AN INQUIRY INTO THE DESIGN POTENTIALS OF LE CORBUSIER'S DOM-INO CLUSTERS

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ABSTRACT

AN INQUIRY INTO THE DESIGN POTENTIALS OF
LE CORBUSIER'S DOM-INO CLUSTERS

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The thesis studies Le Corbusier's Dom-ino clusters. It is a research in the field of architectural design. The aim is to explore and reveal the architectural potentials of Le Corbusier's mass-producible Dom-ino frame (1914), not only by concentrating on a single Dom-ino unit but by focusing mainly to the clusters of Dom-ino, searching for the logic behind their multiplication, how they come together and to what extent the units allow variety. To achieve this, six alternative Dom-ino clusters are analyzed, and alternative Dom-ino units are explored, other than the well-known single one. Today, Dom-ino is argued as an architectural diagram, and this research reinforces this argument. The analysis of both the clusters and the units with different plan types eventually puts forward that the Dom-ino frame identifies and exploits all the potentials of mass-production with the standardization of the elements and modularity of the structural grid; and it is an adaptable, flexible and consequently a generic frame that produces infinitely alternative solutions. For this reason, this thesis argues that resolving the way Dom-ino units come together, and analyzing how and in what scale they allow variety in producing clusters will introduce the tools for proper mass-housing, and consequently could produce solutions for today's mass-housing problems.

Keywords: Dom-ino Clusters, Maison Dom-ino, Le Corbusier, Modularity, Standardization, Mass-production, Generic Quality, Diagram

ÖZ

LE CORBUSİER'İN DOM-İNO KONUT KÜMELERİNİN
TASARIM POTANSİYELLERİ ÜZERİNE BİR ARAŞTIRMA

İskenderoğlu, Yasemin
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Bu tezde Le Corbusier'in Dom-ino konut kümeleri (cluster) çalışılmaktadır. Mimari tasarım alanına giren bu çalışmanın amacı, Le Corbusier'in seri olarak üretilebilen Dom-ino iskeletinin (1914) mimari potansiyellerinin araştırılması ve ortaya çıkarılmasıdır. Tez bu araştırmayı yaparken tek bir Dom-ino birimine değil, Dom-ino konut kümelerine odaklanarak birimlerin üreme ve eklemlenmelerinin mantığını, nasıl bir araya geldiklerini ve çeşitliliğe ne derecede imkan verdiklerini incelemektedir. Bunun için, altı alternatif Dom-ino konut kümesinin analizi yapılmış ve perspektifi yayınlanmış tek Dom-ino biriminin dışında alternatif birimler ortaya çıkarılmıştır. Günümüzde Dom-ino bir diyagram olarak ele alınmakta ve tartışılmaktadır. Bu çalışma da bu görüşü desteklemekte ve güçlendirmektedir. Dom-ino konut kümelerinin ve farklı plan tiplerine sahip Dom-ino birimlerinin analizi, mimari elemanların standardizasyonu ve yapısal ızgaranın modülerliği sayesinde bu iskeletin seri üretiminin bütün potansiyellerini taşıdığını ortaya koyar. Bu analiz aynı zamanda Dom-ino'nun uyarlanabilir, esnek ve dolayısıyla da sınırsız sayıda alternatif çözüm üretebilen jenerik bir iskelet olduğunu gösterir. Bu nedenle, bu tez Dom-ino birimlerinin nasıl bir araya geldiklerini çözümlemenin, ve konut kümelerini ortaya çıkarırken nasıl ve ne oranda çeşitlilik sunduğunu analiz etmenin, toplu konut tasarımı için gerekli olan araçları sunacağını, ve dolayısıyla günümüz toplu konut problemlerine çözüm üretebileceğini savunmaktadır.

Anahtar Kelimeler: Dom-ino Konut Kümeleri, Maison Dom-ino, Le Corbusier, Modülerlik, Standardizasyon, Seri Üretim, Jenerik, Diyagram

To My Family

Hatice, Sami, Atasay Gökkaya
and
Melike, Zafer, Arda İskenderoğlu

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CHAPTER 1

INTRODUCTION

> Conceptual *purification* and *analysis* brings a new freedom: the "free plan," the "free façade," and the freedom to make *infinite combinations of the unit*.[1]
>
> Alexander Tzonis

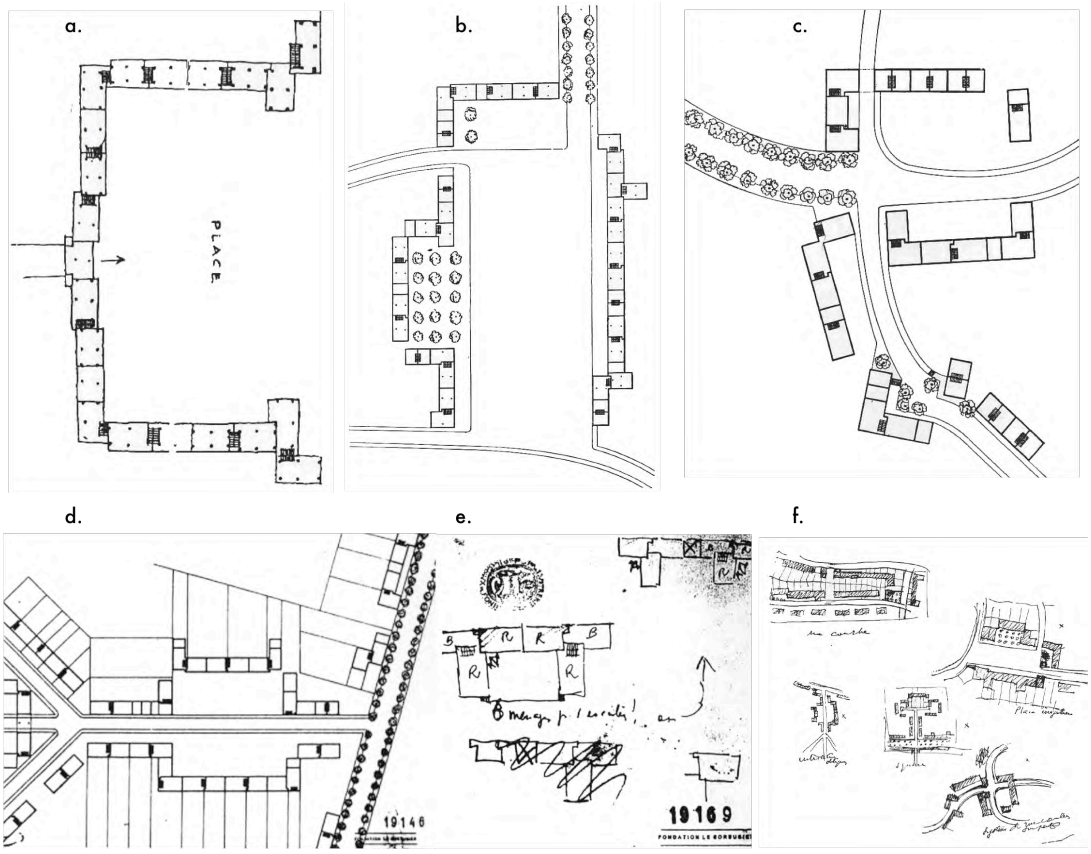

Figure 1.1 **Original sketches of Dom-ino clusters.** Source: a, b, c, f: Le Corbusier, "Les Maisons Dom-ino," Oeuvre Complete, Volume 1, 1910-29, edited by W.Boesiger and O.Stonorov, Berlin: Birkhauser Publishers, 2006, 24-26. d: Columbia University Website. Retrieved February 12, 2009 from (http://brooklyn.arch.columbia.edu/DDL/cad/A4535/SUM95/domino/domino2.gif), and e: Columbia University Website. Retrieved February 12, 2009 from (http://brooklyn.arch.columbia.edu/DDL/cad /A4535/SUM95/domino/domino3.gif)

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[1] Alexander Tzonis, *Le Corbusier: The Poetics of Machine and Metaphor* (Bath, England: Universe Publishing, 2001), 34. Emphasis added.

1.1 Aim of the Thesis

Maison Dom-ino[2] is designed in 1914 by Le Corbusier (1887-1965), who is one of the pioneers of early modern architecture. Being a canon of modern architecture, Dom-ino is always represented with its well-known perspective, which manifests Le Corbusier's "five points of new architecture." This single reinforced concrete Dom-ino unit in the perspective is composed of three rectangular slabs, six slender columns set back on the long sides and coincide with the short sides of the slab, six square footings elevating the first floor from the ground level, and a two-wing staircase. This perspective usually appears as the first image in most of the studies and articles written on Dom-ino (Figure 1.2). Actually, this image, which is imprinted on our memories, implies the existence of several other Dom-ino units generating the Dom-ino clusters (Figure 1.1). The existence of these Dom-ino units and their alternative combinations suggests *other architectural potentials* than the unitary potentials of a single unit (i.e. the five points), which are analyzed and elaborated so many times in architectural literature.

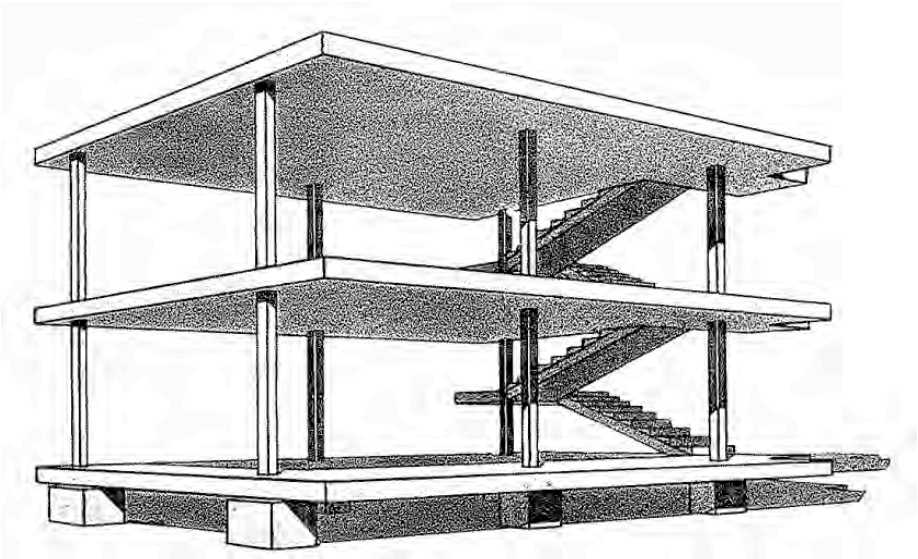

Figure 1.2 **Perspective Drawing of Maison Dom-ino**. Source: Le Corbusier, "Les Maisons Dom-ino," *Oeuvre Complete*, *Volume 1, 1910-29*, edited by W.Boesiger and O.Stonorov (Berlin: Birkhauser Publishers, 2006), 23.

[2] In his texts and sketches, Le Corbusier spells "Dom-ino" in this manner.

As it could also be seen in the sketches of Dom-ino clusters, in a *cluster housing*, dwellings are arranged closely together to form relatively compact groups, leaving open spaces as common areas (Figure 1.1). The common space between these group of houses is allocated to recreational use, pedestrian circulation and gathering. The cluster-housing pattern ensures a higher density land use than that of a conventional subdivision layout, and brings into consideration some design concepts that are essential to cluster design namely, mass production, standardization, multiplication, variety and flexibility.

Then, the thesis makes a research on Le Corbusier's Dom-ino clusters. This is a research in the field of architectural design. The aim is to explore and reveal the architectural potentials of Le Corbusier's *mass-producible* Dom-ino frame, not by concentrating on a single Dom-ino unit, as it is ever done till today, but by focusing mainly to the clusters of Dom-ino, searching for the logic behind their *multiplication*, how they come together and to what extent the units allow *variety*. To achieve this, six alternative Dom-ino clusters are analyzed, and the existence of alternative Dom-ino units, other than the well-known single one, is explored. The analysis of both the clusters and the units with different plan types eventually puts forward that the Dom-ino frame identifies and exploits all the potentials of *mass-production* with the *standardization* of the elements and *modularity* of the structural grid; and it is an *adaptable, flexible* and consequently a *generic* frame that produces infinitely alternative solutions.

It could be stated that the idea of the Dom-ino cluster project coincides with the Domino game. Actually, Le Corbusier does not directly state anywhere that the idea came up with the game, yet the name of the project (i.e. Maison Dom-ino) suggests this.[3]

[3] The similarities between the project and the game are further elaborated in Chapter 4.2.

Although Dom-ino is initiated as a project, it is argued as an architectural diagram or idea today. The thesis does not enter into a diagram discussion, but illustrates and supports the argument (of Dom-ino as a diagram) with the analysis of both the units and the clusters. Actually, the diagrammatic potentials of Dom-ino reinforce its contemporary relevance, and make it the focus of diagram discussions. "[E]xtended on a scale much beyond the two-storey house," the idea of Dom-ino not only forms a theoretical basis for contemporary domestic architecture, but also for Le Corbusier's own domestic buildings.[4] This situation also reinforces Dom-ino as a diagram, but it should be mentioned here that, searching for the traces of Dom-ino in Le Corbusier's domestic buildings is not in the scope of this study.

The analysis of the clusters, units, and the alternative combinations of Dom-ino proves that it is a highly complex frame that synthesizes *economic, industrial, technical*, and *sociological* aspects of design. Being the synthesis of such divergent intentions and preoccupations, Dom-ino could be a guide for contemporary domestic architecture, and could suggest solutions for the problems in mass housing, especially in Turkey. This thesis argues that resolving the way Dom-ino units come together, and analyzing how and in what scale they allow variety in producing clusters will introduce the tools for proper mass-housing, and consequently produce solutions for today's mass-housing problems, such as "*the variety and flexibility in repetition*" and "*the unity in the whole*."

1.2 Structure of the Thesis

The thesis is composed of five chapters. This first chapter introduces the aim of the study, and points out why it focuses on the Dom-ino frame, and especially to the Dom-ino clusters.

The second chapter attempts to re-situate Dom-ino to its original historical-spatial-social context to better understand the theoretical evolution of the frame. The thesis

[4] Tzonis, *Le Corbusier,* 35.

argues that, although this reinforced concrete skeleton was initiated as a project that offered solutions to the problems introduced by the First World War, it has evolved into an idea or a diagram, in time, with the architectural potentials it embraces. To elaborate this suggestion, this chapter first discusses Dom-ino with reference to the period it was developed, as a social modernist practice that came into question with the First World War; then, the architectural potentials it possesses, namely the "five points of new architecture", are further investigated to clarify how it evolved into an idea or an architectural diagram.

The third chapter focuses on Peter Eisenman's "Aspects of Modernism: Maison Dom-ino and the Self-referential Sign,"[5] Eleanor Gregh's "The Dom-ino Idea,"[6] and Barry Maitland's "The Grid,"[7] and refers these articles as the main sources that analyze and elaborate Dom-ino as a diagram or an idea. This chapter will also be a guide for the following part of the thesis that analyzes the clusters of Dom-ino, because these references are significant with their alternative methods of analysis to search for Dom-ino's architectural potentials. Clarifying how Dom-ino is approached as an idea or a diagram in other texts, this chapter once again proves that the unitary potentials of Dom-ino are always in the foreground; the three selected articles make their analyses by focusing to a single Dom-ino unit although they somehow mention that Dom-ino is a mass-producible structural unit that generates alternative clusters.

The fourth chapter focuses on Le Corbusier's sketches of Dom-ino clusters to explore the architectural potentials they possess. Taking the potentials of the single Dom-ino unit, elaborated in the selected texts in chapter three, into consideration; the contribution of this part of the study is the elaboration of the architectural

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[5] Peter Eisenman, "Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign" in *Oppositions Reader: Selected Readings from a Journal for Ideas and Criticism in Architecture, 1973-1984,* ed. K. Michael Hays (New York: Princeton Architectural Press, 1998): 188-198.

[6] Eleanor Gregh, "The Dom-ino Idea," *OPPOSITIONS,* no. 15/16 (Winter/Spring, 1979): 61-87.

[7] Barry Maitland, "The Grid," *OPPOSITIONS*, no. 15/16 (Winter/Spring, 1979): 90-117.

potentials of the Dom-ino clusters through the analysis of six cluster alternatives. Following this analysis, it is discovered that there exist Dom-ino units other than the well-known single one, and the plan menu of these units is produced and the logic behind their multiplication is further investigated. This analysis eventually puts forward that the Dom-ino frame incorporates all the potentials of industrial mass-production. The modularity and standardization in the frame provide economic, simple, flexible, adaptable, and consequently a generic framework for diversified, proportional, rhythmical, orderly, and unifying settlements; and all of these potentials and tools gathered through the analysis of the clusters indicate and demonstrate that Dom-ino is a significant architectural diagram that outlines potential relationships among spatial elements, and suggests possibilities of solutions.

The final chapter constructs a relationship between the contemporary architectural context and Dom-ino, and discusses the significance of the architectural potentials and tools brought forward by the Dom-ino frame in producing solutions for the problems of today's mass housing designs, especially in Turkey.

CHAPTER 2

SHIFT *FROM* DOM-INO AS A PROJECT *TO* DOM-INO AS A DIAGRAM

Maison Dom-ino (1914) is a "historical rupture"[8] since it visualizes the principles of modern architecture, and forms the origins of Le Corbusier's "Five Points of Architecture" (1926) twelve years before its publication (Figure 1.2). These principles that Dom-ino brings forward and the Five Points it formulizes are analyzed in many cases before, but these studies deal with Dom-ino as a single unit, and focus on the unitary potentials of Dom-ino.[9] Although the historical-spatial-social context, in which Dom-ino is originated, is mentioned in these studies, it is usually discussed as a placeless icon without a reference to its context.

Maison Dom-ino was initiated as a project by Le Corbusier as an answer for the new strains of the day, and then it has turned into a diagram or an idea. In this chapter, the thesis attempts to re-situate Dom-ino in its original context, in order to understand the shift *from* Dom-ino as a project *to* Dom-ino as a diagram. The purpose here is not to fix Dom-ino to a certain place or time, but to understand the idea behind the project, and the reason why it is designed.

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[8] Eisenman, "Aspects of Modernism", 189.

[9] Some of these studies are; Eleanor Gregh, "The Dom-ino Idea," *Oppositions,* no.15/16 (Winter/Spring 1979), Peter Eisenman, "Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign," *Oppositions* 15/16 (Winter/Spring 1979), Barry Maitland, "The Grid," *OPPOSITIONS*, no.15/16 (Winter/Spring, 1979), Adolf Max Vogt, *Le Corbusier, the Noble Savage* (Cambridge: The MIT Press, 1998), Deborah Gans, "Le Corbusier: A Biographical Note" in *The Le Corbusier Guide* (New York: Princeton Architectural Press, 1987), Kenneth Frampton, *Modern Architecture: A Critical History* (London: Thames & Hudson, 1992), Paul Turner, *THE OPEN HAND: Essays on Le Corbusier* (Cambridge: The MIT Press).

2.1 Initiation of Dom-ino as a Project

This thesis argues that Maison Dom-ino is an architectural formulation, a social effort that had tried to find answers for the problems of the specific period it is developed. Before Dom-ino is approached as a diagram or an idea, it was produced as a solution to a specific problem. The main triggering fact was the First World War in 1914, which brought the need for rapid reconstruction in its wake. Nevertheless, the war was not the point of departure for Le Corbusier to design Maison Dom-ino. Underestimating Le Corbusier's preoccupations with the "house" as the main problem of modern architecture will be a great mistake in evaluating the project.[10] Eleanor Gregh, in her article "The Dom-ino Idea", states that it is necessary "to relate the idea to Le Corbusier's past as well as to his future thinking" to have a more complete historical picture.

> [The] widely accepted view of the Dom-ino idea, though true, is, in *historical* terms, but a partial one. Seeing the idea simply as a beginning, it takes account of future developments in Le Corbusier's architecture and ignores the past. To have a more complete historical picture, it is necessary to consider Dom-ino as both a beginning and an end, to relate the idea to Le Corbusier's past as well as to his future thinking. The Dom-ino idea was a moment of synthesis, when Jeanneret-Le Corbusier succeeded in focusing a welter of ideas, attitudes, and aspirations that had preoccupied him over many years. In gathering up the past, Dom-ino oriented him toward the future. [11]

Before Maison Dom-ino appeared as a project, Le Corbusier was working towards "a definition of the central problem in modern architecture and of his own role as an architect".[12] Gregh evaluates the project as the synthesis of Le Corbusier's reflections, and summarizes his awareness of the modern industrial society:

> The Dom-ino idea was the synthesis of Jeanneret's reflections 1907-1916 on the nature of architecture and the role of the architect in modern industrial society; it stated the central problem and defined the context in which it had to be solved. [...] In defining the problem,

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[10] Eleanor Gregh, "The Dom-ino Idea", 67. Gregh mentions that the "house" was the central problem in Modern architecture.

[11] Ibid., 61-62. Gregh calls Le Corbusier as "Jeanneret" because his original name is Charles-Edouard Jeanneret, but he adopted the name "Le Corbusier" in 1920.

[12] Ibid., 66-67.

> however, it laid down the principles for a solution: namely a reinforced concrete frame, which, as well as exploiting the advantages of modern materials and techniques, would give the architect maximum freedom in design and aesthetic expression. In this way Dom-ino looked forward to Le Corbusier's Five Points of Architecture and to his pioneering work of the 1920's.[13]

As Tzonis mentions, Maison Dom-ino "is more than a formal technical schema; it is an intellectual construct standing for more general principles and values that Le Corbusier created by erecting it on deeper historical foundations."[14] Modernism, modern industrial developments and "house" as "the central problem of modern architecture" were already in Le Corbusier's focus, and formed the seeds of Maison Dom-ino.[15] War only precipitated the process; the shortage of housing called the need for easy construction, rapid manufacture, and mass-production, all of which were aimed to be solved with the Dom-ino project. In the following part of the thesis, the context that prepared the ground for the development of the project is discussed further and illustrated in a chart (Figure 2.1).[16]

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[13] Ibid., 79.

[14] Tzonis, *Le Corbusier*, 33-34.

[15] Gregh, "The Dom-ino Idea," 67.

[16] Lecture notes, articles, books, and discussions in the courses Arch-513 (Introduction to Architectural Research-instructed by Assoc. Prof. Ayşen Savaş) and Arch-709 (Housing and Discourse II-instructed by Assoc. Prof. Ali Cengizkan) in METU were benefited in structuring the theoretical background of this thesis research. The two articles submitted under the titles "Maison Dom-ino: More Than a Formal Vocabulary" and "Maison Dom-ino: an Interpretable Architectural Formulation," in partial fulfillment of the requirements for the graduate courses Arch-513 (Fall Semester '07) and Arch-709 (Spring Semester '08) respectively, contributed much to the thesis.

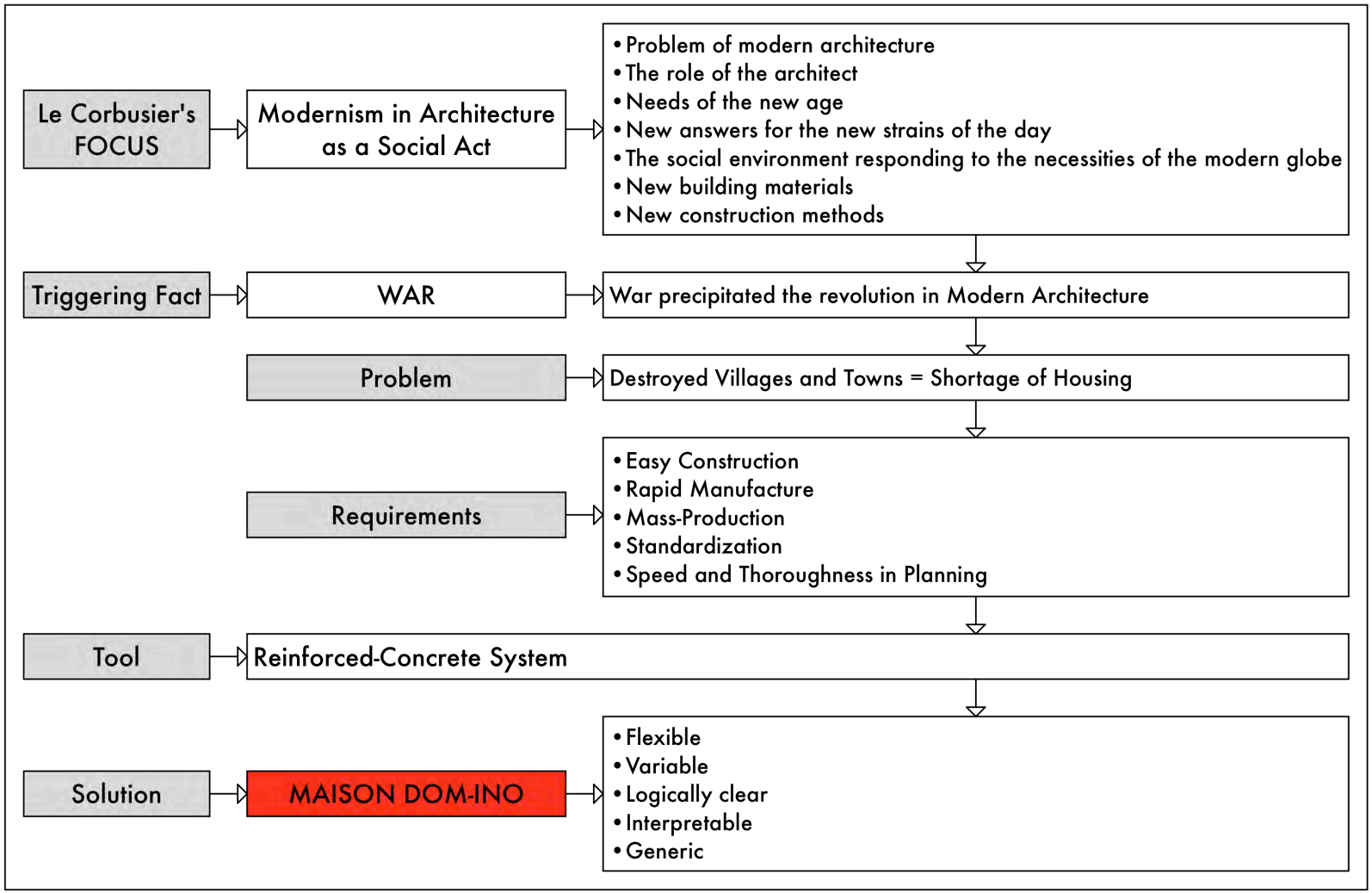

Figure 2.1 **Chart showing the context in which Maison Dom-ino is developed**. Produced by the author.

2.1.1 Modernism in Architecture as a Social Act and Maison Dom-ino as a Social Modernist Practice

This thesis argues that Le Corbusier's preoccupations about modern architecture and his awareness of the role of the modern architect, constitutes his point of departure in designing Maison Dom-ino. In this respect, considering Le Corbusier, it becomes essential to comprehend modernism in architecture as a "social act" and modernist architect as a "social engineer" before evaluating Maison Dom-ino as a social modernist practice. To do so, an assessment is done on modernism in architecture with reference to the article written by Sarah Williams Goldhagen, "Something to Talk About: Modernism, Discourse, Style".[17] This assessment will be helpful in analyzing Maison Dom-ino as an architectural formulation that tried to find answers for the problems of the specific period.

Goldhagen starts her article with an elaborate definition of the "familiar formal tropes" that will conjure up in readers' minds, who deal with modernism:

> What was, or is, modernism in architecture? In contemplating this question many readers – even some who try not to – will likely conjure up a sturdy parade of familiar formal tropes. Flat roofs. "Transparency" and lots of glass: glass window walls, glass doors, glass partitions. Reinforced-concrete or metal buildings, tough edged and stark. Compositions controlled with geometric rigor. Structural armatures split off from building skins, opening up free-flowing spaces articulated lightly with space dividers that barely touch the horizontal planes. A dynamically asymmetrical distribution of spaces. An absence of ornament or historical reference Calvinist in its rigor, an "abstraction," and a resulting emphasis on the compositional play between elements or volumes.[18]

Goldhagen claims that there exists a general agreement on the idea that these formal tropes "reifies modernism in architecture into a style", and such an approach

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[17] Sarah Williams Goldhagen, "Something to Talk About: Modernism, Discourse, Style," *JSAH* 64, no. 2 (June, 2005): 144-167.

[18] Ibid., 144.

ignore its complicated quality and richness.[19] She insists that modernism in architecture is a social act, and argues that modernist architecture "must instantiate an ethically grounded material practice that grapples with (rather than categorically rejects or ignores) the phenomenon of modernity itself."[20] What she means with the "ethically grounded material practice" is an architecture achieved according to moral standards. Touching on the emerging emphasis on the "primacy of socio-ethical intentions over form", she refers to the architects who believed that their "forms would signify to the society" and the people for whom they designed.[21] With reference to her ideas about the "practitioner's obligation to ameliorate the conditions of living in contemporary society," it could be said that modernist architects work for better living conditions and a better society through their projects, and perceive their mission as a social act, and a passion. Their aim is to make a comprehensive work on design and to behave according to the necessities and new conditions appeared in the new period.[22] Mentioning this presupposition that the practitioners of modern architecture handle their vocation as "a social action" that "takes into account the conduct and needs of others, and is meaningfully oriented toward them," Goldhagen points out that these practitioners contribute to this presupposition themselves:

> For many contemporary scholars, the presupposition that modernism in architecture constitutes social action no doubt emerges from the primary sources themselves: practitioners of modernist architecture explicitly framed their goals in socio-ethical terms.[23]

Goldhagen refers modernist architects (such as Walter Gropius, Le Corbusier, J.J. Pieter Oud, Bruno Taut, and others), as social engineers whose "good intentions led to unforeseen," and states that,

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[19] Ibid. Goldhagen states that reifying modernism in architecture into a style "retains the status of a paradigm in the Kuhnian sense of term". She defines paradigm as "a framing device that lends coherence to a discipline by restricting its field of vision to problems of elaboration, expansion, and critique". For the further definition of "paradigm" see also Thomas S. Kuhn, *The structure of Scientific Revolution,* 2nd ed. (Chicago, 1970), 23.

[20] Ibid., 145.

[21] Ibid., 155.

[22] Ibid., 161.

[23] Ibid., 156.

> It is possible, however, to interpret such aspirations also as serious propositions in an ongoing, ethically grounded discussion about the role of architecture in modern life. In contemplating the ethical implications of their modernist practice, these architects and their colleagues embraced the conviction that to make a building or buildings in the world is by definition social action. The practitioner's ethical obligation, then, was to reflect on what sort of social action he proposed and what he hoped to accomplish by it.[24]

The important thing should be the intentions of the architects and what they tried to convey by using the forms they selected. It is valuable when they have concrete and fundamental unifying targets, and produce works under the light of these goals. The intention should be to achieve an architecture that meets the needs of the new age and to do this by establishing a bond between the user and space. New answers should be found for the new strains of the day; and even if the points of emphasis are different, social concerns should govern the design process.

Trying to describe the practices with some formal similarities leads to misconception and such an effort fails to understand the concerns behind the projects. The common concern of modernism in architecture is to create a social environment responding to the necessities of the modern globe: this makes it a wide, deep and demanded social paradigm, which should not be limited.

In reference to Goldhagen's assessment of modernism in architecture, this thesis argues that Maison Dom-ino is an "ethically grounded material practice." It has most of those formal tropes, which are stated in Goldhagen's article, like "flat roofs", use of "reinforced concrete", "geometric rigor" controlling the whole composition, "armatures split off from building skins", "free-flowing spaces articulated lightly with space dividers", "dynamically asymmetrical distribution of spaces", "abstraction", and "absence of ornament".[25] Designing a project with such architectural features is

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[24] Ibid., 156-157.

[25] Ibid., 144.

a formal decision, but this does not mean that it is designed without any social or ethical concerns. Being a social project, Maison Dom-ino, beyond formal decisions, was created with a careful consideration of the conditions of the new period, and the new strains of the day. Le Corbusier went "beyond the notion of applying architectural procedures to industrial building," and applied "industrial building procedures to architecture."[26] Gregh mentions that Le Corbusier's "observation and analysis of his environment" had caused "a revolution in his thought" on the modern industrial development; in four years [from 1907 to 1911], "he had succeeded in clarifying three important issues."

> First, the massive scale of the modern industrial development […]; second, the kind of context necessary for a popular art to flourish; third, the most appropriate direction to follow in developing a modern style. Translated in terms of architecture and the modern architect's role in society, this meant responding to the expansion of the construction industry and planning for whole environments instead of individual buildings; and evolving in the new materials an architectural style, inspired of classical sources, which would express the unity of a society, where all productive activity was to be coordinated and directed toward a common goal. [27]

Depending on Le Corbusier's expressions about the issue, Gregh claims that "a new, modern architecture was possible" only if "the challenge and implications of the revolution in the construction industry" were accepted without delay.[28] Modern architecture should perform for the modern man:

> Jeanneret [...] expresses the classical conception of the Self, the self which the individual shares with his fellows. These ancient buildings, in expressing that general Self, become the embodiment of their age. By implication, modern architecture does not yet, but must, perform the same function for modern man. Being able to find in contemporary architecture the same authentic expression of Self as he finds in older monuments is essential to contemporary man's sense of being part of a continuous and living tradition.[29]

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[26] Gregh, "The Dom-ino Idea," 66.

[27] Ibid., 75.

[28] Ibid., 72.

[29] Ibid., 84. Gregh quotes Jeanneret, from his letter to Ritter, 3 May 1917.

Le Corbusier's effort, in designing Maison Dom-ino, was to create better living conditions and a better society, not through a single project, but by developing an architectural formulation for housing units of the period, proposing an interpretable system of an architectural idea. As Goldhagen states, Le Corbusier was a social engineer with "good intentions", who perceives his mission as a social act and a passion to behave according to the necessities and new conditions appeared in the new period.[30] Stanford Anderson confirms Goldhagen in "The Fiction of Function",[31] and states that Le Corbusier is one of those who recognized the "potentials and joys both of life and architecture"; he challenged himself to find how architecture could serve the people of his culture in his time.

> In the specificity of architectural making, they [Loos, Le Corbusier, Kahn, Aalto] made *places* that "make a world" for those who inhabit them. […] Their buildings tell stories, but not just any story that is different or amusing or ironic or calculated to sell. Rightly or wrongly, not somberly, but rather with ample recognition of the potentials and joys both of life and architecture, they challenged themselves to find how architecture could serve the people of their cultures in their times. To do what they did involve was not function or fiction, but both and more. Their work required an integral understanding of architecture and the life it supports and addresses.[32]

In her article, Goldhagen refers to Le Corbusier's aspiration to develop an architecture that accommodates the "needs of a new era", and to take "a position within modern life"; moreover, to create "an unmeshed relationship between the user and the site."[33] The intuition underlying the Dom-ino project is that "the crucial problem in modern design was the house conceived as an urban unit".[34] He was aware of the need "to determine the house appropriate to the times" as Gregh noted:

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[30] Goldhagen, "Something to Talk About," 156.

[31] Stanford Anderson, "The Fiction of Function," *Assemblage*, no. 2 (1987): 24-28.

[32] Ibid., 29.

[33] Goldhagen, "Something to Talk About," 150.

[34] Gregh, "The Dom-ino Idea," 78.

> He becomes aware of the pressing need "to determine the house appropriate to the times" and for architects to do so by adopting the attitude of engineers, "who work for what is useful, sound, and strong" and "understand the solemn seriousness of their task." [35]

Besides his awareness of the need for the house appropriate to the times, he was also aware of the need of a modern architectural context; the “house” and the “city” were Le Corbusier’s main preoccupations. [36] In a letter written to Du Bois in July 1914, Le Corbusier mentions that he “prepared a tract on ultra-modern architecture: concrete, iron, American houses, the Perrets, Tony Garnier-Lyon, reinforced concrete bridges, New York tramways (sic), etc. ... I feel I have it in me to be someone one day. I am obsessed with building on a large scale, useful and noble, for that is what architecture is about.”[37] The Dom-ino project was designed with such concerns.

> In defining a problem one inevitably defines the context in which it will be solved, so, in defining the central problem of modern architecture as that of the house, on the one hand, and urban design, on the other, Jeanneret seems to come to a greater awareness of the modern architectural context.[38]

Maison Dom-ino, created with a solid background knowledge about the reinforced-concrete construction system and modern production techniques, is perhaps one of the best answers that could be given to Goldhagen’s question: “How did mass consumption and industrial technology influence the approach of architects took to the making of form?”[39]

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[35] Ibid., 67. In endnotes no.14 and 15 Gregh quotes Jeanneret from his letter to Ritter, 19-23 December 1913.

[36] Ibid.

[37] Ibid.

[38] Ibid.

[39] Goldhagen, “Something to Talk About,” 154.

