Continuous while Discrete

Resonant piling as an architectural method
applied to the problem of the floor
in search for a new urban architectonical typology

PhD Candidate
Jordi Vivaldi Piera

PhD Supervisor
Univ.-Prof. D.I. Peter Trummer

Falculty of Architecture
of the Leopolod Franzens University

Continuous while Discrete

Resonant piling as an architectural method
applied to the problem of the floor
in search for a new urban architectonical typology

PhD Candidate
Jordi Vivaldi Piera

PhD Supervisor
Univ.-Prof.D.I. Peter Trummer

2018

The Faculty of Architecture of the Leopold Franzens University of Innsbruck
in order to obtain the academic degree of Doctor of Technical Sciences

Institute of Urban Design

IOUD

To my parents.

The author thanks the following persons for their contribution in relation to different aspects and dimensions of this document:

- Peter Trummer, for his contribution in the architectural content of this doctorate.

- Willy Müller, for his design exigency.
- Manuel Gausa, for his clarity of thinking.
- Daniel Kohler, for his clear-sighted comments on continuity and discretism.
- Sergi García, for his support in the computational simulation.
- Starsky Lara, for his support in the computational simulation .
- Maite Bravo, for her methodological support.
- Maria Kuptsova, for her critics on object oriented ontology.
- Edouard Cabay, for his comments on the drawn material.
- Ji Won Jun, for his support on the image visualisation.
- Josep Alcover, for his support on the image visualisation.
- Marc Sancho, for his contribution in the layout of this document
- Firas Saffieddine, for his comments on the notion of floor.

In experimental academic architecture and over the past decade, the formal recourse to continuity, generalized with the computational revolution of the 1990s, has shown symptoms of exhaustion. In its place, and together with a powerful cross-disciplinary cultural movement, various architectural currents have tried out a reintroduction of the discrete – although the disciplinary impact has been, for the most part, largely cosmetic.

This research is framed by that debate, focusing specifically on a formal study of the floor. This choice responds to the singular performative potential of the floor, justified by its unavoidable and uninterrupted contact with the user in its role as physical support. This work contains an analysis of the discrete floor characteristic of skyscrapers and the continuous floor characteristic of parametricism, and it proposes a third disposition which is not "continuous", "discrete" or "continuous and discrete", but rather "continuous while discrete".

The aim of this research is to demonstrate that the main disciplinary contribution of this third floor is not based on a constructive or aesthetic order, but on a formal and performative one, affecting six formal categories (mereology, geometry, contour, arrangement, development, figuration) and six performative categories (circulation, gaze, orientation, retirement, interiority, access). Its elaboration is also associated with a typology of architectural and urban production based on the object's sameness, which is added to the three typologies (nature, technology, city) outlined by Vidler in the 1970s.

In this process, we use two methodological tools. First, we develop a comparative table which, on the one hand, relates each floor type to the subject-object relationship that characterizes its particular zeitgeist and, on the other hand, describes 12 formal and performative attributes of each floor. Second, we present the results of a computational simulation based on a resonant piling process, which, as a design method, leaves behind emergentist teleological holism and instead emphasizes the collections, ex-centricities and interlacements associated with Levy Bryant's regimes of attraction.

This results in a catalog of 68 computational models that are analyzed based on six spatial categories: clumps, distributions, fillings, interstitialities, silhouettes and grounds. The floor disposition that emerges in various of these models is described as a continuous while discrete floor. The analysis, based on 36 comparative axonometric drawings, outlines the formal and performative contributions of the proposal in relation to the discrete floor and the continuous floor analyzed in the initial chapters.

The formulation of this third floor disposition is relevant to architecture for two reasons. First, it affirms the formal and performative (and not only constructive or aesthetic) potential of the architectural reintroduction of the discrete form characteristic of this decade. Second, it opens a line of architectural research related to object-oriented ontology which is based on a new typology of architectural production linked to the object's sameness. Both points are an incentive not only for contemporary architectural theorization, but especially for the production of experimental architectural design.

Keywords: Continuity, discretism, floor, pile, architectural typology, object oriented ontology.

SUBJECT INTERPRETATION	ABSOLUT SUBJECT	RELATIONAL SUBJECT	ZERO SUBJECT
FOCUS	Human	System	Collection
POSITION	Axis	Hollon	Ex-Centricities
SUBJ - OBJ	Distinction	Mediation	Interlacement
EPISTEMOLOGY	Positivism	Perspectivism	Ecognosis
REF. THINKER (SOC)	A. Comte	Z. Bauman	T. Morton
REF. THINKER (ONT)	I. Kant	G. Deleuze	L. Bryant
MOVEMENT	Modernism	Poststructuralism	Spec. Relativism
FLOOR LAYOUT	DISCRETE FLOOR	CONTINOUS FLOOR	DISC while CONT FLOOR
DISCRETENESS	Countable	Solo	Dotted
CONTINUITY	Progression	Topography	Grains
F1. MEREOLOGY	Whole = Parts	Whole > ΣParts	Whole< Part
F2. GEOMETRY	Euclidian - Flat	Topological	Combinatory
F3. CONTOUR	Ideal	Virtual	Singular
F4. ARRANGEMENT	Shelves	Field	Sack
F5. GROWTH	Repetition	Deformation	Incrustation
F6. FIGURATION	Grounds	Figure = Ground	Co-Figures
M1. CIRCULATION	Spins	Wander	Jumps
M2. GAZE	Horizon	Voyeur	Gaps
M3. ORIENTATION	Core	Deviation	Contour
M4. RETIREMENT	Margin	Wrapping	Compression
M5. INTERIORITY	Opposition	Gradation	Metryoshka
M6. ACCESS	Single	Scattered	Nested
	Homogeneous	Homogeneous	Heterogeneous
DIAGRAM			

expanded table of contents

Introduction

Chapter I

I. Introduction

Architecture is a critical cultural discipline. It problematizes how a society interprets its own contemporaneity, thus defining itself as a body of knowledge. As a result, architecture is inevitably confronted to a particular 'zeitgeist'[1] and the understanding of the subject that results from it. However, as is the case with any content, architecture needs a form[2] for its transmission. In contrast to other disciplines such as music, literature, philosophy, mathematics, sculpture or painting, architecture is set apart because it involves a unique formal operation: the introduction of a world within a world – in other words, the production of interiority.

As a diachronic discipline, architecture develops the aforementioned formal singularity historically through a specific process: the rearticulation of parts[3] within a gravitational scenario. This rearticulation necessarily occurs under the presence of a particular zeitgeist, pivoting between two formal extremes: a total independence of the parts, characteristic of a discrete framework; and a total codependence of the parts, characteristic of a continuous framework.[4]As a critical mechanism for the production of interiority, the tension between discrete and continuous emerges as a unique, fundamental issue that belongs to the body of knowledge specific to architecture. In that sense, a set of questions emerges: By what methods do the discrete and the continuous produce interiority? How do they problematize a particular zeitgeist? What kind of knowledge is used to articulate both categories architecturally?

1.1 The Problem of the Floor and its Disciplinary Relevance

This dissertation frames the aforementioned debate in the context of a particular architectural element: the floor and its vertical layout. The singularity of the floor as part of an architectural whole is derived from the fact that, in contrast to other parts like walls, windows, pillars, or stairs, the floor is a necessary condition for the production of any kind of interiority within a gravitational scenario. Its absence is inconceivable.
Along those lines, these pages will articulate the problematic as follows: what do the categories of discretism and continuity mean in the layout of the floor at height? How the articulation of each of these categories problematize our zeitgeist? What typologies[5] of architectural production do they belong to? And, more specifically, how can the floor layout debate our subject's understanding through a formal rearticulation of the discrete and the continuous?

The relevance of this research is tied to a question that is rooted in our times but has seldom been addressed with the attention it deserves. It focuses on the possibility of a typology of disciplinary production based on the sameness of the architectural object. Where Vidler distinguished three typologies of architectural production based respectively on nature, technology and the city[6], in the cultural landscape of the 21st century the following question arises: is it possible to find a fourth typology based exclusively on the object?[7]

The question of the object has emerged over the past decade as an essential element in understanding the contemporary cultural landscape. In that sense, the advent of Speculative Realism in the early 21st century, and Object-Oriented Ontology in particular, has eliminated the idea of subject entirely [8], substituting the fields and ontological systems characteristic of the late 20th century with flat collections of objects that engen-

1. *"To escape such a dependence on the zeitgeist – that is, the idea that the purpose of an architectural style is to embody the spirit of its age – it is necessary to propose an alternative idea of architecture, one whereby it is no longer the purpose of architecture, but its inevitability, to express its own time."*
Peter Eisenman, "The End of the Classical: The End of the Beginning, the End of the End," in *Architecture Theory since 1968*, ed. Michael Hays, (New York: Columbia Books of Architecture, 2000), 529.

2. The term "form" should be understood in the way it is used by Tristan Garcia. According to the French thinker, form is the negative of an object – that is, everything that contains it, on the one hand adapting to its profile and, on the other, stretching out into infinity: "Form is what connects the infinite plurality of things to an identical formal infinity."
Tristan Garcia, *Form and Object*, ed. Graham Harman, trans. Mark Allan Ohm and Jon Cogburn (Paris: Edinburgh University Press), 2014, 144.

3. Peter Trummer, interview by Luca de Giorgi, "Peter Trummer: What is Architecture," July 12, 2013, in *What is architecture?*, produced by whatisarchitecture.cc, video 00:11:03, accessed June 8, 2018, https://vimeo.com/70166958.

4. It is interesting to observe how, at both extremes, the term 'part' loses the independent balance that differentiates it. Toward the discrete extreme, its absolute independence makes it into a whole; toward the continuous extreme, its absolute surrender to the whole totalizes it.

5. The term "typology" should be understood in the sense in which it is used by Anthony Vidler in his seminal article "The Third Typology".

6. Anthony Vidler, "The Third Typology," in *Architecture Theory since 1968*, ed. Michael Hays, (New York: Columbia Books of Architecture, 2000), 288-94.

7. The singularity of that kind of typology would reside in that fact that, while in the three prior typologies the referent is always located outside the architectural object – whether in nature, technology or the city – in the fourth typology the referent is located within the object itself.

