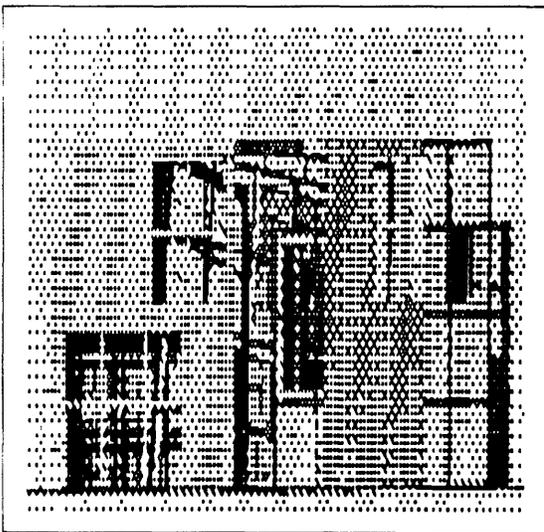

SPATIAL LAYERING: An Effect of Cubist Concepts on 20th Century Architecture



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May, 1989

Submitted to the Department of Architecture in partial fulfillment of the requirements of the degree Master of Science in Architecture Studies at the Massachusetts Institute of Technology. June, 1991

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ABSTRACT

The discourse of architecture has been greatly affected by the revolutionary ideologies introduced by the rise of Cubism earlier in this century. Cubism had an impact on all the arts; there was a particular affinity between the ideas of construction in Cubism and those of architecture resulting in a closer relationship between art and architecture in this century than in preceding centuries. Three of the four architects discussed in this thesis have had explicit interest in the visual arts; Le Corbusier himself was an established artist.

Examining this twentieth century phenomenon has been the task of this thesis, and in particular the concept of layering found in Cubist works and its influence in the formation of new devices of spatial expression. Devices, such as fragmentation, motion and multiple interpretations found in Cubist layering were incentives for architects to investigate the application of the concepts in architecture. I suggest that the fusion of the concept of layering with that of space resulted in a new concept, "spatial layering". Some architectural examples dating after the period following the first war are examined for evidence of these influences, and relationships between them are discussed. Finally, conclusions are proposed regarding the characteristics of the concept of spatial layering as a continuing paradigm of space in architecture.

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Professor for Design in Islamic Culture.

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INTRODUCTION

In *Principles of Art History* first published in 1915, Wolfflin, the German theorist, introduced a method of “artistic vision”. He developed five concepts of dual notions with which he explained visual experiences. One of these dual notions dealt with what he called “the development from the plane to recession”. In it the concept of layering was used to describe a particular type of ordering. Because the author began his book with painting (architecture was left to occupy a small portion of it), “layering” was a concept employed to describe this type of ordering in painting. Wolfflin wrote: “This space in bands is not an expedient to represent recession, it is the very arrangement in bands which is of itself pleasing. It is the form in which the period enjoyed spatial beauty. The same in architecture...

...In the same way color lies in layers.”¹ (1915)

From the point of view of this thesis, the importance of this statement, as far as terminology is concerned, is two-fold:

1. This was an early instance of the use of the concept of “layering”.
2. In his definition Wolfflin makes a connection between “layering” and space.

Both these points are critical in this thesis, as the former pertains to the concept of *layering*

in art and the latter pertains to the concept of *spatial layering* in architecture.

Nevertheless, the concept of layering in the Renaissance identified by Wolfflin remained in an illusionistic state and should be distinguished from layering in Cubism. In Cubism, the artists sought to represent the reality of objects and shy away from illusion. The layering in Cubism also followed a similar course towards reality which culminated in the development of the collage. Describing Cubist art Le Corbusier said: "At the basis of international production is French art, which abstract in name, is really concrete. It is essentially concrete. It contains realism. It proceeds in deep layers towards an organic equilibrium."² This tendency to grow closer to reality translated towards an architectural expression which acted as a model for architecture and as an intersection between the two disciplines. This intersection was the result of the "building" techniques employed in collage which corresponded to some of the construction methods found in architecture. It is from this perspective that the concept of layering found its way into architecture.

Internal developments within the discipline of architecture assisted in the translation of some of the Cubist concepts directly into architecture.

They arose as a reaction to the architecture of the 19th century and were later reinforced by the reaction to the International Style of the Bauhaus in this century. Unlike Modernism, Cubism offered an attitude of ambiguity and hidden meaning that lent itself to engagement intellectuality with architecture. Pavel Janak (1882-1956), a Czech "Cubist" architect wrote, "We need a new theory. There has been enough poetry in modern architecture but too little of architectural beauty"³ The expression of Cubism in architecture proper started to appear only after World War I in Czechoslovakia and France.

One of these expressions is the concept of layering. In this thesis I will be concerned with the manifestations of "layering" in Cubism and their translation and development in architecture.

I will begin with a discussion of the development of the concept of layering in painting from early Cubism until the introduction of collage, which was itself an explicit manifestation of layering. This is due to the construction of the collage which pertains closely to that of architecture.

In architecture, the spaces in between these layers often become the focus, hence the

discussion of the term “spatial layering” in the second chapter of the thesis. The “layering” described in chapter one is generally confined to a visual state without engaging the observer in a spatial or physical experience. The experience - although there is one - is not spatial. The perception of depth and space in that state is only virtual. It becomes actual in architecture when the potential of physical penetrability adds a whole new dimension to the concept of layering.

As a result, I propose a transformation of terminology and meaning; from *layering* to *spatial layering*. The development of collage was certainly a main contributor to this transformation, because of its introduction of “real” space. This facilitated the translation of the concept of layering into architecture. Just as the planes overlap each other in an ambiguous state in paintings, they are actually constructed one on top of the other in collage, and finally they are physically separated from each other in architecture. The translation of the concept to architecture is a transformation from *visual layering* to *experiential layering*.

The manifestation of the concept of spatial layering in architecture will be the focus of the third chapter. The concept of spatial layering is discussed as a paradigm of space that is

susceptible to various interpretations. Four case studies will serve to illustrate these: Villa Savoye by Le Corbusier, Exeter Library by Louis Kahn, Hanselmann House by Michael Graves and The Ushimado Arts Festival Center by Hiromi Fujii. Finally, conclusions regarding the characteristics of the spatial paradigm, introduced in chapter three, will be drawn in the final section of the thesis.

¹ Heinrich Wölfflin, *Principles of Art History, The Problem of the Development of Style in Later Art*, translated by Hottinger, M. D., (New York: Dover Publication Inc., 1932), p. 82.

² Le Corbusier, "The Quarrel with Realism", in *Circle, International Survey of Constructive Art* edited by J. L. Martin, Ben Nicholson and N. Gabo, (New York: Praeger Publishers, 1937), p.70.

³ Pavel Janak, "From Modern Architecture Towards Architecture", from Margolius, Ivan, *Cubism in Architecture and the Applied Arts*, (North Pomfret, VT: David & Charles Inc., 1979), p.35.

LAYERING IN CUBISM

Cubism was, if not necessarily the most important, at least the most complete and radical artistic revolution since the Renaissance... The effects of Cubism are still with us. They can be seen in much of the art of today. In as much as Cubism has conditioned the development of architecture and the applied arts it has become part of our daily lives. For this reason it will, perhaps, be some time before it is possible to put Cubism in its proper historical perspective, to evaluate it with complete assurance.¹ (J. Golding: 1959)

The effects of Cubism are reverberating still throughout modern culture, but today at a distance of half a century it is possible to view with a certain clarity this extraordinary moment in history. For we are now becoming aware of the seminal quality of the decade ending in 1914, during which fundamental new ideas and methods were established in painting, sculpture, architecture, literature, music, science and philosophy.² (E. Fry: 1966)

The above two statements indicate the scale of the movement and the array of fields it had affected. It is important to note that even though the statements were made in 1959 and 1966, the effects of Cubism in architecture are still emerging.

Michael Crosbie in the November 1990 issue

of *Architecture* quoted the architect Kim of Koetter, Kim & Associates saying that the facade of their design is a "Picasso" facade referring to the layering effect that is seen in Picasso paintings. (Fig:I.1 & I.2) Also in the same article, in one of the captions describing figure I.2, it was said that "...the new facade appears to stretch the original's "too stable" facade to make an irregular, Cubist composition."³

Thus, the influences of Cubism on architecture being produced today are still manifest in the

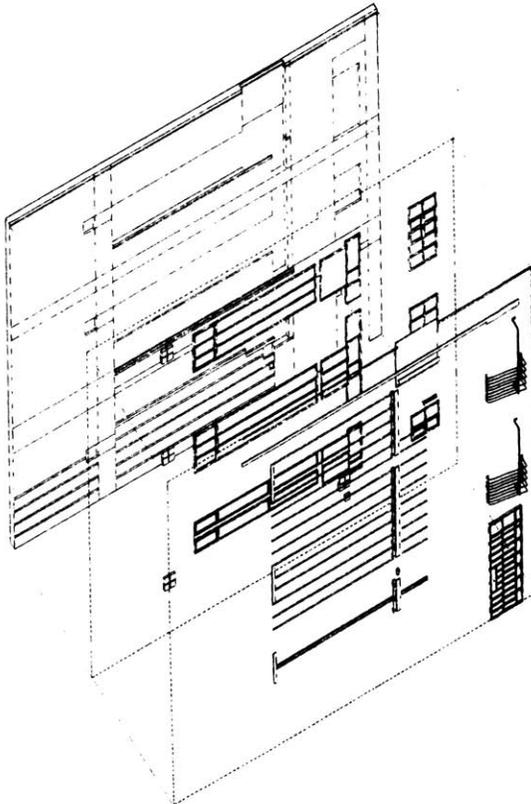


Fig:I.1, Exploded axonometric depicting the thin layers of the building's facade.

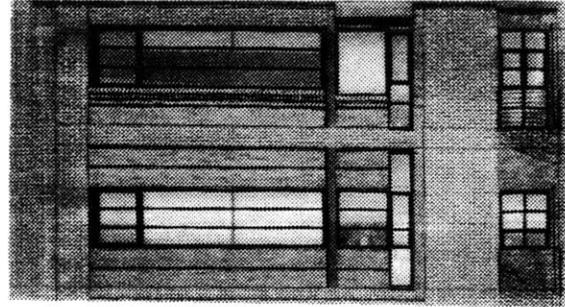


Fig:I.2, View of the main facade.

way architects justify or describe their designs.

Research into the relationship between architecture and Cubism was first initiated by Sigfried Giedion in his book *Space, Time and Architecture* first published in 1941. Then Colin Rowe, along with Robert Slutzky, inspired by Giedion's initial research, wrote an essay entitled "Transparency: Literal and Phenomenal" in 1955, first published in 1963 in the Yale School of Architecture student journal. This article was regarded as seminal in America and later in Europe. A less known essay by the same authors entitled "Transparency: Literal and Phenomenal, Part II" was written about the same time as the first one but was first published in 1971.

Layering vs Transparency vs Overlapping

Layering is the perception of several flat planes or implied planes, receding or advancing in space.

Perception of this could be two fold - as illusion

or as reality. The illusion of layering used in the Renaissance was rejected in Cubism and replaced by the perception of layering as reality. (Fig:I.3) This was ultimately achieved in the development of collage, where the layers are actually *constructed* one on top of the other. (Fig:I.4) Similarly, analytical Cubist paintings show an effort to escape from illusion. The layers in that state are virtual but not actual. They become actual only in collage. Nevertheless, the spatial aspects of both are not emphasized. It must be interpreted by the spectator. It is also up to the spectator to construct in his/her mind the forms that are

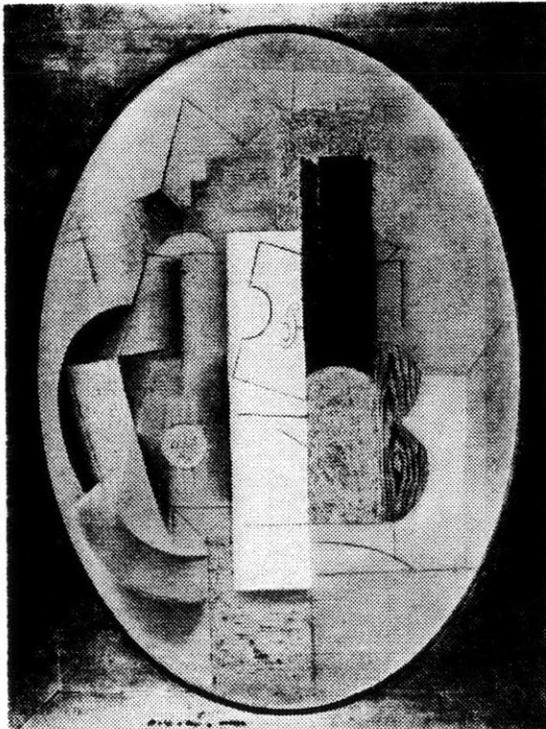


Fig:I.3, Picasso, 'Still-Life with Violin and Guitar', 1913.

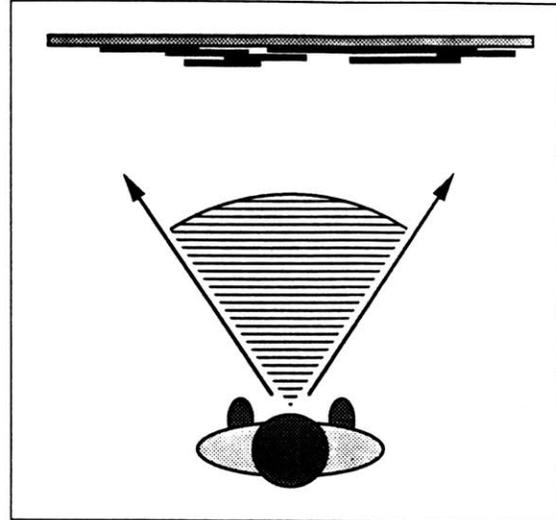


Fig:I.4, The explicit quality of layering in collage.

partially hidden. Sometimes, especially in the hermetic phase of analytical paintings, the overlapping becomes so ambiguous that definite conclusions about real form and space are hard to achieve. Stephen Kern, author of *The Culture of Time and Space* says: "The wild overlapping suggests forms and depth but it is impossible to determine exactly what forms in what depth".⁴ (S. Kern: 1983)

I use the word overlapping as the description of a relationship between two objects and not as a concept like "layering". Referring to a dictionary in this case might be beneficial. From the American Heritage Dictionary, one of the definitions of overlapping is "to lie or extend over and cover part of."⁵

Transparency, on the other hand, was defined

by Gyorgy Kepes in the following statement: "If one sees two or more figures partly overlapping one another, and each of them claims for itself the common overlapped part, then one is confronted with a contradiction of spatial dimensions. To resolve this contradiction, one must assume the presence of a new optical quality. The figures are endowed with transparency; that is they are able to interpenetrate without an optical destruction of each other. Transparency however implies more than an optical characteristic; it implies a broader spatial order. Transparency means a simultaneous perception of different spatial locations. Space not only recedes but fluctuates in a continuous activity. The position of the transparent figures has equivocal meaning as one sees each figure now as the closer, now as the further one".⁶ (1969) (Fig:I.5)

In the above definition, the issue of flat planes never arises, which denotes that the presence of flat planes is not a prerequisite for transparency to occur. Also, I believe that the illustration that Kepes uses to illustrate his point supports the notion that the planar aspect, which is an intrinsic quality of layering and which implies frontality, is not alluded to in transparency. In fact, the combination of this definition of transparency with the concept of

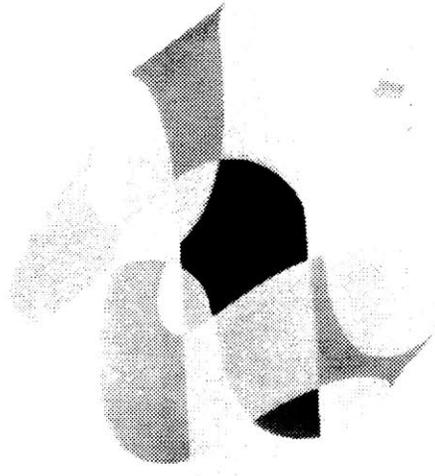


Fig:I.5, Diagram used by Kepes to illustrate the concept of transparency.

the representation of depth through overlapping *planes* results in the definition of layering.

Colin Rowe and Robert Slutzky dwelt on two points in their first essay. The definition of transparency by Kepes was one and the connection that Sigfried Giedion had made between Picasso's *L'Arlesienne*, transparency and Gropius's Bauhaus at Dessau was another. The definition of transparency was an incentive for them to go beyond the literal meaning of the word when used in architecture - which refers to the material condition of an object. Giedion's transparency, on the other hand, was a literal one.

As a result, they arrived at two kinds of transparency - *literal*, which is "an inherent quality of substance", and *phenomenal*, which is "an inherent quality of organization".⁷ (C. Rowe & R. Slutzky: 1963)

It may seem that Rowe's definition of phenomenal transparency which is basically Kepes's is very similar to my definition of layering. As I mentioned earlier, they are similar except that the connotation of flat overlapping planes is absent in transparency. It could be concluded that layering can be identified as a type of phenomenal transparency, but not all kinds of transparency involve layering.

Moreover, in their second essay entitled "Transparency: Literal and Phenomenal, Part II", they revise their definition of the term "phenomenal transparency". It changes from "a gridded space within a shallow three-dimensional zone which is perceived in fluctuating, ambiguous patterns" to refer to "ambiguous readings within an essentially two-dimensional space".⁸ (R. H. Bletter: 1978)

This removes the presence of the third-dimension or even the perception of it, and thus makes "layering" clearly distinguishable from "phenomenal transparency". For this

reason and because of the level of specificity that is inherent in the term "layering", I find the latter more appropriate. In addition, "layering" was used by Rowe to describe phenomenal transparency in more than one instance. For example, he said: "Thus, only the contours of his buildings assume a layerlike character..."⁹ (1963)

As far as the idea of the overlapping is concerned, Cubism was not the first to discover such a process. Evidence of the initial idea of making pictures by pasting up irregular pieces of tinted paper dates back to the twelfth century when Japanese calligraphers wrote poems in such compositions. (Fig:I.6) Later, this technique was imported by the west. However, utilizing this kind of craft would not be seriously pursued as a primary medium of expression until the development of the collage in Cubism.

The importance of the "plane" in the theoretical and critical domain of art was identified by Wolfflin in 1915 in *Principles of Art History* under the title "Plane and Recession". He explained: "Classic art (art of the High Renaissance) reduces the parts of a total form to a sequence of planes, the baroque emphasizes depth. Plane is the element of line, extension in one plane the form of the

Fig:I.6, A Japanese example showing the idea of collage in the twelfth century.



greatest explicitness: with the discovery of the contours comes the discounting of the plane, and the eye relates objects essentially in the direction of forwards and backwards."¹⁰ (1915) This was also stated in his earlier book *Renaissance and Baroque* first published in 1888.

The plane, which is a prerequisite in the concept of layering, would be used and enhanced three centuries later by the Cubists. However, the difference between the perception of layering in the two periods is that the recession of the planes relative to the picture plane in the High Renaissance is replaced by the planes advancing forward of the picture plane in Cubism. (Fig:I.3)

This is due to two factors. First, the view of the most advanced plane in the Cubist painting is

left unhindered and the plane itself attains a certain degree of clarity that diminishes with the relative recession of the planes. In the Renaissance, a reverse arrangement occurs. The foremost plane is partially seen as only a fragment of it is presented which accentuates its ambiguity. The level of fragmentation and ambiguity decreases as the eye penetrates deeper inside the canvas. The "deeper" planes reveal more information and thus are comparable, in that sense, with the "shallow" planes in Cubism. Second, the layers in Cubism are detached from the frame of the picture and converge towards the center of the canvas with their advancement. As a consequence, they perceptually form a *convex* three dimensional figure *in front of* the picture plane. This arrangement is also the reverse of that practiced in the Renaissance. Then, the planes attached

themselves to the frame and as they followed the first arrangement discussed above, they perceptually formed a *concave* three dimensional figure *behind* the picture plane. (Fig:I.7a, b)

However, the principal difference between the two periods is that the expression of the plane in Cubism would be accentuated more than ever; consequently the expression of layering would become more explicit and architectural.

Layering in Cubism

The plane in Cubism became a method of representation, in contrast with its use in earlier periods in which artists experimented with it. A similar argument can be made in terms of the use of layering in Cubism. The development of the concept of layering in Cubism can be described through the movement's three phases which are

summarized in the diagram illustrated in figure I.8. In these phases, there was a continuous effort to overturn illusion and replace it with reality. This led the artwork to be more architectural and hence, a common medium of expression between art and architecture.

In the years before 1907, the art community in Paris witnessed the development of two influences that affected the art discourse for years to come.

1. Paul Cezanne (1839-1906), who has been described as a "link between twentieth century painting and traditional Western art".¹¹ (J. Golding; 1959)
2. *African art* which was discovered by Fauvism, the important style during the first decade of this century before Cubism.