2.1.2 Triggering Fact: The First World War

The declaration of the World War I, in August 1914, and the following devastation and invasion of villages and towns (in Belgium) brought the need for rapid reconstruction in its wake.[40] The destruction, and the shortage of housing in case, called the need for "speed and thoroughness in planning",[41] easy construction, rapid manufacture, and mass-production. Searching for an architectural change and insisting on the possibility of a new architecture, Le Corbusier recognized that "the war will precipitate the revolution in modern architecture."[42] "The news of the devastation, […] had a major impact on his thinking."[43] He considered War as a triggering fact that will accelerate change.

> When, finally, the war broke out, Jeanneret realized that it would precipitate architectural change: "I see that the propitious moment is at hand. ... My dream of going where I can play my part, be useful, work in a milieu which sustains me, and realize or at least try to realize my ideal as constructor and designer." [44]

Le Corbusier's knowledge about the achievements of modern production techniques, and his awareness of the possibilities and exigencies of industrial production made him search for new formulations and perform these methods in architecture. Then, he finally came up with Maison Dom-ino in 1914. As Deborah Gans states, it was an "affordable" structural unit for the "construction of a new housing in the wake of World War I's deconstruction".[45] The inescapable need for rebuilding heightens Le Corbusier's "sense of urgency" to complete the drawings of

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[40] Gregh, "The Dom-ino Idea," 67. In this article it is possible to find more detailed information about the period, the exact dates and how post-war reconstruction affected Le Corbusier's thought.

[41] Ibid.

[42] Ibid.

[43] Tzonis, *Le Corbusier*, 33.

[44] Gregh, "The Dom-ino Idea," 78. In endnote no.135, Gregh quotes Jeanneret, from his letter to Du Bois, 15 September 1914.

[45] Deborah Gans, "Le Corbusier: A Biographical Note," in *The Le Corbusier Guide,* (New York: Princeton Architectural Press, 1987), 27.

Maison Dom-ino, which was planned to accomplish all the requirements coming along with the War.[46]

> Jeanneret looks through his files on the subject, discusses his ideas with "certain reliable persons" and convinces himself of the viability and originality of the Dom-ino idea. He decides to make it his first priority, planning to complete the scheme in all its details by the spring [1914]. Acutely aware of the likely competition in this field, Jeanneret emphasizes the need for speed and thoroughness in planning, so that they may be ready to put up whole villages at a moment's notice. [47]

The reconstruction of villages and towns, destroyed in the war, should be along rational lines using the new industrial building material. Reinforced concrete skeleton was the “technical device for the production” of Le Corbusier’s housing units.[48] Maison Dom-ino, as a mass-producible structural unit, was revolutionary for the period it was proposed not only because it is created with the idea of mass-production, but also because it allows different possibilities in such a standardized form of construction. Offering only a reinforced concrete skeleton, Dom-ino gives way to innumerable results, since there are plenty of combination alternatives. Le Corbusier worked on several Dom-ino clusters, taking Maison Dom-ino as the unit structure (Figure 2.2). As it could be seen in the sketches of Dom-ino clusters in Figure 2.2, the flexibility inherent in the system gives way to produce various solutions, not only a single one. As Charles Jenks states,

> [T]he ‘Dom-ino System’ contained properties suggested in its name. Like ‘Domus’ it was intended as housing for post-war reconstruction; like ‘domino blocks’ it was intended to be mass-produced and assembled in numerous combinations. [49]

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[46] Gregh, “The Dom-ino Idea,” 70.

[47] Ibid., 67.

[48] Kenneth Frampton, *Modern Architecture: A Critical History* (London: Thames & Hudson, 1992), 152.

[49] Charles Jenks, *Le Corbusier and The Tragic View of Architecture* (Cambridge: Harvard University Press, 1973), 42.

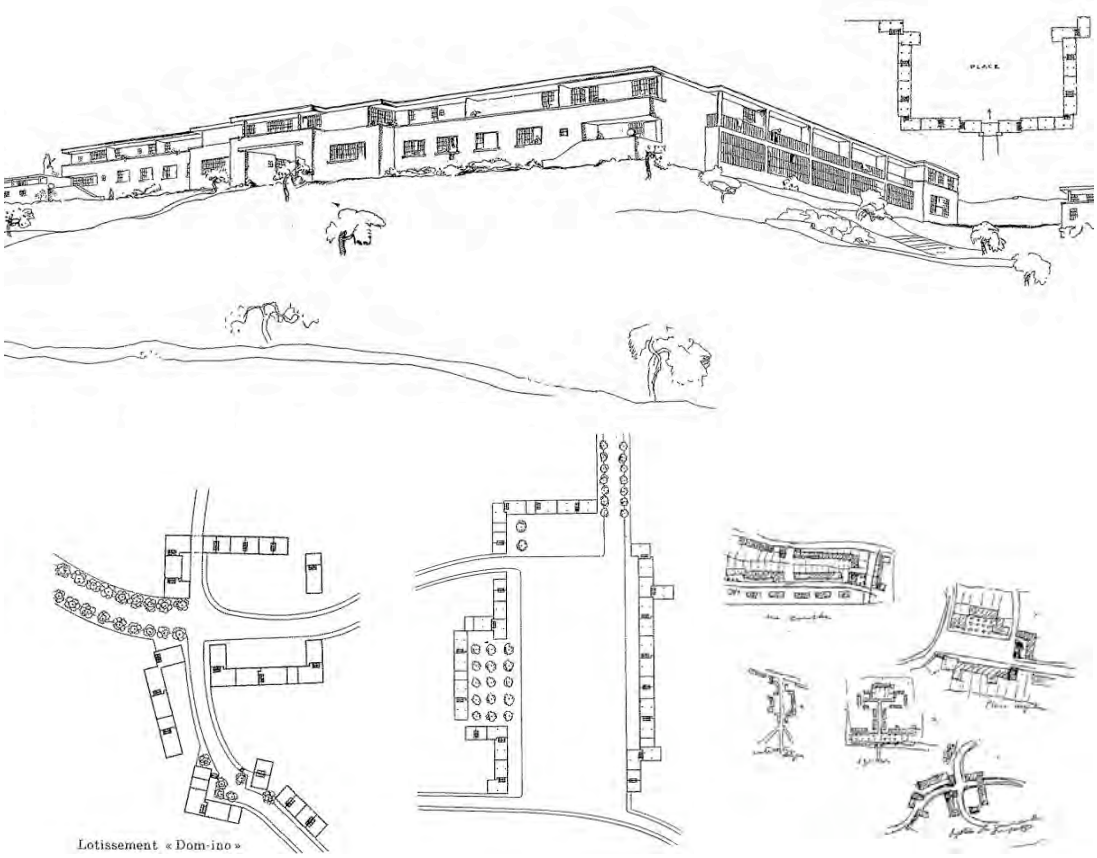

Figure 2.2 **Cluster alternatives of Dom-ino**. Source: Le Corbusier, "Les Maisons Dom-ino," *Oeuvre Complete*, *Volume 1, 1910-29*, edited by W.Boesiger and O.Stonorov (Berlin: Birkhauser Publishers, 2006), 24-26.

In his book, *Le Corbusier: an analysis of form*, Geoffrey H. Baker states that Le Corbusier "envisaged a production line for houses resembling that of factories producing motor cars." [50] Le Corbusier builds up this metaphor, in *Towards A New Architecture,* as such,

> A house will no longer be this solidly-built thing which sets out to defy time and decay, and which is an expensive luxury by which wealth can be shown; it will be a tool as the motor-car is becoming a tool. The house will no longer be an archaic entity, heavily rooted in the soil by deep foundations, built "firm and strong," [...].

[50] Geoffrey H. Baker, *Le Corbusier: An Analysis of Form* (New York: Spon Press, 1996), 62.

> Eradicate from your mind any hard and fast conceptions in regard to the dwelling-house and look at the question from an objective and critical angle, and you will inevitably arrive at the "House-Tool," the mass-production house, available for everyone, incomparably healthier than the old kind (and morally so too) and beautiful in the same sense that the working tools, familiar to us in our present existence, are beautiful. [51]

Planned to create the environment responding to the necessities appeared in the post-war period, Maison Dom-ino is revolutionary. With the techniques and strategies it offers, it is an innovative architectural proposal that permits flexibility and variety. Gregh argues that "architecturally, the idea was revolutionary" since "as well as exploiting all the advantages of modern materials and techniques (economy, rapidity, and flexibility), the Dom-ino frame gave the architect greater artistic freedom" than it had ever been enjoyed.[52] Dom-ino's adaptability for changing needs, and the freedom, economy, rapidity and flexibility inherent in the system makes it a valuable solution in the post-war reconstruction. Maison Dom-ino is a perfect tool for a rapid, effective, and successful reconstruction, which deeply considers the problems of physical rebuilding.

2.1.3 Le Corbusier's Journey to East (in 1911)

Although the First World War triggered the development of Dom-ino, and precipitated the revolution in Modern architecture, it can be stated that the Dom-ino frame and the five points it visualizes were formulated earlier by Le Corbusier. His journey to East in 1911 is significant in the development of the Dom-ino idea. In reference to Adolf Max Vogt, it could be said that technical, cultural, and historical context in East, particularly houses in rural Turkey, Greece, and Bulgaria, influenced Le Corbusier much, and the principles he acquired through his journey formed the basis of the Dom-ino frame.[53] Vogt states that the longest stay in Le Corbusier's

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[51] Le Corbusier, Towards a New Architecture, trans. Frederick Etchells (New York: Dover Publications, 1986), 237, 263.

[52] Gregh, "The Dom-ino Idea," 71.

[53] Adolf Max Vogt, *Le Corbusier, the Noble Savage* (Cambridge: The MIT Press, 1998).

journey to East was in Istanbul, since the projections (*çıkma*) on the upper story of the houses have captured his attention.[54]

> LC's sketches show his visibly strong interest in this construction of the upper story jutting out as a projection (in Turkish called *çıkma*).[55]

Vogt argues that the projection was "further dramatized by the *garden walls*."[56] This thesis argues that these two facts (projections and the garden walls), together with the "sheltered entry space resulting from the upper story projecting far out," form the basis of Le Corbusier's five points, and consequently of his Dom-ino frame.[57] As Vogt confirms, Le Corbusier "turns the Turkish jutting out of parts of a building into a *lifting up of the whole building*" in his further practices.[58] The garden walls seem to be elevating the house from the street level by seperating it from the street, and the upper level projects on the street on one side, and shelters the entry space on another (Figure 2.3). When compared, it is not hard to see the traces of these three features in the Dom-ino frame. The *cantilevered parts* of the Dom-ino frame on the long sides resemble the projection (*çıkma*) in the traditional Turkish house, and the *lifting up of the whole building* in the frame resembles the effect acquired by the garden wall and the sheltered entry space (Figure 2.3). These features might have affected the Dom-ino idea, and the five points of architecture could argued to be the consequences of his journey to East in 1911.

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[54] Ibid., 32.

[55] Ibid., 36.

[56] Ibid., 38. Emphasis added.

[57] Ibid., 37-39.

[58] Ibid., 44.

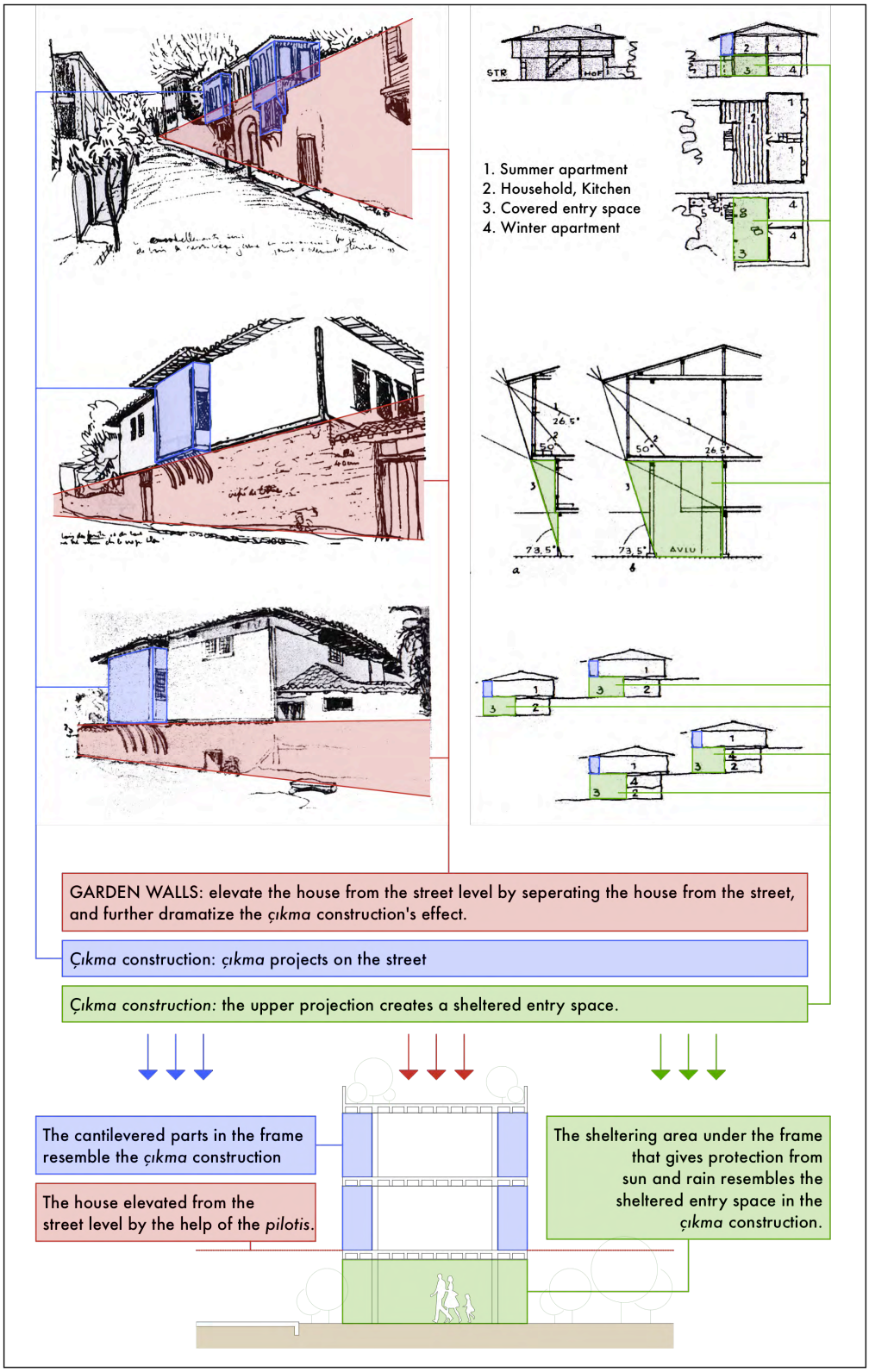

Figure 2.3 **Similarities between the projection (*çıkma* construction) in the Turkish house and the Dom-ino frame**. Source: Adolf Max Vogt, *Le Corbusier, the Noble Savage* (Cambridge: The MIT Press, 1998), 37-39. Edited by the author.

2.1.4 Tool for the Solution: Reinforced Concrete

Reinforced concrete was the basis of the Dom-ino project, since Le Corbusier strongly insisted that the solution, which would respond to the problems emerging with the War, would be reached faster with reinforced concrete. The knowledge he acquired about the reinforced concrete construction technique, from 1908 to 1910, forms a background for him to design Maison Dom-ino in 1914 (Figure 2.4). Potentials of reinforced concrete encouraged Le Corbusier to search for such a project (i.e. Maison Dom-ino) that would take these potentials one-step further.

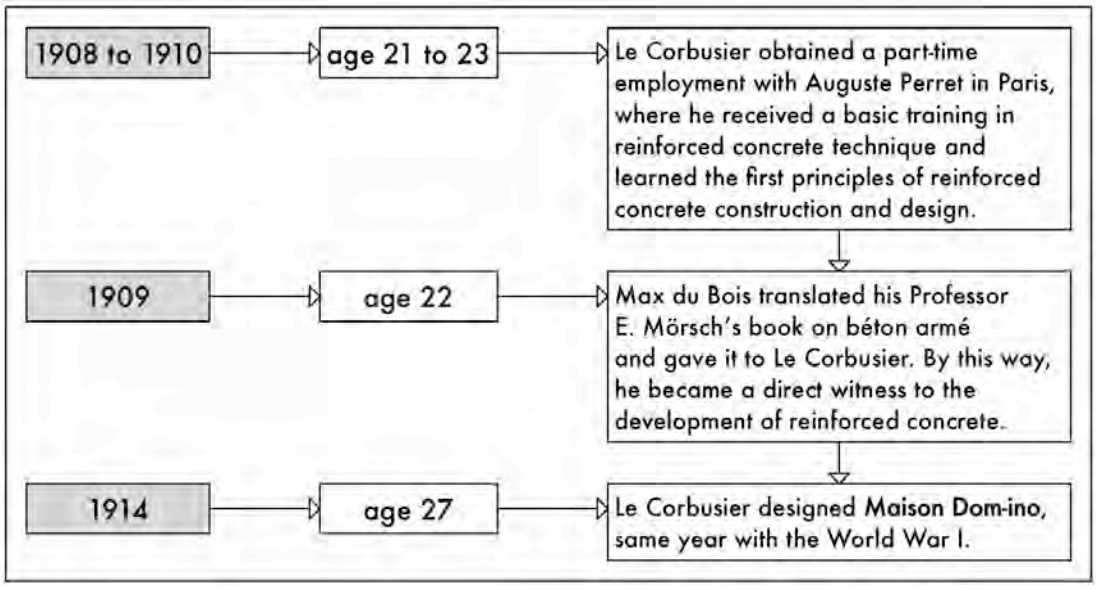

Figure 2.4 **Time chart showing Le Corbusier's knowledge about the reinforced concrete construction technique**. Produced by the author.

The translation of Professor E. Mörsch's book titled *Le béton armé* (1909)[59] and Le Corbusier's fourteen months part-time employment (1908-1910)[60] in Paris with Auguste Perret made him a direct witness to the development of reinforced

[59] Ibid., 4. Du Bois, a friend from Le Corbusier's early youth and the assistant of professor E. Mörsch, translated and gave it to Le Corbusier. Vogt sees Professor E. Mörsch as a prominent specialist on armored concrete, and writes in detail about the triple challenge, which makes Le Corbusier a true admirer of the profession of building engineering, owing to the translation of the book.

[60] Frampton, *Modern Architecture*, 150. Le Corbusier received a basic training in reinforced-concrete construction in Auguste Perret's office, who made his reputation "through his 'domestication' of the reinforced-concrete frame".

concrete. The book and his employment were significant in the development of Le Corbusier's knowledge of the reinforced concrete construction system, thus he discovered that "*béton armé* was the material of the future" with its "malleable monolithic nature", "durability", and "inherent economy".[61]

The quotation from Le Corbusier, in Adolf Max Vogt's book, *Le Corbusier, the Noble Savage*, indicates how Le Corbusier evaluates potentials of reinforced concrete, and approaches it as a turning point in modern architecture.

> Mindful only of following the purest traditions, the little house rises from the armored concrete ..., as true as these true houses. ... The house is lifted in the air, on supports, far from the ground, [therefore] healthier ..., the armored concrete leads from one step to the next ..., through this new building material everything is upturned. Through the commands of the spirit the house is turned into a palace ... by truth can be achieved dignity ..., like a crystal. The rule of the game becomes visible, the game won. And one grasps that this box, smooth and neat, is stretched taut under the sway of multiple intentions. [62]

Reinforced concrete technique was a great convenience compared to the traditional construction system, with the freedom and practicality it offered. In his book, *Towards a New Architecture,* Le Corbusier writes on the development of reinforced concrete, and explains how it shocked contemporary architects:

> The concrete was poured in from above as you would fill a bottle. A house can be completed in three days. It comes out from the shuttering like a casting. But this shocks our contemporary architects, who cannot believe in a house that is made in three days; we must take a year to build it, and we must have pointed roofs, dormers and mansards.[63]

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[61] Ibid.

[62] Vogt, *Le Corbusier*, 11.

[63] Le Corbusier, *Towards a New Architecture*, 230-231.

Le Corbusier conveys the potentials of reinforced concrete to their limits, and develops architectural tools with the help of the possibilities offered by the reinforced concrete construction technique. For instance, Maison Dom-ino, which is argued to be the origin of the "Five Points of New Architecture", is a skeleton that uses all the potentials of the reinforced concrete. Vogt confirms this argument by considering reinforced concrete as a great gift, which constitutes the basis of Le Corbusier's "Five Points":

> Scarcely had the Palais du Peuple of the Salvation Army in Paris been built (1926) when the thirty-nine-year-old LC, together with Pierre Jeanneret, published the 5 points ("Les 5 points d'une architecture nouvelle"). With a strange, suggestive logic these are derived from the great gift of the turn of the century, from reinforced concrete (first reinforced with iron rods, then with steel rods).[64]

Paul Turner, in *THE OPEN HAND: Essays on Le Corbusier*, states that the modern reinforced concrete method of construction is developed as an answer to the shortcomings of the traditional building methods: "In traditional building methods, the wall tended to be wedded to the structure, but reinforced concrete now allowed the structure to consist simply of thin columns, freeing the wall of any structural function."[65] The Hennebique system, developed by the French engineer François Hennebique, constitutes the basis for the modern reinforced concrete method of construction,[66] and he is widely regarded as the most influential pioneer of this construction method. Sigfried Giedion writes, in *Space, Time and Architecture: Growth of a New Tradition*, that until 1890s "reinforced concrete did not come into common employment on a large scale", and the "first large scale use of reinforced concrete in the 1890s was by François Hennebique" in France.[67] The Hennebique

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[64] Vogt, *Le Corbusier*, 4.

[65] Paul Turner, *THE OPEN HAND: Essays on Le Corbusier* (Cambridge: The MIT Press), 34.

[66] Douglas McBeth, "Francois Hennebique (1842-1921), Reinforced Concrete Pioneer," *Proceedings of the Institution of Civil Engineers* 126 no.2 (1998), http://jisc.iceknowledge.com/ArticleView.aspx?doi =10.1680/icien.1998.30436 (accessed December, 7, 2007). François Hennebique (April 26, 1842-March 7, 1921) was a French engineer and self-educated builder who patented his pioneering reinforced-concrete construction system in 1892. He is responsible for the widespread acceptance of reinforced concrete.

[67] Sigfried Giedion, *Space, Time and Architecture: Growth of a New Tradition,* 5th ed. (Cambridge: Harvard University Press, 1967), 325.

system was one of the first applications of the modern reinforced concrete method of construction that integrated separate elements of construction (i.e. column and beam) into a single monolithic element. [68] With the attempts of Hennebique, reinforced concrete became a convenience that freed the walls of any structural function but Le Corbusier took it one step further with Maison Dom-ino. As Deborah Gans states Dom-ino's structural system is different from the "standard Hennebique frame in its *idealization of floors as flat slabs without exposed beams*": [69]

> Its columns were perfectly straight posts without capitals, set in from the edge of the slab. This system freed both exterior and interior walls from all structural constraints.[70]

What makes Dom-ino innovative is the structural use of flat slabs without beams. Only the slabs and the slender columns carry the whole structure, not the beams. Such an interpretation of the Hennebique frame in Maison Dom-ino is revolutionary. In the Dom-ino project, the reinforced concrete method is used not only because it allows the structure to consist simply of thin columns, freeing the wall of any structural function, but also because it is malleable, durable and economic.[71] The idea is the "birth of a new house from the new building material."[72] *Its concrete skeleton acts as a technical device for production*, which is practical, economic, durable, quick and easy to build.

> LC claims to have conceived his skeleton construction Dom-ino system in the same year [with the War in 1914]. […] LC tries again and again to apply it and to draw it the most important kinds of new freedoms for modern architects. As the justification of this construction with armored concrete, which he believes would be cheap and easy to realize, […]. He would like to take part in the rebuilding activities, applying the then newest building material and

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[68] McBeth, "Francois Hennebique (1842-1921)".

[69] Gans, "Le Corbusier: A Biographical Note," 27. Emphasis added.

[70] Ibid.

[71] Frampton, *Modern Architecture*, 150.

[72] Vogt, *Le Corbusier,* 109.

> construction method, which he believes will prove significantly inexpensive due to the standardization that comes from their use. [73]

To sum up, Le Corbusier's perception of modernism in architecture as a social act, the First World War as a triggering fact and the development of modern reinforced concrete technique formed the background of the Dom-ino project. By proposing structural units (Dom-ino units) of the same logic to generate clusters; by taking the potentials of the reinforced concrete construction system one step further by proposing flat slabs without exposed beams and by liberating the design from all the structural constraints Le Corbusier did something unprecedented. He insisted on the validity of the scheme, and then tried to take a patent of the project and to gain support for it.[74] Although he came up with great difficulties in taking the patent of the Dom-ino project, Le Corbusier never gave up. He continued all through his life, in all of his projects to develop the idea behind the Dom-ino project, because it was not such a simplistic idea as Du Bois imagine.[75] Vogt defines Dom-ino as "a masterpiece of analysis".

> Le Corbusier's Dom-ino system, 1914-1915, was certainly a bolt from the blue. Le Corbusier wanted it patented as an invention but failed, because it is a masterpiece of analysis rather than one of invention.[76]

Gregh highlights Le Corbusier's initiative by emphasizing how he "designs the frame in all its detail, makes plans, elevations, and interior arrangements".[77] She mentions that the sketches of the Dom-ino project, with the "explorations of the socio-logical […], architectural, technical, and practical (economic and administrative) aspects of the Dom-ino project, adds greatly to our first assessment of the idea's

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[73] Ibid., 110.

[74] Gregh, "The Dom-ino Idea," 87.

[75] Ibid. It is possible to find more detailed information in the article about Le Corbusier's effort to convince Du Bois (his engineer friend) that Maison Dom-ino is a patentable idea. However for Max du Bois, Dom-ino was a simplistic idea, so it was not patentable.

[76] Vogt, *Le Corbusier,* 109.

[77] Gregh, "The Dom-ino Idea," 68-70.

significance."[78] At the initial stages of the project, there was the idea of constructing mass production houses and clusters rather than constructing a single villa.

> Shortly after his visit to Perret, Jeanneret arrives in Paris for a protracted stay (probably 28th July until 16th September 1915), with the intention of conducting extensive research into the various subjects preoccupying him. As well as reading widely at the Bibliotheque Nationale on town planning past and present, [...] he fills a sketchbook with notes and drawings on the various aspects of the Dom-ino project. [79]

Although we have the imprinted single image of the Dom-ino project on our memories, the thesis emphasizes the fact that Maison Dom-ino was initially designed to generate clusters of great diversity. The project was not proposed for a particular site or context but it was not a conceptualized single unit as well, as it is perceived today. The Dom-ino project has various "Dom-ino units" of different form and size, to be assembled in various forms to generate Dom-ino clusters. These units are the products of same logic, and share same potentials, thus each Dom-ino unit becomes a representative of all units (Figure 2.2).[80]

2.2 Evolution of Dom-ino to a Diagram

Although the Dom-ino project is proposed to generate clusters, design potentials of a single Dom-ino unit are also significant. These unitary potentials exist from the very beginning but they begin to be emphasized and explored in detail, probably when the problems emerging with the First World War began to be disappeared significantly. Dom-ino unit started to be detached from its cluster and to carry on its

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[78] Ibid., 68.

[79] Ibid., 67. In endnote no. 32 Gregh indicates that the sketchbook is undated. She states that the contents being largely concerned with plans for launching Dom-ino, contemporary correspondence enables us to situate it in 1915. When Jeanneret plans the economic life of the new firm for Dom-ino, he calculates sales from 1916 onward. There is a draft for the patent, which was eventually requested in January 1916. Le Corbusier claimed that the Ville-Pilotis idea was conceived in 1915; the sketches for it are in this book.

[80] These Dom-ino units of different form and size are analyzed in detail, in Chapter 3, in the analysis of the Dom-ino clusters drawn by Le Corbusier.

own individual existence as a single unit, presumably when the need for rapid reconstruction receded.

Another reason for the widespread emphasis on the unitary potentials of Dom-ino could be the publication of the "Five Points of New Architecture" by Le Corbusier, in 1926. This thesis argues that these "five points" are the *formulized* and *written versions* of the design potentials *manifested* by the Dom-ino units, which he developed twelve years before, in 1914. Potentials of a single Dom-ino unit, besides its potential to generate clusters, indicate how powerful the Dom-ino idea is. These potentials, which are then formulized as the "five points", are still applicable to the contemporary architecture. This is why Dom-ino goes beyond being a project, and evolved into an idea, a diagram.

As İhsan Bilgin declares, Dom-ino is the first one of the conceptual works of Le Corbusier that he started after his employment in Perret and Behrens' offices, and continued through his entire life.[81] Dom-ino, as a conceptual work, constitutes the basis of most of Le Corbusier's projects since it is not a finished object or project with six columns and three slabs, but a diagram that can generate or suggest possibilities of architectural solutions. The Dom-ino idea formed a generic framework for Le Corbusier's own works through his entire life. He continued developing the idea behind Dom-ino through his projects, books and other products. The potentials Dom-ino brings forward not only formed a base for most of Le Corbusier's later works, but also for most of the contemporary architectural practice. They are still being used as the design tools of contemporary architecture in 2000s. The most important reason of this validity is that, Dom-ino is produced as an interpretable skeleton system.

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[81] İhsan Bilgin, "Serbest Plan, Serbest Cephe, Serbest Ev ...," *Cogito*, no. 18 (1999), http://www.arkitera.com/diyalog.php?action=displaySession&ID=62&aID=631 (accessed September, 18, 2007).

This part of the thesis primarily elaborates the “Five Points of New Architecture” in order to clarify the design potentials of the Dom-ino units, and how these potentials open up the way for Dom-ino towards being an idea or a diagram. The Dom-ino idea is “open to different levels of interpretation”, thus understanding the way how it creates such levels of interpretation will be useful to comprehend the diagrammatic potentials of Dom-ino and its significance in architecture. [82]

2.2.1 Dom-ino as the Origin of the “Five Points of New Architecture”

As stated before, Le Corbusier was working towards “a definition of the central problem in modern architecture and of his own role as an architect”.[83] The “house” was the main problem of modern architecture for Le Corbuser, and this made him search for the “house” appropriate for “modern man”. Le Corbusier’s “Five Points” are the architectural tools that announce an entirely new kind of architecture appropriate to the Modern age. Vogt defines Le Corbusier’s five points as “his summary prescription for the production of the new house”. These five points are the pilotis (*les pilotis*), the roof garden (*les toits jardins*), the free plan (*le plan libre*), the long window (*la fenetre en longueur*), and the free façade (*la façade libre*).[84] Although Le Corbusier did not declare anywhere that these five points are derived from Maison Dom-ino, the publication of the “Five Points of New Architecture” is in fact, a twelve years late publication of the design principals and potentials that Maison Dom-ino suggested. They are briefly the formulized versions of them. When Le Corbusier published the five points, he tried to call attention to the issues of healthiness, accuracy, and freedom in architecture, brought by the new reinforced concrete construction technique. Each of these five points shows that, being a *social engineer,* Le Corbusier’s effort in designing Dom-ino is to improve the living conditions and to create a better society, by developing an architectural formulation for the housing units of the period, proposing an interpretable system of an architectural idea, not a single project. The idea, beyond formal decisions, is created

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[82] Frampton, *Modern Architecture*, 153.

[83] Gregh, “The Dom-ino Idea,” 66-67.

[84] Vogt, *Le Corbusier,* 6.

with a careful consideration of the conditions of the new period, new strains of the day, needs and expectations of the user.

Dom-ino idea is apparent in the sketches of Le Corbusier that he uses to illustrate the five points by comparing the reinforced concrete construction system with the traditional one (Figure 2.5). In his sketches, where he describes the Dom-ino idea, the whole reinforced concrete structure is lifted up in the air on the pilotis; the columns are set back from the edges that let the façade to be freely designed with band windows; the non-structural walls can be placed where desired; and the flat roof permits an additional ground for the roof garden. Actually, they are proposed with social intentions so as to emphasize the social role of the architect.

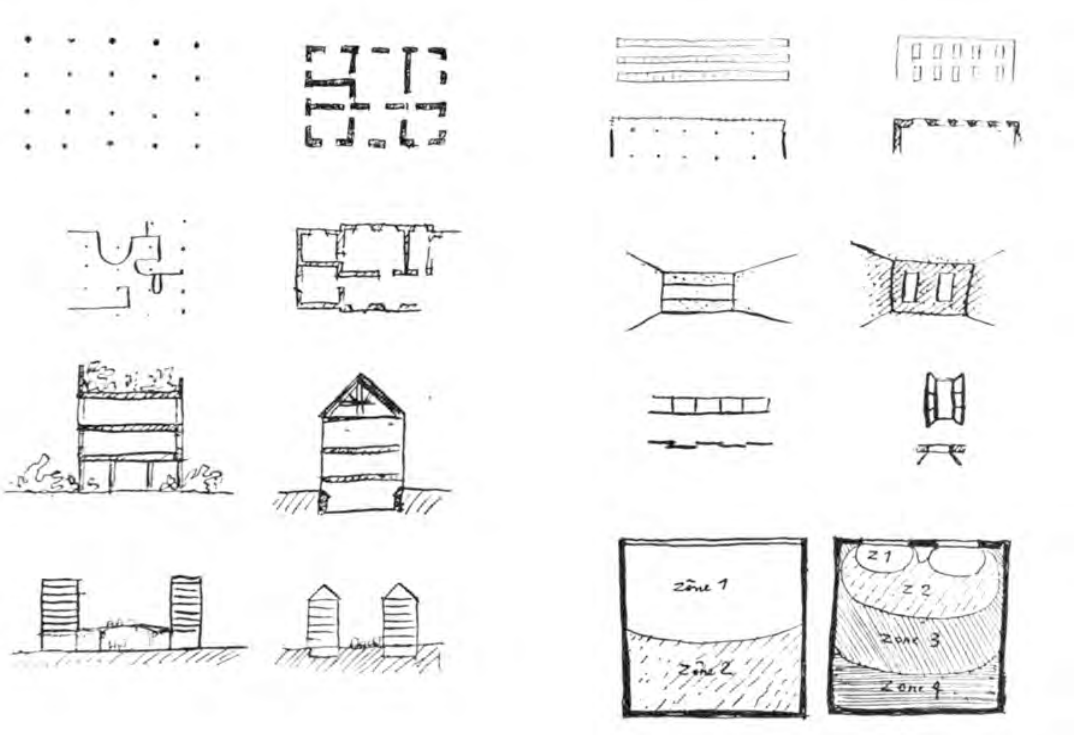

Figure 2.5 **Five Points of New Architecture**. Source: Le Corbusier, “Les 5 Points D’une Architecture Nouvelle,” *Oeuvre Complete*, *Volume 1, 1910-29*, edited by W.Boesiger and O.Stonorov, (Berlin: Birkhauser Publishers, 2006), 129.

Dom-ino, as the basis of Le Corbusier's five points, is one of the most valid innovative creations in architecture. Alan Plattus asserts that it is Le Corbusier's contribution to push these five points, which could be found in the history of architecture, to their logical limits.

> Each of the Five Points, in their literal manifestations, can be traced in the history of the recent past. [...B]ut it was Le Corbusier's peculiar contribution, with a little help from his avant-garde contemporaries, to push all of them, simultaneously, to their logical limits.[85]

What Plattus summarizes as "the basic rule structure of an architectural language predicated upon both modern construction and the revolutionary spatial experiments" is the "Five Points of New Architecture".[86] Far from being only formal decisions, these five points are codified with a great concern on the dwelling house. Being the formulized version of Le Corbusier's architectural principles, the five points will be analyzed in this part in order to understand what he tried to put forward with each of them.

2.2.1.1 The Pilotis

Vogt states that Le Corbusier's interpretation of "column's mutation to pilotis" is much more radical than his contemporaries such as Gropius, Mies, and Rietveld. He writes that lifting the house up in the air was something that could happen only in fairytales, but it becomes a possible reality with the pilotis.[87] He quotes Le Corbusier's words about the pilotis, and states that the other four points appear to evolve logically from the idea of pilotis. Then, the pilotis becomes the generator of the four points:

> The house on pilotis. The house was rammed into the ground: dark and frequently humid spaces. Armored concrete gives us the pilotis. The

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[85] Alan Plattus, "Le Corbusier: A Dialectical Itinerary," in *The Le Corbusier Guide,* by Deborah Gans (New York: Princeton Architectural Press, 1987), 17-18.

[86] Ibid., 17.

[87] Vogt, *Le Corbusier,* 8.

