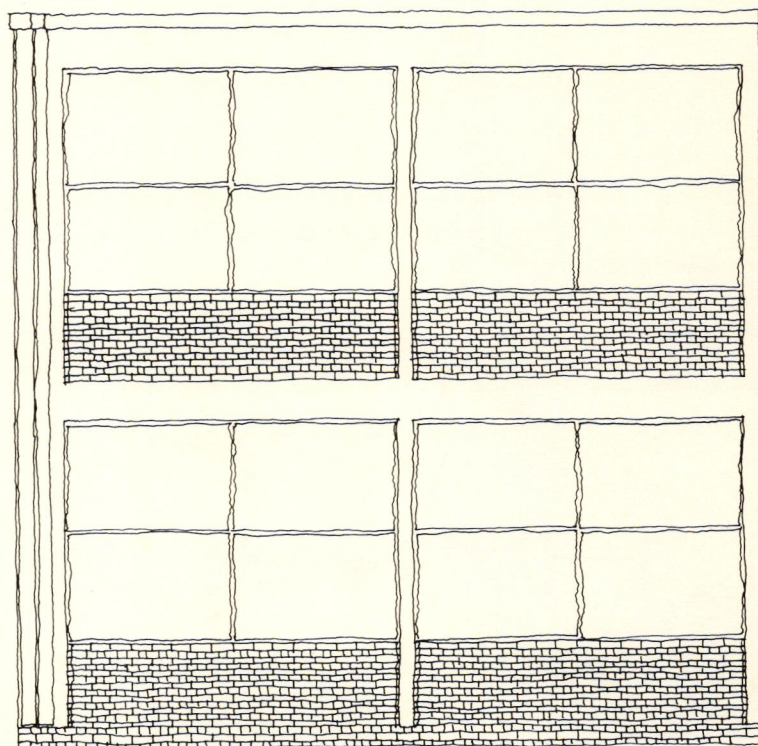
The exteriors of the IIT buildings are logical extensions of the planning system. The armature of regulating lines projects to the exterior face of the structures. Each building could be thought of as a fragment of a system that could continue endlessly. At every module line there appears a projection to catch the partitions as they hit the exterior wall. There is a small spandrel at every floor that receives a slab. These elements form a grid on the facade that is a direct expression of the modular planning grid. This space is filled with either brick or glass, depending on the use immediately behind the panel (illus. 37). At the corner, however, the column appears, contradicting the apparent structural quality of the steel grid covering the fire facade. This subtle device reveals the steel, brick, and glass facade to be a skin stretched over the skeletal structure. Similarly the steel stanchions project short of the ground, insuring their non-structural expression and protecting them from weathering. The steel grid is a metaphor for the structure behind. It is an ornamental device of the utmost sophistication. The fire code requires a protective cover for the steel frame in a building of this type, so direct expression of the steel frame is impossible. The fireproofing makes the frame appear quite heavy. Mies expresses the steel structural frame and controls the proportioning of the members through the reiteration of its materials and forms in the skin of the building.

The earlier buildings at IIT were a disappointment to many. They lacked the spatial inventiveness and high style of Mies's work in Germany. They are not a contradiction of his earlier buildings, however, for they represent a synthesis of tendencies which were unresolved in his previous work. The early IIT buildings resolve the paradox of classical ornamental order and Constructivist aesthetic demands in a manner suggested by Le Corbusier's *Composition* (illus. 29) of 1919. They represent a continuing experiment which makes the later work possible, for it is here that the methodology is established.

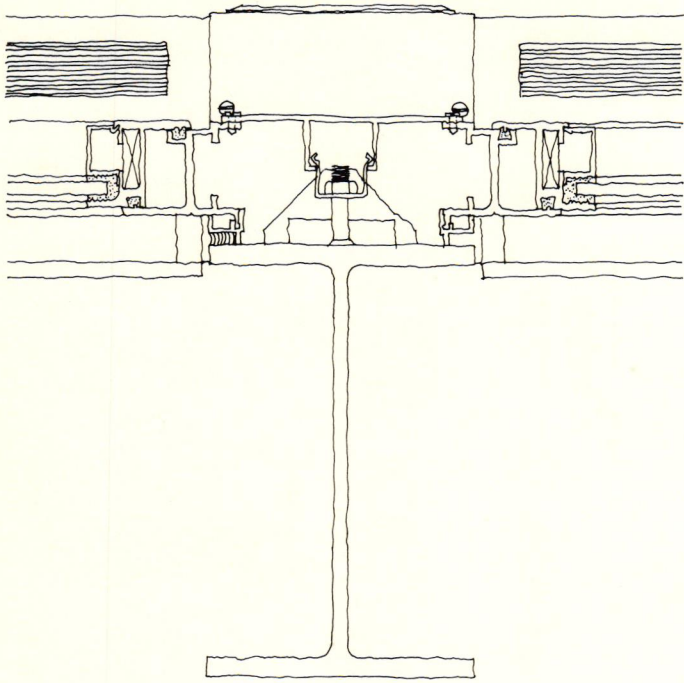
The high-rise structures designed by Mies van der Rohe are his most influential buildings. In these towers, the system developed at IIT was exploited to its maximum effect. The high-rise program, especially for office buildings, requires a flexible division of area within a volume of contained space. In an office building, the configuration of the partitioning is not even contemplated until the construction of the building's shell is complete. The solution developed by Mies uses Sullivan's functional expression of a lobby floor, followed by a regular block of repetitive floors for offices or apartments, and, finally, a mechanical floor at the top. The plan of a high-rise apartment or office tower is extremely rational. The perimeter is entirely of glass. All the occupied space falls in this area, the most desirable for human use. The center, which has no natural light, contains service elements and the vertical shafts. This center, or core area, contains all the space that is non-typical or does not fall into the visual pattern of the open space. Since the core never hits the exterior of the building, the regularity of the facade is assured. The ground floor is expressed as a separate entity by raising the building to form a higher lobby. The glass is pulled back, exposing the structure, and the core shafts project from the ceiling in regular rows. In the office buildings, the top floor, housing the mechanical system, is enclosed in louvers, which are placed in the fenestration system of the window wall. The percentage of active windows is very low, but the entire mechanical floor is expressed in this manner so as not to destroy the regularity of surface expression. In the apartment houses, the mechanical penthouse is set back and articulated as a separate volume.



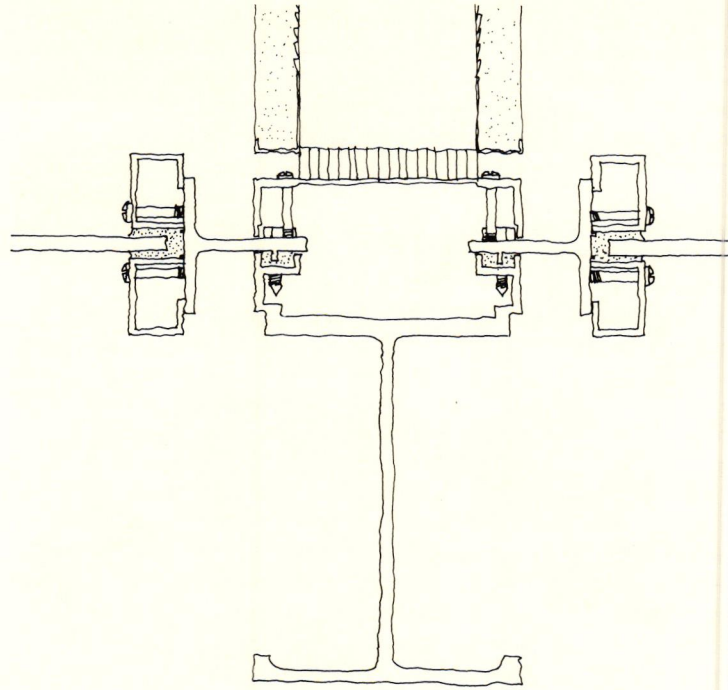
36. Mies van der Rohe, plan of IIT classroom, 1938-58. (Drawing by author.)



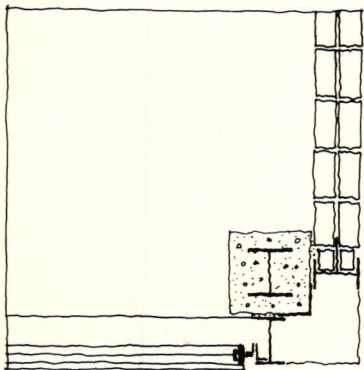
37. Mies van der Rohe, elevation of IIT classroom, 1938-58. (Drawing by author.)



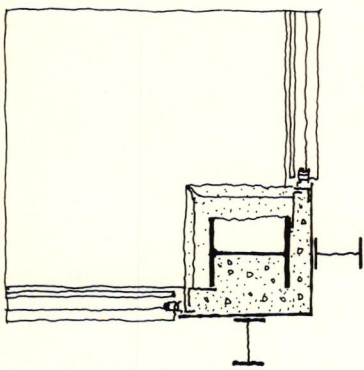
38. Mies van der Rohe, mullion detail of 860 Lake Shore Drive, Chicago, 1948–51.



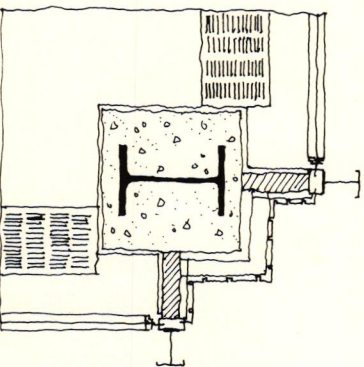
39. Mies van der Rohe, mullion detail from the Seagram Building, New York, 1954–58.