Cezanne's contribution was in his disobedience

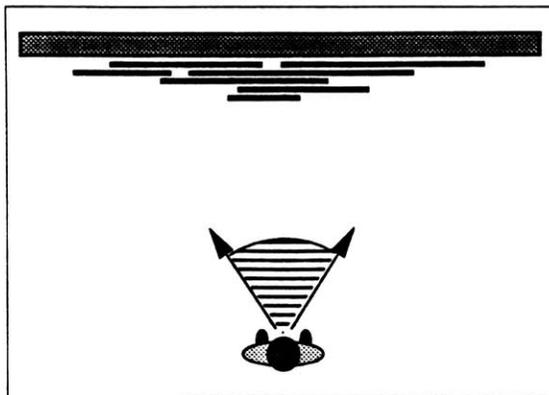


Fig:I.7a, The advancement of planes in Cubism.

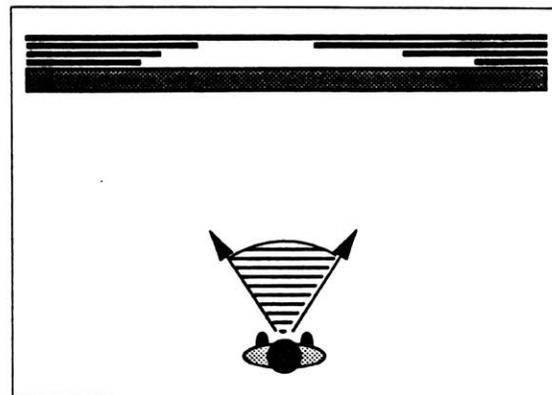


Fig:I.7b, The recession of planes in the Renaissance.

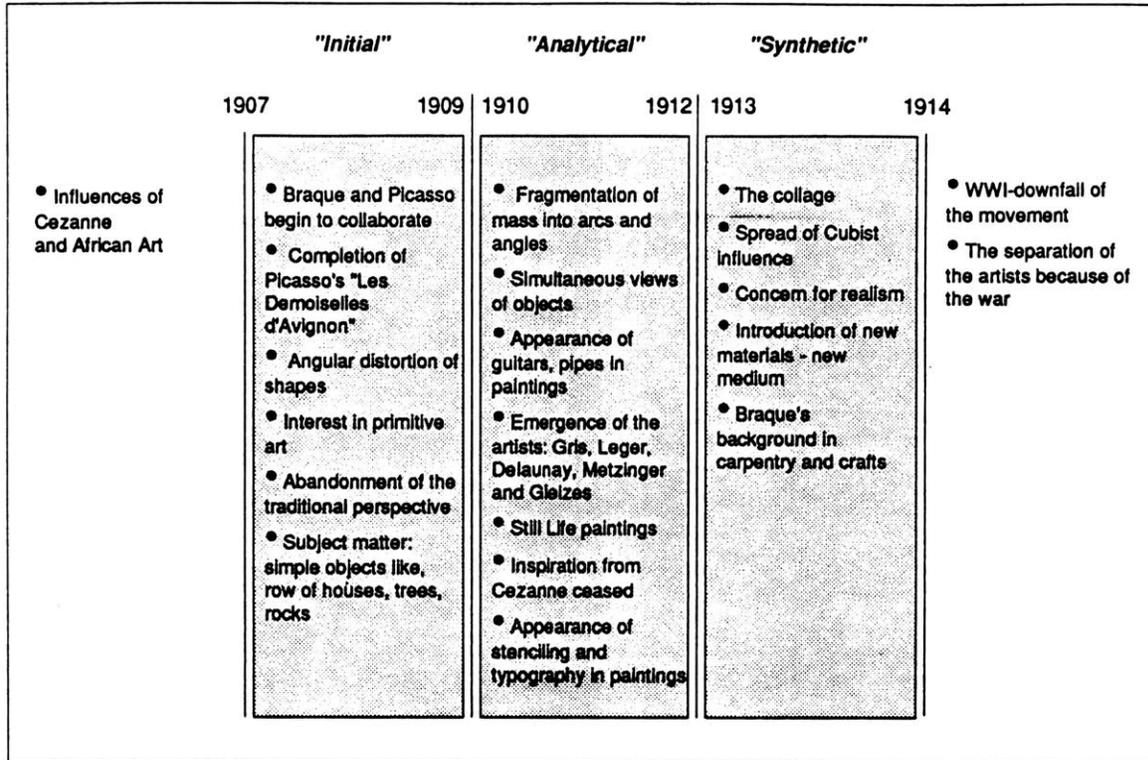


Fig:I.8.

of the Renaissance tradition of composition. He relied on perceptions of the object he had experienced in transferring that object into his paintings. He was concerned with the composition of the form on the flat canvas rather than accurately rendering volume and depth. (Fig:I.9)

Describing the importance of Cezanne, Stephen Kern said: "The important innovations he (Cezanne) made in the rendering of space - the reduction of pictorial depth and the use of multiple perspective - were carried further by

the Cubists in the early twentieth century".¹² (1983)

African art offered to artists of the time a level of abstraction more developed than that of

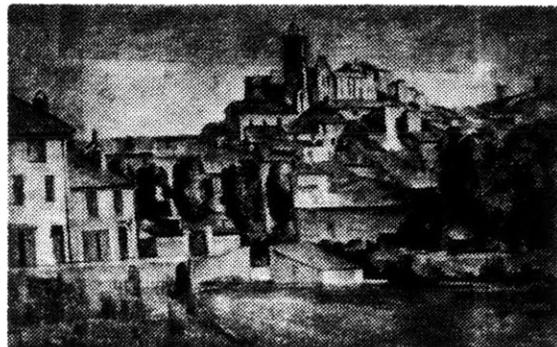


Fig:I.9, Cezanne, 'Gardanne', 1885-6.

Fauvism; it could constitute a new aesthetic. African art found its way to the west through travellers and was appreciated as a “new” type of art during the Fauve period. The Fauves saw African art as a “liberating force, stimulating them in their attempts to achieve a more direct and spontaneous form of expression”.¹³ (J. Golding: 1959) However, contrary to its Western image, African art was a traditional type of art in respect to the culture it was from, not a revolutionary one. (Fig:1.10) Cezanne along with African art, set an

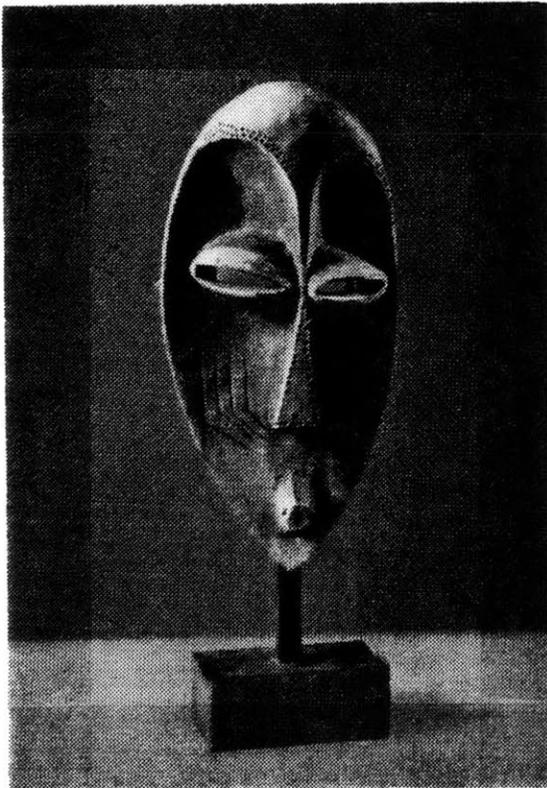


Fig:1.10, Babangi mask, French Congo, an African sculpture.

environment appropriate for the development of a new art movement. Cezanne’s influence can be clearly seen in the beginning of the initial phase, when Cezanne-inspired paintings were a point of departure for early Cubists. This period is what is referred to as the initial phase. It is also called the Cezanne phase because of the strong influence that he had during that period.

In this phase the Cubists were trying to define the objects’ properties through angular geometries without relying on perspective and the actual appearance of things. Their subjects were usually rows of houses, trees, or rocks which were easily broken down into a geometric vocabulary. Here the concept of layering begins to manifest itself, as overlapping elements in the painting convey depth. This technique contrasts with that of the perspective, which conveys depth through the convergence of lines to a single point. Nevertheless, the concept of layering in this phase does not dominate art and it would only do so eventually in the analytical period when planal techniques start to take over compositions as further fragmentation of the objects takes place.

The breakdown of form and the use of simultaneity were the characteristics of this

phase. Objects were painted in fragments that were viewed from various angles. Simultaneity gave a new dimension to art, for it was a totally new concept that was first introduced by the Cubists.

Similarly, the fragmentation of objects was aspect that was introduced by Cubism. Fragmentation and simultaneity resulted in the breakdown of the painting into flat superimposed planes. Giedion observed: "Fragments of lines hover over the surface, often forming open angles which become the gathering places of darker tones. These angles and lines began to grow, to be extended and suddenly out of them developed one of the constituent facts of space-time representation - the plane."¹⁴ (1954) This was a very important point in the development of the concept of layering because as seen in figure I.11, the object in the painting is reduced to flat planes that overlap and that provide information about the space behind them. The spatial aspect of Cubist paintings gives the word overlapping a different meaning - layering. In my definition of layering, I stressed the fact that the flat planes should perceptually recede or advance in *space*.

In this phase, the layers existed in a virtual state. They became actual in collage, which



Fig:I.11, Picasso, 'L'Arlesienne', 1911-12.

was developed as questions about the authorship and objectivity of paintings began to rise. This was called the synthetic phase. During this phase, there was a return to objectivity and the simplification of painting into clearly defined forms. Forms which were increasingly becoming more abstract started to be represented by real materials such as cloth, wood, sand and pieces of newspaper. (Fig:I.12)

The three painters who used this technique extensively were Picasso, Braque and Gris. Collage was yet another form of the artists'

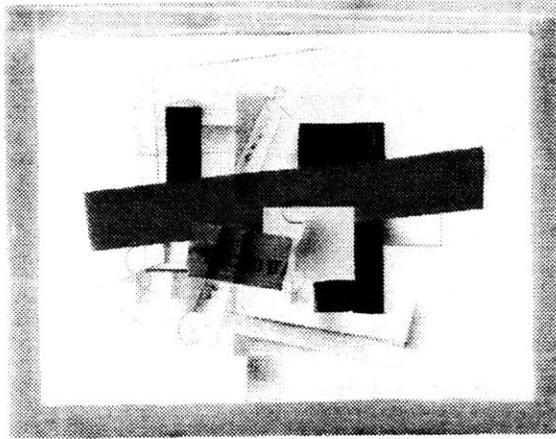


Fig:I.12, Braque, 'Clarinet', 1913.

protest against tradition because it abandoned the traditional medium used in paintings - oil. In this phase, the planes were accentuated and given importance and strength. This resulted in their being more removed from the realm of representation and closer to being themselves. The aspect of collage that I believe is critical to the development of the concept of layering in Cubism (and that is relevant to the topic of this thesis) is the introduction of "real" space. There exists a real space, ambiguous as it may be, that separates the various planes from each other. Cubist collages were closer to architecture than their paintings were as the technique used in "building" them corresponded to some construction methods in architecture. This resulted in the picture becoming architectural, which allowed architects to relate more closely to it.

In conclusion, the Cubist painting, is observed from a certain and fixed stand point where the angle of vision is perpendicular to the picture plane. (Fig:I.13) This accounts for the method of representation used. The object is studied and experienced from various angles and then the synthesis and summation of those studies are put together on the canvas to be viewed from one angle by the spectator. Jean Metzinger, a Cubist painter, said: "They (Cubists) have allowed themselves to move around the object, in order to give, under the control of intelligence, a concrete representation of it made up of successive aspects".¹⁵ (J. Metzinger: 1911) The artist's justification for the development of this approach was that the artists' superior ability to perceive should be exploited in their work. In addition, it was an exploration of the

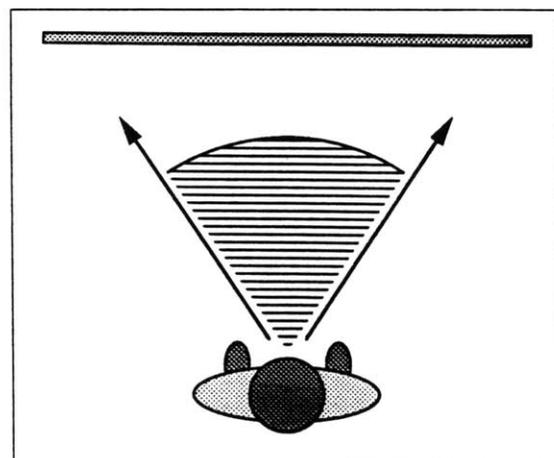


Fig:I.13, The relationship between the observer and the Cubist artwork.

concepts of the fourth-dimension and the X-ray in the medium of art.

In order to represent this complex summary of 3-D objects on a two dimensional surface, the Cubists relied on flattening the fragmented objects into planes. They rejected the representation of objects in three dimensional space in their paintings, but rather sought a way to represent them more accurately on a flat two dimensional surface. This resulted in flat superimposed planes advancing in space, which are more or less parallel to the picture plane, and as a consequence, layering takes place. Thus, a diagram of the kind illustrated in figure I.14 comes about.

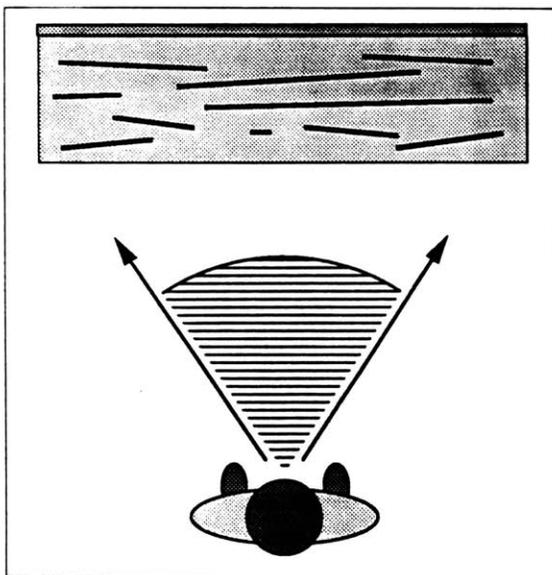


Fig:I.14, The "perceptual" positions of layers in Cubist paintings and collages.

In a 1912 essay by Gleizes and Metzinger, the interaction that takes place between the Cubist painting and its viewer was described: "It is our whole personality which, contracting or expanding, transforms the plane of the picture plane. As it reacts, this plane reflects the personality back upon the understanding of the spectator, and thus pictorial space is defined - a sensitive passage between two subjective spaces".¹⁶

The role of the perceiver is an important one because through his/her vision the experience of the painting is conceived. The authors make a distinction between *pictorial* and *visual space*. *Visual space*, they argued, is a perspectival one that is the result of converging lines. In *pictorial space*, on the other hand, the artist must react to the world, as does the viewer. Following Gleizes and Metzinger terminology, the experience in Cubist paintings and collages is a pictorial one because of the critical role the spectator plays in it. It is also a static one. It becomes, as will be seen later in architecture, more experiential and dynamic through the mobility of the subject.

- ¹ John Golding, *Cubism: A History and Analysis 1907-1914*, (New York: George Wittenborn Inc., 1959), p.15, 17.
- ² Edward Fry, *Cubism*, (New York: McGraw-Hill Book Company, 1966), p.9.
- ³ Michael Crosbie, "Double Indemnity", *Architecture*, (November 1990), p.81.
- ⁴ Stephen Kern, *The Culture of Time and Space*, (Cambridge: Harvard University Press, 1983), p.145.
- ⁵ The American Heritage Dictionary, the Second College Edition, (Boston: Houghton Mifflin Company, 1982).
- ⁶ Gyorgy Kepes, *Language of Vision*, (Chicago: Paul Theobald and Company, 1969), p.77.
- ⁷ Colin Rowe & Robert Slutzky, "Transparency: Literal and Phenomenal", in Colin Rowe, *The Mathematics of the Ideal Villa*, (Cambridge: MIT Press, 1976), p.161.
- ⁸ Rosmarie Haag Bletter, "Opaque Transparency", *Oppositions # 13*, (Cambridge: MIT Press, 1978), p.124.
- ⁹ Colin Rowe & Robert Slutzky, "Transparency: Literal and Phenomenal", in Colin Rowe *The Mathematics of the Ideal Villa*, (Cambridge: MIT Press, 1976), p.168, 169.
- ¹⁰ Heinrich Wofflin, *Principles of Art History, The Problem of the Development of Style in Later Art*, translated by Hottinger, M. D., (New York: Dover Publication Inc., 1932), p.15.
- ¹¹ John Golding, *Cubism: A History and Analysis 1907-1914*, (New York: George Wittenborn Inc., 1959), p.16.
- ¹² Stephen Kern, *The Culture of Time and Space*, (Cambridge: Harvard University Press, 1983), p.142.
- ¹³ John Golding, *Cubism: A History and Analysis 1907-1914*, (New York: George Wittenborn Inc., 1959), p.51.
- ¹⁴ Sigfried Giedion, *Space, Time and Architecture*, (Cambridge: Harvard University Press, 1954), p.433.
- ¹⁵ Jean Metzinger, "Cubism and Tradition", *Paris-Journal*, 1911 from Edward Fry, *Cubism*, (New York: McGraw-Hill company, 1966), p.66.
- ¹⁶ Albert Gleizes and Jean Metzinger, "Cubism" in *Modern Artists on Art*, ed. Robert Herbert, (Englewood Cliffs, New Jersey: Prentice-Hall, 1965), p.7-8.

From "LAYERING" to "SPATIAL LAYERING"

In essence, the Cubists chose to fragment objects in their representations into geometrical planes that were arranged to overlap in a spatial field. They "developed a visual language blending abstraction with fragments of observed reality, allowing space and form to come to new terms."¹ (W. Curtis: 1982) The process involved was one of layering.

Not only did the growth of Cubism transcend geographical boundaries, it also crossed disciplinary ones as well to include architecture. This was observed by architects in addition to critics and theoreticians. Le Corbusier said: "This deliverance (of Cubism) was so powerful that I would see in it a great and spontaneous explosion taking place somewhere in the world when, all of a sudden, by some means and in some place, the safety-valve opens and the thing happens."²

The Cubist concept of layering was adopted in architecture, but it "was not a matter of architects lifting motifs from paintings and aping their forms, so much as it was a matter of fusing the entire three-dimensional anatomy of architecture with a geometrical and spatial character analogous to that first discovered in the illusionistic world behind the picture plane."³ (W. Curtis: 1982) The analogy referred

to takes the form of layering in painting. In architecture though, the spatial aspect dominates the three-dimensional form and as a result, it would be inappropriate to call the quality of the expression involved simply "layering". Hence, I suggest the use of the term "spatial layering", which follows the definition of "layering" with a significant change - spaces replace planes. Thus, the definition of spatial layering is the *perception of interstitial spaces that advance or recede in reference to a point of view or a direction of motion.*

In his description of some of Le Corbusier's designs, Rowe made the association between layering and space. Some of his statements contain phrases like: "The five layers of space..." and "...suggest the possibility of a reading of space by layers...".⁴ Hence, he was one of the architectural theorists who fused the concept of layering with the concept of space. The result was the conception of space as layers - *spatial layering.*

In this chapter, I will discuss those aspects of the concept of layering in Cubism that assisted in its translation into architecture.

The Realism of Collage

In architecture, in contrast to analytical painting and collage, the spectator has the potential of

being able to move about the object and penetrate through it. In terms of visual perception, the multiplicity of views allows the spectator to compare the imagined concept that may have been anticipated in advance with the reality of the object. Arnheim says: "In the course of moving around in our environment, we see things from different viewpoints. We may change our position deliberately to gain a more comprehensive view."⁵ (1977) Thus, in both realms, painting/collage and architecture, there is a dialogue between visual perception/imagination and reality. In art this reality is often dependent on "scientific" means of access to space/time for its realization, whereas in architecture visual signals are ultimately followed by real experiences.

One of the ideals of Cubism as a movement was to allow the artist to work closer to reality. It was an effort to defeat the illusionistic system of the Renaissance. As a result, the appearance of objects in the paintings was replaced by their essence. Analyzing Picasso's *Les Femmes d'Alger (O.J.)*, 1911-12, Pierre Daix said: "Realism is passed, during the realization of this painting of exterior reality to the optical communication of material modifications worked by the artist on his canvas."⁶ (1982) Also, the painters resorted to the representation

of unpretentious objects in order to direct the attention of the spectator to the object's practical reality.

The introduction of stencilling was a significant step in bringing the paintings closer to reality. The letters were independent and could stand on their own; they were real. Nevertheless the plane they formed was not; it was virtual. (Fig:II.1)

The letters then grew to be pieces of newspaper that were actually laid on top of the canvas.