> house is *up in the air, far from the ground*, the garden extends under the house, and in addition is also on top of the house, on the roof.[88]

Le Corbusier added a commentary on pilotis, the "Five Points of the Pilotis", to the book *Oeuvre Complete I, 1910-1929* (Figure 2.6).[89] The first one of these five points is the "*cleaning of the dwellings*", second one is the "*separation of the traffic into pedestrian and car zones*", the third is the "*restitution of the built-up ground and public ground to the inhabitants*", the forth one is "*a sheltering awning (abri) that gives protection from sun and rain, and also for children at play*", the fifth and the last one is the "*abolition of the facade: there is neither front nor back to the house any more*". [90] All these five points assigned to the pilotis once again proves that the project is developed with social intentions and preoccupations. By elevating the house up in the air, he creates a public zone where pedestrian and car zones are separated (the 2nd point of the pilotis); and he provides a sun and rain protected area under the house for the public (the 4th point of the pilotis). Regarding the dwellers of the house, he aims at creating a healthier living environment by the use of the pilotis, since there is no cellar under the house anymore, so no humid spaces (the 1st point of the pilotis). By elevating the house on pilotis and by providing a flat roof, double ground is gained: The pilotis, by raising the house, allows the green to flow under the house, and provides a ground for the inhabitants under the house (public ground), and the flat roof becomes a second ground (private ground) used as a roof garden by the inhabitants (the 3rd point of the pilotis). Slender columns eliminating the load-bearing walls, allow the free plan, free façade and band windows to be applied in the house. Thus the partitions placed where desired without structural constraints and the strip windows, dominating all the façades, provide an uninterrupted view of the surrounding yard.

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[88] Ibid., 6.

[89] Le Corbusier, *Oeuvre Complete*, *Volume 1, 1910-29,* eds. Willy Boesiger, Oscar Stonorov, and Max Bill (Berlin: Birkhauser Publishers, 2006),132. The English translation of the "Five Points of the Pilotis" is taken from Adolf Max Vogt's book, *Le Corbusier, The Noble Savage* (Cambridge: The MIT Press, 1998), 9.

[90] Vogt, *Le Corbusier,* 9.

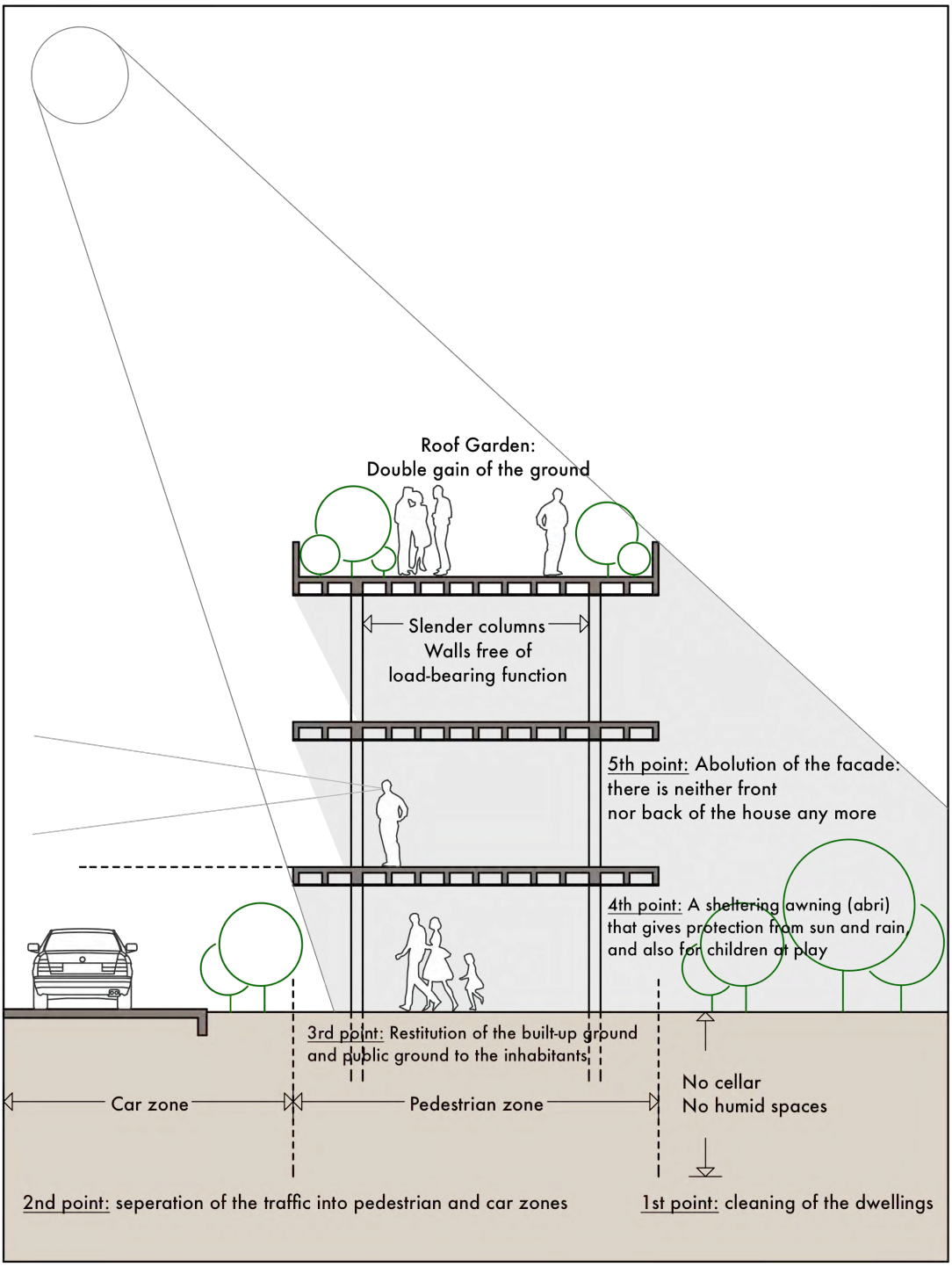

Figure 2.6 **Five Points of the Pilotis**. Produced by the author.

2.2.1.2 The Roof Garden

By elevating the building on pilotis, the green area on the ground floor, which is consumed in the traditional way of building, is compensated and re-placed on the roof. This second point, the roof garden, is a possibility that the flat roof offers. Vogt asserts that there is a double gain of the ground; the garden under the house (repossession) and the garden on top of the house (additional gain), and its double benefit.[91] He also writes about Le Corbusier's argument that "modernism does not destroy but cultivates nature, nurses it alongside the building and on top of their roofs".[92] Concerning social intentions of Le Corbusier in the design of Dom-ino, the roof garden permits different types of *socialization* or *human association*; the roof (garden on top) could be approached as an outer space that is specialized for the *family socialization*, and the ground (garden under the house) as an outer space for the *public socialization*.

2.2.1.3 The Free Plan

In his book, *Towards a New Architecture*, Le Corbusier writes about plan's significance, and the need for a new kind of plan. These words reflect the importance of "plan" for Le Corbusier and how he pays attention to it,

> The Plan is the generator. Without a plan, you have lack of order, and willfulness. The Plan holds in itself the essence of sensation. The great problems of to-morrow, dictated by collective necessities, put the question of "plan" in a new form. Modern life demands, and is waiting for, a new kind of plan, both for the house and the city.[93]

His solution to the problem of "plan" appears to be his third point, namely "the free plan". Alan Plattus asserts that "the free plan has a certain priority among the Five Points."[94] He makes a comparison between traditional and modern architecture,

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[91] Ibid., 8-9.

[92] Ibid., 19.

[93] Le Corbusier, *Towards a New Architecture*, 2-3.

[94] Plattus, "Le Corbusier: A Dialectical Itinerary," 18.

emphasizing the independence of modern architecture from the constraints of bearing wall construction achieved by the free plan:

> Thus, the figural shaping, molding, or carving of space to create the particularized and defined "places" associated with traditional architecture and urbanism, is countered in the free plan by the displacement or interruption of continuous space by figural solids, the disposition of which serves to emphasize the freedom of modern architecture from the constraints of bearing wall construction. As an important corollary, the fusion of a system of structural and spatial modulation and a representational vocabulary that was fundamental to the logic and meaning of the classical language is dissolved in the free plan, which juxtaposes an abstract and rational grid of columns against freely disposed objects that are figural in the sense of both formal gestalt and rhetorical expression.[95]

Since the walls no longer have a supportive function, there appears a great freedom in the space organization of a dwelling. The floor space is free to be re-configured into rooms without any need for supporting walls. The drawings, which Le Corbusier used to present the plan variations of Maison Dom-ino, can be used here to exemplify this opportunity (Figure 2.7). As Reyner Banham states in his conclusion, in the *Theory and Design in the First Machine Age*, "[t]he disposition of the walls was thus left at liberty" in the Dom-ino project.[96]

Mark Wigley refers to Dom-ino as a building system "which rationalizes structure in such a way that all walls become at most light screens, if not curtains, drawn, more or less, across the openings, is a fundamentally Semperian system in which structure is merely the technologically refined but secondary prop, a scaffolding for thin surfaces hung like textiles to define social space."[97]

> Just "a bone structure," as Le Corbusier puts it, a skeleton that is "completely independent of the functional demands." Perhaps it is not

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[95] Ibid.

[96] Reyner Banham, "Conclusion: Functionalism and Technology," in *Theory and Design in the First Machine Age,* (Cambridge: The MIT Press, 1983), 323.

[97] Mark Wigley, *White Walls, Designer Dresses: The Fashioning of Modern Architecture* (Cambridge: The MIT Press, 1995), 186.

> even a skeleton. Perhaps it is really a surrogate body, an empty mannequin on which to hang clothes, decorative surfaces that, like all clothes, project the image of a certain body rather than cover a ready-made one. [98]

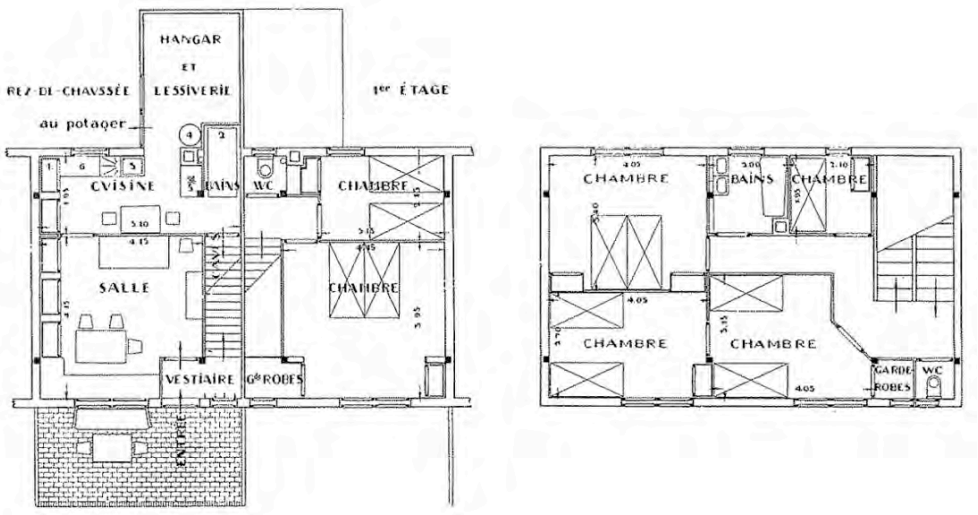

Figure 2.7 **Plan variations of Maison Dom-ino**. Source: Le Corbusier, "Les Maisons Dom-ino," *Oeuvre Complete*, *Volume 1, 1910-29*, edited by W.Boesiger and O.Stonorov (Berlin: Birkhauser Publishers, 2006), 25.

Peter Eisenman sees "free plan of Dom-ino" as "one of the most critical changes ever in the continuous cycle of changes" and such a change "appears to herald a decisive cultural phenomenon: the birth of a Modernist sensibility." [99] About the strong impact Maison Dom-ino created, Jenks states that,

> The 'Dom-ino System' of 1914, a reinforced concrete frame structure, allowed the plan and elevation of the building to be independent of the structure. This naturally led to new aesthetic principles such as the free plan, the free façade and movable partitions. [...] As a visual concept the 'Dom-ino System' exerted a strong impact when it was finally published in the twenties because it presented these properties with a beautiful, logical clarity, as if it were some idealized, Platonic essence of the new architecture.[100]

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[98] Ibid. Wigley quotes Le Corbusier from "Pessac," *L'Architecture Vivante* (Fall 1927): 30.

[99] Eisenman, "Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign," 189.

[100] Jenks, *Le Corbusier and The Tragic View of Architecture,* 42.

2.2.1.4 The Long Window

Since the columns are not placed at the edges of the slabs, but positioned back from the perimeters, and the non-structural partitions could be placed where desired, the elevations could be designed with any shape and size of glazing and solid. As can be seen from the sketches of “the long window”, Le Corbusier preferred to use long strips of ribbon windows, which allow unencumbered views of the surrounding yard (Figure 2.8). This is an opportunity that the reinforced concrete construction system offers. It is not only a formal decision to use long windows, but a careful consideration of the light inside the dwelling (Figure 2.8). Without structural concerns, large expanses of uninterrupted windows could be placed on the façades.

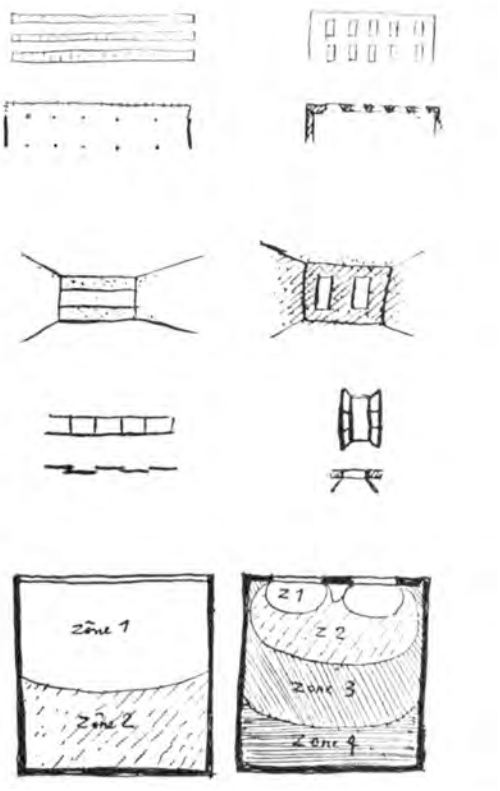

Figure 2.8 **Sketches for the long window**. Source: Le Corbusier, “Les 5 Points D’une Architecture Nouvelle,” Oeuvre Complete, Volume 1, 1910-29, edited by W.Boesiger and O.Stonorov, (Berlin: Birkhauser Publishers, 2006), 129.

2.2.1.5 The Free Façade

With the reinforced concrete construction system, the floors and the slender columns carry the load, and walls become free of their load-bearing function. This naturally gives way to a great freedom in designing the façade of a dwelling. The façade began to be designed as the architect wished, without any structural constraints. The freedom brought forward with the invention of the free façade in the Dom-ino frame also solves the *orientation* and *direction* problems; the changing positions of the units in the clusters never pose a problem or constraint.

Again handling Maison Dom-ino as the exemplary proposal, Vogt asserts that Dom-ino is completely different with its strategies of space and façade organization. He states that,

> [I]f one thinks of the new freedom it gave for a new organization of space on each floor, of the possibility of letting the facade simply hang – that is, if one thinks of what architects call architectural questions – then Dom-ino looked completely different, as if it had a double face, a Janus aspect.[101]

As it is stated before, this thesis argues that modernism in architecture is a *social act*, Dom-ino is a *social practice*, and consequently the "five points" Dom-ino brought forward are *social intentions* that are devoted to modern man. The above discussion of the "five points", besides these social concerns, reveals another significant point that these five points not only form the basis of Le Corbusier's own works, but also of the contemporary architecture. This is one of the most significant reasons why Dom-ino is discussed as a diagram today.

[101] Vogt, *Le Corbusier,* 113.

CHAPTER 3

DISCUSSIONS ON DOM-INO AS A DIAGRAM IN THE WRITTEN TEXTS

As it is stated before, although Dom-ino was preeminently produced as a project that aimed to find a solution to a specific problem, in the course of time it is evolved into an idea or a diagram, which forms a base for a new kind of architecture. The previous chapter elaborates this evolution by focusing on this shift and by mentioning the architectural potentials of a single Dom-ino unit (i.e. the Five Points of New Architecture).

In order to further clarify the shift (*from* a project *to* a diagram), this chapter aims to discuss and highlight how Dom-ino is approached as an idea or a diagram in the written texts. The selected readings are Peter Eisenman's "Aspects of Modernism: Maison Dom-ino and the Self-referential Sign," Eleanor Gregh's "The Dom-ino Idea," and Barry Maitland's "The Grid." Gans mentions that these articles are significant texts to understand how Dom-ino developed as a diagram.[102] They examine and elaborate Dom-ino as the base of a new kind of architecture as this study also does. The purpose here is not to make a literature review, but to concentrate upon different interpretations of the architectural potentials of Dom-ino, and to better understand different approaches to Dom-ino as a diagram, before going into a further analysis in the following chapter, focusing on the clusters of Dom-ino.

[102] Gans, "Le Corbusier: A Biographical Note," 25.

3.1 Peter Eisenman: "Aspects of Modernism: Maison Dom-ino and the Self-referential Sign"

In his article titled "Aspects of Modernism: Maison Dom-ino and the Self-referential Sign", Eisenman defines Dom-ino as a "plan and section diagram" not only because Dom-ino defines "a new Modernist condition of architecture" but beyond that it defines the "certain *minimal conditions for any architecture*."[103] This extremely clear scheme embodies all the potentials of the new architecture that Le Corbusier supported and endeavored.

> As a plan and section diagram, Dom-ino seems rather a simple and straightforward statement. Perhaps for this very reason – its apparently extreme clarity – it is often taken as an icon and a structural paradigm, an example of the potential of the new technology, *a prototypical unit expressing ideas of mass production, repetition, and so on*.[104]

Maison Dom-ino is a structural framework and a base for a new condition of architecture, which "remained conceived by man, representing man and his condition."[105] Eisenman defines Dom-ino as the "canonical spatial diagram" of modern architecture since it was designed with the "spatial concerns of Modern Movement."[106] He argues that the "simplicity and clarity of the diagram" has made a deep impact in the history of modern architecture. [107] The "alteration of space" in Maison Dom-ino announced a "historical rupture."[108] To comprehend this rupture and how Dom-ino achieved it, "the particular configuration of the diagram" should be read "in terms of an *other* condition of representation, an *other* significance, an *other* realm, which exists simultaneously with the accepted interpretations."[109] To mark

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[103] Eisenman, "Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign," 191. Emphasis added.

[104] Ibid. Emphasis added.

[105] Ibid.

[106] Ibid.

[107] Ibid.

[108] Ibid., 189.

[109] Ibid., 191.

this ”otherness,” Eisenman makes an analysis on the basic elements of the Dom-ino diagram (i.e. “the three horizontal slabs, six box-like footings, six linear columns, and one staircase in a primitive geometric configuration”).[110]

> Thus looking now at Maison Dom-ino with a different conceptual spectrum, it is possible to see in the precise selection, size, number, and location of the elements in the Dom-ino diagram the incipient presence of *the self-referential sign*.[111]

Eisenman asserts that structural elements are the “necessary conditions” for building but “not sufficient in themselves to define ‘architecture’.”[112] For him, architecture must be differentiated from geometry, and the structural elements must indicate the signs of their condition in order to be defined as architecture.[113] He argues that “[t]he presence of an intentional sign may be the most important quality, which distinguishes architecture from geometry.” [114] Although the configuration of the structural elements in Dom-ino is initially seen as “the result of necessity rather than any other intention; the columns and slabs are not read as signs, but merely as “integers” of construction,” Eisenman insists that the Dom-ino elements are configured with intentional decisions.[115]

> [L]et us turn now to the original Dom-ino elements and their precise configuration in the Dom-ino diagram. If we analyze this configuration we begin to see that the elements together with their precise size and location exhibit an articulate level of intentionality. [116]

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[110] Ibid., 191-192.

[111] Ibid., 191. Emphasis added.

[112] Ibid., 192.

[113] Ibid., 192-193.

[114] Ibid., 193.

[115] Ibid.,192.

[116] Ibid., 193.

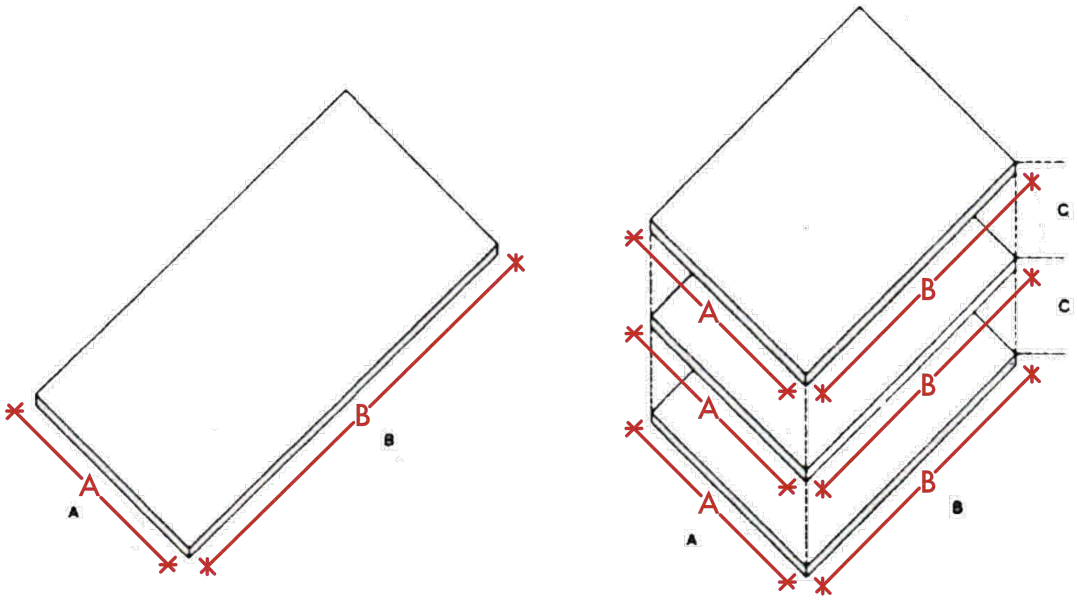

Figure 3.1 **First self-referential sign: the A B relationship of the horizontal slabs of Maison Dom-ino**. Source: Peter Eisenman, "Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign," *Oppositions Reader,* ed. K. Michael Hays (New York: Princeton Architectural Press, 1998), 190. Edited by the author.

There is an A B relationship, of end to side, in the horizontal slabs of Dom-ino (Figure 3.1). Eisenman argues that initially, it cannot be known if this A B relationship is intentional.[117] The intentionality "cannot be seen in the configuration of the slab alone, but in the relationship of the slab to columns" (Figure 3.2).[118] The relationship of the elements shows that their arrangement is not coincidental.

> The fact that the three pairs of columns are set back at an equal distance from the long sides while on the ends they coincide with the edge of the slab provides the clue to the fact that they are more than simple geometrical notations. [119]

[117] Ibid.

[118] Ibid.

[119] Ibid.

There is an a b relationship of the columns to the edge of the slab in Dom-ino. Eisenman indicates that there may be other possible alternatives for this relationship but "only one of these possibilities is in fact the case"[120] (Figure 3.2). For him, there is an intention in this special configuration; the existing a b relationship can be seen to reinforce the "difference between side A and side B,"[121] and this is one of those signs that he mentions.

> [W]e must assume an *intentionality* in the particular configuration with respect to all other permutations, and insist that the precise location of the columns with respect to the slab reveals the presence of an intention to treat the column-slab relationship as a sign and the precise location of the columns as a mark of that intention. [122]

The a b relationship of the columns to the edge of the slab reinforces the A B relationship of the slab, "*which in itself is so clear as not to need reinforcement*."[123] This additional reinforcement indicates that "there is something other than either the geometry or the function of the column and slab."[124] Eisenman states that the location of columns is a "special marking", which could be evaluated as the first "self-referential statement"[125] of the Dom-ino diagram.

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[120] Ibid.

[121] Ibid., 194.

[122] Ibid. Emphasis added.

[123] Ibid.

[124] Ibid.

[125] Ibid.

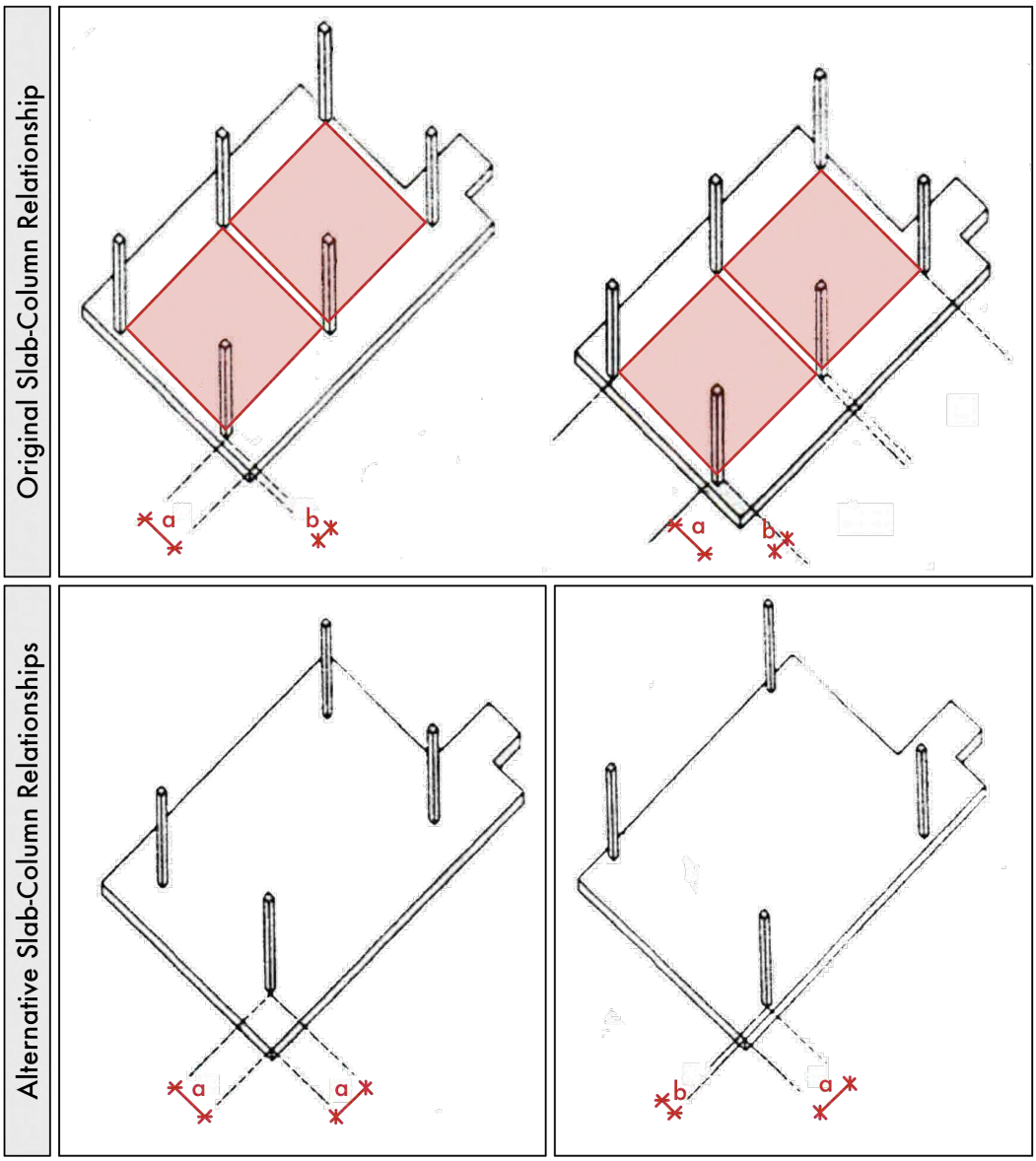

Figure 3.2 **First self-referential sign: the a b relationship of slab to columns in Maison Dom-ino**. Source: Peter Eisenman, "Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign," *Oppositions Reader,* ed. K. Michael Hays (New York: Princeton Architectural Press, 1998), 192. Edited by the author.

Eisenman evaluates "horizontal extension" as the second self-referential aspect of the Dom-ino diagram.[126] The location of the columns reveals this self-referential nature. He explains that the setback of the columns from the long sides suggests that the long sides of the slabs are "complete and will not grow"; at the same time

[126] Ibid.

the columns, which coincide with the edges on the ends of the slab, further suggest that "the ends of the slab have been cut off, implying the possibility, or former condition, of the horizontal extension of the slab on the long axis" (Figure 3.3).[127] Eisenman asserts that the differentiation of the extension in both directions of the horizontal axis (i.e. the longitudinal and the lateral vectors of the plane) is "what is being marked," and in this sense it is self-referential. [128]

> [T]he horizontal plane becomes a datum carrying the idea of both an infinite *extension* of space in longitudinal vectors and the denial of the same proposition in lateral vectors. [129]

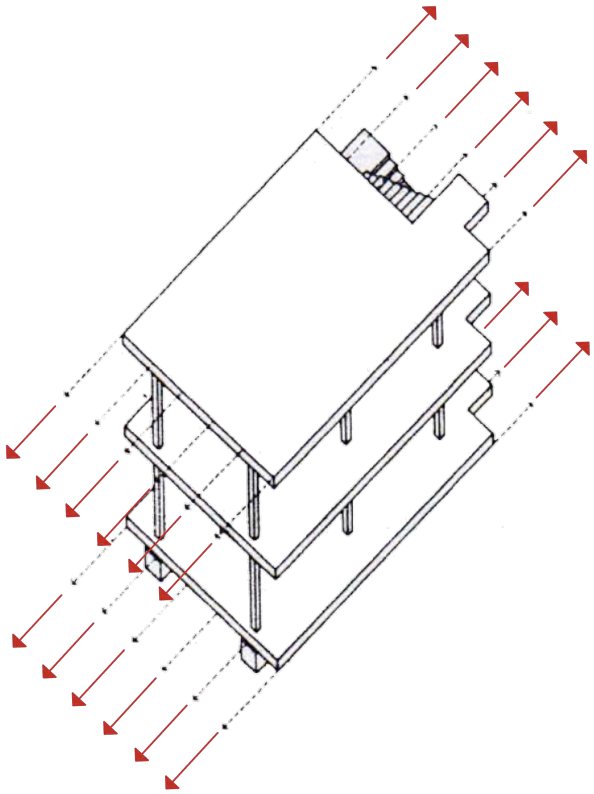

Figure 3.3 **Second self-referential sign: the horizontal extension in Maison Dom-ino**. Source: Peter Eisenman, "Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign," *Oppositions Reader,* ed. K. Michael Hays (New York: Princeton Architectural Press, 1998), 195. Edited by the author.

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[127] Ibid., 195.

[128] Ibid.

[129] Ibid.

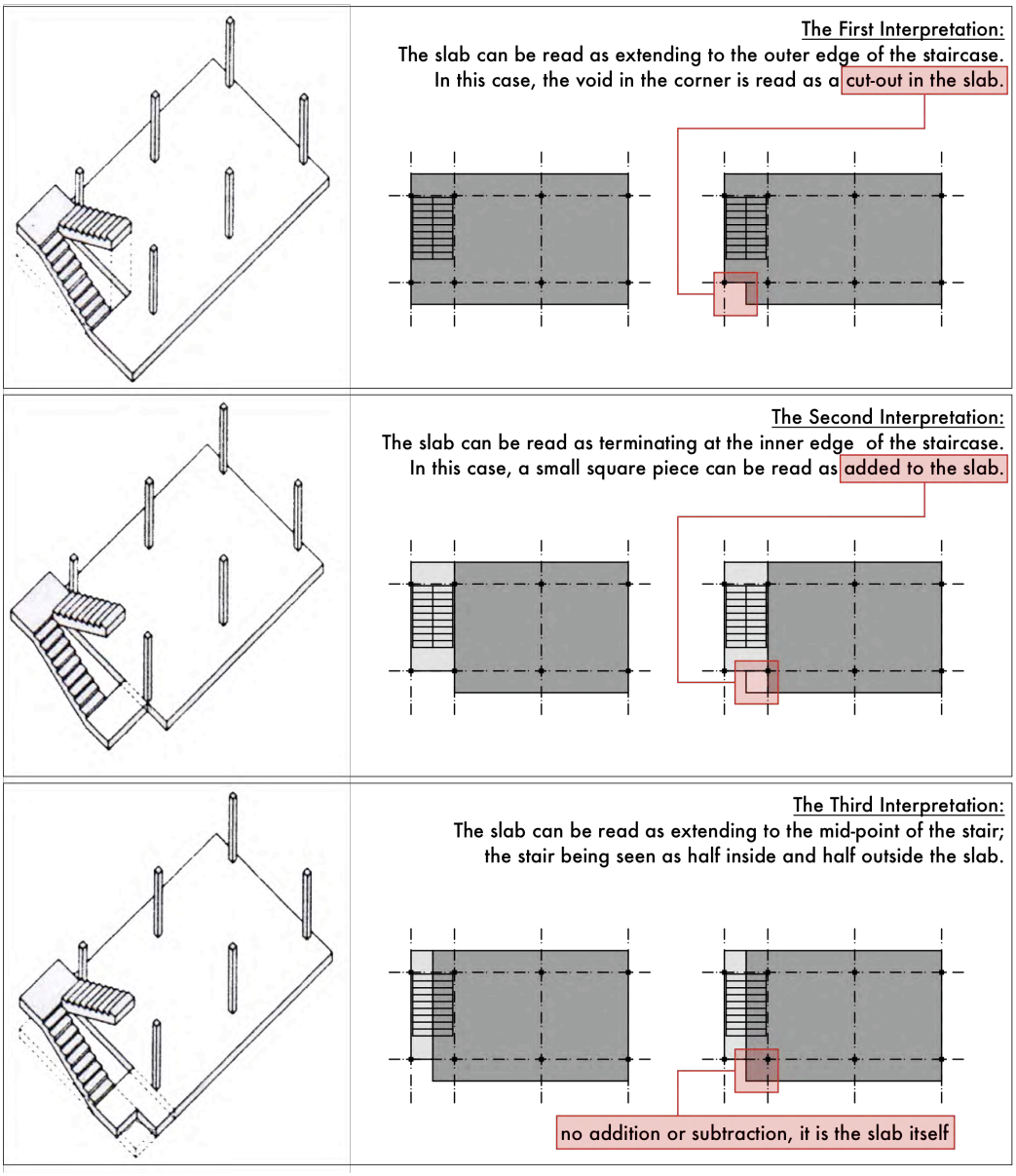

Figure 3.4 **Third self-referential sign: the three interpretations of the staircase in Maison Dom-ino**. Source: Peter Eisenman, "Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign," *Oppositions Reader,* ed. K. Michael Hays (New York: Princeton Architectural Press, 1998), 196. Edited by the author.

Eisenman indicates the "particular location of the staircase with respect to the slab" as the third self-referential notation.[130] Although he mentions that the staircase is the "element by which the units clip together," and the location of the staircase is always

[130] Ibid., 196.

assumed to be derived from this intention; he writes that different kinds of interpretations are possible.[131] He draws and explains three different interpretations of this relationship to indicate the self-referential notation (Figure 3.4).

> First, the slab can be read as extending to the outer edge of the staircase […]; in this case, the void in the corner is read as a cut-out in the slab. Second, the slab can be read as terminating at the inner edge of the staircase; in this case, a small square piece can be read as added to the slab […]. Third, the slab can be read as extending to the mid-point of the stair; the stair being seen as half inside and half outside the slab […].[132]

For him, the actual location of the staircase in relation to the slab "establishes a sign notation which calls attention to the actual addition and subtraction", and refer to the "nature of the horizontal surface itself".[133]

The final self-referential notation, mentioned in the text, is the configuration of the "six square base elements in relation to the first horizontal slab." [134] Eisenman sees the size, shape, and location of the six footings something more than support, because there are again other possible configurations. For example, "the slab could have been set on the ground" but it is raised on these six square base elements in order to be differentiated from the ground (Figure 3.5).[135] The distinction between the ground and the bottom slab was something intentional. Another possible configuration for raising the bottom slab on the ground could be to "continue the columns through the lower slab as *pilotis*", but this time there would be no distinction between the top and bottom of the slab (Figure 3.5).[136] Columns become "block-like elements" under the bottom slab, in order to mark that the lower slab is "something

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[131] Ibid.

[132] Ibid.

[133] Ibid.

[134] Ibid., 196.

[135] Ibid.

[136] Ibid.

other than the two upper slabs". [137] This marking indicates that the intention here was something more than structural, thus it is self-referential.