8. Levi Bryant, Nick Srnicek and Graham Harman, "Towards a Speculative Philosophy" in *The Speculative Turn*, ed. Levi Bryant, Nick Srnicek and Graham Harman (Melbourne: re.press, 2011), 14.

der the Zero Subject.[9] At the same time, in the last decade, and coming from the most experimental areas of architectural scholarship, there has been a certain exhaustion of an architectural rhetoric and aesthetics based on continuity. Exalted in the 1990s from digital parametricism, its continued use over the years has transformed it into a banality with very limited disciplinary interest. In its place, some academic circles have recently experimented with a return to a discrete formal vocabulary, although its impact has been largely cosmetic up to now.

The problem of the floor is very well suited to bring about a qualitative increase in the scope of that impact. The reason lies in the performative and necessary nature of its presence: the floor can hardly be reduced to a mere contingency whose value is accidental. On the contrary: the layout of the floor tends to go unnoticed; it is not made an issue because its presence is so essential that it is accepted acritically as a given[10]. However, its participation as diagram is fundamental: the layout of the floor does not qualify space only through formal categories, but also through performative ones given its peculiarity of being in constant contact with us. This work will approach two main floor diagrams: the discrete floor, represented by the skyscraper, and the continous floor, represented by the topological slab of the end of XX century. In that context, the following question arises: is it possible to produce a new diagram in the vertical layout of floors? How would it problematize the current zeitgeist? And, above all, how would that diagram rearticulate the concepts of discrete and continuous as they are formulated by the other two diagrams?

In response to these questions, this dissertation proposes a new floor layout: the continuous while discrete floor. Based on a comparative analysis, this research concludes that the disciplinary originality of this floor type and its complicity with the contemporary cultural landscape are part of a fourth typology of architectural production: the object-based typology.

1.2 The Method

In order to reach this conclusion, the author will employ an analytical method and a design method.

The analytical method, focused on the floor layout, consists in the compilation of a comparative table. This table associates two particular interpretations of the subject with two floor layouts: the discrete layout – the quintessential example of which is the skyscraper, is associated with the absolute subject characteristic of modernity; and the continuous layout – the quintessential example of which is the topography-building, is associated with the relational subject characteristic of post-modernity.

Each period's interpretation of the subject provides a definition of its particular zeitgeist. To that end, this research will analyze who functions as a subject, the subject's position in the world, and how that subject relates to objects. This ontological understanding of the subject gives rise to an epistemology framed within a particular school of thought. In that context, this dissertation will highlight, respectively, one philosopher who deals with the ontology of the subject and another who focuses on its social consequences.

The layout of the floor will be analyzed from four points of view. First, by studying how the concepts of continuous and discrete are articulated. Second, by analyzing six formal spatial qualities that are relevant in their comparison: mereology, geometry, outline, arrangement, development and figuration. Third, by analyzing six performative spatial qualities that are relevant in their comparison: circulation, point of view, orientation, privacy, interiority, and access. Fourth, and finally, by studying the type of spatiality in which they are embedded, drawing on Eisenman's distinction between homogeneous and heterogeneous space[11]. Each floor layout forms a specific diagram. That diagram gives rise to a large variety of designs, from which a single case study will be chosen to represent each layout.

This table will also serve to evaluate how the proposed disposition of floors can be qualified as original in disciplinary terms based on the two cases studies. It will also be useful when it comes to revealing the complicities between the floor layout and our contemporary conception of the subject.

The design method consists in the preparation, execution and analysis of a computation exercise that simulates a resonant piling, that is to say, a piling process in which its elements are able to produce formal intertwinings under certain circumstances. Through its materialization in a sequence of three-dimensional models, the simulation results in a unique rearticulation of the slabs from the discrete floor layout.

First off, this method is in keeping with the understanding of architecture that underlies this research: it proceeds on the basis of parts and operatively assumes the fact of gravity.

Second, it problematizes the contemporary conception of the subject: it works only with collections of objects, highlighting their ex-centric condition and providing for a particular type of interweavings.

Finally, the results are analyzed based on a graphic catalog made up of six categories, whose inclusion is fundamental to explaining the contributions of the ensemble: Clumps, Distributions, Fillings, Interstitialities, Silhouettes and Grounds. Each of these categories analyzes a series of specific cases according to four main aspects: Generation, Form, Performance and Subjectlessness. This four-part approach ensures a proper understanding of how the model is created, its formal and performative singularities, and how it establishes complicity with subjectlessness.

1.3 Structure of the Research

This dissertation is divided into six chapters, being the first one its introduction. Given that this investigation is a formal study focused on the discrete and the continuous, the second chapter is dedicated to introducing those two concepts. Then, following the method of analysis described above, the discrete floor and continuous floor are described in the light of the absolute subject and the relational subject, respectively. An intermediate case between the two is described in less detail: the discrete and continuous floor. The third chapter describes the advent of the subjectless object in the contemporary cultural panorama. In addition, a state of the art is also presented from a critical perspective, highlighting the strictly cosmetic value of most of the architectural designs that are mentioned. This chapter concludes with the articulation of the hypothesis that structures this dissertation. The fourth chapter presents a description of and the arguments to support the design method used: resonant piling. On the one hand, it is worth differentiating this method from other emergentist design methods; on the other, it is clarified based on three concepts characteristic of the Zero Subject: collections, ex-centricities and interweavings. The fifth chapter analyzes the results of the simulation, evaluating the formal originality and performativity of the proposed floor layout. It also describes how the concepts of discrete and continuous can be reinterpreted in relation to the type of spatiality that is obtained. The dissertation concludes with chapter sixth, returning to the initial question of a fourth typology based on the object and linked to the proposal of the 'continuous while discrete' floor type.

Here, a third diagram is proposed. It is no longer organized according to an emphasis on the discrete at the expense of the continuous or vice versa, but rather, as will be apparent throughout this dissertation, on the basis of an aporia: the continuous while discrete floor is continuous because it is discrete, and it is discrete because it is continuous. A relationship of necessity is established between the two notions which, when applied to the problem of the floor, results in both formal and performative originality. As such, the fourth typology emerges as a tool for architectural production that simultaneously generates disciplinary novelty while also problematizing our contemporary context from a critical perspective.

9. *"We humans are objects. The thing called a 'subject' is an object. Sentient beings are objects. Notice that 'object' here doesn't mean something that is automatically apprehended by a subject."*
Timothy Morton, *Hyperobjects* (London: University of Minnesota Press, 2013), 149.

10. Together with the hammer, the floor is one of the most common examples that is used in order to explain the Heideggerian concep of "readiness-to-hand" (Zuhandenheit). Readiness-to-hand is manifested in its purest form when the user uses the tool without thinking about the tool at all, which is precisely the case of the floor.

11. Peter Eisenman, *Palladio Virtuel*, (London: Yale University Press, 2015), 10.

2.1 Continuity, continguity, succession, discontinuity, discretism
2.2 Discrete floor
2.2.1 The highrise as a repetition of many slabs
2.2.2 The absolut subject: Humanity, axiality and domination
2.2.3 The modern slab as an object-type: floor as datum
2.2.4 Discrete floor: formal and performative qualities
2.3 Discrete and continuous floor
2.3.1 Raumplan: the floor's formal and performative succession
2.3.2 Strasburg palace: the floor's formal and performative contiguity
2.4 Continuous floor
2.4.1 Parametricism as a variation of a single slab
2.4.2 The relational subject: System, holism and mediation
2.4.3 The topological slab as an objectile: floor as continuum
2.4.4 Continuous floor: formal and performative qualities
2.5 Discrete and continuous modulations

Continuity and discretism in floor's layout

Chapter II

II. Continuity and Discretism in floor's layout

2.1 Continuity, contiguity, succession, discontinuity, discretism

The distinction between discrete and continuous is a conceptual tool used in any number of disciplines: philosophy or physics are some examples. However, mathematics offers a definition that stands out for its elevated level of abstraction. This particularity allows, on the one hand, for developing a clear, precise and exact understanding of both concepts and, on the other hand, for facilitating its operative transfer into other disciplines – in this case, architecture. Therefore, before taking on the issue of the floor based on this theoretical distinction, we must provide a mathematical approach to it which (although necessarily be brief) will help clarify and define the scope of both concepts with respect to one another and in relation to other similar terms such as contiguity, discontinuity and succession.

Traditionally Zeno's paradoxes are considered to constitute the first mathematical approach to the problem of continuity.[1] Although they were broadly addressed and largely refuted by Aristotle[2], in general, mathematics have had a certain difficulty in developing the question, which led Leibniz to refer to mathematics as "the labyrinth of the continuum"[3]. One of the most representative examples of this difficulty is the case of the continuum hypothesis[4], advanced by G. Cantor in 1878, who tried unsuccessfully to prove it. The problem gained such notoriety that David Hilbert put it at the top of his list of the 23 mathematical problems of the century, until Gödel demonstrated its undecidability in 1940.[5]

One of the mathematical areas where the distinction between continuous and discontinuous is clearest and most evident is in the sphere of functions. Before the contributions from Weierstrass[6] in the late 19th century, mathematics were known as "the realm of the continuum", especially in considering the series of real numbers or the points in a line. But the German author's contributions shook up the traditional philosophical-mathematical idea of continuity, especially with the discovery of the existence of discontinuous functions and continuous functions without derivatives.

Continuous functions are those whose graph can be drawn without lifting your pencil off the paper, i.e., their graph is a convex whole. This means that, for points close to the domain, there are slight variations in the values of the function. A function f(x) can be called continuous at a point x=a if and only if the following three conditions are fulfilled:

1. That point x=a has an image.
2. That the function has a limit at the point x=a.
3. That the image of the point coincides with the limit of the function at the point.

Therefore, the function f(x) defined over the interval I is continuous if the curve of the graph that represents it – in other words, the series of points (x,f(x)), with x in I – is a continuous line, unbroken and without gaps. In this case, the limit value of the function at a particular point coincides with the value of the function at that point.