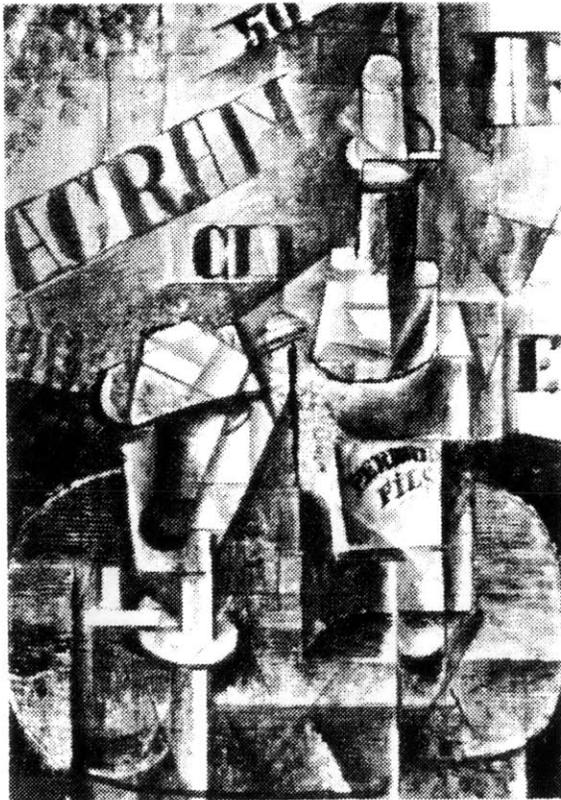


Fig:II.1, Picasso, 'Bouteille de Pernod', 1912.

This was the beginning of the materialization of the concept of layering. The plane formed by the newspaper moved from a virtual state to an actual state, just as the newspaper moved from being a representation to being ostensibly present as a piece of newspaper used in the collage. (Fig:II.2)

At about the same time, cardboard construction of pre-painted objects was taking place. These were supposed to be the means to an end - better understanding of the objects. Soon, some of these constructions became ends and were

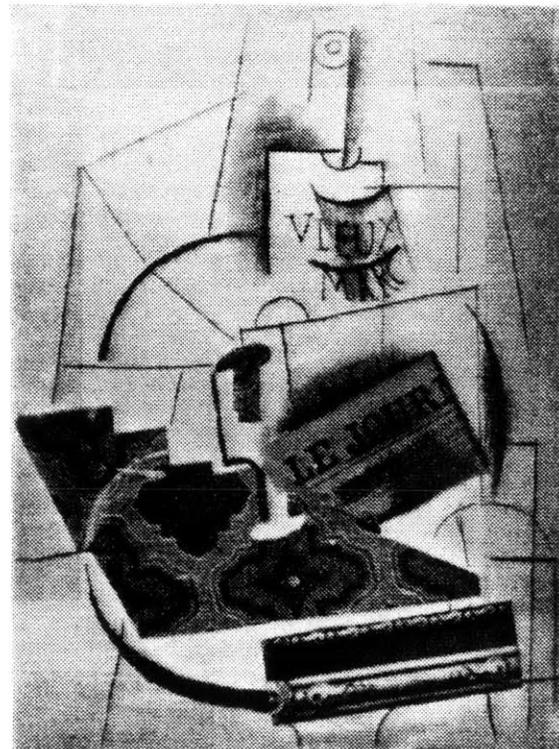


Fig:II.2, Picasso, 'Bottle of Vieux Marc, Glass, Newspaper', Spring 1913.

saved to be viewed as independent pieces of art. William Rubin says: "Braque did nothing to preserve his cardboard constructions, whereas Picasso put his in boxes and, in the case of the cardboard Guitar, realized it with slight alterations in metal. Braque was evidently little interested in his paper sculpture except as an aid to painting."⁷ (1989) The Guitar that Rubin mentions dissociated itself from the realm of representation. (Fig:II.3)

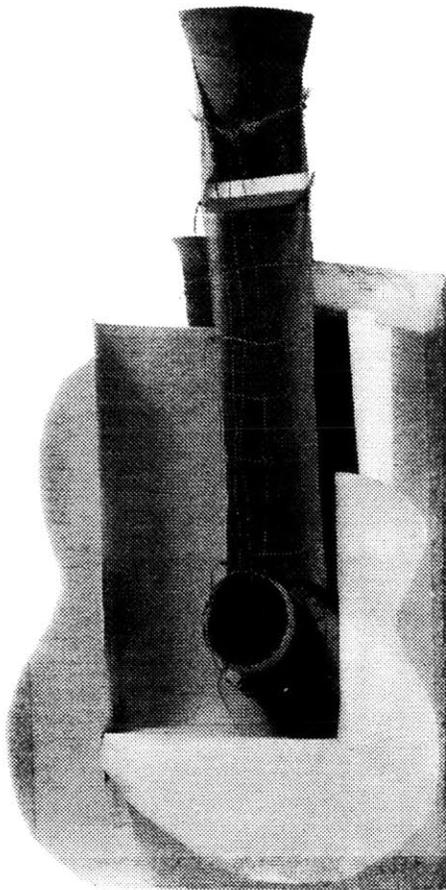


Fig:II.3, Picasso, 'Maquette for Guitar', 1912.

The layering aspect of it became real and could be physically seen in three dimensions. The one aspect that distinguishes this kind of art from other types is that the space between the layers is not only "real" but actual as well. Nevertheless, I am reluctant to call the concept in this case "spatial layering" because of the dominance of the objectivity of the planes and not the space. Maquettes such as this one, in addition to axonometric drawings that were used for similar purposes, attracted the attention of architects because the expression they manifested was closely related to that of architecture.

This research into proclaiming the object's reality in the artwork culminated in the development of the collage. It dissolved the distinctions between the subject-matter and the picture. (Fig:II.4) Ozenfant said: "The emotion no longer comes from an extrinsic

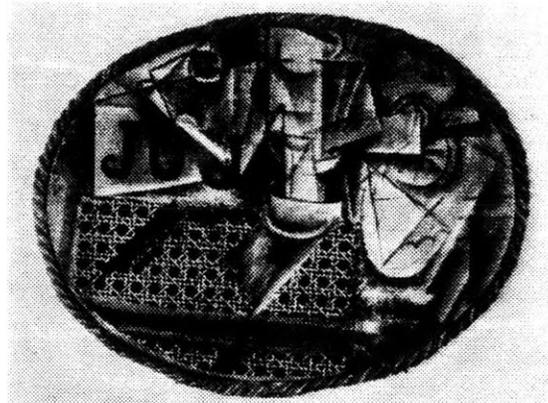


Fig:II.4, Picasso, 'Still Life with Chair Caning', 1912.

object reproduced or painted of the canvas, but from within the picture: *tableau-objet*."⁸ (1926)

Hence, the layers in collage leave the illusionistic world and enter the world of reality. This, I believe, strengthens the ties between architecture and collage as far as the concept of layering is concerned more than any other Cubist endeavor as reality in architecture prevails. The elements of collage that overlap outward from the canvas materialize what Cubist painters sought to achieve with their painting skills. The *reality* of the layers is what establishes the close affinity between collage and architecture. However, in collage, the space between the layers is kept ambiguous. Thus, the difference between architecture and collage in this respect is two-fold:

- Spatial boundaries in collage remain ambiguous.
- Collage is a graphic sign, not an environment.

Consider the diagram in figure II.5. In painting, one has to first assume that the two shapes overlap and then draw other conclusions regarding the hidden part beneath the rectangle. Collage, on the other hand, explicitly attempts to make the picture "architectural" through the construction technique involved.

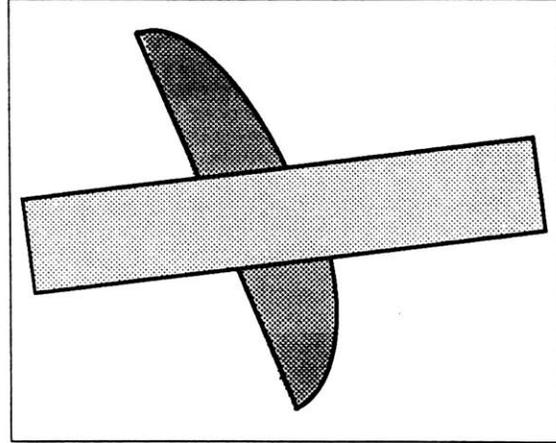


Fig:II.5.

As a result, the information about what is in front of what is given and the spectator is left to speculate on what is hidden. Gyorgy Kepes analyzed such a configuration when he said: "If one spatial form obstructs our view of another form, we do not assume that the second ceases to exist because it is hidden. We recognize, as we look at such overlapping figures, that the first or uppermost has two spatial meanings - itself and beneath itself. The figure which intercepts the visible surface of another figure is perceived as nearer. We experience spatial differences or spatial depth."⁹ (1969) Because of the compelling structure of the form underneath, the spectator has the tendency to complete the shape in the mind to form a crescent. This is left only as a speculation and cannot be verified. In architecture, a speculation similar to that in collage takes place except that one *usually* has

the potential of testing the speculation by simply changing positions with respect to the object and seeing different aspects of it which used to be hidden.

In a similar exercise, analyzing Le Corbusier's *Nature a la Pile d'Assiettes*, 1920, Bernhard Hoesli, in "Transparenz" (1968) (The same publication in which Rowe's essay appeared in German), translated the painting into the three-dimensional form illustrated in figure II.6. The layered organization of the planes was merely the result of a series of assumptions made by Hoesli. A similar analysis of a piece of collage would have been less speculative as the planes in collage physically overlap and

provide information about their displacement. It is true that the space in between the planes is kept ambiguous. In architecture, information about the placement of the planes and the spaces between them is often available. This is not to say that the ambiguity found in art is abandoned in architecture. The spectator still engages in intellectual and perceptual exercises similar to those in art except that these are now available for testing.

What makes the issue of reality an important one is that as the artwork approaches reality, layering becomes more and more explicit - the culmination of this process is the kind of layering found in architecture.

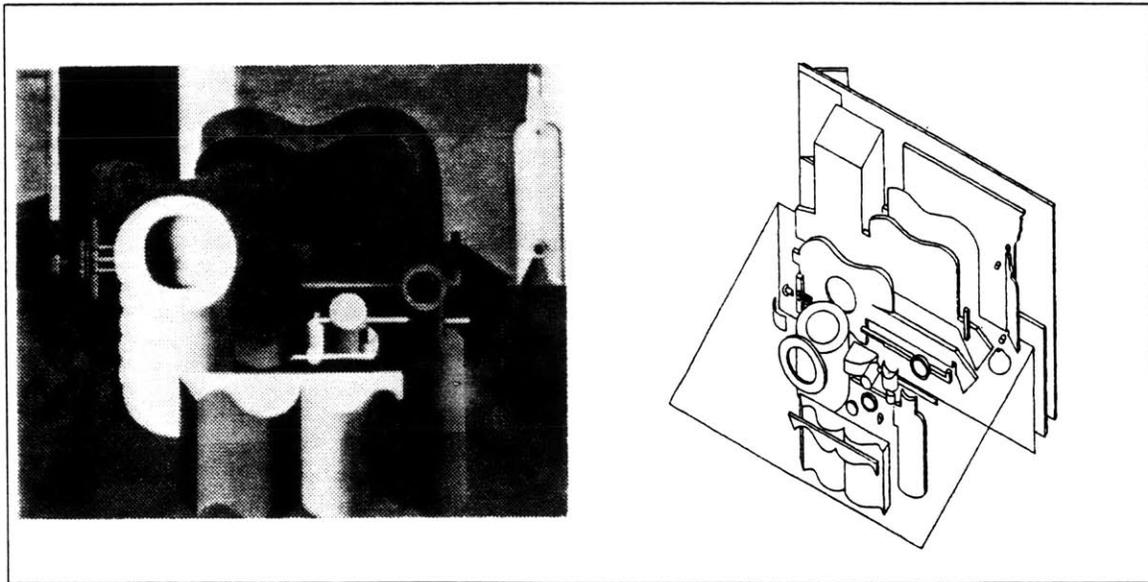


Fig:II.6, A diagram by Hoesli showing his interpretation of the layering that occurs in Le Corbusier's 'Nature a la Pile d'Assiettes' on the left.

Fragmentation

The planes which used to represent fragments of identifiable objects now define fragments of *spaces* which are fused into unified images that can be seen from one point of view or along a predetermined path. These images are critical in order to perceive fragmentation. The end result is a fragmented experience of architecture. To imagine these fragmented experiences as *fragments*, one has to perceive them as parts of a whole; that is where layering plays an important role. Kepes said: "Each enveloping plane does not submerge in an illusory whole but acts as an individual plane which in turn leads to the understanding of the whole. Each plane in its simplicity unhindered by details, has a clear dynamic structural function."¹⁰ (1969)

From the historical stand point, the idea of fragmentation in architecture, though not as momentous as its counterpart in art, was an anti-tradition gesture which was proclaimed by the Cubists. This serves as one of several incentives that encouraged architects to import the concept of layering from art. On a more general level, besides the aspect of fragmentation of the traditional concept of form, space was a central concern to the Cubists and is a main constituent of the concept of layering.¹¹ The preoccupation with "space" of

both disciplines formed a liaison between them for exchanging ideas about space.

"Space" as a word started to appear only recently in architectural texts (during the second half of the nineteenth century). Nevertheless, as a concept of philosophy and science, it has existed for a number of centuries. In the 1890s, Hildebrand and Schmarsow, two German historians, "crystallized the idea of space as essential for the plastic arts".¹² (C. Van de Ven: 1987)

Architectural historians these days can look back and categorize space as a concept in the history of architecture. Giedion, for one, identifies in his book *Architecture and the Phenomenon of Transition* (1971) three chronological conceptions of space:¹³

(i) *Architecture as space - radiating volumes* - "The pyramids and the Pantheon both stand as volumes in space".

(ii) *Architecture as interior space* - "Roman, Medieval, Renaissance and Baroque architecture adhered to the same space conception".

(iii) *Architecture as both volume and interior space* - "In the twentieth century technological

development progressed rapidly and penetrated into the human habitat... In the twentieth century, it was the *painter* who introduced a conscious opposition to the restless superficiality of painting and architecture in the late nineteenth century and to the Art Nouveau".

The hypothetical twentieth century painter whom Giedion refers to was clearly a *Cubist* painter. Shortly before World War I, the ideas of this kind of painting began to be exported from Paris. They reached Japan through artists like Foujita who came to Paris to "see what all the fuss was about". Sometimes Cubism spread through exhibitions organized by artists who kept in touch with the most recent developments in France, such as Larionov in Russia, and in other cases architects interpreted the new movement in art directly into their architecture, as happened in Czechoslovakia.

Reinterpretations of Cubism started to appear as the movement spread. These were "sometimes very different in different groups, but all moved toward rationalization and into architecture".¹⁴ (Giedion: 1954) This was an initial sign of a direct communication between Cubism and architecture. But manifestations of the Cubist influence in architecture came in different forms; one of these was spatial

layering - the topic of this thesis.

The spatial exploration that the Cubist painters undertook as one of the methods in their work resulted in architects thinking in terms of the *layering of volumes or spaces* bound by planes instead of *solidity* and *mass*.

Not only commonly used in art and architecture, the subject of space became a link between various other disciplines. In philosophy, for example, T. Lipps (1851-1914), a contemporary philosopher at that time, wrote: "Empathy means to objectify our sensations, to project ourselves into the inside of objects. An apperceptive motion, which makes a line, is 'empathic' into it. The act of making something *spatial* is in fact a motion. This motion is not only in our mind, but is directly experienced. It is firstly a motion of my inner operations, it is my activity".¹⁵

The Cubists changed the aesthetic qualities of the architectural space from a vast unbounded volume to a space whose attributes flourish with the planes that define it.

Traditionally, the architectural experience consisted of one or more large overwhelming volumes of space. The Boston Public Library, 1893 by McKim, Mead & White, fits the above

description. (Fig:II.7) It consists of several large spaces that constitute the architectural experience. The aspect of transition from one space to another is nullified by the spaces themselves. The spaces tend to be perceived as large independent entities without the implication that they are part of a larger whole.

This is in contrast to the Ushimado Arts Festival Center , 1985 by Hiromi Fujii, where the building is divided into three main volumes which are then divided into numerous interstitial spaces that are part of a formula that results in the architectural experience. (Fig:II.8) None of these spaces can stand on its own. Each needs the support of its neighbors. Each plays a certain role in the pictorial and experiential aspect of the architecture.

These two examples manifest two approaches to architectural design. One of the earliest architects to employ this conceptual method of spatial order of the Cubists was the Czech Pavel Janak who said that architecture should

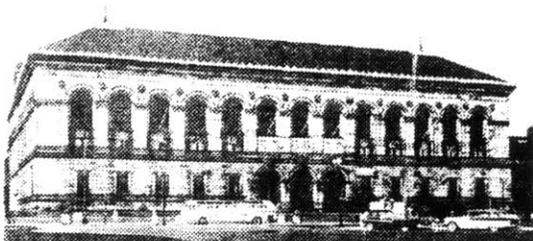


Fig:II.7, The Boston Public Library, 1887-93.

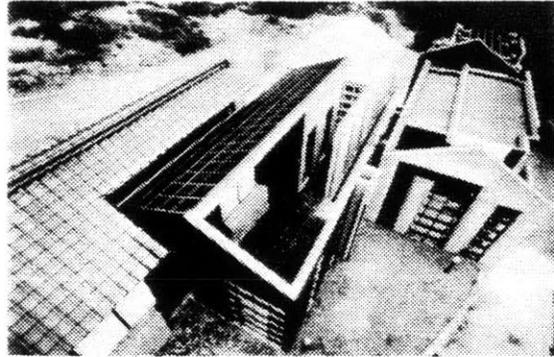


Fig:II.8, The Ushimado Arts Festival Center, 1985.

be closer to abstraction and subjectivism. He believed that there are two approaches to architectural design:

- 1 Direct and objective information is given to the spectator regarding space and form.
- 2 The participation of the spectator in the interpretation of the space laying behind the facade is achieved by supplying a limited amount of information but at the same time giving important hints.

I would add a third approach that compliments the above two:

- 3 Little or no information is given regarding the space/function/form relationship.

The latter of the two examples cited earlier, the Japanese, fits the second approach, while the Boston example applies to the added third approach. The first approach can also be detected in Gropius's Bauhaus building in Dessau, 1926. (Fig:II.9)

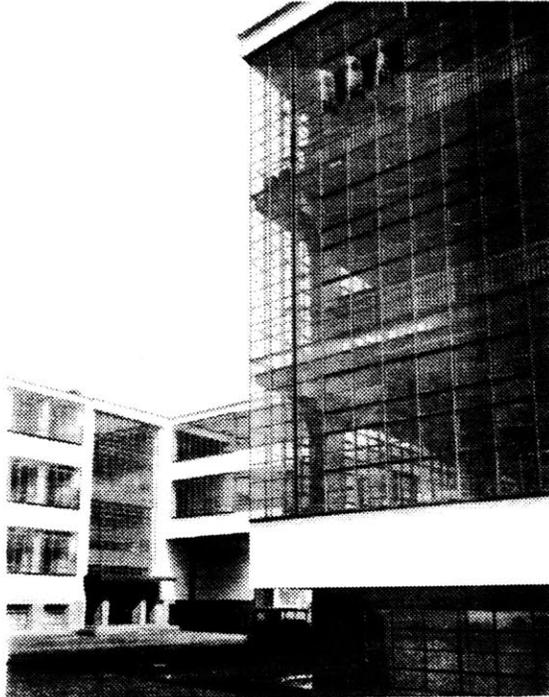


Fig:II.9, *The Bauhaus*, 1926.

The Japanese example illustrates how a space can be fragmented as *objects* used to be fragmented in Cubism. It can be argued that the concept of fragmentation came in part from the discovery of the X-ray by W.C. Roentgen in 1895. What appears to be a wholesome entity from the outside becomes fragmented in the X-ray. This may have served to inspire artists and architects to be more curious about the inside of solids.

As Picasso's maquette for *Guitar*, October 1912 reveals, the representation of the guitar surpasses the normal appearance of it. Views of the interior of the guitar that are usually not

seen dominate the composition as traces of its exterior structure remain. Similarly, architecture space which used to be "solid" in the Boston Public Library appears to be *fragmented* and *layered* in the Ushimado Arts Festival Center.

Space-Time

Besides the principle of the X-ray, other factors contributed to the development of Cubist concepts. Among these are scientific concepts such as Einstein's initial theory of relativity in 1905. It is likely that major theories of art criticism influenced the artists too, such as W. Worringer's "dynamic pathos of free consciousness and will penetrating into matter".

Together, influences such as these instigated artists to investigate ideas of motion and dynamics. In art criticism, this development was called analysis in "space-time". To compensate for the aspect of motion, the painters sought to avoid the reproduction of objects from one vantage point; they circled around them and represented multiple view of the objects.

Giedion observed: "Space in modern physics is conceived of as relative to a moving point of reference, not as the absolute and static entity

of the Baroque system of Newton. And in modern art, for the first time since the Renaissance, a new conception of space leads to a self-conscious enlargement of our ways of perceiving space. It was in Cubism that this was most fully achieved".¹⁶ (1954)

As a result, frontal views of objects were represented along with their side views. For example, the subject's left eye in Picasso's *Wilhelm Uhde, 1910* is shown in a frontal view, while the right eye is shown in profile. (Fig:II.10) A similar technique is applied to the nose of the subject.