IIT (1938–58).



860 Lake Shore Drive (1948–51).



Seagram Building (1954–58).

40. Mies van der Rohe, corner details.

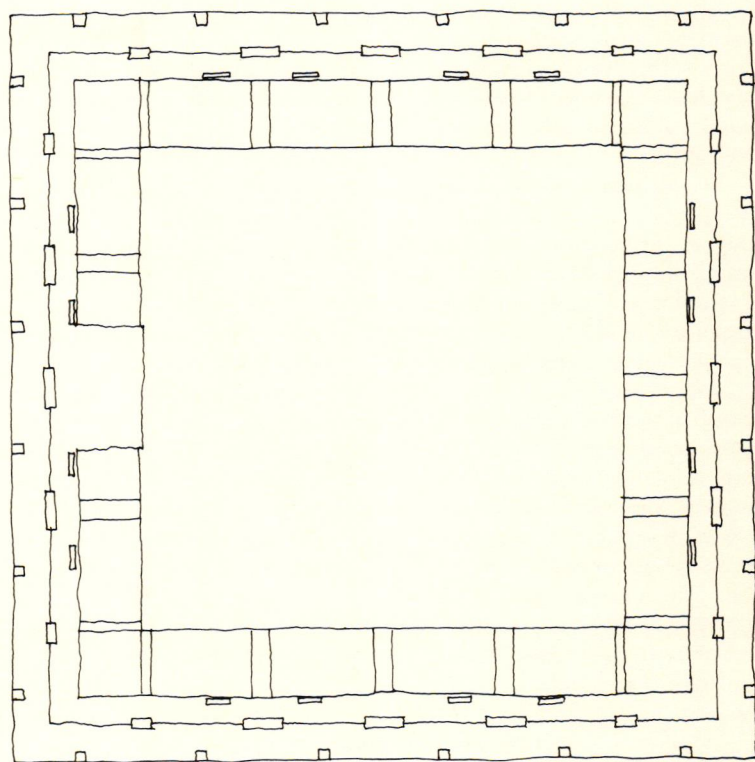
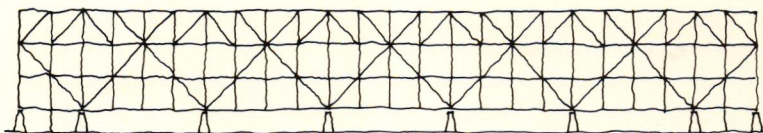
The structural frame is a regular bay system. Its dimensions are determined by the requirements of the program. The structural grid is then subdivided into a planning grid, which is reflected on the exterior by mullion spacing. By specifying a system requiring all-glass infill, the building approaches in appearance a diagram of the inherent modular system. The expression of the exterior of the high-rise structure evolved slowly in Mies's hands. At the 860 Lake Shore Drive building of 1949, Mies expressed the structural frame exactly on the exterior of the building. Rather than using glass in an infill system, he applied a vertical I-beam to each mullion line. This very sophisticated ornamental device forms an unbroken vertical line the entire height of the building, defining all windows and eliminating them as distinct elements, and is, at the same time, a visual metaphor for the structure behind. The thin flanges of the I-sections change the scale of the facade while exemplifying the hidden structural construction (illus. 38). It is clear that the mullions are only attached to the building, and are not part of the structure. They follow the exact tenets of De Stijl in their clear articulation from the horizontal spandrel panels. Their ornamental nature is substantiated by the redundant mullion which occurs at the center line of each column: rather than break the rhythm of the facade, Mies attached a mullion where there was no window. As one views the building from different perspectives, its facade changes from the open reflection of glass to the closed plane of mullions. It is a magnificent ornamental solution, evolving from Mies's earlier experiments.

Mies never employed this exact design again on a high-rise building. At the Commonwealth Promenade Apartments of 1953 and the Seagram Building of 1954 he modified the skin solution used in 860 Lake Shore Drive, which had two irrational features: the entirely decorative mullions on the columns and the atypical windows on each side of the column. At the Seagram Building, Mies pushed the skin in front of the structure as he had done earlier at IIT. This allowed for identical windows throughout. The standard, steel I-section was replaced in the Seagram Building by a custom-made extrusion in bronze. Obviously, the visual and symbolic aspects of the mullion-section are the primary determinants in this configuration (illus. 39). The spandrel of the Seagram Building is expressed as a nonstructural panel by its attachment to the mullions. They are held in place by extruded stops and treated in exactly the same manner as the glass. The skin is broken at the corners to expose the structural column in the manner of the earlier IIT buildings. The ornamental qualities of Mies's solutions are probably the most brilliant and completely resolved examples of what Kerr designated as "structure ornamentalized" (illus. 40).

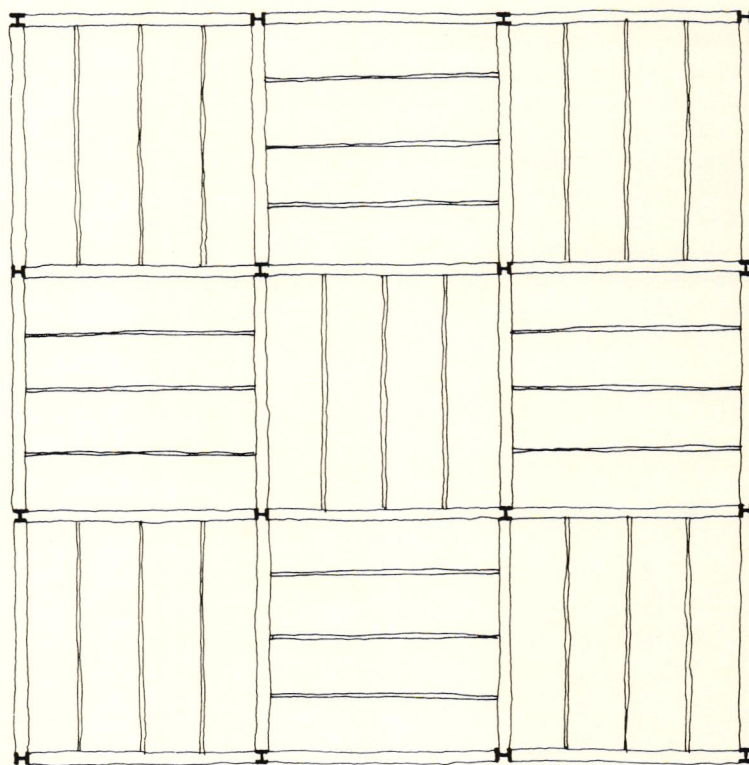
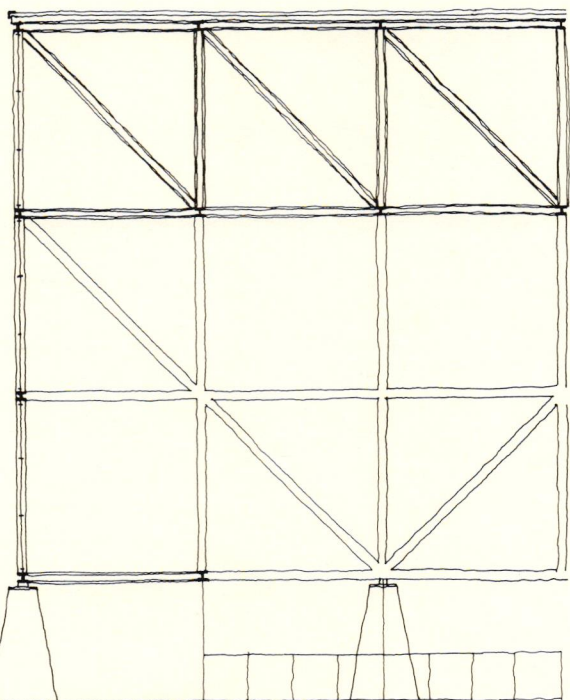
The low-rise structures completed by Mies van der Rohe during this period are interesting in relation to his earlier European structures. In particular, his single-space or "great hall" structures are remarkable

invention. In Crown Hall of 1954 or the Mannheim Theater project of 1953, Mies could have employed his earlier Constructivist spatial schemes. Instead of developing a flow of space, however, he uses the formula developed in his high-rise structures. He buries all the spaces that are typical. The main space has the same inert quality found in the "universal space" of commercial developments. Although not program-matically required, the ornamental, modular-construction techniques are retained. The structure is removed from the interior of the space and tied to the exterior. The ornamental qualities inherent in long-span construction are evident here.

Perhaps these great halls represent Mies's greatest triumph in the integration of construction and ornament. The Convention Hall project for Chicago of 1953-54 (illus. 41) is an ornamental tour de force equal to Wright's Unity Temple. It has the same geometric perfection, except the structure itself performs the dual tasks performed by structure and applied ornament at Unity Temple. Here Mies employed a structure of great decorative quality. The forces are displayed on the exterior and the interior where they gather and combine at the supports. The resemblance to the morphology of a Gothic cathedral (illus. 42) is immediately apparent. The ornamental quality of open-truss construction was employed during the nineteenth century in large exhibition buildings such as the Crystal Palace. The ecstasies of open structure have been transformed through the deliberate reasoning of Mies. The richness of the square enclosure grids, divided by the diagonal truss members, is both rational and visually stimulating. The building is a perfect square, the columns lying on the perimeter are divided into five regular bays with a cantilever at each corner. The exterior wall is a giant truss, distributing the roof loads down to the columns. This wall is divided by the diagonals of the major truss, which is subdivided to form the diagonals of the roof structure. The two-way truss system at the roof forms an even visual pattern of support in both directions. The decking spans in alternate directions, from truss to truss, in a highly ornamental fashion governed by the necessities of even-load distribution (illus. 43). The exterior trusses have an infill of figured marble. In some schemes the color of the infill alternates across the facade, reflecting changes in structural forces. This building marks the culmination of Mies's experimentation. The space is undivided and perfectly uniform; the structure is rational in its arrangement, and yet, the resulting patterns are highly ornamental as well as extremely ordered. Everything is perfectly integrated, yet dynamic in its structural expression. This building is probably the masterpiece of "structure ornamentalized," as Unity Temple is the masterpiece of "ornament structuralized."