The trigonometric functions like sine and cosine and exponential functions are examples of continuous functions in their respective domains of definition. The case of the sine function is emblematic: it is periodic, bounded, and continuous across the entire real domain. That means that its continuity can be verified by looking at just one cycle, since the others are exactly the same.

Discontinuous functions, in contrast, are those that show interruptions at some point in their domain. That means that their graphs have breaks at least one jump in them and, as such, they cannot be represented by a single line. The are various types of discontinuities, which can be classified basically as removable discontinuities or as essential discontinuities. In the former case, the function has a limit at one point; however the value at that point is different from the limit or does not exist. In the latter case, if the side limits are different, or if at least one of them diverges, there is an essential discontinuity of the first kind. Finally, if the function does not exist or does not have a limit on at least

1. The paradoxes devised by Zeno of Elea, a Greek philosopher born in Elea, created any number of controversies among thinkers of the time. Philosophical tradition considers Zenon's reasoning to be the oldest incidence of the thought on infinity developed by Leibniz and Newton in 1666.

2. Aristotle, *On Sophistical Refutations*, trans. W.A. Pickard, (Cambridge: The Internet Classics Archive, 1994) Section 2

3. Eva Martino, El laberinto de la continuidad en G.W. Leibniz, (Madrid: Biblioteca Nueva, 2011), 244.

4. The continuum hypothesis states that there is no set whose cardinality is strictly between that of the integers and the real numbers.

5. In fact it was Cohen who published the proof of independence in 1963, although Gödel had achieved it several years earlier but had only communicated his findings to Professor Gottlob Hassenjaeger by mail.

6. The mathematician Carlos Weierstrass is known for the Weierstrass function, among other contributions. Its relevance is derived from the fact that it is continuous everywhere but differentiable nowhere.

one side of the point, there is an essential discontinuity of the second kind. Step functions are a very clear case of a discontinuous function: for example floor or ceiling functions.

It is important not to confuse a discontinuous function with a discrete function. The difference is that the former are functions defined by 'stretches of continuity' with jumps or holes between them, whereas the latter are functions where the domain is a countable set, i.e., its elements can be counted one at a time. One example of a discrete function is the Poisson distribution, the graph of which is not represented by a single stretch (continuous function) or a series of stretches (discontinuous function), but by a series of points.

The fundamental difference between a function that is continuous across a single stretch and a discrete function that is graphed as a series of points lies in the domain: whereas in the first case the domain includes all values contained within a specific interval, in the second case the domain only comprises a certain number of values within an interval. A person's height, for example, is a continuous value, since it correspond to any value within an interval of heights. The number of people in a classroom, on the other hand, is a discrete variable, since there can only be whole numbers of people. This means that, whereas in the first case the values are measured and, as such, the value can never be entirely exact, in the second case the values are counted and the value can only be entirely exact or entirely inexact.

By default in mathematics, a function with a discrete domain is considered continuous. The reason is that, ultimately, there is no discontinuity in the function because, in contrast to a discontinuous function, there is actually no continuity to be broken, no stretch to interrupt. In other words, it is a continuous discontinuity. Therefore, the contrast between continuous function and discrete function is invalid, since the discrete function, paradoxically, is considered a particular case of a continuous function. On the other hand, what is valid – in addition to relevant in the context of this dissertation – is the contrast between a continuous domain and a discrete domain.

Just as it is necessary to distinguish between discrete and discontinuous, it is also important to avoid confusing the terms continuous, contiguous and successive. In that sense, the definitions Aristotle provides in his Physis are illuminating.[7] Something is successive to something else when it comes directly after it, and there is nothing else of the same class in between. In mathematics, a succession also implies a particular rule of order between the participating elements. But that does not necessarily imply that there is contact: a line of people can be arranged successively according to height, one after the other, without them necessarily touching one another. Formally, a succession can be defined mathematically as a function that applies to the set of natural numbers, and therefore it is a discrete function in which order is relevant. An example: the series of positive even numbers {an} = 2, 4, 6, 8, 10, 12, 14... where a1 = 2, a2 = 4, a3 = 6... Ultimately, it is a weak or symbolic continuity, based more on a system of relationships than on a particular formal characteristic.

However, and continuing with Aristotle, when two physical things are in contact, there is said to be a relationship of contiguity between them, and not mere succession. Being in contact means that certain exterior limits of both elements are in the same place. This is precisely the difference with the idea of continuity: two things are continuous when their limits are identical – as opposed to two contiguous things whose limits are touching. In that sense, contiguity is a species that belongs to the genus of continuity. The limits of two elements can be together without necessarily being the same, but they cannot be one without necessarily being together.
To sum it up, we can make the differentiation as follows:

1. Continuous: Relationship between elements whose limits are identical and they form a whole with no jumps.
2. Contiguous: Relationships between elements whose limits are close together but not identical, and therefore they do not form a single whole.
3. Successive: A relation between elements that are not in contact, but which retain a constant pattern of order between them.
4. Discontinuous: An interruption that occurs in a continuity in the form of a jump.
5. Discrete: A plural ensemble of separate and countable elements, without a necessary relationship between them and whose limits are neither together nor identical.

Of the five terms analyzed here, the concepts 'continuous' and 'discrete' hold a special importance, since they are located at the extremes of the range. There is a relationship of opposition between the two: the former unifies, the latter discriminates; the former is measured, the latter is counted; the former is one, the latter is many, etc. The other three terms make up intermediate cases that border on the one hand with the discrete and, on the other, with the continuous. Ultimately, they are weaker versions of one of those two categories: contiguity implies a coincidence of limits but it does not mean they are identical, whereas succession implies a relationship between the elements based on a constant pattern and without contact between their extremes. Ultimately, both are weaker forms of continuity. Discontinuity, on the other hand, is a jump which depends on the existence of a continuity to interrupt. Its most radical extreme, in the form of a set of separate points, brings us to the opposite of that continuity, i.e., the discrete.

As seen in this mathematical approach, the opposition between discrete and continuous is a tool that, due to its high degree of clarity and abstraction, has been used in many areas of knowledge. Notable among them is the role it has played in the systematization of nature, where the methods used in biology and physics have given rise to broad debates. The notion of field, already latent in the 17th century because of the theory of action at a distance[8], supposes an idea of continuity that sets out to explain a phenomenon not based on the action of a group of atoms, but rather based on the total structure of a physical whole. During some periods in the late 19th century, continuist conceptions seemed to be winning out, via qualitativist proposals like those of Mach, Ostwald and Duhem. Shortly thereafter, however, the emergence of quantum theory once again restored discontinuism. Throughout the 20th century, the systematization of nature occurred in the light of this opposition and the respective efforts toward conciliation. Notable examples include through the unification of field and particle through the wave-particle duality characteristic of wave mechanics. The very nature of light was one of the major problems of modern physics: its wave and/or corpuscular structure was the source of drawn out disputes.

However, one of the thorniest debates on the constitution of nature centered on the polemic between the naturalists Geoffroy and Cuvier in the early 19th century[9]. Whereas the former asserted that all living being descended from a single original archetype, the latter argued, based on a functional stance, against total evolutionary convergence, describing the presence of four different lines of origin. In that sense, with Geoffroy we find a single evolutionary continuum, whereas in Cuvier we find a discrete series of evolutionary lines.

Obviously, this type of debate focused on the opposition discrete-continuous has moved beyond the naturalist sphere to influence other areas of knowledge such as art, economics and sociology. Architecture has been no exception, and throughout its history the continuous and the discrete have been present through a number of debates. One in particular stands out, for its intensity and its duration: the 19th-century debate between the classical and the Gothic, i.e., between what Lars Spuybroek defined as classical elementarism, represented by Gaudet (Fig. 2-1), and Gothic continuity, celebrated by Viollet le Duc (Fig. 2-2).[10] As the Dutch architect wrote in his book The Architecture of Continuity, "*In classicism all the elements are preexisting: the column, the architrave, the pedestal, and so on. In the Gothic, everything is a result of the relationships between the ribs.*"[11] These ribs become columns or vaults through a complex exercise in continuity, as opposed to aggregation. In classicism, this unifying effort has traditionally taken place through ornamentation, but in the architecture itself. In the Gothic, however, the elements have no need for a unifying layer because they are already united in advance through their shared origin: the rib.

We could give more examples of this opposition, which would no doubt enrich this conversation quantitatively speaking. However, from a qualitative standpoint, not much of relevance would be contributed, especially with regard to the specific case we are discussing, i.e., the application of this opposition between continuous and discrete to the question of the floor. Accordingly, throughout this chapter we will analyze, in this light of particular ways of understanding the notion of subject, how the continuous and the discrete as spatial categories affect the formal and performative qualities of the floor.

2.2 Discrete floor

The layout of floors defined as "discrete" refers to a distribution that is characterized by being countable. In other words, it can be separated into independent units whose limits are not adjoining. Setting aside single-story buildings, whose type cannot be qualified as discrete since they do not consist of a plural series of elements, throughout the history of architecture, vertical construction has stood as the maximum example of the discrete distribution.

2.2.1 The high-rise as a repetition of many slabs

One of the oldest cases of this strategy is that of the Roman insulae.[12] In that sense, the House of Diana, in Ostia, is an emblematic example. It was spread over six or seven stories and rose nearly 20 meters above the ground. Although there were insulae of up to eight or nine stories tall, imperial legislation did impose height restrictions: none of the insulae could be taller than 24 meters. The main reason for this restriction was structural: Roman construction did not include elements capable of resisting traction like modern steel bars. The slightest earthquake or strong wind could cause those constructions to teeter or even knock them down. It is interesting to highlight the role of stairs in this type of construction, since they were understood as an external element for vertical communication and not as an intrinsic part of the building: something similar to what would be the case later with elevators.

The vertical construction characteristic of the Roman insulae and other European buildings like the built in France and England beginning with the Industrial Revolution[13] are, effectively, typical cases of a "discrete" floor distribution. Each of the floors is formally independent, separable and countable. And

7. Aristotle, *Physis*, trans. W.A. Pickard, (Cambridge: The Internet Classics Archive, 1994) Section 1

8. Newton's approach to the phenomenon of gravity did not identify any mediating element, assuming the instantaneous action of gravity regardless of distance.