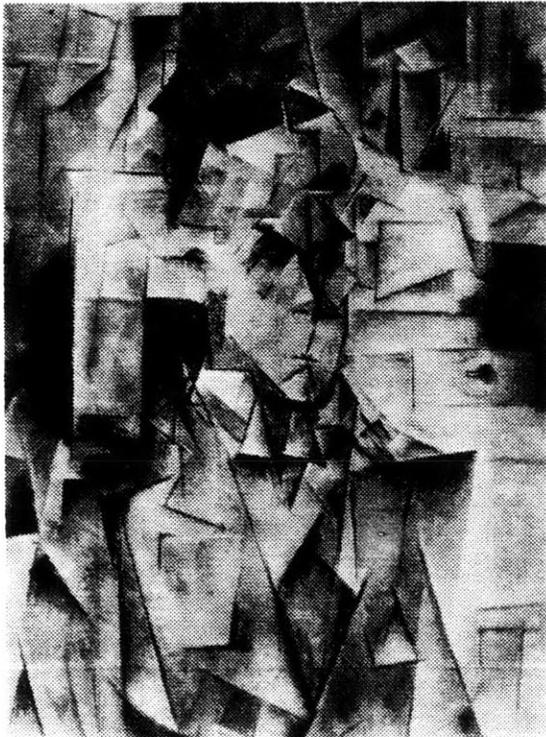


Fig:II.10, Picasso, 'Wilhelm Uhde', Spring 1910. An example of simultaneity.

It also could be argued that the issue of simultaneity could have been brought into painting from mechanical drawing. In the late 1880s, mechanical drawing was being taught in schools as a way to support the demands of industry. According to Fernard Buisson, its introduction was called for by various sectors who "saw drawing as the salvation of French Industry".¹⁷ (M. Nesbit: 1986)

The example in figure II.11 shows two views of the same object simultaneously - a top view and a side view. This type of drawing was developed in order to give a more descriptive analysis of the object than the traditional methods of representation had managed to convey. Compared with these traditional methods of representation, mechanical drawing was believed to be a more "truthful" technique. Molly Nesbit mentions in her article: "the child was learning that there were two

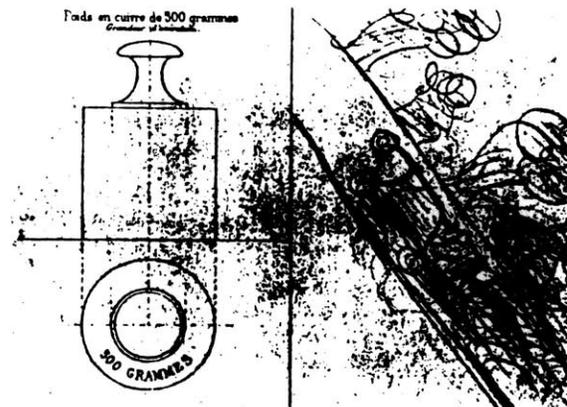


Fig:II.11, A mechanical drawing of a 500 g. weight.

kinds of representation: drawing that imitated the appearance of things to the naked eye and drawing that revealed the truth of things behind the surfaces of appearance: that is to say, there was perspective drawing and mechanical drawing."¹⁸ (1986)

This type of drawing revealed what architects sought to convey in their working drawings. Actually, the mechanical drawings can be thought of as the working drawings for a commodity.

The objective of the issue of simultaneity explored in mechanical drawings coincides with that found in Cubist paintings - the true representation of reality. The similarities between the two realms of representation extend beyond that to include the type of objects that were being represented. Both looked at everyday objects like bottles, cones, cylinders, etc.

There is a connection between the idea of layering and this method of representation. While mechanical drawing put the multiple images on a single plane, in Cubist paintings they occur on several planes with varied spatial depths. This was accomplished with the techniques of overlapping and shading, both of which were absent in mechanical drawing.

Mechanical drawing served as a common language of interest for both Cubists and architects and thereby helped architects to understand and decipher Cubist paintings into more comprehensible images.

Another type of drawing that was being taught in the nineteenth century was the axonometric, which at that time was envisioned as a sophisticated graphical technique for carpentry. According to Yve-Alain Bois, the "axonometric projection abolished the fixed view point of the spectator and allows for several possible readings of one and the same image, ..." ¹⁹ Also in the same article, Bois refers to Claude Bragdon's interest in axonometry as a concern that grew out of his studies in the fourth dimension - time. These two attitudes by Bois tie up directly with Cubism and consequently with layering. In fact, it was the artists who revived this technique, which had started in ancient China, in this century. It is also argued by Bois that "the fact that axonometry destroys neither the basic linearity nor the objective of representation led to the architects' enthusiastic adoption of the technique from the painters."²⁰ This leads me to believe that this technique could have acted as a liaison between art and architecture in assisting as a mental device to decode Cubist paintings and collages and consequently

layering.

Axonometry can be clearly seen in Purist paintings such as Le Corbusier's *Nature a la Pile d' Assiettes* (1920) where the angles applied were 0 and 90 degrees. A similar case occurs in Hiromi Fujii's drawing for the Ushimado Arts Festival Center. (Fig:II.12)

As will be shown later in the Hanselmann House by Graves, this type of drawing can be used as a tool that manifests the concept of layering because of its non-linearity and objective integrity.

The concept of space-time emphasized motion. In paintings the perception of motion takes place in the mind when the spectator's vision travels across the canvas. According to Ivan Margolius, author of *Cubism in Architecture and the Applied Arts*, "the Czech painter E. Filla said that Cubism has a tendency to express

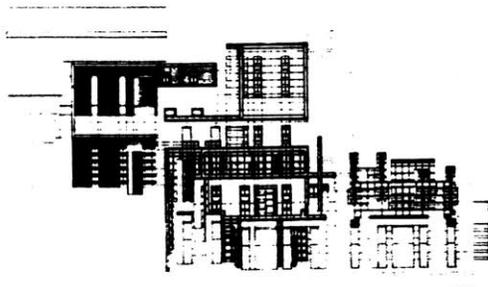


Fig:II.12, An axonometric of the Ushimado Arts Festival Center.

static and dynamic states at the same time; the pictured object is restful in its final appearance, but with its spatial virtue it has an expression of movement if only in our imagination." (1979) In architecture, motion is real. Motion can only be detected relative to stationary elements which act as references. Arnheim observed: "The visual experience of locomotion is always a relative matter. It is conveyed by displacement with regard to the environment that serves as the frame of reference. Paradoxically again, as we move, our own body or vehicle remains visually immobile. It is only the displacement in the things around us that confirms for the eyes the kinesthetic information of locomotion."²¹ (1977) Because of the aspect of penetrability found in architecture, the concept of motion and relativity takes a more explicit form.

Layering allowed several of these references to co-exist - which in turn increased the perception of motion. In assigning the role of reference to architectural elements, the architect finds him/herself determining a path from which the increased perception of motion takes place. In the concept of spatial layering, these references take the form of implied planes that separate the spaces. To optimize the function of these references, the direction of motion should preferably be perpendicular to the

direction of the implied planes. The perception of motion prevails providing that the perceptual movement of the references relative to the spectator exists. This is in agreement with Arnheim's statement: "When flying through fog or dense clouds, one sees no progress..." (1977)

The space of the Boston Public Library can easily represent the fog or dense clouds scenario. Because references in this example are not obvious, the perception of movement is weakened. On the other hand, this perception is amplified in Michael Graves' Hanselmann House, built in 1967, through the use of parallel implied planes that are perpendicular to the direction of motion. (Fig:II.13) In this case, the motion takes place on an elevated walkway which connects all the layers together and accentuates the perception of movement.

In conclusion, the aforementioned aspects facilitated the translation of the concept of layering from Cubism to architecture. In the process, the concept was transformed to take on a new term and meaning - "spatial layering". This translation did not occur without the assistance of other factors such as technological advancements. Ever since the period of the Crystal Palace, 1851, the development of cast

iron, steel and reinforced concrete frame constructions had presented views of architectural forms which could be read in both formal and spatial terms. They had presented architects with an array of possibilities of spatial formation and organization. The development of the balloon frame had even enhanced that more because of its lightness and adaptability. In 1914, Saint' Elia "demanded an architecture imbued with the utmost elasticity and lightness, utilizing all the newly developed elements of construction from iron and ferroconcrete to composite materials made by chemical processes, including textile fiber and paper. Behind these technical demands loomed his artistic aim: mobility and change."²² (Giedion 1954) These

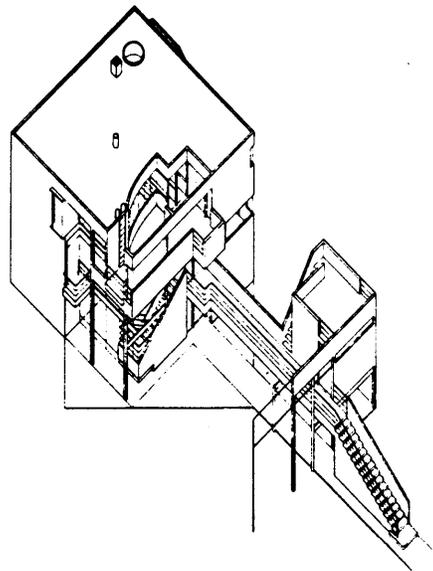


Fig:II.13, The Hanselmann House.

advancements in construction systems, I believe, assisted the architects in realizing the concept of spatial layering in their architecture.

¹ William Curtis, *Modern Architecture Since 1900*, (New Jersey: Prentice-Hall, Inc., 1982), p.93.

² Le Corbusier, "The Quarrel with Realism", in *Circle, International Survey of Constructive Art* edited by J. L. Martin, Ben Nicholson and N. Gabo, (New York: Praeger Publishers, , 1937), p.70.

³ William Curtis, *Modern Architecture Since 1900*, (New Jersey: Prentice-Hall, Inc., 1982), p.91.

⁴ Colin Rowe and Robert Slutzky, "Transparency: Literal and Phenomenal", in Colin Rowe, *The Mathematics of the Ideal Villa*, (Cambridge: MIT press, 1976), p.170, 171.

⁵ Rudolf Arnheim, *The Dynamics of Architectural Form*, (Berkeley: University of California Press, 1977), p.110.

⁶ Pierre Daix, "Picasso and Braque at the Time of the Papier Colle" in *Braque: The Papier Colle*, (Washington: National Gallery of Art, 1982), p.24.

⁷ William Rubin, *Picasso and Braque Pioneering Cubism*, (New York: The Museum of Modern Art, 1989), p.35.

⁸ Amedee Ozenfant, in the *Journal de Psychologie Normale*, (Paris, 1926), p.295, found in Reyner Banham, *Theory and Design in the First Machine Age*, (Cambridge: MIT Press, 1989), p.204.

⁹ Gyorgy Kepes, *Language of Vision*, (Chicago: Paul Theobald and Company, 1969), p.76.

¹⁰ Ibid, p.94.

¹¹ See my definition of "Layering" on p.12.

¹² Cornelis Van de Ven, *Space in Architecture*, (The Netherlands: Van Gorcum Assen, 1987), p.XI.

¹³ Sigfried Giedion, *Architecture and the Phenomenon of Transition*, (Cambridge: Harvard University Press, , 1971), p.3.

¹⁴ Sigfried Giedion, *Space, Time and Architecture*, (Cambridge: Harvard University Press, 1954), p.435.

¹⁵ T. Lipps, "Estetika Prostorova", *Styl*, Vol. 5, p.98-117 from Ivan Margolius, *Cubism in Architecture and the Applied Arts*, (North Peomfret, Vermont: David & Charles, 1979), p.12.

¹⁶ Sigfried Giedion, *Space, Time and Architecture*, (Cambridge: Harvard University Press, 1954), p.432.

¹⁷ Molly Nesbit, "Ready-Made Originals: The Duchamp Model", *October* #37, (Cambridge: MIT Press, 1986) p.54.

¹⁸ *Ibid*, p.59.

¹⁹ Yve-Alain Bois, "Metamorphosis of Axonometry", *Daidalos* #1, Berlin Architectural Journal (Berlin: Bertelsmann, 1981), p.42.

²⁰ *Ibid*, p.45.

²¹ Ivan Margolius, *Cubism in Architecture and the Applied Arts*, (North Pomfret, Vermont: David and Charles, Inc., 1979), p.25.

²² Rudolf Arnheim, *The Dynamics of Architectural Form*, (Berkeley: University of California Press, 1977), p.155.

²³ *Ibid*, p.156.

²⁴ Sigfried Giedion, *Space, Time and Architecture*, (Cambridge: Harvard University Press, 1954), p.443.

SPATIAL LAYERING IN ARCHITECTURE

Hitherto it has been shown that the concept of spatial layering in architecture was derived from some Cubist concepts, which collage had materialized in an explicit fashion. The concept of spatial layering in architecture can be thought of as a “paradigm of space”. This spatial paradigm is first dynamic. This quality comes from the accentuated perceptual movement of the spectator. It is an influence of the theory of relativity which, in Cubism, was identified as “space-time”. Second, space is fragmented. Fragmentation of space comes as a direct translation of the fragmentation of objects in Cubism. The term “fragment” alludes to the notion that it is part of a larger whole. Similarly, the fragmentation of space portrays such a connotation. Third, multiple readings of space. This attribute results from the involvement of the moving spectator as a principal component in the architecture. Indulging the spectator with intellectual and perceptual activities that are viable to change from one position to another and from one person to another, heightens the effect of this attribute. The acceptance of this paradigm (like any adopted concept) is subject to various kinds of interpretations.

In this section, I will look into these interpretations through the works of four

architects - Le Corbusier's Villa Savoye, Michael Graves' Hanselmann House, Louis Kahn's Exeter Library and Hiromi Fujii's The Ushimado Arts Festival Center.

The choice of these examples was initiated by the projects themselves and not by their designers. It was the level of curiosity that they generated within me that led me to engage in this investigation. Nevertheless, the role of the designers and their background ultimately prevail in their work. As a result, a brief discussion of the architects' background is woven in with the analyses which follow. According to Michael Hays's theory-constitutive conventions, which suggests that these conventions operate on three levels: "critical judgment", "theoretical principles" and "background", the "background" level is critical in affecting the outcome of these conventions.¹

Hence the architects' various backgrounds could explain their different interpretations of the concept of spatial layering. In applying Hays's model to the concept of spatial layering, spatial layering becomes the "critical judgment", Cubism becomes the "theoretical Principle" and the architects' background becomes the "background".

A statement by Wolfflin supports such an

observation: "Ludwig Richter... and three friends set out to paint part of the landscape, all four firmly resolved not to deviate from nature by a hair's-breadth; and although the subject was the same, and each quite creditably reproduced what his eyes had seen, the result was four totally different pictures, as different from each other as the personalities of the four painters."² If interpreting physical nature resulted in four "totally different" paintings, one can imagine how different these paintings might be if they had attempted to interpret a theory-constitutive convention. As a result, the interpretation of spatial layering depends to a large extent on the architect's background. In this thesis the four architects present four distinct backgrounds and thus four distinct interpretations. Of course similarities accompany those differences as some backgrounds overlap, and in some instances these similarities seem obvious, as in the case of Villa Savoye and the Hanselmann House.

However, the emphasis will not be on how Hays's model can be applied to "spatial layering" but rather on the application of the concept of spatial layering and its ramifications in the formation of a spatial paradigm.

Building: *Villa Savoye* (Fig: III.1)

Architect: *Le Corbusier*

Date: 1928-30

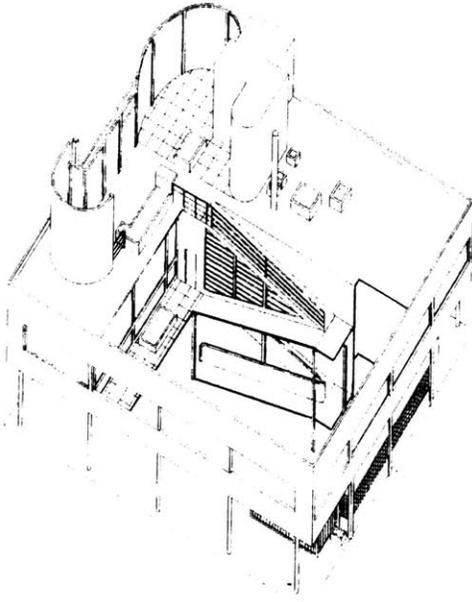


Fig:III.1, Villa Savoye, 1930.

One cannot deny the importance of Le Corbusier as a link between architecture and Cubist art. Although the movement of which he was a part was named Purism, his association with Cubism is undeniable given the concept of layering that Purism inherited. Le Corbusier himself said: "I refer to the Cubist movement which, with its droll title, burst on us like a liberation... This revolutionary event was produced with clarity and with vision. It was the artists who started it, like a shell at the end of its trajectory."³ Numerous articles have since been written regarding the subject of layering in Le Corbusier's architecture, the most famous of which is "Transparency: Literal and Phenomenal" by Colin Rowe and Robert Slutzky.

Most of those articles treated Villa Stein as their major example. Here I pick Villa Savoye, not for the sake of being different but because of a view that I saw of that building that arose my curiosity. The view was in form of a photograph of the facade of the second floor terrace. (Fig:III.2 & III.3) This view constructs the image of the pictorial experience from which I will describe the layered spaces.

Unlike the examples that will be discussed later, the value of this one occurs in the motion of the mind. Common to all the architectural

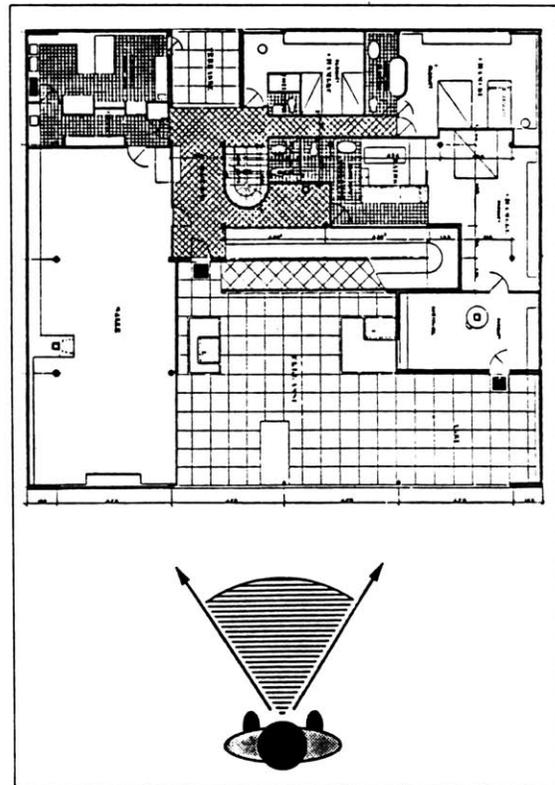


Fig:III.2, The assumed position of the spectator.

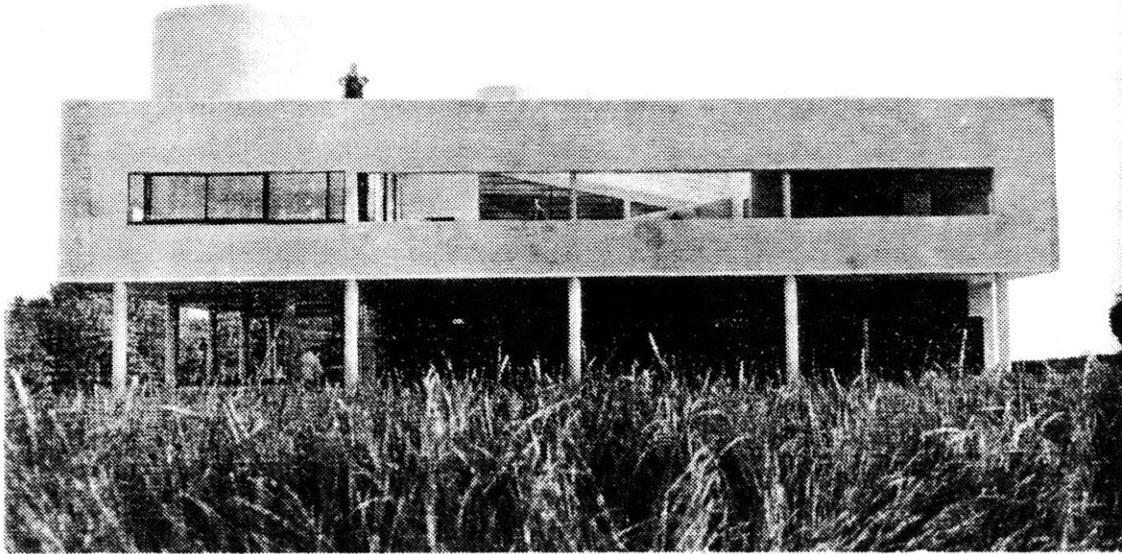


Fig:III.3.

examples are *visual motion* - which functions in a similar manner to that in Cubism - and *physical motion*. But the merit of this example lies in the visual motion in which the eye is left to travel and meander through the various layers. And thus he was able to blur the distinction between the inside and the outside and establish a zone of permeability between the two. This is due to the strong pictorial quality that this example possesses. In this case, the photograph becomes a tool that manifests the concept of spatial layering. The issue of photography and architecture in Le Corbusier's work was a topic pursued in an article by Beatriz Colomina. In one of her examples, she shows a photograph from

l'illustre of Emperor Khai Dinh and compares it with a drawing by Le Corbusier realized after the photograph.⁴ (Fig:III.4) As this explains the strong affinity between Le

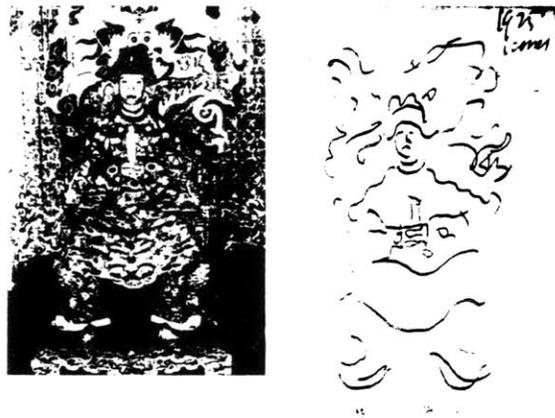


Fig:III.4, Le Corbusier's drawing on the right realized after the photograph on the left.