41. Mies van der Rohe, elevation and plan of Convention Hall project, Chicago, 1953-54.



43. Mies van der Rohe, roof structure plan of Convention Hall project, Chicago, 1953-54.

Mies van der Rohe, partial elevation of Convention Hall project, Chicago, 1953-54.

Modern architecture evolved as a violent reaction to nineteenth-century architectural strategies and appearances. The conceptual thrust of Wright, Le Corbusier, and Mies van der Rohe preceded the implementation of their ideas. When confronted with actual construction, they had to develop a methodology which would accomplish what had already been theoretically proposed. At this point they relied heavily on their training in ornament. Here was a complete system of abstract geometric construction. As they proceeded into the actual design process, the forms and methods of ornamentation appeared in new architectural applications. The ornamental aspect of their work was always thoroughly integrated into the conceptual framework of modern architecture. Ornament resumed its position in the contextual base of architecture, avoiding the disassociation occasioned by eclecticism.

Construction today reveals a general apathy toward qualities once thought to comprise the essence of the Modern Movement. One wonders whether this apathy is the result of recent unforeseen, external forces or simply the dissipation of the revolutionary energy that produced a new way of building at the beginning of this century. Perhaps a reiteration of the origins and historic context of the Modern Movement could explain its apparent demise. The beginning of the nineteenth century saw a wave of stylistic revivals. Their relative visual and moral qualities were argued at great length, to no particular conclusion. Simultaneously, new techniques and materials appeared in the hands of civil engineers. This technology was never fully integrated into what was then considered architecture. At that moment, attempts were made to revitalize architecture by reducing buildings to their component parts and extracting from those parts visual and sensuous phenomena which could be formalized into a system of composition. The apparent value of historical precept was maintained, but the principle of stylistic integrity was lost. This freedom heightened the dichotomy between new building techniques and the arbitrary cloak of traditional forms until the serious architect was forced to seek out a new approach.

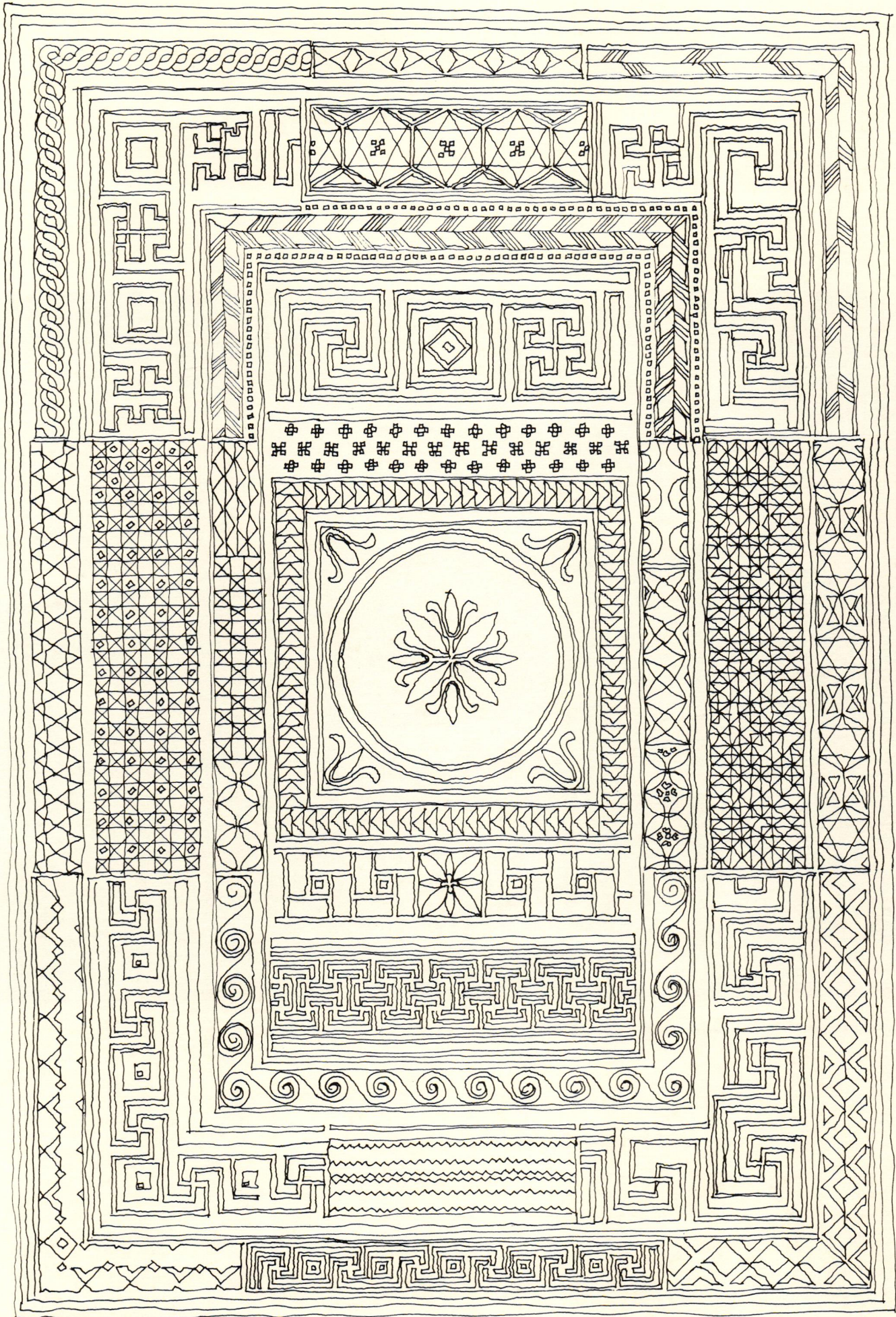
Modern architecture was considered an apocalyptic split with the past. Rational planning and machine-made parts were finally accepted by the architect. A variety of convincing and often beautiful solutions resulted. The early work of Wright, Mies van der Rohe, Le Corbusier, and others is a unified body of work, yet each displays differing sensibilities. Obviously, the work of these early masters did not follow the exact course each originally outlined, but that does not necessarily negate the modern program entirely. In reality, modern architecture offers a richer conceptual, visual, and environmental experience than the avowed intents of its major proponents. Ornamental manipulation and historical architecture were carried into the Modern Movement in veiled form. The architect raised with the intricacies and invention of ornament had a grammar of form which has been denied those trained in Modernism.

The work of those following Le Corbusier seems tied to eclectic recombinations of geometries conceived by the master. There is no thrust into new formal solutions based on the conceptions of Corbusier. Attempts to revive nineteenth-century models as a basis for anything greater in size than a house seem doomed from the outset. Meanwhile, the followers of Mies van der Rohe seem to be caught in an endless cycle of arriving at the same overall solutions by inductively proceeding from the familiar details.

A most valuable system of design has been stripped from the architect's training, leaving him mired in an eclectic predicament no better than existing just before the emergence of the Modern Movement. Perhaps before we completely dismiss modern architecture—or revive it in a historical style—we should examine the derivation of its forms and conditions more carefully.

NOTES

1. Owen Jones, *The Grammar of Ornament* (London: Day and Sons, 1804), p. 2.
2. *Ibid.*, p. 156.
3. *Ibid.*, p. 2.
4. As quoted by Peter Collins, "Aspects of Ornament," *Architectural Review* 129 (June 1961): 375-76.
5. As quoted by Reyner Banham, "Ornament and Crime," *Architectural Review* 121 (February 1957): 86.
6. *Ibid.*
7. Le Corbusier, *Creation Is a Patient Search* (New York: Frederick Praeger, 1963), p. 24.
8. *Ibid.*, p. 22.
9. Le Corbusier, *Modulor I* (Cambridge: Harvard University Press, 1961), p. 25.
10. *Ibid.*, p. 30.
11. Amedee Ozenfant, *Foundations of Modern Art*, trans. John Rowland (New York: Dover Publications, 1952), p. 162.
12. Jones, *Grammar*, p. 5.
13. Frank Lloyd Wright, *Genius and the Mobocracy* (New York: Horizon Press, 1971), p. 71.
14. For a study of the relation between Owen Jones and Frank Furness see James F. O'Gorman, *The Architecture of Frank Furness* (Philadelphia: Philadelphia Museum of Art, 1973), p. 37.
15. Frank Lloyd Wright, *An Autobiography* (New York: Duell, Sloan and Pearce, 1943), p. 75.
16. Frank Lloyd Wright, *A Testament* (New York: Horizon Press, 1957), p. 19.
17. Wright, *Genius and the Mobocracy*, pp. 70-71.
18. *Ibid.*, p. 74.
19. *Ibid.*, p. 75.
20. *Ibid.*, p. 82.
21. *Ibid.*, p. 80.
22. Wright, *Autobiography*, p. 141.
23. *Ibid.*, p. 147.
24. Jones, *Grammar*, p. 5.
25. Louis H. Sullivan, *A System of Architectural Ornament* (New York: Dover Publications, 1963), pl. 4.
26. *Ibid.*, pl. 4.
27. Philip C. Johnson, *Mies van der Rohe* (New York: Museum of Modern Art, 1947), p. 196.