9. The debate between Étienne Geoffroy Saint-Hilaire and Goerges Cuvier took place at the French Academy of Science in 1830 and lasted for approximately two months. At the time, Cuvier was considered the winner of the debate, although in retrospect Geoffroy Saint-Hilaire should be recognized as a foresighted defender of evolutionism.

10. *"The system of architecture inciting the most debate was of course that of the Middle Ages, with the École des Beaux-Arts, as we have seen a number of times in the preceding chapters, forever erecting safeguards against it."*
Jacques Lucan, *Composition, Non-Composition*, trans. Theo Hakola (Oxford: EPFL Press, 2012), 157.

11. Lars Spuybroek, *The Architecture of Continuity*, (Rotterdam: V2/NAi Publishers, 2008), 210

12. Although the term insula (plural insulae) means "island" in Latin, the word has been used to refer to the stacked housing that was built in a number of Roman cities, particularly in ancient Rome. An insula differed significantly from a domus: while the latter is essentially a single-family home, the former contained multiple units. Unlike today, in a world with elevators, in ancient Rome the best apartments were located near the ground floor, whereas those on the upper floors were the least prestigious. The advent of vertical construction in the capital was mainly due to a population increase during the 1st century B.C. The Social War played an important role. While Rome was victorious in the armed conflict, the allies achieved several of their aims, including the introduction in 90 B.C. of the Lex iulia de civitate latinis et socii danda, (also known as the Julian Laws) by Lucius Julius Caesar. It offered Roman citizenship to all inhabitants of cities who had not taken up arms against Rome during the war and who settled in the outskirts of Rome. This attracted a large number of people to the Roman capital, transforming it into an immense city of more than one million inhabitants, the largest city in the known world at the time. Due to this unprecedented demographic growth, other cities near Rome also experienced sudden and rapid growth, and vertical construction emerged as a response to the extraordinary demand for housing. Ostia was one of the best known cases, since its status as a port city, where large quantities of supplies arrived from all over the Empire to feed the capital, further increased its population. Many insulae were built there, making it a city characterized by stacked housing, a phenomenon of urban construction that was not seen again until the Industrial Revolution.

13. The massive flight of residents from rural areas into cities such as Manchester, London or Liverpool caused a serious housing crunch. Part of the problem was addressed through vertical constructions, without elevators, that could be as tall as six or seven floors.

Figure 2-1: Hotel Guadet, Paul Guadet, 1913.

Figure 2-2: Vladislav-Hall, Benedickt Reit, 1493

yet, because they were limited to five or six stories on the one hand (floors above the second were deemed inappropriate for commercial uses and above the fifth they were considered uninhabitable), and because of the differences in floor plans due to the structure of the walls, the insulae could not use the discrete floor as an "operative design strategy". Rather, its role was limited to that of a mere secondary characteristic.

The true exaltation of the discrete floor as a design strategy occurs with a different typology: the skyscraper.

In the same way that the insulae can only be understood at the height of Imperial Rome, skyscrapers cannot be conceived without the 19th-century splendor of Chicago. While many of the innovations and events that were essential to the emergence of skyscrapers originated in other regions, it was in Chicago where they flourished at the end of the 19th century. Specifically in that city and during that period there was a unique combination taking place: industrialization, economic development, the availability of land, and a conqueror's mentality.

Usually, developments in metallurgy and the invention of the elevator are cited as the central technological drivers behind the skyscraper. However, there are a series of much less spectacular technical innovations that are nonetheless highly relevant: advances in plumbing, foundations, lighting and ventilation systems were essential to the proper function of skyscrapers. A generalization of pneumatic systems or the advent of the telephone in 1876 were also relevant, as was the growing use of curtain walls, used for the first time in the Oriel Chambers building by Peter Ellis in 1864. To that effect, skyscrapers could be covered at any time, and the slow and tedious process of building up the façade from the ground could be avoided.

However, the phenomenon of the emergence of skyscrapers was, above all, an economic phenomenon. With regard to skyscrapers, Huxtable affirms that "*It is just as much a product of zoning and tax law, the real estate and money markets, code and client requirements, energy and aesthetics, politics and speculation. Not least is the fact that it is the biggest investment game in town.*"[14]. Indeed, business activity acted as a motor that led to the appearance of a new building typology: the office building. In that sense, Huxtable writes that "*The patron was the investment banker and the muse was cost-efficiency.*"[15] Style was a secondary matter, subjugated to parameters of economic yield. In general, the fact of wanting to leave a mark or create a grand visual symbol was not thematized. And there was certainly no concern for trying to understand aesthetically how to address the appearance of a completely new typology. Parameters such as speed of construction, economic yield, and logistic efficiency were much more important. The incipient phase of skyscrapers was eminently pragmatic, and it was based above all on a concept with close ties to the discrete[16]: repetition.

In fact, as Mario Carpo points out in The Alphabet and the Algorithm, the idea of repetition can be seen in "*another mechanical revolution that had already changed the history of architecture. Printed books are a quintessentially industrial product. They are mass-produced. Mass production generates economies of scale, which makes them cheaper than manuscript copies. They are standardized.*"[17] Although it is true that the idea of repetition really stood out under the 19th-century modernity that give birth to the skyscrapers, it was already present in the 15th century: Gutenberg's invention of the printing press in 1450 led to an industrialization process avant la lettre, in which repetition already constituted a mass production strategy.

In fact, beginning in the late Renaissance, the idea of repetition was linked to an incipient mass production. It was the cheapest and fastest production method, since it allowed for serial production which would later propel the emblematic assembly lines at the Ford Factories. The most obvious case of this repetition strategy as it applies to skyscrapers is the Reliance Building in Burnham from 1880 (Fig.2-3). The design was the result of practical requirements, and its structural sincerity showed clearly on the façade to what extent the literal vertical repetition of floor structures was the principle behind its growth strategy.

Yet this repetition mechanism was not just a response to the demand for speed and cheap construction. The increase in land prices due to the congestion and concentration of economic activities in the city led to the need to replicate the plots vertically: as such, what people did was "multiply" the urban land they purchased, rather than just building it. In that sense, the terrible Chicago fire of 1871[18], despite the hundreds of deaths that it caused, was a great economic opportunity. Approximately 10 square kilometers of the city were burned by a fire that spread through the urban grid, laying waste to balloon frame[19] houses and some with metallic structures. As a result, there was a large amount of empty urban land in the center of Chicago. The speculation unleashed by this event prioritized the adoption of vertical architectural solutions, which had between 10 and 16 floors at that time. The designs were carried out by a series of architects and studios who came to be known as the Chicago School.[20] Since they proposed similar solutions, it determined the definition of a common architectural pattern: concrete pillars as a support, metallic structure sheathed in a fireproof material, curtain walls, and in most cases the elimination of load-bearing walls. The Chicago World's Fair, held between May 1 and October 3, 1893 was the city's best opportunity to show its new face to the world.

The process of the emergence of skyscrapers shows just how much the idea of repetition was fundamental to understanding

14. Ada Louise Huxtable, *The Tall Building Artistically Reconsidered*, (California: The New Criterion, 1982), 122.

15. Ibid., 124.

16. Repetition is the simplest mode of production for multiple elements. In consequence it has traditionally been used to produce discrete series, understood as groups of elements whose limits are not joined or identical.

17. Mario Carpo, *The Alphabet and the Algorithm*, (Massachussets: MIT Press, 2011), 13.

18. Until 1871, Chicago was fundamentally a city built of wood. Buildings in the center of the city could easily exceed five stories in height although they did not have any metal structural elements or elevators. The Great Chicago Fire of 1871 destroyed much of the city, but in just under a year almost $40 million in new buildings had already been built.

19. The balloon frame is a building technique developed in the United States. Based on a structure of multiple narrow studs that can be shaped and nailed, the balloon frame technique allows for easy construction of much lighter buildings than traditional wooden post and beam framing.

20. William Le Baron Jenney, Henry Hobson Richardson, Burnham & Root and Louis Sullivan are some of the architects from the Chicago School who made relevant contributions to the development of skyscrapers.

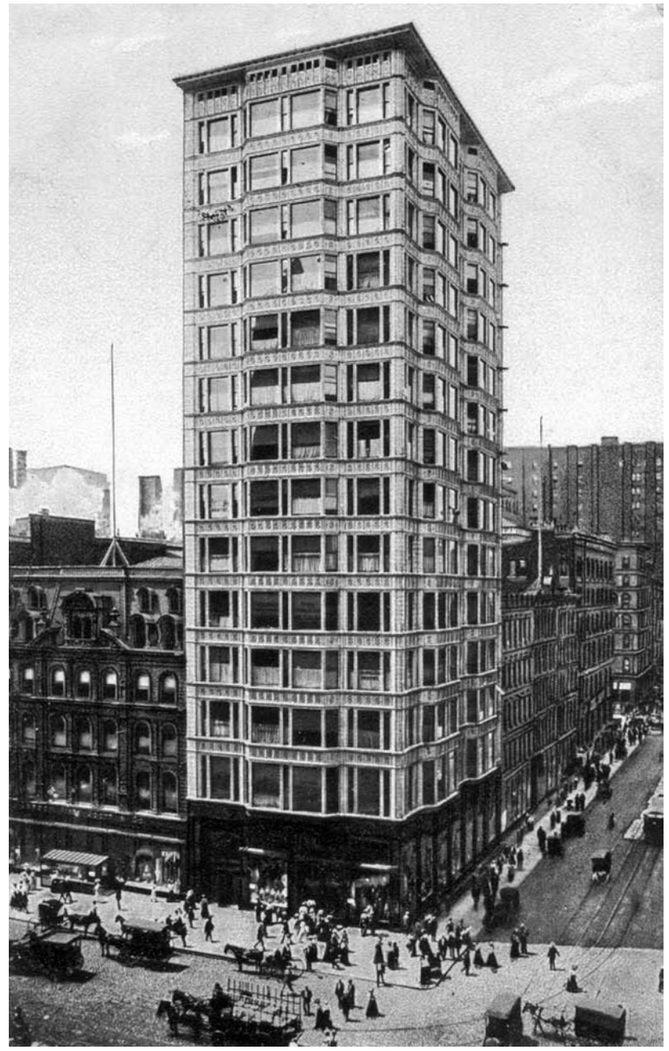


Figure 2-3: Reliance Building, John Root and Charles B. Atwood 1880

the nature of this new typology. At the same time, the vertical multiplication of the floor characteristic of skyscrapers emerges as the clearest and most characteristic case of a discrete distribution of floors. Indeed, the floors could be accumulated practically indefinitely in a series of layers that are countable and separable, and moreover retain complete independence from one another, dismissing any kind of inter-relation: their limits are not identical (continuity), nor are they located in the same place (contiguity), nor do they maintain any kind of particular order among them (succession). On the contrary, each floor is independent, since "*incidents on the floors are so brutally disjointed that they cannot conceivably be part of a single scenario.*"[21]

The 1909 theorem[22] (Fig. 2-4) is revealing: the skyscraper should be understood as a device capable of multiplying urban land in a practically unlimited way, as though it "*the production of unlimited numbers of virgin sites on a single metropolitan location.*"[23] The reference to a "virgin site" is not irrelevant. American culture was marked by the conquest of the West, which took place over the 19th century. The borders were shifted westward toward the Pacific Ocean, and once their horizontal development reached its end there was only one other possibility: a vertical conquest. In that sense, the emergence of skyscrapers allowed for a continuation of the American conquest through a vertical displacement of its borders, setting out for new territories high in the air, so aptly represented by the 1909 theorem.

