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ARCHITECTURE

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REVISED EDITION
AS SPACE
HOW TO LOOK AT ARCHITECTURE
EDITED BY JOSEPH A. BARRY
HORIZON PRESS NEW YORK
TO ALL MY FRIENDS
IN THE MOVEMENT FOR
ORGANIC ARCHITECTURE
ONE DAY, sometime in the 1430's, Johann Gutenberg of Mainz conceived the idea of engraving the letters of the alphabet on little pieces of wood and of putting them together to form words, lines, phrases, pages. He invented printing and so opened up to the masses the world of poetry and literature, until then the property and instrument of a restricted class of intellectuals.

In 1839, Daguerre applied his knowledge of photo-chemistry to the problem of reproducing images of an object. He invented photography and marked the passage from the aristocratic to the collective plane of a vast amount of visual experience hitherto available only to the few who could afford to employ an artist to paint their portraits or who could travel to study works of painting and sculpture.

In 1877, Edison invented a cylindrical apparatus and succeeded for the first time in recording sound on a sheet of tin-foil. Forty-three years later, in 1920, the first radio broadcast took place. The art of music, previously at the exclusive command of limited groups of connoisseurs, was by means of the phonograph and the radio made accessible to the great public.

Thus, a continuous scientific and technological progress made possible the large-scale diffusion of poetry and literature, painting, sculpture and music, enriching the spiritual heritage of an ever increasing number of people. Just as the reproduction of sound has by now almost reached perfection, so the progress of color photography indicates that the next few years will show a distinct elevation of general education in chromatic values, a phase of visual experience in which the average level of understanding is still much lower than it is with regard to drawing and composition.

Architecture, however, remains isolated and alone. The problem of how to represent space, far from being solved, has not as yet been
even stated. Since up to now there has been no clear conception or
definition of the nature and consistency of architectural space, the need
for its representation and mass diffusion has consequently not been felt.
This is one more reason for the inadequacy of architectural education.

As we have seen, the methods of representing buildings most fre­
quently employed in histories of art and architecture consist of (1) plans,
(2) façades and elevations and (3) photographs. We have already
stated that neither singly nor together can these means ever provide a
complete representation of architectural space. But, in the absence of
thoroughly satisfactory methods, it becomes our concern to study the
techniques we have at hand and to make them more effective than
ever. Let us discuss them in detail and at length:
1) Plans. We have said that a plan is an abstraction entirely removed
from any real experience of a building. Nevertheless, a plan is still the
sole way we have of evaluating the architectural organism as a whole.
And every architect knows that the plan, however insufficient in itself,
has a distinct primacy in determining the artistic worth of a building.
Le Corbusier, speaking of the "plan générateur," does nothing to
advance the understanding of architecture; quite the contrary, he is
engendering in his followers a sort of mystique of the "esthetic of the
plan," scarcely less formalistic than that of the Beaux Arts. However,
his concept is based on fact. The plan is still among the basic tools in
the representation of architecture. The question is how to go about
improving it.

Let us take, for example, Michelangelo's planimetric design for
St. Peter's in Rome. Many books reprint Bonanni's plan (fig. 1), partly
because of a snobbish vogue for old prints and drawings (a vogue which
plays no small part, particularly in the history of city planning, in
increasing the general confusion) and partly because the authors of the
books do not bother to investigate the problems involved in the repres­
entation of architecture. Yet no one after some thought can say that
Bonanni's plan is the most satisfactory representation of Michelangelo's
spatial conception for the young man who is beginning his study of
architecture or for the general reader who is naturally asking the critic
and historian to help him understand architectural values.
To begin with, this plan shows an abundance of details, a minute marking of every pilaster and every curve, all of which may be useful in a later stage of the critical commentary (when it becomes our concern to ascertain whether the spatial theme is given a consistent elaboration in the decoration and plastic treatment of the walls), but which
is confusing, at this point, when all our efforts should be directed toward illustrating the spatial basis of the architectural work.