Pompeian ornament. Owen Jones, *The Grammar of Ornament* (London: Bernard Quaritch, 1868), Plate XXV.



1. Teotihuacán, view to the north, facing the Pyramid of the Moon.

RENASCENCE AND DISJUNCTION IN THE ART OF MESOAMERICAN ANTIQUITY

George Kubler

Attention has seldom been drawn to the notion that the literary habits of the Renaissance resemble the weaving of Penelope. Historians often write of the web of history as happening, the tapestry of history, as though it were a creation of patient persistence only. The other face of happening, however, which is all disruption and broken threads, gets little attention. It is much more difficult to describe change than to report continuity. This may be why historians prefer to describe change as a continuity disturbed, rather than as a change and disruption *per se*. For this reason perhaps, the writing of history has often been lacking in sharply contrasted opposites.

Let us take, for example, the Renaissance. We speak of "The Renaissance" with ease and familiarity as though it were an operational reality. One of the tests of reality is the presence of an opposite: night and day, wet and dry, hot and cold. The idea of Renaissance suggests a field of forces, though it is seldom noted by historians, the presence of an opposite. How are we to apprehend these counter-forces in history?

We can begin by laying out a scale of the magnitude of periods within the historical field. The Renaissance, as everybody understands it, is the latest species in the museum of history. In magnitude it is like the dinosaur—by far the greatest example of its kind—but structurally it is similar to much smaller and more recent species.

The next smaller historical instance has been studied mainly by idealists. Less ample than Renaissance, the name it usually bears is *renascence*. Erwin Panofsky presented those many medieval episodes in which a renaissance of some part of classical antiquity was attempted, in a volume of 1960 entitled *Renaissance and Renascences*.¹ The idea of renaissance includes the special case of the Carolingian *renovatio*. Panofsky and his colleague Richard Krautheimer finally enumerated so many renaissances, from the early Christian centuries through to the Quattrocento, that these formed an almost continuous tissue of classical substance. From their work there appeared a new definition of tradition. For them, tradition could be characterized as a close meshed sequence of efforts to restore portions of classical antiquity to positions of authority in medieval culture. In this light, renaissance could be seen as a phenomenon of the persistence of tradition. We can now observe as well the persistence of tradition throughout the entire scale of magnitudes of historical periods.

Our museum of history, now a museum of continuities, contains even smaller species of the same genus as Renaissance and renaissance. The history of art abounds in examples of closely related persistences of tradition called "revivals of taste." When many different revivals coexist, as in the thirteenth century, their intermingling is called an "eclectic style." Revi-

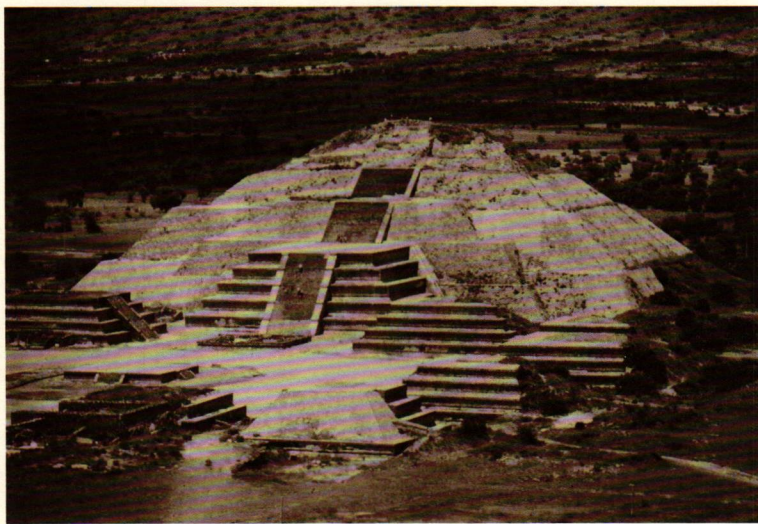
val differs from renaissance, however, as fashion differs from historic style. Greek or Gothic or Egyptian revivals are episodes of taste. As such, they transform the scene. Doric columns, Theban pylons, and Flamboyant vaulting reappear side by side. They function more as quotations from the past than as whole texts. The Renaissance was an attempt to live from the whole book of antiquity; renaissances make use of fragments; and revivals are selective, obeying the rule of taste in ransacking the whole treasury of history and archaeology.

Of even briefer duration than revivals are the revolutions and cycles of fashion in clothing. Two different rhythms appear in fashion: the slower one skips generations, and the faster one turns back upon its track several times in each generation. The slower rhythm reasserts the continuity with the grandparents' generation. The faster cycle is fashion itself, as charted by Richardson and Kroeber,² and is manifested in the regular rise and fall of skirt length, degree of flare, waist height, and depth of décolletage. On the slower cycle of fashion, the present often returns to the modes of about six decades, or two generations earlier, thereby skipping the parents' style to renew an interest in the style of the grandparents.

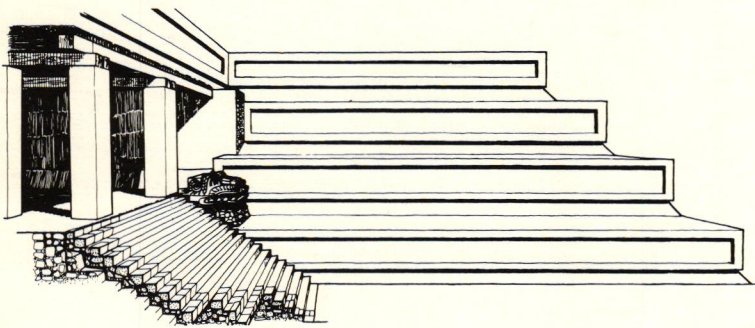
These terms and concepts all pertain to continuity and the reassertion of tradition, but there are few correspondences on the other side of the ledger, where discontinuity and rupture might be recorded. In an experimental accounting of such polar terms we might have, in descending order of magnitude:

<i>Types of Continuity</i>	<i>Means of Discontinuity</i>
Renaissance	disjunction
renascence	disjunction
renovatio	disjunction
revival	discard
fashion	discard

"Discard" needs little comment. But "disjunction" is a term brought into the history of art by Panofsky in 1944,³ following the lead of Adolf Goldschmidt and Paul Frankl.⁴ Goldschmidt had noted in 1937 the phenomenon of the separation of classical form from classical meaning in medieval art. Panofsky's "principle of disjunction" comes from his long examination of the modes of survival of classical antiquity during the Middle Ages. His analysis was iconographic, and it was only toward the end of his lifelong study that Panofsky adopted the idea of disjunction to explain the medieval re-use of classical forms and meanings. In the process of his investigation he came to believe that a principle of disjunction which governed these survivals existed in consistent and recognizable form.



2. Teotihuacán, Pyramid of the Moon.



3. Teotihuacán, Plaza of the Moon, with *tablero*, platform, and stairway approach to colonnaded entrance.

The axioms fundamental to this method, and first stated in 1939 by Focillon,⁵ are, first, that visible form often repeated may acquire different meanings with the passage of time and, second, that an enduring meaning may be conveyed by different visual forms. Panofsky extended this perception to the systematic study of medieval Christian iconography in 1937 with the formulation as follows, "wherever a [medieval] sculptor or painter borrows a figure or a group from classical poetry, mythology or history almost invariably presents it in a non-classical, viz., contemporary form." In 1960 Panofsky called this the "principle of disjunction,"⁷ and amplified it to cover not only the reclothing of classical meanings in medieval forms, but also the converse bestowal of medieval meanings on classical forms. In these terms Panofsky presented the entire fabric of classical art as disrupted during the Middle Ages, with classical forms torn from their meanings and reorganized as medieval art on the pattern of classical meanings expressed in medieval form and classical forms yielding medieval meanings.

Panofsky's works treat only of symbolic expressions in classic and medieval European literature and art. When wider ranges of useful objects and ordinary communications are considered, the question arises whether the disjunctive process of combining old forms and meanings with new meanings and forms does not vary along a gradient between choice and necessity. Indeed, useful objects and everyday expressions usually display a greater conjunction of form and meaning through time than do the more fragile expressions of religious symbolic systems. For instance, stability of form in utilitarian pottery is evident to all. Cooking ware changes more rapidly than carved and painted pottery made for ceremonial use. The most useful symbols also endure with little change. For instance, the letters of the alphabet, which are non-ritualistic symbols, continue essentially unchanged for long periods because they are in constant, universal use. Although the grand disjunctions described by Panofsky all concern religious beliefs and symbols rather than the iconography of everyday life, the principle can be carried over to ancient and medieval technologies, which also underwent change in form and meaning, if less rapidly than did the corresponding systems of religious iconography. Were we to read the succession of classical and medieval civilizations from cooking ware alone, the many differences between them would vanish into the continuity of ceramic technology.