Corbusier and the principles of photography, I believe, this also justifies the emergence of *visual layering* as a kind of montage as a central theme in Villa Savoye.

The absence of the picture plane in most architectural cases dissolves the distinction between the recession and the advancement of the planes. But the more logical way to go about describing a layered ensemble is to go from the clear to the ambiguous. As a result, my description of the spatial layers will be in a receding order because of the dominance of the advancing spaces. Unfortunately, in the medium of writing the issue of simultaneity that is an attribute of the concepts of layering and spatial layering is more or less abolished because of the linear process that is involved in writing. In the course of describing the spatial layers in the examples, it may appear that a linear process is undertaken, but this is merely a restriction introduced by the medium of writing.

The nearest plane that is seen by the observer is the exterior surface of the exterior wall that is tangential to the five cylindrical columns on the first floor. This wall is perceived as a rectangular plane punctured with a smaller rectangular hole. (Fig:III.5) The window on the far left plays the role of a solid separator



Fig:III.5, The main facade perceived as a single plane punctured with a rectangular hole.

between the inside and the outside, more than the role of being translucent. This compliments the role of the exterior wall which is thought of as a mere membrane. Its perception as a membrane is heightened by the way in which it breaks the rule it governs. Cutting a hole in it will allow the spectator to see beyond the membrane and realize the role it plays - as a separator between two zones.

The second plane is implied by the two second floor columns just behind the front wall. The space in between the two planes is the first layer of space that is closest to the spectator. The perception of its depth is made ambiguous by the reduction in scale of the upper two columns. This makes the spectator believe that the layer of space formed is deeper than it actually is. But, the actual thickness of the wall, which is the depth of the space, is more or less known. Hence, there is a "dialogue" in the spectator's mind between these two logics. The reduction of scale of the columns and their placement behind the exterior wall was intentional. The plan of October 1928 (seven

months before the completion of the final plans) reveals that the column is square shaped and is encased within the wall. (Fig:III.6)

Assuming that Bernhard Hoesli's interpretation of Le Corbusier's *Nature a la Pile d' Assiettes*, 1920 is a correct one, one can notice a similar effect being explored there as well. (Fig:III.7) The frontal circular shapes represented in his axonometric show a hierarchy of placement of the elements in depth; the sizes of the rings correspond to their position. The smaller ones are further back and the larger ones are in front. Through this method of representation he was able to magnify the perception of depth in that painting. I believe a similar technique is being explored in Villa Savoye.

The next implied layer of space occurs on both floors simultaneously. On the first floor, it is

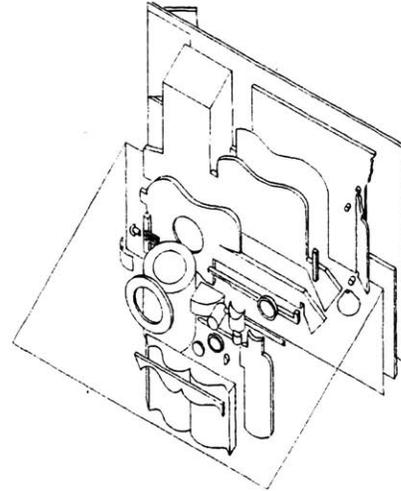


Fig:III.7, Hoesli's interpretation of Le Corbusier's 'Nature a la Pile d' Assiettes'.

bounded by the rear edge of the five columns and the glass curtain wall. On the second floor, it is bounded by the back of the exterior wall and the grey wall of the room on the far right. The bottom layer looks as deep if not deeper than its second floor counterpart simply because of the difference in intensity of shade between the two surfaces. The perception of

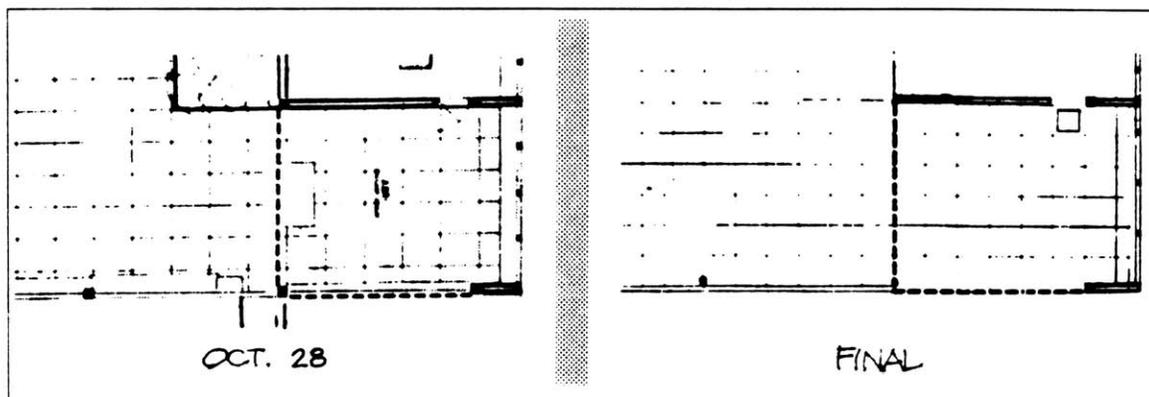


Fig:III.6, Column/wall relationship.

the black plane makes the spectator perceive it is farther away than the grey one.

of the ramp. It gets translated as such because of the evident geometry of both planes.

Immediately behind the upper layer of space lies another layer. It starts at the end of the previous one and ends at the small triangular plane which is part of the first ramp.

The last plane is the back wall of the second ramp which contributes to the definition of the last spatial layer. Perceptually, the second to last seems much deeper than the last simply because of the intensity of light that is reflected off of its membranes.

Contrasting the light colored small triangle against the larger plane with the dark windows behind it establishes yet another layer of space. The dimension of this layer is actually the width

In total there are six layers of space seen from the assumed view. (Fig:III.8) The devices

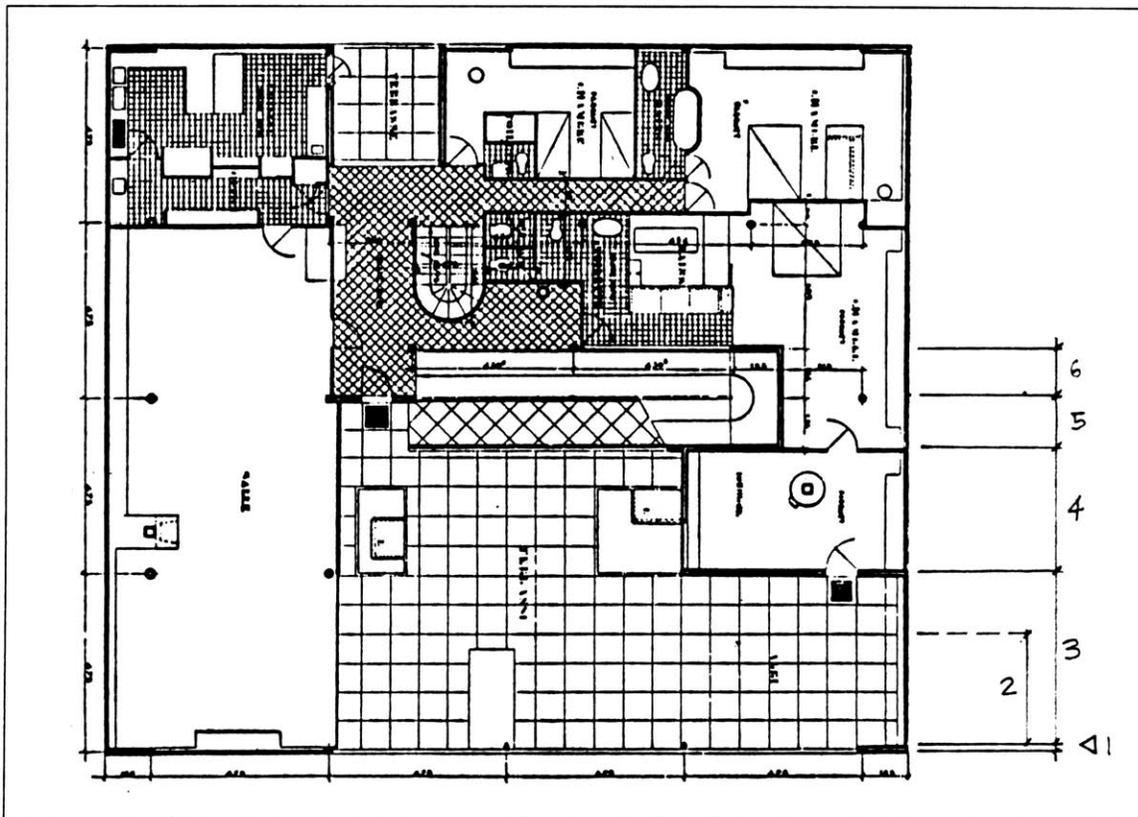


Fig:III.8, A summary of the spatial layers.

used to magnify the effect of layering are three:

- 1 Intensity of light
- 2 Scale
- 3 Tone and color

The second factor was used sparingly. Nevertheless, factors 1 & 3 were used to their fullest capacity. Alternating the planes' shade between light and dark has magnified the effect of layering and enabled the spectator to distinguish each space and consequently to indulge in intellectual/perceptual exercises.

In conclusion, the assumed view can be thought of as a series of facades that fluctuate in *space*. The planes are kept neutral and subdued so as to shift the attention of the spectator to the spaces these planes define. The use of the *plane* as opposed to other forms in Le Corbusier's designs is an interesting one because of his clear distinction between space and volume. He used *planes* to define *spaces* while to express volume he introduced curvilinear forms. He relied on the three previously mentioned points to alter the characteristics of the planes, which in turn is reflected in the spaces they define, and not the changing of their material. The meanings of the spaces are independent of the materiality of the planes. This deliberate choice of stripping down the planes to a bare minimum

is of a similar objective as that of the Cubists when they chose to paint every day simple objects like bottles and cylinders. This was accentuated by the Purists. Giedion said: "He (Le Corbusier) himself assures us in his "Peinture Moderne" that he has deliberately chosen the most uninteresting of objects - bottles, drinking glasses, and the like - so that attention will not stray away from the actual painting."⁵ (1954)

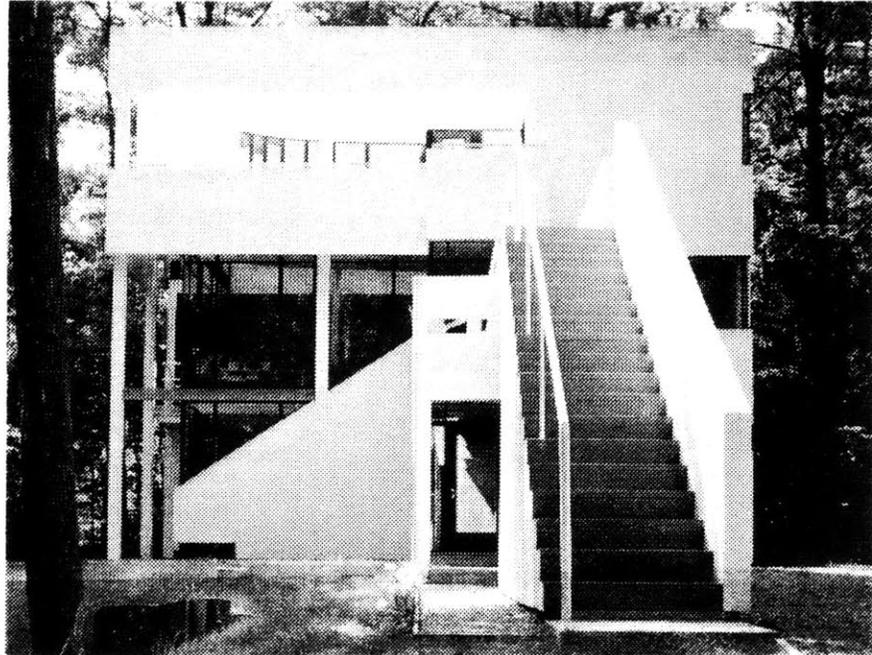
Building: *Hanselmann House* (Fig:III.9)

Architect: *Michael Graves*

Date: 1967

Michael Graves's work in the 1960s was deeply influenced by Le Corbusier's work. However, his work was not a mere copy of it but a reinterpretation of his concepts which in some cases were of Cubist origin. Alan Colquhoun commented on this point when he said: "To return to the 1920s and Le Corbusier was not an eclectic choice but a return to sources. What was new about this return was its rejection of functionalism and its claim that architecture never exploited the formal and semantic possibilities of modernism as the other arts had".⁶ (1981) Coincidentally, he was also a painter and some have said that "his paintings are certainly rooted in Cubism and Purism".⁷ (M. Tafuri: 1976) Others have said that "his

Fig:III.9, A front view of the Hanselmann House, 1967.



work as a painter is closer to his architecture than Le Corbusier was to his".⁸ (A. Colquhoun: 1981) I would say, from the examples that I have seen of both his architecture and his art, the relation between them is a *literal* one. His art work in fact is focused on a fascination with layering. (Fig:III.10)

Although Graves is also a painter, this fact was not a criterion for choosing this example. I based my selection solely on the choice of an architectural project to be analyzed: the Hanselmann House. In this case, however, the axonometric is the tool with which I will identify the concept of spatial layering. (Fig:III.11) It seemed obvious that spatial

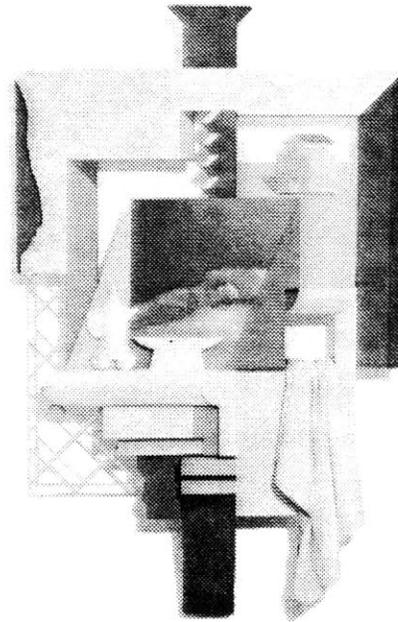


Fig:III.10.

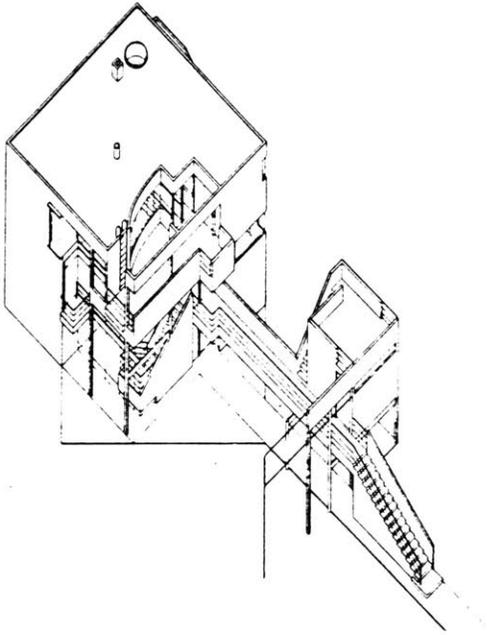


Fig:III.11.

layering was a main feature of this building.

The layers in an axonometric are easily recognizable because of simultaneity and their evident presence within a three dimensional coordinate system in the eyes of the spectator. Simultaneity comes from the ability to see identical views of parallel planes from one vantage point. Their evident presence within a three dimensional system comes from the ability to accurately describe the location of the planes in space. Hence, the axonometric in this example becomes a tool through which one identifies the concept of layering.

This example is an instance where the

architect's background and education, which enthusiastically had adopted this type of drawing, prevail in the work. In Graves's drawings, the main architectural element is the bridge that connects the various interstitial spaces. Diagrammatically, figure III.12 sums up the arrangement.

In the analysis that follows, I will assume the erection of the studio structure even though photographs of the building reveal that it had not been built. The Cubist tradition of frontality is optimally utilized along the bridge which maintains a normal relationship between the angle of vision of the spectator and the object. My description will follow the sequence of

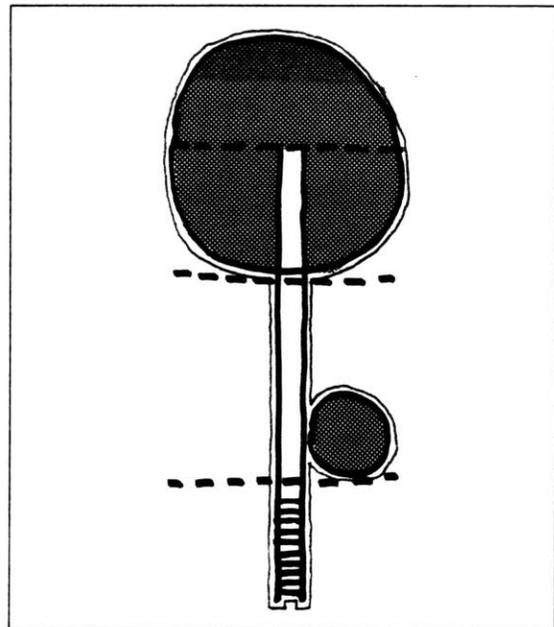


Fig:III.12.

spaces encountered by assuming such a procession towards the building's interior. (Fig:III.13)

Michael Graves describes the house in his monograph when he says: "The house is understood frontally by the layering of three principal facades. The first of these, consisting of a pipe rail frame and the front plane of a studio house (which have not been built), define the outer edge of the house's precinct. It acts as a gate, receiving the stair between the ground and the entrance level. The main volume of the house is entered through the second primary facade, located at the center of the composition. This point of entry is also

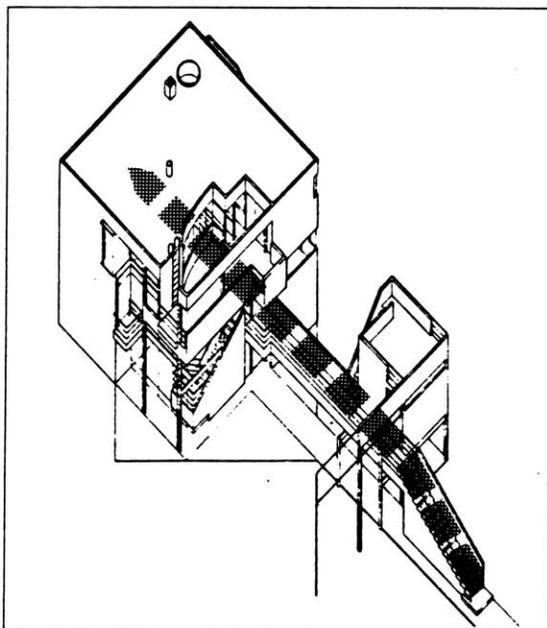


Fig:III.13, *The assumed path.*

reflected in the distortion of the plan of the roof terrace above. The third facade, which is the densest, is the rear wall of the house containing the mural".⁹ (1982)

Note the use of the terms: *frontally, layering, plane* and *composition*. This set of words could very well be used to describe a piece of collage. There is no doubt that the achievement of spatial layering was a conscious effort on the part of the architect .

In his description, he cites two big cubic volumes which, as it will be shown, are sliced into numerous layers of space that are coherent to the experience of the building. As a result, the *experiential* aspect of "spatial layering" is added to the visual layering witnessed in Villa Savoye. This example manifests the synthesis of both visual and experiential layering, where the physical experience portrays one of the aspects that differentiates collage from architecture.

The first layer of space that receives the spectator is defined by the staircase. The rise of the first step of the stair marks its beginning and the end of the concrete parapet on the right marks its end. This definition of space is a subtle one. As will be seen later, this subtlety is not confined to one or two citations but can

be seen throughout the house. He relied on the change of material of the rail and its solidity to define this slot of space, which is the second spatial layer, between the stair and what he calls the "first facade". (Fig:III.14)

This facade plays a role similar to that of the main facade in Villa Savoye - a separator between two zones. Here also the transparent quality that is given to the wall allows it to perceptually become a more powerful membrane. It gives the spectator a fragmented view of the house that he/she is able to reconstruct in the mind. As the spectator passes this threshold the mental image gets verified.

