LAYERING AS AN ARCHITECTURAL OPERATION: PETER EISENMAN'S HOUSE II

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PETER EISENMAN'S HOUSE II

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ABSTRACT

LAYERING AS AN ARCHITECTURAL OPERATION:
PETER EISENMAN'S HOUSE II

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Supervisor: Assoc. Prof. Dr. Berin F. Gür

September 2012, 106 pages

This thesis suggests the concept of layering as a "generative" operation in architectural design process. To understand generation of architectural forms and trace their transformations in this process, this study proposes layering as an integrative and intellectual operation embracing analysis, design and representation phases of architecture. In order to do that, the operation of layering is discussed under three titles: Layering as an analytical tool, as a design tool and as a representational tool. This means that, "layering" can operate to understand complex forms (to analyze), to generate space (to design), and to communicate in design process (to represent).

In this context, for a deeper inquiry into the operation of layering, House II designed by Peter Eisenman is analyzed. The complex and layered form of House II addresses an extensive formal analysis that attempts to reveal the formations and transformations of layers constituting the building. Considering the building as a formal system, "layers" are defined as the fragments of the whole, and "layering" is conceptualized as the main operation that organizes relationships between these fragments. These analyses reveal the *multi-layered* formation of House II.

Creating an architectural system, the operation of layering has the capacity to organize varied architectural elements by defining relationships in-between them.

Keywords: operation of layering, layer, depth, superposition and superimposition, Peter Eisenman, House II, architectural design process.

ÖZ

MİMARİ BİR OPERASYON OLARAK KATMANLAMA:
PETER EISENMAN'IN EV II'Sİ

Tüntaş Karaman, Duygu

Yüksek Lisans, Mimarlık Bölümü
Tez Yöneticisi: Doç. Dr. Berin F. Gür
Eylül 2012, 106 sayfa

Bu tez mimari tasarım süreci içinde katmanlama fikrini "üretken" bir operasyon olarak ele alır. Mimari biçimlerin üretimini anlamak ve bu süreç içinde bu biçimlerin dönüşümlerini izlemek için, bu çalışma katmanlamayı mimarlığın analiz, tasarım ve temsiliyet aşamalarını kapsayan tümleşik zihinsel bir operasyon olarak önerir. Bu anlamda, katmanlama operasyonu üç başlık altında ele alınmıştır: Analiz aracı olarak, tasarım aracı olarak ve temsiliyet aracı olarak katmanlama. Başka bir deyişle, "katmanlama" karmaşık biçimleri anlamak (analiz etmek), mekân üretmek (tasarlamak), ve tasarım sürecinde iletişim kurmak (temsil etmek) için kullanılabilir.

Bu bağlamda katmanlama operasyonunu daha iyi sorgulamak için Peter Eisenman tarafından tasarlanan Ev II projesi çalışılmıştır. Ev II'nin karmaşık ve katmanlı yapısı, biçimlenmeleri ve yapıyı oluşturan katmanların dönüşümünü açığa çıkartmaya çalışan derinlemesine bir biçimsel analiz gerektirir. Yapı örgün bir sistem olarak ele alındığında "katmanlar" bütünün parçalarını, ve "katmanlama" bu parçalar arasındaki ilişkileri kuran birincil eylem olarak tanımlanır. Bu analizler Ev II'nin çok-katmanlı yapısını ortaya çıkarır.

Katmanlama eylemi bir mimari sistem üreterek, pek çok mimari elemanı birbirleri arasında ilişkiler kurarak organize etme kapasitesine sahiptir.

Anahtar kelimeler: katmanlama operasyonu, katman, üst üste gelme ve çakışma, Peter Eisenman, Ev II, mimari tasarım süreci.

To My Family

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CHAPTER 1

INTRODUCTION

…architecture is both *substance* and *act*.[1]

1.1. Aim of the Thesis

This thesis is a critical attempt to investigate the concept of "layering" in architectural design process. It claims that "layering"[2] is an intellectual operation that constructs three-dimensional space by overlapping spatial layers. Approaching layering as an architectural operation suggests construction of (spatial) relations between the overlapping layers not only in vertical plane (i.e. vertical section of the building) but also in horizontal plane (i.e. plan as a horizontal section).

One of the motivations of this research is the discussion related to design process and formal explorations, in other words, the shift from object to design process in architecture.[3] Here, what comes forward is architectural "operations" that organize and actualize this process.

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[1] Peter Eisenman. "Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign," Oppositions Reader. New York: Princeton Architectural Press, 1998: 197. Emphasis mine.

[2] Eisenman uses "layering" as a formal tool in his designs. See Eisenman, Peter. Diagram Diaries. New York: Universe Publishing, 1999.

[3] There are thesis researches conducted in METU, which are mainly concerned with architectural design process: Kerem Yazgan, "Designography of Architecture" (2003);

The design process embraces both mental and material processes that give way to the architectural production. Since, mental and material processes of design are intertwined and mutually constructing each other, they cannot be approached independently.

This thesis is therefore intended to be an exploration into "layering" as an architectural operation where both mental conception and material expression of design are thought together. Thus, this study is concerned with conceptual and formal issues, in the sense that the operation of layering produces architectural space.

1.2. Layering

The definitions of terms related to "layering" need to be clarified for a better understanding of further discussions. "Layer" means "a sheet, quantity, or thickness of material, typically one of several, covering a surface or body;" "layered" is defined as "arranged in a layer or layers;" and "layering" is "the action of arranging something in layers."[4] From these definitions, it can be interpreted that "layer" is the substance and "layering" is the act. On the basis of these definitions regarding "layer" as the *substance* of the *act* of "layering", I should point out that layering and layer are constituents of each other; in other words, layering -as an act- and layer -as its substance- emerge simultaneously in design process.

A layered expression could be thought of linear since the act of layering evolves from a directional vector initiated by a point or plane of reference. A reference plane can be considered as a layer, which can be either planar or spatial.

Burak Turgutoğlu, "Expanding Architecture; A Proposal for a Multi-Functional Hall at METU" (2003); Nihat Kalfazade, "Diagrammatic Potency of the 'Nine Square Grid' in Architectural Design" (2004); Sinem Çınar, "Reading/Unfolding Form: An Inquiry into the Venice Hospital Project by Le Corbusier" (2005); Heves Beşeli, "Web as a System of Architectural Organization: Frankfurt Römerberg Competition Project" (2009) and etc.

There is also a graduate course "ARCH778 Formal Analysis of Buildings" opening in the fall semester in 2012 by the supervisor of this thesis, Assoc. Prof. Dr. Berin F. Gür.

[4] Oxford Dictionaries. oxforddictionaries.com

To compare planar and spatial layers, it can be said that spatial layer has depth as the third dimension, and planar layer on its own does not denote for depth. A planar layer can also be conceptualized as a "surface"[5] An arrangement of multiple layers has the potential to create illusion of depth in between them. (Fig. 1-1)

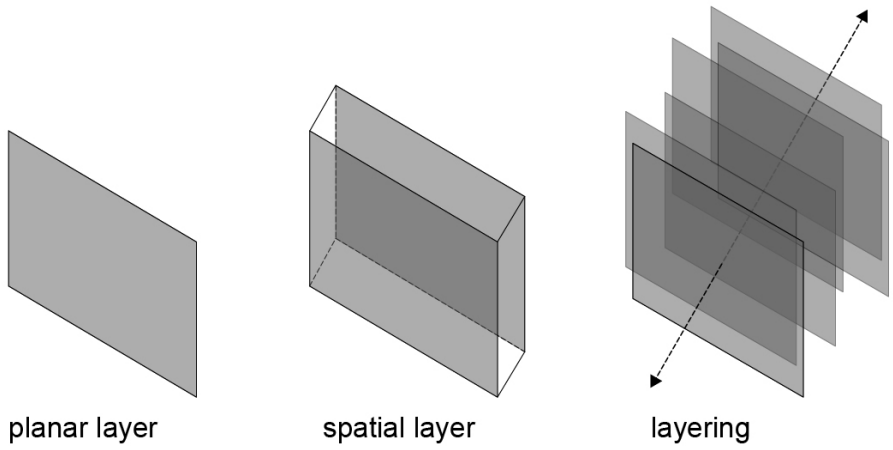

Figure 1-1 Diagrams showing types of layers and the operation of layering.
Produced by the author.

Relevancy of the Concept of "Layering"

In his book *The New Paradigm in Architecture*, Charles Jencks defines "layering and ambiguity" as one of the experimental "movements" of Post-Modern space that "develops the ambiguity and complex spatial layering – the skews, shifted axes and dissonant figures" in the 1970s. This movement, as Jencks calls, "leads into the movement of folding, blob architecture and biomorphic design, all aided by the computer" from 1985 then on.[6] Regarding this evolution from layering to fold, blob and biomorphic design; layering appears to be the fundamental

[5] See: Ali Y. Özdemir. "An Inquiry into the Concept of 'Surface' in the Works of Peter Eisenman." Unpublished Master's Thesis, METU, 2012.

[6] Charles Jencks. "The Modes of Architectural Communication," The New Paradigm in Architecture: The Language of Post-Modernism. New Haven and London: Yale University Press, 2002: 51.

operation of computer-aided design. The contemporary reflections of layering can be found by considering “layer” as an operational entity rather than an object.

Recent implication of layering can be seen in Yokohama Port Terminal designed by FOA completed in 2002. In this building, if transverse sections are interpreted as layers, then the layering of these sections generates the relationship between other layers, which forms the topographic surfaces of the building. The building is designed layer-by-layer. Minimal changes on one of these layers affect the entire formation. The layers are also important for the structure of building. Therefore, they are both organizational in design process and structural in the construction process. Another competition entry to Yokohama Port Terminal is by Jesse Reiser and Nanako Unemoto. (Fig. 1-2) The design of this project is very parallel with the winning project of FOA in the way the building is constituted by sequential sectional layers.

Another recent example is Burnham Pavilion in Chicago designed by Zaha Hadid Architects (2009). This project is also produced by sectional layers to obtain overall form, and also, to be able to construct the pavilion. Therefore, it is possible to say that these layers are both conceptual and structural. (Fig. 1-3)

These layers are different from the ones in Yokohama Port Terminal, as they are formal and not organizational for the building program due to the program-free condition of the pavilion. It is also different in the sense that the layers are produced after the form of pavilion is designed, whereas in Yokohama Port Terminal, the layers are produced in order to attain the overall form. In any case, layers play a crucial role in the generation of buildings and therefore, any alteration in layers affects the entire configuration, as they exist mutually.

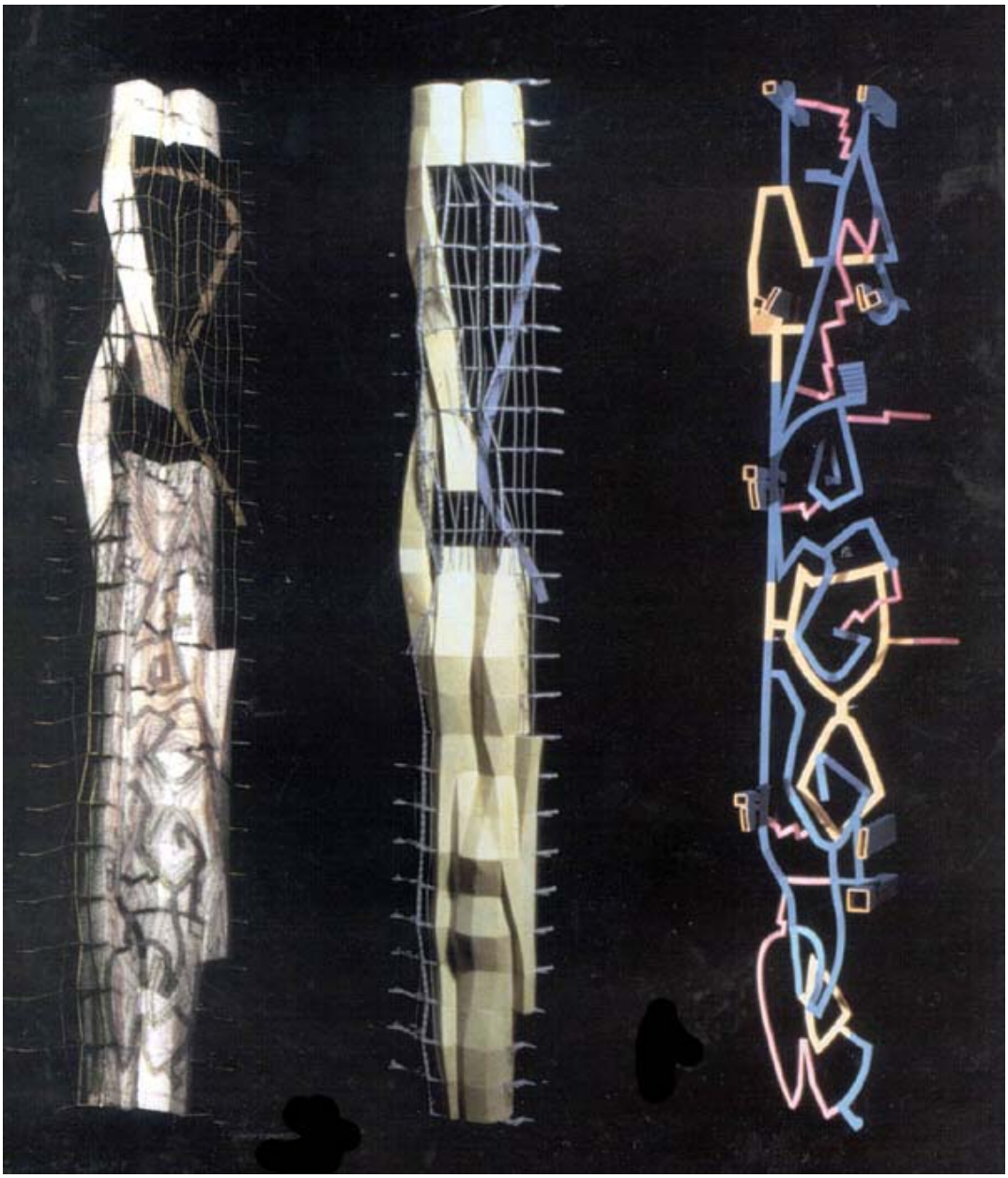

Figure 1-2 Model showing Structural layers of Yokohama Port Terminal competition entry in 1995 by Jesse Reiser and Nanako Unemoto. Source: Andrew Benjamin. Reiser+Umemoto: Recent Projects. Academy Editions, 1998: 66.

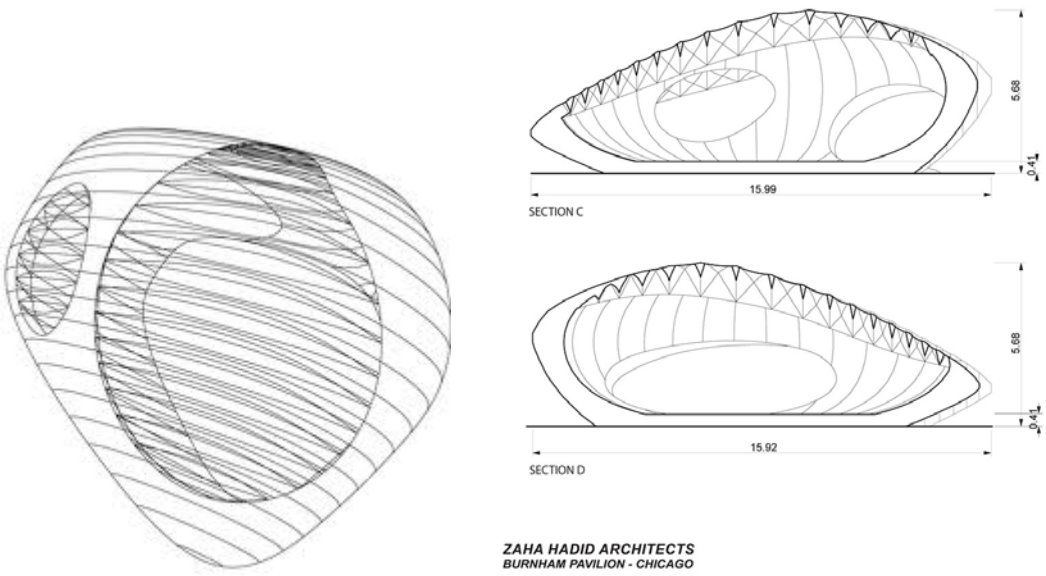

Figure 1-3 Burnham pavilion by Zaha Hadid Architects. 12 June 2012. <http://www.zaha-hadid.com/architecture/burnham-pavillion/>

The contemporary examples generated by the operation of layering can be multiplied. In order to produce these complex forms digitally and physically, layering of spaces is necessary.

The digital world of architecture operates with layers of information. In 2D and 3D computer programs such as Photoshop, AutoCAD, Rhinoceros, 3DsMax, Revit, ArchiCAD, SkecthUp etc., the user is expected to differentiate layers in the interface in order to define their attributes. Therefore, the components of each layer are dependent on these definitions.

In 3D computer programs such as AutoCAD, Rhinoceros, and etc., there is a command used for uniting different layers -cross sections- to generate a whole form: "Loft."[7] This command operates by relating different layers and thus it is a very potential tool in design process.

[7] Loft is a command used in 3D programs like AutoCAD, Rhino etc. that relates and unites various sections to create a whole form.

1.2.1. Layering in Cubism

Cubism, as a twentieth century phenomenon, highly affects the emergence of the conception of layering. The significant effect of Cubism to architectural space initiates the discussions on layering. Bernhard Hoesli explains this significance in his commentary in Colin Rowe and Robert Slutzky's book *Transparency*:

> …the study of abstract art not only has the capacity to help us understand how the forms of contemporary architecture are brought into being but also has the power to further influence their development.[8]

Similarly, in their book *Architecture and Cubism,* Eva Blau and Nancy J. Troy assert that in the 1920s in Europe there were architects "looking to cubist painting to find a model for spatial experience that would be appropriate to modern architecture":

> For Giedion, the translation into architecture of a new perception of space extrapolated from cubist painters' "device of simultaneity" and "transparency of overlapping planes" was central to the architectural project of the modern movement in Europe in the 1920s.[9]

A cubist sees and represents an object made up of planes rather than being a mass. Therefore voids in between planes or layers become actual or real spaces. Therefore, layering of planes in a cubist painting also leads to layering of spaces. Depth has a major role in this layering.

In the subject of layering, a master thesis entitled "Spatial Layering: An Effect of Cubist Concepts on 20th century Architecture" by Basel Kotob analyzes some twentieth-century buildings in terms of layering, and proposes the concept of "spatial layering."[10] Kotob claims that layering was first developed by the introduction of "collage" in early Cubism and then translated to architecture.

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[8] Bernhard Hoesli. "Commentary", in Rowe, Colin and Robert Slutzky, Bernhard Hoesli, Werner Oechslin. Transparency. Basel: Birkhauser-Verlag. 1997: 58.

[9] Eve Blau and Nancy J. Troy. "Introduction," Architecture and Cubism. Cambridge: MIT Press, 1997: 2.

[10] Basel Kotob. "Spatial Layering: An Effect of Cubist Concepts on 20th century Architecture." MIT Unpublished Master Thesis, 1991.

Therefore with the introduction of “space” as the third dimension in architecture, the shift from layering to spatial layering is inevitable.

In relation to the concept of layering and cubist painting, (by referring to Peter Eisenman) as Mario Gandelsonas informs us, reading of a building and a painting both permit “multiple spatial readings” where architecture is read as “literal space” and painting as “figurative space.”[11] Eisenman claims that layering in architecture is a physical experience, and neither the Classical nor the Cubist concept of layering has this property, since in the Classical concept of space, space is perceived from a fixed picture plane, and in the cubist painting, space is read as a suppression of depth.[12] In this sense the inadequacy of depth in the cubist painting is provided in a physically experienced space.

Similar to this statement, according to Bernhard Hoesli, “Le Corbusier’s purist image is correspondingly built up in layers in the Cubist tradition” which gives a spatial effect, but which is not a real space.[13] (Fig. 1-4) Moreover, there is no fixation of layers in space that creates dynamism.

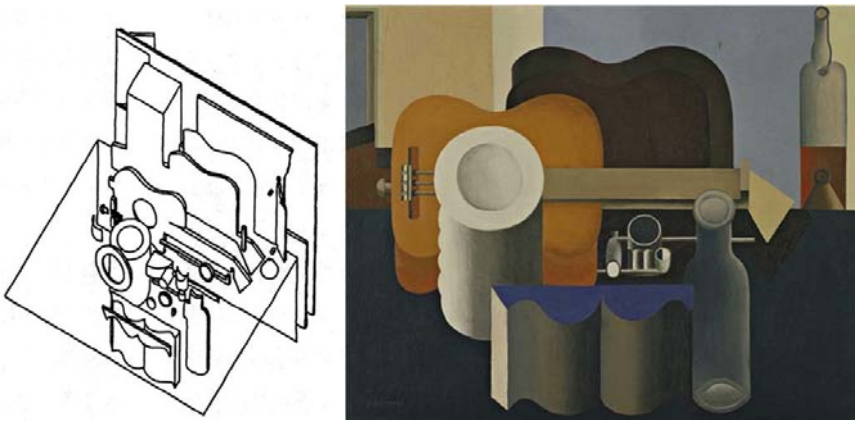

Figure 1-4 Le Corbusier’s purist image built up in layers in the Cubist tradition by Bernard Hoesli. Source: Colin Rowe and Robert Slutzky. Transparency, 1997: 60.

[11] Mario Gandelsonas. “On Reading Architecture,” Progressive Architecture. Vol. 3, 1972: 85.

[12] Ibid.

[13] Bernhard Hoesli. “Commentary”, in Rowe, Colin and Robert Slutzky, Bernhard Hoesli, Werner Oechslin. Transparency. Basel: Birkhauser-Verlag. 1997: 60.

Gandelsonas explains the shift in the conception of space from classical to the Modern by the introduction of layering:

> Layering, as an adjunct to the Classical concept of space as a dramatic setting, was expected to reinforce the illusion of perspective from fixed observation points. In Graves' work, which develops from concepts of space in Modern architecture, layering is derived from notions of space as exemplified in Cubist painting, where space is perceived not as a stage setting, from a fixed proscenium or picture plane, but rather *as a dialectic between plane and depth; between frontal and non-frontal planes*; between an observer's ability to make precise readings of frontal planes, and only imprecise readings of peripheral planes.[14]

It could be interpreted from Gandelsonas's quotation that with modernism, the concept of space has shifted from a setting observed from a constant point for amplification of the effect of perspective to "dialectic between plane and depth". That is to say, the perception of space has switched from a static stage into a dynamic experience.

With reference to above quotation, layering constructs spaces as a "dialectic between plane and depth," as a "dialectic between frontal and non-frontal planes." This dialectic between frontal and non-frontal planes emphasizes depth. While in cubist painting the depth is suppressed for the sake of "frontality,"[15] in Modern architecture it offers a literal space.

For a definition of physical space, the operation of layering inherits depth, thus it is not possible to consider the notions of "layer" and "depth" in isolation, since they exist in relation to each other and superposition of the series of layers gives the information of depth therefore space. As defined as "suppression of depth,"[16] *frontality* is one of the concepts related to transparency. In this conception *depth* refers to the thickness of volume and thereby the spatial interval between layers.

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[14] Mario Gandelsonas. "On Reading Architecture," Progressive Architecture. Vol. 3, 1972: 82. Emphasis mine.

[15] Colin Rowe and Robert Slutzky, Bernhard Hoesli, Werner Oechslin. Transparency. Basel: Birkhauser-Verlag. 1997: 25.

[16] Ibid.

Colin Rowe and Robert Slutzky, in their book *Transparency*, in which they conceptualize "phenomenal transparency," state that "[o]ur feeling for phenomenal transparency probably derives from cubist painting."[17] It can be noted from these quotations that cubist painting affected the notion of space in architecture; since, phenomenal transparency denotes for *depth*, therefore space.

To sum up, it is possible to relate the space in Cubist Painting and Modern architecture in terms of layering of space(s). Deeper debates related to layering can be seen in Cubist painting, and in the concept of "phenomenal transparency" which was formulated by Colin Rowe and Robert Slutzky in their book *Transparency,* which I will argue in the second chapter. These discussions may sustain the argument of layering as an architectural operation and help formulating a base/framework for further discussions.

1.3. Case Study: House II Designed by Peter Eisenman

Introducing the operation of layering and its use in the design process can be best illustrated by analyses of architectural works. In this respect, among various projects, this thesis focuses on House II (1969-70) designed by Peter Eisenman, who is a leading figure of the past quarter century and influential in many ways in the field of architecture in terms of both theory and practice.[18]

House II is constructed in Hardwick, Vermont for Mr. and Mrs. Richard Falk.[19] The significance of this vacation house comes from the relevance of architect's conception of design process as an integrated architectural production in terms of analysis, design and representation.

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[17] Ibid. Rowe conceived "Phenomenal Transparency" for the first time in 1955. The article "Transparency: Literal and Phenomenal" that he wrote with Slutzky published in 1963 in *Perspecta.* (Vol. 8, pp: 45-54).

[18] Rafael Moneo. "Peter Eisenman," Theoretical Anxiety and Design Strategies. Barcelona: MIT Press, 2004: 146.

[19] Peter Eisenman. Houses of Cards. New York: Oxford University Press. 1987: VI.

One of early works of Eisenman, House II is a physical outcome of architect's theoretical work. The strong correspondence between his theory and practice makes this case a strong one for the examination of an architectural operation "layering," which organizes both mental and material processes in design.

1.4. Structure of the Thesis

In this thesis, I will discuss the operation of layering by proposing three uses: layering as an analytical tool, as a design tool and as a representational tool. Although these uses of layering are differentiated and discussed separately, they are not considered as separate entities. They complement each other in a single design process.

The following chapter entitled as "layering as an architectural operation" aims at broadening the discussion by exemplifying concepts with architectural works, thereby, constituting a base for further discussions and analysis, deriving knowledge that is necessary for the formation of the following chapter.

The third chapter, as the analytical part, presents the main study of this thesis by focusing on the generation and transformation of House II designed by Peter Eisenman. This specific building is analyzed to understand in terms of how the building is generated and transformed by the operation of layering in design process.

The fourth chapter is the discussion chapter where *the operation of layering* is thought as *a system of relations* based on the deductions from the analyses of House II.