> They function, but at the same time they *overcome* their function, an idea which begins to suggest another primitive condition for an architecture. [138]

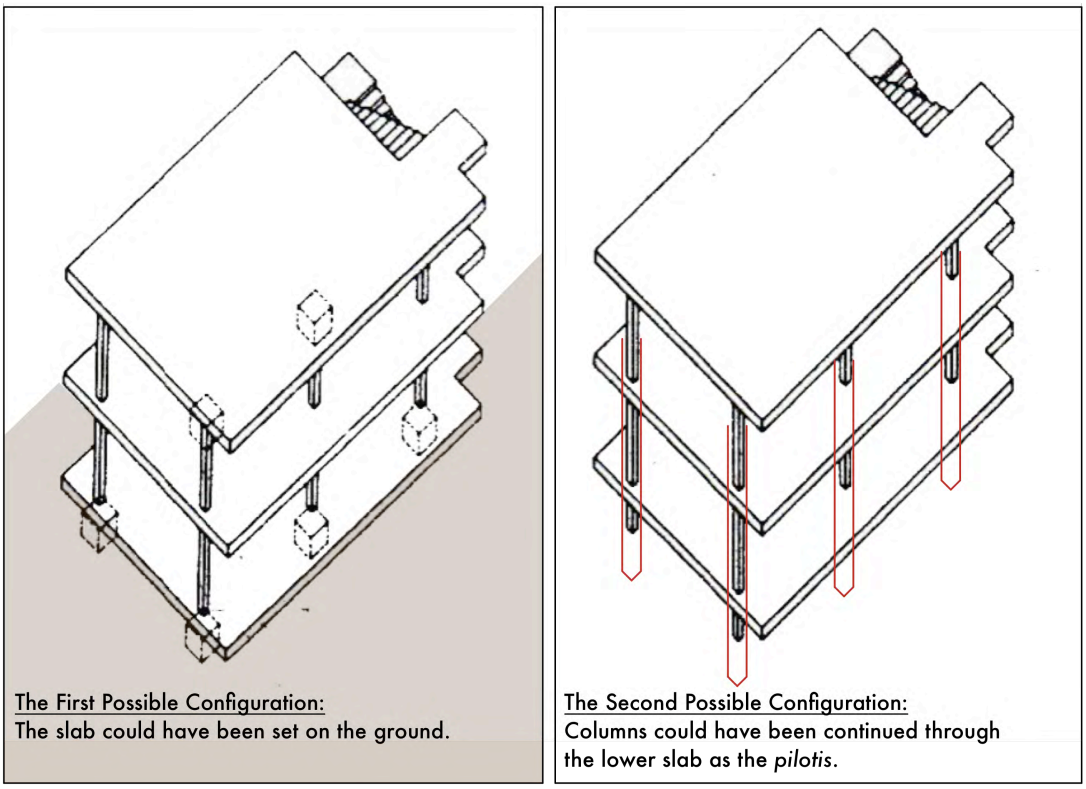

Figure 3.5 **Final self-referential sign: the possible configurations for the footings in Maison Dom-ino**. Source: Peter Eisenman, "Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign," *Oppositions Reader,* Ed. K. Michael Hays (New York: Princeton Architectural Press, 1998), 196. Edited by the author.

For Eisenman, Dom-ino is "truly Modernist" with its "aspect as a self-referential sign," and "its existence as *an architecture about architecture*."[139]

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[137] Ibid.

[138] Ibid.

[139] Ibid., 191.

> In this sense the Maison Dom-ino is a sign system which refers to this most primitive condition of architecture, which distinguishes it from geometry, or from geometry plus use and meaning. But more importantly in this context, the Maison Dom-ino can be seen to reflect a Modernist or self-referential condition of sign, and thus a true and seminal break from the four hundred year old tradition of Western humanist architecture. [140]

In his article Eisenman insists that the existence of the "intentional act" distinguishes architecture from building.[141] His analysis on the basic elements of the Dom-ino diagram, and on their precise selection, size, number, and location shows that they are configured with intentional decisions. For Eisenman, this intentionality in the particular configuration of the Dom-ino elements reveals a sign notion that is the mark of that intention; therefore, he defines Dom-ino as a "*self-referential sign*".[142] He examines Dom-ino in order to discover and prove the existence of these signs. Considering the argument of this thesis, the important point in his text is that the analysis of the basic elements of Dom-ino indicates an intentionality that differentiates Dom-ino from a single building and makes it an *architectural diagram* that defines *the minimal conditions for any architecture*. Eisenman defines the impact of this simple and clear diagram in the history of modern architecture as a "historical rupture" and makes his analysis in order to discover this rupture and how Dom-ino achieved it.[143] In this respect, Eisenman's text is a significant reference for this study, because it explains and illustrates the way Dom-ino diagram manifests self-referential statements (about the location of the columns, the horizontal extension, the location of the staircase and the location of six square base elements), and points out that Dom-ino is a *simple*, *straightforward*, and an *extremely clear canonical spatial diagram* expressing the potentials of the *new technology*, and ideas of *mass production, repetition, and so on*. [144]

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[140] Ibid., 198.

[141] Ibid., 197.

[142] Ibid., 191. Emphasis added.

[143] Ibid., 189.

[144] Ibid., 191. Emphasis added.

3.2 Eleanor Gregh: "The Dom-ino Idea"

In her article, "The Dom-ino Idea", Gregh discusses the Dom-ino system as Le Corbusier's "point of departure for realizing an ideal and personal vision of a new architecture in new materials."[145] She argues that the architectural potentials attributed to Dom-ino reduce the limits to a minimum on "architect's freedom to design", because the elements of architecture is liberated from the exigencies of structural necessity.[146] Lack of restrictions in the organization of the interior space and façade provides architect maximum freedom in design, since the slender columns carry the full structural load alone, and do not appear on the façade.

However, Gregh believes that seeing the Dom-ino idea only as the liberation of the design process is inadequate, though it is true.[147] As stated in the previous chapter, she discusses the idea as both a "*beginning*" and an "*end*" for Le Corbusier, because it is related to both his past and future thinking.[148] Dom-ino gathered up the "ideas, attitudes, and aspirations" that had preoccupied Le Corbusier over many years, and "oriented him toward future".[149] Gregh argues that the Dom-ino idea manifests itself in "Le Corbusier's subsequent architectural development." [150] She writes in detail about the way Le Corbusier worked for the idea; the association planned between Du Bois, Le Corbusier and E.L. Bernand, and the efforts for registering the patent of the idea.[151] She argues that Le Corbusier's attempt to establish a firm, which is "ready to branch out into other kinds of architectural

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[145] Gregh, "The Dom-ino Idea," 61.

[146] Ibid.

[147] Ibid., 61-62.

[148] Ibid., 62.

[149] Ibid.

[150] Ibid., 71.

[151] Ibid., 68. Gregh drives these from the notes of Jeanneret in his undated sketchbook, which he fills with notes and drawings of the Dom-ino project. Du Bois was assumed to be the administrative control, Le Corbusier as the consultant architect, and E.L. Bernand as the third collaborator.

activity," indicates his belief in the *generic* nature of Dom-ino.[152] With an approval from Auguste Perret about the Dom-ino system's *suitability* and *adaptability* to all building types, Le Corbusier decided that Dom-ino would be the "key" to *unity* in urban design.[153]

> In working on the drawings for the sales brochure, Jeanneret has been enlarging and clarifying the Dom-ino concept, making exciting discoveries. The system, he tells Du Bois, will make it possible to design villas on a grand scale at the current price of workers' housing, and will, become the basis of an architecture that can be expanded into urban design. Standardized elements (including windows, doors, gates, etc.) are the key to *order* and *diversity* in modern design: "*Order, rhythm*, and *unity* reign in our invention." [154]

In her article, Gregh defines Dom-ino as the "synthesis of many ideas" that Le Corbusier held over for a long period.[155] The design and manufacture of standardized elements, the use of the new building materials and the building technique, the idea of erecting the whole buildings and even towns with the basic frame suggested by Dom-ino, and the concern for the new social dimension of modern architecture prove the complexity of the project.[156] It is the basis of a new architecture; a discovery that embodies "*order", "rhythm", "unity",* and "*diversity"* in Le Corbusier's own words.[157]

The "reduction of the building to a few standardized elements" (i.e. six equidistant footings, six columns, three rectangular slab, and the stair element) is a new design method and a new way of construction, which provides the basis for new models of

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[152] Ibid. Gregh drives these from the notes of Jeanneret in his undated sketchbook, which he fills with notes and drawings of the Dom-ino project.

[153] Ibid., 67. Also see endnote 28 on page 81.

[154] Ibid., 70. Emphasis added. Gregh quotes Le Corbusier from his undated letter to Du Bois.

[155] Ibid.

[156] Ibid., 71-72.

[157] Ibid., 70. Gregh quotes Le Corbusier from his undated letter to Du Bois.

organization.[158] This housing scheme, which lays the foundations of the new architecture he supported, is so simple and straightforward that it imposes nothing. Le Corbusier thought that the Dom-ino idea could be the "basis of a revolution."[159] This radically new diagram does not provide a specific solution to a problem, but lays down "the principles for a solution." [160]

In her article, Gregh discusses Dom-ino as a *framework* and a *base* for the new architecture, which Le Corbusier supported and worked for. It is not hard to educe from these words that the Dom-ino diagram primarily manifests itself in Le Corbusier's own architectural practices. Dom-ino system's *suitability* and *adaptability* to all building types, discussed in Gregh's text, indicates that the Dom-ino diagram would be the *"key" to unity* in urban design with its *generic* nature.[161] In this respect, Gregh's article reinforces the argument of this study, which insists that Dom-ino is an interpretable skeleton that is adaptable for changing needs. Considering the assertion of this thesis, another significant point in Gregh's text is that the analysis of the Dom-ino frame demonstrates that it is designed with the *economic, industrial, technical* and *sociological* aspects of design. This fact either corroborates this study, because the thesis also insists that the Dom-ino frame is designed with an awareness of the necessities and new conditions appeared in the new period. Consequently, Gregh's text is an important reference for this thesis, because it clarifies how Dom-ino works as *a generic frame* that is *suitable* and *adaptable* to all building types, and discovers the way Dom-ino *reduces the limits*, and *maximizes the freedom* in design.

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[158] Ibid., 61.

[159] Ibid., 71. Du Bois mentions this in a letter he wrote to Gregh, in 16 August 1978.

[160] Ibid., 79.

[161] Ibid., 67. Also see endnote 28 on page 81.

3.3 Barry Maitland: "The Grid"

Barry Maitland discusses "grid" in his article, because "the establishment of a frame of reference of some kind must be a basic action in the making of an ordered architectural language or world."[162]

> In its usual sense the word "grid" suggests something of a geometric nature, as in 'planning grid', 'structural grid', 'gridiron'. Here, however, it is intended to use the word in a wider sense to cover any idea, which has this function: to *select, relate, fix*, or otherwise *order a set of particulars or possibles*.[163]

Before going into a further analysis of the structural grids of Le Corbusier's domestic buildings, Maitland makes a quotation from Antoine de Saint-Exupéry, and relates it to Le Corbusier's ideas on industry and architecture.[164] In his description of an aircraft, Saint-Exupery states that,

> It is as if there were a natural law which ordained that to achieve this end, to refine the curve of a piece of furniture, or a ship's keel, or the fuselage of an airplane, until gradually it partakes of the elemental purity of the curve of the human breast or shoulder, there must be the experimentation of several generations of craftsmen. In anything at all, *perfection is finally attained not when there is no longer anything to add but when there is no longer anything to take away*, when a body has been stripped down to its nakedness … so that in the end there is no longer a wing hooked to a framework but a form flawless in its perfection, completely disengaged from its matrix, a sort of spontaneous whole, its parts mysteriously fused together and resembling in their unity a poem.[165]

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[162] Barry Maitland, "The Grid", 91. Barry Maitland was born in 1941, in Scotland. He is an Australian author of crime fiction. After studying architecture at Cambridge, Maitland practiced and taught in the UK before moving to Australia, where he became a Professor of Architecture in the University of Newcastle. He retired in 2000 and took up writing full-time.

[163] Ibid., 91. Emphasis added.

[164] Antoine de Saint-Exupéry (29 June 1900-31 July 1944) was a French writer and aviator. He was a successful commercial pilot in France on the outbreak of war.

[165] Maitland, "The Grid," 95. Emphasis added. Maitland takes this quotation from Antoine de Saint-Exupéry; from his book *Terre des Hommes* (Paris: Galimard, 1939).

Maitland relates Saint-Exupéry's description of the aircraft to Le Corbusier's architectural point of view. Le Corbusier asserts that this description is "as true for the airplane as for the steamship," and for the "motor car."[166] "But what about modern architecture?" he says; for him, "it is the problem of the *house* […] to which these principles must be first applied."[167] Most probably because he works for the perfection of the house, he comes up with the Dom-ino frame that reduces the elements to a minimum (i.e. six columns, six footings, three slabs, and a stair), in which there is no longer anything left to take away. Simplicity is one of the principles Le Corbusier admires and applies in his buildings. In considering the existence of such principles in Le Corbusier's domestic projects of the twenties, Maitland states that "the idea of the grid" should be taken as a "theme of development" for his buildings.[168]

In his analysis of the Dom-ino frame, under the subtitle "*The Evolution of the Dom-ino Paradigm*", Maitland discusses Dom-ino as a "structural diagram" that is developed after a long period of "experiment", and of "specific clarification." [169] He argues that the investigation of the frame "*was not* […] *confined to the structural implications of the diagram*," and refers to Colin Rowe's emphasis on the Dom-ino frame's "major role in developing *the formal system of modern architecture*." [170] For him, the Dom-ino structure is "a *disciplining frame of reference* to a system of non-load bearing walls." [171] The specific structural grid of Dom-ino is not used with its exact dimensions in Le Corbusier's buildings, but distorted and rather interpreted.

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[166] Ibid.

[167] Ibid. Emphasis added.

[168] Ibid.

[169] Ibid. The long period of "experiment" and "specific clarification" mentioned here was Le Corbusier's description. Maitland takes this quotation from Le Corbusier, from his book *Oeuvre Complete 1910-1929* (Berlin: Birkhauser Publishers, 2006): p. 23.

[170] Ibid. Emphasis added. Colin Rowe defines Dom-ino as a frame developing the formal system of modern architecture, in his article "Chicago Frame-Chicago's Place in the Modern Movement," *Architectural Review* (Nov. 1956): 285-289.

[171] Ibid. Emphasis added.

> […] Le Corbusier does not maintain the column grid in its pristine form, but rather distorts it so that each of his buildings has its own specific grid.[172]

Maitland makes an analysis on the structural grids of the particular domestic projects of Le Corbusier, as a continuation of the specific structural grid initiated by the Dom-ino frame. He does this analysis in order to understand the logic of the distortions of the grids mentioned above but he insists that "the deformations of the structural grid cannot be considered in isolation, and that the analysis of the buildings must read as a kind of history of the relations between all the systems involved."[173] For Le Corbusier, "structural, volumetric, circulatory, and geometric" systems (i.e. "the *structural skeleton*, the *volumes of the building* defined by their own system of walls independent of the structure, the *circulation system* […], and finally a *proportional or geometric system* demanded by the building as a whole") are "the 'elements' from which he builds the complex dialectics of his house designs."[174] For the geometric element, Maitland makes an analogy with the human body.

> The geometric element may be thought of as being analogous to the way in which *a complex and asymmetrical system of organs* is contained within a relatively *simple and symmetrical form*, imposed by demands made upon the complete organism.[175]

Maitland states that such a "geometric discipline" is performed upon the building as a whole in Le Corbusier's work, and one important aspect of this geometric order is the "regulating line." [176] The fact that Le Corbusier devotes one chapter to the subject (i.e. "Regulating Lines") in *Towards a New Architecture* shows the importance of the issue for him. For Le Corbusier, a regulating line confers a "quality

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[172] Ibid., 95.

[173] Ibid., 97.

[174] Ibid., 96. Emphasis added.

[175] Ibid. Emphasis added.

[176] Ibid..

of rhythm" on the work, which leads to a satisfaction of an order.[177] As Maitland also mentions, Le Corbusier describes the regulating line as "an inevitable element of architecture." [178]

> The regulating line brings in this tangible form of mathematics, which gives the reassuring perception of order. The choice of a regulating line fixes the fundamental geometry of the work; it fixes therefore one of the "fundamental characters." The choice of the regulating line is one of the decisive moments of inspiration, it is one of the vital operations in architecture. [179]

Le Corbusier writes, in *Towards a New Architecture,* that "a unit gives measure and unity" while "a regulating line is a basis of construction and satisfaction."[180] Maitland mentions that this duality between "measure and rhythm […] might be taken as the relationship between the systems of structure and geometry." [181]

> On the one hand there is the even measure of the *grid*, providing a *repetitive series of units*, *columns and bays*; on the other, the particular *rhythms*, or *regulating lines*, adopted for the specific work.[182]

Maitland states that it is "worth considering the Dom-ino diagram more closely", because all of the four characteristics stated above, namely structural, volumetric, circulatory, and geometric systems, are already involved in the diagram.[183] Le Corbusier implied "the character of the new elements", and "the horizontal floor slabs supported on vertical columns" first time in the structural skeleton of Dom-ino but Maitland argues that the "drawings show more than a structural idea."[184]

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[177] Le Corbusier, *Towards a New Architecture*, 75.

[178] Ibid., 67.

[179] Ibid., 75.

[180] Ibid., 72.

[181] Maitland, "The Grid," 96.

[182] Ibid.

[183] Ibid., 98.

[184] Ibid..

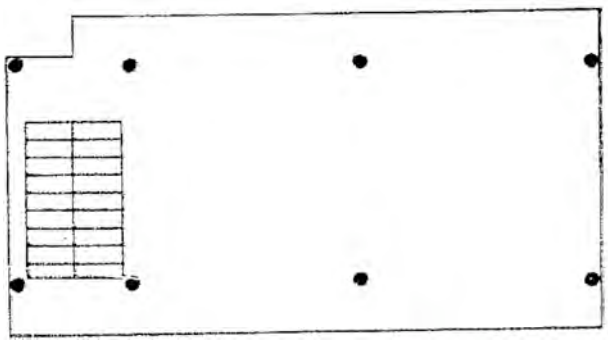

Figure 3.6 **The diagrammatic plan of the Dom-ino structure**. Source: Barry Maitland, "The Grid," *OPPOSITIONS 15/16*, Winter/Spring, The MIT Press, 1979, 97.

Maitland analyses the plan of the Dom-ino diagram in two parts (Figure 3.6). The first part consists of "two large square bays, defined by columns and the side-cantilevered projections of the floor slab," which would "house the main rooms of the building."[185] The second part is "a narrow half-bay lying at one end of the first part," which is devoted to the stairs that "serve as the building's system of vertical circulation." [186] In reference to this specific structural system, Maitland makes an analysis with respect to the other three characteristics (i.e. volume, circulation, and geometry), and argues that each of these characteristics is "quite distinctive, and typical of the series of buildings" he considers.[187]

In connection to the first characteristic (i.e. the volume), Maitland mentions that the "double square of the living quarters" in Dom-ino could also be seen in the plan of a "primitive temple" Le Corbusier illustrated in *Towards a New Architecture* mentioning that it is the same spirit whether it is the plan of a house, or the plan of a temple (Figure 3.7). [188]

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[185] Ibid.

[186] Ibid.

[187] Ibid.

[188] Ibid.

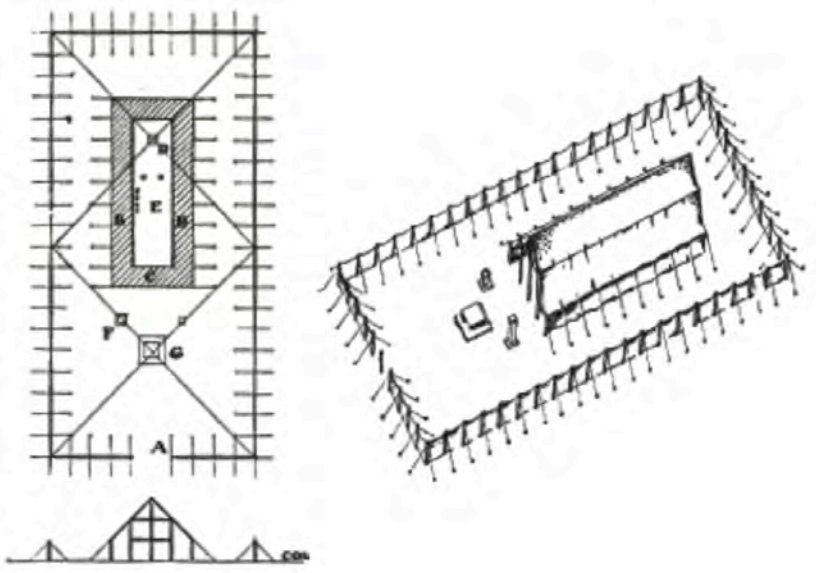

Figure 3.7 **The plan and perspective of a primitive temple.** Source: Le Corbusier, Towards a New Architecture, trans. Frederick Etchells (New York: Dover Publications, 1986), 75.

The second characteristic (i.e. the circulation), namely the end-half bay with stairs, is the first distortion of the regular grid. In order to explain the reason behind this distortion, Maitland refers to Mies van der Rohe's domestic projects. He mentions that although there is a "strict adherence to a regular column grid" in Mies' projects, which are "single story structures in which the problem of the staircase does not arise," there is an independent treatment of the stair from the column and slab system in the multi-storey structures of Mies (e.g. the Weissenhof apartments and the Tugendhat house).[189] In other words, the distortion of the regular grid is inevitable if there is a vertical circulation element in the building.

With respect to the third characteristic (i.e. the geometry), taking the width of the narrow bay as a module, Maitland indicates that "the proportion of the building in plan is dictated by the geometry of a rectangle measuring three by five modules" (Figure 3.8).[190] For Maitland this plan proportion is determined in order to fix the

[189] Ibid.

[190] Ibid.

fundamental geometry of the work.[191] He infers a “planning grid within this rectangle, three square bays by five, providing the "measure" for the "rhythm" of the golden section rectangle” (Figure 3.8).[192] Maitland argues that the preferred rhythm is the “golden section” in Le Corbusier’s rectangular gridded buildings.[193] Another point in the layout of the geometrical organization of Dom-ino is that the cantilevered parts share a common module by half (Figure 3.8). Maitland discusses this non-alignment of column and plan grids as an intentional decision, in order to “place the two rows of columns symmetrically about the long axis of the rectangle,” and mentions that this is the dropping of the traditional notion of alignment.[194]

In his analysis, Maitland divides the structural grids of the particular examples of Le Corbusier into two types, which are concurrently developed. He defines the first grid-type as the “golden section rectangle,” and the second as the “square.”[195] He makes such a differentiation of the two schemes in order to understand the characteristics of these different methods (i.e. the golden section rectangle grid-type, and the square grid-type) more clearly, in reference to each other. The golden section rectangle grid-type in his article refers to the interpretations of the Dom-ino’s structural grid, and the square grid-type refers to a totally different system. For the golden section rectangle grid-type housing projects, Maitland analyses the Citrohan project (1922), villa at Weissenhof Siedlung in Stuttgart (1927), the third composition of the Four Compositions of Le Corbusier, and villa at Garches; and for the square grid-type projects, the Artisans’ dwellings project (1924), the Immeuble-Villas project (1922), Villa Meyer (1925), Maison Cook (1926), and Villa Savoye at Poissy (1928) are analyzed.

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[191] Ibid., 99.

[192] Ibid.

[193] Ibid., 96.

[194] Ibid.

[195] Ibid., 104.

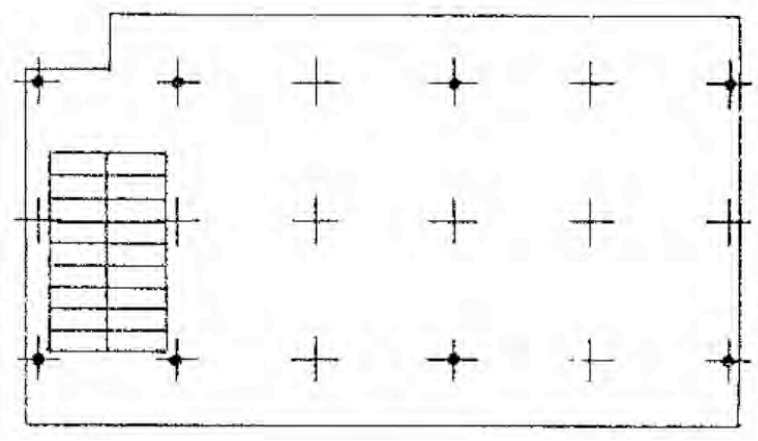

Figure 3.8 **Non-alignment of planning and the structural grids of the Dom-ino diagram**. Source: Barry Maitland, "The Grid," *OPPOSITIONS 15/16*, Winter/Spring, The MIT Press, 1979, 97.

Maitland analyses these projects in terms of their structural grids, and in reference to the basic grid of the Dom-ino frame. He argues that the structural grids of the rectangle grid-type examples are the interpretations of the Dom-ino grid. For example, he mentions that all of the elements, which he has discussed in the Dom-ino house (i.e. a column and slab structure, a plan rectangle three bays by five, a double square for living quarters, and a side bay for stairs and circulation), exist in the Citrohan project of 1922, but the elements "have been rearranged and the previous symmetry abandoned."[196] Another example that Maitland elaborates as an interpretation of the Dom-ino grid is the villa at Garches. Both the plan rectangle, and the elevations of the building have the "approximate golden section proportions" (i.e. five by eight bays).[197] Maitland states that this "significant proportion", and "the basic grid of the villa" is the same as that of the Dom-ino or Citrohan houses.[198] For these reasons, he discusses villa at Garches as the "most elaborate example of the grids developed through the Dom-ino and Citrohan houses."[199]

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[196] Ibid., 99.

[197] Ibid., 102.

[198] Ibid.

[199] Ibid., 104.

After a detailed analysis of the rectangle grid-type, Maitland continues with the square grid-type examples, and analyses the projects comparatively with the first type. Through this comprehensive analysis and comparison of the two families of grid-types, Maitland discovers that "their differences become immediately apparent."[200] This difference stressed by Maitland is essential to this thesis in order to better clarify design potentials of Dom-ino clusters. He defines the rectangle grid-type as "*not specific*," because the rectangular grids solve the problem (i.e. the particular demands of each site and building) on "a general level" and can be applied to *any building* in which the locations of columns is estimated.[201] However, for the square grid-type Maitland discovers that each particular example has its own "*specific*" grid.

> With the first group we could proceed in an almost determinist fashion, defining first the systems and then their consequences, and finally arriving at a grid which was *not specific*, if by this is meant something dependent on the particular demands of each site and building. Rather, the rectangular grids solved the problem on a general level and could then be applied to a range of particular buildings in which the position of each column was predictable. The second series could not be considered in this way […]. Each building […] had its own grid, quite orderly and geometric, but nevertheless quite *specific* as to its content.[202]

To reinforce his argument, Maitland exemplifies the situation, and compares the villas at Garches and Poissy (Villa Savoye). He remarks that "the grid of the former is at first complex and irregular but, once recognized, *predictable and repetitive*, while that of the latter is first established around its periphery as simple and regular and then allowed, within this general framework, to become *unpredictable and specific*." [203]

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[200] Ibid., 107.

[201] Ibid.

[202] Ibid.

[203] Ibid. Emphasis added.

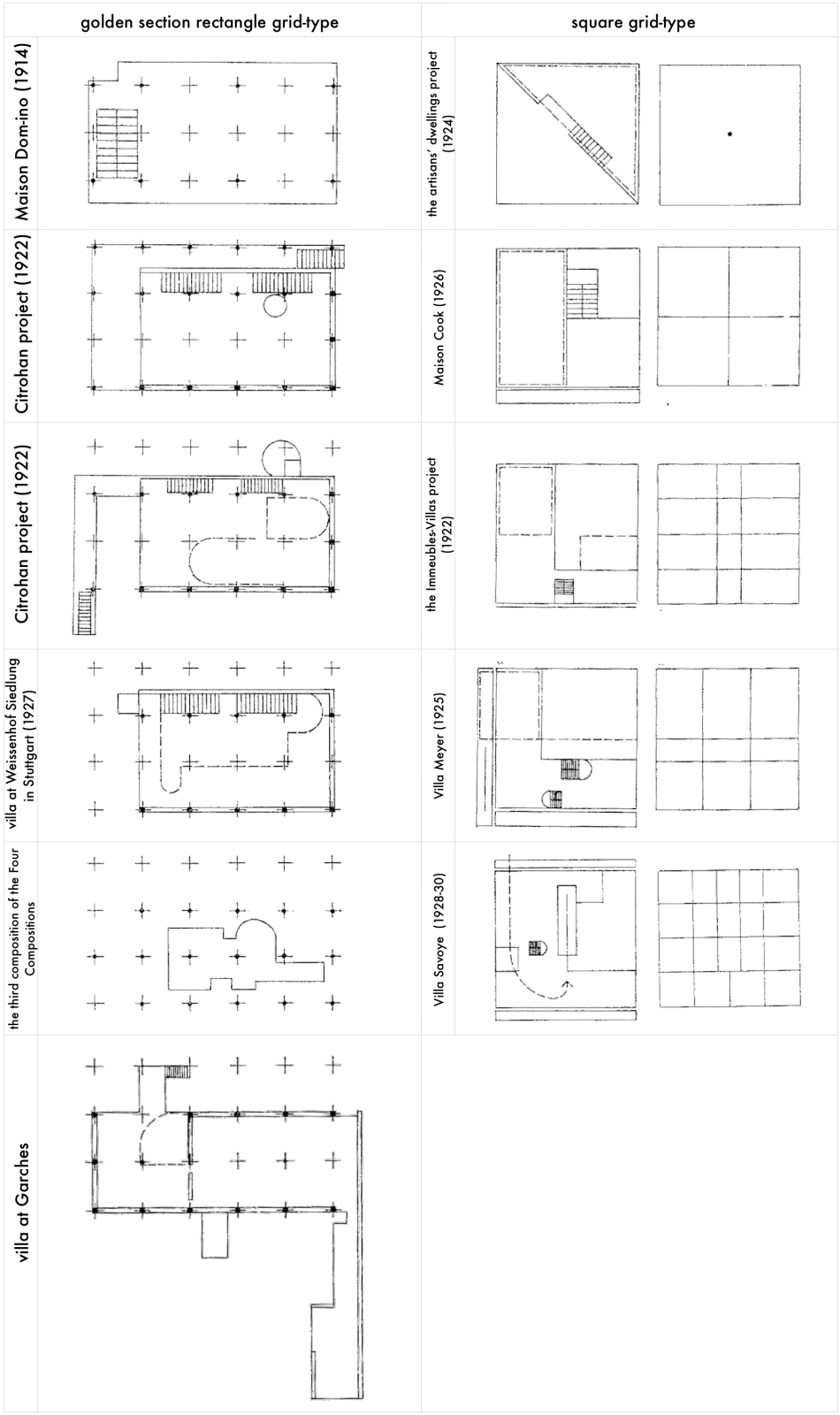

Figure 3.9 **Structural grids of Le Corbusier's particular domestic buildings and the differentiation of the plans under two grid-types**. Source: Barry Maitland, "The Grid," *OPPOSITIONS 15/16*, Winter/Spring, The MIT Press, 1979, 98-105. Arranged by the author.

In his article, Maitland explains and illustrates different possible distortions in the regularity of the structural grid, and insists that these possibilities may be "extended beyond the work of Le Corbusier to clarify more generally the processes by which an *architectural language* is constructed." [204] Considering the argument of this thesis, the important point in Maitland's text is that the analysis of Le Corbusier's particular domestic projects indicates that the rectangular grid-type initiated by Dom-ino is *generic, predictable* and *repetitive*, which could then be applied to any building. The interpretations and different uses of Dom-ino's structural grid in the further projects of Le Corbusier show that Dom-ino forms a framework for his other buildings. In this respect, Maitland's text is an important reference for this study, because it demonstrates the way Dom-ino acts as a structural diagram, and points out its *non-specific* and *generic* quality.

3.4 Evaluation of the Selected Texts in Relation to the Thesis' Problem

Each of these three articles, discussed above, performs a totally different way for discussing Dom-ino as an idea or an architectural diagram. In order to prove their arguments, Peter Eisenman analyzes the precise selection, size, number, and location of the basic elements of Dom-ino; Eleanor Gregh digs out the chronology of the project, and lastly Barry Maitland analyzes the structural grid of Dom-ino and searches for the continuation of the specific structural grid initiated by the Dom-ino frame in the domestic projects of Le Corbusier. Although the way they analyze Dom-ino differs from each other, all of the three texts argue the diagrammatic potentials of Dom-ino. For instance, both Eisenman and Maitland discuss Dom-ino as a diagram but Eisenman calls Dom-ino "a plan and section diagram" or "the canonical spatial diagram," while Maitland calls it "a structural diagram."

All of the three interpretations refer to the *simplicity* of the Dom-ino frame; Eisenman discusses Dom-ino as a "simple," "straightforward," and an "extremely clear"

[204] Ibid., 117. Emphasis added.

statement, which defines "certain minimal conditions for any architecture," [205] Gregh mentions "the reduction of the building to a few standardized elements" [206] by Dom-ino, and finally Maitland refers to the quotation by Antoine de Saint-Exupéry, "perfection is finally attained not when there is no longer anything to add but when there is no longer anything to take away," [207] which Le Corbusier admired and applied in his house designs, most probably to the Dom-ino frame.

Another common point in the three articles is that they all examine and elaborate Dom-ino as the *base of a new kind of architecture*, which is accepted as a break in the history of architecture, due to the fact that it synthesizes a wide range of fresh and recent ideas. Eisenman deals with Dom-ino as an "example of the potential of the new technology," and "a prototypical unit expressing ideas of mass production, repetition, and so on," [208] which announced a "historical rupture" [209] in architecture, Gregh mentions Dom-ino as Le Corbusier's point of departure for realizing "a new architecture in new materials," and discusses Dom-ino as the "synthesis of many ideas" such as economy, industry, technique, and sociology, [210] and lastly Maitland states that the principles of the new architecture Le Corbusier proposes manifests itself in Dom-ino.

The final common point discussed in the three interpretations is the *generic* quality attributed to Dom-ino. Again all of the three texts handle this issue in completely different ways but actually mention and insist on the generic, non-specific nature of Dom-ino. For example, Eisenman emphasizes that the precise size, selection, number, and location of the basic elements of Dom-ino exhibit an "articulate level of

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[205] Eisenman, "Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign," 191.

[206] Gregh, "The Dom-ino Idea," 61.

[207] Maitland, "The Grid," 95. Maitland takes this quotation from Antoine de Saint-Exupéry; from his book *Terre des Hommes* (Paris: Galimard, 1939).

[208] Eisenman, "Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign," 191.

[209] Ibid., 189.

[210] Gregh, "The Dom-ino Idea," 71-72.

intentionality" in the presence of an intentional sign, and these additional intentions differentiate Dom-ino from a single building, and makes it an architectural diagram that forms a base for a new condition of architecture.[211] Gregh more directly elaborates the *generic* potential of the Dom-ino frame by stating the *suitability* and *adaptability* of the frame to all building types, and by mentioning that Dom-ino does *not produce a single solution* to a problem but produces *the principles for a solution*. For her, the ideas manifested by this *interpretable* frame firstly announce themselves in Le Corbusier's subsequent development. Finally Maitland, very similar to Gregh, discusses Dom-ino as a non-specific structural diagram that can be applied to any building. He mentions that the characteristics of Dom-ino is typical to the buildings of Le Corbusier, and exemplifies his argument by studying the distortions of the rectangular grids of Le Corbusier's particular domestic buildings as a continuation of Dom-ino's structural grid. The way the structural-grid of the Dom-ino is reinterpreted in the projects reinforces his argument.

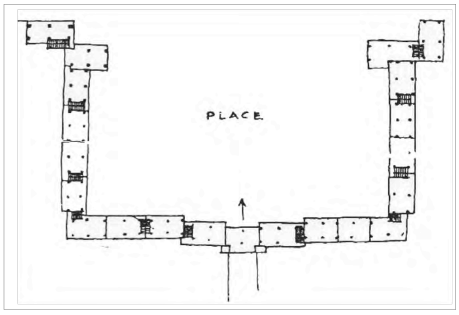
To sum up, the selected articles are significant texts for this thesis with their alternative methods of analysis to search for Dom-ino's architectural potentials. All of them are important guides for the following part of the thesis, which will make an analysis on the clusters of Dom-ino. However, these texts, like most of the articles written on the Dom-ino frame, make their analysis on the *single Dom-ino unit* imprinted on our memories. Although they somehow mention the ideas of mass-production and repetition, they do not go in a deep discussion on these potentials. Taking the potentials of the single Dom-ino unit into consideration, the contribution of this thesis will be the analysis of the clusters of Dom-ino, searching for the logic behind their multiplication.