The disruption between religious forms and their meanings yields an objective measure of the extent to which antiquity was replaced by the Christian and Islamic Middle Ages. This disjunction, which is a mode of renovation, may be said, in an even wider frame of reference, to happen whenever a civilization refashions its inheritance by discovering new meanings in the forms of the preceding civilization and by clothing in new forms those old meanings which remain acceptable. The successors then unconsciously obey a rule of least effort: without realizing it they salvage large parts of their inherited tradition and so avoid having to discard and then re-invent everything. The cumulative character of the succession of cultures in a given region can occur only with the selective discard which is implicit in disjunction. Panofsky's investigations of medieval and Renaissance materials demonstrated that the carry-over of a cultural tradition can be quantified by the extent of the disjunction between its form and meanings. The quantification may be coarse, but it is undeniably a measure of old and new matter.

When observing disjunction, not only do we pace out the boundaries between eras in occidental history, but we also face the difficult notion of discontinuity in a temporal fabric whose weave we know to be unbroken. Continuous form does not predicate continuous meaning, nor does continuity of form or of meaning necessarily imply continuity of culture. On the contrary, prolonged continuities of either form or meaning, on the order of a thousand years, may mask a cultural discontinuity deeper than that between classical antiquity and the Middle Ages. This is a particularly important caveat in considering civilizations for which literary sources are unavailable, as, for example, in the study of the older stages of the native civilizations of ancient America. The principle of disjunction, once accepted, brings into question every ethnological analogy by insisting on discontinuity rather than continuity wherever long durations are under discussion, but it also provides a serviceable explanation for many common mechanisms of cultural change.

The relation between renaissance and disjunction is of particular interest in considering the Mesoamerican archaeological record. Le

der in detail, then, both the architectural profiles of Teotihuacán and their continuation as resurgent forms in later periods, and also, through the interaction of form and meaning, the changing significance of the endurance of the jaguar in Mesoamerican iconography.

The iconography of architecture, both here and in Europe, has been the subject of an intense study for several decades. The methods of that study can also yield useful results when they are applied to the architecture of ancient Mesoamerica. It is now apparent that no building is without some conventional meaning which is conveyed by its spatial order as well as by its decorative themes. It is also apparent that such meanings can be recovered from the spatial designs of peoples who left no written records when their societies vanished long ago.

At Teotihuacán (illus. 1) the ancient architecture built from 300 B.C. to about A.D. 700 includes many forms which centuries later reappear at other places in Guatemala and Yucatán, signifying at least some continuity of meaning both in time and in space. The most distinctive and characteristic physiognomic trait of the architecture at Teotihuacán, known as the "talud-profile," was used to articulate huge pyramidal platforms which served as bases for shrines (illus. 2). It is often called by its Spanish name, even in English writing, as the "talud and tablero profile." *Talud* is "talus" in English, or, here, the receding slope at the base of the pyramid. The *tablero*, which means "apron" in English, is a panel rising vertically above the slanting talus. This panel, or tablero, is the facing on a horizontal ledge of slate which is cantilevered out over the top of the slanting talus. Seen frontally, then, the first level of construction in the pyramid is the talus, which slopes away from the viewer, and the second level is the tablero which overhangs the talus and rises vertically above it (illus. 3). There are large and small terraces, depending on the size of the pyramid and its context in space, but both the small and the large terraces follow the same format.

The projecting tablero protects the talus from weathering, and the pyramid as a whole assures a certain degree of stability by its cantilevered structure. Stonework projects from the face of the tablero around its perimeter to form a frame for the recessed panel (illus. 4). This frame rested on stone blocks destined sooner or later to collapse. Early stone frames such as the *talud* platform in the Citadel, are wider, deeper, and thicker than later frames and are made of massive masonry blocks. In contrast, the frames of the later centuries had thin, shallow frames.

The visual effect of this form of construction is remarkable. The massive, framed tablero overhanging a relatively small talus casts a deep shadow when the sun is high in the sky. This shadow causes the massive face of the tablero to seem to levitate off a supporting cushion of darkness (illus. 5). The effect is especially striking at midday when seen from the courtyard dwellings of the last periods.

The main difference between public, or religious, and private, or domestic, constructions of ancient Mesoamerican architecture was probably one of size. Large platforms were for public use, small ones for dwellings or household shrines. Within the household, a difference in proportion indicated the difference between the divinity and the people of the compound. The shrine rose upon its high slanting base—the entire pyramidal form—while the surrounding megaron-like chambers occupied lower levels over shadowed taluses.

Talud and talus are omnipresent at Teotihuacán. As the privileged form, chosen to distinguish the facades of temples and their platforms, it dominates all parts of the vast city. No other exterior profile competes. The tablero and its base, like the pediment in Mediterranean antiquity, may have connoted "sacred architecture." The domain of cult and the sacred would thus be marked off from secular building by the notched and cantilevered profile of the platform. The tablero may or may not bear decorative indications of the specific cult, but it is likely that its main purpose was to set sacred edifices apart from dwellings and other secular buildings. If this guess is correct, then the tablero and talus are significant forms in themselves, without additional information which might have been supplied by written record but which, if it had been offered, might be only corroborative. In this case, we may suppose that the architectural profile is in and of itself a major indicator of meaning, specifying both the function of the building and the ethnic identity of its builders.

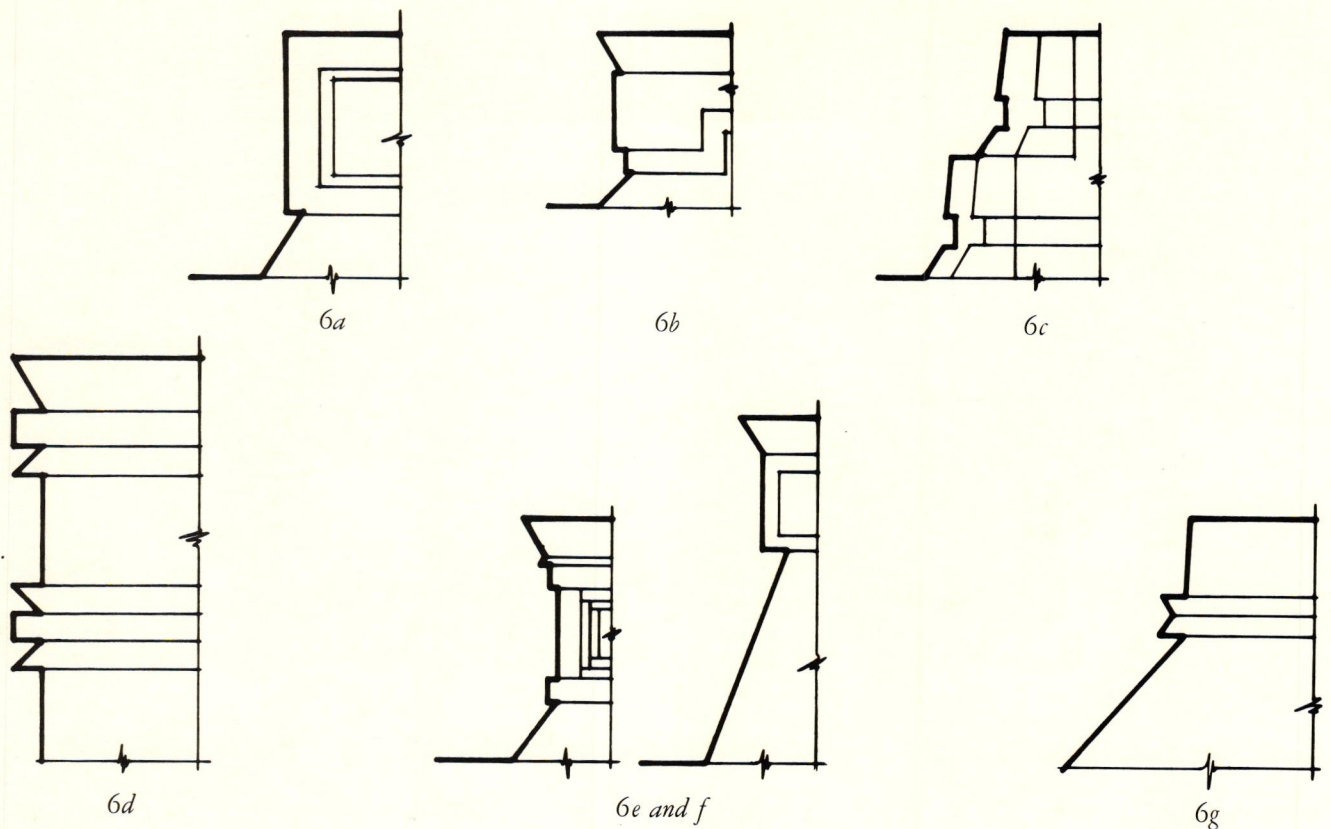
The mention of ethnic identity brings us to ask, how are the terrace profiles at Teotihuacán related to those of the rest of ancient Mesoamerica? Other varieties of profiles assembled by Marquina⁸ in 1951 differ