The Downtown Athletic Club is one of the designs that most clearly shows how in the discrete floor arrangement characteristic of the skyscrapers each slab indicates the presence of a new independent territory. The building diligently obeys the 1909 theorem through the creation of 38 platforms that repeat the original surface of the plot with slight geometric variations. Connected by 13 elevators, it shows to what extent "*the elevator generates the first aesthetic based on the absence of articulation.*"[24] The floor plans of the Downtown Athletic Club contain all types of program: sports areas with squash and handball courts, billiard rooms, bars, preventive medicine, pools, etc. However, special mention should be made of the golf course on the seventh floor, which seems like it is attempting, in all its voluptuousness, to imitate literally the green hills of the 1909 theorem. From the 20th to 35th floors, the skyscraper contains only bedrooms.

These examples highlight the extent to which each of the floors, while a repetition of the previous one, maintain complete programmatic and conceptual independence from one another, emulating the typical characteristics of a discrete layout. Like Leibniz's monads,[25] each floor is set forth as a closed-off world, with its own system of coordinates and even its own system of moral values. Only the vertical circulation cores, like narrow pins disappearing amid the multiple territories they cross, act as spaces of relation – or, more aptly, as transition rituals, as though you might need a space shuttle to travel from one world to another.

Given the large variety of repeated, independent and separate grounds the skyscraper can offer, it emerges as the clearest example and the most enthusiastic celebration of the discrete floor. The process of the emergence of skyscrapers not only shows us the extent to which they exalt the characteristics of the discrete floor. A careful reading of this process demonstrates another fundamental peculiarity: the skyscraper was and still is a symbol of human progress. While the idea of progress is largely debatable today, the 19th-century impulse that built the first skyscrapers in Chicago was rich with a profoundly humanist spirit. The Renaissance extolment of humans (although limited to Western, white men) as beings capable of ruling the world through Science underlies the positivism characteristic of 19th-century American society.

Although the initial phase of skyscrapers was pragmatic over all and fundamentally interested in the economic yield of its real estate investments, it is hard to deny that "*from the Tower of Babel onward, the fantasies of builders have been vertical rather than horizontal.*"[26] It is no coincidence that most 20th-century architectural trends have looked at skyscrapers as a great opportunity. The energetic aerodynamics of Futurism, the historic calligraphy of Postmodernism, the messianic elegance of the International Style, the rationalist revisionism of Neoliberty, the dynamic flexibility of Metabolism or the technocratic daring of High Tech are just some of the movements that chose the skyscraper as their emblematic typology. Even a figure as "rustic" and critical of cities as Frank Lloyd Wright designed a skyscraper a mile high.

In "The Tall Building Artistically Reconsidered,"[27] Huxtable writes that "*the skyscraper and the twentieth century are synonymous,*" and she continues that "*the tall building is the landmark of our age.*" The New York native cleverly detects the close relationship between skyscrapers and the industrialization and mass production characteristic of the 20th century. In that sense, it can be taken one step further to affirm that tall buildings, understand as the discrete accumulation of floors, are the stamp of Modernity. When Patrick Schumacher defines Modernity through the principles of "*separation, specialization and repetition,*"[28] he is very aware of the advances of industrialization and especially the developments that took place in the Fordist era. He understands the latter as a "*system of industrial mass production that was able to produce complex consumer goods on a scale and at a price that made them universally accessible.*"[29] The key concept in this issue is that of "mass production", and it was Taylorism in the late 19th century that introduced it on a large scale. Understood as a scientific organization of

21. Rem Koolhaas, *Delirious New York*, (New York: The Monacelli Press, 1994), 85

22. The 1909 theorem was drawn by the humorist A.B. Walker for Life magazine in March 1909. Coming ahead of the interpretation that Koolhaas would later publish, the author of the theorem wrote a caption emphasizing the idea of a "constructed" lot: "*Buy a cozy cottage in our steel constructed choice lots, less than a mile above Broadway. Only ten minutes by elevator. All the comforts of the country with none of its disadvantages.*"

23. Koolhaas, *Delirious New York*, 83.

24. Ibid., 82

25. Leibniz's famous quote about his monadological system is telling: "*Monads are windowless.*"
Gottfried Leibniz, *Discurs de Metafísica / Monadologia*, ed. Josep Olesti Vila, trans. Josep Olesti Vila, (Barcelona: Marbot, 2018), 104.

26. Huxtable, 126.

27. Ibid.

28. Patrick Schumacher, *The Autopoiesis of Architecture, vol 2*, (Wiltshire: Wiley, 2012), 636

29. Ibid., 635.

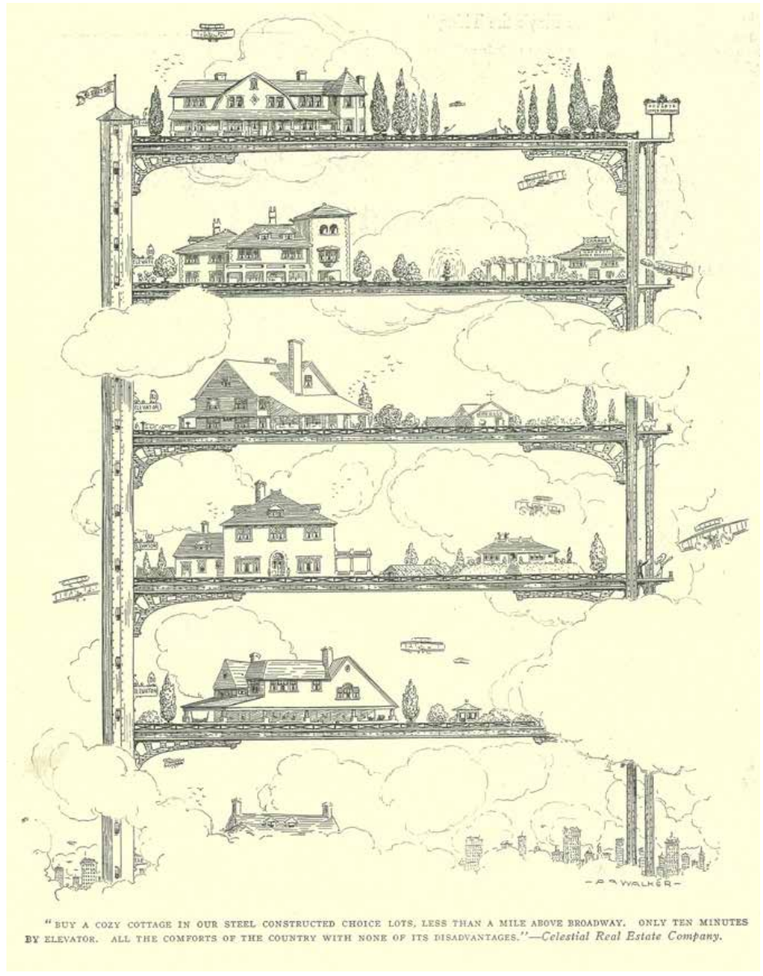


Figure 2-4: 1909 Theorem, J. Walker, 1909

work, its main contribution was that of assigning the basic principles of the scientific method to the working process, with the aim of optimizing performance. This kind of positivism, promoted by thinkers like Spencer or Comte, was very characteristic of the 19th century and was not generally abandoned until after the Second World War.

Although most architects throughout the 19th century ignored or rejected the new technologies of mass production,[30] they are the foundation for concepts such as the "production chain" whose presence is closely linked to the emergence of skyscrapers as a typology. The mass production that took place on Taylorist or Fordist assembly lines consisted of the repetition of a single product ad infinitum. In parallel, the skyscrapers that were opened in the same country during that same period were also, as we have seen, the repetition of a single element in a series – in this case, the floor. Both are discrete processes, in which each product is the same as the previous one, but maintains its independence: the elements are qualitatively identical but quantitatively different – i.e., separable and countable. Rem Koolhaas talks about this formal parallel in his Delirious New York, when he says that "According to the logic of automatism, workers on the site are described as passive, almost ornamental presences. '*It was, as Shreve the architect said, like an assembly line placing the same materials in the same relationship over and over...*'"[31]

The preparation and development of skyscrapers occurs in conjunction with the technocratic and industrial optimism which characterized the Western world in the late 19th century. In that sense, vertical construction bears the hallmark of modern man, understanding modernity in the broadest sense, i.e., as a socio-cultural movement that elevates the human figure to that of an absolute subject. Later, the CIAM's La Sarraz Declaration of 1928 lent continuity to this pursuit of repetition and mechanization.[32]

2.2.2 The Absolute Subject: Humanity, Axiality and Domination

It is important to highlight that the relationship established between the discrete floor, on the one hand, with the skyscraper at the forefront, and Modernity, on the other hand, understood as a philosophical approach, is not a relationship based on subordination or causality. On the contrary, it is a flat and bidirectional relationship based on sharing a common tradition of interpretations characteristic of the period, which we can sum up in two fundamental reflections. First, it is acceptable to favor ontologically certain existences to the detriment of others, asserting the superiority of human existence above the rest, making the human being an absolute subject. Second, independently of this ontological privilege, there is a socio-cultural approach to the human being which, drawing on a profoundly positivist epistemology, highlights three fundamental concepts: humanity, axiality and domination.