This facade acts as a mirror when it reflects an

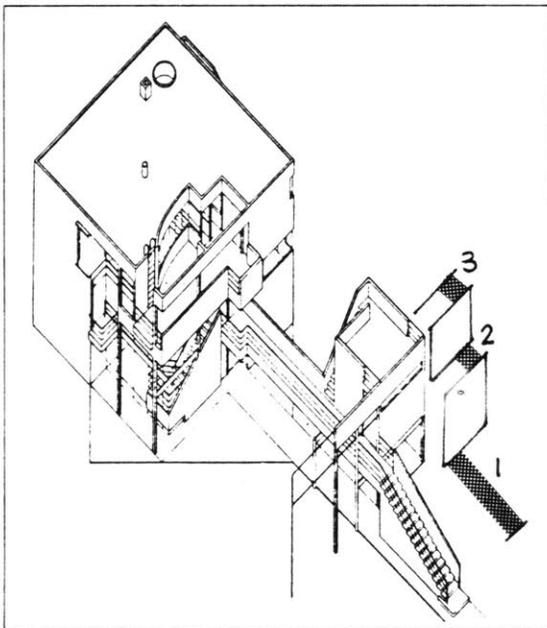


Fig:III.14.

identical slot of space. It is defined by the facade itself on one side, and the end of the pipe rail of the terrace above and its matching entrance opening to the studio on the other. This peripheral definition of space is an element that can also be seen in Villa Stein. Rowe and Slutzky pointed this out in their essay when they said: " At Garches the recessed surface of the ground floor is redefined upon the roof by the two free-standing walls which terminate the terrace; and the same statement of depth is taken up by the glazed doors in the side walls which act as a conclusion to the fenestration. In these ways Le Corbusier proposes the idea that, immediately behind his glazing, there lies a narrow slot of space travelling parallel to it..."¹⁰ (1976) (Fig:III.15)

Note also that this relationship of alignment between elements is carried in Michael

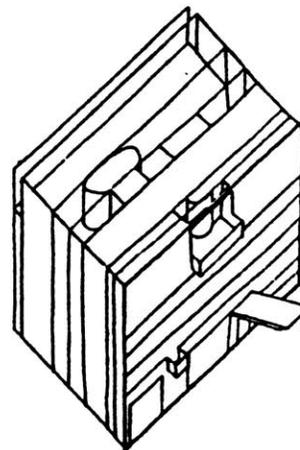


Fig:III.15, Eisenman's analysis of Villa Stein.

Graves's design to the other side of the terrace. This, although not seen from the path I am assuming, reinforces the concept of slicing up the volume into successive narrow spaces that extend beyond the limited dimensions of the structure.

The next two layers of space are defined in a similar fashion. The first matches the solid wall that starts at the conclusion of the last layer of space and ends with the stair leading to the terrace. The stair itself also implies a pair of membranes and thus defines a layer of space. (Fig:III.16)

The procession continues in a causeway-like

path connecting the two main structures of the house. This marks another spatial layer that is bounded by the edge of the stair case as its beginning and by the distortion of the plan of the upper floor as its conclusion. (Fig:III.17)

During the procession, the :“second facade” appears to be fragmented into black and white geometric planes. These fragments are dislocated *perceptually* and *actually* as they either advance or recede from the facade. One of these is the projection of the parapet of the balcony above that physically advances towards the spectator. This simple gesture plays two roles:

1 It establishes a layer of space just before

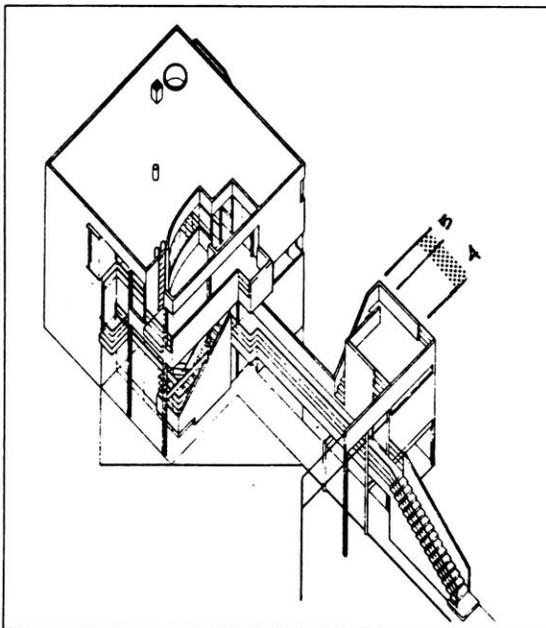


Fig:III.16.

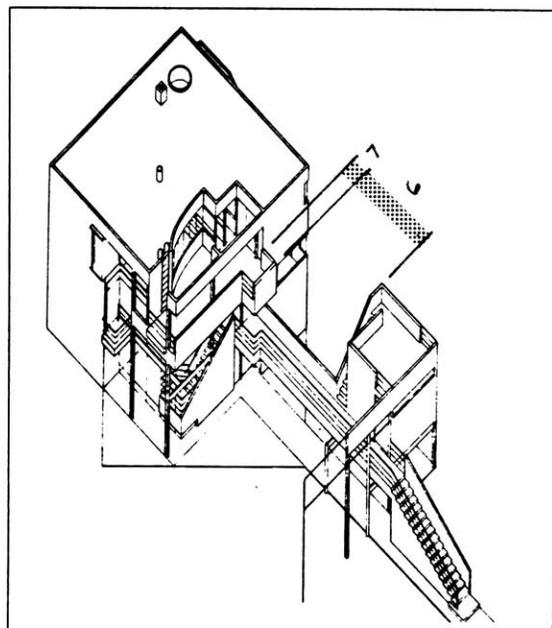


Fig:III.17.

penetrating the actual facade.

2 It enhances the solidity and the thinness of the facade.

The spectator is reminded of this quality of thinness by the narrow window on the upper right hand corner of the house. The contrast of the color of the white and black geometrical shapes gives the spectator the illusion of their existing in varied spatial depths.

The left hand side window and the triangular plane of the stair form a receding plane from the main facade. This results in an interstitial space. On the left, this space is an external one and is bounded by the facade itself and the implied plane that projects down from the parapet of the balcony above. (Fig:III.18) On the right, a similar case occurs except that the space is an internal one and is bounded by the exterior facade of the dining room on one side and the implied plane of the study room above on the other. (Fig:III.19)

The entrance door marks the beginning of two successive spatial layers, each of considerable depth. The first concludes with the definition of the third floor balcony that overlooks the living room. The second layer of space starts with the conclusion of the aforementioned and ends with the "third facade" that contains the

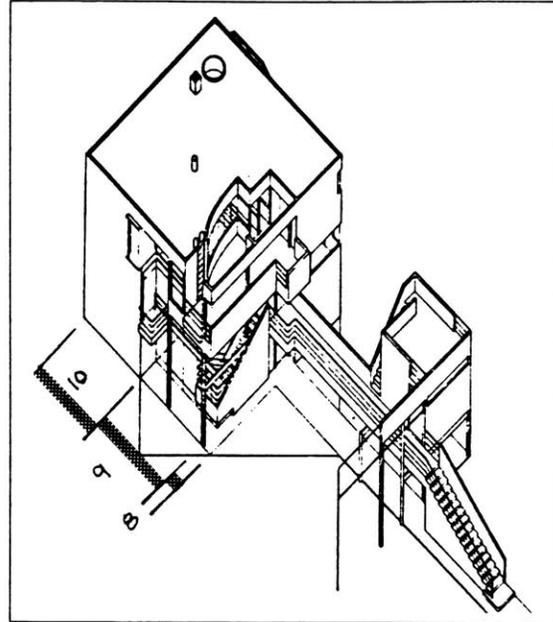


Fig:III.18.

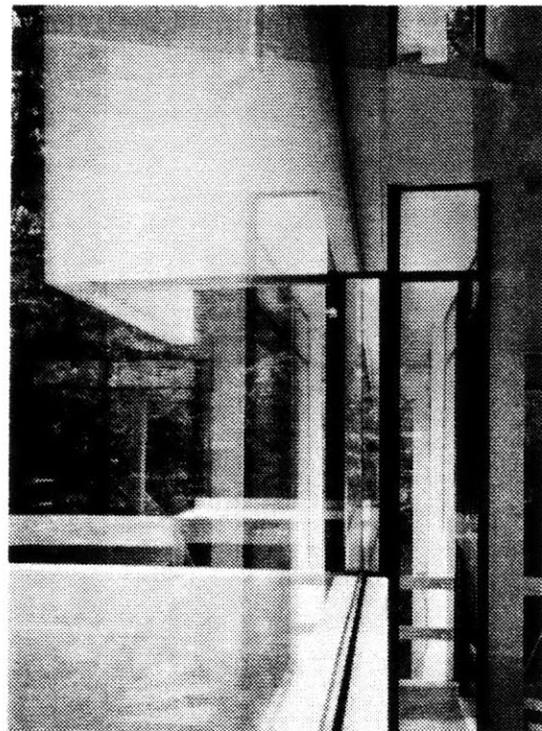


Fig:III.19, Dining room wall detail.

mural. These two layers of space constitute the main interior volume of the house.

Finally, this layering extravaganza ends with the most curious and ambiguous spatial layer of all. The wall containing the mural is all solid except for a small slot window on the left. (Fig:III.20) Unlike the perceptually solid window of Villa Savoye, the transparency of this window prevails. As the spectator looks through it, his/her vision travels for some ambiguous distance and then ends with a wall of trees. This constructs a last and final layer of space.

In total there are eleven layers of space encountered by the spectator when the assumed journey is taken. (Fig:III.21) The main devices that are used to define them are three:

- 1 Peripheral definition
- 2 Planes
- 3 Elevated walkway

The first device was appropriately used to imply certain spatial boundaries through subtle gestures like changing the material of the rail or running the stair perpendicular to the direction of motion.

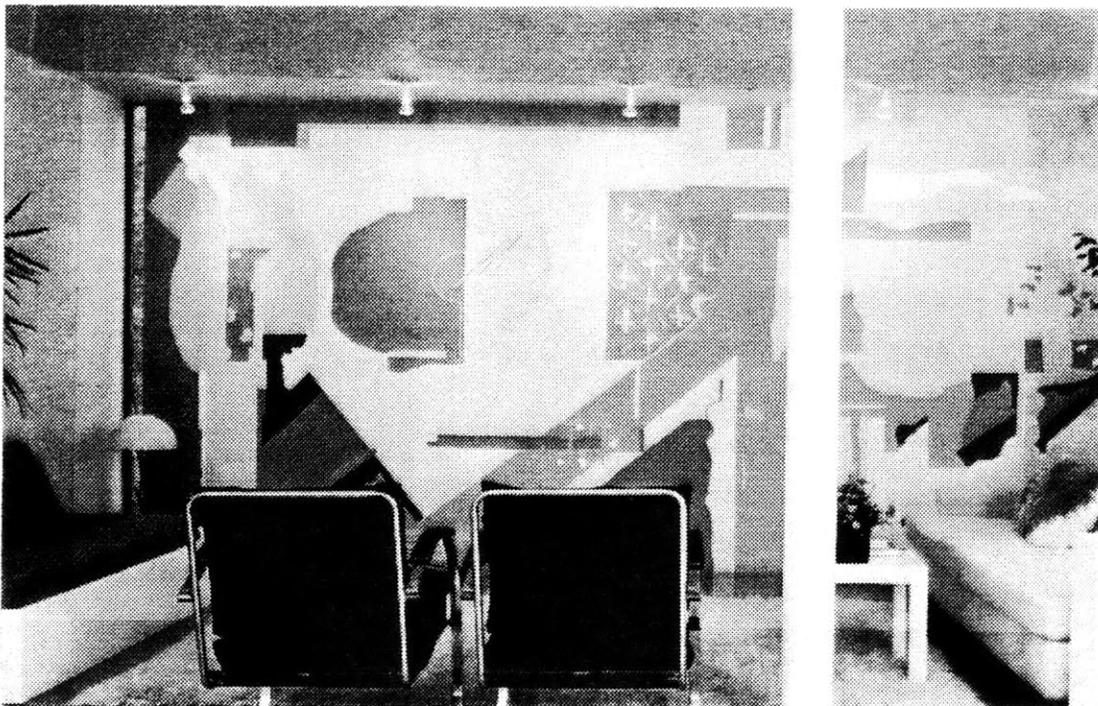


Fig:III.20, The mural wall of the living room showing glimpses of the space beyond through the slot window on the left.

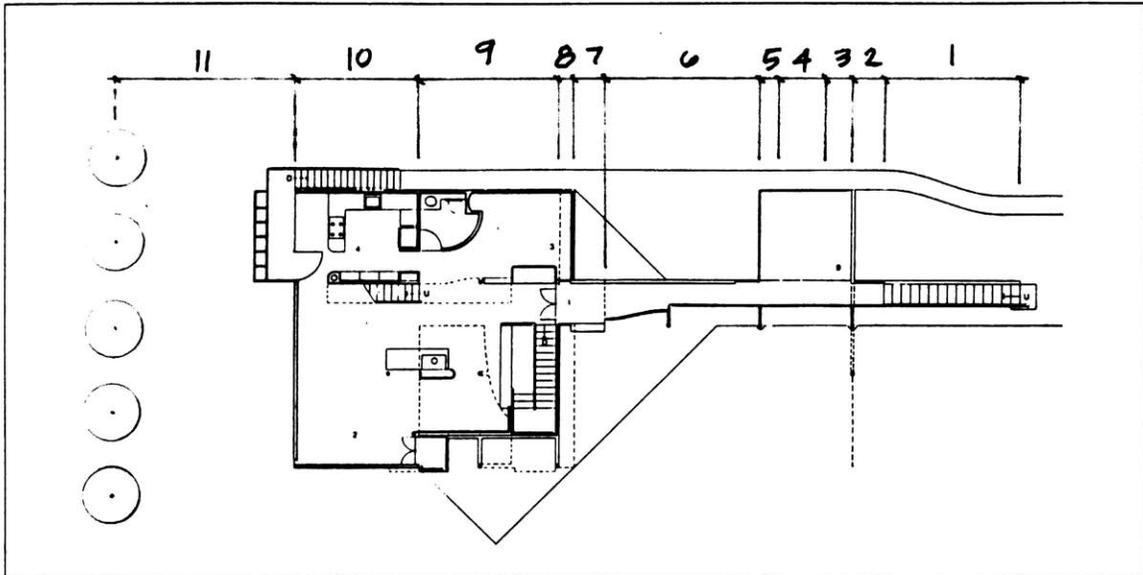


Fig:III.21, Summary.

Besides defining spatial layers, free standing planes were used to define a larger scope which complies with the architect's agenda. Moreover, these planes result in fragmented spaces that are reassembled mentally as motion through the layers takes place.

This motion occurs intentionally on an elevated platform that maintains a frontal relationship between the spectator and the building. By elevating it, the perception of it as an element that cuts through the sliced layers of space is enhanced and as a result, the definition of the spatial layers is also strengthened. It acts as a tape measure with varied dimensions that correspond to the thickness of the spatial layers. This elevated platform possesses a great

resemblance to Picasso's *Glass and Dice*, 1914 in which his construction is also transversed by an elevated piece of wood that penetrates through the whole structure. (Fig:III.22)

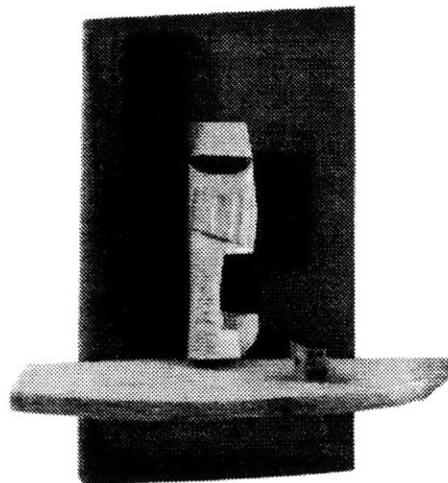


Fig:III.22, Picasso, 'Glass and Dice', 1914.

This kind of directed walkway has another function which Arnheim mentions in his book *The Dynamics of Architectural Form*. "Strict control by a narrow channel is not the only means of guiding locomotion. Propelled by a sufficiently directive impulse, the walker may find himself traversing a room whose axis he crosses at a right angle. Suddenly without support, he enjoys the freedom tinged with anxiety of being on his own, a sense of power and adventure."¹¹ (1977)

He supports his statement with the diagram illustrated in figure III.23. In the Graves example, one can draw a similar diagram by simply multiplying it several times. Figure III.24 is the result.

In conclusion, it is important to observe that

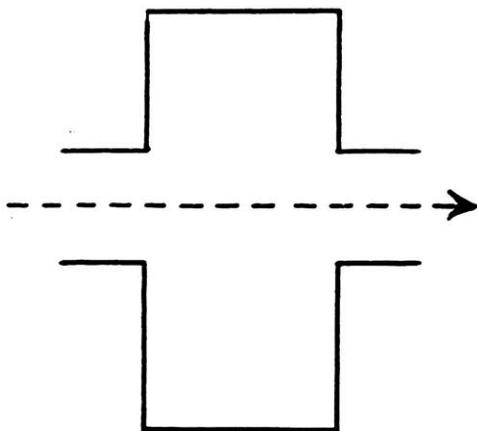


Fig:III.23, Arnheim's diagram of the 'narrow channel' traversing a room.

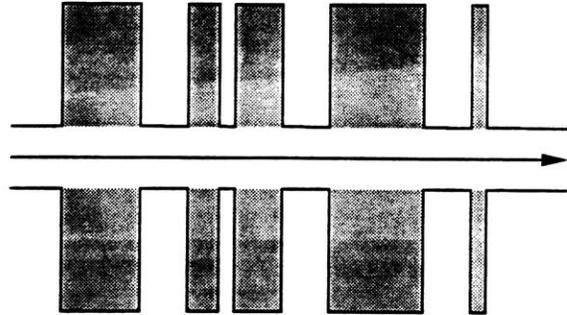


Fig:III.24.

the vocabulary of all the membranes that define the spatial layers is kept neutral and subdued so that the displacement and geometry of the membranes play an optimal role in defining the spaces. In other words, it is the space between the membranes that is more important than the membranes themselves.

Building: *The Exeter Library* (Fig:III.25)

Architect: *Louis Kahn*

Date: 1971

This building "offers a rich source of evidence

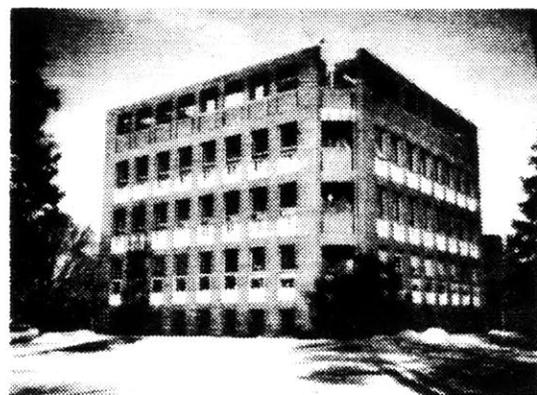


Fig:III.25, General view of the library.

of the way in which Kahn practiced his art."¹² (J. Wickersham, 1989) His interest in the visual arts provides some explanation of the pictorial quality that some of his buildings enjoy. However, his paintings do not reflect the same concept of layering that those of the previous two architects do. (Fig:III.26)

In this building Kahn's use of layering is more complex than that of Le Corbusier's and Graves's. Here the membranes gain importance: they are no longer mere separators between two zones. The punctured holes in walls have specific meanings as well: they not only allow one to see through an opaque surface, but their shape conveys deeper meaning.

The basic design of the building is a series of concentric rings which surround a central hall. These rings constitute the spatial layers. In

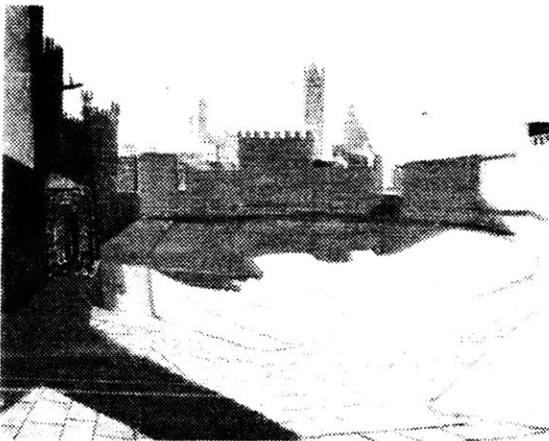


Fig:III.26, A painting by Kahn of Siena.

contrast to the previous two examples, this design possesses a "center". There is a clear identity to this center towards which pictorial images converge. Jay Wickersham, the author of the article "The Making of Exeter Library" says: "Looked at both spatially and constructionally, though, the library is really three separate layers: the inner shell of the central hall; the bookstack areas and corner towers (what Kahn called the "bookcase building"), and the outer brick arcades."¹³ (1989) The illustration in figure III.27 translates the analysis into a diagram.