4. Teotihuacán, stepped platform of cantilevered panels on talus bases.



5. Teotihuacán, Citadel, Pyramid of Quetzalcoatl at Noon.



7. Monte Albán, stone model of temple.

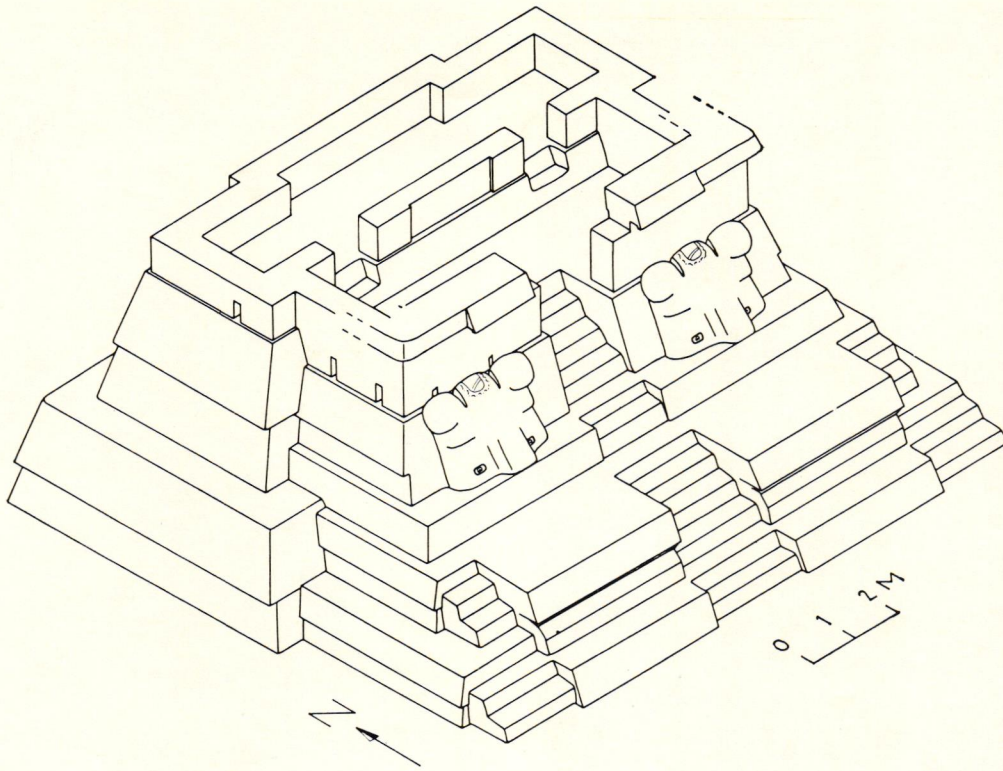
significantly from those of Teotihuacán (illus. 6a). Five more types are easily recognizable during the two-thousand-year era from Late Formative until the sixteenth century (illus. 6). They are:

- 6b) the dentated profile of Monte Albán
- 6c) the slanted and undercut profile of the southern Maya lowlands
- 6d) the so-called binder profile of the northern Maya province
- 6e and f) the outsloping profile of Tajín and Xochicalco
- 6g) the double-pitched profile of Aztec architecture.

Each profile marks out an architectural sphere of influence, and has a distinct duration. Certain profiles—especially the tablero and talus of Teotihuacán or the dentation of Monte Albán—reappear far away from their origins, both as colonial forms, as at Kaminaljuyú, and as revived or renescent forms, as at Tula and Chichén Itzá. Each probably has a distinct meaning in its characterization of different architectural traditions, different cult practices, and different ethnic identities.

The terrace moldings at Monte Albán are often treated as though they were merely another variety of the tablero and talus profile, but their design and construction differ radically from those of Teotihuacán. Here, the talus is not at the base of the platform, but rests upon a rectangular plinth (illus. 6b and 7). Above the talus hang several short bracket-like moldings which repeat in two or more parallel receding planes. Above these moldings may be a short outsloping cornice or another plinth. The effect of the bracket-like moldings is of planes and outlines alternating in high and deep shadow, giving to the base and the roofline the character of an intermittent or rhythmical system. These separate planes of relief are fringed by a fillet, or headband. The molding above the talus is not a table with a frame, and it encloses no panel. In large compositions its profile is slanting. No supporting ledges cantilever the projecting portions, which are generally corbelled out only enough to cast the desired shadows. The dentated profile of Monte Albán or Mitla was repeated with modifications many centuries later at Chichén Itzá in the profiles of the Toltec-Chacmool Temple as well as at the Castillo.

The southern Maya lowlands repertory of profiles is more difficult to define and interpret. A recognizable group from Uaxactún extends through to the end of the Initial Series period in the ninth century from a coherent system of design. In this group the exterior profile of a vaulted building echoes the profile of the platform terrace on which it is built (illus. 8). This profile, shared by platform and building alike, c



8. Tikal, diagram of early building and platform on the North Acropolis.

d "a slanted and undercut apron molding." An architect would call it a beveled bevel. The chamfer, or recessed molding, acts as a talus, and the long shadow it casts separates the terraces, while the bevel, which catches the light, emphasizes the weight of the terrace whose shape it defines. The chamfer sometimes occurs in the bevel itself.

Northern Maya builders separated the vaulted building from its platform by endowing it with a profile more characteristic of buildings than platforms (illus. 9). This profile resembles the binder with which a pitched roof is gathered or cinched together at the eaves and at the peak. Its imitation in stone of the construction with wattle and slender saplings is seen in Mayan houses. This "binder molding," as it is called, appears in the Puuc, and East Coast buildings. At the Caracol in Chichén Itzá the binder molding at impost level has five members, expressive of the structural requirements of this annulated vault system.

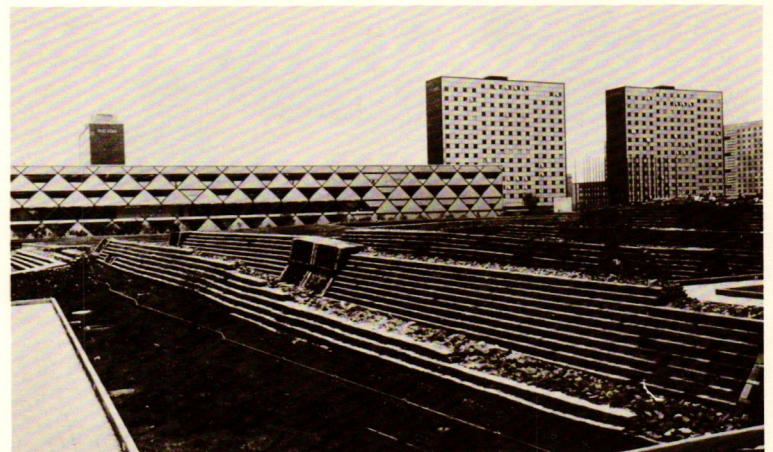
The outsloping profiles used at Tajín (illus. 6e) and Xochicalco (illus. 6f) may be regarded as a regional variety of the binder molding, rising upon the platform and sloping out above the construction. Here the binder is like a beveled strip, containing niches or geometric frets. Its early history is obscure; it is possible that the form may reflect contact with Maya peoples.

The last of the Mesoamerican terrace molding appears in post-classic Aztec architecture after 1300. Aztec influence throughout ancient Mesoamerica was total, and no region entirely resisted its terrible appeal. An architectural symbol was probably the stair-balustrade which is distinguished by having two slopes of different pitch (illus. 6g). It is a special variant of the binder molding; the effect resembles the constriction when a bag of earth is abruptly capped by a confining lid. To the observer, the suddenly increased pitch of the balustrades makes the stairs appear steeper. All its victims, whether ancient or modern, have been intimidated by such visual changes of angle in their ascent of the painfully low treads (illus. 10).

These six major Mesoamerican profiles correspond to geographic and ethnic groupings, as did the orders of classical antiquity codified by Vitruvius, the first-century architect of the Emperor Augustus. For Vitruvius, the Doric order was the earliest and was associated with the Peloponnesus in the reign of the Dorian kings of Achaëa. The Ionic order came later when the Athenians colonized Asia Minor. The Corinthian order was invented last by a sculptor wishing to imitate the growth of acanthus leaves in the ornamentation of the capitals. Each order had definite expressive properties: the Doric was manly; the Ionic, womanly; the Corinthian, lighter, more maidenly proportions. These expressive conventions have



9. Edzná, view of binder molding in veneer facing over concrete rubble core.



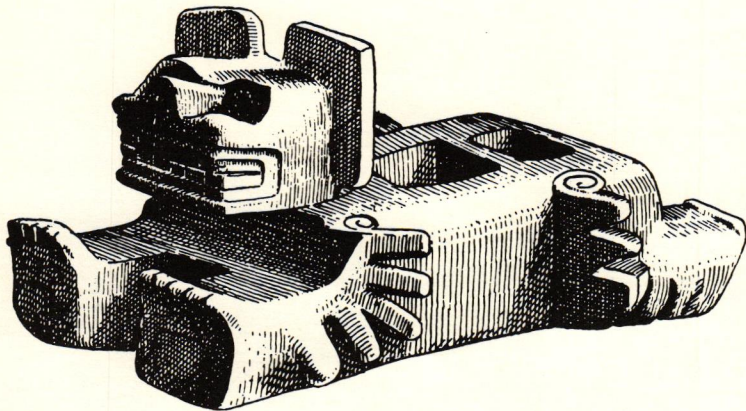
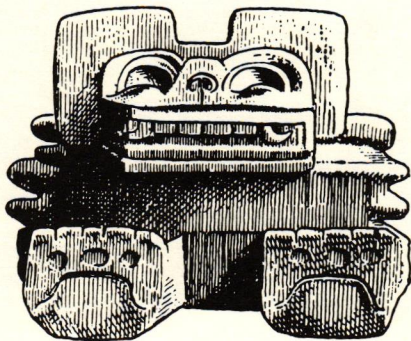
10. Tlatelolco, double-pitched stairway at pyramidal platform surrounded by new building.