[211] Eisenman, "Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign," 193.

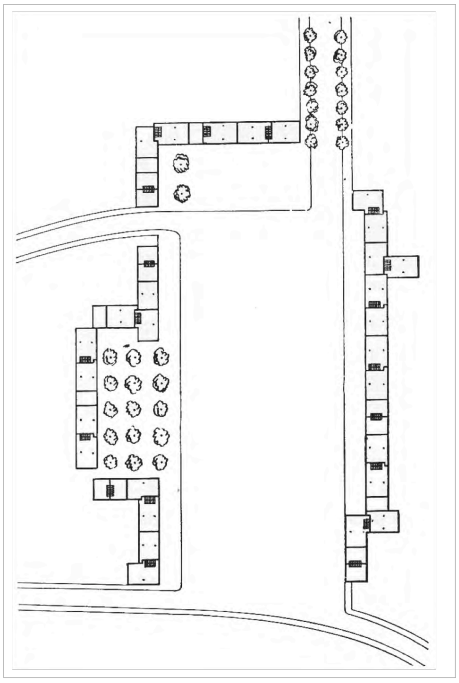
CHAPTER 4

THE ANALYSIS OF DOM-INO CLUSTERS

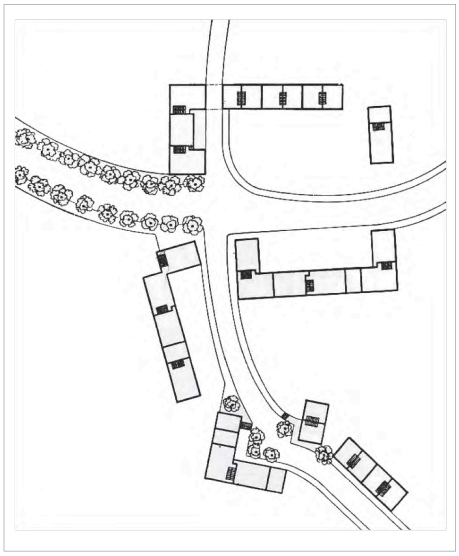
As it is stated before, this thesis argues that the Dom-ino project is not made up of the single Dom-ino unit that is mentioned and analyzed so many times. To prove this argument this chapter focuses on Le Corbusier's sketches of Dom-ino clusters (Figure 4.1). Since the sketches are not drawn in detail, most of the time they are discussed only as the illustrations to depict the ability of the project to produce clusters. Although the Dom-ino unit is mentioned as a mass-producible structural unit in many texts, this thesis argues that these sketches imply much more. To further discover these implications, and the architectural potentials of the Dom-ino units, the clusters are analyzed in a systematic way as Eisenman did on a single Dom-ino unit (Figure 4.3, 4.4, 4.5, 4.6, 4.7). This analysis first reveals the Dom-ino *units* with different plan types through the reproductions of the sketches of alternative Dom-ino clusters (Figure 4.8), and then searches out how they come together and to what extent the units allow variety.



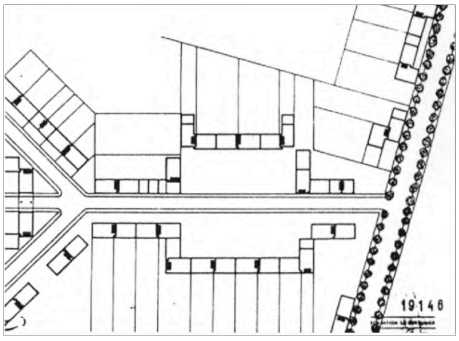
a. Model-1



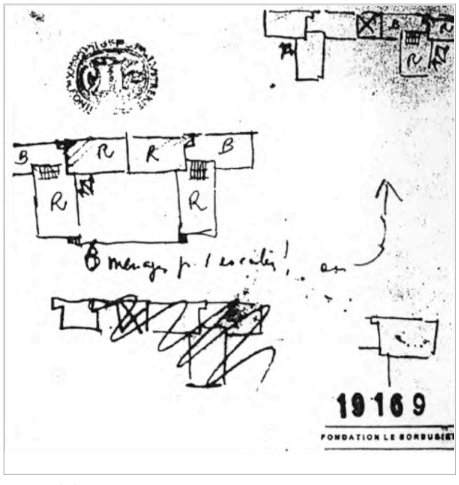
b. Model-2



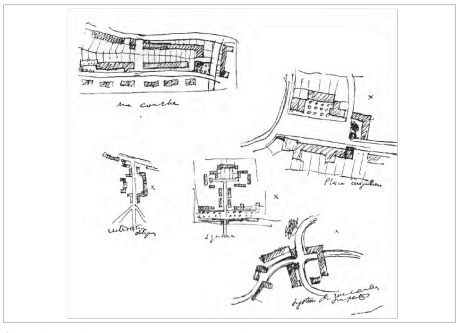
c. Model-3



d. Model-4



e. Model-5/6



f. Other alternative Dom-ino clusters

Figure 4.1 **Original sketches of alternative Dom-ino clusters**. Source: a, b, c, f: Le Corbusier, "Les Maisons Dom-ino," *Oeuvre Complete, Volume 1, 1910-29*, edited by W.Boesiger and O.Stonorov, Berlin: Birkhauser Publishers, 2006, 24-26. d: Columbia University Website. Retrieved February 12, 2009 from (http://brooklyn.arch.columbia.edu/DDL/cad/A4535/SUM95/domino/domino2.gif), and e: Columbia University Website. Retrieved February 12, 2009 from (http://brooklyn.arch.columbia.edu /DDL/cad/A4535/SUM95/domino/domino3.gif)

4.1 Plan Menu of the Dom-ino Units

This part of the study further analyzes and elaborates the alternative clusters Le Corbusier produced for the Dom-ino project, in order to identify the Dom-ino units that generate these clusters (Figure 4.1); and designates the plan menu of the units obtained through this analysis. This elaboration brings out that the project is not made up of the single Dom-ino unit that is presented as the standard Dom-ino skeleton ("*L'ossature standard <<Dom-ino>>"*) in the *Oeuvre Complete, Volume 1, 1910-1929*.[212] Through the reproductions of the original sketches, there appear several different Dom-ino units, with varying plan types, other then the emphasized one (Figure 4.3, 4.4, 4.5, 4.6, 4.7).

This thesis argues that the Dom-ino project is created with the mass-production idea in its focus. Le Corbusier's emphasis is on the combination, multiplication, and repetition of the units that generate alternative clusters. For this reason, the sketch he drew for the patent of the project is significant for this study because it illustrates various plan types for repeatable Dom-ino units, and their possible configurations, combinations, and couplings (Figure 4.2). This sketch, in a way, proves that various plan configurations (types) could be realized; in other words, it demonstrates that Dom-ino is an idea or a diagram that poses a framework for alternative outcomes.

> The concept for the Maison Domino was based on existing concrete technology, and envisaged a repeatable unit without a standardized living programme, but keeping to the framework: a prefabricated skeleton in which various types could be realized. [...] The well-known 1919 perspective shows one such variant. [213]

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[212] Le Corbusier, *Oeuvre Complete,* 23.

[213] Max Risselada, *Raumplan versus Plan Libre: Adolf Loos and Le Corbusier, 1919-30*, (Netherlands, Delft: Delft University Press, 1989), p.99.

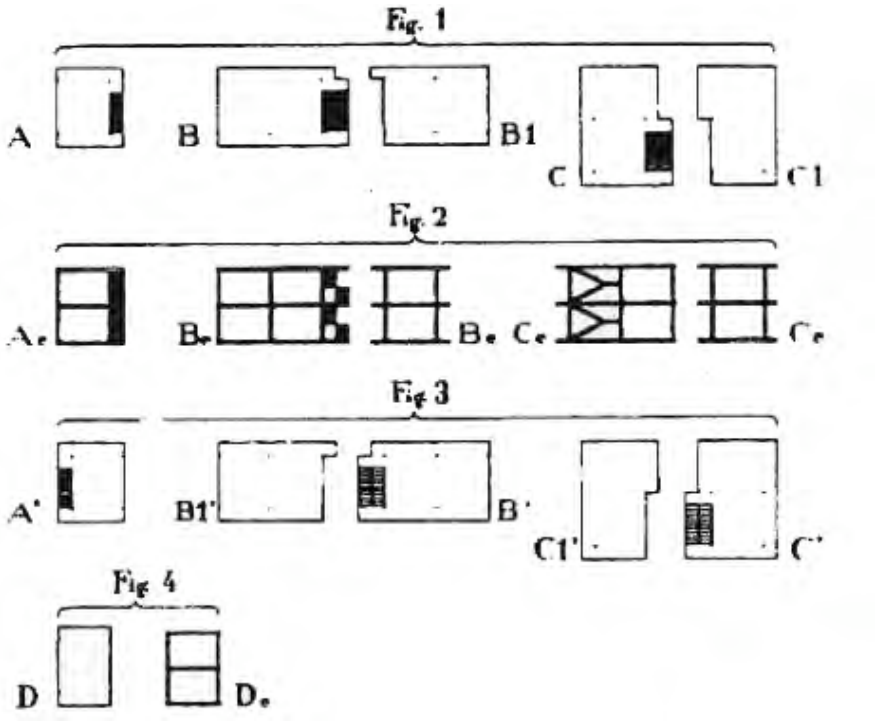
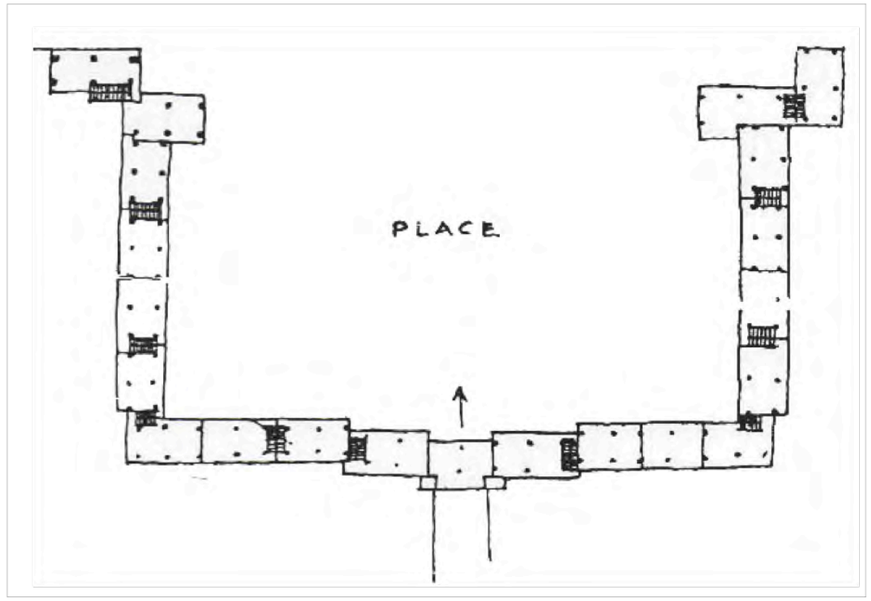
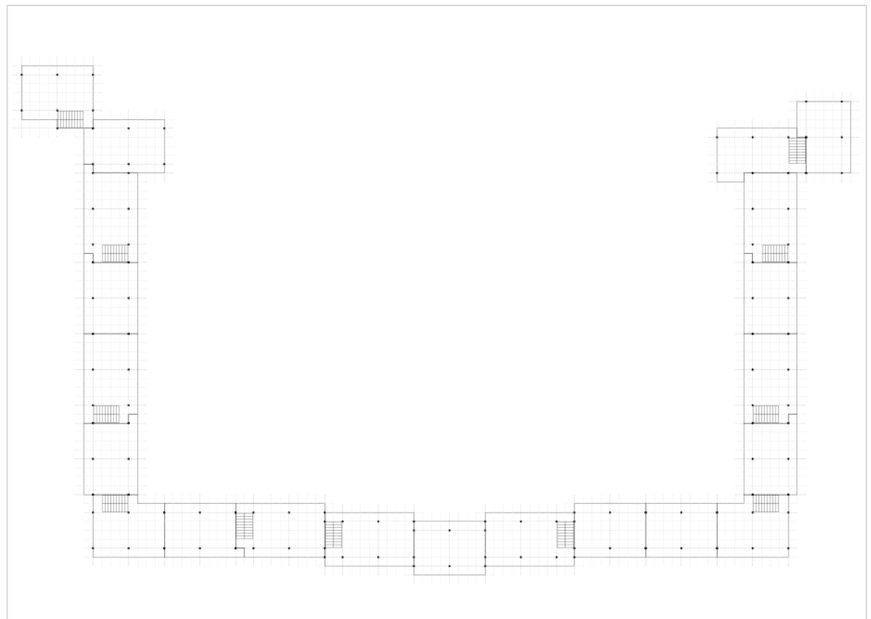


Figure 4.2 **Le Corbusier's drawing for the patent of repeatable Dom-ino units**. Source: Max Risselada, "Documentation of 16 houses," *Raumplan versus Plan Libre: Adolf Loos and Le Corbusier, 1919-30*, Netherlands, Delft: Delft University Press, 1989, p.99.

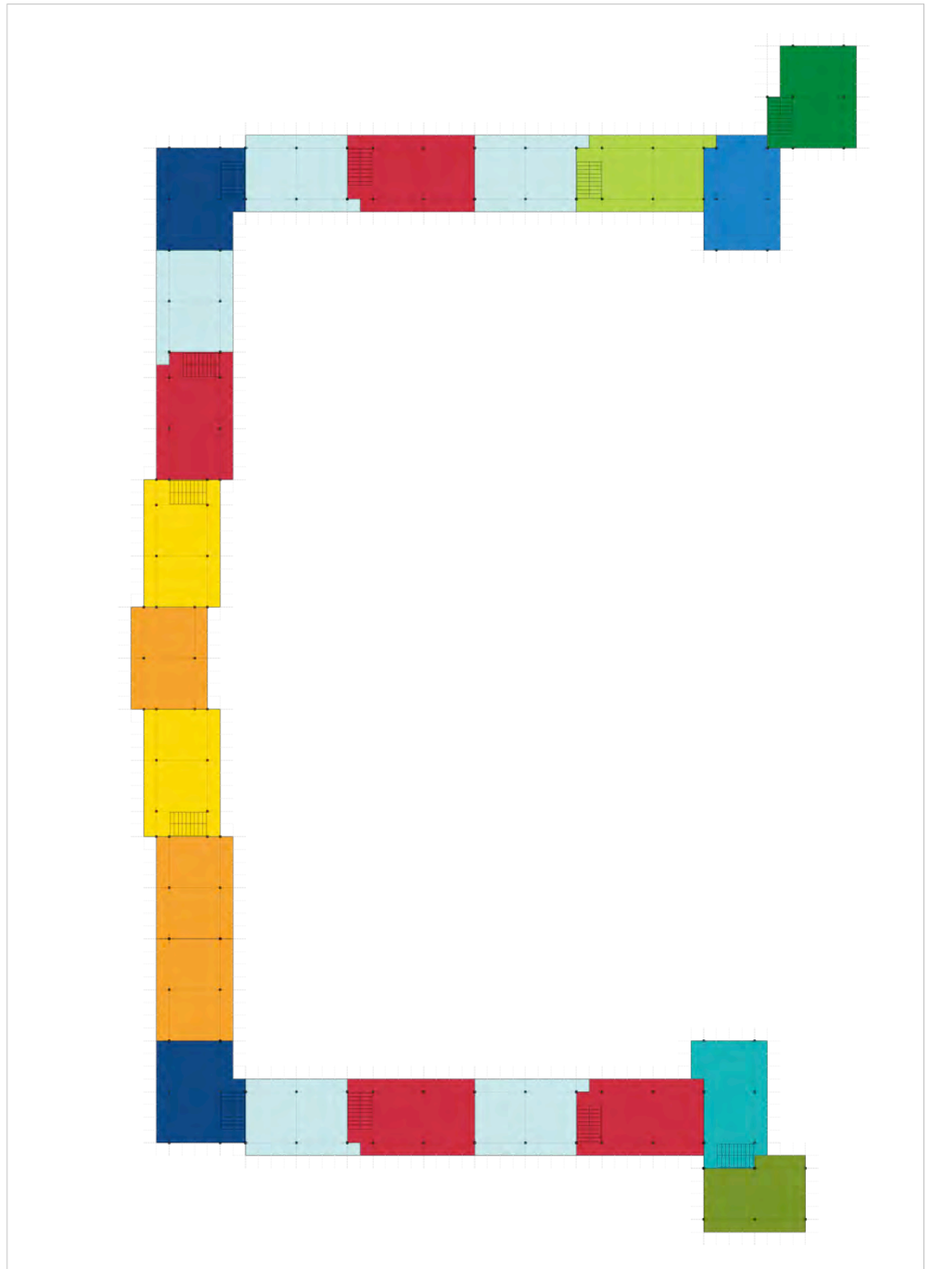
Before the analysis of the clusters, it should be mentioned here that there might be several other cluster alternatives of the Dom-ino project, but the thesis will analyze six of these alternatives published and presented in the *Oeuvre Complete, Volume 1, 1910-1929* (Figure 4.1-a, 4.1-b, 4.1-c), and registered by the *Fondation Le Corbusier* (Figure 4.1-d, 4.1-e). The point here is that the study aims at showing the existence of several other Dom-ino units, and these alternative clusters are seen adequate to prove this argument.



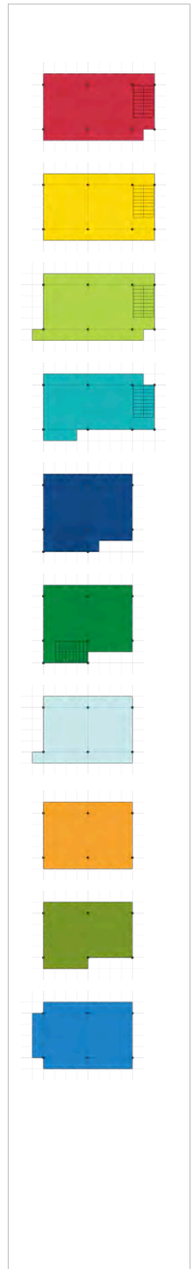
a.Original sketch of an alternative Dom-ino cluster



b.Reproduction of the original sketch

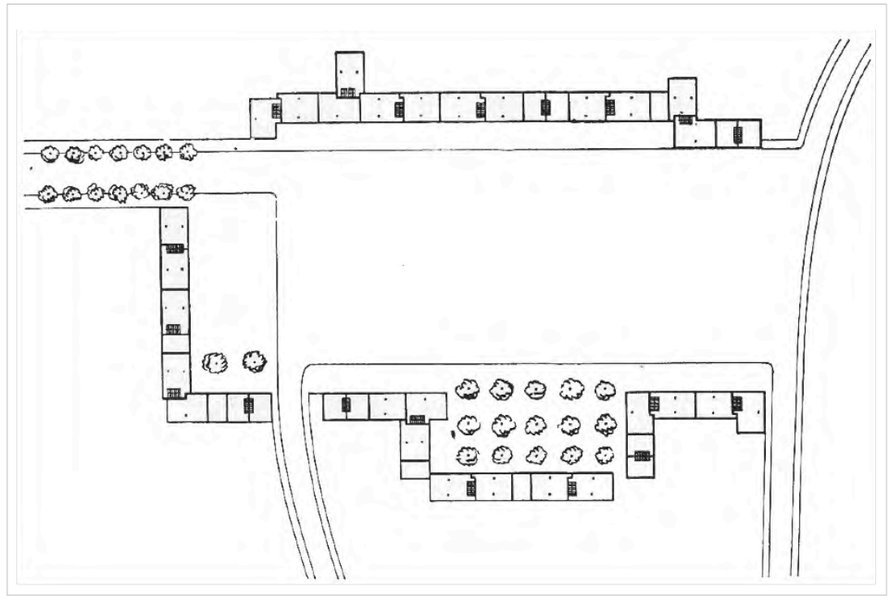


c.Analysis of the Dom-ino units in the cluster

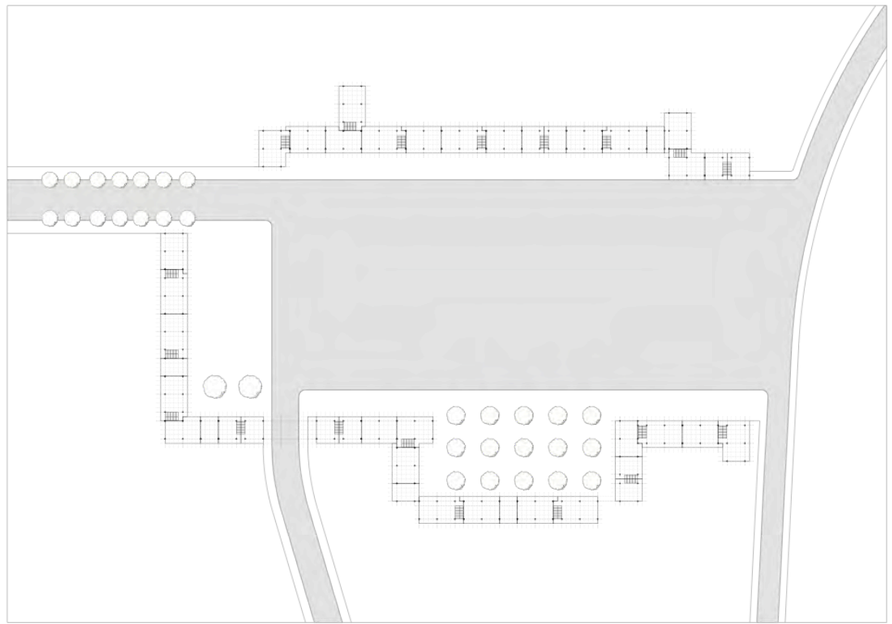


d.Dom-ino units generating the cluster

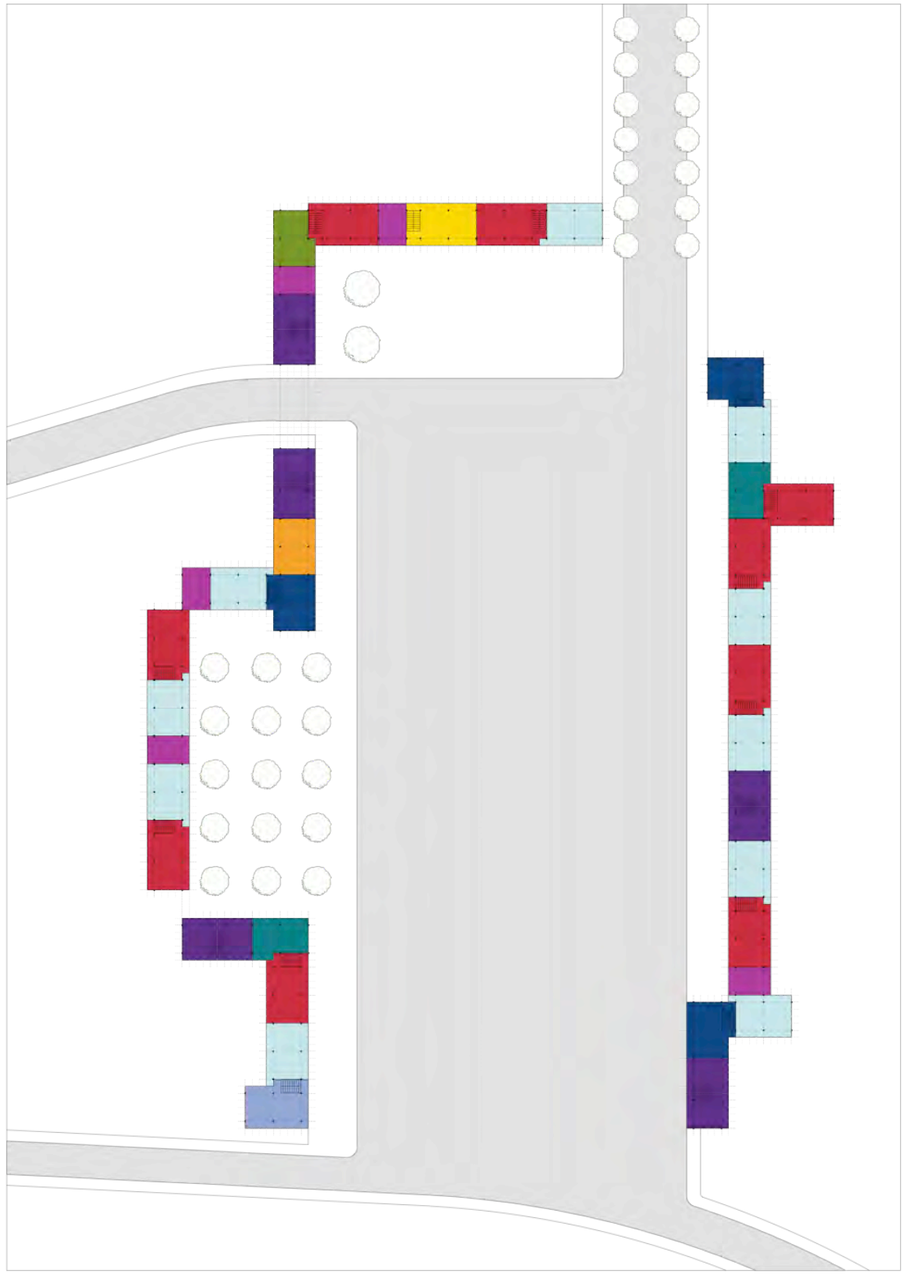
Figure 4.3 **Analysis of an alternative Dom-ino cluster (Model-1)**. Source: Le Corbusier, “Les Maisons Dom-ino,” *Oeuvre Complete, Volume 1, 1910-29*, edited by W.Boesiger and O.Stonorov, Berlin: Birkhauser Publishers, 2006, p.24. Edited and produced by the author.



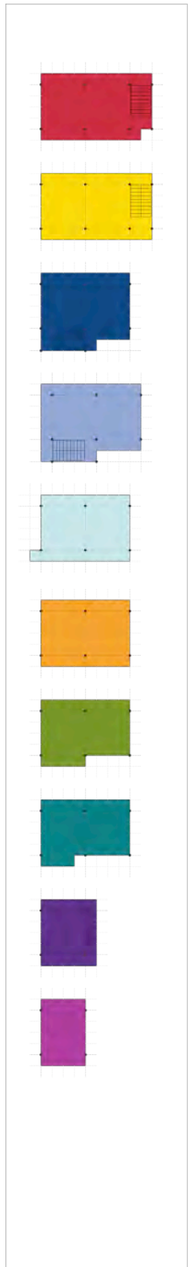
a.Original sketch of an alternative Dom-ino cluster



b.Reproduction of the original sketch

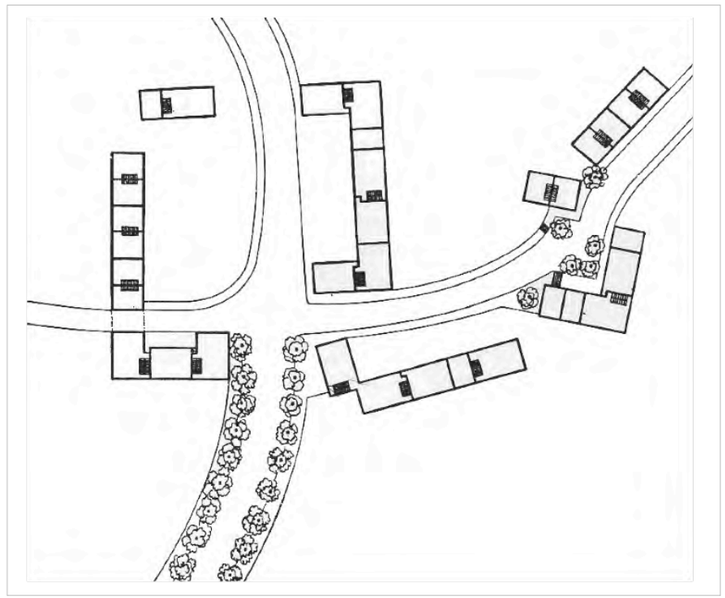


c.Analysis of the Dom-ino units in the cluster

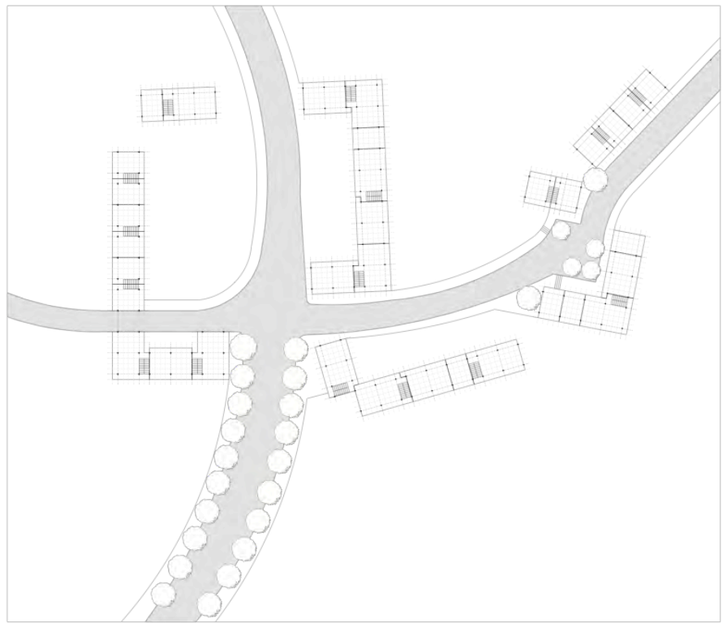


d.Dom-ino units
generating the cluster

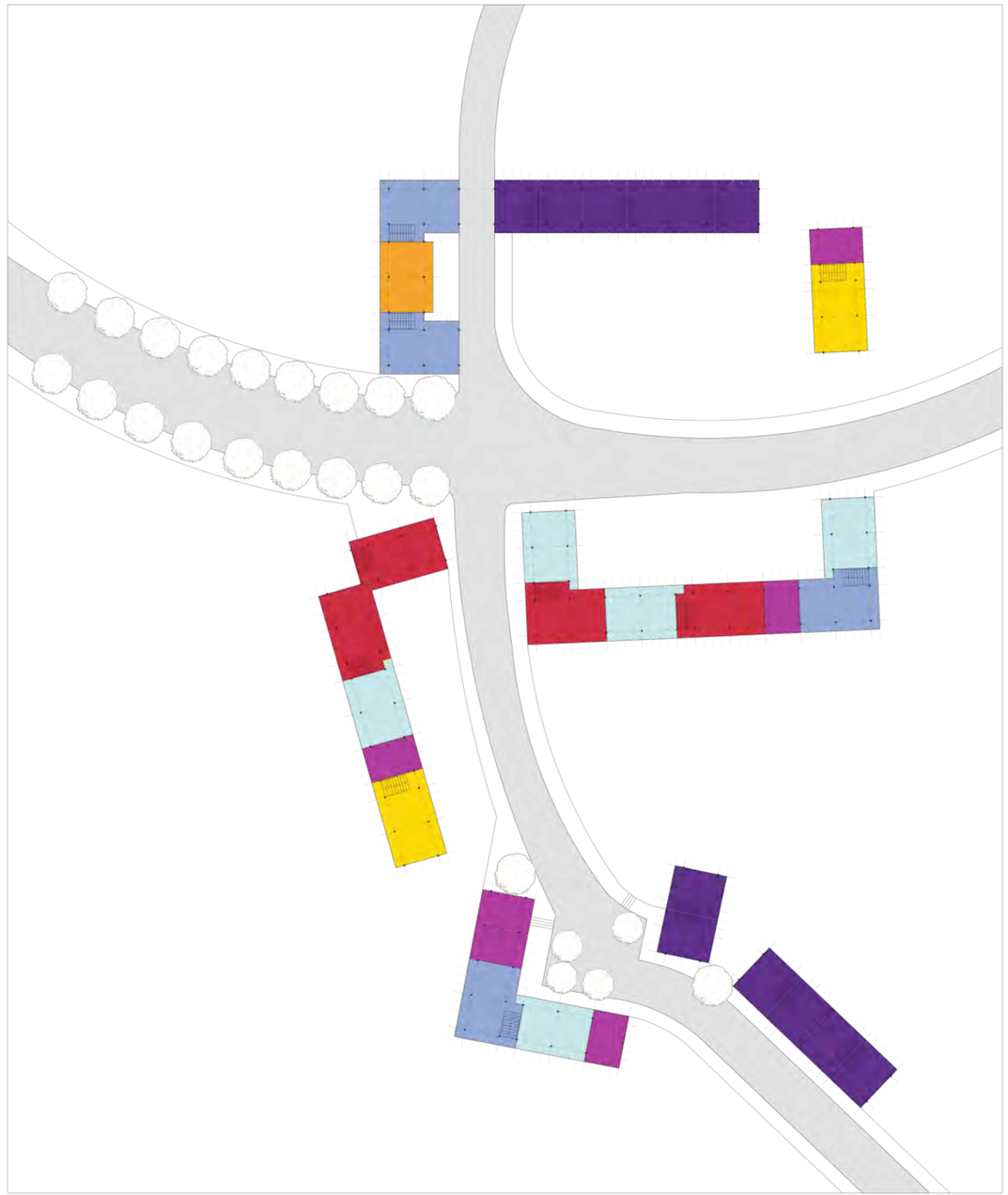
Figure 4.4 **Analysis of an alternative Dom-ino cluster (Model-2)**. Source: Le Corbusier, “Les Maisons Dom-ino,” *Oeuvre Complete, Volume 1, 1910-29*, edited by W.Boesiger and O.Stonorov, Berlin: Birkhauser Publishers, 2006, p.25. Edited and produced by the author.