A professor of Italian literature does not give his students a complete, unannotated text of the *Divine Comedy*, saying, "Here is the masterpiece—read and admire it." There is first a long phase of preparatory work—we learn about Dante's subject matter from the summaries in our school texts on literature—we accustom ourselves to the language of the period and poet through selections in anthologies. Literary pedagogues devote a considerable part of their labors to simplifying the material, whereas the analogous problem is for the most part ignored by pedagogues writing on architecture for the general public. To be sure, it is unnecessary to summarize a sonnet from the *Vita Nuova*, or any brief poetic fragment; similarly, a small villa or country house can readily be understood without a simplified plan. Michelangelo’s St. Peter’s, however, is a work no less complex than the *Divine Comedy*, and it is difficult to understand why it should take three years of study to analyze and enjoy Dante’s epic, when St. Peter’s is disposed of in a hasty reference in the course of a lesson on High Renaissance architecture. The gross lack of proportion between the time spent on literature and the time devoted to the explanation of architecture has no justification in criticism (it takes longer to understand Borromini’s S. Ivo alla Sapienza than Victor Hugo’s *Les Misérables*) and has ultimately resulted in our general lack of spatial education.

Before the performance of a tragedy, the Greeks listened to its plot summarized in a prologue and so could follow the dénouement of the play without that element of curiosity which is alien to contemplative serenity and esthetic judgment. Moreover, possessing the theme and substance of the play, they were better able to admire its artistic realization, the value of every detail and modification. In architectural education some method of graphic summary is undeniably necessary, even if limited to the technique of representation offered by the plan. The whole, after all, precedes its dissection, structure comes before finishing touches, space before decoration. To aid the layman in understanding a plan by Michelangelo, the process of criticism must follow the same direction as Michelangelo’s own creative process. Figure 2 shows a
summarized version of the plan in figure 1 according to one interpretation (any summary implies an interpretation). Although a hundred better versions might be drawn, what matters is that every historian of architecture should consider it his duty to work out this norm of instructive simplification.

We now come to a far more significant matter. The walls, shown in black on the plan, separate the exterior or urbanistic space from the interior or properly architectural space. Every building, in fact, breaks the continuity of space, sharply divides it in such a way that a man on the inside of the box formed by the walls cannot see what is outside, and vice versa. Therefore, every building limits the freedom of the observer’s view of space. However, the essence of architecture and thus the element which should be underlined in presenting the plan of a building, does not lie in the material limitation placed on spatial freedom, but in the way space is organized into meaningful form through this process of limitation. Figure 2, no less than figure 1, emphasized the structural mass, that is, the limits themselves, the obstructions which determine the perimeter of possible vision, rather than the “void” in which this vision is given play and in which the essential value of Michelangelo’s creation is expressed. Since black attracts the eye more readily than white, these two planimetric representations (figures 2 and 3) may appear at first sight to be just the opposite, the photographic negative, so to speak, of an adequate representation of space.

Actually, this is a mistake. If we look at figure 3, we shall see that it is no improvement on figure 2; it is still the walls, the limits, the frame of the picture, not the picture itself, which are brought out. Why? For the simple reason that interior and exterior space are not distinguished from each other in the representation and no account is taken of the absolute and irreconcilable contradiction which exists between the two kinds of space. Being in a position to see the one means being unable to see the other.

By now the reader will have understood where we want to go. In figures 4 and 5 he will find two planimetric representations of Michelangelo’s conception. Figure 4 gives the interior space at the spectator’s level; it presents the space in terms of a man walking around inside the
building. Figure 5, on the other hand, shows the exterior space, which is defined by the outer walls of the basilica, and which, of course, means nothing in itself, since urbanistic space is not shaped around a single building, but is realized in the voids bounded by all elements, natural and constructed—trees, walls, and so forth—that surround them.