Kahn himself alluded to this point when he said: "I made the outer depth of the building like a brick doughnut, independent of the

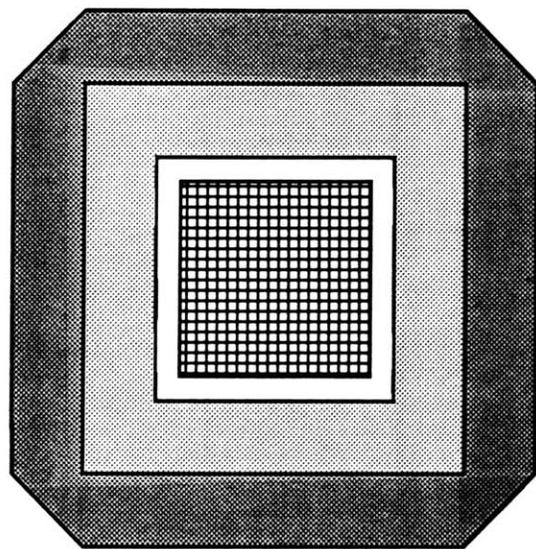


Fig:III.27.

books. I made the inner depth of the building like a concrete doughnut, where the books are stored away from light."¹⁴

A closer look reveals that these concentric spaces are more numerous than the ones cited by Wickersham, though they still comply with his division into three principal layers.

As I have done in the past two examples, I assume a certain path, the principal route into the building, and use this to describe how the spatial layers are experienced. The journey in this case follows the description by Wickersham of the library when he said; "The library has no visible front door, only a deeply shadowed arcade which runs all the way around the building. Once one has entered the arcade and found the door, one ascends the curving arm of a monumental stair to arrive to a sky lit room, seventy feet high and fifty feet square, with large circular holes cut into its concrete walls, which almost touch at the corners. Within the circles float cantilevered balconies, clad in oak panels. Beyond them one sees the guts of the building, especially the ranges of metal bookstacks... After the monumentality of the great hall, the reading areas offer a welcome intimacy. After passing through the bookstacks, one enters a continuous band of two-story-high arcades

which march all the way around the building."¹⁵ (1989)

From this description, one can sense the importance of the sequence of the experiences that the architect is presenting to the spectator. The pictorial aspect of this building is overshadowed by its elaborate *spatial experience*. The change of materials, which is carefully synchronized to match the appropriate space, helps define spatial boundaries. Rather than just rely on the geometry of the planes to define space, here the architect introduces distinct properties and meaning to those membranes. This takes place in the form of materials chosen, natural light and the height of the space. By doing so, he was able to stress the distinction between the various spaces that are organized in a layered fashion and consequently, amplify the effect of layering.

From the exterior, this example can be conceived as a cube that is carefully sculpted. Its corners are carved out, exposing the thickness of the brick walls as if they are membranes detached from the mass behind. (Fig:III.28) This has been achieved by allowing the diagonal wall to recede slightly, which results in the relationship illustrated in figure III.29. The perception of the walls as membranes is enhanced by punctured

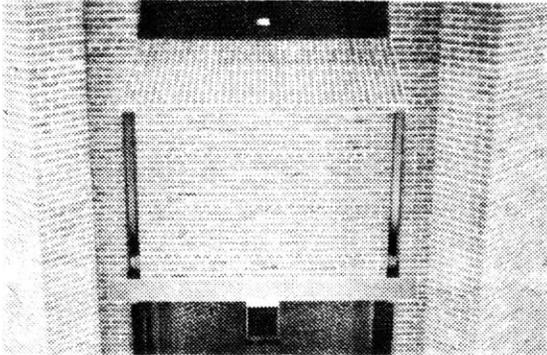


Fig:III.28, Corner detail.

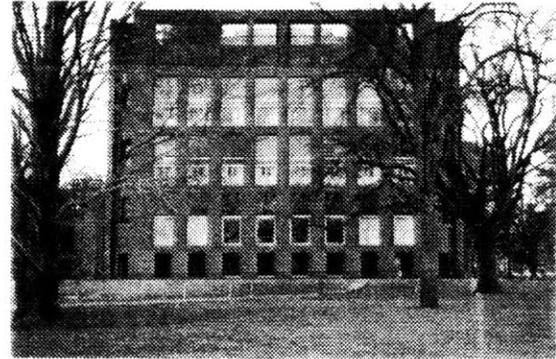


Fig:III.30.

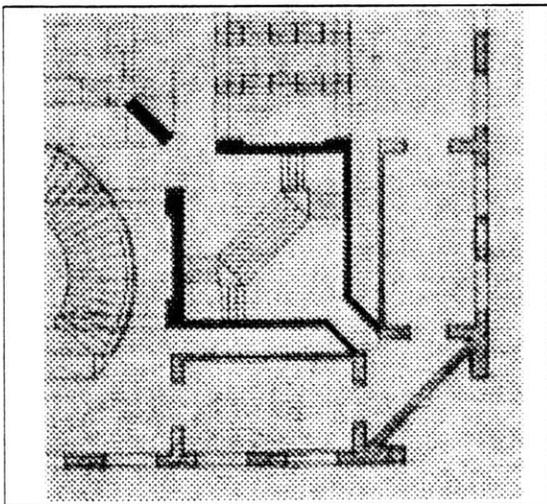


Fig:III.29, Corner detail in plan.

rectangular top openings, beyond which is glimpsed the roof terrace. The size of these openings corresponds to that of the narrowing piers which signify the amount of load each section of the pier is carrying. (Fig:III.30) Hence, the openings match a part of another order - structure. This kind of order could not be seen in the last two examples. The membrane also helps define the first spatial layer, the arcade. (Fig:III.31)

In the area between this layer of space and the central hall there exist four narrow spatial layers. (Fig:III.32)

The first is merely a few feet deep, defined by the end of the arcade and the implied membrane of the wall with the trapezoidal opening above. (Fig:III.33) As one enters this spatial layer, two events take place:

- 1 The material changes from predominantly brick to predominantly marble.
- 2 The height of the space almost doubles.

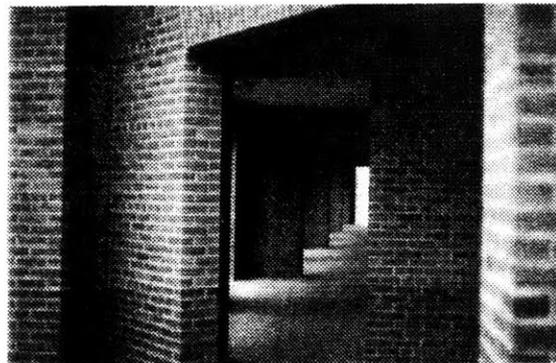
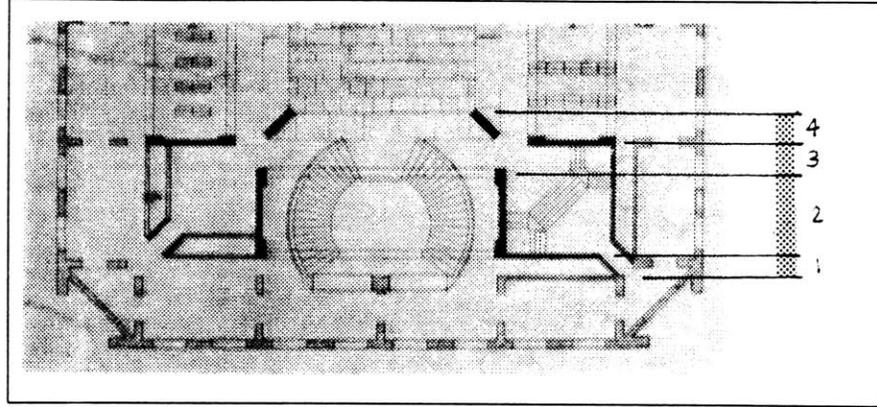


Fig:III.31, The arcade.

Fig:III.32.



At the top of the stair, there exists an identical method of definition of space which concludes the second spatial layer.

is aligned with the end of the stairway parapet defines the third spatial layer. The upward extension of this membrane is the oak clad balconies that overlook the central hall.

The implied outer shell of the central hall which

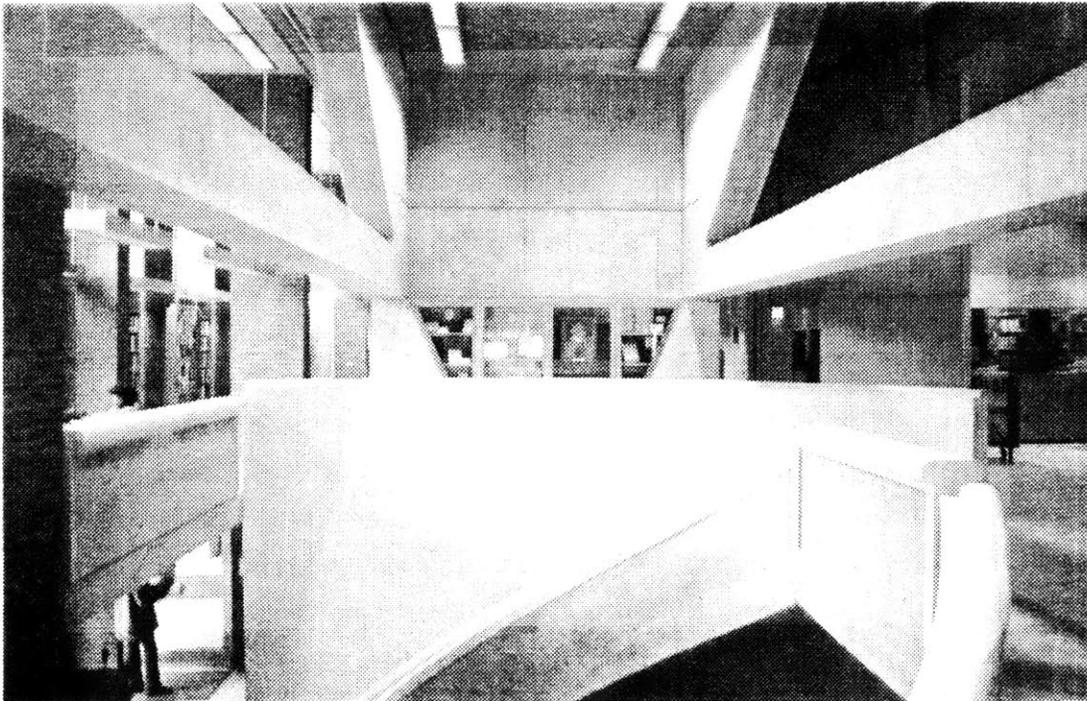


Fig:III.33, View of the entrance.

The fourth layer of space before entering the central hall is defined by its inner and outer shell.

This section of spatial layers constitutes what Wickersham described as the second separate layer. It houses the bookstacks on other levels of the building. Since moving on the staircase - and until this point - the height of the spaces and their corresponding materials has remained the same. The spaces have been growing successively darker, however, as one gets closer to the center, fragmented pictures of the central hall start to appear which build an element of anticipation inside the spectator's mind. This anticipation reaches a climax when the spectator penetrates the membrane defining the central hall. At that time, one cannot help but look up, right and left in order to absorb new information about the space and to compare it with the speculation that was taking place during the journey. (Fig:III.34) The drama of going from one spatial layer into another is achieved through:

- 1 A change of wall materials from entirely wood to concrete and wood.
- 2 The direction and intensity of natural light changes - from a space with relatively less intense lateral natural light to a space that is flooded with filtered natural light from above.
- 3 The dimensions of experienced space -



Fig:III.34, View of the central hall.

change from a narrow low space to an overwhelmingly large volume of space.

From here glimpses of the bookstacks that lie behind the wood clad balconies start to appear; these are nicely fitted within the circular cutouts of the concrete screen. The perception of the concrete screen as a membrane is similar to the two walls cited in the previous examples in that they are enhanced by their transparent

quality. But there is something more curious about the shape of these openings. They allow the spectator to perceive the formation of an unreachable cube that is hung in mid air - which signifies the arrival at the center of the library and as Kahn conceived it, the center of the campus.

Besides its aesthetic implications, the wood cladding on the balconies is repeated on all the levels to reinforce the perception of the implied plane as a membrane. Because of the ability to see fragments of the stack area on the second level, one proceeds outward through a similar experience to the corner tower that houses the staircase.

After exiting the staircase, one finds oneself in a vestibule area that easily connects to the wood clad balconies. (Fig:III.35) This ends any speculation as to the location of the spectator with respect to the central hall (which is used

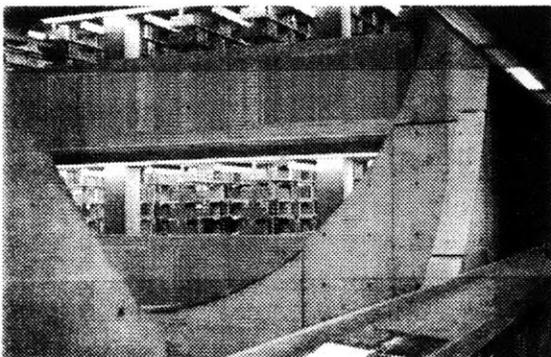


Fig:III.35, View from one of the balconies.

as a reference because of its evident identity). The balconies constitute the eighth overall layer of space. The stacks themselves form the ninth layer of space.

Before reaching the study carrels one is confronted with a layer of space between the stacks and the carrels. This is defined by the edge of the stacks and the set of columns that support the balcony overlooking the study carrels. (Fig:III.36) The study carrel space, which is the last of the spatial layers, is a two-storey space that, in contrast to the previous two, is flooded with lateral natural light. (Fig:III.37)

Taking on this journey, which is a typical route any student might take, the spectator encounters a total of eleven spatial layers. (Fig:III.38) The main determinants in defining the spatial layers are four:

1 Material change



Fig:III.36, Study carrels.



Fig:III.37.

- 2 Intensity and source of natural light
- 3 Implied planes
- 4 Dimensions of space

All of these devices are used to follow a certain

functional stratification scheme for the building. Materials change, spaces grow larger, spaces become laterally lit, or spaces become physically separated in order to follow a functional order that was regarded very highly by Kahn. Kahn said: "The beginning of architecture is after the function is thoroughly comprehended. At that point, the mind opens to the nature of the spaces themselves."¹⁶

For instance, the central hall was regarded as a "public space which offered readers "the invitation of books", it would dramatize the nature of the library as a storehouse of learning, and it would provide a central focus for the

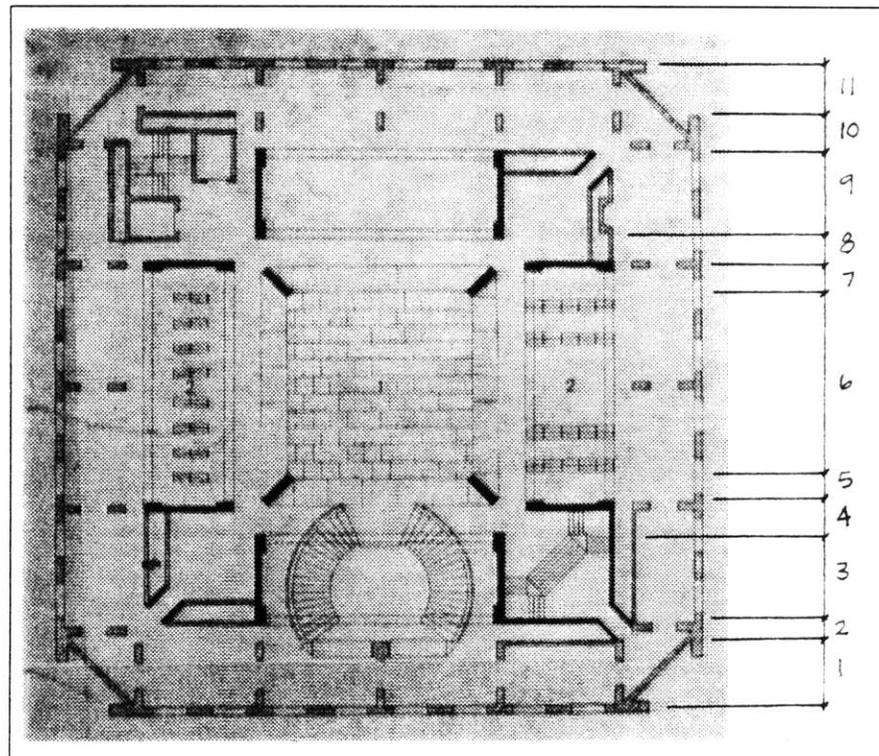


Fig:III.38, Summary.

Academy's campus."¹⁷ (J. Wickersham: 1989) In other words, it fits a certain functional need. As another example, one of his layers accommodates for some students to "sprawl in a deep armchair". Others allow "students to sit by an open window".

In conclusion, it is important to note that the stratification of the various layers of space was determined through a preconceived functional scheme. It is also important to observe that the membranes of the various layers gain importance and attract attention through the use of different materials and other physical properties. Together they identify an intrinsic quality of the spaces that they define instead of being neutral and subdued, as the membranes often are in the works of Le Corbusier and Graves. As a marginal note, Golding observes a similar distinction concerning the use of the plane in the collages of Picasso and Braque. The layers in the

compositions of Picasso were transformed by giving them specific meaning while Braque's layers were merely used as means to establish the composition of a picture.

Building: *The Ushimado Arts Festival Center*
(Fig:III.39)

Architect: *Hiroshi Fujii*

Date: 1985

This building, I believe, is the most "Cubist" of all the examples. Concepts of fragmentation, X-ray and space-time crystallize in the spatially layered structure. This building manifests an explicit translation of the Cubist idea of layering into architecture. It is composed basically of three structures: an exhibition hall, an entrance/office space and a structure that houses the rest area. (Fig:III.40) The exhibition space used to be an old storehouse, which in the design process was a source of inspiration to the architect. The reason I believe that the

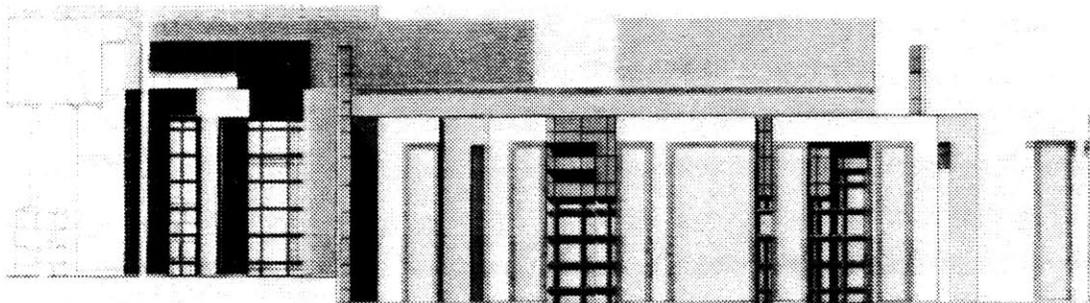


Fig:III.39, *The main facade.*

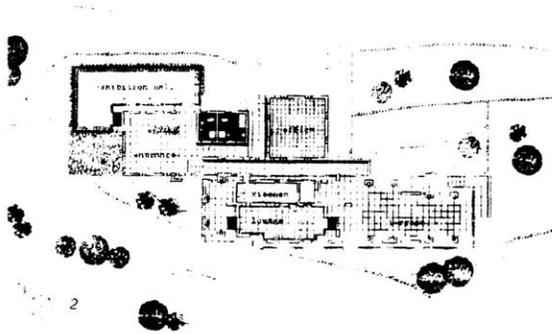


Fig:III.40.

architecture is very Cubist is because of the technique used; the architect studies the old structure and then provides the spectator with aspects of it that are normally not seen.

There is the exhibition hall which is derived from the old townscape and reflects the atmosphere of the town. It is a simple structure, a stone-based structure with a tiled, gabled roof. This form is then studied, fragmented and transformed and forms the genesis of a method for designing the new structures. The result is a conceptualized, layered, X-ray image of the old form. The purpose of this process is to relate the building to its environment. Fujii said: "Architects generally respond to such a wish or condition with fusion or contrast, harmonizing the design with the environment in question or relating the two in some other way. I disregarded such conventional methods, however, and began by metamorphosing the old, existing storehouse...

transformations of formal and spatial codes or architecture, if repeated, cause forms and spaces to lose their coding and to become eventually traces of their originals."¹⁸ (1987)

What remains in the new spaces is the essence of the old storehouse. This essence is then molded with other ingredients such as "conceptual" information and then shown in the new structures. This recalls a similar endeavor in analytical Cubism, where "conceptual" information was added to the object to enhance its practical reality. John Whiteman observed: "In recent projects Fujii has systematically explored the methods and mechanisms by which the rules and customary codes of ordinary appearance can be altered."¹⁹ (1987)

Besides the close relationship in approach between this building and analytical paintings, the planes in this example become more literal, causing an increased perception of concatenated interstitial spaces. This makes its affinity with collage important as well.