The discrete floor is not just linked to man understood as an industrial subject capable of mass producing slab-objects, but also man understood as an absolute subject capable of dominating nature from his privileged position. In that sense, the skyscraper is precisely one of the most representative symbols of this capacity for domination. In effect, Modernity not only focuses its efforts on the figure of man. It makes him an "absolute subject", in other words, it awards him ontological and epistemological privilege. In that sense, the opposition between subject and object was never so exalted as it was in that period. Although it is true that Descartes was the first to make man a "founding subject" in beginning his philosophical system from there, Kant went one step further in distinguishing the "empirical self" from the "transcendental subject". There is a self that is an object of perception (the empirical self or phenomenal self) and a self as the subject of thought in a transcendental sense, i.e., as every subject's consciousness of the act of thinking, which provides unity to concepts. The epistemological characteristics of this "transcendental self" are what makes the object appear to the subject according to that subject. The object's "appearance" is subordinate to the subject, in this case man, who, as an absolute, compels objects to appear one a particular way as opposed to another: man does not adapt his senses to the object; rather the object adapts to the epistemological singularities of man. Kant represents better than any other modern author what, in the 21st century Meillassoux would eventually define as "correlationism": the idea that we can only access the "correlation" that is established between object and thought.[33] As such, space and time are not properties of things, but rather the forms of our sensitivity and therefore, subjective conditions make possible our perceptions of phenomena. Man and his conditions become an absolute, to which the presence of all the objects that surround him are subordinated. Gilles Deleuze explains it verey well when he writes that "the fundamental idea of what Kant calls his "copernican revolution consists in replacing the idea of an harmony in between the subject and the object (final concordance) by the principle of a necessary submission from the object towards the subject." [34]Later, based on his idealism, Fichte developed this thesis through his idea of the infinite self, whose activity consists in projects the totality of what is: it is the self which, as the absolute I, determines everything that is not itself, i.e., the not-I or the world of objects. For his part, Schelling associated this infinite self with Spinoza's substance, and Hegel understood it as a product of the evolution of the absolute in the history of humanity. In any case, beginning with Kant, man is no longer just "*the measure of all things*", as Protagoras said,[35] but also the cause of how those things appear. Kant retraced all of human subjectivity looking for the key to the solution in the personal subject's self-consciousness. Ultimately, as Manuel Fraijo writes, "*the Kantian revolution – whether it is Copernican or it should be called a Ptolomaic counterrevolution – places man at the center of everything. Kant's great questions refer to man's capabilities and limitations. Ultimately, his main question is: What is man?*"[36]

But aside from being a "transcendental subject" from an ontological and epistemological point of view, modern man possesses other socio-cultural characteristics that make him unique. Despite Kant's relevance in the development of Modernity and the attribution of its birth to Descartes with his "cogito ergo sum", its roots go all the way back to the Renaissance. As opposed to the Middle Ages, when God was the absolute center of intellectual and popular life, the Renaissance presaged Modernity in placing man at the center of the World, and in that sense we can say, along with Ortega y Gasset that "*where ancient life was cosmocentric and medieval life was theocentric, modern life has been anthropocentric*".[37] Although most Renaissance thinkers were still believers, humanity took on an unprecedented strength and prominence for a particular reason: the dignity of man was not longer rooted in having been created in the likeness of God, but in his freedom and, as Engels remarked, his consciousness of freedom. Setting aside categorical divisions in a period that was actually quite heterogeneous, Pico della Marandola's Oration[38] is essential to explaining the sociocultural centrality that man would later occupy under 19th-century positivism. Initially written as an introduction to the 900 theses to be debated to achieve religious peace, the Oration on the Dignity of Man is a plea in defense of humanity. Shakespeare also forcefully expressed this renewed value of humanity in Hamlet: "*What a piece of work is a man! How noble in reason, how infinite in faculty, in form and moving how express and admirable, in action how like an angel, in apprehension how like a god.*"[39]

In that sense, the anthropological revolution that took place in the Renaissance is essential to understanding the scientific revolution that took place some decades later: Renaissance philosophers defended free and independent thought, capable of substituting the principle of authority characteristic of the Middle Ages for that of free inquiry. This is fundamental to understanding Modernity since, as opposed to a vision of the world as a "vale of tears" and as a temporary home, Renaissance thinkers "*discovered its value and its beauty and appreciated it as an object worthy of contemplation and a suitable place for man to built his shelter there.*"[40] The consequence of this change in attitude was the study of nature in order to capture an objective image of it, the result of which was the appearance of modern science and the experimental scientific method.

Although the figure of Galileo was fundamental in the elaboration of the scientific method, and above all in its mathematization, it is impossible to explain the dominant attitude characteristic of 19th-century positivist man, without citing F. Bacon. In that sense, a celebrated scholar of English philosophy like B. Farrington[41] stated in his book "The philosophy of Francis Bacon that, although it is true that Bacon's main goal was to reconstruct human knowledge of nature, his most relevant contribution does not lie in the "how" of that reconstruction, but in the aim he attributed to it. Indeed, whereas up to that point, and since Aristotle, science had been a contemplative activity focused fundamentally on knowledge as an end in itself, Bacon transformed science into an instrumental knowledge in the service of humanity. Ultimately, modern man realized that science could make him a God, confer to him the rule of nature, and thus mitigate the weight of the human condition. Optimism and a belief in progress became the new emblems of the Western world.

Comte's positivism made that attitude its motto and, through its metaphysical austerity, used it toward a social, political and economic reorganization of the context of the Industrial Revolution. The term 'positive', understood as the celebration of all things useful, true, precise, and constructive, places emphasis precisely on the real – in other words, on a here and now that does not accept any transcendence, but only the empirical reality of man and his science. And it was precisely science that was chosen to lead a society that could only but progress under its yoke: The industrial era, the offspring of that mandate, culminated with the assembly line as the synthesis of all its desires, taking on responsibilities even in the most unsuspected realms. In a fit of exaltation for serial production, Comte went as far as to proclaim an industrial ethics, warning that moral behavior should be modeled on the assembly line, understood as a common project. Without any doubt, the skyscrapers that lit up the Chicago skyline in the late 19th century were the result of Modernity. But they were also, and above all, one of the most boastful exaltations of modern man – of his positivism, his centrality, his domination. A construction that in its repetition of urban land ad infinitum is, on the one hand, the embodiment of the "discrete" as an architectural category regarding floor distribution and, on the other, the large-scale celebration of the production chain as an emblem of the period. Driven by events such as the Renaissance, the Protestant Reformation, the French Revolution, or the Enlightenment, modern man entered the 20th century at the height of an industrial frenzy. Much of the architecture of the early 20th century followed that same path, through disciplinary contributions that occurred on all fronts. One of those contributions was a unique approach to the problem of the floor, of which the 19th-century skyscraper was but an experiment avant la lettre.

2.2.3 The modern slab as an objet-type: floor as datum

While industrialization was motivated by the optimism and energy characteristic of modern man and his position as an absolute subject, in the first quarter of the 20th century mass-produced objects took on a certain artistic prominence when they were interpreted as fetish objects by the avant-garde. It was no longer the romantic exaltation of a unique object, but the mechanical

30. Carpo, *The Alphabet and the Algorythm*, 13.

31. Koolhaas, *Delirious New York*, 139-40.

32. H.P. Berlage et al., "CIAM's La Sarraz Declaration (1928)", Modernist Architecture, uploaded by Ross Wolfe, last modified September 8, 2011. https://modernistarchitecture.wordpress.com/2011/09/08/ciams-la-sarraz-declaration-1928/

33. Quentin Meillassoux presents an in-depth explanation of his theory on correlationism in his book After Finitude.

34. Gilles Deleuze, *La filosofía crítica de Kant*, trans. Marco Aurelio Galmarini, (Madrid: Cátedra, 2017), 31.

35. There is no consensus about whether Protagoras' famous expression refers to Man as an individual or human beings on the whole, either in the sense of a natural category or in the sense of a social group. In this case we are referring to Man as an individual.

36. Manuel Fraijó, Filosofía de la Religión, (Madrid: Trotta, 2010), 25.

37. José Ortega y Gasset, En torno a Galileo, (Madrid: Biblioteca Nueva, 2005), 221.

38. The Oration on the Dignity of Man is one of the most effusive defenses of man in Renaissance culture. According to the text, man's greatness does not reside in his occupying a privileged place in the structure of the universe, or in the excellence of his nature, or his capacity for reason, but rather in his essence as a free being with the ability to shape himself according to his own will.

39. William Shakespeare, *Hamlet*, (London: Digireads, 2005), 47

40. Moises González, *Introducción al pensamiento filosófico*, (Madrid: Tecnos, 2016), 211

41. Benjamin Farrington was one of the great scholars of the classical world. However, he also delved into scientific thinking in Western culture, including noteworthy contributions centered on the figure of Francis Bacon.