Figure 4, particularly in comparison with the characterlessness of figure 1, may strike us as interesting, but gives rise to the objection that in representing the entire void as one uniform black spot, it fails to give any idea of the hierarchy of heights within the space. Apart from the fact that it errs in including, though sketched in lightly, the space of the portico, which cannot be experienced simultaneously with that of the church, it does not separate the space determined by the central cupola, which is very high, from the spaces defined by the four small cupolas at the corners, and these, in turn, from the aisles and niches. Figure 4 would be acceptable if the basilica were all of uniform height, but since there are very marked differences in the heights of various parts of the church, and these are of decisive importance in the determination of spatial values, it follows that even in a plan some attempt

Figs. 2 and 3. Simplified version of the plan in fig. 1 and negative.
must be made to project the forms produced by these differences in height. Some books give figure 6, in which the fundamental structures articulating the organism of the church are shown schematically. This projection represents a step in the right direction with respect to figure 1, in spite of the fact that it retains all the defects we have pointed out as contained in figures 2 and 3.

It may also reasonably be objected that stating an antithesis between interior and exterior space, as illustrated in figures 4 and 5, is somewhat arbitrary and polemic. Michelangelo did not first conceive the inside of the basilica, then the outside, separately. He created the whole organism simultaneously and if it is true that seeing the interior space of a building automatically means not seeing its exterior, it is also true that this gap is to a certain extent closed by the "fourth dimension" of time employed in seeing the edifice from successive points of view; the observer does not always remain on the inside or outside of a building, but walks from one to the other. In a building erected during different periods or by different architects, where one has created the interior and another the façades, the distinction and antithesis estab-
lished in figures 4 and 5 may be legitimate. But works of unitary conception are marked by a coherence, interdependence and, it might almost be said, an identity between interior space and volume; this latter, in turn, is a factor in urbanistic space. The two originate in one inspiration, one theme, one work of art.

With this we come to the heart of the problem of space and its planimetric representation. One author may consider that the most important element to be underlined is the cross-shape of St. Peter's

Figs. 6 and 7. The plan of fig. 1 as a projection of the fundamental structure and as a spatial interpretation.

and will draw a plan like figure 7. Another might see fit to underscore the architectural predominance of the central cupola and the square formed by the aisles, as in the interpretation of figure 8. A third might give greater importance to the four cupolas and the vaults, and will produce a plan such as in figure 9. Each of these interpretations expresses a real element in the space created by Michelangelo, but each is incomplete in itself. However, if our investigation of the problem of representing space is broadened along these lines, there is no doubt that although we may never succeed in discovering a method of fully rendering a conception of space in a plan, we shall nevertheless achieve
better results in teaching and learning how to understand space and how to look at architecture by analyzing and discussing the means we have than if we merely neglect the problems they offer and limit ourselves to reproducing figure 1.

2) Façades. The line of reasoning followed in our discussion of plans can be repeated in a simpler way when we deal with elevations. Here

Figs. 8 and 9. Two more spatial interpretations of Michelangelo's plan for St. Peter's.

the basic problem is to represent an object which has two, or at most three, dimensions. Skimming through books on architecture, you will find the graphic linear method very commonly used, as for example in Letarouilly's drawing of the façade of Palazzo Farnese (fig. 10) or in the sketched elevation of Frank Lloyd Wright's Falling Water (fig. 11). It would be difficult to conceive a representational method less thought-ful or less fruitful.

The problem of representing the façade of Palazzo Farnese involves
only two dimensions, as we are dealing with a wall surface. Therefore our only concern is how to render the voids and the different textures of the materials employed (plaster, stone, glass) and the degree to which they reflect light. In figure 10 the problem is completely ignored. No distinction is made in representing the various materials. A smooth wall, the space surrounding the building, and the window openings are all shown as if they were alike. Although in present-day discussions of architecture much emphasis is placed on the counterplay between solids and voids, this kind of drawing is still pointed to as a model of clarity. We have rejected the 19th-century pictorial and scenic sketch of a building in the name of greater precision, but on the other hand we have lapsed into an abstract graphic style which is decidedly anti-architectural. In fact, as we are dealing here with a problem clearly sculptural in nature, a representation of this sort is equivalent to rendering a statue by drawing nothing but its outline on paper.