Although in the second chapter, the part "Layering as an Analytical Tool" will be discussed first, and "Layering as a Design Tool" will come next; in the third chapter this order will change since, House II needs a clarification in terms of its design process and formal transformations. After these discussions under the title "Layering as a Design Tool: Designing the Process by Layers", this study will unfold the relationship between "design" and "analysis" in the part "Layering as an Analytical Tool: Learning from analysis on Giuseppe Terragni by Peter Eisenman."

CHAPTER 2

"LAYERING" AS AN ARCHITECTURAL OPERATION

The introductory chapter has presented the concepts related to layering in order to construct a common language to discuss the operation of layering. Now in this chapter, with reference to various architectural examples, different uses of layering will be examined.

A "layer" -as the substance of layering- is a two dimensional entity that does not have the potential to generate space on its own, where the operation of layering is able to create space due to its suggestion of depth. Therefore, the constituents of architectural space in this study are "layer" and "depth". When layers are "transparent," spaces defined between layers have the possibility to interpenetrate into each other. Then continuity between layers is achieved which enables spaces "to travel one behind other." This continuity provides a depth between layers, which suggests relationships between various layers. All these conditions are produced by the operation of layering.

By constructing a set of relationships between different layers, layering organizes "the assembling of complex relations into an ordered series generating from a given plane or point or reference, either actual or conceptual."[20] This reference can be called as "datum" in which all other layers are generated and positioned in space with reference to that layer. (Fig. 2-1) Peter Eisenman defines this

[20] Mario Gandelsonas. "On Reading Architecture," Progressive Architecture. Vol. 3, 1972: 85.

generation of layers as an “additive” process that is the operation of layering.[21] In this process, layers can be both planar and spatial; they can be posited either vertically or horizontally.

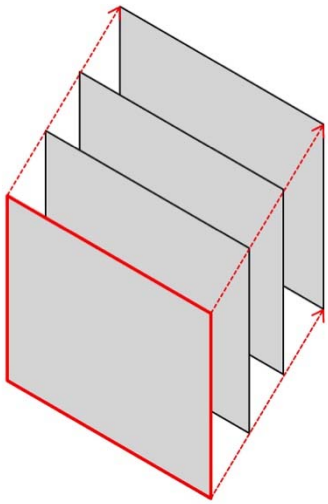

Figure 2-1 “Datum layer” initiates layering, therefore generates other layers.
Produced by the author.

In order to explain the operation of layering, I dissect the subject into three sub-titles: Layering as an analytical tool, layering as a design tool, layering as a representational tool. Although they are discussed separately in the structure of this thesis, I suggest that they are naturally inseparable, complementary and parallel to each other: Through analysis, knowledge of architecture is derived and reflected to design process, and designing and representing occur simultaneously. Therefore, the architectural works examined in this chapter are chosen to elucidate this discussion.

[21] Peter Eisenman. Giuseppe Terragni: Transformations Decompositions Critiques. New York: The Monacelli Press, 2003: 29.

2.1. Layering as an Analytical Tool

By analysis, the aim is to understand the generation and transformation of architectural form by layering. This can be done through a decomposition of buildings into its layers. This study suggests an alternating reading of buildings as series of layers instead of volumes. This kind of an analysis provides learning architectural works by layering of planes and volumes.

Analytical reading of architectural works by this operation ensures the establishment of a link between buildings and their preceding works. Stan Allen emphasizes this link as:

> Above all, the argument assumes that architectural knowledge is ongoing. Architects learn from the past, not by imitating or repeating, but by extending and developing propositions made by other like-minded practitioners.[22]

The relationship between Peter Eisenman and Giuseppe Terragni's works can be said as an appropriate example to this kind of a link between a building and its precedent. During his Ph.D. studies, Eisenman examines Terragni's Casa del Fascio as one of his cases that he was highly influenced. From the emergence of the form of Casa del Fascio, he comes up with the idea of "a series of layers" initiated by the front facade and added to form the building. (Fig.2-2) I claim that in the design of House II this analytical tool was very influential for Eisenman, which will be discussed deeply in the third chapter.

Eisenman publishes two articles on the formal analysis of buildings. First one is on Casa del Fascio, and the second one is on Casa Giuliani Frigerio. After 43 years he had completed his Ph.D., his dissertation is published in 2006. In 2003, his book *Giuseppe Terragni: Transformation, Decompositions, Critiques* put out. In the introduction of this book, for Giuseppe Terragni's works and his works, Peter Eisenman says that: "Traditionally, the subject and author of a book occupy separate positions. But in this case the work -architectural/analytical- of the two

[22] Stan Allen. "Mat Urbanism: The Thick 2-D," in Case: Le Corbusier's Venice Hospital and the Mat Building Revival, ed. by Hashim Sarkis. New York: Prestel, 2001: 119.

architects is linked, parallel, and complementary."[23] From all these analysis on Terragni's works, gaining design knowledge is of course inevitable:

> Historians and critics have traditionally resorted to explaining works of architecture as developing from preceding works, which, in turn, had proceeded from other works.[24]

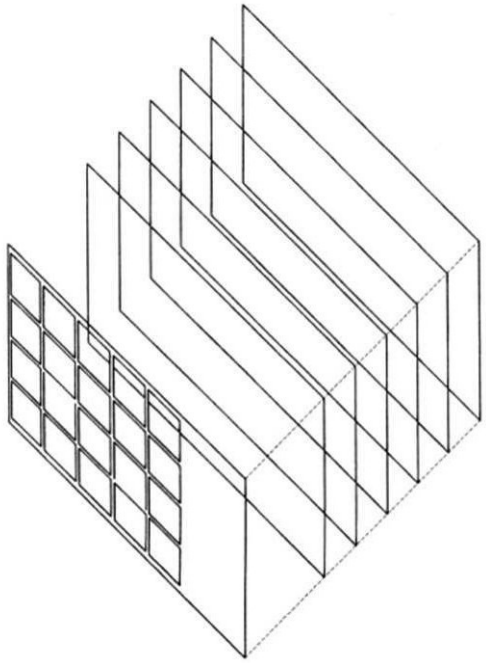

Figure 2-2 Eisenman's analytical diagram of Terragni's Casa del Fascio: layering of frontal planes. 23 Sep 2011. <http://architecturality.wordpress.com/2010/10/20/transparency-i-layering-of-planeslayering-of-spaces/>

The analysis of buildings by layers inspects the transformational process. According to Eisenman, generation of an architectural form from its initial form – "generic form"- to the final form –"specific form"- is called as the transformational process:[25]

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[23] Peter Eisenman. "Introduction," Giuseppe Terragni: Transformations Decompositions Critiques. New York: The Monacelli Press, 2003:11.

[24] Ibid., 10.

[25] See: Eisenman, Peter. The Formal Basis of Modern Architecture. Lars Müller Publishers, 2006.

> The analysis of the transformational process…begins from the traditional assumption that one way architecture is understood is through its associative relationship to simple geometric figures. The complex information visible in a given building can be processed in terms of these more basic figures and their spatial qualities and relationships, such as symmetry and asymmetry, rotation and stasis, solid and void, line and plane, addition and subtraction. Building form in this sense is understood as the product of the process of transformation, the modification of some primary configuration.[26]

Using the layering as an analytical tool enables us to explore transformational process that establishes the relationship between layers and depth. Thus, *layering becomes an analytical tool for understanding this mental process*.

In order to establish relationships between layers and in turn spaces in between them, what we need is "transparency" of layers. Hence, for the analysis of relationships between layers, the concept of "phenomenal transparency" should be employed in the following discussions.

2.1.1. Concept of "Phenomenal Transparency"

Within the framework of this thesis, it will be convenient to discuss concept of "phenomenal transparency", since this concept could be used as a tool for analyzing spatial organization of layers. While doing that, the major source of discussion will be the book *Transparency* written by Colin Rowe and Robert Slutzky in 1955. In the "Commentary" part, Bernhard Hoesli explains the employment of the concept:

> The concept of transparency, as defined by Rowe and Slutzky, becomes a tool for study; it makes understanding and evaluation possible. Bu it also becomes immediately and simultaneously an employable operative means enabling he intellectual ordering of form during design process, as well as its graphic representation.[27]

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[26] Peter Eisenman. "Transformations: the Processes of Volumetric Addition and Subtraction," Giuseppe Terragni: Transformations Decompositions Critiques. New York: The Monacelli Press, 2003: 27.

[27] Bernhard Hoesli. "Commentary", in Rowe, Colin and Robert Slutzky, Bernhard Hoesli, Werner Oechslin. Transparency. Basel: Birkhauser-Verlag, 1997: 60.

Rowe and Slutzky differentiates literal and phenomenal transparency respectively as “inherent quality of substance” and “inherit quality of organization.”[28] In this sense, phenomenal transparency can be called as “organizational transparency.” Therefore, it can be used as an organizational tool, which also helps understanding relationship between layers. Therefore, it is possible to say that the operation of layering overlaps with the concept of phenomenal transparency, since they are both organizational, and layering of frontal planes (frontality and stratification) can be used to create phenomenal transparency in architecture.[29]

This thesis argues that “layering” as an analytical tool is highly related with the concept of phenomenal transparency as it constructs formal relationships between layers, in turn spaces. Additionally, phenomenal transparency as a concept enables us to analyze buildings and it “creates the multiple readings of possible spatial relationships and connections.”[30]

With respect to Rowe and Slutzky, basicly, layering of spaces both in vertical and horizontal creates phenomenal transparency. It is possible to see this vertical and horizontal layering in the case of Villa Garches designed by Le Corbusier. (Fig. 2-3) In *Transparency*, Rowe and Slutzky exemplify Le Corbusier’s Villa at Garches for this kind of organizational transparency.

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[28] Colin Rowe and Robert Slutzky, Bernhard Hoesli, Werner Oechslin. Transparency. Basel: Birkhauser-Verlag, 1997: 23.

[29] Colin Rowe and Robert Slutzky, “Transparency: Literal and Phenomenal,” The Mathematics of the Ideal Villa and Other Essays. Cambridge, Mass., MIT Press, 1982.

[30] Colin Rowe and Robert Slutzky, Bernhard Hoesli, Werner Oechslin. Transparency. Basel: Birkhauser-Verlag, 1997: 67.

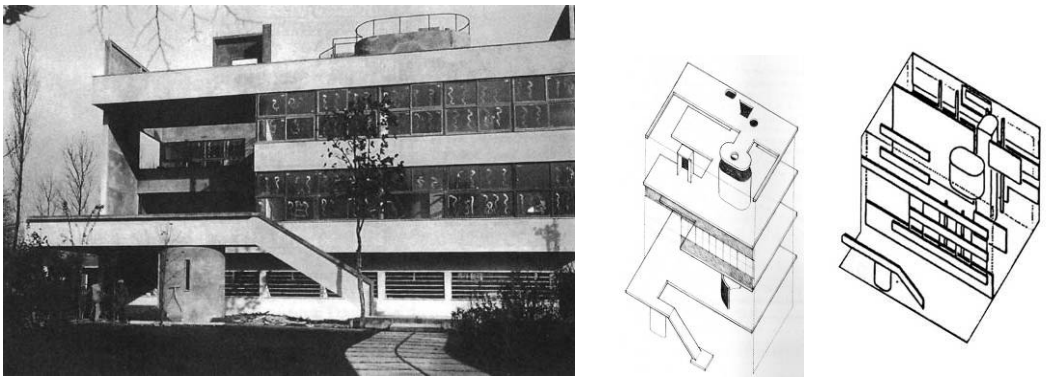

Figure 2-3 Vertical and horizontal layering of Villa Garches. Source: Colin Rowe and Robert Slutzky, Bernhard Hoesli, Werner Oechslin. Transparency. Basel: Birkhauser-Verlag, 1997: 35, 61.

In Corbusier's Villa, "the planar qualities" of glass is a part of architect's organization of space that consequently ends up with "layerlike stratification of the interior space of the building, a succession of laterally extended spaces traveling one behind other."[31] This layerlike stratification enables observer with alternative readings of that space:

> The five layers of space which throughout each vertical dimension divide the building's volume and the four layers which cut it horizontally will all form time to time claim attention; and this gridding of space then result in continuous fluctuations of interpretation.[32]

The layered space organization of Villa Garches provides alternative readings of space. This condition of space could be analyzed by decomposing the building into its layers so that the relationship between the organizational layers could be revealed.

This analytical potential of phenomenal transparency can be applied to space organization by the employment of layering as a design tool. Therefore layering as an analytical tool provides different readings, and in turn, comprehensions of

[31] Ibid., 38.

[32] Ibid., 41.

space become “a design tool” that has the potential to organize relationships between layers.

2.2. Layering as a Design tool

Layering as a design tool generates relationships within an architectural form by defining space and organizing layers. While in the analysis part, building is decomposed into its layers to understand the formation of space, in designing; layers are organized in order to generate relationships in-between.

As it has already been told, in this kind of process, layers can be both planar and spatial producing different relations and forms within a system. Therefore, layering as an operation establishes these relationships.

To establish relationships between layers there are two operations in order to comprehend layering. These can be called as complementary operations of layering, namely: “superposition” and “superimposition.”

2.2.1. Superposition and Superimposition of Layers

“Superposition” corresponds to *an arrangement of layers in space* with reference to one another. With a small distinction, “superimposition”[33] denotes for interlocking of layers, suggesting an overlay of different elements. Regarding this definition, when two or more layers are superimposed, they define different relationships by suggesting interactions. By this means many unpredictable relationships may come up.

[33] Definition of superimpose from the Cambridge Advanced Learner's Dictionary.

Superimpose (verb): to put especially a picture, words, etc. on top of something else, especially another picture, words, etc., so that what is in the lower position can still be seen, heard, etc.

For Rafael Moneo, superimposition "allows us to see the intersection of abstract elements-planes, columns, floors, ceilings, etc. - that the architect manipulates."[34] Therefore, superimposition allows us to see the relationships between different layers (fragments) so that the design process is chased; as it is possible to observe the overlapped parts of belonging to both layers.

The terms superposition and superimposition are mostly used interchangeably as synonyms. But actually they are different operations, and therefore they define different relationships between layers. Eisenman illustrates the clearest definition of these two terms emphasizing the difference in meaning. With reference to his discussions in *Diagram Diaries*, "[s]uperimposition refers to a vertical layering differentiating between ground and figure" while "[s]uperposition refers to a coextensive, horizontal layering where there is no stable ground or origin, where ground and figure fluctuate between one another."[35]

Similar to this definition, as an outcome of multiple readings, Bernard Tschumi uses "superimposition" as a key device in his works, and for him; superimposition is used as a conceptual tool to juxtapose events relating to the function, the programme and the historical dimensions of architecture.[36] Similar to Tschumi, for Stan Allen, superposition of layers signifies more than laminating layers i.e. putting layers on top; it indicates an interaction between the layers.[37]

It can be deduced from these definitions that superposition defines positions of layers in reference to each other so as to create "*dialectic between plane and depth*."[38] On the other hand, superimposition emphasizes the space "in-between," it creates a *dialogue between layers* and due to juxtaposition, calling for a different kind of interaction.

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[34] Rafael Moneo. "Peter Eisenman," Theoretical Anxiety and Design Strategies in the Work of Eight Contemporary Architects. MIT Press 2004:156.

[35] Peter Eisenman. Diagram Diaries. New York: Universe Publishing, 1999: 30.

[36] Bernard Tschumi. "Disjunction," Architecture and Disjunction. MIT Press, 1996: 251.

[37] Stan Allen. "Mat Urbanism: The Thick 2-D," in Case: Le Corbusier's Venice Hospital and the Mat Building Revival, ed. by Hashim Sarkis (New York: Prestel, 2001), 125.

[38] Mario Gandelsonas. "On Reading Architecture," Progressive Architecture. Vol. 3, 1972: 82. Emphasis mine.

In Parc de la Villette, Bernard Tschumi defines and superimposes a system of three layers: points, lines and surfaces. (Fig.2-4) In this way, he achieves a unity of unrelated layers-*heterogeneity*. For these layers, he asserts that: "Each represents a different and autonomous system (a text), whose superimposition on another makes impossible any 'composition,' maintaining differences and refusing ascendency of any privileged system or organizing element."[39] He continues saying that even though the architect decides these elements; the moment they are superimposed on each other, the architect becomes an audience.

For the competition of Parc de La Villette, besides Tschumi's project, one other project that should be reconsidered in terms of the layering is Rem Koolhaas' proposal. (Fig. 2-5) Even the operation is the same for both projects; the relation (intervals) between layers for each case is defined in different ways:

> The urban landscape is conceived as an artificial ground, as it is in Holland, for the superposition of one organizational type on top of the next. Five layers – bands of planting, confetti of small furniture, circulation systems, existing and new buildings – are distributed and placed over each other to form a rich congestion. This became a model for a later heterogeneous urbanism and city park.[40]

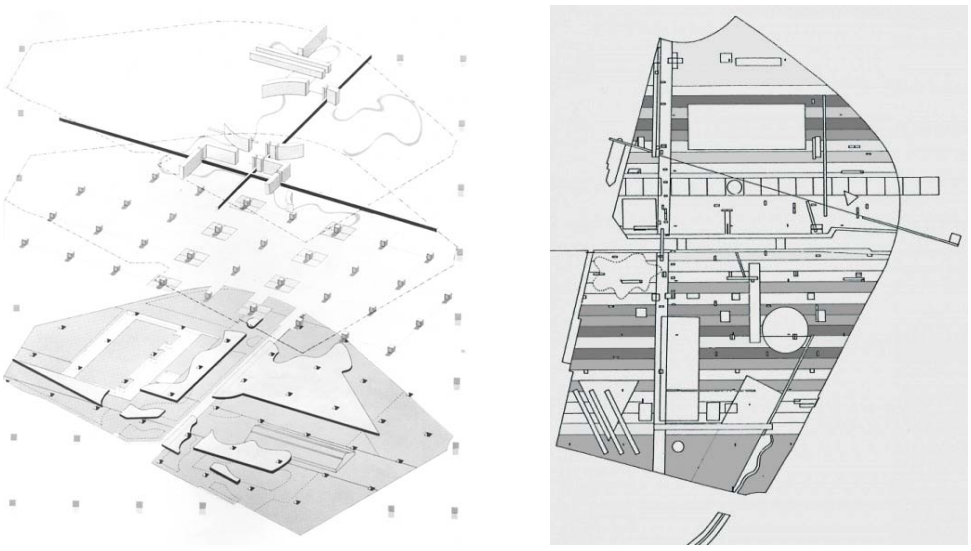

Figure 2-4 (left) Tschumi's proposition for Parc de La Villette, (right) Koolhaas' proposition for the same park.

[39] Bernard Tschumi. "Disjunction," Architecture and Disjunction. MIT Press, 1996: 195.

[40] Charles Jencks. "The Heteropolis," The New Paradigm in Architecture: The Language of Post-Modernism, New Haven and London: Yale University Press, 2002: 181.

In Koolhaas' Parc de la Villette, layers are in the form of stripes and they define open spaces:

> On the striped site were further superimposed three other layers having their autonomous logic. One was a system of point grids named the "Confetti", the second was the system of circulation and the third layer was a composition of major elements counterbalancing the existing masses of the Museum and the shed.[41]

Rem Koolhaas defines each layer (strip) as a social condenser, and the totality of those layers forms a city of social condenser.[42] Even though the stripes are layered side-by-side in a very homogeneous way, the "wall"[43] between them allows maximum penetration, which eventually leads to unpredictable relations. It can also be said that the position of layers introduces a different relation in the line that connects one layer to the other.

> In his design [Koolhaas] for the Parc de la Villette, for instance, he used the generic grid – ultimate abstraction – as the backdrop for five organizational types layered on top of each other…These were then superimposed and random overlap created chaotic diversity on a uniform grid. A method of functional invention thus became *the* model for many subsequent architects, and it mixed repetition and differentiation at their extremes.[44]

In La Villette, there are five layers of elements. (Fig. 2-6) The layer "stripes" is composed of many layers placed side-by-side to generate the platform of the park. These layers are actually conceptualized as projections of different floors of a skyscraper. Where in a skyscraper these floors are horizontal layers superposed on one other, suggesting vertical relationship between layers, in Parc

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41 Louis Martin. Architectural Theory After 1968: Analysis of the Works of Rem Koolhaas and Bernard Tschumi. Massachusetts Institute of Technology, Department of Architecture MS Thesis 1988, Published in 1994: 154-155.

42 Özay Özkan. "Strategic Way of Design in Rem Koolhaas' Parc de La Villette Project." Unpublished Master's Thesis, METU, 2008: 33.

43 Fritz Neumeyer. "OMA's Berlin: The Polemic Island in the City", Assemblage. No. 11, Apr., 1990: 43. Neumeyer asserts that OMA uses strips to create "The wall as architecture".

44 Charles Jencks. "The Heteropolis," The New Paradigm in Architecture: The Language of Post-Modernism, New Haven and London: Yale University Press, 2002: 181.

de la Villette layers suggest horizontal relationships to maximize interaction on ground level.

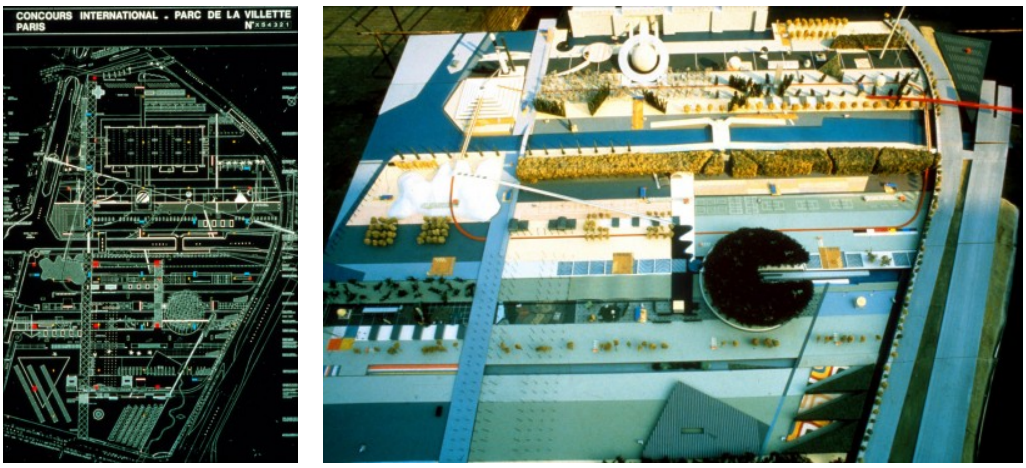

Figure 2-5 Rem Koolhaas' project for the Parc de la Villette Competition.

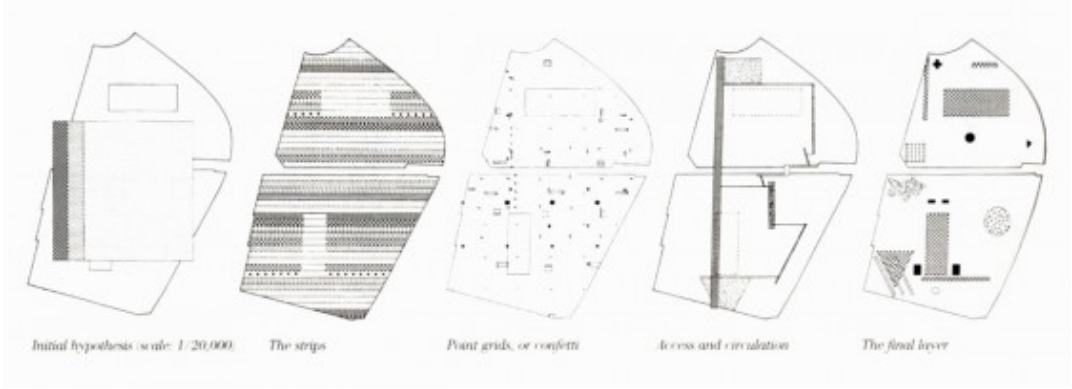

Figure 2-6 Five layers of Koolhaas's project.

In the Bibliotheque National competition entry by Rem Koolhaas, layers are superposed more like a skyscraper calling for a vertical relationship. (Fig.2-7) All these layers are loaded with a similar program; therefore the layering can be described as *homogenous*. This homogeneity creates a static relationship between floor layers. Subtracting different voids from the layered building volume provides interaction and activates the relationship between layers which were previously static.

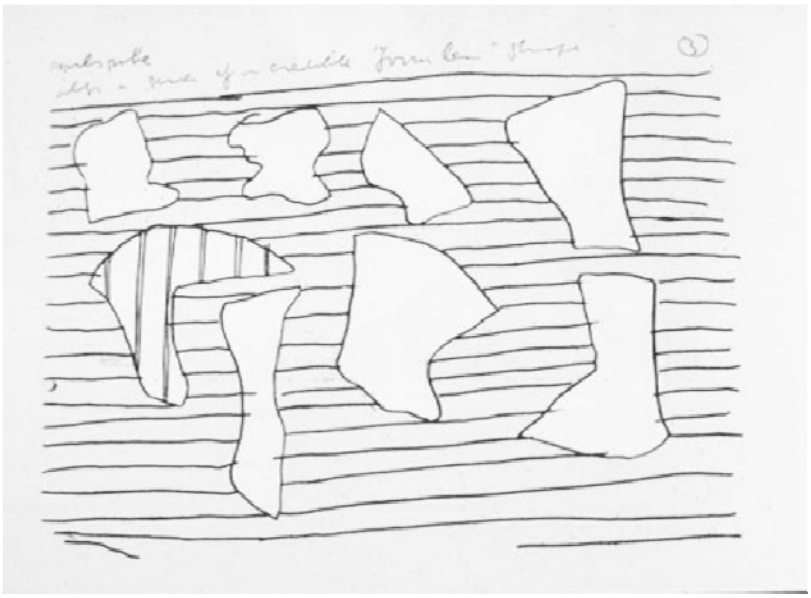

Figure 2-7 Diagram showing layered formation of Bibliotheque Nationale by Rem Koolhaas. 23 July 2012. <http://oma.eu/projects/1989/tr%C3%A8s-grande-biblioth%C3%A8que>

Other than Rem Koolhaas, we also find "superimposition used remarkably in Peter Eisenman's work." [45] As Eisenman informs us his Romeo and Juliet project pushed layering "literally and philosophical parallels to extremes."[46]

Besides the Romeo Juliet project, in the book *Diagram Diaries* the chart showing the formal and conceptual tools used in his projects indicates Eisenman uses superposition as a formal tool in the design of Columbus Convention Center.[47] (Fig.2-8)

In this project layers are again in the form of stripes, which is similar to the layering conception of Rem Koolhaas' Parc de la Villette. But this time layers generate closed spaces rather than open spaces. They are again superposed side-by-side to generate building form.