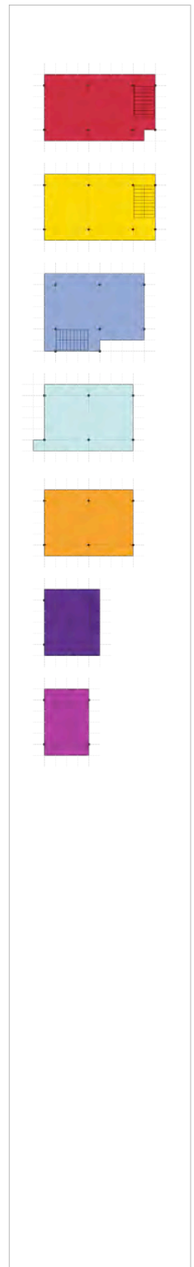
a.Original sketch of an alternative Dom-ino cluster



b.Reproduction of the original sketch

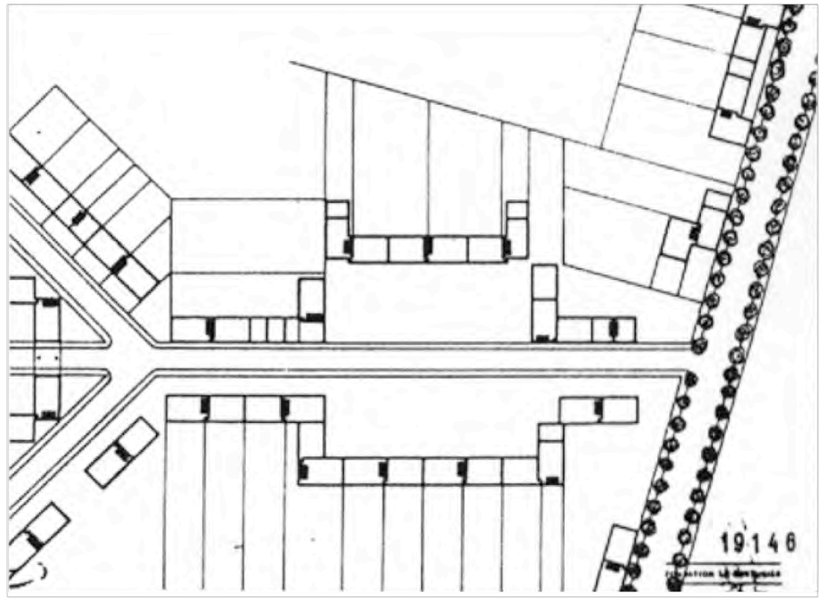


c.Analysis of the Dom-ino units in the cluster

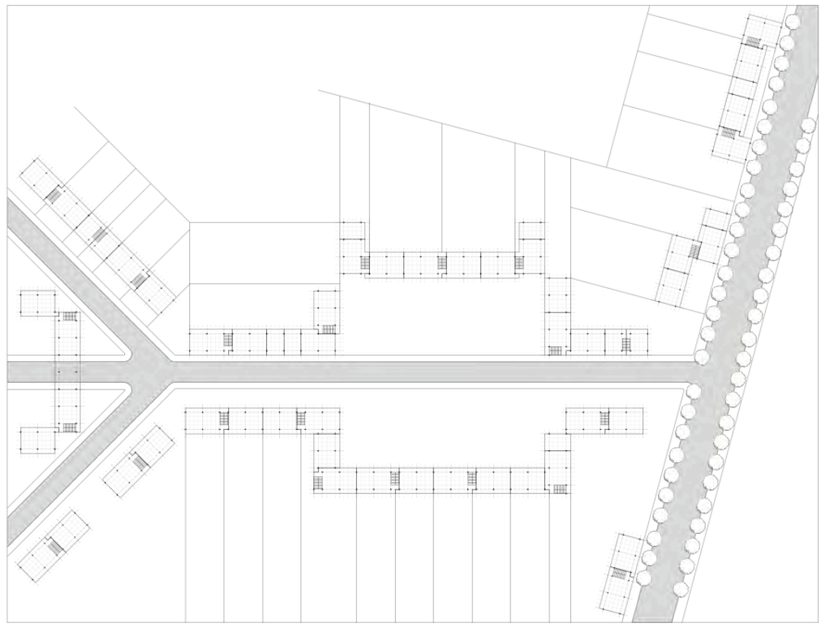


d.Dom-ino units
generating the cluster

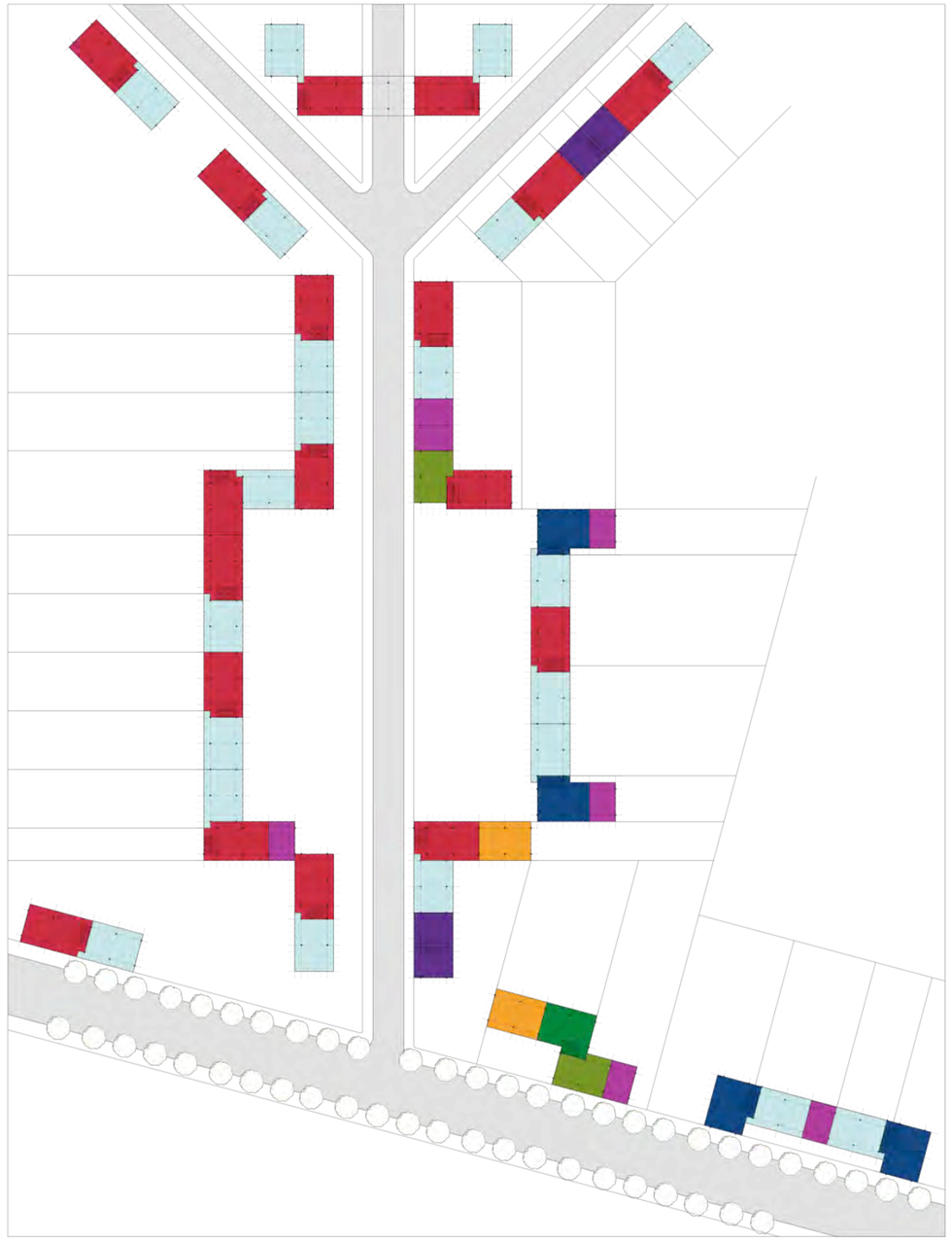
Figure 4.5 **Analysis of an alternative Dom-ino cluster (Model-3)**. Source: Le Corbusier, “Les Maisons Dom-ino,” *Oeuvre Complete, Volume 1, 1910-29*, edited by W.Boesiger and O.Stonorov, Berlin: Birkhauser Publishers, 2006, p.26. Edited and produced by the author.



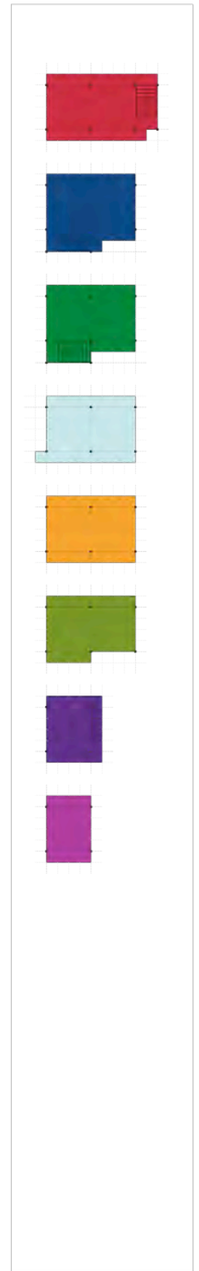
a.Original sketch of an alternative Dom-ino cluster



b.Reproduction of the original sketch

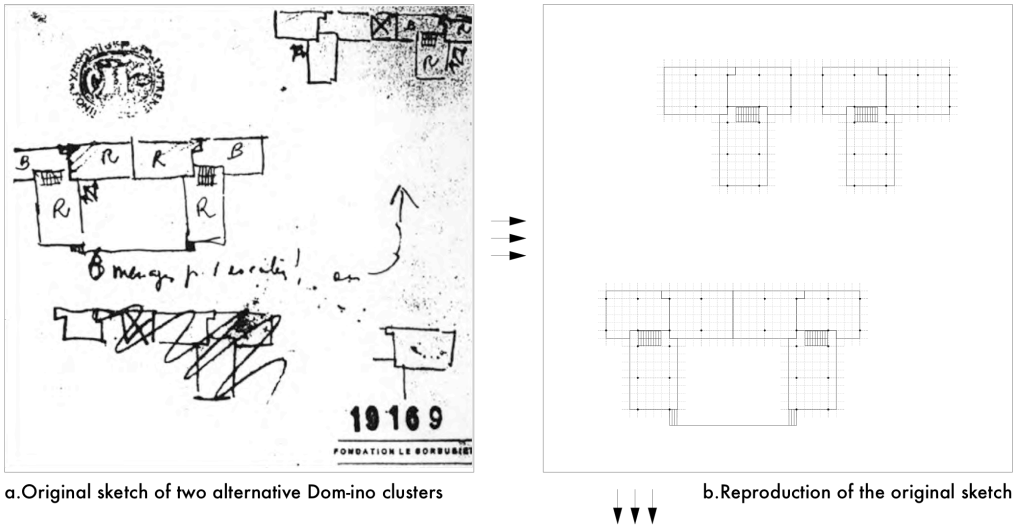


c.Analysis of the Dom-ino units in the cluster



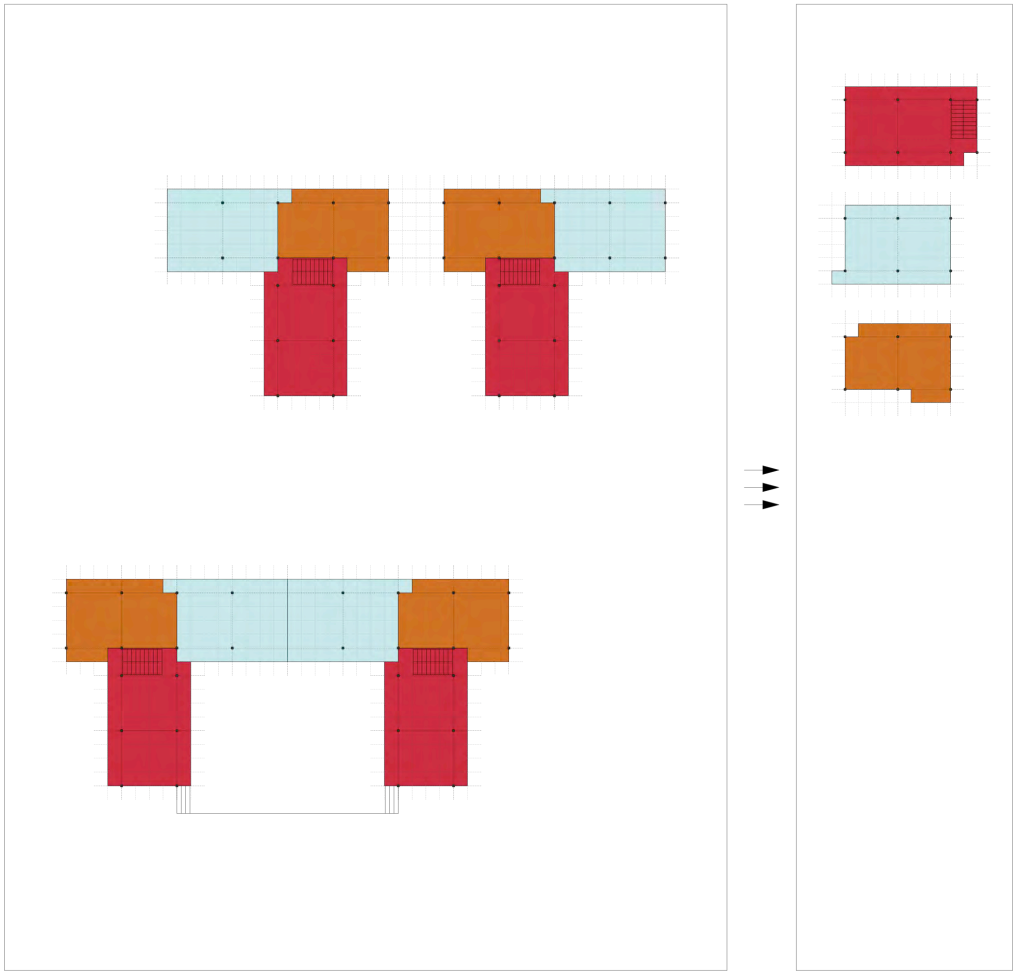
d.Dom-ino units
generating the cluster

Figure 4.6 **Analysis of an alternative Dom-ino cluster (Model-4)**. Source: Columbia University Website. Retrieved February 12, 2009 from (http://brooklyn.arch.columbia.edu/DDL/cad/A4535/SUM95/domino/domino2.gif). Edited and produced by the author.



a.Original sketch of two alternative Dom-ino clusters

b.Reproduction of the original sketch



c.Analysis of the Dom-ino units in the clusters

d.Dom-ino units
generating the clusters

Figure 4.7 **Analysis of two alternative Dom-ino clusters (Model-5/6)**. Source: Columbia University Website. Retrieved February 12, 2009 from (http://brooklyn.arch.columbia.edu/DDL/cad/A4535 /SUM95/domino/domino3.gif). Edited and produced by the author.

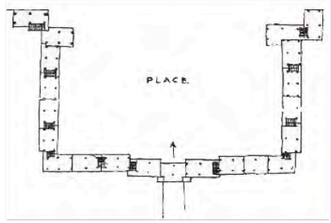
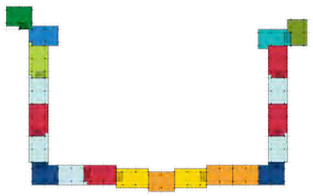
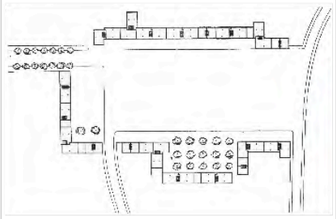
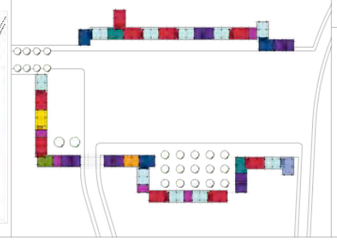
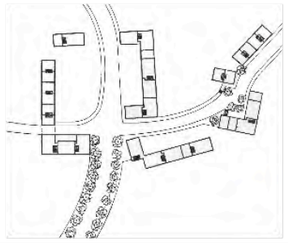
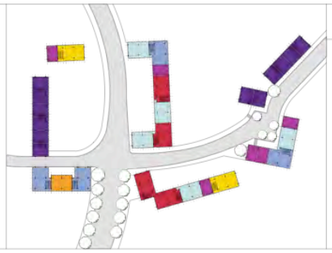
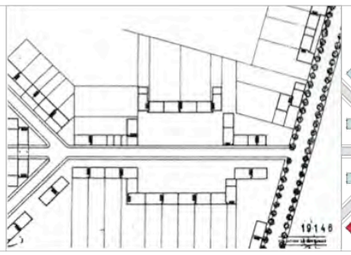
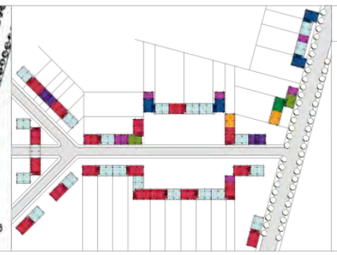
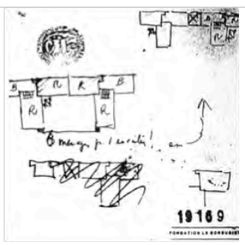
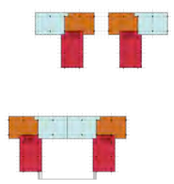
			Unit A	Unit B	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit I	Unit J	Unit K	Unit L	Unit M	Unit N	Unit O
Cluster Alternative (Model-1)																	
Cluster Alternative (Model-2)																	
Cluster Alternative (Model-3)																	
Cluster Alternative (Model-4)																	
Cluster Alternative (Model-5/6)																	

Figure 4.8 **Chart showing the Dom-ino units with different plan types.** Developed and produced by the author.

The analysis of these six alternative Dom-ino clusters introduces fourteen more Dom-ino units (units B, C, D, E, F, G, H, I, J, K, L, M, N, and O) except the well-known single one (unit A) (Figure 4.8). Most probably more units could be found in other sketches but the analysis in this part of the study concentrates on the units found in the above-mentioned cluster alternatives.[1] These units are adequate to exhibit the idea behind the Dom-ino frame; how the Dom-ino units are formed, and how they come together.

Before going into a thorough analysis of these units, of the logic behind their multiplication, and of the different characteristics they acquire, this thesis elaborates why a single Dom-ino unit (unit A) is emphasized and analyzed, although the others exist without getting noticed. One of the most important reasons of this situation is that the chapter devoted to Dom-ino project in the *Oeuvre Complete, Volume 1, 1910-1929,* namely the *Les Maisons <<Dom-ino>>*, discusses unit A as the standard Dom-ino skeleton (*L'ossature standard <<Dom-ino>>*), and illustrates the unit in detail (Figure 4.9).[2] On the contrary, the cluster alternatives appear as very small sketches in the same chapter (Figure 4.1). By focusing on the structural sections, plans and perspective of the standard Dom-ino skeleton (unit A) (Figure 4.9, 4.10), and on the architectural potentials attributed to it, the existence of other alternative units and consequently the potentials they exhibit, could not be noticed.

[1] These fifteen units are designated with the analysis of the five sketches that could be accessed. The thing that is tried to be mentioned here is that any other sketch can introduce more units, other than these fifteen, with different plan types.

[2] Le Corbusier, *Oeuvre Complete*, *Volume 1, 1910-29* eds. Willy Boesiger, Oscar Stonorov, and Max Bill (Berlin: Birkhauser Publishers, 2006), 23-26.

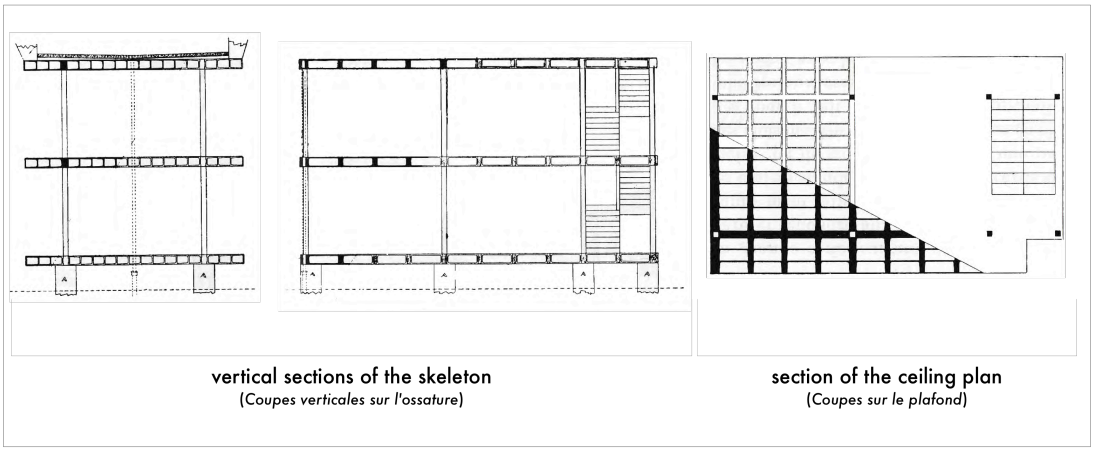


Figure 4.9 **Structural sections of the standard Dom-ino skeleton (*L'ossature standard <<Dom-ino>>*)**. Source: Le Corbusier, "Les Maisons Dom-ino," *Oeuvre Complete, Volume 1, 1910-29*, edited by W.Boesiger and O.Stonorov (Berlin: Birkhauser Publishers, 2006), 23.

Although Le Corbusier could select any other Dom-ino unit to emphasize, he focuses on this unit (unit A). Actually, the selection and elaboration of this particular unit in *Oeuvre Complete, Volume 1, 1910-1929* suggests *intentionality* (Figure 4.10). Exploring why this individual unit with a cut-out in the corner is selected, emphasized and mentioned to be the standard Dom-ino skeleton, besides any other units, needs elaboration to better understand this *intentionality*.

As Eisenman expresses, this unit's (unit A) particular configuration with respect to all other permutations is a "self-referential statement".[3] There are intentional decisions both in the specific configuration of the selected unit, and in its selection as the exemplary unit to present the project. Although it seems as a single unit in the first page of the chapter devoted to Dom-ino, in *Oeuvre Complete*, it suggests the existence of other Dom-ino units, in such a way that the missing parts in this particular unit indicate that *the frame is incomplete*, and will *somehow be completed* (Figure 4.10). For instance, the cut-out in the corner of the unit A is a "special marking" which calls attention to the fact that the slab is incomplete; and this

[3] Eisenman, "Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign," 194.

missing part in the corner indicates a possibility for the unit to be jointed and extended, like the pieces of a puzzle.[4] Furthermore, the absence of columns carrying the staircase on one side is also a sign (an emphasis) that this single Dom-ino unit can not stand alone. In other words, there is again an implication of a joint, and a clue for continuation. Consequently, although Le Corbusier focuses on this single unit (unit A) he reminds that this is a cluster project, in which the repeating units complement each other and create alternative housing schemes.

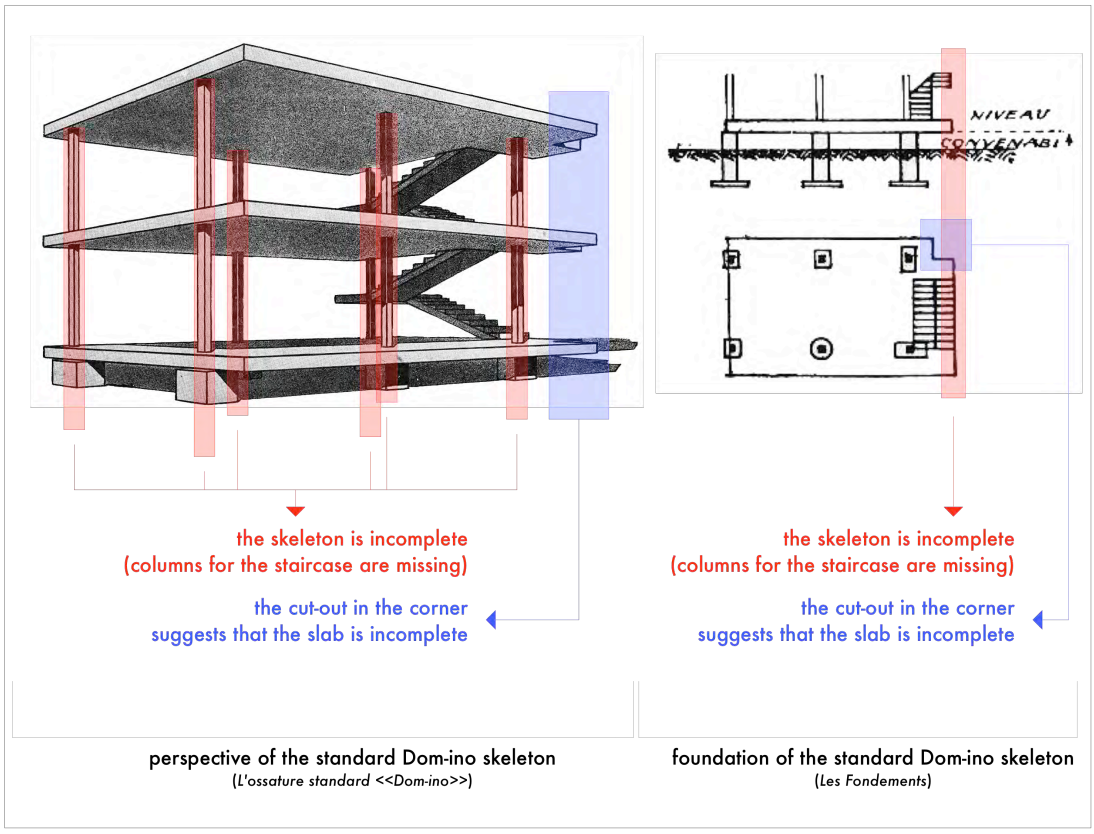


Figure 4.10 **Intentional decisions in the standard Dom-ino skeleton (*L'ossature standard <<Dom-ino>>*)**. Source: Le Corbusier, "Les Maisons Dom-ino," *Oeuvre Complete, Volume 1, 1910-29*, edited by W.Boesiger and O.Stonorov (Berlin: Birkhauser Publishers, 2006), 23. Edited by the author.

[4] Ibid.

When these intentional decisions are taken into consideration, it could be stated that the *selected* Dom-ino unit embraces and implies further potentials, other than its identified and designated potentials. For these reasons, this thesis insists that the Dom-ino project shouldn't be evaluated only with the potentials attributed to the individual Dom-ino unit; and the analysis of the architectural potentials of Dom-ino should be extended to the alternating units identified above (units A, B, C, D, E, F, G, H, I, J, K, L, M, N, and O), and done with reference to the logic behind their combination and multiplication.

At this point, the analysis of these fifteen units suggests four main groups with different plan types (Figure 4.11). These four groups are designated according to their formal plan organizations. The first group is the double square unit type with a half-square vertical circulation element added on the longitudinal direction (Figure 4.11-a); second group is the double square unit type with a half-square vertical circulation element added on the lateral direction (Figure 4.11-b); the third is the double square unit type without vertical circulation (Figure 4.11-c); and the fourth one is the single square unit type (Figure 4.11-d).

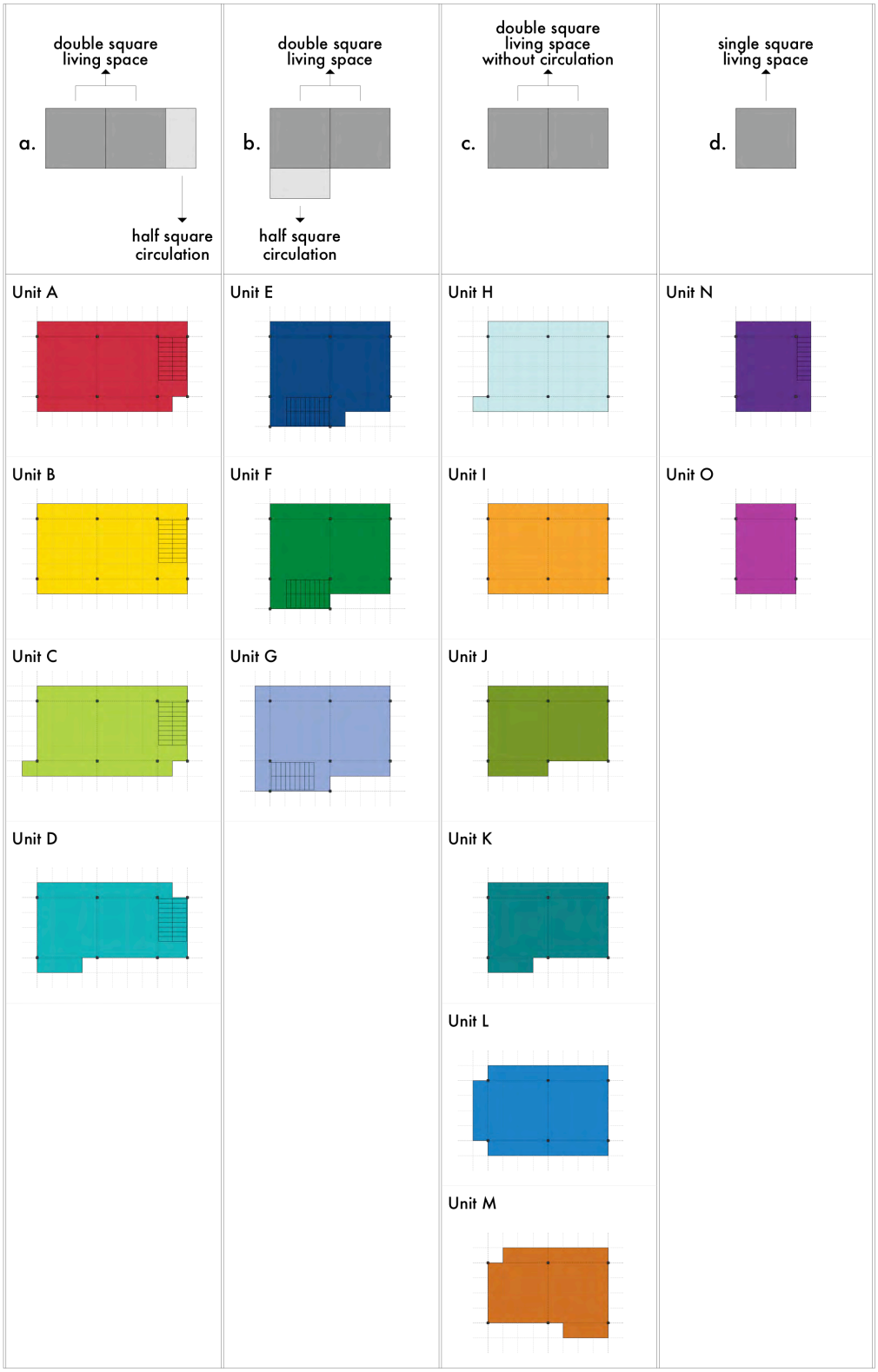


Figure 4.11 **Plan menu of Dom-ino units classified under four main groups.** Developed and produced by the author.

4.1.1 Double Square Unit Type With a Half-Square Vertical Circulation Element Added on the Longitudinal Direction

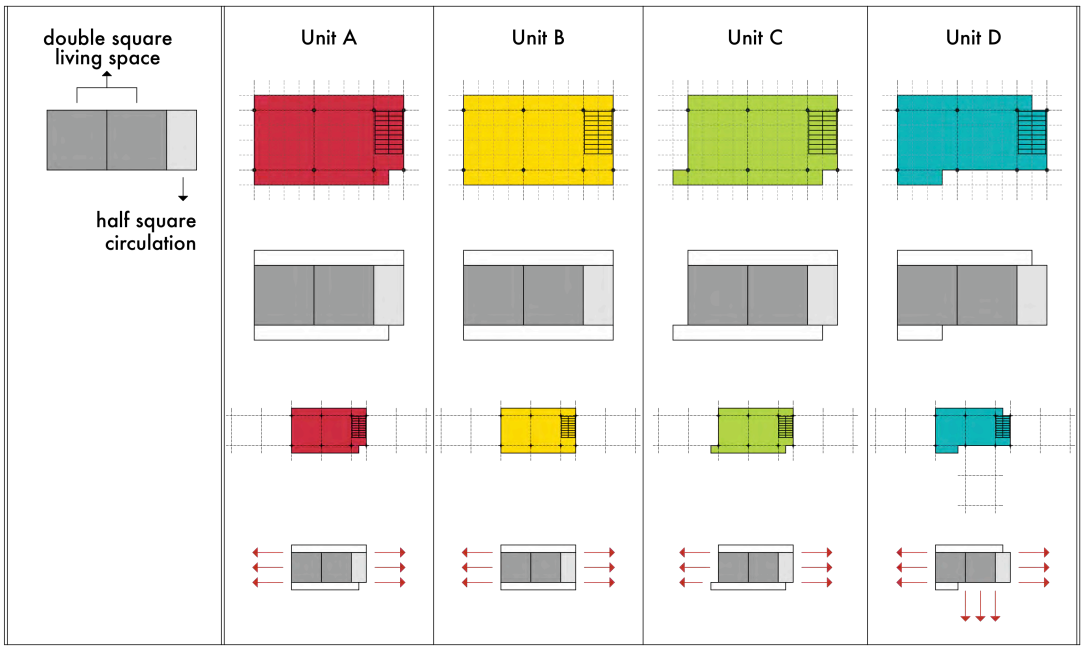


Figure 4.12 **Double square unit type with a half-square vertical circulation element added on the longitudinal direction.** Developed and produced by the author.

The structural axes of these four units (A, B, C, D) form a gridal framework of “4a to 4a” for the main slabs, and “4a to 2a” for the staircases (Figure 4.13). The cantilever dimension is fixed on the short side, and equal to “a”, but variable on the long side (Figure 4.12, 4.13). Although the two main squares of the main slabs and the half-square of the staircase cannot be changed, the cantilevered parts on long sides can be cut-out in many ways to be linked with other units in various positions and directions (Figure 4.12). This variability points out that other alternative Dom-ino units can be produced with the same logic; any plan configuration can be produced, providing that the double square living space and the half-square circulation element remain the same.

When the four units in this group are compared, unit B differs from the other three because it does not indicate a joint, or any other implication (Figure 4.12). On the contrary, the cut-outs and additions in the cantilevered parts of the other three units (A, C, D) suggest that they will be jointed and extended, although they could operate without need for any other unit. When this difference is taken into consideration, it could be inferred that unit B has the most generic plan configuration compared to the other three units, because these units someway acquire a specific character of their own. At this point, it could be questioned why unit A is selected as the standard Dom-ino skeleton (*L'ossature standard <<Dom-ino>>*) in the *Oeuvre Complete, Volume 1, 1910-1929,* instead of unit B; but as it is mentioned before, this selection is totally *intentional*.[5]

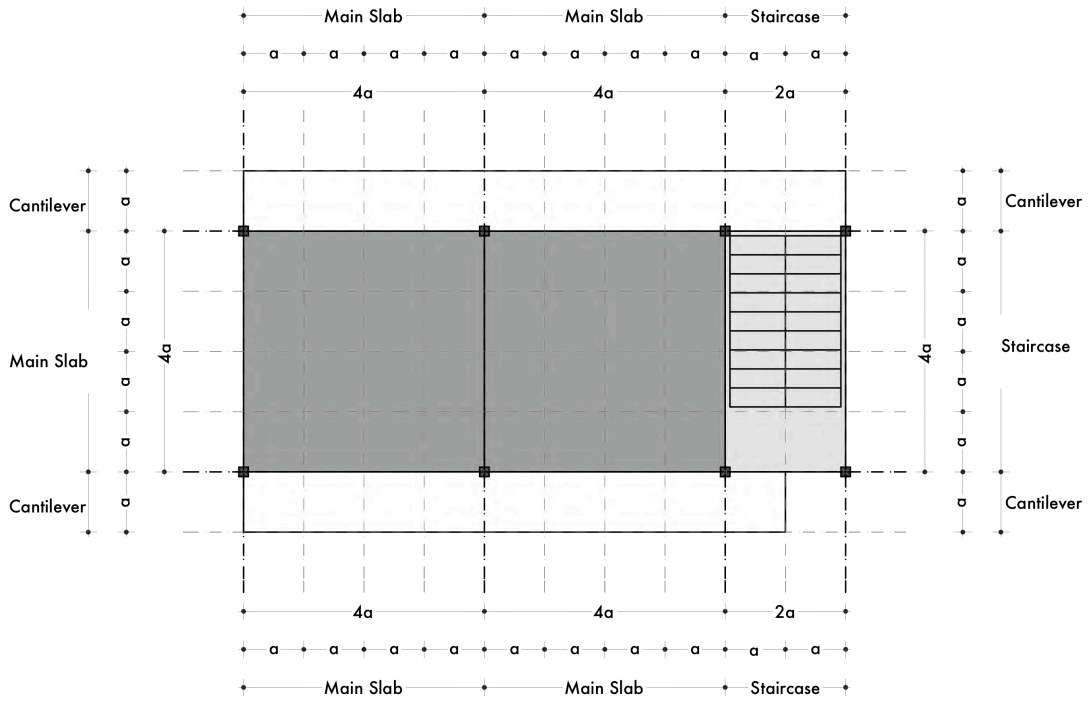


Figure 4.13 **Dimensions of the structural grid (first group of plans).** Produced by the author.

[5] Le Corbusier, *Oeuvre Complete*, 23.

Another comparison between the four units points out that their directions of growth or extension changes for each unit, and the configuration of the cantilevers defines these directions in which the unit will be added and grow. A cantilevered part on one side of the unit indicates that the unit cannot grow in that direction, since the cantilevers are the tools to provide free façades. In this respect, unit D differs from the other three (A, B, C) because it could grow in both longitudinal and lateral directions, while units A, B, and C could only grow longitudinally (Figure 4.12).

4.1.2 Double Square Unit Type With a Half-Square Vertical Circulation Element Added on the Lateral Direction

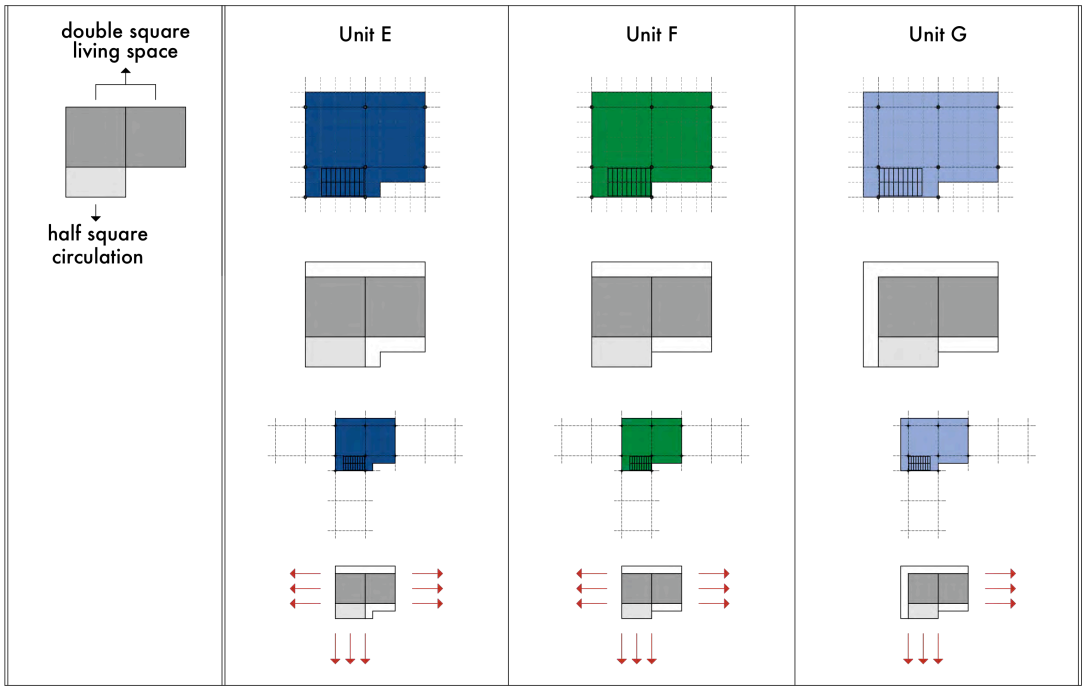


Figure 4.14 **Double square unit type with a half-square vertical circulation element added on the lateral direction.** Developed and produced by the author.