11. Teotihuacán, pottery vessel with molded jaguar-serpent-bird icon.



13. Teotihuacán, mural of jaguar eating a winged figure in the wall.



12. Teotihuacán, onyx jaguar-serpent-bird icon. British Museum, London.



14. Teotihuacán, mural showing a jaguar lacking some claws.

isted to the present day in architectural theory. During the centuries of the Italian Renaissance, architectural fashions continued to recapitulate the earlier history of the orders. In the fifteenth century the Corinthian order was the one preferred by Italian sculptors; sixteenth-century Mannerist architects turned to Doric and the even cruder Tuscan severity; seventeenth-century Palladianism used Ionic details, and Baroque architects preferred the Corinthian. When the orders were depaganized in the Renaissance, Christ and the saints, both male and female, were assimilated to the Vitruvian system. Even the ages of man were equated with Vitruvian orders in schemes comparing the Tuscan column to old age, the Ionic, to the prime of manhood, and so on.

In the past quarter-century, the students of American antiquity have become increasingly partial to terms borrowed from Mediterranean archaeology. The Americanist's use of the word "classic," to designate events earlier than A.D. 900, is now part of a terminology having almost unquestioned acceptance. Other suggestions of the classic parallel are the following: the presence of a canon of proportions based upon numerical ratios; the prevalence of the use of local-tone coloring, without perspective shading, and no shadows; the strong anthropomorphism of most Mesoamerican art. These all reinforce the idea of the "classic" character of American antiquity before A.D. 1000. The existence of an expressive system, shown in the face profiles we have examined, again confirms the parallels with pre-Roman antiquity that have long been apparent. Such a system of expressive architectural forms, as we have seen, is also necessary to the existence of a classical tradition perpetuated by repeated renewals or discoveries. Mesoamerica shares this pattern with the Mediterranean world. Indeed this study itself forms a minute part of the ongoing renaissance of American antiquity in the twentieth century.

But tradition is more than self-renewal: it also contains pauses and gaps and many disappearing structures. As an example of the self-renewing character of disjunction, let us turn to the jaguar theme in Mesoamerican art. During the Classic Age, from A.D. 100 to 700 in the Valley of Mexico, a dominant pattern of ritual and ceremony centered upon the jaguar-serpent-bird icon. This cult was known first at Teotihuacán (illus. 11) and it reappeared much later at Tula and Chichén Itzá. Jaguar-serpent-bird images appear at Teotihuacán as quadrupeds and bipeds, as netted busts, as priestly headdresses, as ritual instruments, and as ritual icons. Uncompounded jaguar images are non-existent. Every four-footed image of the jaguar is in one way or another compounded with other jaguar parts drawn from other life forms. The eyes are usually round and rimmed by feathers; the broken-circle spots on the pelt are treated as shells or seashells; the tongue is a bifid serpent's tongue, and the entire body is often covered with a design resembling a fishnet. For example, the most easily recognizable jaguar from Teotihuacán is the thirteen-inch-long x (tecali) figure in the British Museum shown lying belly-down with its legs extended (illus. 12). On each front paw is a glyph-like cipher which resembles the serpent's mouth and is associated with rain. The eyes are the head eyes of a bird, and the legs are shown fringed with serrated forms like the paw-wing of avian derivation in Olmec art before the fifth century B. C.

Similar instances of compounded jaguar forms abound in the murals. The mural of the mythological animals at Teotihuacán (assigned by Clara

Millon to an early Stage Two in the history of wall painting at the site)⁹ various four-footed jaguars appear among the waves. One has a winged figure halfway down its throat (illus. 13). One square-jawed feline, swimming with an overhand stroke and spitting vigorously, wears a floral pelt like that of the Tetitla cat. Another lacks some claws, having perhaps been flayed (illus. 14). These early jaguars all have round bird's eyes.

By far the largest class of jaguar images consists of human beings wearing jaguar costumes. Sometimes the costume is an entire pelt, with head and claws and tail, but more often it is only a jaguar headdress. Whether in full garment or headdress alone, the jaguar traits are always compounded with others drawn from bird and serpent images.

The kneeling jaguar-man from the wall paintings at Tetitla (illus. 15) wears an overall netted costume with the meshes extending to the muzzle and ears of the jaguar suit. The wearer's human identity is revealed by the shield and staff he holds in his hands. He kneels upon a pathway leading to a temple decorated with floral spots like those of a pregnant she-jaguar. These spots surround the doorway and fill the crenellations below a band of netting similar to the netting worn by the jaguar-man. They probably signify the dedication of the temple to a spirit or force represented by these markings. Elsewhere the netted figure is associated only with the jaguar-serpent-bird figure in murals and pottery decoration.

If we suppose that frontal figures are more likely to represent objects of worship than were the profile figures serving or accompanying the frontal figure, it is plausible to maintain that large and isolated frontal figures are cult objects or icons.

Cylindrical vessels on tripods, of Teotihuacán III date, show crouching jaguar-serpent-birds in frontal aspect, both alone and attended by priests (illus. 16). In one liturgical scene, the intended representation of the priest's headdress is unknown, but the icon he approaches is the familiar figure with bird's eye, serpent's tongue, and jaguar's mouth in double profile. This figure appears frontally with a large pecten shell on its chest and serpent scales on its limbs. In the background are conch shells, feathered eyes, and flames. The offering borne by the priest resembles a bird with beak and round eye, reminding us of the mural of the mythological animals at Teotihuacán where a jaguar is seen swallowing a bird (illus. 13), suggesting that birds were offerings welcome to the jaguar-serpent-bird.

This scheme reappears without the offerings in a number of molded pottery fragments. The feathered bird's eyes surmount a jaguar's mouth, and the bifid serpent's tongue hangs between the legs and claws of the crouching jaguar. This theme appears again in abbreviated form at Tula and at Chichén Itzá, and we shall examine these forms later.

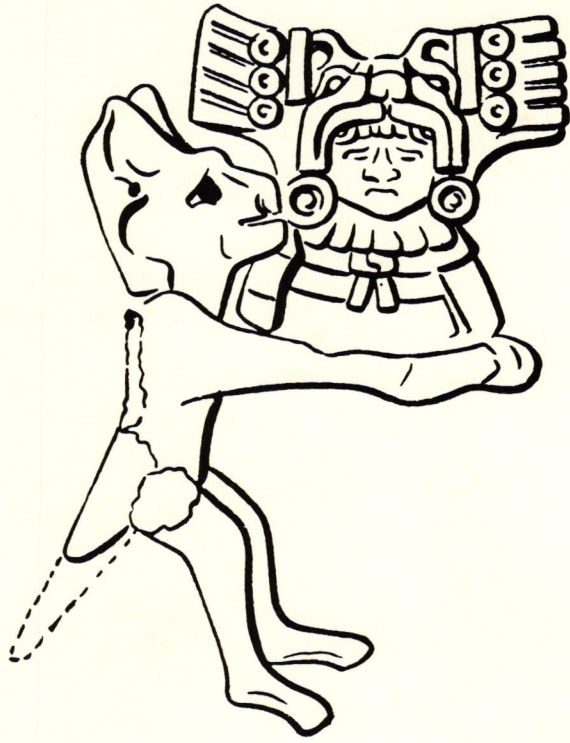
A human form, shown only to the waist, is frequently represented in murals, pottery designs, and clay figurines as a pyramidal bust, crowned by the jaguar-serpent-bird helmet. In a mural found at Zacuala, this figure carries a shield on his left arm and, in his right hand, a feathered jaguar-mask held like a vessel or censer. The helmet is in the iconic form of a jaguar's mouth seen in double-profile, and it has feathered bird's eyes and netted panels. The censer-like mask repeats these forms in single profile and is surmounted by a netted jaguar's paw and a bifid serpent's tongue. Among the feathers on the mask are drops of water and cusped lines like those of the waves in the fresco of the mythological animals at Teotihuacán



Teotihuacán, Tetitla compound, drawing of a mural of the jaguar-man.



16. Teotihuacán, vessel fragment showing a ritual of bird sacrifice before jaguar-serpent-bird icon.



17. Teotihuacán, pottery figurine, jaguar-man holding helmeted bust. Diego Rivera Museum, Mexico City.

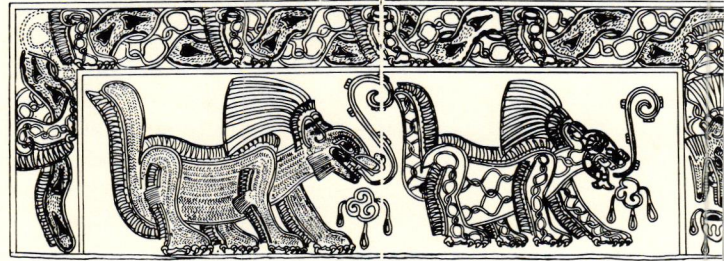
(illus. 13). A helmeted bust,¹⁰ is also of this type, but the eyes behind the goggles are closed, suggesting death, and the plumage seems to be that of a butterfly, often associated with burials.

The significance of the helmeted-bust form is suggested by a double figurine of baked clay in the Diego Rivera Museum in Mexico City (illus. 17). A standing human with the head of a jaguar carries just such a helmeted bust in his outstretched arms. The helmet is of the Oaxacan type, with the parted upper lip of a jaguar. The scenic and narrative context of the jaguar-headed man holding the helmeted bust allows a provisional interpretation of the figure as a heraldic bearer. The helmeted bust may have been intended as the portrait likeness of a dynastic personage, whose clan or family membership it signified.

Cats and dogs do not usually go about together, but at Atetelco jaguars and coyotes appear in peaceful procession on a panel inside a border where a coyote's body is intertwined with netted jaguars, suggesting the interchangeable and complementary character of the two forms (illus. 18). The netted jaguars have feathered bird's eyes and bifid serpent's tongues. Under the mouths of both creatures appear trilobed water-signs like those common in Oaxaca. On the right-hand border, the water-sign is augmented by an eye signifying the brightness of running water. The water theme reappears in the upper border, where goggled rain-faces appear among the twining parts of the bodies of netted jaguars and coyotes. The scene invites speculation upon the union of cat and dog and the relation of this union to water, running water, and rain water.