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[45] Peter Eisenman. Diagram Diaries. New York: Universe Publishing, 1999: 252.

[46] Ibid.

[47] Ibid., 238-239.

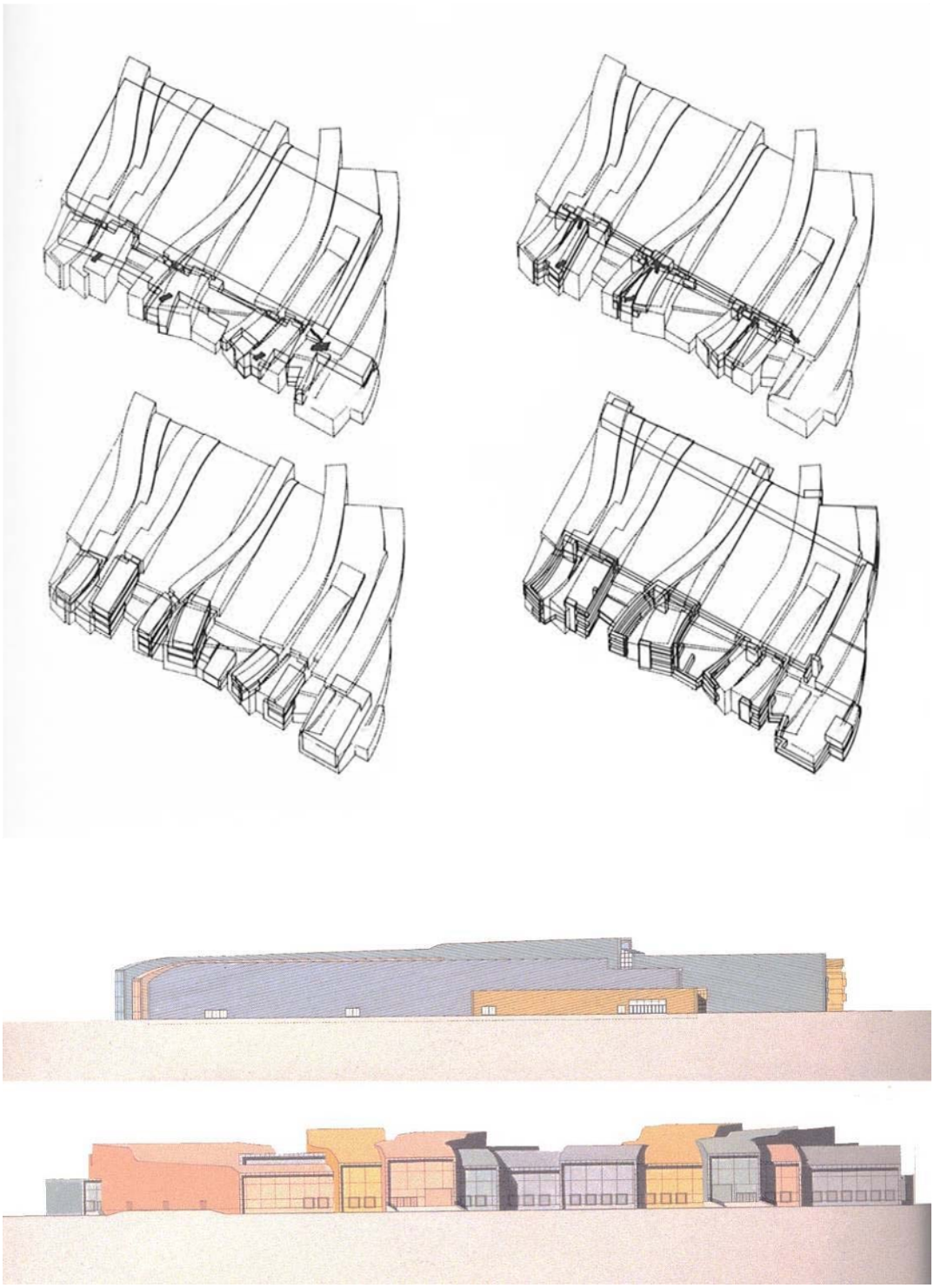

Figure 2-8 Axonometric drawings and elevations of Columbus Convention Center. Source: Peter Eisenman. Eisenman Architects: Selected and Current Works. Australia: The Images Publishing Group Pty. Ltd. 1995: 161.

Cinematic Sectioning

In the discussion of superposition, the establishment of relationships between layers can be said to be linear, as layer are positioned on a linear direction initiated by a point or plane of reference. In the same line "cinematic sectioning" can be thought of a similar condition of producing architectural form. Here sections are conceptualized as layers that generate layering by repetition through a linear axis. The dialogue between these section layers is crucial to understand the overall form. The intervals between sections define spaces between layers.

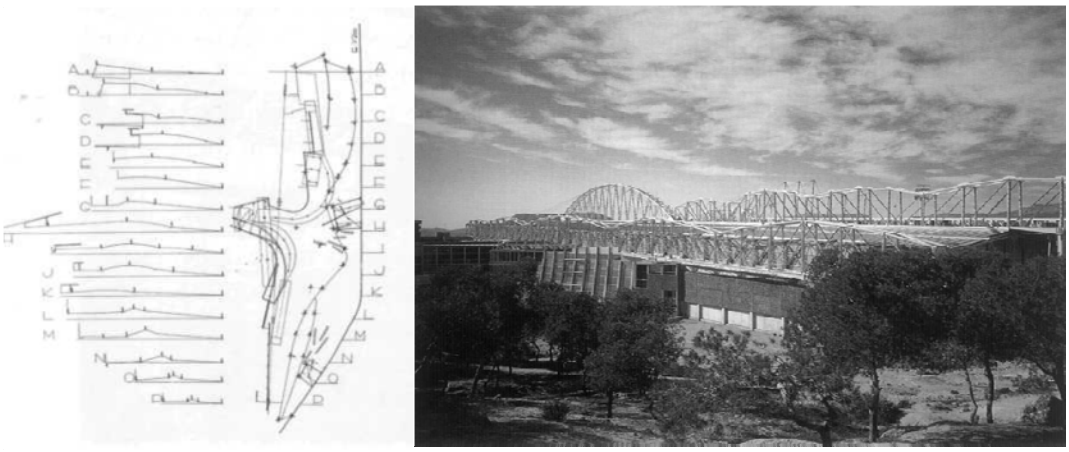

Figure 2-9 "Enric Miralles, Eurhythmies Center, Alicante, Spain, 1993-94. (Left) The earth movements under entry ramps spread as wave-forms from A to G and H to P- "cinematic sectioning." (Right) the rise and fall of the structure in jagged tangents "borrows the mountainscape." Source: Charles Jencks. "Postscript: Architecture Becomes Land-Form," Architecture of the Jumping Universe. Academy Editions (Revised edition): Singapore, 1997:174.

Charles Jenks claims that cinematic sectioning is devised by Enric Miralles.[48] His Eurhythmies Center in Alicante is generated by the employment of many sections. (Fig.2-9) He explains the concept as "the analysis of a large land-mass by making many cuts through it. The resulting sections reveal a sequence of varying topography, as if one took cinema stills and flipped through them to animate

[48] Charles Jencks. "The New Paradigm I – Fractal Architecture," The New Paradigm in Architecture: The Language of Post-Modernism, New Haven and London: Yale University Press, 2002: 235.

movement across the land."[49] In this formation, every time the section changes, the whole design changes accordingly.

The same conception is valid in the Yokohama Port Terminal by Foreign Office Architects. As Jenks states, the "multi-layered topography for Yokohama achieves diversity and unity, disjunction and continuity" by means of "layering of sections."[50] As Allen informs us, vertical layers (sections) of Yokohama Port terminal define relationship between different levels; at the same time, they achieve continuous movement in the building while differentiating program elements: "Conceived as an artificial landscape, minimal sectional variation separates and smoothens traffic flows at the time that activities complex programmatic variation."[51] These minimal sectional variations on layers ensure the generation of a continuous surface. (Fig.2-10)

[49] Ibid.

[50] Ibid., 237.

[51] Stan Allen. "Mat Urbanism: The Thick 2-D," in Case: Le Corbusier's Venice Hospital and the Mat Building Revival, ed. by Hashim Sarkis. New York: Prestel, 2001: 120.

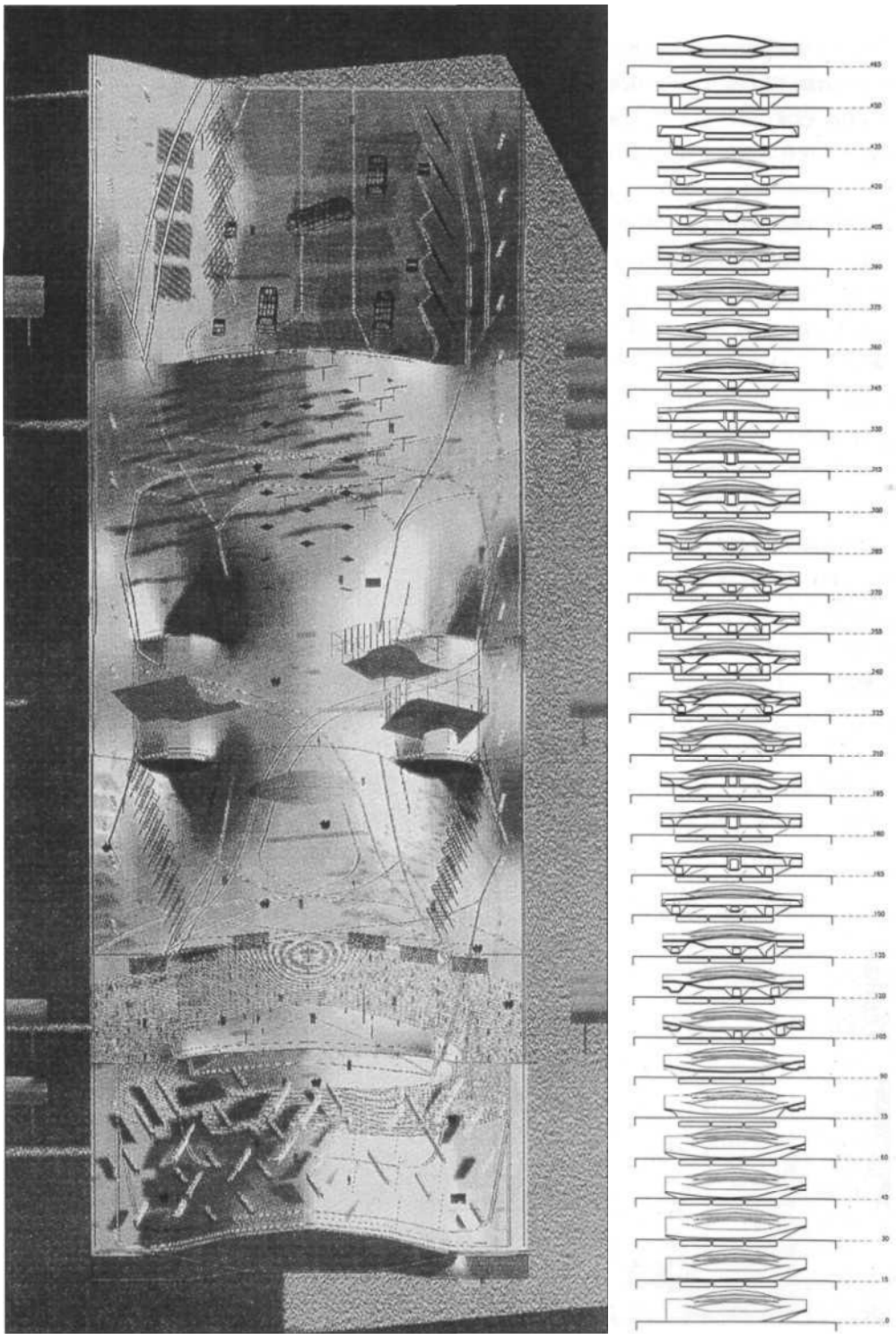

Figure 2-10 Yokohama Port Terminal: Top view and cinematic sections. Source: Charles Jencks. "Postscript: Architecture Becomes Land-Form," Architecture of the Jumping Universe. Revised edition, Academy Editions: Singapore, 1997:175.

In these above-mentioned architectural examples, architects put emphasize on design process rather than buildings as objects. The examples show that a simple operation, in this case "layering", may result in various outcomes, and could produce different relationships in between different elements. The emphasis on design process arises the necessity to communicate to describe the phases of this mental process. Thus, it draws attention to "representation" of works.

2.3. Layering as a Representational Tool

As previously stated, in this thesis, representation is mainly conceived as a part of design-and-thinking process that generates architectural form rather than just a presentation of an end product. Therefore, designing and representation are simultaneous and complementary in design process. In the case of layering, representational process highly corresponds to design process, as it becomes an operational tool that organizes all design phases, and reveals relationships that generate the architectural form.

Cubist Representation of Layers

As said in the introductory chapter, Cubist painting has a significant role in the discovery of "phenomenal transparency," which is highly related with the concept of layering. Thus, the Cubist painting is considerable in the representation of layering.

In Cubist painting different layers of an object are explicit as their frontal and side views are represented simultaneously. This way of representing layers is obviously the reflection of a different perception of space. These Cubist drawings invite the observer and let the eye travel around these superimposed layers:

> …the splintering image of cubist painting displaces the static viewer, it mobilizes the eye in a quasi-cinematic way. But the different angles of view are not presented in any sequence, they are juxtaposed.[52]

[52] Beatriz Colomina. "Where are We?," in Architecture and Cubism. Ed. by Eve Blau, Nancy J. Troy. Cambridge: MIT Press, 1997: 140.

Although layers seem fragmented in the Cubist drawings, the juxtaposition or superimposition reveals the relationship between these layers.

Axonometric Drawings

By means of representations of a project, one has the possibility to trace a design process. Especially sequences of axonometrics showing different phases of design process are potential means of describing design evolution.

For instance, the axonometrics of House II designed by Peter Eisenman reveals the architect's conception by unfolding the steps of project's evolution. (Fig.2-11) Instead of using plans and elevations, these axonometrics provide a simultaneous comprehension of different layers generating the building. When layers are represented as transparent entities, the relationship between all constituent layers can be revealed.

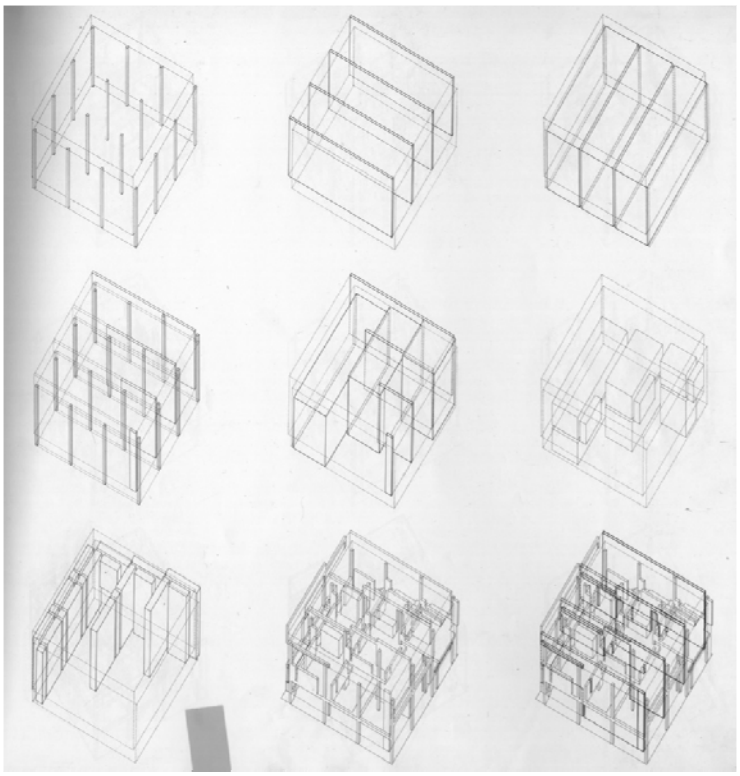

Figure 2-11 Axonometric drawings of House II representing the design process. Source: Peter Eisenman. Houses of Cards. New York: Oxford University Press, 1987.

Exploded axonometric views could be more promising as they display all layers in different levels, so that, by the superimposition of these layers, the relationship between them can be easily perceived.

The exploded axonometric drawing of Bernard Tschumi for Parc de La Villette exhibits different elements (points, lines, surfaces) as different layers. (Fig.2-12) The layering of these elements is generated within a system. The layers constituted by different architectural elements are superimposed to establish relationships in between layers. Therefore for this case, the exploded axonometric drawing reveals and represents the final product as well as the mental process behind it.

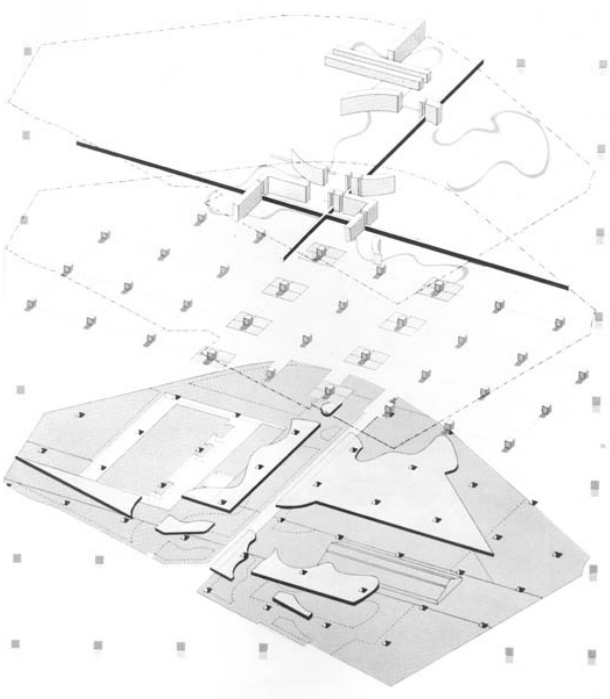

Figure 2-12 Exploded axonometric drawing of Bernard Tschumi's project for Parc de La Villette.

Constituted by the same operation, in Rem Koolhaas' proposal for the same park, layers are conceived as stripes, and this conception is reflected in the representation of the project. These side-by-side layers are reflections of typical floors in a skyscraper so that, a section of a skyscraper becomes a plan in the design of the park. Here, the strip is both an architectural action and an element.

Although their design objectives are quite different, the representations of two projects by Koolhaas, namely Parc de La Villette and Bibliotheque National are considerably similar, as they represent the same operation (respectively in plan and section). (Fig.2-13)

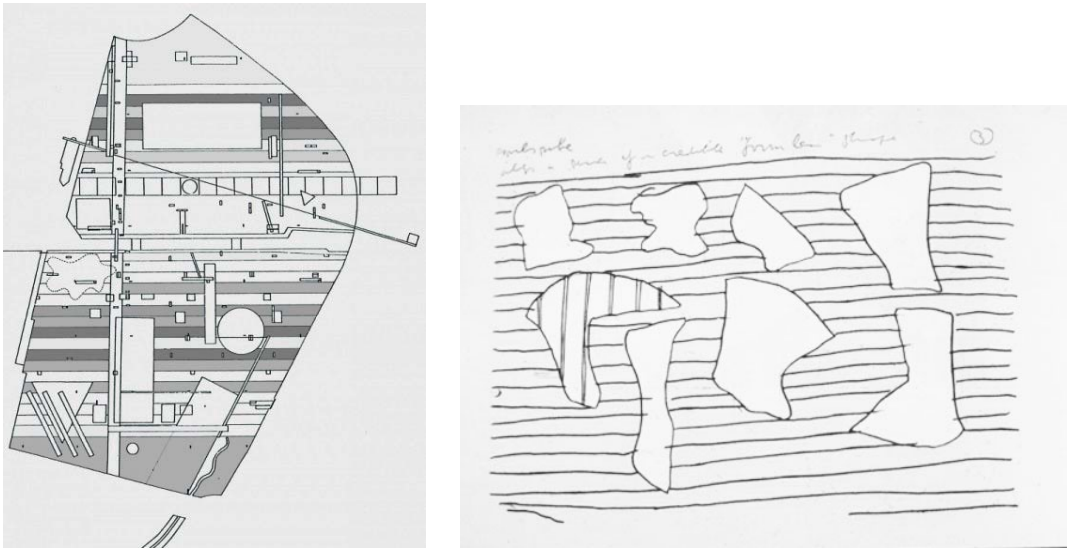

Figure 2-13 On the left: Rem Koolhaas' project for Parc de La Villette. On the right: conceptual section drawing of Bibliotheque National designed by Rem Koolhaas.

Other than representing the design process, these drawings can represent the analytical process. As said earlier Peter Eisenman's analytical studies are significant as he learns from them and reflects the outcomes on his designs. (Fig.2-14) His drawings represent the analytical process, and also, his way of thinking. From his analytical studies, one can understand how he ends up with the idea of layering. The totalitarian design conception of Eisenman makes him and his designs influential in terms of the use of layering.

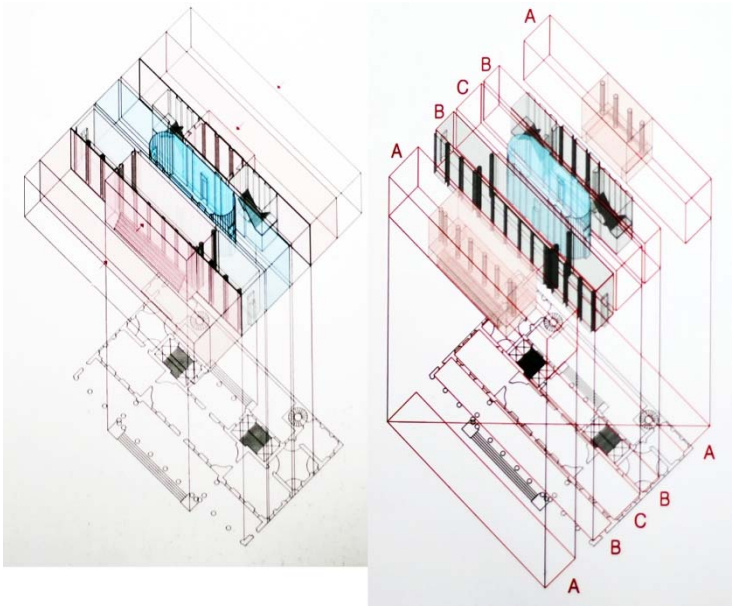

Figure 2-14 Exploded axonometric views showing the layered analysis of Plazzo Chiericati by Peter Eisenman. Source: Peter Eisenman. Feints. Milano: Skira Editore, 2006: 61-62.

In this chapter the intention was to introduce and discuss varied use of layering in architecture by focusing on different examples. In all of the examples, it is the operation of layering that governs the total architectural organization. Therefore, the examples selected here are to represent the possible developments of any layered formal system.

Considering that the analysis of buildings is reflected on design, and representation is an inseparable part of design process, there is a strong link between them. Layering as an operation embraces all these, as it organizes the whole process by operating as an analytical tool, a design tool and a representational tool. Therefore, the discussions in this chapter can be regarded as an introduction, a basis for the detailed analysis of House II designed by Peter Eisenman in the following chapter.

CHAPTER 3

ANALYSIS: "LAYERING" IN HOUSE II DESIGNED BY PETER EISENMAN

> By the 1970s it had become the complex and layered spaces of Peter Eisenman and The Five Architects.[53]

In this thesis, in order to examine layers, relationship between them and thereby generation of architectural elements, an alternating reading of a building as a series of layers rather than as a volume is encouraged. In doing so, the discussions of "phenomenal transparency" can be used as a tool to reveal these relationships between layers.

Since phenomenal transparency has the potential to be used as an organizational design tool that simultaneously identifies layers and allows them to integrate in a complex architectural form,[54] it would be appropriate to employ the concept in order to understand the operation of layering, and to explore the physical and conceptual relationships between layers.

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[53] Charles Jencks. "The Modes of Architectural Communication," The New Paradigm in Architecture: The Language of Post-Modernism, New Haven and London: Yale University Press, 2002: 41.

[54] Colin Rowe and Robert Slutzky, Bernhard Hoesli, Werner Oechslin. Transparency. Basel: Birkhauser-Verlag, 1997: 99.

Figure 3-1 House II, 1969-70, Hardwick, Vermont. Photo by Norman McGrath. Courtesy of Eisenman Architects. 23 June 2012. <http://bombsite.com/issues/117/articles/5991>

As it is necessary to illustrate the argument put forward in this thesis, in this chapter the use of layering as an operation in "House II" designed by Peter Eisenman (Fig.3-1) will be studied on the basis of the discussions in the previous chapters. "Layering as a design tool: designing the process by layers" will be discussed in the first place in order to understand the use of layering as a tool in design process.

Then, in the part titled "learning from the layered analysis of Giuseppe Terragni's works" the relationship between design and analysis, thereby, architect and his predecessors will be explored regarding design decisions and generation of architectural form by means of layers. Within this framework layering is conceptualized as a "design tool," which Eisenman has learned from his analysis on Terragni's works, in which he used layering as an "analytical tool," and as a result, he used as a "representational tool" throughout the whole process to describe and express his ideas.

Although the focus of the study and therefore the main object of this thesis is House II, in some discussions, the study will refer to other "early house" projects of Eisenman to clarify the arguments. As the design conception and operations that Eisenman used are very similar in these projects, it becomes inevitable to refer to them.

3.1. Layering as a Design Tool: Designing the Process by Layers

> Only by knowing about the process can we have access to the essence of his [Eisenman's] architecture.[55]

The main concern of this part is how the operation of layering is used as a design tool in House II. In other words, "layering as a design tool" examines the way that House II is built up in layers. The building evolves from its initial form (*generic form*) to the final form (*specific form*) by this operation. Therefore, to understand the contribution of layering as a design tool in House II, the building will be

[55] Rafael Moneo. "Peter Eisenman," Theoretical Anxiety and Design Strategies in the Work of Eight Contemporary Architects. Barcelona: MIT Press, 2004: 151. Emphasis added.

decomposed into its layers so that the operations and transformations could be observed and traced.