Although the plan organizations of these three units (E, F, G) are different from the first group (A, B, C, D), the structural grid dimensions are the same, and again “4a to 4a” for the main slabs, “4a to 2a” for the circulation element, and “a” on the short side of the cantilever (Figure 4.15). Similar to the first group of units, the changing dimensions and configurations of the cantilevers of this group indicate that

alternative units can be produced with the same plan type, and this flexibility reinforces the fact that the frame is *adaptable* and *interpretable*. Another similarity with the first group units (A, B, C, D) is that the three units of this group (E, F, G) could also operate without need for any other units because they all have their circulation elements.

Different from the first group, the location of the circulation element in units E, F, and G suggests a corner or a point in which the cluster will branch out (Figure 4.14). Therefore, these units constitute the corners of the linear Dom-ino settlements. Particularly, unit G is definitely a corner unit because it has cantilevers both on the long side and on the short end of the slab so that it could not extend in linear direction. This situation proves that the cantilevers are the determiners of the directions of growth as it is in the first group.

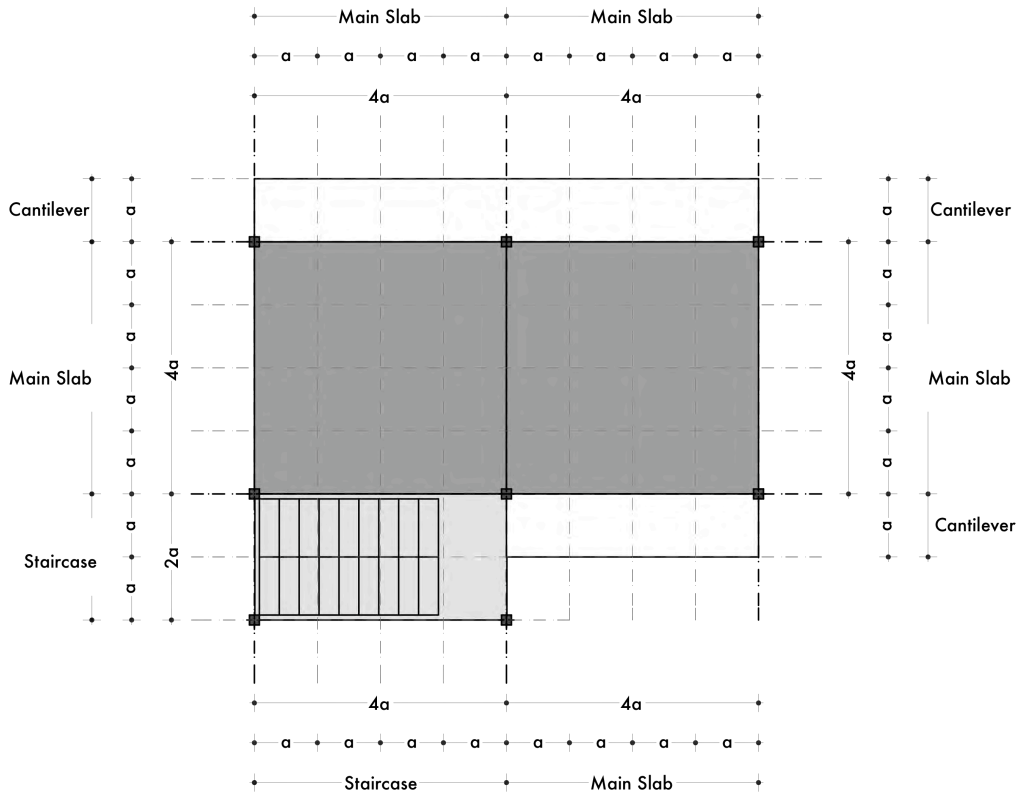


Figure 4.15 **Dimensions of the structural grid (second group of plans).** Produced by the author.

4.1.3 Double Square Unit Type Without Vertical Circulation

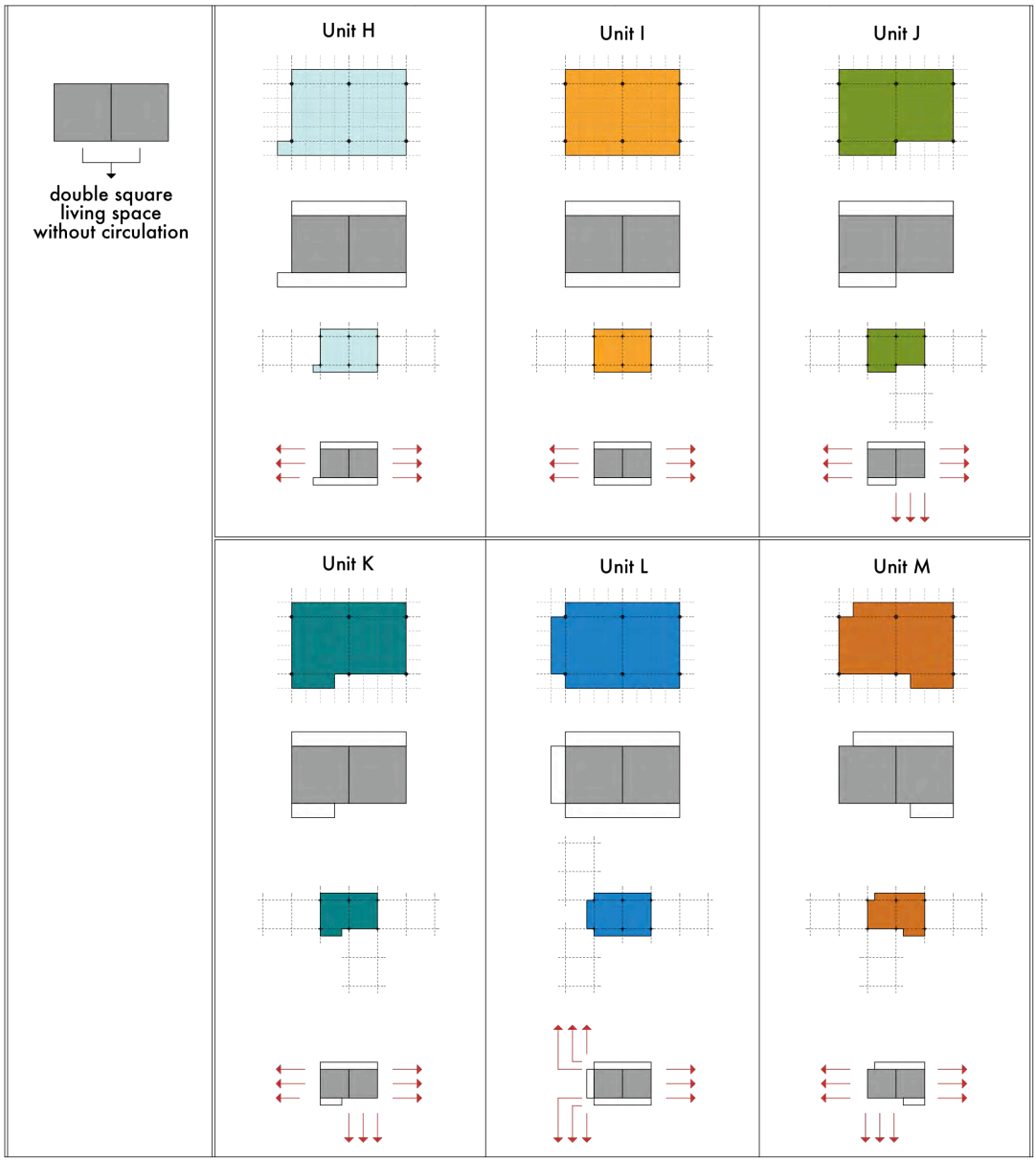


Figure 4.16 **Double square unit type without vertical circulation.** Developed and produced by the author.

Different from the first and second group of plans (A, B, C, D, E, F, G), the Dom-ino units in this plan type (H, I, J, K, L, M) do not have a vertical circulation element, so they could only operate with the existence of a unit from the first two groups, which has a staircase (Figure 4.16). Therefore, it could be inferred that the Dom-ino units in this group are the complementary units, which are used to expand the double

square based units with a vertical circulation element (A, B, C, D, E, F, G) in longitudinal or lateral directions. Similar to the first two groups of plans, the structural grid of this plan type forms a framework of “4a to 4a” for the main slabs (Figure 4.17). The flexibility of the cantilevered parts is significant especially for this group, because these units are created to be added to the others, and should be configured freely to provide the appropriate couplings and joints. Cantilevers are again the determiners of the directions of growth, as it is in the first and second group of plan types.

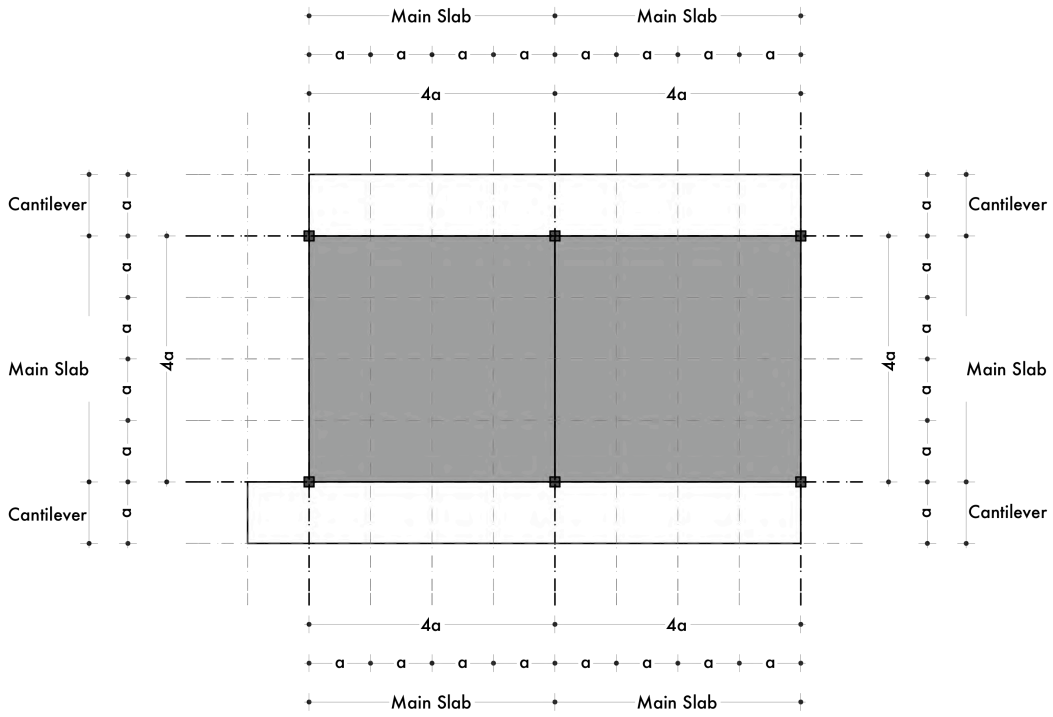


Figure 4.17 **Dimensions of the structural grid (third group of plans).** Produced by the author.

Although some of the units in this group could be seen as the direct pairs of other units from the first two groups (Figure 4.18), they could join with any other unit with countless configurations, as it is analyzed and illustrated in the following part of this chapter (Figure 4.22). Le Corbusier’s drawing for the patent of repeatable Dom-ino units should also be approached in that manner, and be seen as the illustrations of some alternative pairs, not of the fixed couples (Figure 4.2).

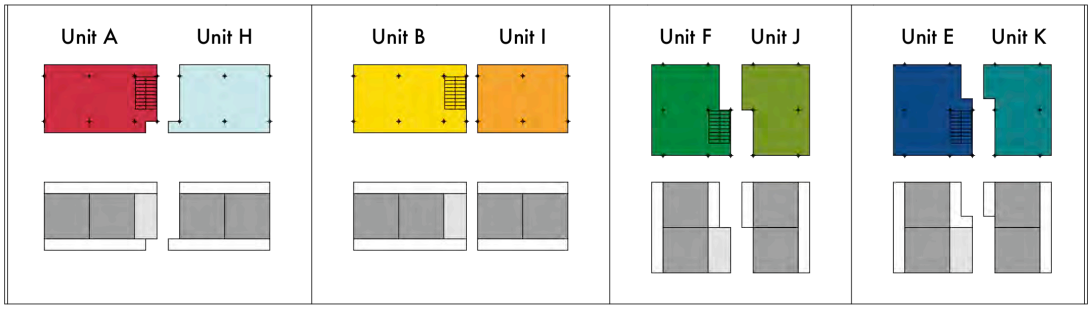


Figure 4.18 **Exemplary Dom-ino pairs.** Produced by the author.

4.1.4 Single Square Unit Type

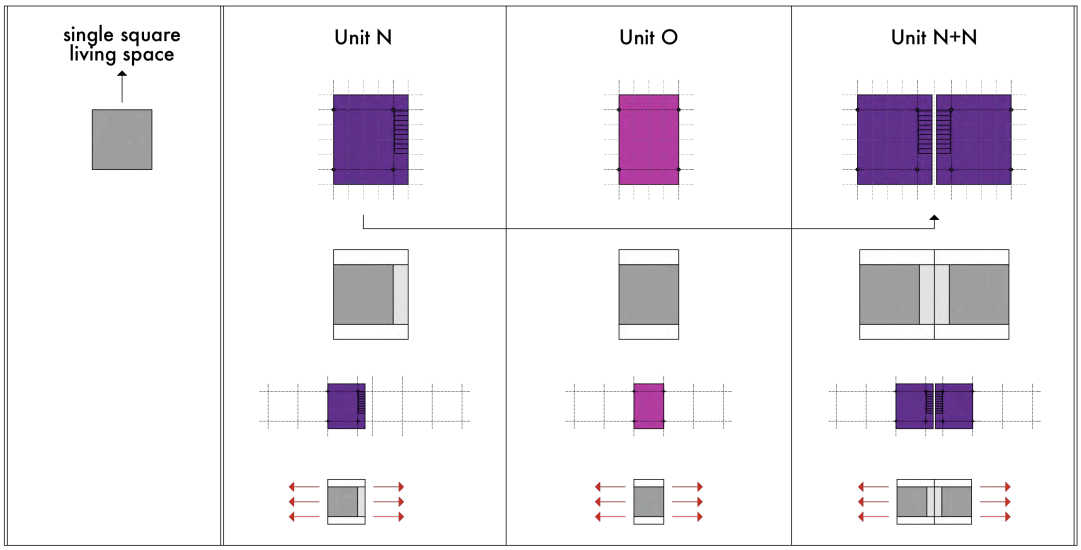


Figure 4.19 **Single square unit type.** Developed and produced by the author.

These two units (units N and O) are completely different from the other units with their single square plan organizations. In spite of this difference, this group also fits in the modular structural grid of the other Dom-ino units. The structural grid dimensions of these units (units N and O) are “4a to 4a” for the main slabs, and “a” on the short side of the cantilever (Figure 4.20). However, the cantilevers of these two units differ from the others in the longitudinal direction because they do not suggest any cut-out or addition (Figure 4.19). This situation indicates that N and O are the units to expand the cluster longitudinally in the linear direction.

Similar to the third group, units N and O cannot operate alone, and are designed to be used as the complementary units in the clusters, just because unit O does not have a vertical circulation element, and unit N does not have a proper one (Figure 4.19). In this respect, unit N is different from all of the other fourteen Dom-ino units, because they either have a vertical circulation or not. The existence of one arm of the staircase (and the absence of the other) in unit N enforces it to be the direct pair of the mirror of the same unit because there is no other unit with a half-stair element. The exciting point here is that the combination of unit N with its mirror suggests a compulsory unit (unit N+N), and this unit indirectly suggest a fifth type, namely the “double square unit type with a half-square vertical circulation element in the middle” (Figure 4.19).

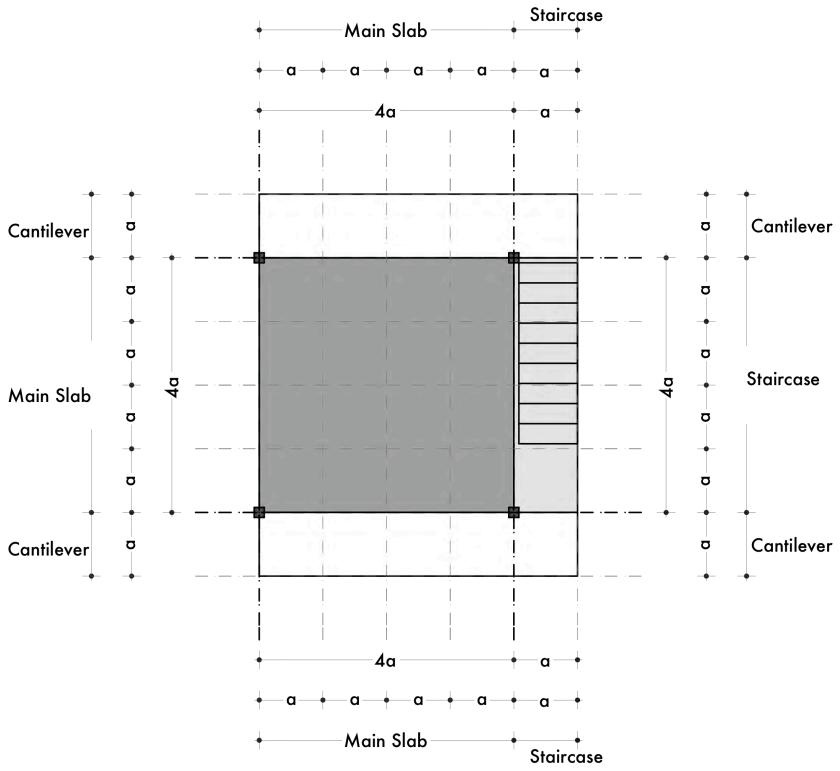


Figure 4.20 **Dimensions of the structural grid (fourth group of plans).** Produced by the author.

4.1.5 Evaluation of the Plan Types

The analysis of the fifteen Dom-ino units under four plan types suggests that although they are totally different in their plan organizations, they all fit into the same modular structural grid. At this point, it could be said that the structural grid is the main regulator, which forms the general framework of the Dom-ino units and consequently of the Dom-ino clusters.

Although the main slab and vertical circulation element are constant geometric modules in all of the fifteen Dom-ino units (analyzed above), the flexibility in the configuration of the cantilevers points out that the Dom-ino frame can be adapted and interpreted for any particular joint. Each of these new adaptations and interpretations reveals new Dom-ino units with alternative plan configurations. Therefore, the cantilevered parts are significant in the frame because they not only provide free facades, but could also be rearranged to produce alternative units. Another common point obtained through the analysis is that the cantilevered parts are the determiners of the directions of growth in each one of the fifteen units. The existence of a cantilever means that the unit is complete and will not grow in that direction, and the absence of the cantilever on one side indicates that the unit will be jointed on that side. This could be seen limiting, but the flexibility in the configuration of the cantilevers alters this situation.

Another significant inference derived from the analysis above is that, despite their variable plan organizations, all Dom-ino units have the same vertical section (Figure 4.21). Therefore each of the units has all the architectural potentials brought by this remarkable section. The whole structure in every single Dom-ino unit is raised up in the air on the *pilotis*, the cantilevered parts provides a free façade to be designed freely, and the flat roof permits an additional ground for the roof garden. This part does not go into the positive aspects and advantages of the particular Dom-ino section since it is discussed in the second chapter of this thesis (Chapter 2.2.1). However, the important point to be emphasized here is that the common potentials shared by the Dom-ino units suggest that any single Dom-ino unit could represent

all the others. At this point, Le Corbusier's selection and demonstration of a single Dom-ino unit (unit A) in *Oeuvre Complete, Volume 1, 1910-1929* makes sense once again. He selects a single unit because any unit could represent the others, and selects this particular unit (unit A) because it *suggests the existence of others*. This situation not only proves that every single aspect in the Dom-ino project is *intentional* and *consciously planned*, but indicates that the presentation of the project is also *intentional*.

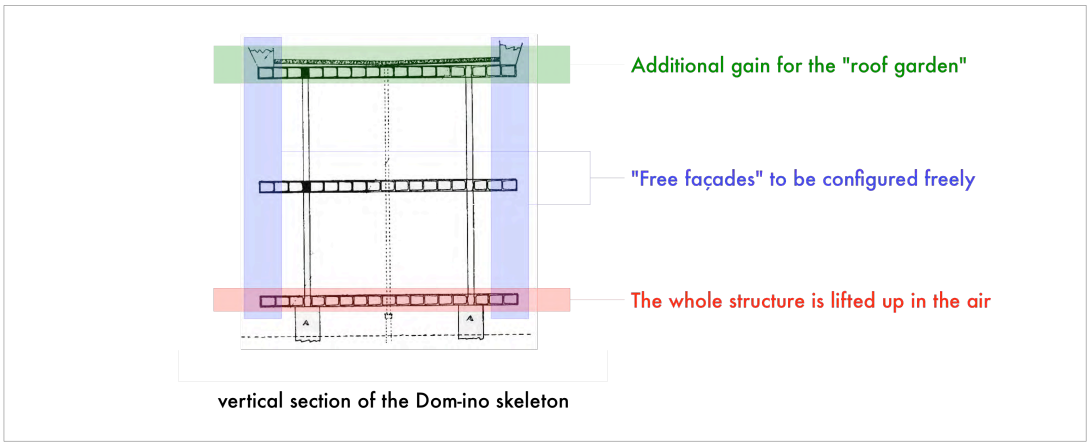


Figure 4.21 **Vertical section of the Dom-ino skeleton**. In Le Corbusier, "Les Maisons Dom-ino," *Oeuvre Complete, Volume 1, 1910-29*, edited by W.Boesiger and O.Stonorov (Berlin: Birkhauser Publishers, 2006), 23. Edited by the author.

4.2 Combination Alternatives of the Dom-ino Units

The previous analysis of the Dom-ino units points out that countless alternative Dom-ino units could be designed other than the fifteen units mentioned. This situation proves the *generic* quality of the Dom-ino frame to produce limitless alternatives in unitary base. In addition to this analysis that demonstrates the flexibility inherent in the units, this part of the chapter focuses on the combination alternatives of the Dom-ino units to demonstrate the infinite possibilities of producing Dom-ino clusters.

To do so, the analysis focuses on the pair combinations of Dom-ino although there are the combinations of three, four, or so on. The reason for focusing on the pair combinations is that these combinations in fact embrace all the other combinations,

and suggest possibilities of producing different combinations of Dom-ino clusters. The Dom-ino pairs are selected among the fifteen units analyzed above (Figure 4.22). In the analysis, every single Dom-ino unit is coupled with each of the other fourteen Dom-ino units, and the alternative combinations of each pair are explored. This study, in a way, proves that no single Dom-ino unit is the direct pair of any other. As it is stated before, every single Dom-ino unit could join with any unit from the other fourteen units with countless configurations; therefore, no single Dom-ino unit is bound to any other.

The range, diversity, and number of different combinations of the Dom-ino pairs illustrated in Figure 4.22 shows that the Dom-ino frame could generate infinite combinations of Dom-ino clusters. The aim here is to illustrate the infinity inherent in the system, but this study could be a reference for further inferences; mathematical formulas and computer codes could be produced for the alternative configurations of the Dom-ino frame and the clusters. With the codes and formulas of the Dom-ino clusters many more alternatives could be obtained than that of the ones illustrated in the chart. The flexibility inherent in the configurations of both the units and the clusters suggests that Dom-ino is an interpretable and adaptable frame that could be re-arranged for different conditions. This thesis argues that it is the *simplicity* of the frame that leads to the *complexity* of the outcomes. The liberation of the design process from all the secondary elements and consequently from all kinds of dependencies gives architect a great freedom in design. On this subject, Turner states:

> At first glance, the Domino design seems consummately simple and straightforward: a concrete structural unit consisting of three horizontal slabs, six columns, and a stair connecting the levels. This was to provide two-story housing units, which could be linked or expanded in various ways, as Jeanneret suggested in other drawings and also in a patent that he wrote up in his notebook, which described as a "*system of construction able to be arranged according to infinite combinations of plans*". [6]

[6] Turner, *THE OPEN HAND: Essays on Le Corbusier,* 32-34. Emphasis added.

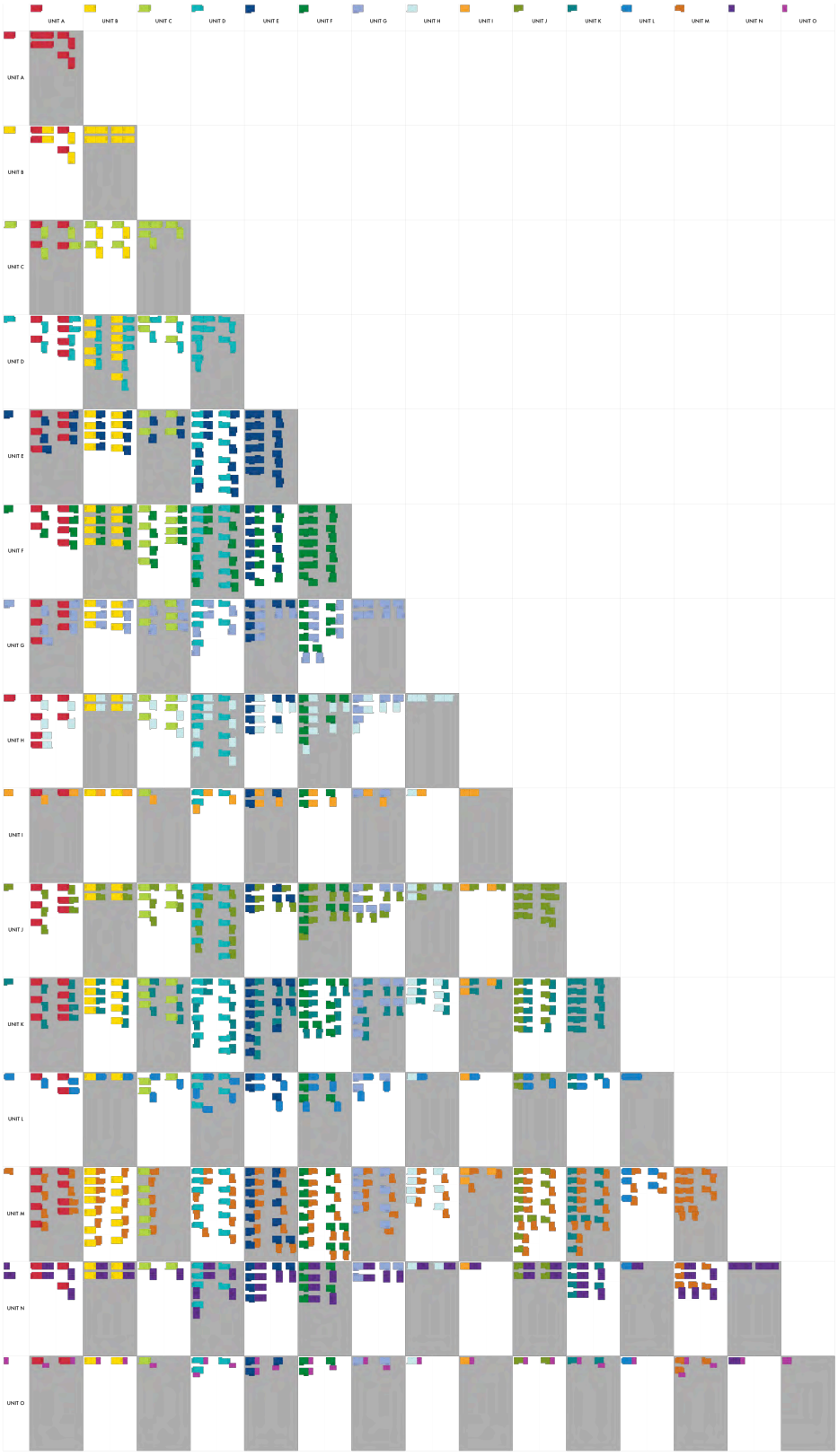


Figure 4.22 **Chart showing the combination alternatives of the fifteen Dom-ino units**. Produced by the author. (Larger version of the image is in a pocket in the back-cover of the thesis.)

It should be clarified here that although Dom-ino is mentioned to be the basis of limitless alternative units and clusters, there are some determinants that bring *order* to the whole scheme. The main determinant in the Dom-ino frame is the *structural grid* that regulates both the configurations of single units and the arrangements of clusters.[7] The positioning of the units and the general layout in the clusters are organized within the modular structural grid put forward by the Dom-ino frame. It could be seen in Figure 4.22 that the pairs could not be jointed in any intended configuration. The modular grid regulates the way they are linked and expanded, thus the units could only be jointed in either linear directions or right-angled turns. As a result of this control implemented by the structural grid, Dom-ino clusters are generally linear settlements with right-angled turns at some particular points, which defines *courtyards* of varying dimensions and proportions (Figure 4.1). Although it seems like a constraint that restricts the design process, Le Corbusier applies the modular structural grid to his Dom-ino frame because he approaches *modularity* as the insurance of "architectural unity" and "proportion." [8] Therefore, the use of the modular structural grid in Dom-ino is a significant design decision that brings *order* and *unity* to the whole arrangement, and consequently ensures a "coherent complex."[9]

Another determinant of the way the Dom-ino units are jointed is the particular configurations of the cantilevered parts of the units. As it is analyzed in Chapter 4.1, the chart showing the possible configurations of pairs illustrates that the units are jointed on the sides with no cantilevers (Figure 4.22). Therefore, any particular cantilever configuration of a single Dom-ino unit determines the position and direction of the other, like in the pieces of a puzzle. At this point, the Dom-ino frame could be related to the "Domino game" as Frampton,[10] and Klaus Peter Gast also

---

[7] The significance and control of the structural grid in the particular plan configurations of the Dom-ino units are analysed and illustrated in Chapter 4.1.

[8] Le Corbusier, *Towards a New Architecture*, 237. Emphasis added.

[9] Klaus Peter Gast, *Le Corbusier: Paris-Chandigarh* [translation from German: Michael Robinson] (Basel, Switzerland: Birkhauser-Publishers for Architecture), p. 27.

[10] Frampton, *Modern Architecture*, 152.

did.[11] In the Domino game, adjacent tiles should match each other having the equal values; the first tile determines the second, the second determines the third, and so on (Figure 4.23). Thus, the way the units are linked to each other, both in the Dom-ino frame and in the Domino game, shows similarity. Another resemblance with the Domino game is that there is also possibility of infinitely various combinations, and the "formations of dominoes in play" resembles the Dom-ino clusters in the way they generate linear settlements with right angled turns (Figure 4.23).[12] Another analogy, made by Frampton, is that the freestanding columns of the Dom-ino frame "could be regarded in plan as domino dots."[13] Besides all these similarities, Domino tiles are rectangular units, which are twice as long as they are wide, and a line in the middle suggests a division into two squares as the structural grid does in the double square Dom-ino units (analyzed in Chapter 4.1.1, 4.1.2, and 4.1.3). Although, Le Corbusier does not directly state anywhere that he derived the idea from the Domino game, the name of the project (i.e. Maison Dom-ino) suggests this. Accordingly, the comparison of the Dom-ino frame with the Domino game is significant because the way the Domino game constitutes the basis of such a remarkable architectural project, and the way Le Corbusier transforms the game to an architectural masterpiece are considerably striking.

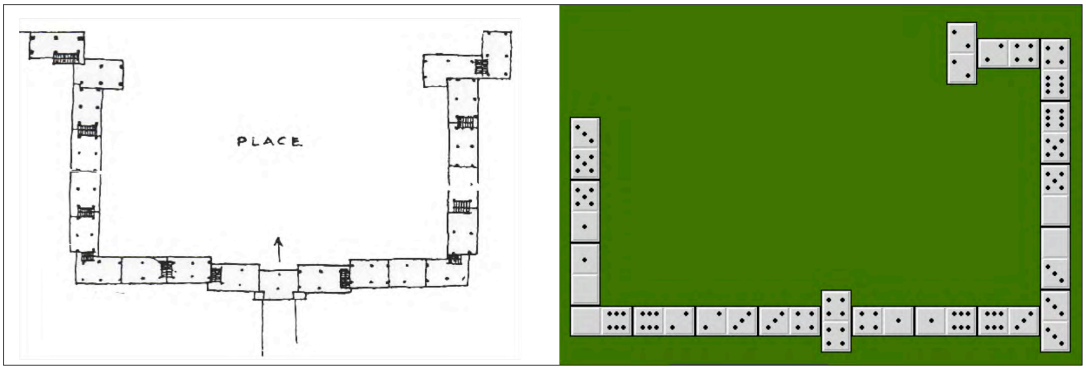


Figure 4.23 **Comparison of an alternative Dom-ino cluster with an alternative formation of the dominoes in play**. Source: http://www.sadmansoftware.com/images/fivesshot.gif. Produced by the author.

[11] Gast, *Le Corbusier: Paris-Chandigarh*, 26.

[12] Frampton, *Modern Architecture*, 152.

[13] Ibid.

4.3 Discussion: Architectural Potentials of Dom-ino

This part of the study begins with an elaboration of the Dom-ino system in reference to Le Corbusier's explanations, and further gathers the intentions behind the system and the primary components of it to emphasize its architectural potentials. In *Oeuvre Complete, Volume 1, 1910-1929*, Le Corbusier explains six points of the Dom-ino system.

> 1) It is purely structural, being quite independent of the interior plan of the house; whatever the plan, the structure remains the same.
>
> 2) The constituent elements are standardized and may be assembled in a variety of ways, this flexibility being a source of diversity in designing groups of houses.
>
> 3) The reinforced concrete columns are poured in situ. Once they have set, metal spigots are attached to each column, their function being to hold in suspension a grid of steel I-beams, formwork for the pouring of the floor slabs, which must be completely smooth on both sides. This new technique does away with traditional, costly, wooden formwork, replacing it with a metal system, which may be, reused any number of times.
>
> 4) An engineering firm is responsible for delivering the Dom-ino frames to the site, grouped in accordance with the architect-town planner's particular design.
>
> 5) As regards the design of the house itself, the particular position of the concrete columns on the perimeter of the structure (therefore not in any way impeding the interior space) and yet just inside the outer edge of the floor slabs means that the architect has complete freedom in the disposition of the interior walls, doors, cupboards, and other fitments, as well as complete freedom in the organization of the facade.
>
> 6) Another firm, sister to the first, is responsible for the manufacture of all possible fitments, inside and out, according to standardized measurements. The building procedure is then as follows: the structure is erected; the fitments are placed; the interior dividing walls and exterior walls are constructed. [14]

[14] Gregh, "The Dom-ino Idea," 62. Gregh directly translates these six points from the text on Dom-ino by Le Corbusier, in *Le Corbusier's Oeuvre Complete, 1910-1929, Volume I*, p.23.

These six points respectively refer first, to the *free plan* independent from the constraints of the bearing wall construction, in which the structural frame introduced by Dom-ino exists only as a skeleton to fill in as wished; second, to the fact that the *standardization* and *flexibility* inherent in the Dom-ino system leads to *diversity* in the configurations of alternative clusters; third, to the *smoothness* and *economy* of the new construction system owing to the reusable metal formwork; fourth, to the fact that the project is a product of *coordination* between different disciplines, namely the engineer and the architect-town planner; fifth, to the set-back of the columns, which helps the design to release from all kinds of dependencies and provides maximum *freedom* both in the disposition of all secondary elements and the organization of the facade (i.e. the *free facade*); and sixth, to the *management* and *industrialization* of the construction process. The elaboration of these six points summarizing Dom-ino proves that Dom-ino is a synthesis of many ideas that preoccupied Le Corbusier. The elements of this synthesis could be summarized as the *economic, industrial, technical* and *sociological* aspects of design, as Gregh discusses in her article.[15]

Both the elaboration of the six points of the Dom-ino system, and the analysis done on the clusters, units, and alternative combinations of Dom-ino show that it is a highly complex frame that embodies and exhibits significant architectural potentials. The following part of this chapter will make a final elaboration and evaluation of the intentions that pave the way for Dom-ino frame's creation, and of the architectural potentials that Dom-ino brings forward.