Figure 11 shows a building in which the structure, rather than being confined to a simple stereometric form, is developed with extraordinary organic richness in projections and returns, in planes suspended and intersecting in space. Here we see that the method of
representation in figure 11 is hopelessly inadequate to the subject. No layman, not even an architect, highly skilled in visualizing an architectural conception on the basis of its drawings, could ever gather from this design what Falling Water really looks like.

Reproducing the drawing of a façade in its photographic negative is of no more use than it was for us in the case of a plan. Figure 12, the negative of figure 10, has the same shortcomings as its positive. The solution must be something on the order of figure 13, in which the material entity of the building is detached from the surrounding sky, the relatively transparent voids of the windows are distinguished from the opaque wall surfaces, and the various materials are distinguished from each other.

Nothing can be done, however, greatly to improve figure 11. It would be absurd to try to clarify the representation of Frank Lloyd Wright's volumetric play by adding light and shade. Figure 14, in which this has been done, is little more effective than figure 13. It is clear that this technique of representation is entirely incapable of rendering a complex architectural organism, whether it be the Cathedral of Durham, a church of Neumann or a building of Wright. The

Fig. 11 F. Ll. Wright: Elevation of Falling Water, Bear Run, Penna. (1936).
method of representation must be substantially different. In each of these cases, the box formed by the walls cannot be divided into simple planes or walls independent of each other, because it is a projection of the internal space; the construction is conceived primarily in terms of volumetrics. We are dealing with plastic volumetric conceptions which can be represented only by models. The evolution of modern sculpture, of Constructivist, Neo-Plastic and to some extent Futurist experiments, and of research in the simultaneity, juxtaposition and interpenetration of volumes, all provide us with the instruments necessary for this type of representation.

On the other hand, we cannot say that models are completely satisfactory. They are very useful and ought to be used extensively in teaching architecture. However they are inadequate, because they neglect an element crucial to any spatial conception: the human parameter—interior and exterior human scale.

For models to be perfect, we should have to suppose that the value of an architectural composition depended entirely on the relations existing between its various components, without reference to the spectator; that, for example, if a palace is beautiful, its elements can be repro-

Fig. 12. Negative of fig. 10.
duced exactly in their original proportions, reduced, however, to the scale of a piece of furniture, a beautiful piece of furniture, at that.

This is patently mistaken. The character of any architectural work is determined both in its internal space and in its external volume by the fundamental factor of scale, the relation between the dimensions of a building and the dimensions of man. Every building is qualified by its scale. Therefore, not only are three-dimensional models inadequate in representing a building, but any imitation, any transference, of its

decorative and compositional schemes to organically different structures (we have all of 19th-century eclecticism to prove it) turns out to be poor and empty, a sorry parody of the original.

3) Photographs. As photography to a large extent solves the problem of representing on a flat surface the two dimensions of painting and the three dimensions of sculpture, so it faithfully reproduces the great number of two- and three-dimensional elements in architecture, everything, that is, but internal space. The views, for example, in plate 2 give us an effective idea of the wall surface of Palazzo Farnese and the volumetric values of Falling Water.

But if, as we hope to have made clear by now, the characteristic

Fig. 13. An interpretation of fig. 10.
value of an architectural work consists in our experiencing its internal space from successive points of view, it is evident that no number of photographs can ever constitute a complete pictorial rendition of a building, for the same reason that no number of drawings could do so. A photograph records a building *statically*, as seen from a single standpoint, and excludes the dynamic, almost musical, succession of points of view movingly experienced by the observer as he walks in and around a building. Each photograph is like a single phrase taken out of the context of a symphony or of a poem, a single frozen gesture of an intricate ballet, where the essential value must be sought in the movement and totality of the work. Whatever the number of still photographs, there is no sense of dynamic motion. (See plates 3 and 4.)