To do this, the first step is to look into the analyses of Eisenman on Terragni's work. In the following part titled "Layering as an Analytical Tool," the concern will be to understand the use of layering as an analytical tool. Here, in examining layering as a design tool, the shift from being an analytical tool to being a design tool will also be explored. By the analyses of House II, the intention is to explore how the operation of layering generates architectural form.

House II demonstrates how the operation of layering generates the design process and, in turn, the formation of the building. Eisenman defines the operation of "layering" as a "conceptual tool" in his book *Diagram Diaries*.[56] The table of "Tools of Peter Eisenman," (Fig. 3-2) in which "formal and conceptual tools" and their use in his projects are given, shows that layering as a conceptual tool is used in House II. As a result, this thesis inquiry is supported by this table.

In order to examine the act of layering in House II and correspondingly the spatial contribution of these layers in the architectural space, one should first understand the transformational process that generates the building.

The design process of House II is initiated with a square. Through transformations, this square evolves into a quite complex layered form that is generated by the operation of layering. While layering is used as an operational design tool, various layers and their superimposition produces different architectural elements, such as walls, openings on the roof, staircase etc., of the building.

[56] Peter Eisenman. Diagram Diaries. New York: Universe Publishing, 1999: 38-39.

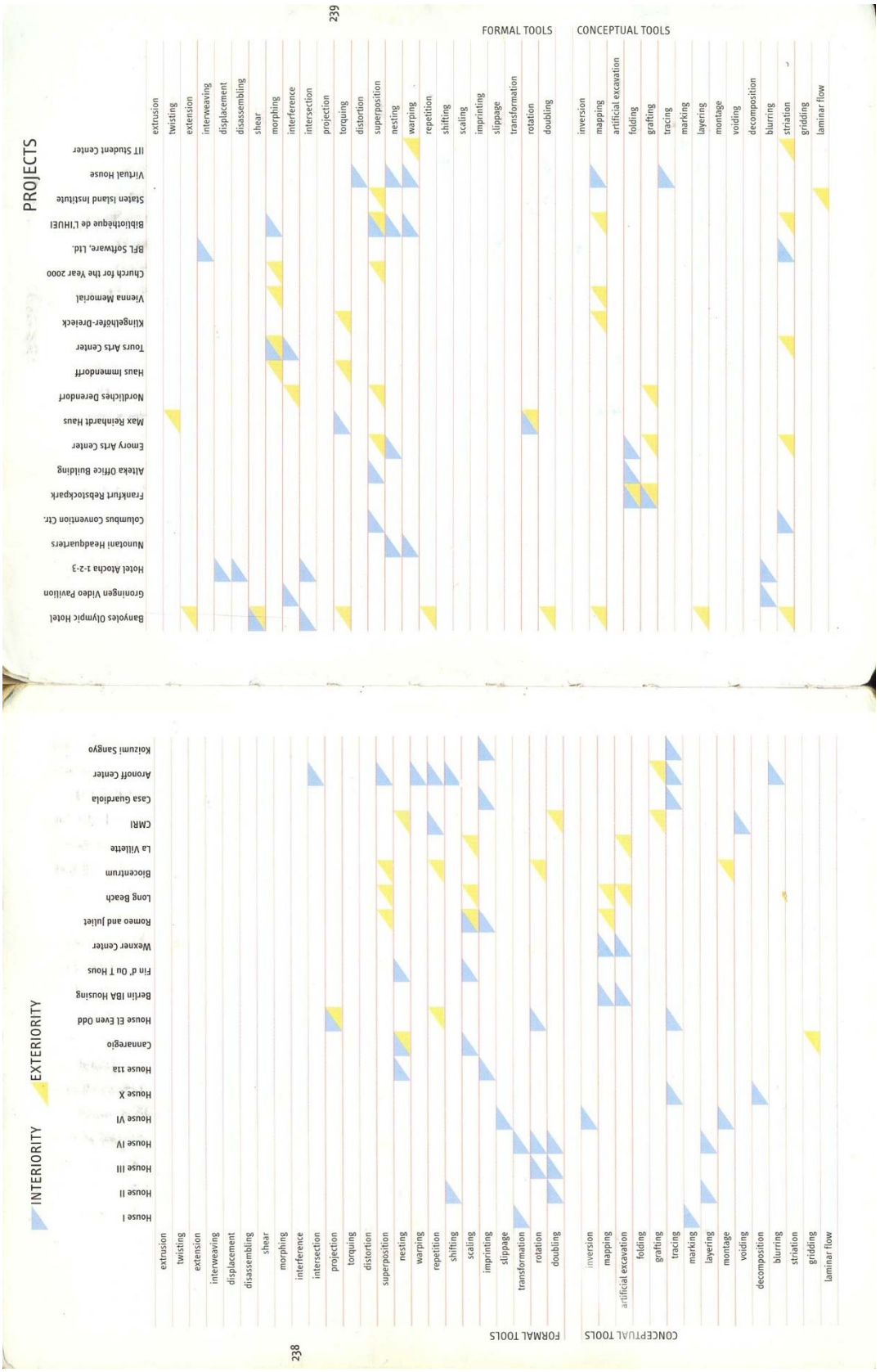

Figure 3-2 Table of Tools of Peter Eisenman. Source: Peter Eisenman. Diagram Diaries. New York: Universe Publishing, 1999: 38-39.

The following operations are not the steps of design process, but rather, they indicate *alternative generations of a single work by the operation of layering*. For instance, different layers of grid help to organize different elements; the superimposition of different layers of grid constitutes the underlying reference or base. Likewise, when building volume and shear walls are superimposed an alternative generation of the same building becomes possible. Similarly, vertical layers produce facades and horizontal layers produce slabs. The superimposition of these layerings constitutes the whole building.

3.1.1. Layering of Grids: "Frame of References"[57]

The initial form of House II is a square prism. This square prism can also be called as the generic form of the building. The square prism defines a volume, which can also be defined by a nine-square grid (9SG) that constitutes a cage-like structural frame: single gridded point supports as columns. This grid or frame acts as a Cartesian field in which the planes and volumes are located.

This square volume could also be defined by "a series of four planes or a series of three volumes seen as solids between the planes."[58] Accordingly, "…while the grid of nine squares can be seen as an underlying structure, the axial opposition of planes and volumes can be seen to create a transformation of this structure." [59]

For the initial form, Eisenman states that: "[T]he original square is divided into nine squares. These squares are marked by a matrix of 16 square columns."[60] This 9SG is the structural grid and therefore it can be called as "the actual grid." By the help of a diagonal shift, this 9SG is doubled with distance "x". (Fig.3-3) The emerging second grid is a non-structural grid that organizes non-supportive dividing and enclosing wall surfaces. Hence, this second grid is not an actual grid; it is "a virtual one." (Fig. 3-4)

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[57] Peter Eisenman. The Formal Basis of Modern Architecture, Lars Müller Publishers, 2006: 63.

[58] Peter Eisenman. "Cardboard Architecture: House II" Five architects: Eisenman, Graves, Gwathmey, Hejduk, Meier. New York: Oxford University Press, 1975: 25.

[59] Peter Eisenman. Feints. Milano: Skira Editore, 2006: 82.

[60] Ibid.

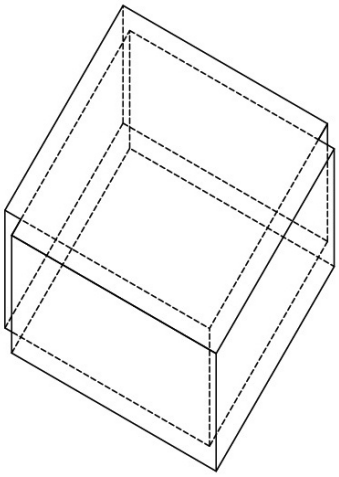

Figure 3-3 Diagram showing the diagonal shift of the initial volume. Superimposition of two bounding volume. Redrawn by the author.

The first grid as a matrix of columns contains *building volumes*, whereas the shifted grid organizes planar elements: *walls*. The matrix of columns defines one layer and the planes define the other layer. These two grids as different layers formulate different elements and "the diagonal shift forces the two layers apart."[61] This aperture creates a potential that enables these layers to work independently. Accordingly, the building volume is freed from structural elements.

There remains some area due to the shift between these grids. It is certain that the residuals between these layers are *intentional*. Eisenman asserts that: "The particular location of columns, walls and volumes produced by the diagonal shift creates two datum references."[62] By the help of these references it is possible to read both shear walls and columns as a neutral reference with different viewpoints. This situation creates a layered reading of the building.

[61] Peter Eisenman. "Cardboard Architecture: House II" Five architects: Eisenman, Graves, Gwathmey, Hejduk, Meier. New York: Oxford University Press, 1975: 26-27.

[62] Ibid., 25.

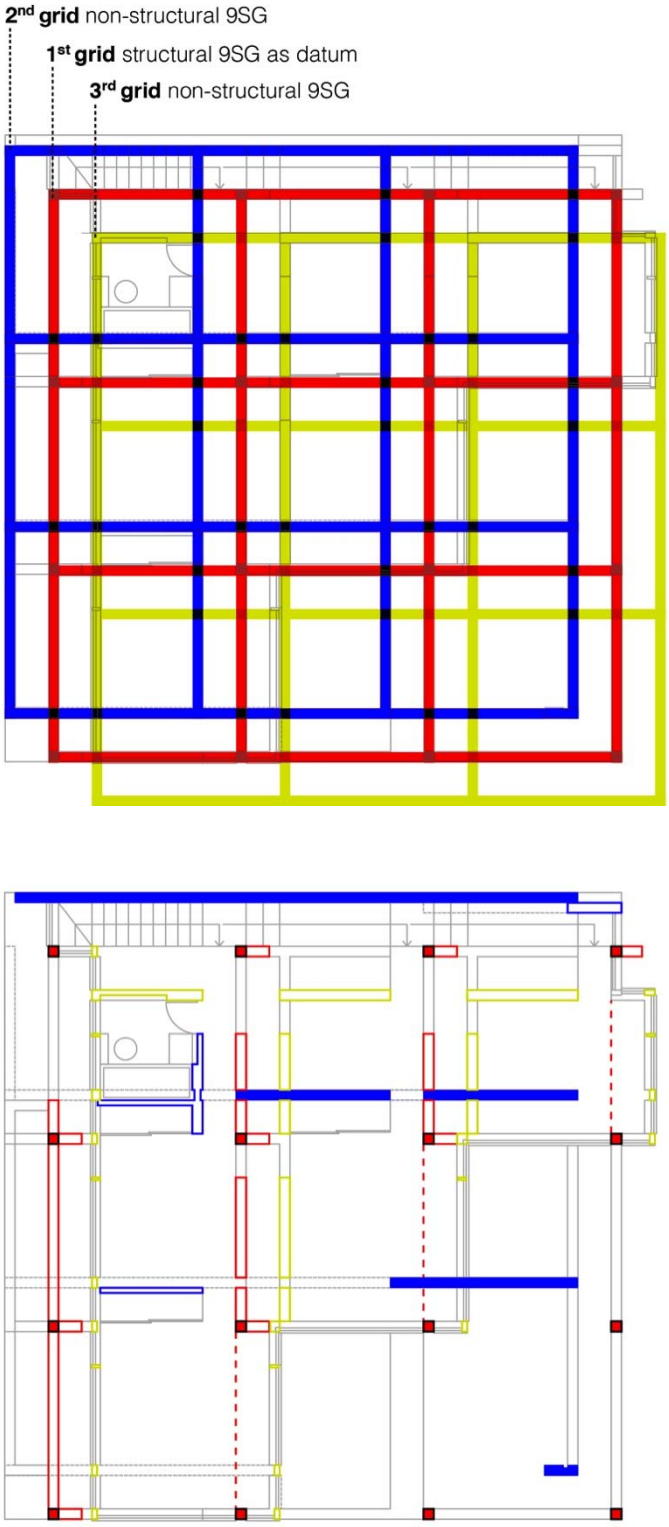

Figure 3-4 Diagram showing superimposition of structural (actual) and two non-structural (virtual) grids in House II and their architectural representatives. Produced by the author.

Besides these two grids, there is a third grid, which is not defined in the design process of House II. It is not intentional as it is neither shown in diagrams nor written in the texts. This third layer -as my interpretation- is the outcome of the necessity for separation of volumes to make them work independently, which eventually produces *voids* between volumes. It is the diagonal reflection of the non-structural layer with reference to the initial layer. (Fig. 3-5)

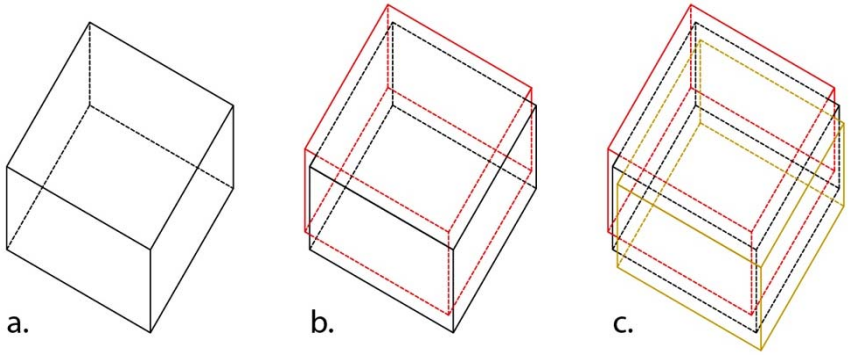

Figure 3-5 Diagrams showing a) the initial layer b) dislocation in the form of a diagonal shift c) reflection of the diagonal shift. Produced by the author.

This layering of grids produces a cross layering in both axes. The first grid constitutes an underlying structure defined by columns and beams. The second grid as the outcome of a diagonal shift creates a formal order that walls follow. As my interpretation, the third grid exposes the layered reading of the building by composing voids between building volumes on the upper level in the north-south direction and generating projections through East. This will be further discussed in the coming parts of the thesis.

House II is composed of series of layers arranged both vertically and horizontally with reference to a grid system that structures relationships between various layers and in turn elements. Eisenman conceives grid as the "frame of references for all perception."[63] Therefore it can be noted that grid as the main reference of all generations and transformations in House II constitutes an underlying structure

[63] Peter Eisenman. The Formal Basis of Modern Architecture, Lars Müller Publishers, 2006: 63.

to organize vertical and horizontal layers. Similarly Charles Jencks puts emphasis on Eisenman's use of grid:

> The grid is implied as the reference plane. This means that the route through the building, or curvilinear elements, are related to a conceptual cage of space perceived frontally.[64]

The conception of grid as the initiator of all generations and transformations in design process is also emphasized by Rafael Moneo in *Theoretical Anxiety and Design Strategies:* "[W]e see how the ideal grid on which the architect is to work is activated by a first, formal impulse that gives rise to a series of transformations and inventions, and these are documented at every single phase of the work."[65]

3.1.2. Layering of Building Volume/Spaces: Programmatic Layering

> …building volume…generally reveals the original conceptualizing of a building most clearly…[66]

Transformational process can be traced by analyzing building volume in House II. It is previously stated that the square prismatic building volume can be defined as "a series of three volumes seen as solids between the planes."[67] Within the same conception in House II, the building volume is divided into three equal spatial layers. (Fig.3-6-a) This tripartite division of building volume creates a "programmatic layering" on the upper level, however on the lower floor the layering of spaces is in the opposed direction, which I will further discuss in the coming parts.

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[64] Charles Jencks. The New Paradigm in Architecture: The Language of Post-Modernism. New Haven and London: Yale University Press, 2002: 89.

[65] Rafael Moneo . "Peter Eisenman," Theoretical Anxiety and Design Strategies. Barcelona: MIT Press, 2004: 151.

[66] Peter Eisenman. "Transformations: the Processes of Volumetric Addition and Subtraction," Giuseppe Terragni: Transformations Decompositions Critiques. New York: The Monacelli Press, 2003: 29.

[67] Peter Eisenman. "Cardboard Architecture: House II" Five architects: Eisenman, Graves, Gwathmey, Hejduk, Meier. New York: Oxford University Press, 1975: 25.

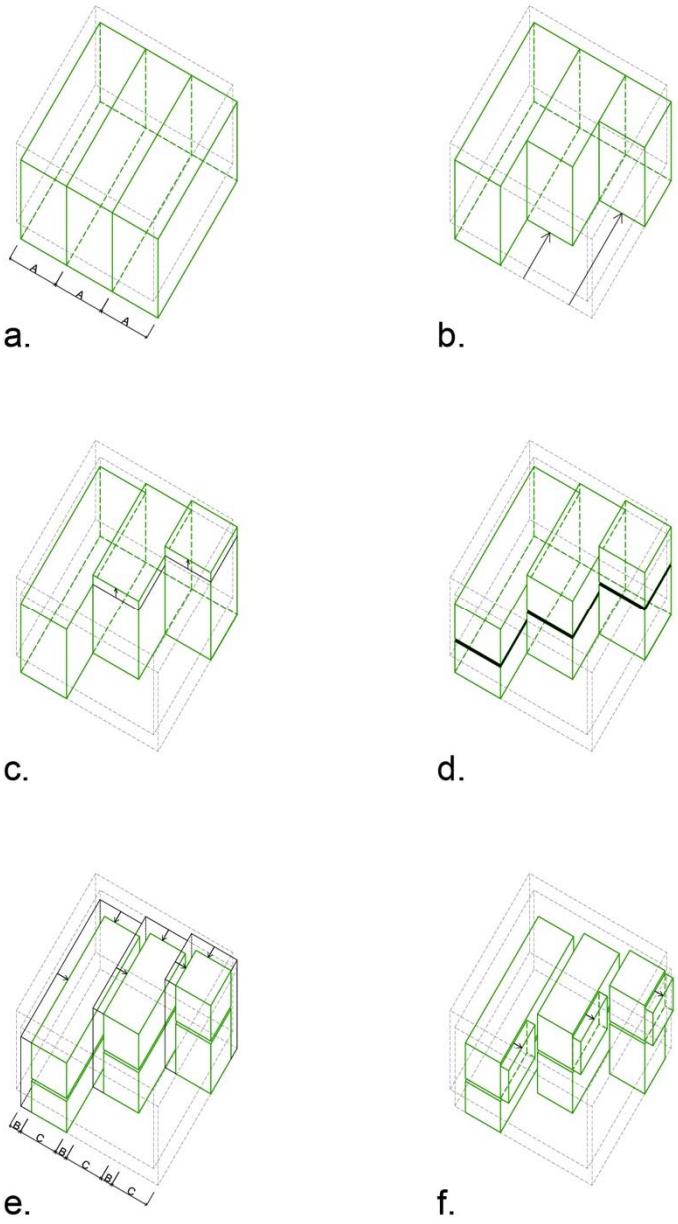

Figure 3-6 Diagrams showing transformations of the building volume in House II. Redrawn and edited by the author with reference to Eisenman's analytical diagrams in Houses of Cards. New York: Oxford University Press, 1987.

The three volumes set back from west to east to define a diagonal. This recession constructs the relationship between open and closed spaces. (Fig.3-6-b) Then, these volumes pull up from west to east to break physical connection between volumes in the upper floor. (Fig.3-6-c) Elevating both slabs and roof decks ensures the level difference between upper three volumes. This elevation emphasizes the three partite division and layered reading of the building. After elevating building volumes gradually, a horizontal division of these volumes is applied to achieve a leveling of the spatial layers. (Fig.3-6-d) Then, the residual volumes, which are previously discussed, are subtracted from these volumes. (Fig.3-6-e) The building volume is further articulated by the projections coming off from each spatial layer from west to east. (Fig.3-6-f)

3.1.3. Layering of Planes/Shear Walls: Frontal Layering

A secondary layering is produced by the diagonal shift at the very beginning of the evolution of House II. This layering defines shear walls, which are ordered by the second grid. Their position is perpendicular to the layering of building volume, which will result in plaiding of walls and volumes.

These walls, as vertical layers, are layered in the north-south axis, as opposed to the layering of building volume. The building volume in the form of a volumetric echelon is the outcome of subtraction of volumes, which is further defined by this sequence of layered walls. (Fig.3-7)

These vertical layers as “shear walls … repeat and reduce in length as they move along the diagonal from full-length shear wall at the north.”[68] (Fig.3-8) The resultant diagonal cuts through the building volume and therefore defines divisions in the main three volumes.

[68] Peter Eisenman. “Cardboard Architecture: House II,” Five architects: Eisenman, Graves, Gwathmey, Hejduk, Meier. New York: Oxford University Press, 1975: 25.

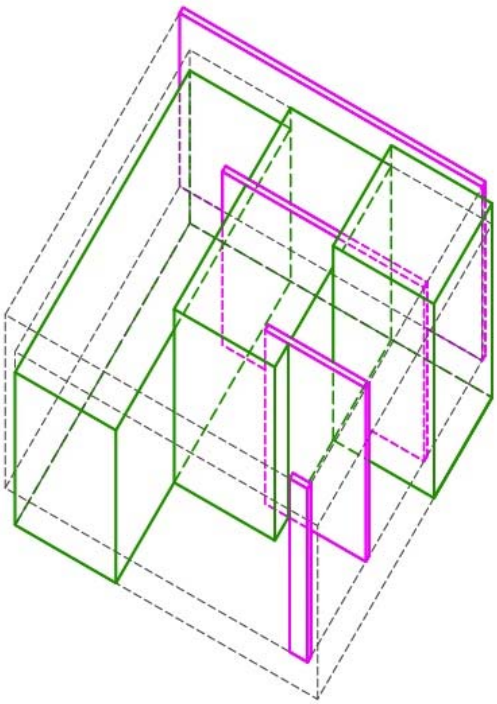

Figure 3-7 Diagram showing how two systems of layering are superimposed in axial opposition in House II. Redrawn by the author.

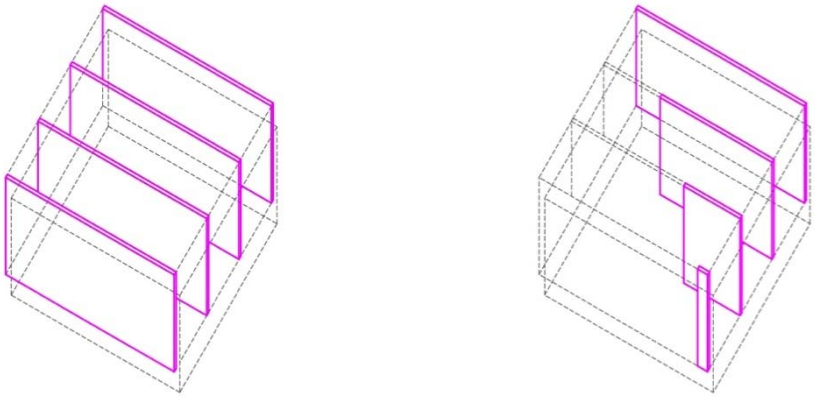

Figure 3-8 Diagrams showing transformation of walls. Redrawn by the author.

The wall on the south defines the end point of the underlying grid that generates these walls. More than being a wall, it is like a column with a rectangular section. For the purpose of defining the underlying grid, a continuous beam just under the upper level slab connects these walls.

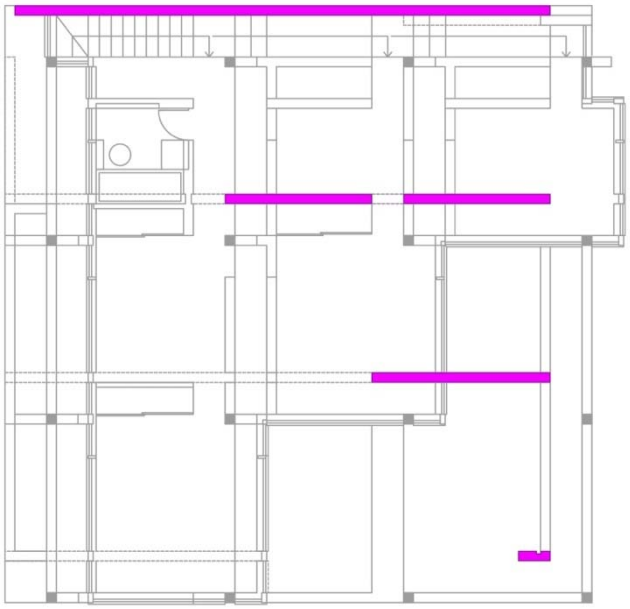

Figure 3-9 Plan showing shear walls. Redrawn and edited by the author.

Figure 3-10 Axonometric drawing showing the relationship between implied layers and shear walls. Source: Peter Eisenman, Houses of Cards. Edited by the author.

Since walls get narrower moving to south, building is totally closed in north and it becomes more open in south, ending with an outdoor space. Where the building is more closed, the *depth* of spaces increases and vice versa. In other words, this transformation of walls orders the "depth" of spaces. This situation, which is the result of the cross layering of building volume and walls, adds a complexity to the architectural space.

In the following part, I will define layering of vertical planes as "facades." The shear walls that Eisenman defines are a subset of these vertical layers. While the non-structural grid generates shear walls, the first grid (structural grid) that defines building volumes produces partition walls. Therefore, all vertical planes, including shear walls and partition walls, in House II are conceptualized as vertical layers that are the components of vertical layers.

3.1.4. Vertical Layers: Facades

In reality, the perception of a volume is by planes and therefore this study conceptualizes volume as it is decomposed into its planes. This is necessary for the analysis of layers and understanding the relationships between them. In the case of House II, this apprehension of volume as planes is more obvious than as masses.

In this particular case, the layers act as "facades." Because of the formation of the building, at some points vertical layers are conceived as outer facades, and at some points as inner facades. Therefore, facades organize inside-outside relationships as well as inside-inside and outside-outside relationships between spaces. For instance, an inside wall that relates/separates two spaces becomes an inner facade. Therefore in the case of House II, more than being an interface between outside and inside, *facade becomes an organizational tool*.