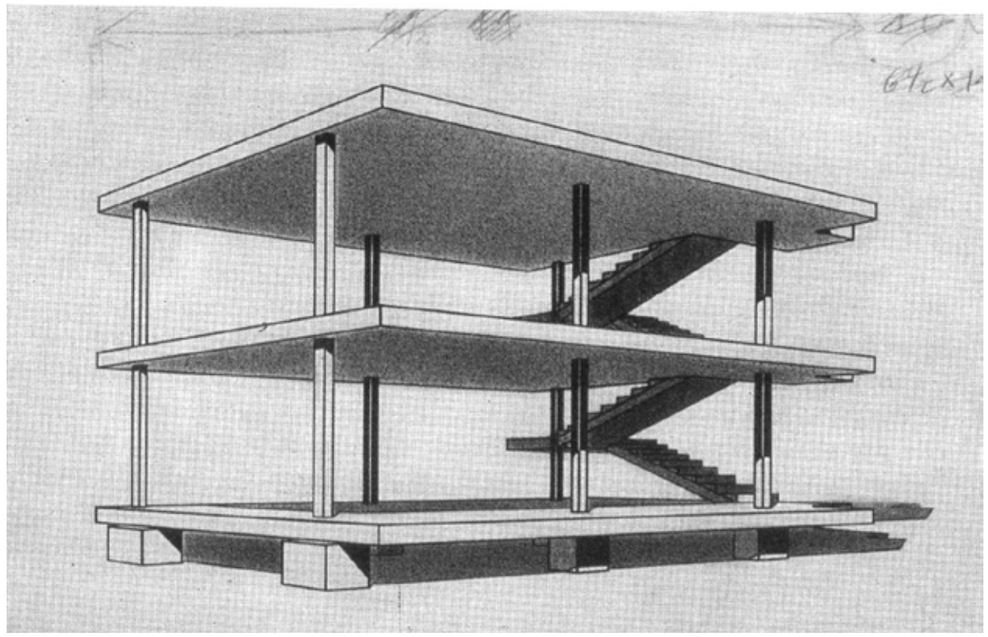


Figure 2-5: Dominó diagram, Le Corbusier, 1914

Figure 2-6: Ford T Mass Production, 1908

celebration of a model object: in other words, what Le Corbusier would later call the "objet-type"; and the slab characteristic of the discrete floor is one of the most emblematic cases. Modern thought, with its insistence on reproducibility, had negated the possibility of the monument, i.e., a unique and unrepeatable piece that is a monument precisely because it is different from the rest[42]. The loss of Walter Benjamin's 'aura' [43] was compensated by the formal and mechanical optimization that constituted the "objets-type". Both Ozenfant and Le Corbusier were the first victims of its seductive power, something Ozenfant wrote in his memoirs:

> *"The object-forms we chose were recognized the world over, and that universality was incompatible with any excessive interest in the subject. All our attention was free to focus on the play of forms and colors."*[44]

In that sense, Baudrillard took it even further by later defending the power of "*the seduction of the object: it isn't the subject that desires, it is the object that seduces.*"[45] Seduction, here, is understood as a paradoxical game of subject-object relationships, although because of their complexity it is difficult to favor one side of the subject-object pair over the other. In any case, the function of the object-seduction-subject came down to Ozenfant and Le Corbusier by way of the Cubist aesthetic. The Cubist masters, Braque, Gris and Picasso, among others, oriented their work toward an unheard-of liberation of the object with serious repercussions in the visual arts. However, although the purist reading of the object begins with the Cubist composition, it takes the exaltation of the object to another level:

> *"We know that in Cubism the object, the starting point, is modified – sometimes to an extreme – with regard to its organization with the painting; Purism places importance on preserving the norms of the object's constitution"*[46]

According to Jeanneret and Ozenfant, the Cubists destroy precisely what draws them in: preserving in objects the norms of their constitution – in other words, their knowledge, their materiality, their formal hierarchy. The fact that Cubists may represent a bottle using a triangle instead of a circle constitutes true sacrilege for a purist "order" that has sworn formal loyalty to the object above all else. In that sense, Jeanneret and Ozenfan assert that "*Purism does not express variations, but what is invariable.*"[47] A very important concept in its role as a bridge between painting and architecture: indeed, when Le Corbusier applied all the purist formal investigations to the world of architecture, the appreciation of invariability was essential to understanding the industrial nature of his work.

Le Corbusier's Dom-ino (Fig. 2-5) design helps us connect these pictorial reflections to the world of industrial man and the question of the discrete floor. Architecture in the machine age is subordinate to the search for prototypes – in other words, invariants – which Banham later criticized alleging (in contrast to Buckminster Fuller) a metaphoric use of technology in the International Style.[48] In any case, when Le Corbusier published his Dominó diagram in 1914, it was the first time he interpreted the floor as another of the objets-type from his purist compositions. According to Kipnis[49], the floor is understood as a datum, i.e., smooth surfaces, which – like in manufacturing processes – must be understood as flat plane that should make optimum contact. In fact, Le Corbusier had already emerged as an unconditional supporter of standardization: "*The good product is developed within the industry. [...] The good product is the 'standard type'. The 'standard type' is the perfectly made product.*"[50] The floor from the Dom-ino diagram appears as an object that can be reproduced infinitely, mass produced and accumulated in section. But it appears, above all, as an industrial object (similar to the Ford T production (Fig.2-6)), whose appearance was motivated by a peculiar combination of events:

First off, by the desire to produce low-cost social housing. In that sense, modern society was posited as "*democratic and egalitarian, based on the ethics of sincerity, justice and the economy, which were constituted as expressions of the scientific image of a free nature.*"[51] Second, by the need to get in line with an industrial logic that had become a socio-cultural asset. The industrial logic was based on ideas mentioned earlier such as the assembly line, repetition, mass production, etc., which took shape artistically in concepts like the objet-trouvé, the objet-type, or the invariant. Its introduction into the world of architecture was only a matter of time, and notions like the prototype or prefabrication are prime examples. Third, by the availability of advanced concrete technologies that had been developed in France since the time of Freyssinet.[52] In that sense, while 19th century architecture in the United States was centered on metallurgy, in the continental European tradition of the early 20th century, concrete was the emblem of much of modern architectural experimentation.

One of the most notable formal aspects of the Domino diagram is its strict horizontality. Not only have the load-bearing walls, characteristic of traditional building, disappeared, the floor beams have also been eliminated – which was also very evident in the work of Mies van der Rohe. Moreover, the pillars are set back from the perimeter to create a façade and an open plan, and the primitive foundation blocks lift the building slightly off the ground, freeing the architecture from it and accentuating the horizontal nature of the ground slab. Like Girodano Bruno's infinite universe[53], Le Corbusier breaks with the limits that traditionally defined the forms of architectural space in order to reach an open, uniform, flexible and unlimited understanding of space. In that context, Le Corbusier's flat slabs simply aim to frame a small portion of that unlimited space, while preserving its fluidity on the horizontal plane (but not vertically, which requires the introduction of a stair core). In fact, when we talk about a discrete floor distribution, we are talking precisely about this opposition between fluidity in plan, due to the absence of limits, and interruption in section caused by the repetition of floors.

The fluidity and flexibility characteristic of the discrete floor outlined by Le Corbusier gave rise to what Rem Koolhaas would later theorize as the Typical Plan. Indeed, the plan of a Manhattan office building is probably the most enthusiastic exaltation of Le Corbusier's idea: rectangular geometries, minimalism in the masses, absolute neutrality, repetition of elements, etc. Ultimately, it is a plan where – like in Robert Musil's The Man without Qualities[54] – the qualities have been reduced to calculated relationships between discrete elements, where each can behave as it sees fit.[55] The expression "Typical" refers to the "nth plan" – in other words, the floor we referred to earlier that results for literally multiplying the original plot to reproduce the congestion of New York along the vertical axis. Rather than a plan understood as an inert object, the "*typical plan" is a device, which is also "as empty as possible: a floor, a core, a perimeter, and a minimum of columns.*"[56] Its "typical" character does not merely refer to the unlimited horizontal extension of the slabs, but also a strict modular reproducibility that allows occupants to engage in a maximum of activities with a minimum of infrastructure[57]. The "typical plan" thus aligns with the productive forces in Manhattan, making them more explicit than ever, indefinitely reproducing the technical conditions that inaugurated them.

The office building is not the only typology, however, that has made use of the typical plan as a design strategy. Using the system of reinforced concrete patented by his brother, Albert Kahn[58] managed not only to elevate a number of concrete floors that could support heavy weights, he also reduced the frequency of interior columns to 1 every 10 meters. His Ford Highland Park Plant, built in 1910, responded very effectively to the demands of an assembly line across four stories of more than 200 meters in length. In the interior, thanks to a space that was entirely continuous (Fig. 2-7), workers could be distributed freely, their positions determined only by the machines on the assembly line, in what Ford referred to as "a city under a single roof". In that sense, the building itself was a clear representation of what was going on inside: the logic of the assembly line housed within served to form the factory itself as an object, through the use of repetition as a design strategy. However, over time Ford and Kahn realized that multi-story factories were not ideal for a rational operation of the assembly line: the need for vertical transportation of all manner of materials and products resulted in a waste of both time and space. Over the years, the factories were designed to occupy a single story, although a similar modular and open schematic was applied.The concept of the typical plan structured the working spaces for the two classes of workers living in American cities: both blue-collar and white-collar workers[59] went to factories and offices designed according to the open floor plan model. However, as we have seen, despite its horizontal fluidity and flexibility characteristic of the Domino schema, Albert Kahn's factory model does not have all the attributes of the discrete floor. Its tendency to congregate over an enormous single story distances it from repetition understood as a multiplication of floors: its repetition strategy focuses on the control of the floor's surface area through a modular system, but it is not applied to the floor as an object in itself. In contrast, many of Modernity's tall buildings, associated with housing program or offices, made the repetition of floors, and not just their modular makeup, one of their leitmotivs. In that sense, the work by Mies van der Rohe is one of the clearest examples of the serial application of the Domino schema, with some nuances. As Josep Maria Montaner writes, Mies van der Rohe's architecture is based, above all on "*perfecting the two fundamental types: the pavilion and the skyscraper. In the pavilion, a sandwich spatial structure, Mies seeks out a universal space, an idealized space of Platonic perfection formed by two symmetrical planes – the floor and the roof – in relation to an ideal axis located at the eye level of a human being'.*"[60] The Barcelona Pavilion, built for the Barcelona World's Fair in 1929, is emblematic in that respect: two absolutely flab slabs frame an open and fluid space, whereas the extended cantilevers of the top slab highlight the horizontal condition even further, interrupted structurally only by the metal columns that support it. In the wake of the research undertaken in Barcelona, beginning in the 1940s Mies developed an intense interest in buildings with a minimum of structural obstructions, inspired by the naves of Gothic cathedrals and the colonnades of classical

42. Juan Carlos Sancho, *El sentido cubista de Le Corbusier*, (Valencia: Munilla-Lería, 2000), 63.

43. Walter Benjamin, *The Work of Art in the Age of Mechanical Reproduction*, trans. Claude Kipper, (London: CreateSpace Independent Publishing Platform, 2011), 24.