Photographs, of course, have a great advantage over three-dimensional models of conveying some idea of scale, particularly when a human figure is included, but suffer from the disadvantage, even in the case of aerial views, of being unable to give a complete picture of a building.

The researches of Edison and the Lumière brothers in the 1890’s led to the invention of a camera geared to carry film forward continu
ously, so that a series of exposures could be taken in rapid succession, making it possible for photography to render an illusion of motion. This discovery of the motion picture was of enormous importance in the representation of architectonic space, because properly applied it resolves, in a practical way, almost all the problems posed by the fourth dimension. If you go through a building photographing it with a motion picture camera and then project your film, you will be able to recap­ture, to a large extent, the spatial experience of walking through the building. Motion pictures are consequently taking their proper place in education and it seems likely that in teaching the history of architecture, the use of films, rather than of books, will greatly advance general spatial education.

Plans, façades, cross-sections, models, photographs and films—these are our means of representing space. Once we have grasped the basic nature of architecture, each of these methods may be explored, deepened and improved. Each has its own contribution; the shortcomings of one may be compensated for by the others.

If the Cubists had been correct in believing that architecture could be defined in terms of four dimensions, our means would be sufficient for a fairly complete representation of space. But architecture, as we have concluded, has more than just four dimensions. A film can represent one or two or three possible paths the observer may take through the space of a building, but space in actuality is grasped through an infinite number of paths. Moreover, it is one thing to be seated in a comfortable seat at the theater and watch actors performing; it is quite another to act for oneself on the stage of life. It is the same difference that exists between dancing and watching people dance, taking part in sport and merely being a spectator, between making love and reading love stories. There is a physical and dynamic element in grasping and evoking the fourth dimension through one's own movement through space. Not even motion pictures, so complete in other respects, possess that main spring of complete and voluntary participation, that consciousness of free movement, which we feel in the direct experience of space. Whenever a complete experience of space is to be realized, we must be included, we must feel ourselves part and measure of the archi-
tectural organism, be it an Early Christian basilica, Brunelleschi's Santo Spirito, a colonnade by Bernini or the storied stones of a medieval street. We must ourselves experience the sensation of standing among the pilotes of a Le Corbusier house, of following one of the several axes of the polyform Piazza del Quirinale, of being suspended in air on a terrace designed by Wright or of responding to the thousand visual echoes in a Borromini church.

All the techniques of representation and all the paths to architecture which do not include direct experience are pedagogically useful, of practical necessity and intellectually fruitful; but their function is no more than allusive and preparatory to that moment in which we, with everything in us that is physical and spiritual and, above all, human, enter and experience the spaces we have been studying. That is the moment of architecture.

Plate 3. Interplay of volumes as represented in photographs.
Plate 3. Interplay of volumes as represented in photographs
St. Mark's, Venice (10th-14th century). Detail.

Plate 3. Interplay of volumes as represented in photographs.
Plate 3. Interplay of volumes as represented in photographs
Plate 4. Internal space as represented in photographs
Plate 4. Internal space as represented in photographs

Piazza of St. Mark's, Venice (15th century).
F. Brunelleschi: Santo Spirito, Florence (begun 1444). Interior. See also pl. 11.

Plate 4. Internal space as represented in photographs.
Plate 4. Internal space as represented in photographs.

F. Brunelleschi: Santo Spirito, Florence (begun 1444), Interior. See also pl. 11.
Plate 5. Space and scale in ancient Greece

"Basilica" (6th century B.C.) and Temple of Poseidon (5th century B.C.), Paestum. Views.

Plate 5. Space and scale in ancient Greece
"Basilica" (6th century B.C.) and Temple of Poseidon (5th century B.C.), Paestum. Views.
Plate 5. Space and scale in ancient Greece

Interior of the "Basílica" (ca. 500 B.C.).