I will assume an experiential path, as I have done in the past, and use it to describe the encountered layers of spaces. The sequence of spaces here originates in the old structure as Fujii stated when he described his building: "I

said at the beginning that this project had its start in the metamorphosing of an old storehouse. This involved first of all identifying and then rearranging the characteristics of the storehouse... Then I designed the entrance space, enclosed in by black walls with gridded aluminum joints... Space in the building housing the rest area, however, is compositional in nature and is itself open in character..."²⁰ (1987)

From the above description, it is evident that there is a preconceived notion of a certain sequence of spaces that the spectator experiences. This sequence is a linear one that follows the direction of the path to be taken and maintains a normal relationship with the direction of the interstitial spaces. This allows for a *frontal* relationship between the observer and the parallel implied planes which is essential in the Cubist concept of layering.

The old structure has been reshaped by superimposing an identically shaped structure on top. (Fig:III.41) This resulted in an L-shaped space where the long arm of the "L" is the first layer of space. The second layer of space is a small narrow space between the edge of the superimposed structure and the new transparent wall of the old structure. (Fig:III.42)

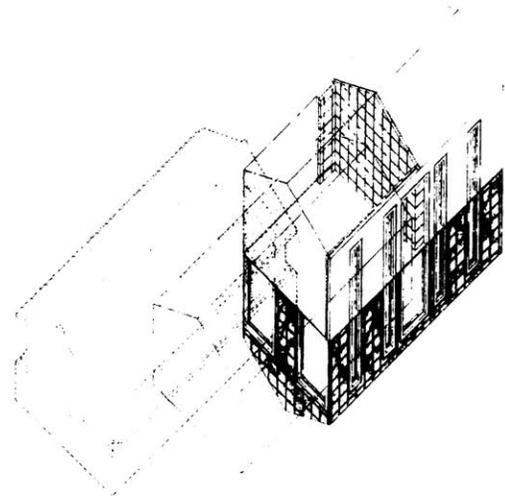


Fig:III.41, *The fragmentation of the old.*

The common space between both structures is the third layer of space. It is defined on the one hand by the black wall of the new structure and by a fragment of the old on the other. (Fig:III.43) The fragmented piece of the old structure maintains a longitudinal shape so as to increase its effectiveness in defining space.

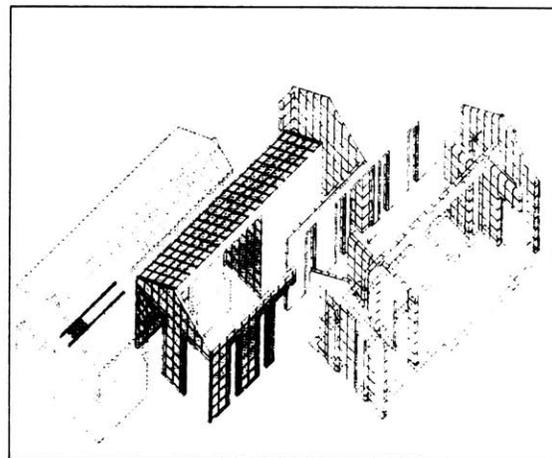


Fig:III.42.

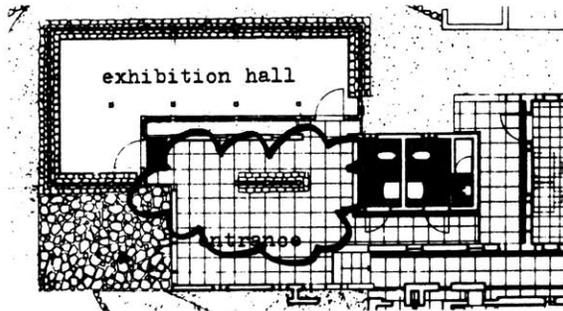


Fig:III.43.

This is a typical example of the transformation of a "solid" space to a *layered and fragmented* space.

The fourth layer of space is defined by the conclusion of the old structure and the mid-line of the new structure which is implied through the south-west rest room wall and the edge of the roof opening above. (Fig:III.44) This is the most subtle definition of space in this example. This definition seems not so subtle when compared with Graves's example in which one spatial layer was defined through the change of the material of the rail.

The space under the roof opening is also an

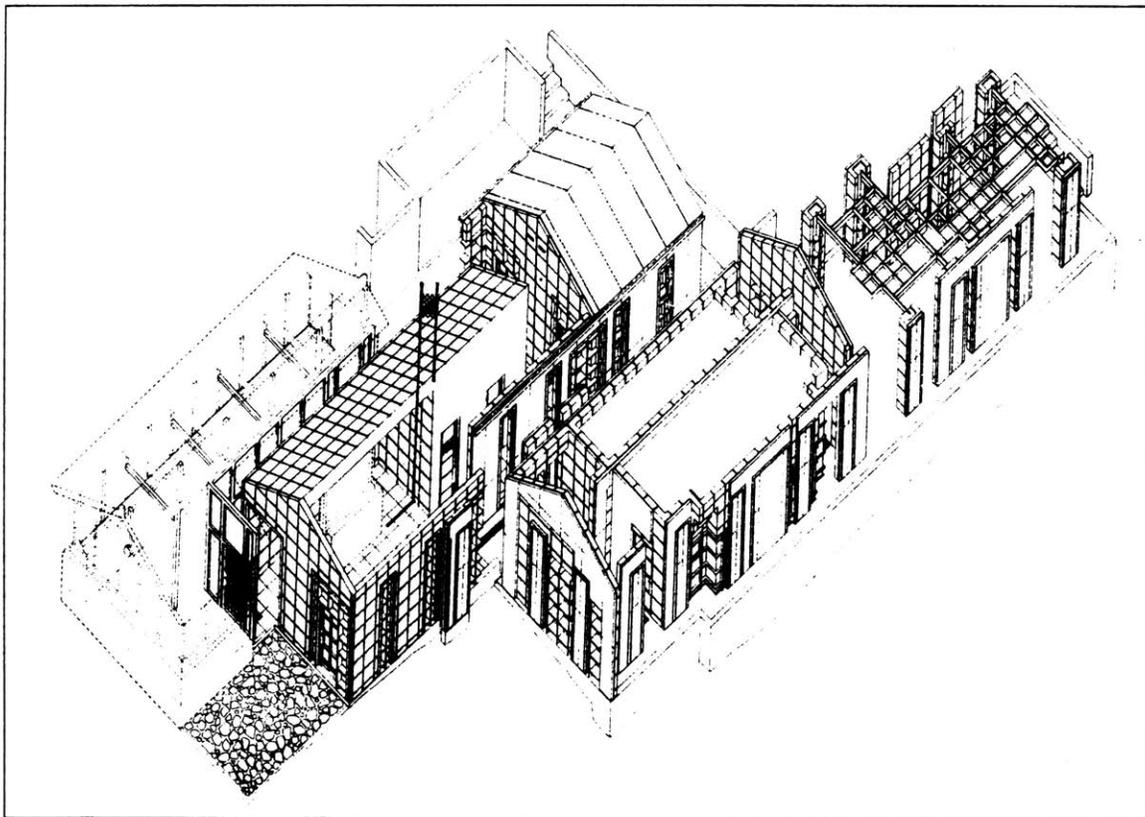


Fig:III.44.

example of a single entity which was subdivided. This time the fragmentation occurs through the intrusion of a plane parallel to the direction of the space which magnifies the perception of spatial layering. This plane is the extension of the south-west wall of the office building. (Fig:III.45) The resultant two spaces are of equal depth. The space between the restrooms and the plane itself is the fifth layer of space, while the plane that concludes this space and the common wall between the second and third structures define the sixth layer of space. The latter space is one of the rare occasions among the examples in which the motion of the spectator follows the direction of the space instead of traversing it. (Fig:III.46) By doing so, the architect was able to shift the direction of motion of the spectator to align it with that which traverses the third structure. This serves as a reminder that the architect in this case was interested in the concept of layering as a concept to achieve other goals.

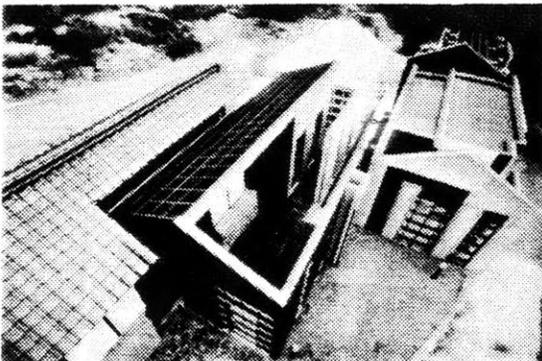


Fig:III.45.



Fig:III.46, View of spatial layer #6.

The definition of the spaces within the third structure becomes ambiguous when compared with the other two and with it the perception of spatial layers is weakened. Nevertheless, as the observer enters the structure, he/she encounters a very narrow and intriguing space. It is defined by two parallel fragments of two walls. The beginning of this layer of space is the common wall between the second and the third structures and its conclusion is the exterior wall of the kitchen. A fragment of the latter wall becomes displaced laterally and attaches itself to the exterior wall of the

entrance. A matching opening slot is found in the north western facade of the third structure. These two gestures serve as reminders to the spectator that such an interstitial space exists. (Fig:III.47)

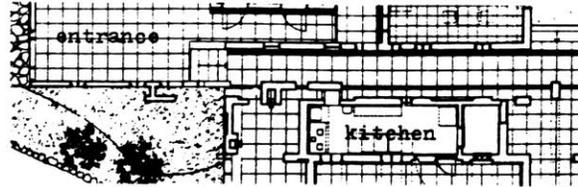


Fig:III.47.

Finally a space with similar depth occurs at the end of the structure bounded by the exterior wall on one side and by the rail on the other.

In total there are nine spatial layers that the spectator encounters when an experiential path such as the one assumed is taken. (Fig:III.48) Some of the elements used to define the spatial layers are:

- 1 Explicit planes
- 2 Tone of materials

This example more than the other three examples mentioned here, exploits the use of

the plane to the fullest. It is not as poetic as the use of the plane by Le Corbusier to define his terrace, where he enhanced its meaning by defeating its purpose. Neither do the planes here reflect the sensual meaning that Louis Kahn's possessed. They are merely used to separate two zones; as space definers. The plane that separates spaces 5 & 6 illustrates this point very well. This plane is first punctured with rectangular openings. The punctures are then displaced perpendicularly out of their plane to define the plane that is common to the second and third structures. His diagram indicates that a technique along

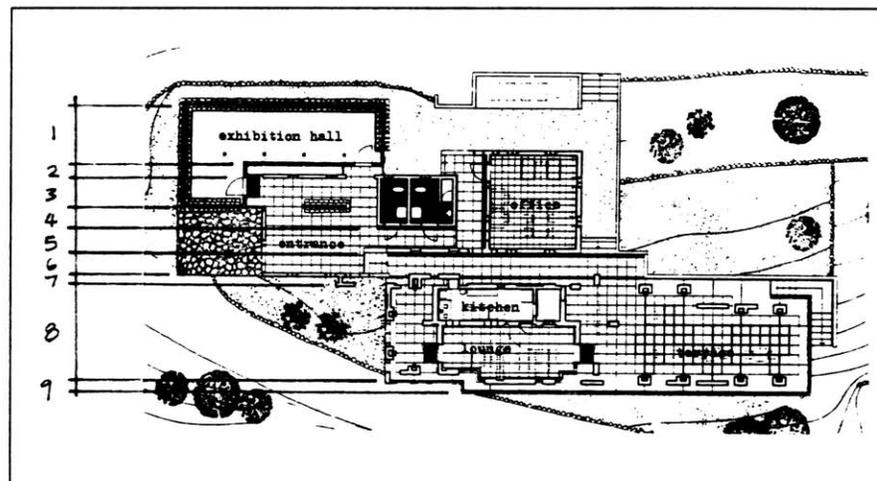


Fig:III.48, Summary.

these lines was used to define the exterior wall of the third structure. (Fig:III.49) Fujii indulges his spectator with a purely intellectual game that bares little or no relationship to the significance of the spaces these planes define. Nevertheless, they function through their evident presence as generators of the idea of motion. Unlike Graves's example, the planes do not congregate tightly along a pre-established path but rather are loosely arranged, giving the experiential path a more flexible definition.

The tones of materials were also used to convey illusionistically the placement of different surfaces in different spatial depths. For example, the south-west wall of the third structure is comprised of three tones: dark, grey and white. Although these three tones actually co-exist on the same plane most of the time, perceptually, they seem to be positioned

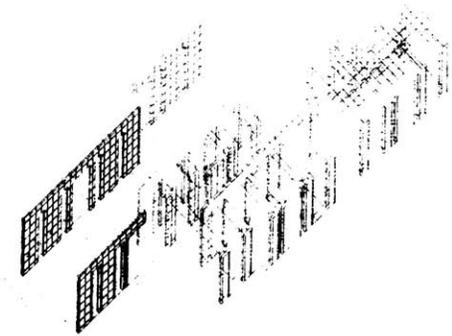


Fig:III.49, The method of "projection" used to determine the characteristics of other membranes.

in a layered-like composition; the white being the nearest, the grey being in the middle and the black being the farthest. (Fig:III.50)

The similarities in the utilization of the concept of layering between this building and Cubism are numerous. However, Fujii himself never admits in his essays that a connection of this kind has occurred. He claims that his idea of fragmentation has come from Japanese

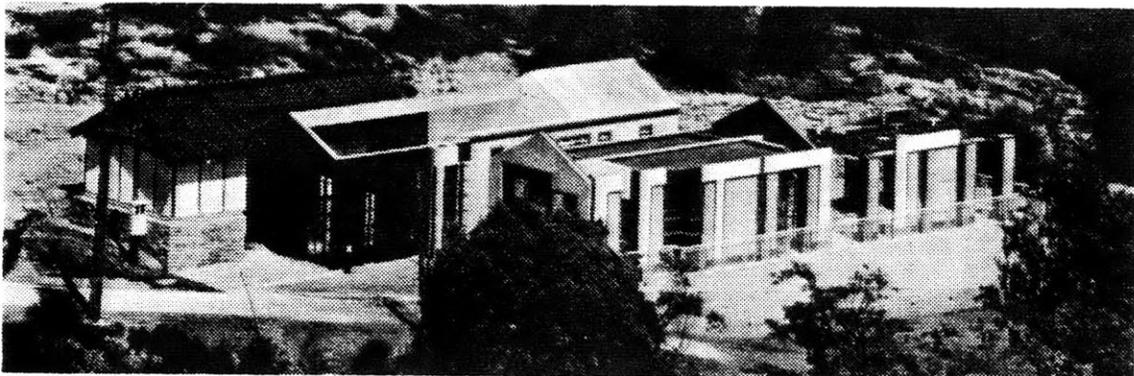


Fig:III.50.

landscape ideologies.

He compares the gardens of Versailles with Japanese gardens to illustrate this point. He says: "The overlapping landscape blends one's line of vision and foils attempts to see the entire garden. The landscape is not integrated through vision but is in fact compelled to flex and fragment. This poverty of vista is precisely what is distinctive about a Japanese garden."²¹ (1987)

This could very well be true but I find his choice of the gardens of Versailles as an example that contrasts the idea of fragmented space a curious one. This is because in *Space, Time and Architecture*, Giedion makes a similar argument also, choosing Versailles as an example. Under a section entitled "The Research into Space: Cubism", Giedion said: "...it has become plain that the aesthetic qualities of space are not limited to its infinity for sight, as in the gardens of Versailles. The essence of space as it is conceived today is its many-sidedness..."²² (1956)

The connection of the idea of fragmentation with Cubism in Giedion's book could have filtered down to Fujii's research about fragmentation. Further evidence, such as the issue of frontality, which is critical in the Cubist

concept of layering supports this observation. Granted that fragmentation may be a quality that Japanese gardens possess, issues such as frontality that is found in Fujii's work cannot be explained in that way.

- ¹ Michael Hays, "Theory-Constitutive Conventions and Theory Change", *Assemblage #1*, (Cambridge: MIT Press, 1986), p.117-128. As an example, he used the egg in Piero della Francesca's painting.
- ² Heinrich Wölfflin, *Principles of Art History, The Problem of the Development of Style in Later Art*, translated by Hottinger, M. D., (New York: Dover Publication Inc., 1932), p.I.
- ³ Le Corbusier, "The Quarrel with Realism", in *Circle, International Survey of Constructive Art* edited by J. L. Martin, Ben Nicholson and N. Gabo, (New York: Praeger Publishers, 1937), p.70.
- ⁴ Beatriz Colomina, "Le Corbusier and Photography", *Assemblage #4*, (Cambridge: MIT Press, 1987), p.9.
- ⁵ Sigfried Giedion, *Space, Time and Architecture*, (Cambridge: Harvard University Press, 1954), p.510.
- ⁶ Alan Colquhoun, *Essays in Architectural Criticism: Modern Architecture and Historical Change*, (Cambridge: MIT Press, 1981), p.172.
- ⁷ Manfredo Tafuri, "American Graffiti: Five * Five = Twenty-Five", *Oppositions #5*, (Cambridge: MIT Press, 1976), p.53.
- ⁸ Alan Colquhoun, *Essays in Architectural Criticism: Modern Architecture and Historical Change*, (Cambridge: MIT Press, 1981), p.177.
- ⁹ Michael Graves, *Michael Graves*, edited by Karen Vogel Wheeler, Peter Arnell and Ted Bickford, (New York: Rizzoli International, Inc., 1982), p.19.
- ¹⁰ Colin Rowe & Robert Slutzky, "Transparency: Literal and Phenomenal", in Colin Rowe, *The Mathematics of the Ideal Villa*, (Cambridge: MIT Press, 1976), p.168.
- ¹¹ Rudolf Arnheim, *The Dynamics of Architectural Form*, (Berkeley: University of California Press, 1977), p.157.
- ¹² Jay Wickersham, "The making of Exeter Library", *Harvard Architecture Review #7*, (Cambridge: MIT Press, 1989), p.139.
- ¹³ *Ibid*, p.145.
- ¹⁴ Louis Kahn, quoted in *ibid*, p.145.
- ¹⁵ *Ibid*, p.140.
- ¹⁶ John Cook & Heinrich Koltz, *Conversation with Architects*, (New York: Praeger, 1973), p.206.
- ¹⁷ Jay Wickersham, "The making of Exeter Library", *Harvard Architecture Review #7*, (Cambridge: MIT Press, 1989), p.141.
- ¹⁸ Hiromi Fujii, *The Architecture of Hiromi Fujii*, edited by Kenneth Frampton, (New York: Rizzoli, 1987), p.106.
- ¹⁹ John Whiteman, "Between Reason and Experience: The Words and Works of Hiromi Fujii", in *ibid*, p.18.
- ²⁰ *Ibid*, p.108, 109.
- ²¹ *Ibid*, p.101.
- ²² Sigfried Giedion, *Space, Time and Architecture*, (Cambridge: Harvard University Press, 1954), p.431.

CONCLUSION

This text has been concerned with the discussion of spatial layering as a particular design concern of twentieth century architects. The method used has been first, to identify the concept of layering in analytical paintings - where it existed in a virtual state. Then, through examining the development of the collage, to study how "real" space was introduced as the layers became actual and physically separated from each other through construction techniques similar to those found in architecture. Although the *space* thus formed was "real", it was not actual, except in the case of a few maquettes for paintings. It became *actual* when it entered the realm of architecture, where it also contributed to shaping the meaning and identity of the concept.

Following the theme set out in the title of the thesis, it has been argued that the concern with spatial layering found in architecture over the past sixty years is an effect of Cubist concepts. The chronology of the examples chosen provides enough evidence that the concept in architecture was not confined to the architecture of the 1920s or 1930s, but rather, is a phenomenon that is still engaging the attention of designers. Architects imported, changed and molded this concept with their own ingredients to fit their own goals. Thus, the concept was transformed from "layering"

to “spatial layering”, and was variously interpreted by the architects who adopted it. The pictorial aspect of the concept in art was also changed to become more *experiential* in architecture. In addition, identification of this transformation of terminology and meaning supports the idea that “layering” existed in Cubism as a *concept* and that it was at that level that architects found it fascinating. For this reason, the execution of the concept of spatial layering by Michael Graves, for example, is different from that of Hiromi Fujii. All four architects of the examples analyzed used the concept differently, nevertheless, they all used it to achieve three goals which were considered central to its use.

- The spectator as an active participant in the architecture
- Fragmentation
- Motion

The above three aspects constitute the main guidelines of the paradigm of space that I alluded to earlier in chapter three.

This paradigm of space relies heavily on the new vision introduced by the Cubists. This vision called for the participation of the *mind* as a main contributor in the perception of the art work. In the presence of spatial layering, the interplay between opacity and transparency

invokes the feeling of ambiguity and hidden meaning. Through opacity it incites curiosity and through transparency it eludes identification. Feelings like these allow the spectator to think and speculate and finally interpret the space differently from others, which in the end results in a personalized perceptual image of it. All of this occurs because the observer *sees* or *experiences* spaces arranged in a certain fashion. It is this assertion of a new vision in the perception of images, which stemmed from the Cubist teachings, that led some architects in this century to engage in a similar manner in the exploration of the concept of layering in architecture.

For some of these architects, there is a new paradigm of space in the balance between apparency and concealment that is achieved through the application of the concept of spatial layering.

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