As explained in this context the conceptualization of facade is different from the idea of elevation. While elevation is a means of presentation of the outer appearance of a building, facade is a three dimensional entity that has the potential to transform a building. Similar to this conception, Colin Rowe distinguishes the idea of elevation and the idea of facade as "[e]levation…is

merely the literal or technical display of interior arrangements projected onto the outer surface of a building … much like a section or a plan in that it records factual information" while a facade differs from an elevation with its "character." [69]

In the same way, Eisenman explains the distinction of the facade from the plan, section, and volume. He says, facade "can be seen as a vertical plan or section that constitutes the outermost surface of a volume," therefore "it is analogous to plan and section in this way."[70] However with a different point of view, "the facade can be physically perceived, calling for a different type of reading."[71] He continues as "…the facade can be seen as a flattened three-dimensional entity with its own plan and section, with conceptual equivalence to the two-dimensional plan and section." Other than these properties, the facade has time dimension. Its relation to time differs itself from plan, section, and volume says Eisenman. He also states "the experiential and perceptual reading of the facade is more immediate because that reading of the facade compresses or encompasses time."[72]

In the context of this analysis, Casa del Fascio and Casa Giuliani-Frigerio are significant, as they somehow affected Eisenman in the conceptualization of House II. It is noted that the time of the analysis on Casa del Fascio done by Eisenman during his PhD studies corresponds to the design of House II. Therefore the discussions on these buildings are relevant as they provide considerable information to analyze and comprehend House II. The significance of facade in the evolution of Casa del Fascio is cited as "the facades contain traces of their processes of evolution. The articulation of the formal and conceptual evolution of these buildings is a crucial factor in the reading of these facades. [73]

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[69] Peter Eisenman. "Transformations: The Facade," Giuseppe Terragni: Transformations Decompositions Critiques. New York: The Monacelli Press, 2003: 33.

[70] Ibid., 34.

[71] Ibid.

[72] Ibid.

[73] Ibid.

In a similar sense, facades of House II also show evidences of its process. By that it becomes possible to reveal the operations and transformations that the building goes through.

> This articulation is also radically different from the status of the modern facade as a record of the interior; the articulation of these two buildings' facades can be seen as the registration of the generation of the interior as opposed to its spatial disposition.[74]

Therefore, it is possible to say that there is a shift in the conceptualization of modern facade. Facade becomes an operative means in design process beyond revealing the interior organization of a design. Employing a facade in design process as an active element is essentially distinct in this sense. For the case of House II, "the building is conceived as a progression from outside to inside."[75] Hence "the facade becomes a series of parallel layers" producing varied relationships in between them:

> …there is a series of layers moving from outside to inside. This is different from the reading of inside to outside which is fundamental to a cubist aesthetic. Again the original diagonal shift produces the condition where the *facade becomes a series of parallel layers.* [76]

It can be inferred from the quotation that in modernism, facade is treated as a reflection of interior space of a building. Therefore the facade is generated by the inner dynamics of a building. Unlikely, in House II facades becomes operative means that generates overall form starting from outside to inside.

In the context of this thesis, both the formal structure of the facade and the conceptual process of its generation in House II should be read. To do that, the facades should be analyzed both from frontal and oblique views.

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[74] Peter Eisenman. "Transformations: The Facade," Giuseppe Terragni: Transformations Decompositions Critiques. New York: The Monacelli Press, 2003: 34.

[75] Peter Eisenman. "Cardboard Architecture: House II," Eisenman Inside Out: 1963-1988 Selected Writings. New Heaven and London: Yale University Press, 2004: 38.

[76] Ibid., 26. Emphasis mine.

Frontality of Facades

As a term, frontality suggests a relationship between the observer and the object. It suggest a frontal view –a parallel position of picture plane and object– and likewise, "[w]hen a facade is said to be primarily frontal, it means that its particular configuration, the size, shape, number and relationship of its voids and solids, is marked in such a way as to make its schematic order most apparent when the viewer is standing directly in front of it."[77]

The significance of frontality in this study arises from its relationship to the operation of layering to organize spaces. Supporting this argument, in their book *Transparency*, Rowe and Slutzky emphasizes the potential use of stratification and frontality, i.e., layering of frontal planes, in architecture to provide phenomenal transparency. [78]

When we discuss the frontality of House II, it appears to be quite complex as the frontality of layers shifts in the upper floor with reference to the layers in the ground floor. One expects to call the entrance facade as the front facade, however the treatment of the underlying grid organizes space in such a way that in different floors the frontality of layers change. This situation adds building another complexity due to the cross-layering/axial opposition of building volume in different levels.

Although the grid is a neutral element that does not call for any direction of layering, in House II, by the help of extensions on columns, the neutrality of grid is lost. This is actually a positive input considering the fact that the extensions evoke for implied layers that run parallel to each other. These implied layers define movement that is perpendicular to layering of building volume, creating dynamism in the building.

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[77] Peter Eisenman. "Transformations: the Facade," Giuseppe Terragni: Transformations Decompositions Critiques. New York: The Monacelli Press, 2003: 38.

[78] Colin Rowe and Robert Slutzky, Bernhard Hoesli, Werner Oechslin. Transparency. Basel: Birkhauser-Verlag, 1997.

Layering and Transformations of Facades

The initial square volume suggests four facades and two slabs. When it is doubled with a diagonal shift, the number of facades is also doubled. Thereby, this shift produces facades composed of a series of parallel layers.

The formation of these layers is dependent on the regulating grids. Especially the structural facades has the necessity to carry the building, therefore they are composed of columns and beams of 9SG. The non-structural layers of facades are freer than the structural layers. They are at the same time ordered by the underlying grids.

In House II, the transformational process starts from outside to inside. Therefore, facades are important elements to generate space. For the formation of facades of Casa del Fascio, Eisenman declares that:

> Each facade seems to pick up a formal motif from the preceding one and then introduce a new motif as a secondary element, which in turn is picked up by the next facade.[79]

Since the facade conceptions of Casa del Fascio and House II are similar in terms of generation of facade layers, this argument calls for an investigation in the transformation of facades on which geometric cutouts of varying sizes and depths are guided by the superimposition of underlying grids.

a. The North Facade

The diagonally shifted grid defines the external layer of the north facade. This external layer seems to be detached from the building volume. The distance between the outer facade and building volume defined by an underlying grid is further emphasized by linear voids on the top in the east-west direction.

The north facade of the house is a continuous and blind plane. Gradually the shear walls get narrower generating an echelon form. This transformation of layers creates porosity between layers by causing the building to open to outside in north-south direction.

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[79] Peter Eisenman. “Transformations: the Facade,” Giuseppe Terragni: Transformations Decompositions Critiques. New York: The Monacelli Press, 2003: 37.

The solid north facade defines the vertical circulation and it hides staircases behind. Distinctively, as a result of this blindness, building establishes an opaque relationship between its surrounding in the north face.

Figure 3-11 North Elevation of House II (Layering of facades in the North-South direction). Color darkens when layers get deeper. Produced by the author.

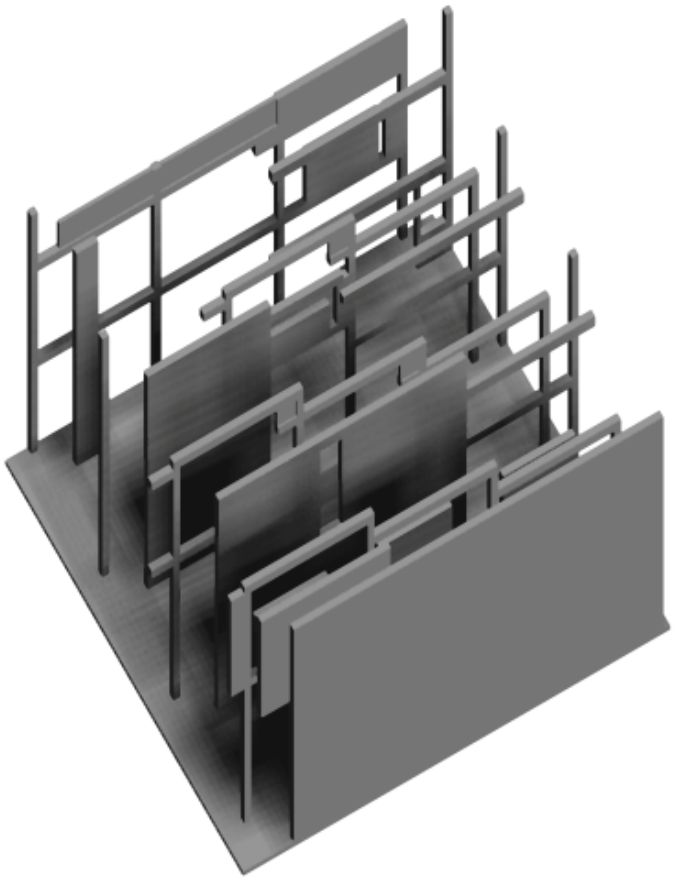

Figure 3-12 Diagram showing the series of facades layered from back to front along the north-south axis. Produced by the author.

b. The South Facade

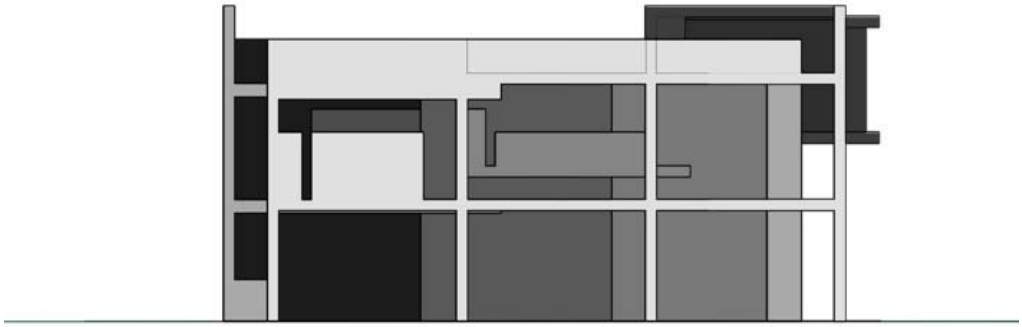

Figure 3-13 South Elevation of House II (Layering of facades in the North-South direction). Color darkens when layers get deeper. Produced by the author.

South facade reveals the structural grid on the outer layer.[80] Although the layering of walls predominates in this facade, due to the outer structural layer, the facade is conceived as a cage-like structure as a combination of columns and beams. Therefore it can be deduced from this analysis that the south facade is dependent on the structural system.

The south facade creates ambiguity, which is resulted from the diagonal shift. Eisenman explains this ambiguity:

> …the final shear wall to the right is the same width as the fascia of the south facade and is placed in such a way in relation to the articulation (the way it is cut on the right) of the fascia so as to force the most exterior plane to be seen as completing itself with this shear wall behind. This sets up a warping or distortion in the frontal plane. While the diagonal shift forces the two layers apart, now a pressure is created for the individual to read them as one. [81]

[80] Peter Eisenman. "Cardboard Architecture: House II," Eisenman Inside Out: 1963-1988 Selected Writings. Yale University Press: New Heaven and London, 2004: 38.

[81] Ibid.

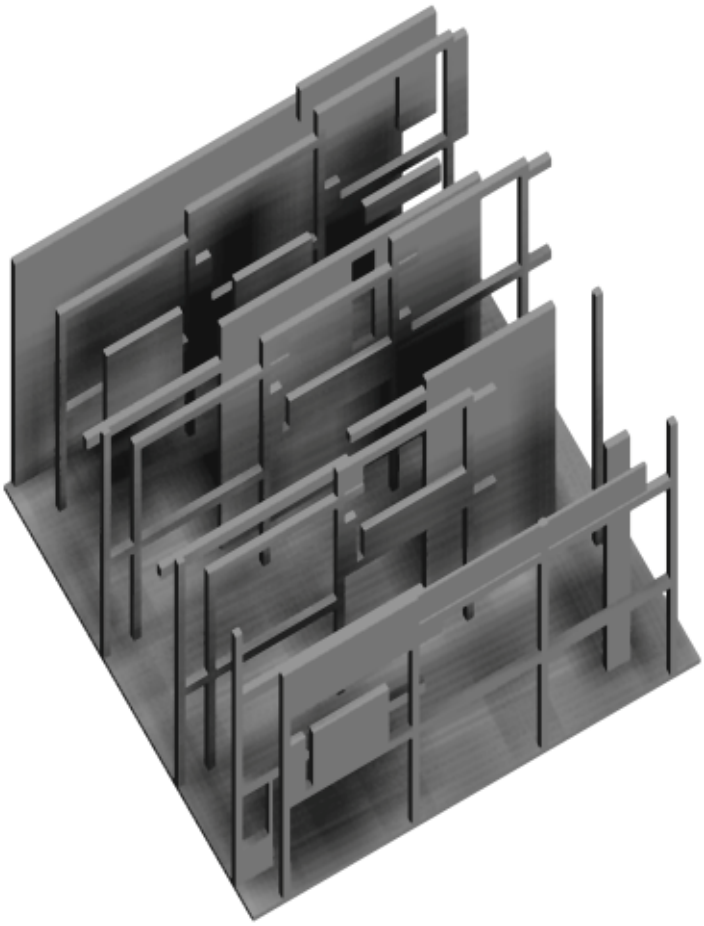

Figure 3-14 Diagram showing the series of facades layered from front to back along the north-south axis. Produced by the author.

c. The West Facade

The west facade is a detached, autonomous element projected forward from structural layer to mark one layer that reinforces the house's frontality, and the facade of upper level is recessed back to mark another. Therefore the west facade is composed of three different layers and in order to identify these layers, the structural layer acts as a *datum* for this layering. (Fig. 3-15,16)

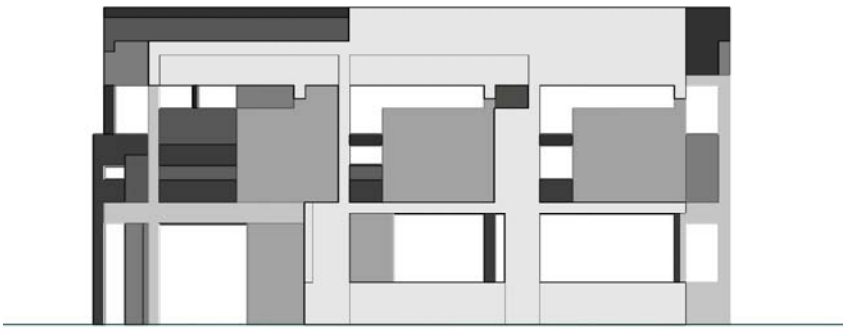

Figure 3-15 West Elevation of House II. Redrawn and edited by the author.

Figure 3-16. West facade of House II. Source: Peter Eisenman. Feints. Milano: Skira Editore, 2006: 86-87.

On the ground floor, the projected layer extends the building volume and defines the kitchen unit. On the upper level the recessed layer becomes the glazed surface of the building volume. When upper level facade sets back behind the front plane of exterior facade, the recession defines skylights for the ground floor, which are placed directly over the residual between facades in the north-south

axis. Therefore, the outer layer of the west facade is like *a frontal plane conceptually detached from the building volume* to form an additional plane of entry.

Similar kind of facade conception could be seen in the Casa Giuliani-Frigerio designed by Giuseppe Terragni.[82] It would be interesting to compare the layering of facades in the Casa Giuliani-Frigerio and House II in the part titled “Layering as an Analytical Tool.”

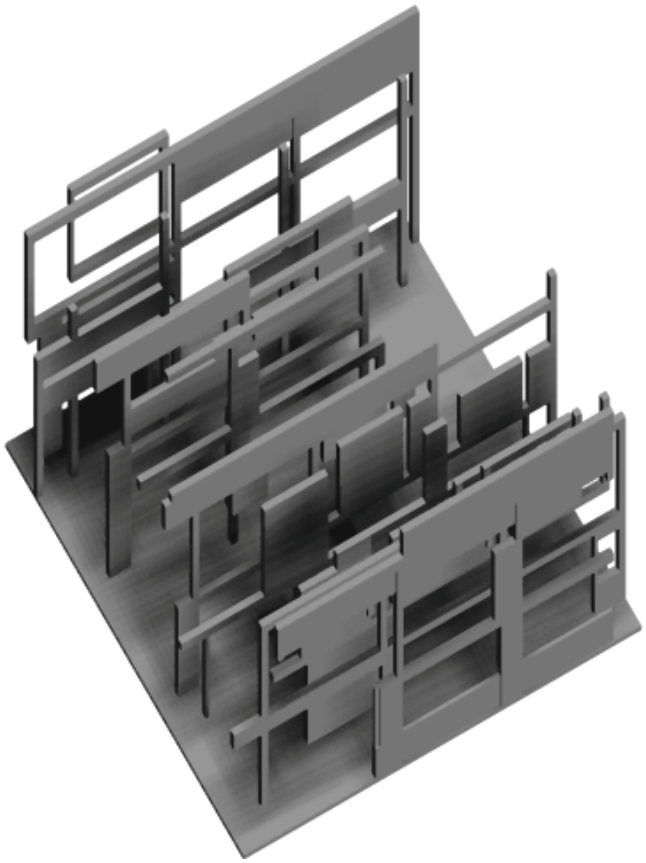

Figure 3-17 Axonometric drawing showing layering of facades in the east-west direction. Produced by the author.

[82] Peter Eisenman. “From Object to Relationship II: Casa Guiliani Frigerio: Giuseppe Terragni Casa Del Fascio,” Perspecta, Vol. 13/14, The MIT Press, 1971: 36-65. 24 Feb 2012. <http://www.jstor.org/stable/1566970>

d. The East Facade

The outer structural layer is the reference/datum layer for this facade. Projection on the right segment creates a new layer, which is defined by the third grid. Two other projections come from middle and left segments, but since they are behind the structural layer on the outside, they cannot be observed from a frontal view. Therefore what make the east facade distinct are the projections stepping out from west to east.

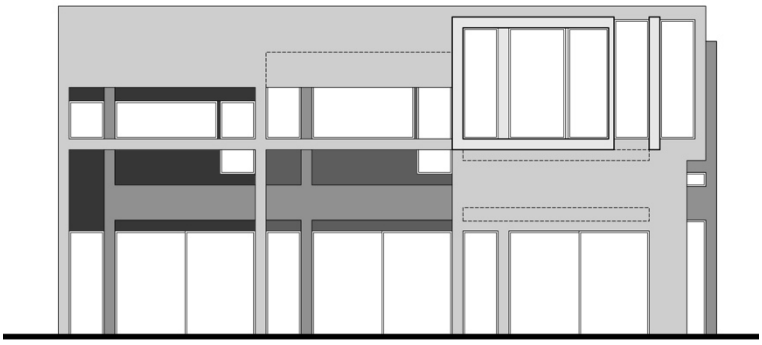

Figure 3-18 East Elevation of House II. Redrawn and edited by the author.

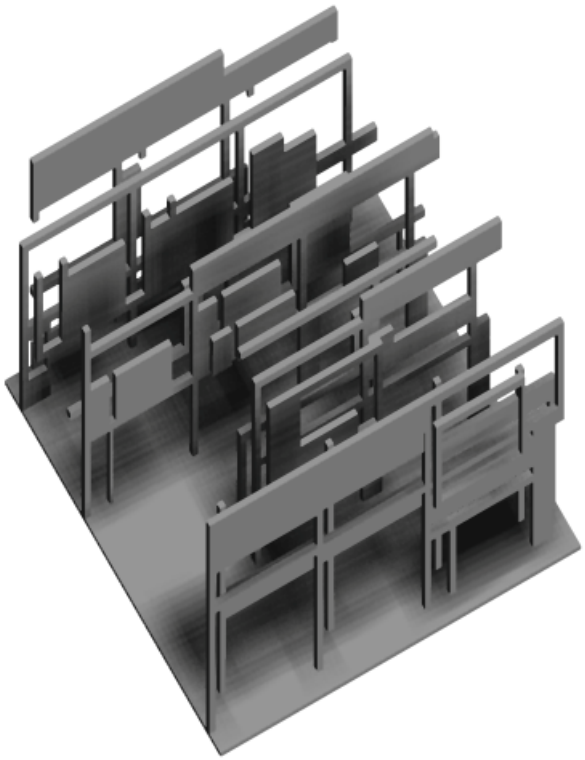

Figure 3-19 Axonometric drawing showing layering of facades in the west-east direction. Produced by the author.

3.1.5. Horizontal Layers: Slabs

> …while a facade may be viewed in a glance, plan is never actually viewed. It is experienced in time and by movement from an entry point. The facade can be seen as an inscribed surface perceivable at a fixed moment in time; the plan, while never seen as such, is also an inscribed surface. Yet this surface is understood through a process of apperception−a retrospective process of piercing together fragments of information received chronologically. Like film, the plan is the sum of single instances of perception. The perception of actual time is largely lost through this mnemonic process, and, in turn, the fragments of experience are incorporated into an order analogous to the one of the building. While facades can be both actually perceived and conceptually understood, ultimately the plan is mainly conceptual.[83]

It could be inferred from the quotation that although in most cases the plan (slab) of a building may not be experienced like a facade, in House II, by the help of voids in slabs and the condition that partition walls never touch the ceiling, the possibility of observing and experiencing the slabs is ensured. Furthermore, slabs in House II are also conceptualized as transformational layers like facades. As a matter of fact, slabs can be thought as ninety-degree rotated facades and vice versa. With this point of view, it is possible to conceptualize *slab as an organizational tool* like facade.

Like facades, slabs are also guided and structured by the underlying grids. The boundaries and solid-void relationships of slabs are the result of a transformational process guided by the underlying grids. Therefore it is possible to say that the relationship between facades and slabs is defined by the underlying grids.

A series of slabs are defined by a sequence of horizontal layers defined by the initial square form of House II. (Fig. 3-20) The building in the form of square consists of three horizontal layers namely: Ground, floor and roof layer. These three layers transform with respect to the underlying grids. The recession in the form of echelon that building volume encompasses directly affects horizontal layers as well. This operation forms the slabs and therefore defines the solid void relationships. The second transformation is the result of elevation. This creates the floor and roof layers to break apart so that the level differences between them

[83] Peter Eisenman. “The Plan,” Giuseppe Terragni: Transformations Decompositions Critiques. New York: The Monacelli Press, 2003: 115.

are obtained. Then, the three projections coming off from each building volume constitutes extensions on the floor layers. The treatment of these extensions on the roof layer is slightly different. In addition to extensions on slabs, a downward dislocation with a distance equal to the thickness of slabs creates another leveling on the top of projections, which changes the section of slabs. This leveling could be regarded as the continuation of roof slabs.

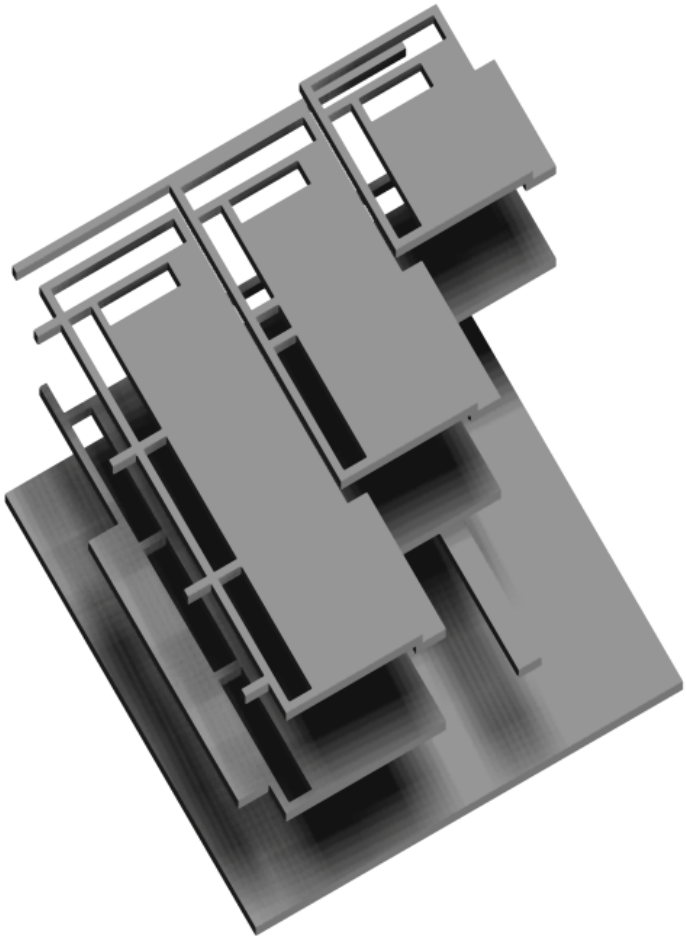

Figure 3-20 Horizontal layers as slabs. Produced by the author.

The reading of horizontal layers in House II becomes a secondary layering with reference to horizontal layering of facades. Although in the general sense, the dominancy of facades obstructs reading of these slabs, with an oblique view this

situation changes due to the formation of layers at meeting points (of facades and slabs).

The composition of vertical and horizontal layers enhances the layered reading. When a vertical and a horizontal layer meet, they are shifted and detached from each other in order to produce a void so that layers never merge. This treatment also prevents the building form from being read as a mass. Therefore, the layered reading of House II becomes more dominant than its volumetric reading.

3.1.6. Superimposition of Layers

As discussed previously in the second chapter, “superposition” corresponds to an arrangement of layers in space with reference to one another. With a small distinction, “superimposition” suggests interlocking of layers, an overlay of different elements. Regarding this definition, when two or more layers are superimposed, they define different relationships by suggesting interactions. Additionally, this act gives flexibility to layers by letting them have their own autonomous logic. As a result, layers become both autonomous - and fragmented in themselves – and related to others by means of depth in between layers.

In House II these relationships between layers are established within a formal order. For this formal order, Eisenman claims that: “Any ordering or organization of architectural form within the design process can be called a system: more explicitly a formal system.”[84] Superimposition of layering on different axis creates a formal system, which brings an ordering to the architectural form. Superimposition of the above mentioned layers -grids, building volumes, walls, facades and slabs- generates elements of program, such as living room, bed room, study room, kitchen, service, movement, voids, and projections.

Distribution of program elements

For the general organization of spaces, layering of the building volume, which is guided by the initial grid, defines main spaces. (Fig. 3-21) By the superimposition

[84] Peter Eisenman. The Formal Basis of Modern Architecture. Lars Müller Publishers, 2006: 87.

of the building volume and shear walls, the sub-distribution of spaces is achieved. For instance, while the upper level program is divided into three units by the layering of building volume, the sub-units of each main unit is bordered by the shear walls which are guided by the shifted grid.

The transparent organization of layers is significant in the definition of these spaces for possible uses such as living, dining, kitchen, bedroom, etc. Although a layered distribution of spaces is achieved, inconsistencies resultant from location of bathrooms creates a condition that does not fit into the spatial layering.

Figure 3-21 Diagram showing the organization of spaces. Redrawn and edited by the author.