Although neither jaguar nor coyote was unknown in the Valley of Mexico, the coyote was more common in the dry northern plateaus and the jaguar in the humid lowlands of Veracruz and Tabasco. It is possible that their encounter at Teotihuacán may have signified some resolution of opposites in the cult of Teotihuacán, such as, for example, the unifying of unlike peoples in a common ritual.

The association of intertwining coyote and jaguar is both complementary and reciprocating; each seems to supply what the other lacks, and their apparent affection for one another is mutual. It is also a unique association, for the jaguar-serpent-bird is found with no other land animal at Teotihuacán except man, as in the jaguar holding a human bust (illus. 17). Furthermore, there is no example at Teotihuacán—in any medium—of the association between jaguar and eagle that became common at Tula and of central importance in the warrior cult of Aztec religion at Tenochtitlán. These various instances of the association of jaguar and eagle in Aztec iconography all have in common the idea of darkness as expressed by night, caves, eclipse, and any other disappearance of the sun. No such expression



18. Teotihuacán, Atetelco mural of coyotes and jaguars in procession.

of darkness is manifest in the repertory of representations of the jaguar at Teotihuacán. Furthermore, warriors at Teotihuacán identified themselves with a weapon-bearing owl rather than with a jaguar. The compound properties suggested by jaguar, serpent, and bird elements, as emblems of earth, water, and air, respectively, points to transcendent powers of metaphysical nature rather than to a cult of war.

For these reasons, it is doubtful that either the eagle or the jaguar images at Teotihuacán carried the meaning assigned to them by the Aztecs.¹¹ By the same token, doubts arise about the validity of interpretation of the religious significance of jaguars throughout the Teotihuacán empire which are colored by the beliefs of the Aztecs centuries later when a disjunction, occurring between new and old mythologies, had altered the jaguar's form and thereby his meaning.

Let us now contrast the felines of seventh-century Teotihuacán with those of the thirteenth-century Toltec and fifteenth-century Aztec peoples. Both these later peoples brought about a new era of political expansion using old symbolic forms for the worship of the new gods brought into the Valley of Mexico by wandering tribes from the North who came as hunters and nomads after the collapse of the polity and the faith at Teotihuacán.

When the new post-Classic peoples began to use the jaguar-serpent-bird form, it was already two thousand years older than they, and its changed meaning from a miscegenated Olmec were-jaguar before 400 B.C. to a transcendent spirit compounded of various animal powers. The folk in due time used the variants as they saw fit and transformed the jaguar and the eagle into a symbol of warfare conveyed by the complementary images of these creatures. The earlier compounds of the jaguar-serpent-bird converted by the process of disjunction to other purposes. For example the old jaguar-serpent-bird acquired a new Toltec meaning as a symbol of the underworld by being placed in a new context at Chichén Itzá and at Tula (illus. 19a and b).

At Chichén Itzá the jaguar-serpent-bird appears on the bases of columns (illus. 19a), as Tozzer has noted, "almost 500 times in connection with the top figure of the sun disk, the atlantean bacab, or a masked serpent." Tozzer believed that the jaguar-serpent-bird referred to the underworld when conjoined with the sun disk or with a sky-bearer. At Tula the jaguar-serpent-bird figure (illus. 19b) is shown between pairs of eagles and vultures, and on column bases in what was thought of as the underworld position beneath the feet of a warrior or priest.

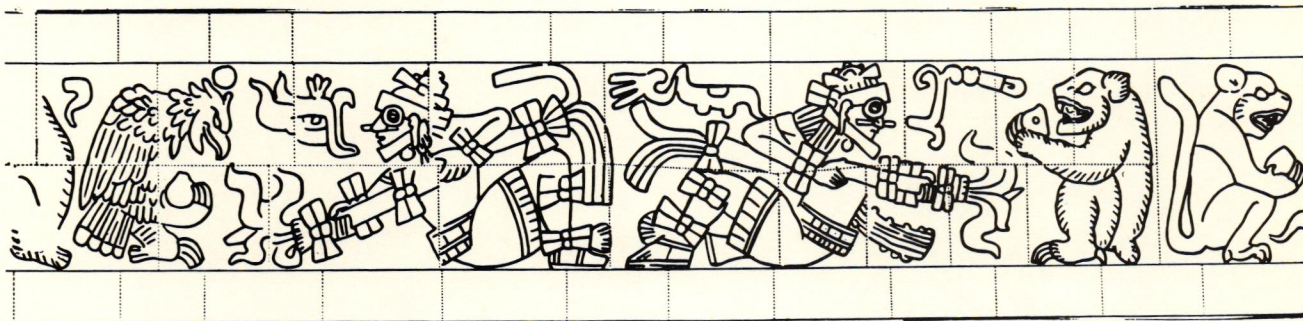
At the same time, however, jaguars and eagles devouring human figures became the emblems of the new warrior societies at Chichén Itzá (illus. 19c) and at Tula with the result that jaguars acquired new meanings in



19a. Chichén Itzá, pier base of jaguar-serpent-bird man.



19b. Tula, pier base of a jaguar-serpent-bird icon.



20. Chichén Itzá, tablero relief of warrior, eagles, and jaguars.

, as underworld figures when represented as jaguar-serpent-birds, and emblems for warriors when shown as seated or walking animals. Neither these meanings is evident from jaguar contexts in the usage of Teotihuacán, nor in the usage of pre-Classic Olmec or Oaxacan peoples. It is certain, on the evidence of their representations, that jaguars meant different things before and after the end of Teotihuacán.

With the emergence of the Aztecs, the symbol of the jaguar-serpent-woman and vanished, perhaps because it was replaced by the eagle-jaguar warrior cult and because the cult of Tezcatlipoca as a jaguar was inherited from the cult of Quetzalcoatl as a feathered serpent. This disjunction probably had the effect, among other things, of factoring out jaguars for separate treatment.

It seems clear, then, that these newer meanings for jaguar and eagle are no older than the Toltec era, which had begun in the Mexican highlands at Tula, after the fall of Teotihuacán in about A.D. 700. The people of Teotihuacán never connected jaguar and eagle in the fashion of their successors. Their respects to the jaguar were addressed to the jaguar-serpent-bird, first in an iconic, later in a dynastic aspect, whose representation ceased after the fall of Tula and before the rise of Tenochtitlán.

A still unrealized humanistic task for archaeologists everywhere is to distinguish among fundamental historic forms in the products of excavation. Such historic forms are the resurgent and disjunctive classes of objects we have been considering. The resurgent expressions are repetitions of a tradition made in order to assure its perpetuation. The disjunctive expressions, on the contrary, infuse old forms with new meanings, and replace the old meanings in new forms. Artists and artisans at all times face this choice about the forms of the past: either the past is viable, deserving to be renewed, or it is irrelevant and condemned to discard, at least for a time. In the choice imposes a separation or disjunction between form and meaning. One is renewed, and the other is replaced.

For the archaeologist to distinguish resurgent from disjunctive classes among his artifacts may require the training of a humanist. Since the appearance of Panofsky's book in 1960 it has become much clearer that archaeology, in order to discover meaning, needs once again to embrace humanistic learning.

The relation between Americanist studies and art-historical scholarship is a two-way circuit. Art-historical studies can assist the Americanists in their efforts to discover an archaeological history. In the other direction, conclusions drawn from American antiquity can perhaps lead to a reevaluation of ideas about the history of art: as by confirming the generality of disjunction and disjunction as processes of making and undoing tradition.

NOTES

1. Erwin Panofsky, *Renaissance and Renascences in Western Art* (Stockholm: Almqvist and Wicksell, 1960).
2. Jane Richardson and Alfred L. Kroeber, "Three Centuries of Women's Dress Fashions: A Quantitative Analysis," *Anthropological Records* 5 (1940).
3. Erwin Panofsky, "Renaissance and Renascences," *Kenyon Review* 6 (1944): 201-36.
4. See Adolf Goldschmidt, "Die Bedeutung der Formenspaltung in der Kunstentwicklung," *Independence, Convergence, and Borrowing in Institutions, Thought and Art* (Cambridge: Harvard University Press, 1937); and Paul Frankl, "The Crazy Vaults of Lincoln Cathedral," *Art Bulletin* 35 (1953): 105.
5. Henri Focillon, *La Vie des formes* (Paris: Alcan, 1939).
6. Panofsky, "Renaissance and Renascences," p. 220.
7. Panofsky, *Renaissance and Renascences*, p. 8.
8. Ignacio Marquina, *Arquitectura prehispánica* (Mexico: Instituto Nacional de Antropología e Historia, 1951).
9. Clara Hall Millon, "A Chronological Study of the Mural Art of Teotihuacán" (Ph.D. diss., University of California, Berkeley, 1962).
10. For illustration, see Miguel Covarrubias, *Indian Art of Mexico and Central America* (New York: Alfred A. Knopf, 1957), p. 129.
11. These latter-day beliefs of the Aztecs were summarized on textual and archaeological evidence by Eduard Seler in "Die Teotihuacan-Kultur des Hochlands von Mexico," *Gesammelte Abhandlungen* 5 (1915): 484-506.
12. Alfred M. Tozzer, "Chichén Itzá and its Cenote of Sacrifice," *Memoirs of the Peabody Museum* 11 (1957): 123-26.

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