4.3.1 Modular Structural Grid as a Regulating Tool

The analysis of the alternating Dom-ino units and the clusters they generate shows that the *modular structural grid is used as a regulating tool* that guarantees flexibility and unity, rather than a constraint, both in the plan configurations of units (Chapter 4.1) and in the arrangement of clusters (Chapter 4.2). It coordinates the design by

[15] Ibid., 72.

introducing a *dimensional discipline* and *modularity* to ensure maximum *repetition* and *standardization* in the predetermined grid layout (Figure 4.24). Most probably that's why the kind of architecture Le Corbusier envisages is based on the "multiples and divisions of a geometric module," as it is shown in figure 4.24.[16]

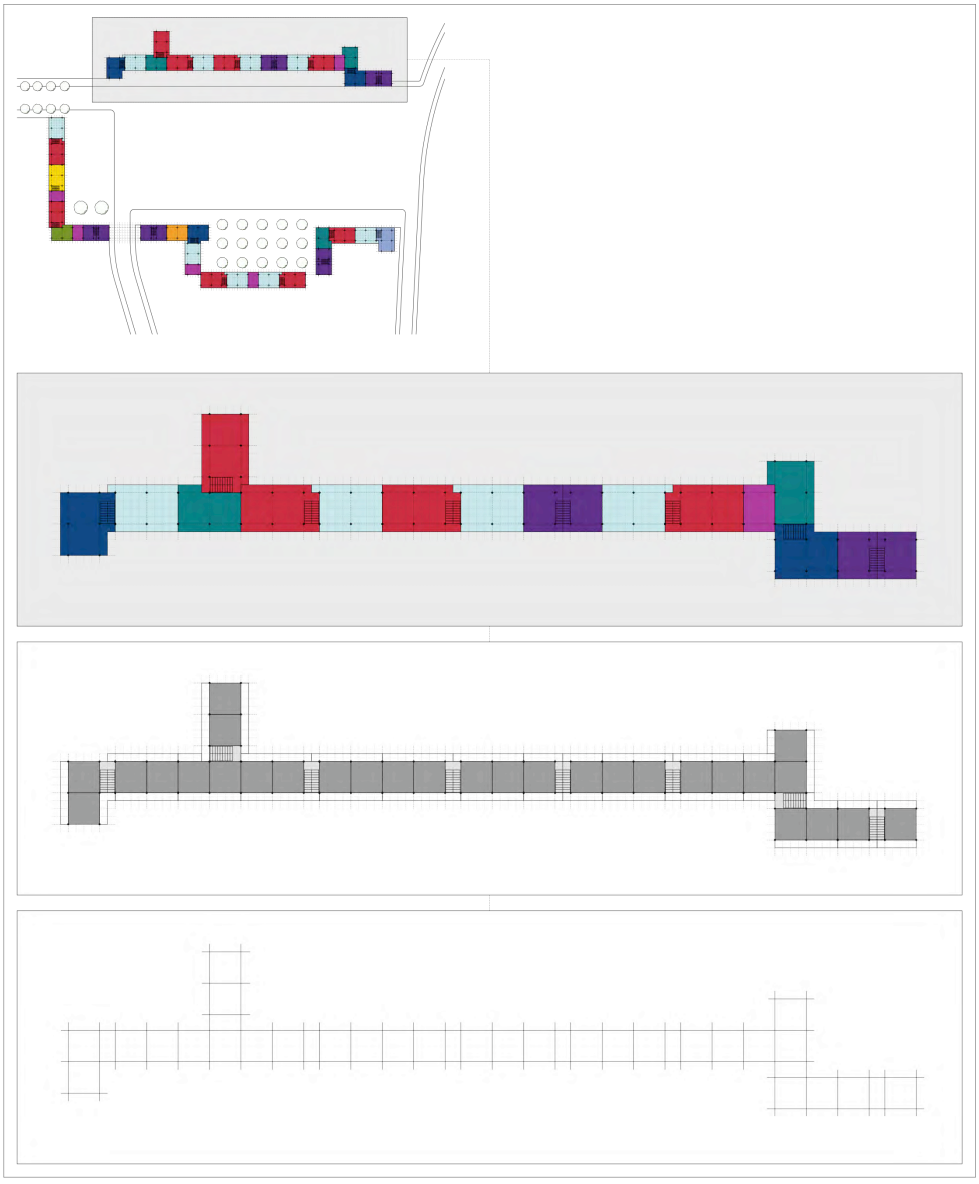


Figure 4.24 **Modular structural grid in Dom-ino (partial analysis of a cluster)**. Produced by the author.

[16] Ibid., 68. Gregh drives these from the notes of Jeanneret in his undated sketchbook, which he fills with notes and drawings of the Dom-ino project.

Discussing *modularity* as an approach that subdivides a system into smaller parts, this thesis argues that the structural and spatial modulation in Dom-ino is *intentional* because, in this way, every particular Dom-ino unit in the whole organization could be created and modified *independently*. Being both the components and outcomes of a modular system, Dom-ino units could be re-arranged in a variety of configurations. In addition to the *flexibility* achieved by this means, modularity brings forward some other acquirements. For instance, Le Corbusier insists that a "module" or a "common unit of measurement" assures "*unity*" and "*proportion*" in design.[17]

> A further gain, of the greatest importance, is architectural *unity*, and by means of the module, or unit of measurement, good *proportion* is assured automatically.[18]

This study asserts that both *flexibility* in the individual and multiple configurations of the Dom-ino units, and *unity* in the whole organization could concurrently be achieved only by adhering to a *standardized framework*. Being well informed and aware of the advantages brought by standardization, Le Corbusier uses the modular structural grid as a framework in his Dom-ino design. Therefore, this thesis argues that the *modular* design of Dom-ino is an attempt to benefit from the advantages of *standardization.*

4.3.2 Standardization as the Source of Diversity, Order, Rhythm, Unity, and Proportion

The *standardization* idea is brought forward with the *industrial mass-production*, which Le Corbusier strongly believes that it should be directly applied to architecture. Flora Samuel argues that there seems to be three motives behind Le Corbusier's "obsession" with standardization. For her, Le Corbusier chooses to apply *standardization* in his designs in order "to provide cheap high quality homes," "to make life more simple" and "less easy to grasp, to connect people together

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[17] Le Corbusier, *Towards a New Architecture*, 237. Emphasis added.

[18] Ibid. Emphasis added.

through their shared use of *standard* elements." [19] As she mentions, one of the reasons why Le Corbusier insists on standardization is *economy* because when the primary elements of construction are once standardized they ensure the *reduction in cost* due to lesser customization.[20] However, there exist some other potentials that standardization brings along, beyond *economy* and *simplicity.* Gregh summarizes these potentials as *diversity, order, rhythm, unity*, and *proportion,* referring to a letter written by Le Corbusier.[21] In this undated letter he wrote to his engineer friend Du Bois about the Dom-ino frame, Le Corbusier discusses Dom-ino as an "invention" that embraces *order, rhythm*, and *unity* in the total design (Figure 4.25). He notes that "the reduction of the building to a few standardized elements" is the first advantage of the Dom-ino frame that "provides the basis for systems of *modular proportion*."[22]

The contents and multiplicity of these potentials (i.e. *economy, simplicity, diversity, order, rhythm, unity*, and *proportion*) clarify Le Corbusier's insistence on standardization, because they all play a key role in architecture. These potentials are achieved in the Dom-ino frame through the design and manufacture of standardized elements, and the standardized modular structural grid. In general, Dom-ino could be summarized as the *standardization* of the structural skeleton, of the secondary elements of design (including windows, doors, gates, etc.), and consequently of the construction process. The analysis in figure 4.25 illustrates the fact that the *unity* and *proportion,* achieved by the standardized modular structural grid, pave the way for mathematical or proportional relations, and consequently for *order* in the Dom-ino frame.

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[19] Flora Samuel, *Le Corbusier in Detail* (Oxford: Architectural Press, 2007), 16. Emphasis added.

[20] Le Corbusier, *Towards a New Architecture*, 229.

[21] Gregh, "The Dom-ino Idea," 70. Emphasis added. Gregh quotes from Le Corbusier, from his undated letter to Du Bois.

[22] Ibid. Gregh stated that Jeanneret noted the first advantage in his notes for the patent, in Sketchbook 1915-16, p. 58 (note 1).

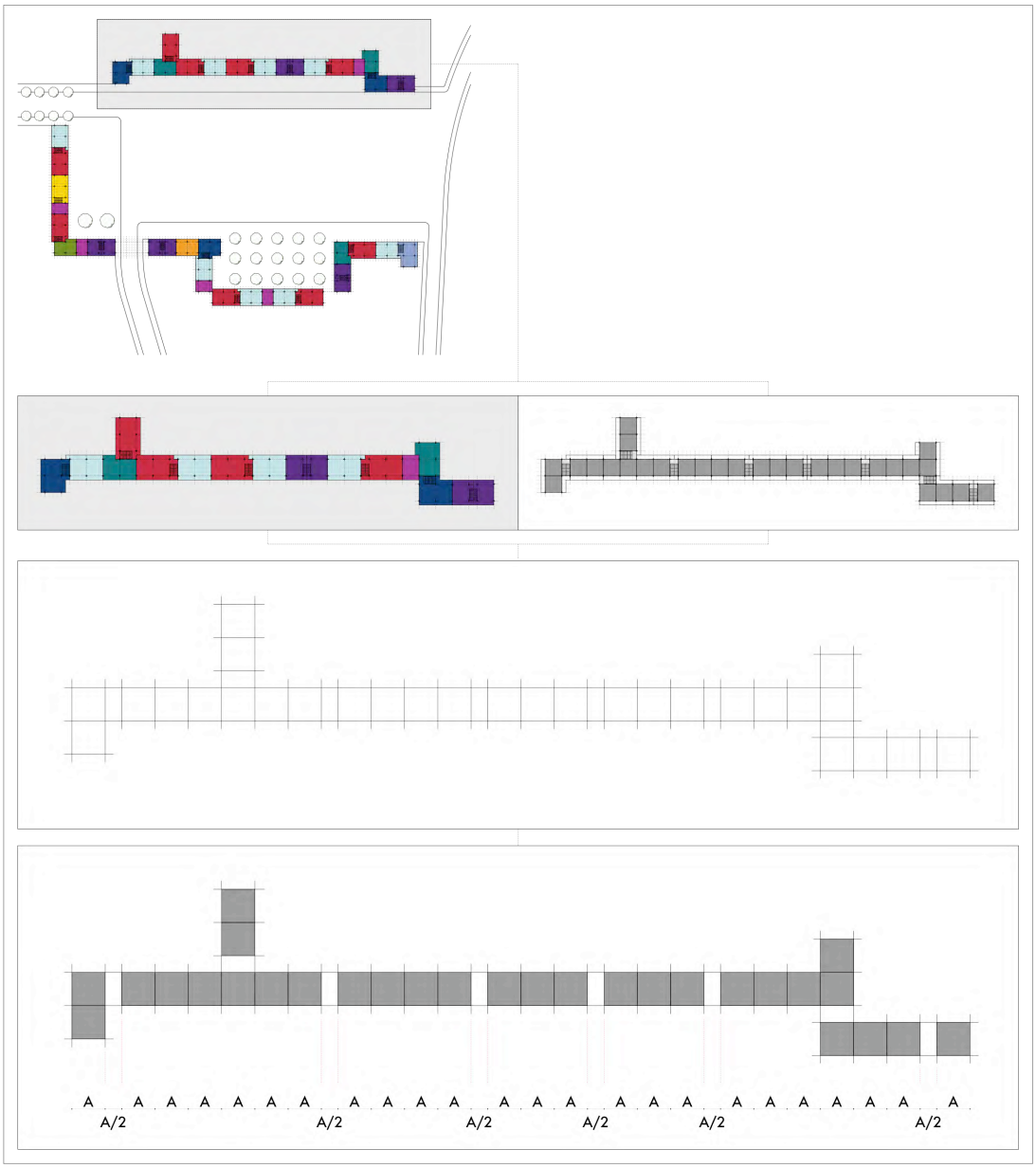

Figure 4.25 **Order, rhythm, unity, proportion, and diversity suggested by the modular structural grid in Dom-ino (partial analysis of a cluster)**. Produced by the author.

4.3.3 Mass-production

> *Industry on the grand scale must occupy itself with building and establish the elements of the house on a mass-production basis.*
>
> *We must create the mass-production spirit.*
>
> *The spirit of constructing mass-production houses.*
>
> *The spirit of living in mass-production houses.*
>
> *The spirit of conceiving mass-production houses.*[23]

Le Corbusier evaluates mass-production as a "*great epoch*," and insists that "*the problem of the house is a problem of the epoch*."[24] Therefore, he applies the principles brought forward with industry, and consequently with mass-production into his domestic designs, and primarily to the Dom-ino frame. The elements of construction in the frame, and consequently every single Dom-ino unit, being *modulated* and *standardized*, are designed on a mass-production basis; and Le Corbusier's drawings, both for the patent and presentation of the project, emphasizing the combinations, multiplications, and repetitions of the units are confirmations of this basis. *Speed and thoroughness in planning, rapid manufacture*, and *easy construction* are some of the advantages brought by the mass-production spirit, and the Dom-ino frame possesses all these advantages because it incorporates the principles of "mass-production and large scale industrialization."[25]

> […T]his new "purified" and redefined type of building permits *standardization* and subsequently *industrialization* and *mass production*. [26]

Le Corbusier states that the mass-production house necessitates "a minute study of every detail connected with the house, and a close search for a *standard*."[27] The

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[23] Le Corbusier, Towards a New Architecture, 227.

[24] Ibid.

[25] Ibid., 236.

[26] Tzonis, *Le Corbusier*, 35.

[27] Le Corbusier, Towards a New Architecture, 264.

analysis of the Dom-ino clusters, and consequently of the Dom-ino units, their combination alternatives, and the way they come together significantly proves that the Dom-ino project is based on “analysis and experiment” as it is in mass-production.[28] For these reasons stated above, this thesis argues that Dom-ino is a significant architectural frame, representing the one-to-one implementation of the *industrial mass-production* into *architecture*.

4.3.4 Generic Quality as the Source of Flexibility and Adaptability

It is far too much discussed and stressed in the written texts on Dom-ino that it is a *flexible*, *adaptable*, and consequently a *generic* frame in terms of plan and facade organizations. However, this thesis elaborates the *generic* frame from a different point of view; it analyzes Dom-ino clusters and the way units are jointed to each other in order to discover the potentials of *repetition, variation* and *multiplication.*

The inferences of the analysis prove that Dom-ino is a *framework* that forms a base for many Dom-ino units other than the emphasized one, since it has the technical capacity to produce alternative units with flexible cantilever configurations (Chapter 4.1). This framework generates not only alternative units, but also infinitely different combinations for clusters because any particular Dom-ino unit could be jointed with any other, in any particular configuration (Chapter 4.2). These inferences reinforce the argument of this thesis, which insists that Dom-ino is an adaptable, flexible, interpretable, and consequently a *generic* frame without any constraint. It is a *general, common, and inclusive* frame rather than a *specific, unique*, or *selective* one.

This study argues and proves that the *simplicity* of the frame leads to this *complexity,* and consequently to the *infinity* of the outcomes; the *uniformity* of the frame brings along the *variety* in general. Liberation of the design process from all

[28] Ibid., 227.

the secondary elements by the reduction of the building to a few standardized elements (i.e. three horizontal slabs, six footings, six linear columns, and a staircase) *reduces limits* and *maximizes freedom* in the plan and façade organizations, while the standardized modular structural grid creates *freedom* in the total design. As Eisenman asserts, Dom-ino is an *extremely clear, simple*, and *straightforward* frame that defines the "*minimal conditions for any architecture*".[29] This *flexibility* inherent in the system is interpreted by Gregh as the *suitability* and *adaptability* of the frame to *all building types*.[30] For these reasons, this thesis argues that the design of the frame is convenient to be adapted to any user (of low-middle-high income groups), to any physical environment, and any particular situation.

4.3.5 Intentionality

The previous analysis of the units and clusters of Dom-ino proves the fact that the frame is endowed with intentional decisions both in detail, and general. As it is mentioned and clarified before, the selection and elaboration of a single Dom-ino unit (with a cut-out in the corner) for the representation of the idea of the project is intentional in the way it indicates the incompleteness of the slab (Figure 4.10). This is an intended selection that suggests an addition or joint, in order to emphasize that it is a cluster project. The absence of columns carrying the staircase is again intentional, and indicates the possibility of multiplication (Figure 4.10).

The selection and elaboration of a single Dom-ino unit to represent the whole project, and consequently the presentation of the frame, suggest another intentionality because any particular unit could represent the others and the whole project in total, by possessing all potentials brought forward by the frame.

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[29] Eisenman, "Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign," 191. Emphasis added.

[30] Gregh, "The Dom-ino Idea," 81.

This thesis argues that the intentional decisions in the Dom-ino frame are not limited with the ones stated above; but even these three points are adequate to prove that it is a product of analysis and experiment. Everything is *conscious, calculated* and *planned*; and *nothing is coincidental* in the design and representation of the frame.

4.4 Dom-ino as a Diagram

The third chapter discussed and highlighted how Dom-ino is approached as an *idea* or a *diagram* in the written texts by particularly referring to the three main articles on Dom-ino (i.e. Peter Eisenman's "Aspects of Modernism: Maison Dom-ino and the Self-referential Sign," Eleanor Gregh's "The Dom-ino Idea," and Barry Maitland's "The Grid."). These three articles evaluate Dom-ino as an architectural diagram with different interpretations of the architectural potentials of a *single* Dom-ino unit. Different from these three interpretations, this thesis focuses on the architectural potentials of the Dom-ino *clusters*, and the repetition, variation, and multiplication of the units in order to better understand why Dom-ino is or could be approached as a *diagram*. The above-discussion on the potentials of Dom-ino clusters, gathered through the analysis, reinforces Dom-ino's diagrammatic potential. Stan Allen describes diagram as such:

> Multiple functions and action over time are implicit in the diagram. The *configurations* it develops are momentary clusters of matter in space, subject to *continual modification*. A diagram is therefore not a thing in itself but a description of *potential relationships among elements*, not only an abstract model of the way things behave in the world but *a map of possible worlds*. […] Its abstraction is instrumental, not an end in itself. Content is not embedded or embodied but outlined and multiplied. *Simplified* and *highly graphic*, diagrams support *multiple interpretations*. *Diagrams are not schemas, types, formal paradigms* or *other regulating devices*, but simply place-holders, instructions for action, or contingent descriptions of *possible formal configurations*.[31]

[31] Stan Allen, "Diagrams Matter," Any 23 (2000): 16. Emphasis added.

Allen's description of diagram above reinforces this thesis' argument that Dom-ino is an *architectural diagram*, beyond question. The analysis of the Dom-ino clusters proves that various plan and cluster configurations could be realized, and it is emphasized that the alternatives analyzed in this study are not the only ones. The "*continual modification"*, which Allen mentions to be explicit in a *diagram,* is also valid for the Dom-ino frame.[32] The configurations of both the clusters and the units of Dom-ino are only some of the "momentary clusters" that the frame generates.[33]

Dom-ino is an "abstract model", which designates the "potential relationships among elements" with the precise selection, size, number, and location of the elements and the modular structural grid introduced by the frame.[34] This particular configuration of the elements in the Dom-ino diagram does not restrict, but constitutes "*a map of possible worlds*," and guides the design process forming a base for "*possible formal configurations*," in the way it supports "*multiple interpretations*" (Figure 4.26).[35] Gilles Deleuze states that "the diagram is a *possibility of fact* - it is not the fact itself," and the Dom-ino frame suggests these possibilities.[36] This thesis argues that, although Dom-ino was not aimed to be created as a diagram by Le Corbusier in the period it is developed, it turned out to be a significant diagram in the history of architecture, embodying all the potentials attributed to a diagram, such as being *generic*, and *operative* in the sense that it suggests design actions for *multiplication, growth* and *extension*. As it is elaborated in this analysis chapter, both the particular cantilever configurations of alternative units and the modular structural grid operate the multiplications, extensions, and directions of growth in the clusters (Figure 4.12, 4.14, 4.16, and 4.19)

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[32] Ibid. Emphasis added.

[33] Ibid. Emphasis added.

[34] Ibid. Emphasis added.

[35] Ibid. Emphasis added.

[36] Gilles Deleuze, "The Diagram," in *The Deleuze Reader*, edited by Constantin Boundas (New York: Columbia University Press, 1993), 193. Emphasis added.

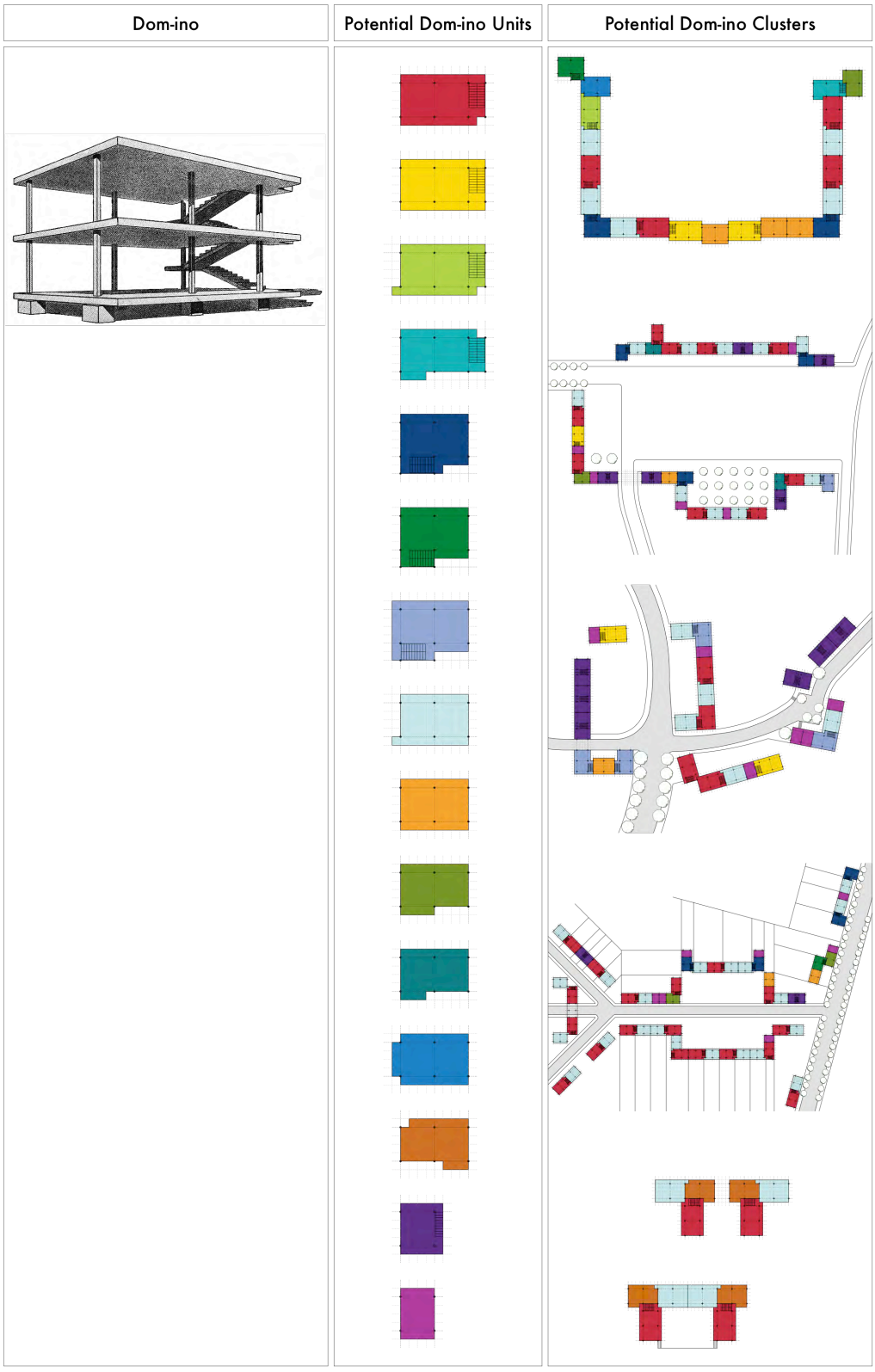

Figure 4.26 **Possible formal configurations and exemplary potential combinations suggested by the Dom-ino diagram**. Produced by the author.

Similar to Allen's differentiation of diagram from "schemas, types, formal paradigms, or other regulating devices," Eisenman makes a distinction between the diagram and the type, although he discusses both as a condition of abstraction.[37]

> While type moves towards abstraction, it does so in a way that reduces the model, the copy or the original. The diagram, on the other hand contains more than the model. The type and the diagram are two different conditions of abstraction: type, the abstraction of a reduction to a normalization, and diagram, *the abstraction that may generate into something more than the thing itself*, and thus potentially overcome normalization.[38]

Referring to these differentiations made by Allen and Eisenman, this thesis approaches Dom-ino as a diagram, because it fits better to the condition of abstraction of a diagram, rather than of the type. As the analysis (in Chapters 4.1 and 4.2) proves, the alternative Dom-ino units and clusters are produced and *multiplied without being copied*, because the Dom-ino frame potentially points to "a state of continual transformation" (Figure 4.26)[39] From the very beginning this study argues Dom-ino as a simplified and abstract frame that forms the basis for infinitely alternative outcomes, and this argument directly corresponds to Eisenman's definition of diagram as "*the abstraction that may generate into something more than the thing itself*."[40]

Another condition, which proves the diagrammatic potential of the Dom-ino frame, is the selection and elaboration of a single Dom-ino unit to represent the whole project. The capability of this single unit to manifest *the idea* of the project suggest that any particular unit possesses all the potentials brought forward by the frame, and

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[37] Allen, "Diagrams Matter," 16.

[38] Peter Eisenman, "Diagrams of Anteriority" in *Diagram Diaries* (New York: Universe Publishing, 1999), 42. Emphasis added.

[39] Robert Somol and Sarah Whiting, "Notes Around the Doppler Effect and other Moods of Modernism," Perspecta 33 (2002): 74.

[40] Eisenman, "Diagrams of Anteriority", 42. Emphasis added.

consequently could represent the others and the whole project in total. Ben van Berkel and Caroline Bos approach diagram as a "reductive machine for the compression of information."[41] Being a "*reductive machine*" that compresses all the architectural potentials of the Dom-ino frame, this single Dom-ino unit could be approached as the diagram not only of the Dom-ino clusters but also of other domestic projects of Le Corbusier.[42]

The elaboration of the architectural potentials Dom-ino diagram possesses (based on the analysis of Dom-ino clusters), and the intentions behind these potentials prove and clarify that Dom-ino is the *synthesis of many ideas* held over a long period. This thesis argues that Dom-ino is an architectural diagram because it accommodates such a complexity with considerably few elements. This extremely clear diagram embodies all the potentials of the *modular, standardized, repeatable*, and *mass-producible* architecture. It is an *economic, simple, flexible, adaptable*, and a *generic* solution for the *diversified, proportional, rhythmical, orderly*, and *unifying* settlements. These potentials indicate and demonstrate that the idea is architecturally revolutionary, and Dom-ino is a *significant architectural diagram,* which changed the formal and logical vocabulary of the architecture in the post-war period, and still continues to be one of the main focuses of contemporary discussions on architecture. It is a premise for contemporary modern architecture and is still valid today since it succeeds in its elusion from all the limiting secondary elements, dependencies and efforts to impose meaning. As a generic system without any statement, Dom-ino diagram imposes nothing, but suggests a frame that allows architects to bring alternative solutions, and permits flexibility and variety. With the freedom inherent in the system it is adaptable for changing needs.

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[41] Ben van Berkel and Caroline Bos, "Diagrams-Interactive Instruments in Operation," *Any* 23 (2000): 20.

[42] Ibid., 20. Emphasis added. As it is stated in the introduction of this thesis, searching for Dom-ino in Le Corbusier's domestic buildings is not in the scope of this study, but at this point Maitland's analysis (in Chapter 3.3) could be recalled since he discusses and illustrates how Dom-ino forms the basis of Le Corbusier's own particular domestic buildings.

CHAPTER 5

CONCLUSION

The need for *rapid reconstruction* in the wake of the First World War, and Le Corbusier's preoccupations with the "house" as the main problem of modern architecture lead him to search for a solution. He aimed at exploring the potentials of *mass-production*, which became a current issue in the modern industry in the beginning of 1900's with its economical and technical concerns, and applying these potentials into domestic architecture. Finally, he came up with the Dom-ino frame, which is an architectural formulation and a social effort that had tried to find answers for the problems of *mass housing* in the specific period it was developed.

The thesis has aimed to explore the architectural potentials through the analysis of the Dom-ino clusters, and the intentions and concerns behind them, because the analysis and its consequences are thought to be helpful in understanding and evaluating the products of contemporary domestic architecture, as Le Corbusier's preoccupations for *economy, simplicity, flexibility, adaptability, variety, unity, order*, and *proportion* are still valid concerns today.

One of the most significant points Le Corbusier achieved with his Dom-ino frame is the *management of the whole production and construction process*. As Tzonis mentions, Le Corbusier's intention was to revolutionize "the *management* and *production* of housing."[43]

[43] Tzonis, Le Corbusier, 32. Emphasis added.

> The project encompassed aspects of *management, construction*, and *design*. It was conceived as a universal […] system for *putting together any kind of building* that responded to the colossal postwar needs while at the same time exploiting the vast opportunities offered by the new means of *construction* and *industrial production*. [44]

This study has argued that, Le Corbusier attempted to benefit from the advantages of *standardization* brought forward by the industrial *mass-production,* in designing the mass producible structural Dom-ino units and the clusters they generate. The analysis of the clusters in the fourth chapter of this thesis confirms that he applied *standardization* to his Dom-ino frame by the implementation of the *modular structural grid*, and the use of standardized elements of construction. Referring to the potentials discovered through the analysis, the thesis has emphasized that besides being *economic* and *simple*, the *modularity* introduced by the standardized structural grid suggests *unity, order, flexibility, diversity, rhythm*, and *proportion* in the whole organization, although they could be seen contradictory.

Although Le Corbusier aimed to eliminate the mass housing problems of the post-war period with his Dom-ino frame, and introduced such a complexity of ideas and potentials, nearly a hundred years later, mass housing is still a problem in the contemporary context, especially in Turkey, as the potentials that the mass-production suggests are not adequately applied. The problems of mass housing can be defined mainly as "*the variety and flexibility in repetition*" and "*the unity in the whole*". The analysis of the Dom-ino clusters and the above-mentioned potentials have showed that the Dom-ino frame overcomes these problems with the integration of *industrial mass-production* into *housing*. For these reasons, this thesis has focused on Dom-ino clusters as one of the first significant mass housing examples embracing all the potentials mass-production suggests.

[44] Ibid., 33. Emphasis added.

- **The Variety and Flexibility in Repetition:**

It is a common concern that the *house* should be able to be appropriated according to the needs and expectations of the dwellers. The *flexibility* and *adaptability* become significant potentials considering these extremely divergent expectations. However, in the contemporary mass housing examples in Turkey, flexibility and adaptability could not be achieved mostly due to economic and technical concerns, which force people to live in *monotypes* (i.e. in 2+1, 3+1, 4+1 and so on) (Figure 4.27).[45] At this point, Dom-ino is a significant example of a *generic* and *adaptable skeleton*, which proposes the basis for *individually alternative solutions* in mass housing.

Figure 4.27 **Various mass housing examples from TOKI in Turkey**. Source: a: Qurbaa Website. Retrieved September 9, 2009 from (http://www.qurbaa.com/images/konyada-yazirdaki-640-toku-konutun-yapimi-tamamlandi-370x247.jpg), b: Kütahya Gündem Website. Retrieved September 9, 2009 from (http://www.kutahyagundem.com/images/toki.JPG), c: Kozan Belediyesi Website. Retrieved September 9, 2009 from (http://www.kozan.bel.tr/upload/toki.jpg), d: Doruk Gazetesi Website. Retrieved September 9, 2009 from (http://dorukgazetesi.com/haberimg/d95b8aa122a8bfa8e4e5db66016f8155.jpg), e: Imageshack Website. Retrieved September 9, 2009 from (http://img115.imageshack.us/i/resim1ae2aq4.png/#q=toki%20imaj), and f: Son Söz Haber Website. Retrieved September 9, 2009 from (http://www.sonsozhaber.com/images/news/1294.jpg).

[45] In the marketing terminology in Turkey, 2+1 is used to indicate houses with 2 bedrooms and 1 living room; 3+1 is used to indicate houses with 3 bedrooms and 1 living room; and so on.

Le Corbusier's approach in designing Dom-ino suggests establishing a framework that allows flexibility in both the individual and multiple configurations and arrangements of a unit; it brings forward flexibility not only in *plan solving*, but also in *patterning*. Therefore, the Dom-ino frame could be defined as a tool for creating free-patterns. For this reason, this thesis insists that the Dom-ino frame is convenient to be adapted to any user (of low-middle-high income groups), to any physical environment, and any particular situation. The necessity of variation in such a uniform program (housing) is accomplished by the flexibility in the frame. As it has been analyzed in the thesis, the Dom-ino clusters overcome the problem of achieving "*variety and flexibility in repetition"* in modern domestic environment, by the use and integration of grid with its "modular and repetitive structure."[46] Le Corbusier uses the *modular structural grid* in the Dom-ino frame as a design tool for *repetition,* which suggests *variation* and *multiplication*. Then, it indicates the *repetition of difference* not *of same*, which highlights generic and diagrammatic potentials of Dom-ino.

- **The Unity in the Whole:**

Another problem in the contemporary mass housing (especially in Turkey) is to achieve *harmony, unity, order,* and *proportion* in the whole organization. The Dom-ino frame produces *consistent, unified, orderly, rhythmical*, and *proportional* settlements, while allowing flexibility and variation in both the individual and multiple configurations of the units as well. This proves that the *modular structural grid* serves as a tool both for producing the individual units with different plan types, and for bringing these alternative units together under a *guaranteed totality*.

The analysis and the above-discussion of Dom-ino clusters' design potentials have put forward that Le Corbusier uses the *modular grid* as an architectural tool for achieving both *variety and flexibility in repetition,* and *unity in the whole*. This thesis

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[46] Rosalind E. Krauss, "Grids" in *The Originality of the Avant-Garde and Other Modernist Myths* (Massachusetts: The MIT Press, 1996), 15.

argues that the way Dom-ino frame produces solutions to these significant problems, and the tools Le Corbusier suggests could guide contemporary domestic architecture, especially mass housing.

The mass housing also includes the problem of clustering in terms of *land use* and the organization of the *outdoor environment*. The way in which the whole Dom-ino settlement is elevated on pilotis so as to provide an undisturbed green area (that is guided by social and ecological concerns), and the way the Dom-ino clusters define courtyards as common areas for *recreational use, pedestrian circulation*, and *gathering* could suggest the tools for the creation of better environments in mass housing practices.

However, although Le Corbusier introduced the problems of housing, discussed the matters to be dealt with, and elaborated his solutions for the problems nearly a hundred years ago by his Dom-ino frame, the potentials he proposed could not have been properly applied to mass housing since then. This thesis argues that the most important reason for this situation is the fact that the contemporary domestic architectural environment in Turkey, always *reproduces Dom-ino as a single unit*. These *individual reproductions of Dom-ino* produce *individual solutions* as well, and remain unrelated and unconcerned to their surrounding environment. This is contradictory to the idea of Dom-ino because it should be approached as a whole with all the possibilities it possesses (not only with the unitary or multiple potentials it brought forward). Disregarding the possibilities and potentials suggested in the clusters and reducing Dom-ino to a single unit by producing individual copies of the well-known Dom-ino perspective ignore the potentials of mass production it suggests. Although landownership and parceling seems to be the reason of this individuality, the mass housing examples occupying larger sites, which are not subdivided into smaller parcels, also embody and introduce similar problems. In this context, the thesis argues that the analysis of the Dom-ino clusters will be beneficial and instructive, to better understand how Dom-ino overcomes this problem by maintaining a general ordering principle, which guarantees totality.

As it is mentioned before, Dom-ino frame manifests Le Corbusier's ideas, intentions, and preoccupations on the problems of *mass housing*. That is why the thesis has focused mainly on the clusters of Dom-ino to discover the potentials it possesses particularly in the urban scale, not simply on the single Dom-ino unit and the unitary potentials it brought forward (i.e. the five points of new architecture). Then, this thesis insists that the concerns, intentions, preoccupations, and the potentials explored through the analysis of the clusters provide a framework for the contemporary mass housing, both in the production of individual and multiple configurations, and also for the determination, evaluation, and amelioration of the irregularities of house-dominated contemporary urban environments.

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