Storage Units

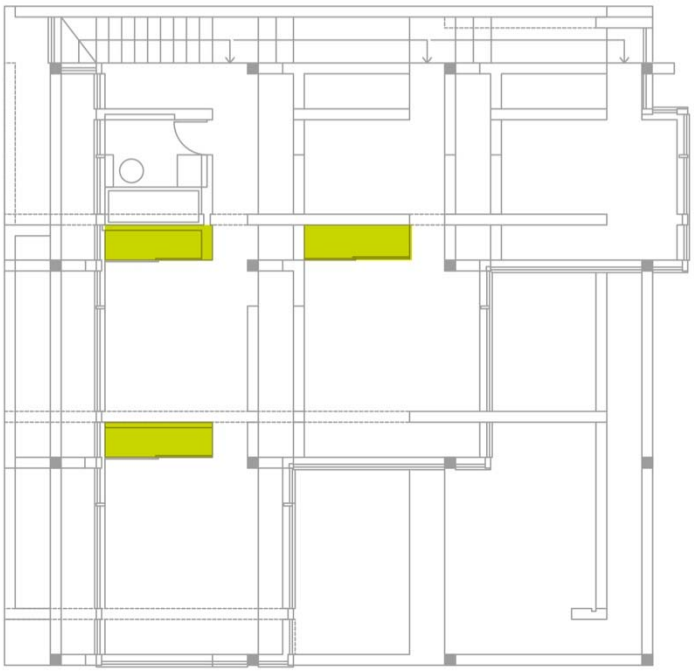

Figure 3-22 Diagram showing service areas in House II. Redrawn and edited by the author.

The residual layers between structural and shifted grid generates storage units. (Fig. 3-22) The number of units is determined by the number of bedrooms.

Movement/Circulation

Volume can not be thought of without movement into it…[85]

An echeloning movement as the outcome of superimposition of layers - first and second grid - generates staircases and corridors. (Fig. 3-23) On the ground level, movement is initiated with the entrance. This entrance does not only act as a

[85] Peter Eisenman. The Formal Basis of Modern Architecture. Lars Müller Publishers, 2006: 73.

passage from outside to inside but it also presents “a beginning to a system of movement throughout the building.”[86]

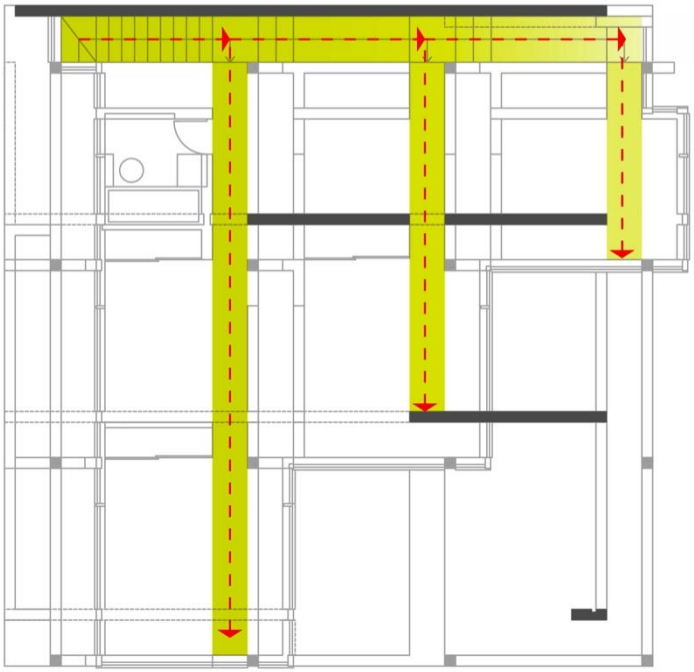

Figure 3-23 Diagram showing movement and its relationship with shear walls in the upper levels of House II. Level differences are indicated with different tones.
Redrawn and edited by the author.

By means of staircases, the vertical movement is provided between ground floor and the three-leveled upper floor. After reaching the first level, the movement is rotated through the building volume creating a corridor-like circulation to bathroom and two bedrooms. On the second level, the movement pattern is the same except for the shortening of the corridor due to the subtraction of building volume at the first stages of transformation. Therefore, this second level corridor reaches first to the study room and then the third bedroom. This echeloning movement ends when it reaches to the third level where there is a study room. This space is the highest part of the building, terminated with a projection to east. (Fig. 3-24)

[86] Ibid., 113.

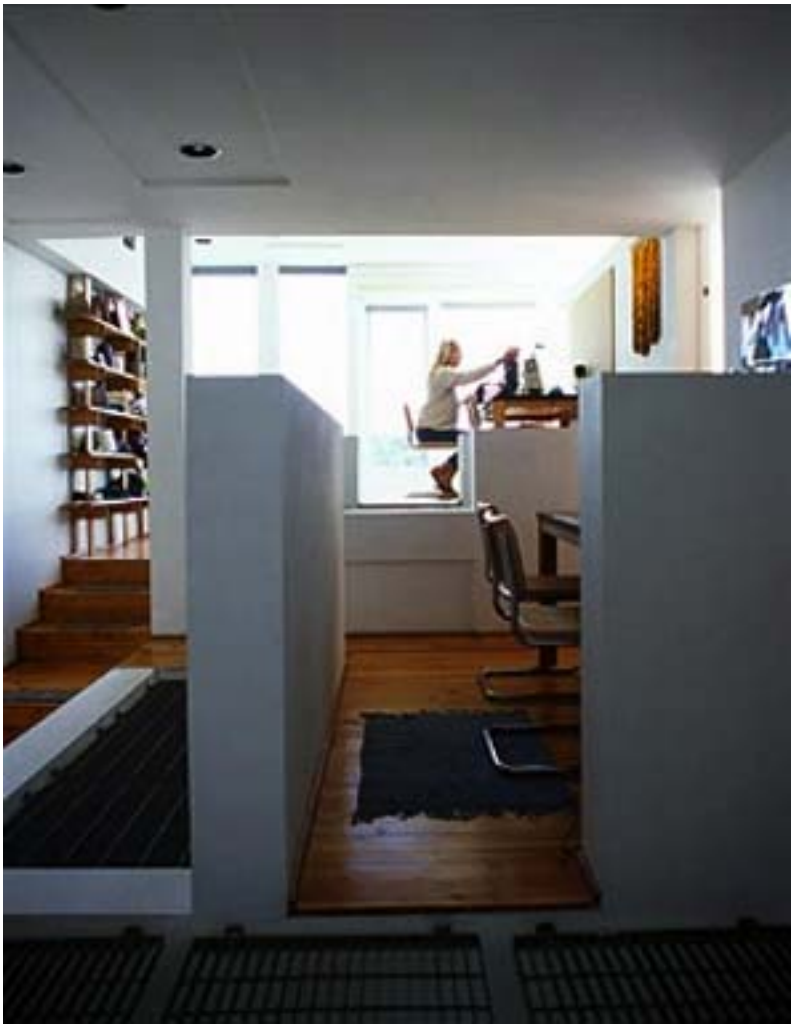

Figure 3-24 Interior photograph of House II showing the relationship between staircases and different levels. 21 June. 2011. <http://blog.ramzinaja.com/2010/05/house-ii-and-casa-del-fascio.html>

The movement on the upper levels is well defined, whereas the ground level movement is considerably free. This results from the fact that the ground floor is for general uses and therefore space organization is freer than upper level spaces, which are more private and divided.

Therefore in the case of House II, the movement becomes a program element that connects the layers of the building by defining both physical and visual transitions between them.

Voids

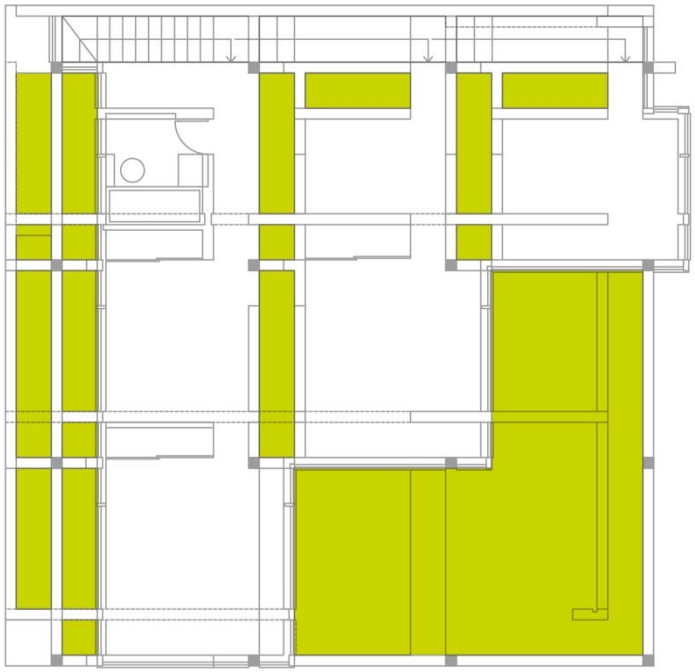

Figure 3-25 Diagram showing voids in House II. Redrawn and edited by the author.

The initial operation –subtraction- of the building volume results in an "L" shaped void in plan. This main void is composed of two terraces named as "morning terrace" and "evening terrace."[87]

Other than this main void in building mass, as the outcome of the diagonal shift, there are secondary voids as linear residuals between structural and non-structural grids in the north-south axis. Although they seem like left overs, these voids emphasize the volumetric layering in House II by separating the upper level building volumes. The placement of skylights on the roof slabs emphasizes these voids being located directly over the residual volumes in the north-south axis.[88] (Fig. 3-26) These voids on the roof are significant for the overall form of building

[87] Mario Gandelsonas. "On Reading Architecture," Progressive Architecture. Vol. 3, 1972: 86-87.

[88] Peter Eisenman. "Cardboard Architecture: House II," Five architects: Eisenman, Graves, Gwathmey, Hejduk, Meier. New York: Oxford University Press, 1975: 25.

as they are traces of the diagonal movement, which is the result of both a planar and a sectional shift. [89]

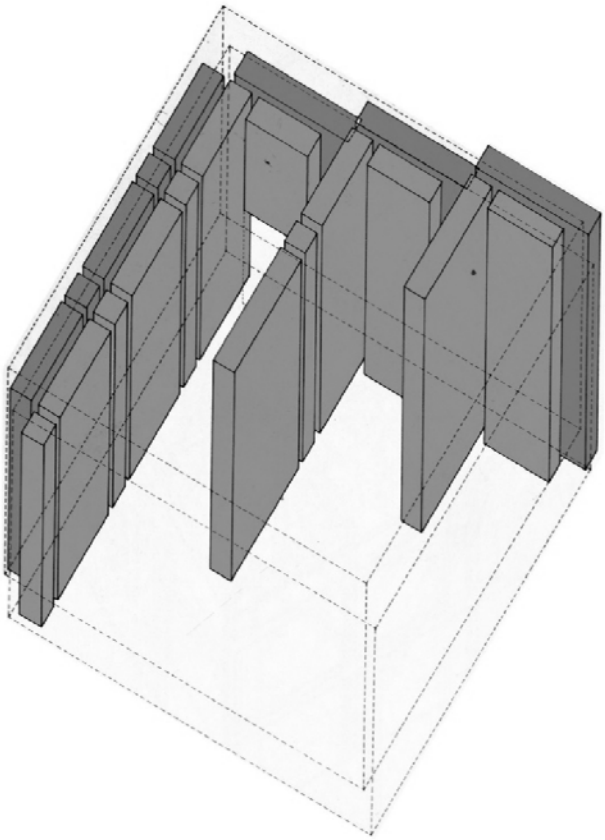

Figure 3-26 Diagram showing residual voids between grids as mass. Source: Peter Eisenman. "Cardboard Architecture: House II," Five architects: Eisenman, Graves, Gwathmey, Hejduk, Meier. New York: Oxford University Press, 1975: 34. Edited by the author.

Projections

The layering of grids with a diagonal shift enables the volumetric layers work independently due to the residual voids between them. Where building volume is subtracted to create open spaces, in the north-south axis of residual volumes, the spaces are expanded by means of projections composed of glazed surfaces. As the underlying grid dictates, there are three projections pulled from west to east, from structural to non-structural layer. (Fig. 3-27)

[89] Rafael Moneo. "Peter Eisenman," Theoretical Anxiety and Design Strategies in the Work of Eight Contemporary Architects. Barcelona: MIT Press, 2004: 160.

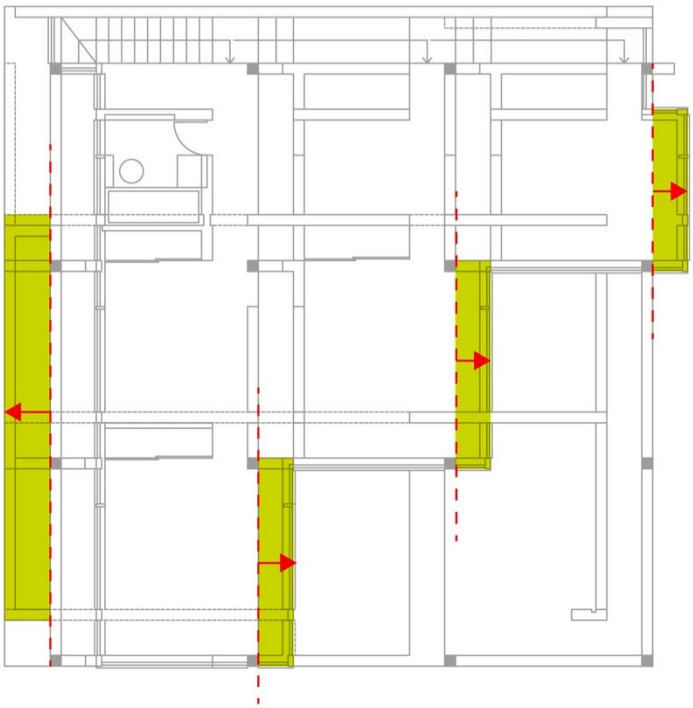

Figure 3-27 Diagram showing projections with their reference layers in House II.
Redrawn and edited by the author.

The projection vectors are in the same direction of shear walls emphasizing east-west direction, whereas the building volume is in the north-south direction. This condition leads to confusion in the reading of layering directions. However by a sectional shift in the roof of these projections, the slab of building volume and projection is detached. Therefore from an outer view, the predominance of layering of building volume in north-south axis, rather than layering of shear walls in east-west direction is attained. (Fig. 3-28)

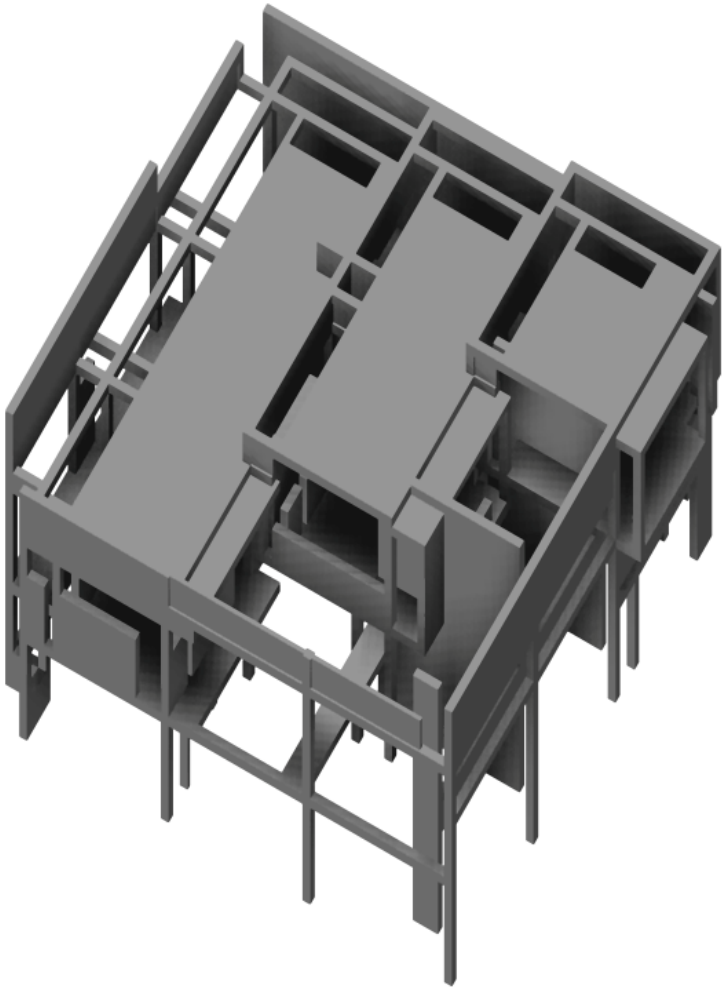

Figure 3-28 Model of House II. Produced by the author.

3.2. Learning from the "Layered" Analysis of Giuseppe Terragni's Works

> A superficial examination of the project [House II] may give us the idea that the architecture of House II comes from models of De Stijl or Terragni.[90]

As it has already been acknowledged in the preceding chapters, with reference to Peter Eisenman's analysis of Casa del Fascio and Casa Giuliani Frigerio, this thesis will examine the relationship between these buildings and House II in terms

[90] Ibid., 157.

of their process of formation by the operation of layering. Thereby, I will try to show how Eisenman uses "layering" as an analytical tool during his "critical readings" of Terragni's works, from which he acquired layering as a design tool. Regarding this acquaintance, the strong link between Eisenman's analysis of Terragni and design of House II will be discussed.

Apparently, Eisenman was mostly influenced by his formal analysis of the Casa del Fascio by Terragni when he was working on his PhD dissertation, titled *Formal Basis of Modern Architecture*.

In an interview by Carlos Brillembourg, Eisenman states that: "The energy of Terragni permeated my early work; House I is certainly Terragni, but House II is much more influenced by, say, Rosalind Krauss's writing on contemporary art at the time and the idea of sculpture in the expanded field and the work of minimalist sculptors Robert Morris and Sol LeWitt."[91] However, this study shows that House II is *also* Terragni with its massing and formation of facades. Through a different reading, this study will illustrate the relationship between Terragni's work and Eisenman's House II by using the operation of layering as an analytical tool.

3.2.1. Grid

Grid as the underlying reference for both Casa del Fascio and House II is the outcome of a cross layering. When this planar grid is extruded to form relationships in the third dimension, it becomes a spatial grid. Alternative to this method, it is possible to construct a spatial grid when vertical and horizontal layers are superimposed.

In Casa Del Fascio the conceptual grid is initiated from the plan and then, projected to facades.[92] This three-dimensional grid constitutes a cage like structure. By this way, it becomes possible to experience the planar grid from the exterior.

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[91] Peter Eisenman. Interview by Carlos Brillembourg. Bomb 117, Fall 2011/Architecture. 13 May 2012.< http://bombsite.com/issues/117/articles/5991>

[92] This can be seen in the preliminary drawings of the Casa del Fascio. Peter Eisenman. Giuseppe Terragni: Transformations Decompositions Critiques. New York: The Monacelli Press, 2003: 45.

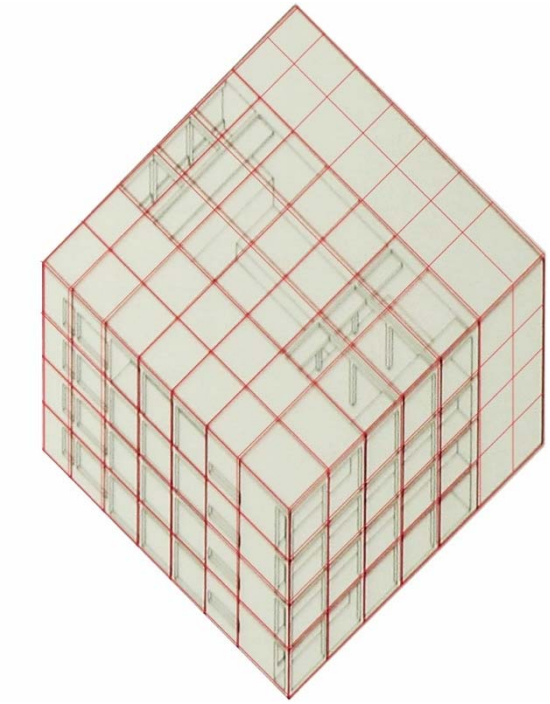

Figure 3-29 The 3D grid of Casa del Fascio. Source: Peter Eisenman. Giuseppe Terragni: Transformations Decompositions Critiques. New York: The Monacelli Press, 2003: 71. Edited by the author.

In House II the use of ideal and actual grid is further pushed forward by the diagonal shift that doubles the grid both in plan and section. Although, this operation obstructs the reading of the initial grid, it also advances the form by establishing more relationships between layers.

For the employment of grid in House II, Rafael Moneo puts emphasis on the effect of Terragni and says: "Terragni is in fact present here. But it is also true that Eisenman has his very own, peculiar way of working on the grid, and the way the walls seem to serve as infill for the structure confirms this."[93]

[93] Rafael Moneo. "Peter Eisenman," Theoretical Anxiety and Design Strategies in the Work of Eight Contemporary Architects. Barcelona: MIT Press, 2004:157.

3.2.2. Building Volume

Conceptualization of layering of building volumes in Casa Giuliani-Frigerio and House II shows some similarities. As the first transformation, both have the three-partite division of building volume. (Fig. 3-30) In House II this division is further defined by the diagonal subtraction that leads an echeloning building form. Secondly, the employment and formation of shear walls as vertical layers reveal the similar additive operation. Then, the building volume and walls are superimposed to create a double reading or an ambiguity. For this discussion Eisenman states: “In Terragni’s work an ambiguous condition is developed by superimposing an additive on a subtractive process-where both solids and voids carry a charge-which can be read simultaneously as oscillating between positive and negative.”[94]

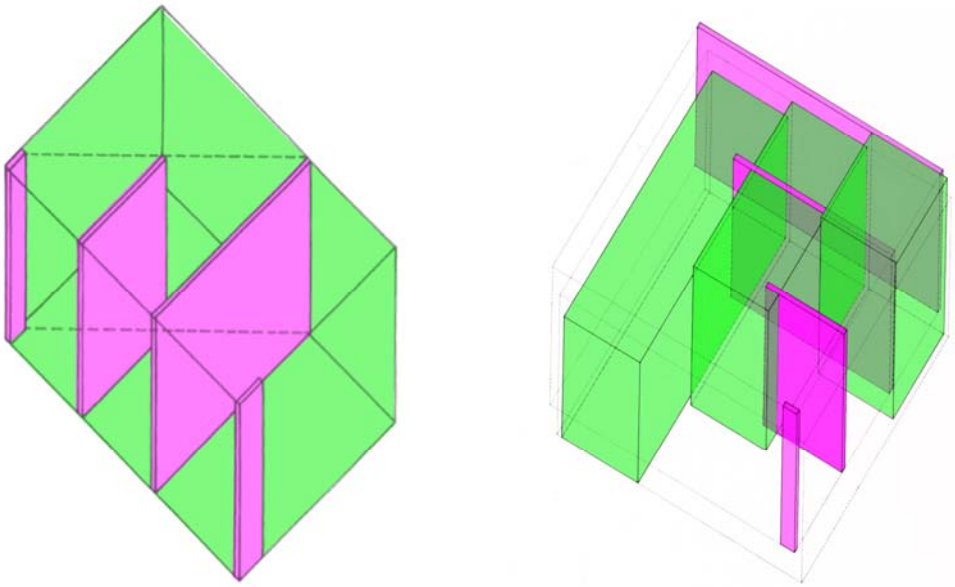

Figure 3-30 (Left) Tripartite division of building volume in Guiseppe Terragni’s Casa Guiliani Frigerio, (right) in Eisenman’s House II. Interpreted and edited by the author.

[94] Peter Eisenman. “From Object to Relationship II: Giuseppe Terragni Casa Giuliani Frigerio,” Perspecta. 13/14, 1971: 41.

3.2.3. Facade

As it has been already said in the previous discussions, layered conception of facades in Casa del Fascio and Casa Giuliani-Frigerio is radically different than the modern facade, which is "a record of the interior" (reading the building from inside to outside). Eisenman claims that the facades of these two buildings generate the interior space (facade as a series of layers moving from outside to inside).

For the Casa del Fascio, Eisenman mentions that the building space is "made up of a series of implied layers, much like a deck of cards."[95] He names this as additive conception of space. He explains this layering in *From Object to Relationship II*:

> In the Casa del Fascio the frontal emphasis – the layering of space from a frontal datum – is considered mainly in relation to the specific context; in the relationship of the building to the adjacent piazza and to the cathedral.[96]

In his analysis of Casa del Fascio, Eisenman interprets the southwest facade of Casa del Fascio as "a series of planes layered from front to back"[97], "a series of implied planes from piazza through the internal void to the rear plane of the building"[98]. The outer layer of southwest facade of building is argued as the "vertical datum" from which the other layers are produced. (Fig. 3-31) The analysis on the Casa del Fascio can be said as a predecessor of Eisenman's early house projects that he uses layering as a design tool.

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[95] Ibid.

[96] Ibid., 60.

[97] Peter Eisenman, Giuseppe Terragni, et al. Giuseppe Terragni: Transformations, Decompositions, Critiques. New York: Monacelli Press, 2003: 96.

[98] Ibid., 107.

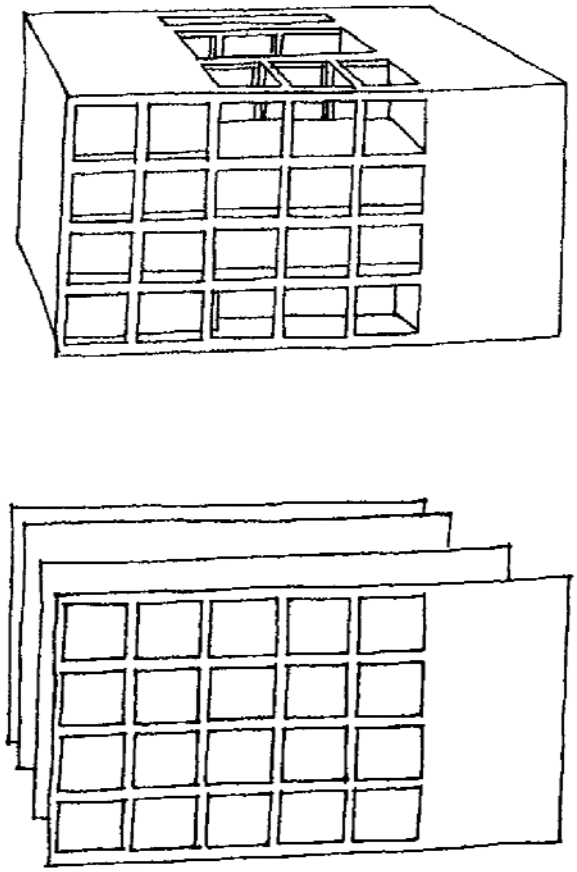

Figure 3-31 Giuseppe Terragni: Casa del Fascio, solid cut away or additive planes. Source: Peter Eisenman. The Formal Basis of Modern Architecture. Lars Müller Publishers, 2006:80.

For the condition of the entry facade of Casa del Fascio, Eisenman states that "[it] is posited through a series of planer layers that not only denies a single frontal datum but also provides for a conceptual transition from outside to inside."[99] He continues to say that: "Terragni developed the special organization as a series of vertical planes articulated in such a way as to define a single frontal plane, the spatial order seen as recessional from this frontal reference."[100]

[99] Ibid., 107.

[100] Peter Eisenman. "From Object to Relationship: the Casa del Fascio by Terragni," Casabella. Vol. 344, January 1970: 38.

From the above discussions, it can be concluded that Eisenman extends and develops the knowledge of layering that he learned through his analysis of Terragni's buildings, and introduces the concept in his own designs as an operative tool that organizes the whole process.

In line with this argument, where in the Casa del Fascio, layering of planes/spaces is in one direction, in House II this layering becomes a cross layering through the superimposition of two layerings in two directions which advances the building form. Therefore, it can be claimed that House II concerns a more intricate layering comparing to Casa del Fascio.

For the facade conceptions, in Casa Giuliani-Frigerio, unfortunately, the accomplishment for the generation of facade layers could not be reached in the inner organization of space, as Eisenman informs us: "[I]ts facades mask the interior space rather than reveal its disposition indicates that it is not space that is at issue in this building."[101]

However in House II, layers of facades generate and transform the overall form in a totalitarian attitude in a way that inside outside spaces are almost interlocked causing the borders between inside and outside melted.

3.3. Layered Representation of House II

As representation is an inseparable part of the mental process of design, the way the ideas are expressed and transferred has a considerable role in this process. In the context of this thesis, how layering is used as a representational tool in House II requires an investigation. As Rafael Moneo explains Eisenman's apprehension of representation:

> Representing the architecture is not a mere matter of defining the object, but of taking stock of the process behind it.[102]

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[101] Peter Eisenman. "Terragni and the Idea of a Critical Text," Written Into the Void: Selected Writings 1990-2004. China: World Print, 2007: 127.

[102] Rafael Moneo. "Peter Eisenman," Theoretical Anxiety and Design Strategies. Barcelona: MIT Press, 2004: 151.

In a similar sense, Thomas Patin explains the relationship between House II and its representations. As Patin quotes from Hal Foster; more than representing the process, House II "represent[s] itself in order to become its own representation." [103]

> Drawings, plans, and models do not only lead to and represent the house - they are the house . . . Eisenman's early houses almost seemed to design themselves through his establishment of a transformational program seemingly free of authorial constraints. The object becomes the result of its own generative history, and yet retains this history, serving as a record of the process. The process itself becomes the object...[104]

Since the architect's intention is to reflect the mental process in the final form of House II, its representation should always be explicit in the generation of form.

3.3.1. "Cardboard House": Abstract Idea of Plane[105]

Eisenman conceptualizes his early houses (House I, II, III and IV) as examples of cardboard architecture and calls them "Cardboard Houses." According to Thomas Patin, "Eisenman took up the term [cardboard] precisely because its associations with models signaled his interest in ways of generating structures and forms at the level of abstraction."[106] Like a model is produced out of thin layers of cardboard, House II is produced conceptually and physically with layers. In fact all the planar layers in House II have the same thickness just like a cardboard material dictates. As Gandelsonas tells us, Eisenman uses this term, as it is "connotative of less

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[103] Thomas Patin. "From Deep Structure to an Architecture in Suspense: Peter Eisenman, Structuralism and Deconstruction," Journal of Architectural Education. Blackwell Publishing, Vol. 47, No 2, 1993: 92.

[104] Ibid.

[105] Mario Gandelsonas. "On Reading Architecture," Progressive Architecture, vol. 3, 1972: 80.

[106] Op cit. Patin: 90.

mass, less texture, less color, and ultimately less concern for these. It is closest to the abstract idea of plane."[107]

It can be inferred from the above statement that cardboard as a material describes the immateriality of House II, and in turn, its abstract conception. It also describes the process and "is used to denote the particular deployment of columns, walls, and beams as they define space in a series of thin planar, vertical layers."[108] Therefore "cardboard" signifies layering - actual or implied:

> Cardboard is used to signify the result of the particular way of generating and transforming a series of primitive integar relationships into a more complex set of specific relationships which become the actual building.[109]

It is almost impossible to differentiate House II from its cardboard models. Intentionally photographs of the building were taken in winter, as "snow eliminates all possible references to the surrounding landscape, so that House II is pure architectural form."[110] This abstract condition was what "Eisenman wants his architecture to have."[111] (Fig.3-32)

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[107] Mario Gandelsonas. "On Reading Architecture," Progressive Architecture. Vol. 3, 1972: 80.

[108] Peter Eisenman. "Cardboard Architecture: House I 1967," Five architects: Eisenman, Graves, Gwathmey, Hejduk, Meier. New York: Oxford University Press, 1975: 15. Emphasize mine.

[109] Ibid.

[110] Rafael Moneo. "Peter Eisenman," Theoretical Anxiety and Design Strategies in the Work of Eight Contemporary Architects. Barcelona: MIT Press, 2004:157.

[111] Ibid.

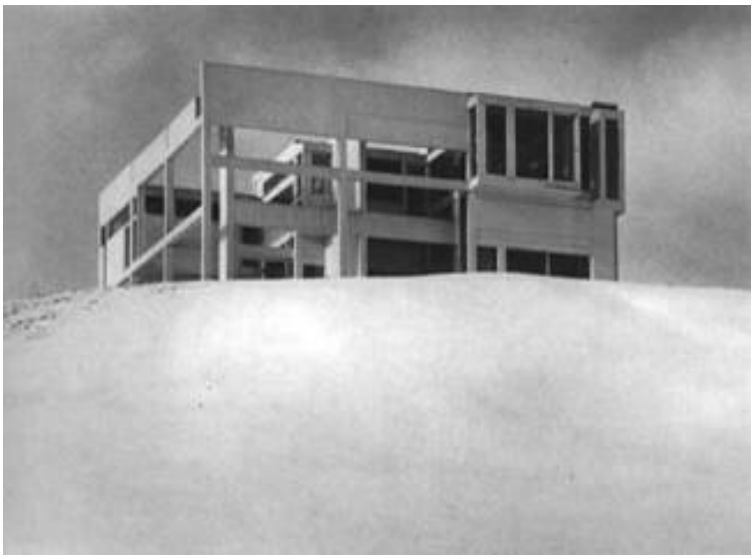

Figure 3-32 Peter Eisenman, House II, Hardwick, Vermont, 1968.
31 Oct 2011.
<http://www.christianhubert.com/writings/ruins_of_representation.html>

Superimposition of planar layers in House II creates depth within the building. It is possible to see this layering as a representational tool in Eisenman's study models. (Fig. 3-33,35) A similar representation of layers can be achieved in House II by the superimposition of facade layers. (Fig. 3-34,36) By giving different tones of gray - from white to black - to layers from front to back, the representation of "depth," and therefore relationship between these layers, could be achieved.

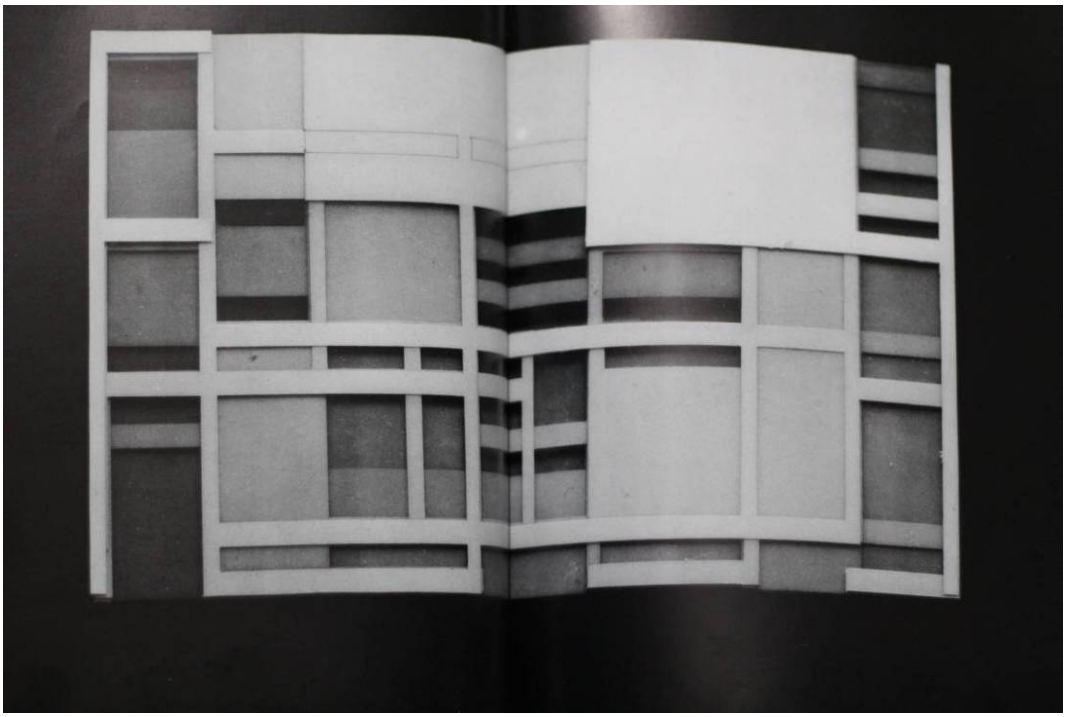

Figure 3-33. Study model of House IV. Source: Peter Eisenman**.** Houses of Cards. New York: Oxford University Press, 1987: 62.

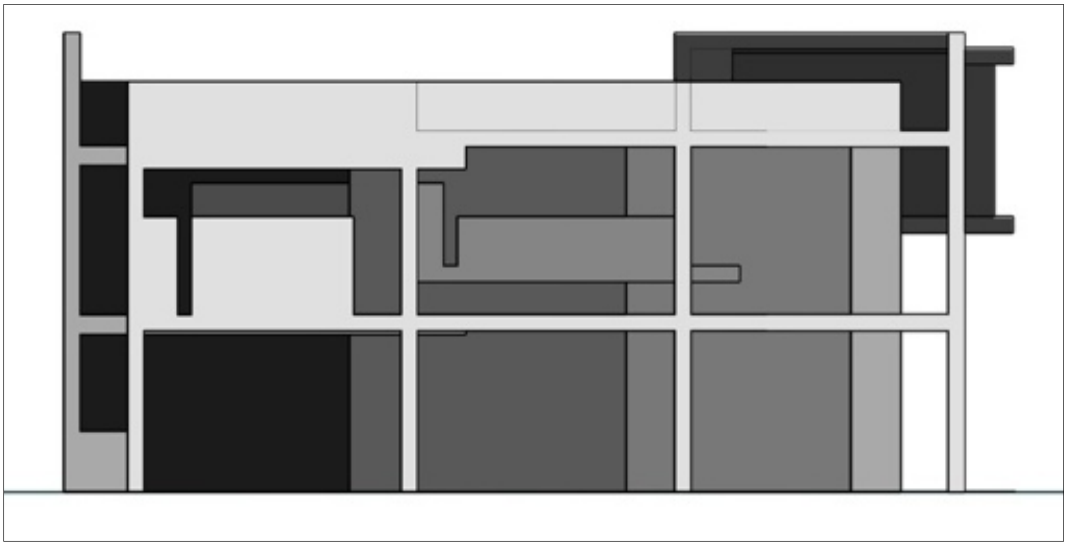

Figure 3-34 South Elevation of House II (Layering of facades in the North-South direction). Color darkens when layers get deeper. Produced by the author.

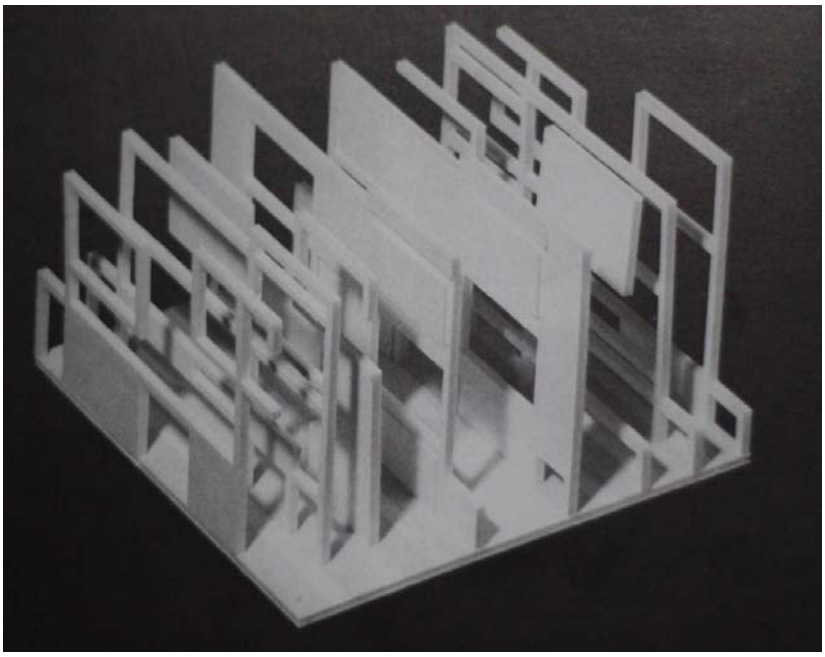

Figure 3-35. Study model of House IV. Source: Peter Eisenman. Houses of Cards. New York: Oxford University Press, 1987: 102.

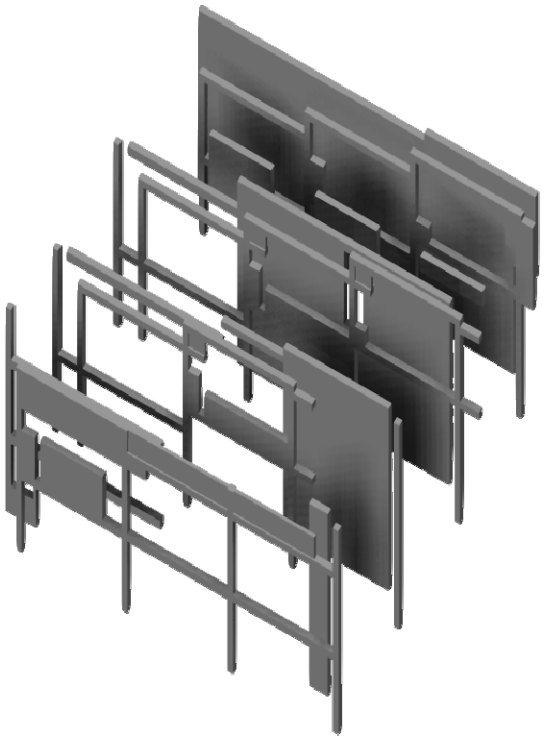

Figure 3-36 Diagram showing the series of facades layered from front to back along the north-south axis. Produced by the author.

3.3.2. Representation of Layers in Axonometric Drawings

> …[A]xonometric projection abolished the fixed view point of the spectator and allows for several possible readings of one and the same image…[112]

Eisenman uses sequences of axonometric drawings instead of traditional representation techniques in order to convey us the operations that his projects goes through. For instance the book cover of his book *Houses of Cards* indicates the different layers that constitute the building. (Fig. 3-37) While different colors representing different layers, the transparency of these layers enables us to see behind. This condition, creating an ambiguous reading of the represented space, provides the perception of all layers simultaneously.

Figure 3-37. Book cover of Peter Eisenman, Houses of Cards, 1987.

The emphasis on axonometric drawing comes from the representation of layers in an equal angle that enables layers to be observed identically and simultaneously

[112] Yve-Alain Bois. "Metamorphosis of Axonometry," Daidalos #1. Berlin: Bertelsmann, 1981: 42.

in a three dimensional system. Therefore the significance of axonometric drawing in the representation of layers is resulted from the potential to illustrate the precise location of layers with reference to other layers in this system. Similarly, Robert E. Somol indicates the significance of axonometric for Eisenman:

> In contrast to the other dominant mode of three-dimensional drawing…the axonometric favors the autonomy of the object by conveying measurable or objective information over the distortion created by a vanishing point oriented to the viewing subject. …[t]he axonometric simultaneously renders plan, section, and elevation, thus again collapsing the vertical and horizontal. …[t]he three-dimensional device of the axonometric enables analysis and object to become congruent.[113]

On Reading Architecture, Gandelsonas stresses the importance of axonometric drawings for Eisenman's apprehension of representation to convey the operations in design process: "In his [Eisenman's] desire to understand these operations, he substitutes for the traditional means of representation (plan, elevation, section and perspective) a generative sequence of axonometric perspectives related directly to representative cardboard models." [114] For sure his sequential axonometric drawings narrating his design process help the reader relate his projects and the operations that these projects go through.

It is interesting to note that Eisenman always establishes his axonometric drawings of House II revealing the project's southeast corner. This intentional choice is due to showing the main void that emphasizes the diagonal movement of the building. Likewise, as the most open part of the building is located there, it gives possibility to show more layers generating the building. (Fig. 3-38)

Although it is said that axonometric drawings are objective as there is no fixed point of view,[115] in this case the choice of the specific corner is intentionally subjective.

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[113] Robert Somol. "Dummy Text, or the Diagrammatic Basis of Contemporary Architecture," in Diagram Diaries. 15-16.

[114] Mario Gandelsonas. "On Reading Architecture," Progressive Architecture, 1972, vol. 3: 85.

[115] Yve-Alain Bois. "Metamorphosis of Axonometry," Daidalos #1. Berlin: Bertelsmann, 1981.

It could be understood that since the north facade is solid, there may not be any reason to show that facade, but there is not much information about the west facade. One may expect to see more on the west facade, because it is the entry facade, and also distinct in terms of its composition of vertical layers.

In Eisenman's axonometric drawings the rotation angle of plan is also subjective. An equal angle of 45-45 degree axonometric drawing represents both sides of the building in an equal way. However, a 30-60 degree representation of the building breaks this equality: the side that is less distorted by the rotation of plan becomes more apparent and dominant. Therefore, to represent layers in different priorities, the choice of angle of axonometric drawing is significant.

To sum up this chapter, it can be said at ones that layering could be used intentionally or unintentionally as an organizational tool in many architectural work. This can be acknowledged through analysis of buildings by layering. What makes House II distinct from those is that layering becomes an architectural operation that generates and structures the transformation of the building.

From the analysis and discussions done in this chapter, it can be deduced that House II is *a multi-layered architecture* that includes the operations of superposition and superimposition as well as layering. For House II, it is possible to observe the three ways of using layering as inquired in this thesis: The outcome of the analysis of Terragni, the operational use of layering in design process and the employment of layering as a representational tool are to demonstrate the argument.

CHAPTER 4

DISCUSSION: THE OPERATION OF LAYERING AS A SYSTEM OF RELATIONS IN HOUSE II

> The key to Peter Eisenman's work lies in his concern for *the architectural system* itself, unrelated to any external reference.[116]

So far, this thesis tried to explore the concept of layering as an architectural operation that organizes design process, and consequently, generates and regulates overall form. In the second chapter the aim was to discuss the operation of layering through varied examples to illustrate the possible uses of layering in design process. Whether intended or not, these examples put forward the layered formation in a coherent way.

A particular example to the intentional employment of the operation of layering is the House II designed by Eisenman. The formal and conceptual exploration of layering is rendered by a series of analysis of the building in the third chapter. Those analyses have revealed the multi-layered composition of the building and in the meantime, they provide an understanding of relationships between different layers.

In the analysis, the contextual issues are ignored since in House II, Eisenman intentionally focused on the interiority of design in order to explore the potentials

[116] Mario Gandelsonas. "On Reading Architecture," Progressive Architecture. Vol.3, 1972:80. Emphasis added.

of elements of architecture. It is also apparent in the photographs of the building in which the House is shown without giving any clue about the surrounding environment. Then, the abstract physical context of building provides a freedom in the form organization.

Following the discussion set out in the previous chapters, now the intention is to discuss the outcome of those analyses produced in the previous chapter with the concepts introduced in the introductory and second chapter.

As Kenneth Frampton explains in his book *Modern Architecture*, layering is a tool used as "frontalized parallel rectilinear voids or masses, receding like successive picture planes from a given vantage point" as a desire to achieve a "transparent architecture" by addressing Giuseppe Terragni, whose works especially exhibit these "receding spatial layers." [117]

In the previous discussions this "vantage point" was defined as "datum" and "frontalized parallel rectilinear voids" as "spatial layers." Therefore, Frampton's statement highly corresponds to the concept of phenomenal transparency, which was discussed in the second chapter.

4.1. The Role of "Phenomenal Transparency" in Layering

As it has been already said, "phenomenal transparency" is crucial for the generation of architectural space and instrumental in the organization of layers. In the case of House II, the openings on layers enable the observer to perceive different spatial locations. Gyorgy Kepes discusses this perception in *Language of Vision*:

> If one sees two or more figures overlapping one another, and each of them claims for itself the common overlapped part, then 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

[117] Kenneth Frampton. Modern Architecture: A Critical History. London: Thames and Hudson, 1980: 208-209.

> spatial locations. Space not only recedes but fluctuates in a continuous activity.[118]

Similarly, Bernard Hoesli explains this perception of space by layers, and he mentions, "the observer can see himself in relation to one or the other order, and by means of the resultant tension, reading after reading is enforced."[119] When the relationship between the observer and building changes/rotates, an alternative reading of layering could be possible:

> Since a transparent organization invites and encourages the fluctuation of multiple readings, and suggests individual interpretation, it activates and involves. The spectator remains not observer "on the outside", he becomes part of the composition through his participation. He enters a dialogue. He has to decide and in "reading" a facade, choosing one of several possible readings of the composition he is, at the same time, in his imagination, engaged in its creation.[120]

Clearly, in defining a continuous space, transparency of layers is a necessity, since simultaneous perception of layers is resulted from the transparency of layers, which creates ambiguity. Correspondingly, the operation of layering simultaneously identifies each layer and establishes relationships between them. Thus, for the purpose of achieving spatial relationships by means of layering, what we need are *layers* as substance or fragments, *phenomenal transparency* to organize layers, and *movement* perpendicular to layers to establish relationships between them.

4.2. House II as a System of Relations

> The most important thing for Eisenman is not the finished product itself, but the operations that gave rise to it.[121]

In his book *The Formal Basis of Modern Architecture*, Eisenman defines "system" as: "Any ordering or organization of architectural form within the design process

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[118] Gyorgy Kepes. Language of Vision. Chicago: Paul Theobald, 1944: 77.

[119] Bernhard Hoesli. "Commentary", in Rowe, Colin and Robert Slutzky, Bernhard Hoesli, Werner Oechslin. Transparency. Basel: Birkhauser-Verlag, 1997: 61.

[120] Bernhard Hoesli. "Addendum", in Rowe, Colin and Robert Slutzky, Bernhard Hoesli, Werner Oechslin. Transparency. Basel: Birkhauser-Verlag, 1997: 99.

[121] Mario Gandelsonas. "On Reading Architecture," Progressive Architecture. Vol.3, 1972: 85.

can be called a system: more explicitly a formal system."[122] In his essay "On Reading Architecture" Mario Gandelsonas states that Eisenman uses layering of elements "as constituents of a specific architectural system of relations"[123]

In a parallel direction, he quotes from Eisenman indicating that layering "establishes the arrangement and relationship of elements" and "[i]t establishes both a formational and a transformational structure in that it gives order to a base system and generates a system of implied spatial oppositions -shear, tension, compression, centrifugal or centripetal- which are not actually in the specific forms, but which accrue to relationships developed from this layering."[124] The consequence of this layering is the uniting of intricate relations into an organized arrangement that develops from a point of reference – "datum". According to Gandelsonas, this point of reference could be actual or conceptual:

> From these relationships of layered spatial systems, all specific form is generated. In this method the notion of layering refers not only to the actual manifestation of explicitly layered elements, but to implicit relationships between relational elements. This form of layering requires neither a single constant 'proscenium' nor a normative plane of reference.[125]

From this quotation it can be inferred that when the operation of layering is a system of relations, its generation of form is *self-referential*. Then, it does not require any kind of exterior reference, since it becomes *autonomous*.

Gandelsonas mentions that Eisenman's architecture in his early house projects is independent from external requirements.[126] The abstract and context-free condition provides House II with a self-referential - autonomous formation. Therefore the specific form of building is the result of a *complex system of relations* or *operations* that emerge from internal dynamics.

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[122] Peter Eisenman. The Formal Basis of Modern Architecture. Lars Müller Publishers, 2006: 87.

[123] Mario Gandelsonas. "On Reading Architecture," Progressive Architecture. Vol.3, 1972: 85.

[124] Ibid.

[125] Ibid.

[126] Ibid., 71.

Besides the fact that House II is free from external references, the program is not challenging and "the program need have little to do" with the design, as acknowledged by Eisenman.[127] It is a weekend-vacation house made up of traditional program units. For this reason, the formation of building is mainly a result of a set of formal rules.

The generation of space is "self-referential" as the grid is employed as a frame for all references. This condition comes from the "interiority" of the building. Since there is no external reference affecting the design of the building, grid as the outcome of cross layering is set as the main reference that guides all the activities within the building. This defines the significance of House II by the superimposition of different layers to create a *multi-layered* system of organization in which all the elements as fragments are organized by the same system. In this system every layer refers to other layers, and they altogether define a set of relationships between themselves. Gandelsonas explains this system as "a dialectic between elements":

> The relationships between units are based on complex systems of oppositions which develop from line, plane and volume. These elements…become a system of equally weighted elements…or a system of relations defined by a dialectic between elements. In this system, volume can be seen as an extension of the plane, while line or column can be seen as a residue of the plane.[128]

The superimposed grids as reference to the system of layering in House II are shown in the figure 4-1. The layers ordered by different 9SGs are indicated by different colors. This analytical model shows the multi-layered formation of the building.

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[127] Mario Gandelsonas. "Editorial," Progressive Architecture, vol.3, 1972: 67.

[128] Op. Cit. Gandelsonas: 82.

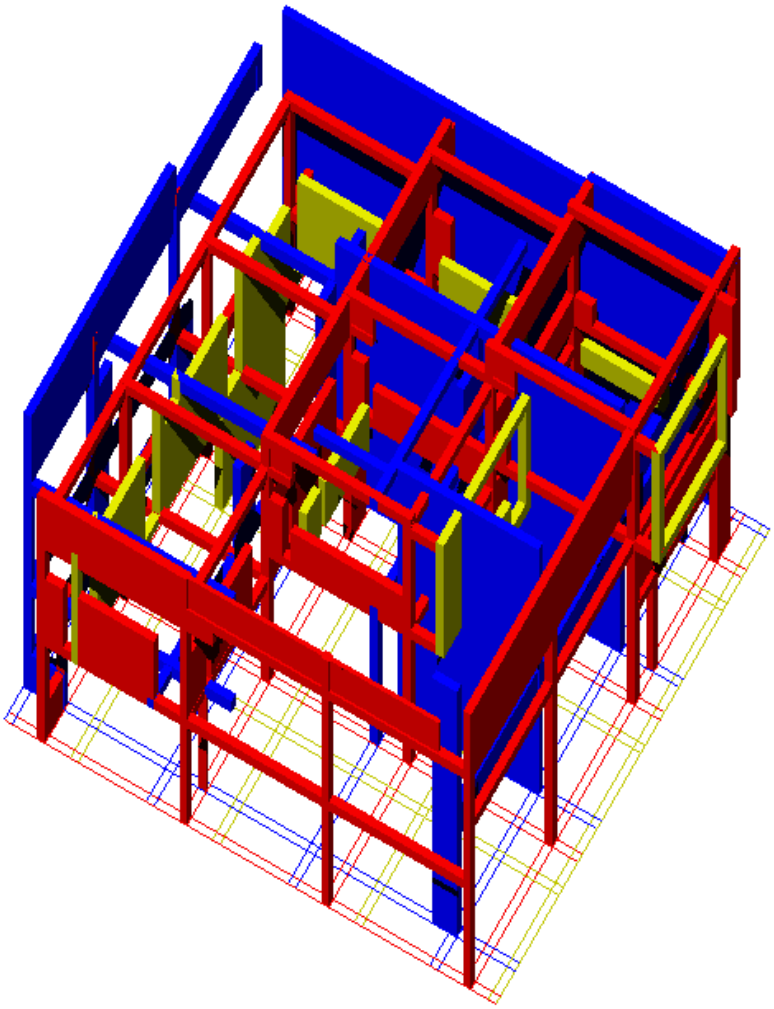

Figure 4-1 Model of House II showing the relationship between vertical planar layers regulated by the underlying grids. Produced by the author.

4.2.1. Movement Establishing the System of Relations

In this study the emphasis is on architecture as an apprehension of formal relationships rather than architecture as a physical object. What establishes these relationships between fragments and provides an understanding of space, as a whole is the "movement." According to Eisenman the emphasis on the physical object is shifted "to the understanding of its relationship to an underlying structure."[129]

[129] Peter Eisenman. "Cardboard Architecture: House II," Five architects: Eisenman,

In the discussion of layering, this shift requires of "movement" establishing relationships between layers (fragments) and architectural space. As Eisenman mentions:

> One way to make someone aware of these relationships is to control the direction of his movement in contrast with the direction of architectural space. In House II, the columns on the ground level are extended to become implied planes which layer the ground level space parallel to the volumes above. In the upper level, the columns are extended at right angles to the volumes, thus layering the space perpendicular to the volumes. The intention of this extension of the columns to form implied planes on the ground level is to define someone's movement perpendicular to the upper level, since movement is now parallel and within the volumes, to define it by creating layers which run counter to the major axes of the movement.[130]

From the above quotation, it is evident that parallel layers should be in the opposite direction to the movement direction so that layers can be visible and experienced frontally. As Bernard Hoesli explains: "It gives rise to transparent organizations of form which indicate above all spatial transitions and announce the existence of possible directions for movement in space or make them clearly visible and available to choose."[131] Therefore the organizational opposition between layering of spaces and movement direction also suggests phenomenal transparency.

On the ground level, the vertical layers in east-west direction are actually perceived and experienced physically due to the existence of this opposition. However the layers in the north-south direction are mostly observed visually, not experienced by movement. On the other hand, the upper level organization is mostly experienced in the north-south direction as the movement dictates.

Graves, Gwathmey, Hejduk, Meier. New York: Oxford University Press, 1975: 26.

[130] Ibid.

[131] Bernhard Hoesli. "Commentary", in Rowe, Colin and Robert Slutzky, Bernhard Hoesli, Werner Oechslin. Transparency. Basel: Birkhauser-Verlag. 1997: 65.

As it can be derived from this organization of layers and movement in House II, vertical layers as series of facades interpenetrates into the building space by the help of the movement regulated by the shift at the first stages of transformation.

In this quite complex arrangement, the voids in the slabs provide observer with an understanding of building space. The horizontal and vertical layers remain both connected and separated by these voids so that these layers become visible. By means of vertical movement enabled by the staircase the total space is observed and experienced. Therefore, movement creates a dialogue between the observer and building.

A section cut perpendicular to any layered system will reveal these relationships between layers and spaces. Likewise, the direction of movement should be perpendicular to layers enabling a frontal experience moving through layers. By this way one can experience phenomenal transparency.

4.2.2. Grid as an Underlying Structure

The duplication of the initial grid by the diagonal shift starts the whole chain of formal transformations.[132] All these organizations and transformations of layers and building elements somehow result from the relationships regulated by this underlying structure.

Aforementioned, the operation of layering requires a linear development from a reference point or plane. When two layerings are superimposed in the opposed axis, the linear condition becomes a plaiding – gridding. The act of superimposition enables these two layered-formations, which are composed of autonomous fragments as layers, to be interlocked. In the case of House II this interlocked system forms a nine square grid (9SG) that regulates all the fragments in the composition.

This 9SG acts as an open structural cage in which layers as parallel and separate planes are suspended. In this spatial grid, the transparency of layers enables these layers to integrate. Furthermore, the fragments as “transformational layers”

[132] Rafael Moneo. “Peter Eisenman,” Theoretical Anxiety and Design Strategies in the Work of Eight Contemporary Architects. Barcelona: MIT Press, 2004: 156.

become “diagrams” in the design process creating indeterminate relationship between inside and outside. (Fig.4-2) This relationship is further emphasized by the transparency of layers that enables Eisenman to define the boundaries of the building without destroying the flow of space between outside to inside.

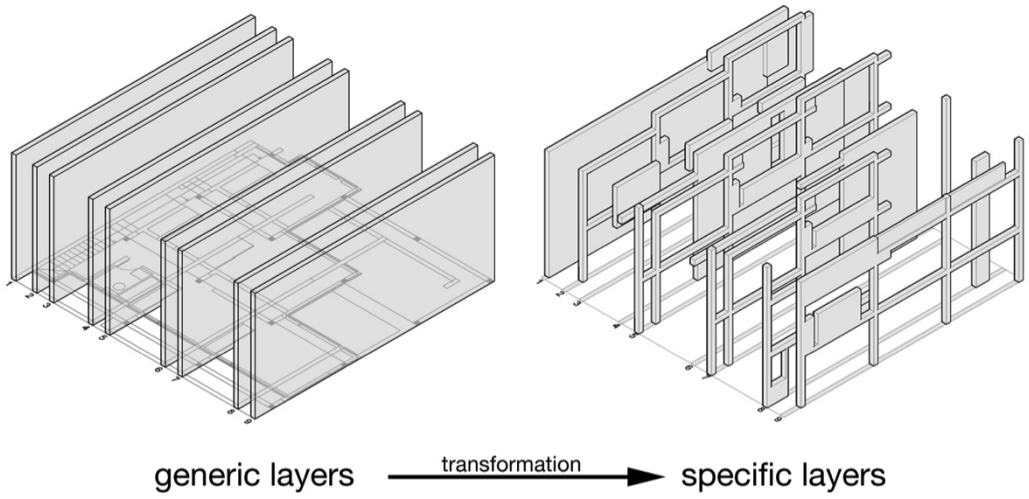

Figure 4-2 Diagrams showing the transformation of planar layers in House II.
Produced by the author.

The spatial grid is generated by the superimposition of vertical layers (facades) and horizontal layers (slabs). Eisenman overlaps these diagrammatic layers in a systematic way to produce ambiguities within the building. A continuous space of House II is partially interfered by these layers. Therefore, the house is no longer a layered formation but a superimposition of several different layered formations creating a system of relations. (Fig.4-3)

In line with this discussion of gridding of space by the cross layering, Eisenman reports that: “In the first instance, the space is conceived of as a layering or plaiding (cross layering) of planes.”[133] This condition of House II contributes to a

[133] Peter Eisenman. “Cardboard Architecture: House I,” Five architects: Eisenman, Graves, Gwathmey, Hejduk, Meier. New York: Oxford University Press, 1975: 16.

complex “gridding of space [that] results in continuous fluctuations of interpretation.”[134]

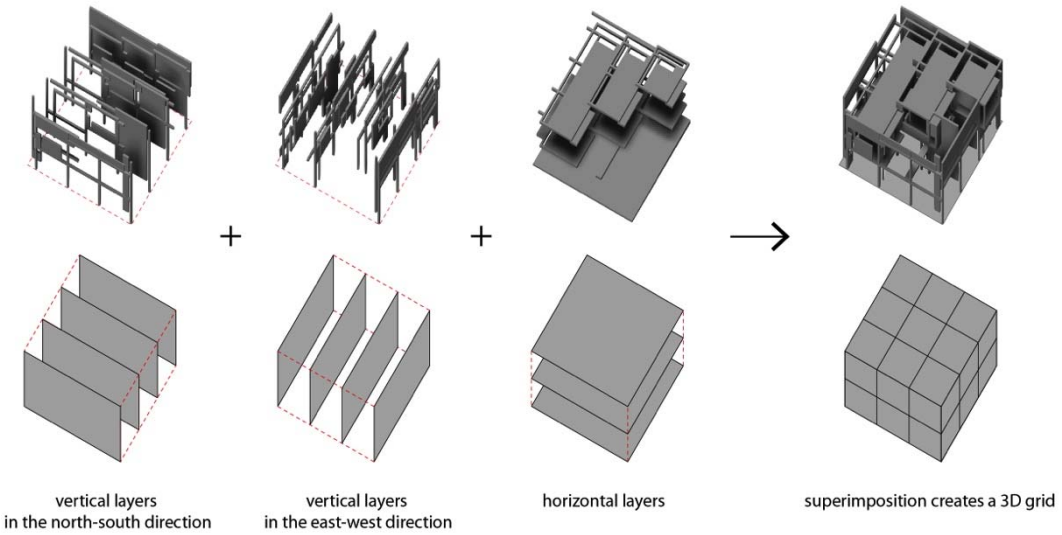

Figure 4-3 Chart showing three layered formations and their superimposition in House II. Produced by the author.

The alternative layering systems generating House II are illustrated in figure 4-4. The first chart shows the superimposition of three different underlying spatial grids, which regulate all the formal transformations. The second one illustrates the transformations of “layering of building volume” and “layering of planes” beginning from the square generic form. It also demonstrates the superimposition of these layerings.

The last one presents the superimposition of vertical layers (facades) in north-south direction, vertical layers in east-west direction and horizontal layers (slabs). In this context, the reverse process of superimposition can be called decomposition, as the building is broken up into its constituent layers. Thus, these layers in the form of processed planes generate the house.

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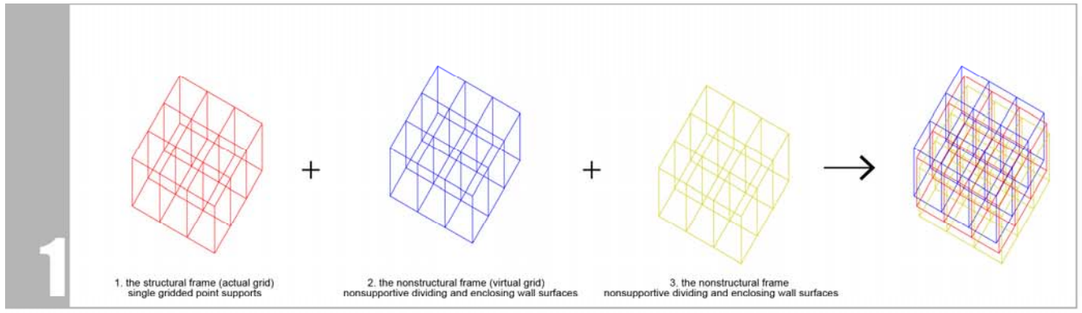
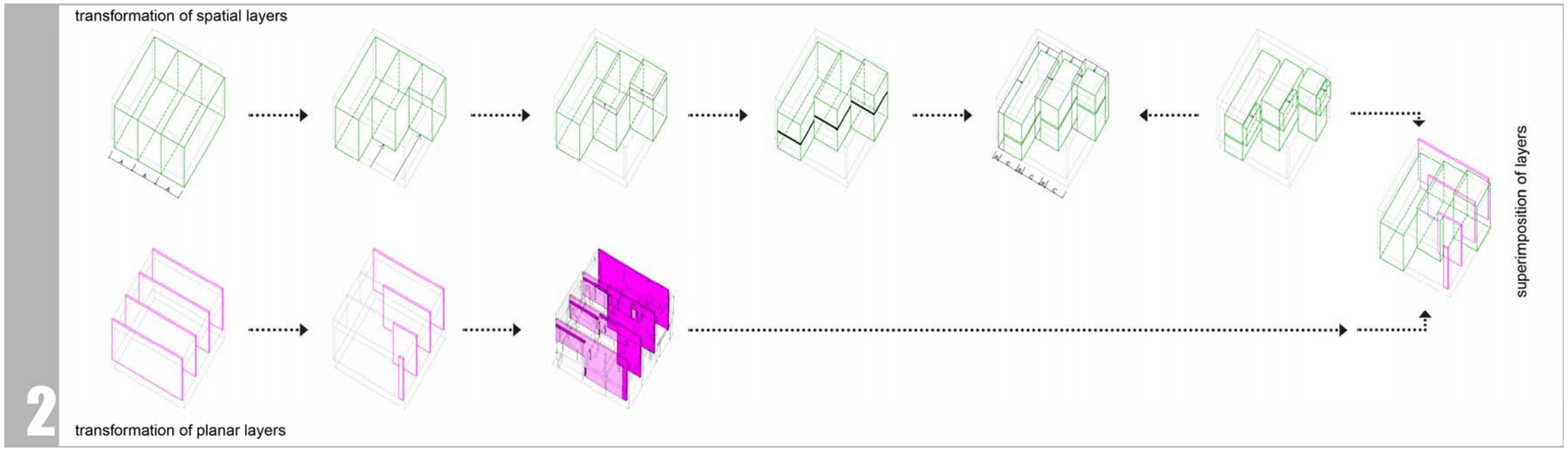
[134] Rowe, Colin and Robert Slutzky, Bernhard Hoesli, Werner Oechslin. Transparency. Basel: Birkhauser-Verlag, 1997: 41.





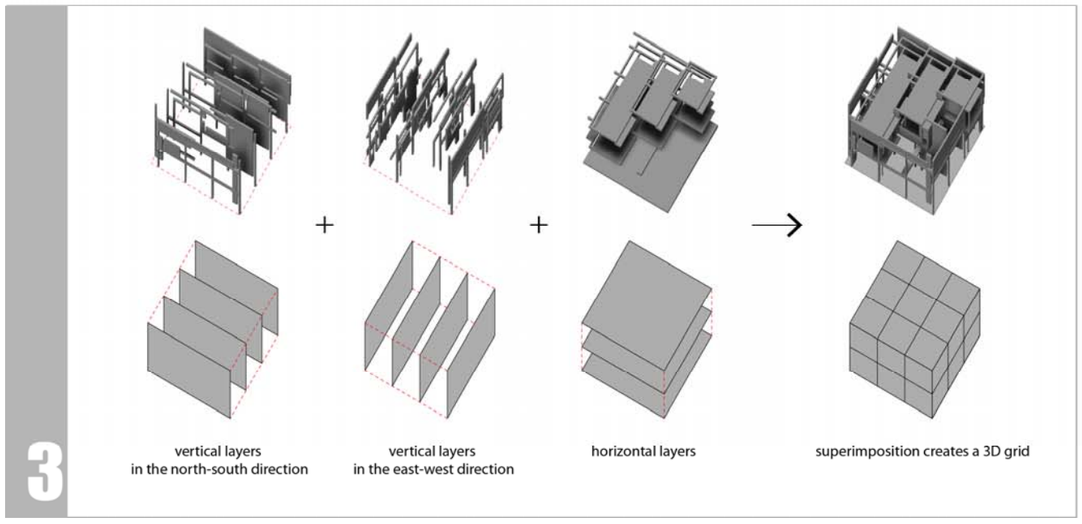


Figure 4-4 Chart showing alternative layering systems (1.Grids, 2. Building volume-shear walls, 3. Facades-slabs) from the decomposed layers to the superimposed formation in House II. Produced by the author.

4.3. Layering in the Early House Projects of Peter Eisenman

Among the Eisenman's eleven house projects, the first six of them are called "Cardboard Houses".[135] The general features that can be counted for House II can also be said for these houses. All of them are forms of or initiated by a square. They are freed from "externally determined motives,"[136] therefore their formations are results of a set of rules, which enable objects to be self-referential, autonomous objects. While "distancing…the architect from the design process," this autonomy helps "search for and establish a transformational program free from traditional authorial constrains."[137] Eisenman considers these individual houses as experiments, as his aim is "investigating the nature of the relationship of form and meaning in architecture."[138] To actualize this aim he uses various operations to organize design process.

One of the intentional operations used in early houses is "layering."[139] The uses of layering in these houses are illustrated in figure 4-5. As it is shown, in House I, the layering operates in one direction. For this reason, it can be said that it is the basic form of layering. This situation makes sense remembering the influences of the Casa del Fascio on Eisenman. Reflections of the analysis of the layered form of the Casa del Fascio are apparent here.

In House II, the linear layering is doubled in the opposed direction to form gridding of space. This superimposition of layers or cross layering is shown in the diagram explicitly. While this intentional duplication of elements elaborates the building space, it obstructs reading and understanding of form creating an ambiguous condition of space. Only by looking at the design process one can comprehend the form deeply. Another way can be decomposing the building into its fragments. The analyses done in the third chapter were for this reason.

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[135] Peter Eisenman. "Misreading Peter Eisenman," in Eisenman Inside Out: 1963-1988 Selected Writings. New Heaven and London: Yale University Press, 2004: 212.

[136] Ibid., 217.

[137] Ibid., 218.

[138] Peter Eisenman. Houses of Cards. New York: Oxford University Press, 1987: 150.

[139] The other operations can be

Design of House III goes one step forward in terms of layering. Where, in House II, the superimposed layers are quite similar in the general sense, in House III they are divergent in terms of scale and form. Differently, they are overlapped with 45-degree angle.

House IV shows a similar form of layering with House I and House II. Layering of spaces dominates in the north-south axis, although; layering in the east-west axis is also valid. Different than House II, in which layering of planes in both direction are almost equal in dominancy, the condition that House IV does not complete itself into a square form in plan further emphasizes the dominancy of layering in the north-south direction.

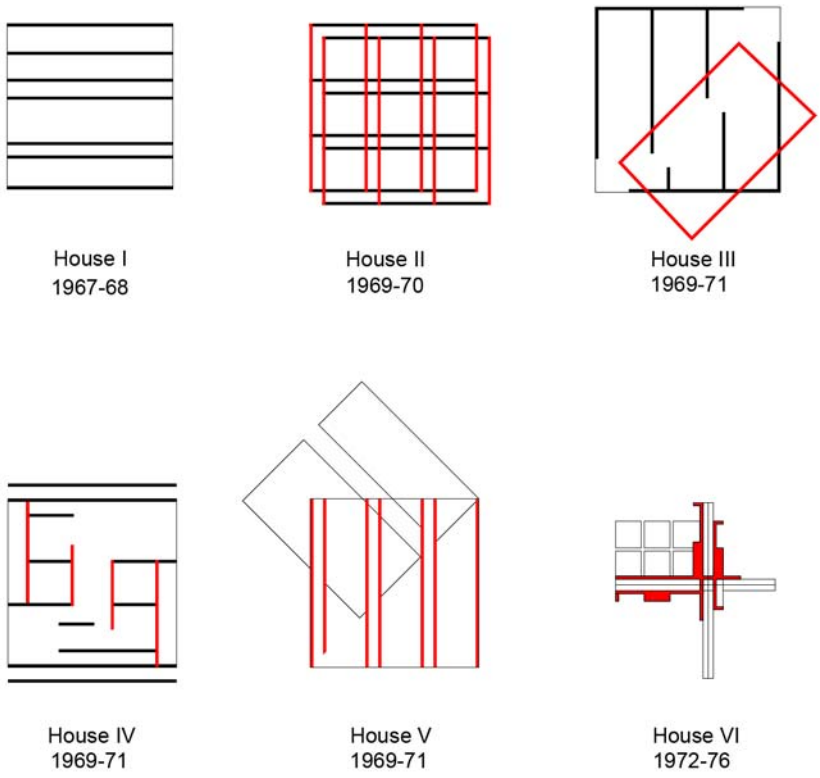

Figure 4-5. Plan diagrams showing layering in Eisenman's Cardboard Houses.
Produced by the author.

House V, which is not built like House IV, stays immature compared to other houses of Eisenman. In this composition, there are two main layers of boxes that are superimposed with an angle of 45-degree. One of the boxes acts as a topographic element and the other one is more elaborated and layered in its own logic.

Initiated by a square form, House VI is formed by layers in the opposed direction in the form of a cross. With a series of transformation on these layers the final form is achieved. The cross-formed planar layers regulate spaces around them giving a sense that the spaces are projected from these planar layers. These main layers are extended to organize exterior functions and expanded to house service spaces.

Started with a generic square form and ended up in different formations all these house projects of Peter Eisenman show physical implications of his theoretical work. The argument of this thesis that layering is an architectural operation, which embraces analysis, design and representation simultaneously, can be discussed for all of them. From the discussions above, it can be claimed that layering as an operation is apparent in all of the houses. What distinguishes House II from others is its emphasis on design process. The mutual relationship between analysis, design, and correspondingly, representation of ideas are explicitly or implicitly valid in this process. Although House I is directly linked to the Casa del Fascio, the analyses reveal the impact of analysis of Giuseppe Terragni's work on House II. It is also seen from the analyses that Eisenman develops what he learned from Terragni and develops by introducing more complexity to concepts and his designs.

CHAPTER 5

CONCLUSION

The problem of generating architectural form can be solved considering architecture as a process, and in turn, a product of design operations. Layering as one of these operations is the main concern of this study. Thus, how layering generates architectural space is the major question to ask. In this context, the direct relationship between the form of building and the operations employed to generate it is questioned and different architectural examples were discussed accordingly. As the main focus of the thesis, House II was analyzed by decomposing it into its layers with alternating readings.

In the introductory chapter, the aim and concepts related to layering were presented in relation to the contemporary practices. The layering in Cubism was construed in order to introduce the concepts of frontality and depth.

The second chapter discussed layering as an operation that organizes design process. The integration of this process can be achieved by considering design process as an integrated process that includes analysis, design and representation at the same time. In the part “layering as an analytical tool,” the strong relevance between the Casa del Fascio designed by Giuseppe Terragni and House II by Peter Eisenman was set. Furthermore, the parallel condition between concept of “phenomenal transparency” and layering was revealed. In the part “Layering as a Design Tool,” different architectural works were discussed in order to exemplify the assumption of the title. In addition to layering, the complementary operations as superposition and superimposition were discussed

and illustrated. Finally, the representational use of layering was illustrated. Thus, as a preparation for the detailed analyses of House II, a general framework was established.

Presenting the main contribution of this thesis, chapter three is an analytical study feeding from the discussions in the previous chapters. While in most architectural cases, presented in this study, the use of layering is implicit; it is intentionally explicit in Eisenman's House II. It is derived from the analysis of House II that layering as an operation suggests a system of relations. This condition comes from the "interiority" of the building. Since there is no external reference affecting the design of the building, grid as the outcome of cross layering is set as the main reference that guides all the activities within the building. This defines the significance of House II by the superimposition of different layers to create a multi-layered ordering system in which all the elements are organized.

The analysis of Terragni's work and decomposition of House II contribute in many ways. After revealing the source of Eisenman, conception of layering comes from Terragni, the thesis focuses on how layering is used as a design tool by Eisenman in House II. From the analysis, it is deduced that layering in House II is guided by 9SG that is also layered by multiplication.

On the basis of these definitions that regard "layer" as the *substance* of the *act* of "layering", I should point out that layering and layer are constitutive of each other; in other words, layering as an act and layer as its substance emerge simultaneously in design process.

In House II, the dialectic between layers and depth contributes to the architectural space. Concept of layering *becomes* operative when it is employed as a generative system. This condition creates "a dialectic" due to the simultaneous existence of layers as fragments of a whole.

The analyses done in this thesis questioned the analytical process through which House II is generated and transformed by the operation of layering. The cardboard cut outs on layers suggest a space made through additive processes rather than something that is carved out from a solid. The additive process generates space by relating each layer with other layers. Through

transformational process, the generic layers as rectangular planes are transformed into cut outs, elaborated building elements.

In the analyses, this thesis examined the mutual relationship between the generation of space and the role of layering as an operation. While the concept of phenomenal transparency can be utilized in a manner parallel to the concept of layering, these analyses and discussions revealed generation and organization of architectural form through tracing the design process.

The analysis of House II not only helps comprehending the operation of layering but is also ensures a new line of vision that can guide the design and reading of architectural spaces. One can examine a range of buildings by the operation of layering. Therefore, it is possible to analyze and understand a building by decomposing it into its constituent layers as well as to compose a building by designing its component layers. This thesis suggests the use of layering as an architectural operation for a generative way of architectural production.

The research limits itself to the concept of layering and its operational use in the formation of architectural works, and makes a formal analysis of Eisenman's House II. This kind of formal analysis may be criticized since it disregards the contextual issues. However, ignoring the context and therefore external references affecting the building form may direct the researcher to explore the autonomous issues peculiar to architecture.

This situation underlines another potential of layering as a learning tool particularly in the early stages of architectural education. It provides a medium, in which students may explore and experiment the tools and operations of design process, and helps comprehending architectural form as a process. Therefore, the capacity of layering as an educational tool could be considered as a further implication of this research.

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