44. Sancho, 68.

45. Later, in Fatal Strategies, Baudrillard took the devaluation of the subject even further by transferring its sovereignty to the object.

46. Charles-Édouard Jeanneret-Gris and Amédée Ozenfant, "Idées personelles," *L'Esprit Nouveau,* no. 7 (1922): 33.

47. Sancho, 71.

48. Reyner Banham, *Teoría y diseño en la primera era de la máquina*, (Barcelona: Paidós, 2015), 321.

49. ""Discrimination" by Jeffrey Kipnis", YouTube video, 23:30, lecture on July 15, 2013, posted by "Harvard GSD", July 23, 2013, https://www.youtube.com/watch?v=vur3TRzFztQ.
Where "ground" refers to the natural terrain that can be understood as public space, "land" is a portion of that ground constituted as private property, with all the legal consequences that implies. In contrast, "datum" would be the democratization of that land through its repetition, which Le Corbusier's diagram describes with precision.

50. Stanislaus von Moos, "Le Corbusier and Loos", in *Raumplan versus Plan Libre*, ed. Max Risselada (Rotterdam: 010 Publishers, 2008), 23.

51. González, 222.

52. Eugène Freyssinet is considered the driving force behind the use of prestressing in concrete structures. Moreover, he was able to carry over his research into industry, allowing for a widespread use of his contribution.

53. *"G. Bruno was in a league of his own when it came to revealing the distance between the Medieval era with its closed, finite, immutable, clearly defined universe, and the new age of an infinite universe, open and overflowing with possibilities."*
González, 213.

54. MUSIL, Robert: The Man Without Qualities. Ed. Knopf, 1995.

55. Ulrich Anders, the main character in the novel, is deemed a man without qualities not because he has none, but because the ones he has are useless. Koolhaas uses this analogy to assert that the typical plan has no attributes because they have been reduced to only what is strictly necessary.

56. Rem Koolhaas, *SMLXL*, (New York: Monacelli Press, 1995), 344.

57. In the 70's, Archizoom will emphasize this condition with the project "No-Stop City" (1970-1971), in which Gilberto Corretti "draws a continuous space sustained by huge triangulated beams of miesian inspiration".
Pablo Martínez, "The interior City", in *Sobre Arquitectura Moderna y Contemporánea*, ed. Anton Capitel (Madrid: Diseño, 2016), 224.

58. Albert Kahn was probably the most well-known industrial architect in the United States during his lifetime. He is known above all for large-scale industrial plants for companies like Ford or Packard, whose flexibility facilitated the distribution of machinery and flows of circulation.

59. The terms "white collar" and "blue collar" are specifically modern and have been attributed to the author Upton Sinclair.

60. Josep Maria Montaner, *La modernidad superada*, (Barcelona: Gustavo Gili, 2011), 100.

Greek temples. In the Farnsworth House (1945-1950), Mies located the structural supports outside the slabs, further emphasizing their horizontal character and their continuity, which was also enhanced by the broad cantilever at the entrance, the riserless stairs and the open entrance hall. Furthermore, like in the Domino schema, the floor slab is not resting on the ground; it is elevated by exterior columns that don't penetrate the slab but support it along the edges. In this way, Mies achieves a strong feeling of weightlessness: the three slabs float in space, freed from any structural element that might interrupt the continuity of the plane. Throughout his work, Mies designed a number of buildings that share these same concerns: The Barcardí building in Mexico (1961), Crown Hall in Chicago (1955), the Cantor Drive-in Restaurant in Indianapolis (1945), the TD Center pavilion in Toronto (1969) or the Neue Nationalgalerie in Berlin (1968) are some good examples.

Mies then transferred this type of formal investigation to tall buildings. The German architect looked at 19th-century skyscrapers in the United States with a mixture of admiration and disdain: on the one hand, he was amazed by the technical boldness of American architects like Sullivan or William le Baron Jenney but, on the other hand, he did not understand the American tendency to hide the modernity of their skyscrapers behind the stony style of traditional Europe, encumbered with artistic prejudices. Mies advocated for what he considered should be "*sincere expressions of the present*". In that sense, he argued that the task of architecture understood as an art should transcend a mere celebration of technical skill. As described by Detlef Mertins,[61] in the early 20th-century United States, the powers of industry and capitalism had produced a genuine and objective form of building, a natural result of the social, economic and technological developments of the modern metropolis. And yet it was in Europe, especially through Mies's work, that the American "raw technique" could be elevated to the transcendence characteristic of a new artistic expression. In fact, in Mies's approach to skyscrapers, aesthetics is put before technical aspects and not the other way around: it was precisely an aesthetic fascination for constructive sincerity that led Mies to propose new forms of inhabiting space.

In any case, when Mies translated his open plan investigation into skyscrapers, his strategy consisted of repeating that horizontality in section. In that sense, his 1922 design for a skyscraper in Berlin is very revealing: the tectonic sincerity of Mies's approach to skyscrapers lets us clearly see the building's insides and we understand how the repetition of floors can become a design strategy. Mies aimed to maintain the constructive skeleton free from formal add-ons that might interfere with its aesthetic understanding: the floor, understood as a functionally optimized technical prototype provided an aesthetic value in itself, and constructive sincerity was the best way of highlighting it. The German architect looked at the Domino diagram from 1914 and took it to the extreme: by expanding, repeating and exhibiting it, Mies made it into the center of gravity for the emergence of a new formal language. Throughout the 20th century, it would take shape in a number of vertical designs: the Seagram building, the Toronto Dominion Center of the IBM building, all of them permeated by an industrial logic made into an artistic expression, are good examples. However, the project that best represents this type of consideration and brings together all the attributes of a discrete floor distribution is Mies' Lake Shore Drive building in Chicago (1951). First off, what Koolhaas defined as the "typical plan" is a precise fit for the plan of the design: it is a pure rectangle limited to a floor, a circulation core, a perimeter, and a series of columns (Fig.2-8). The floor plan is gridded and supremat ist, where the vertical circulation core is laid out as a square in the center, and the apartments are distributed around it. Its residential program requires the distribution of a series of dividers to create different rooms, but their function is not structural. In that sense they could be given any other type of pattern. Second, the design accumulates 28 identical floors that are repeated vertically, as though they were produced on a Ford factory assembly line. The photographs of the building process are very revealing in that respect (Fig.2-9): the construction was approached literally like a vertical assembly line, progressively distributing the floors and façade elements vertically, and concluding with the assembly of discrete pieces. Third, and in keeping with the principles of the 1909 theorem, each floor is independent: there are no relationships between the floors beyond the vertical circulation core. There is no attempt at generating complicity between the floors; rather their independence is emphasized along with their ability to establish themselves as one of the many "virgin sites" produced by the industrial apparatus at the turn of the century.

2.2.4 Discrete floor: formal and performative qualities

The discrete floor characteristic of skyscrapers uniquely possesses a series of spatial attributes that differentiate it from the continuous floor not only in its form, but in its performance. The following section presents a systematic analysis of six formal attributes and six performative attributes that will later serve as the foundation for a comparison of the spatial characteristics of the discrete floor in relation to the continuous floor (Fig. 2-31).

Mereology: Whole = ΣParts

If we understand the discrete series of floors in a building as a "whole", each of the floors can be understood as one of its "parts". However, if as asserted by the 1909 theorem, each of those floors "*is treated as a virgin site, as if the others did not exist*",[62] it is fair to assume that no relationship are established between them: each slab is an independent world resulting from the conception of the skyscraper as "*a utopian formula for the unlimited creation of virgin sites on a single urban location.*"[63]

In this context, the inability of the parts to establish relationships with one another implies that the "whole" is equal to the sum of those parts, in other words, the ensemble of floors is equal to the sum of each of them, since there are no interactions to calculate.

As a result, each part can be approached as an independent whole, and in that sense they can be read in keeping with Leibniz's system of monads. The tension between the external

61. Detlef Mertins, "Mies's skyscraper "project": Towards the redemption of technical structure", in *The presence of Mies*, ed. Detlef Mertins (New York: Princeton Architectural Press, 1994), 49-50.

62. Rem Koolhaas, *Delirious New York*, 85.

63. Ibid,, 87.

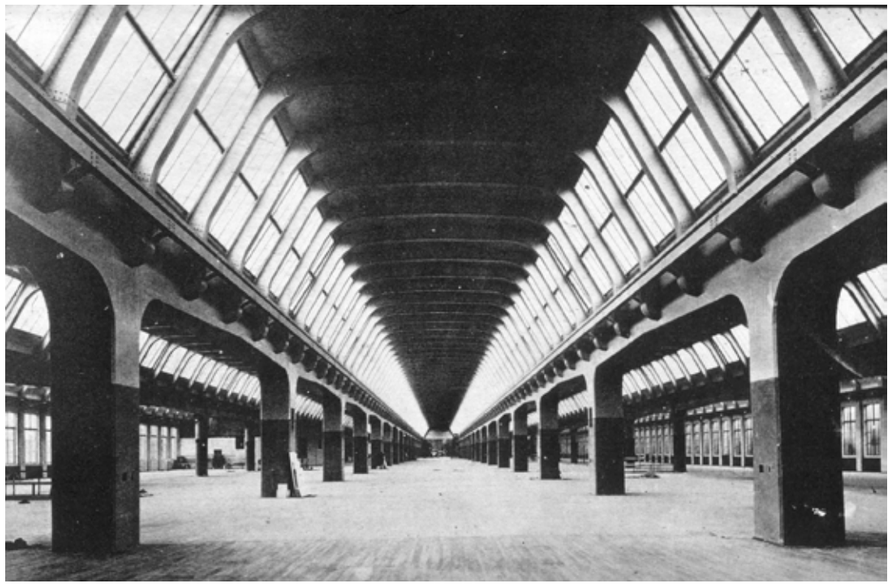


Figure 2-7: Ford Highland Park Plan, Albert Kahn, 1908

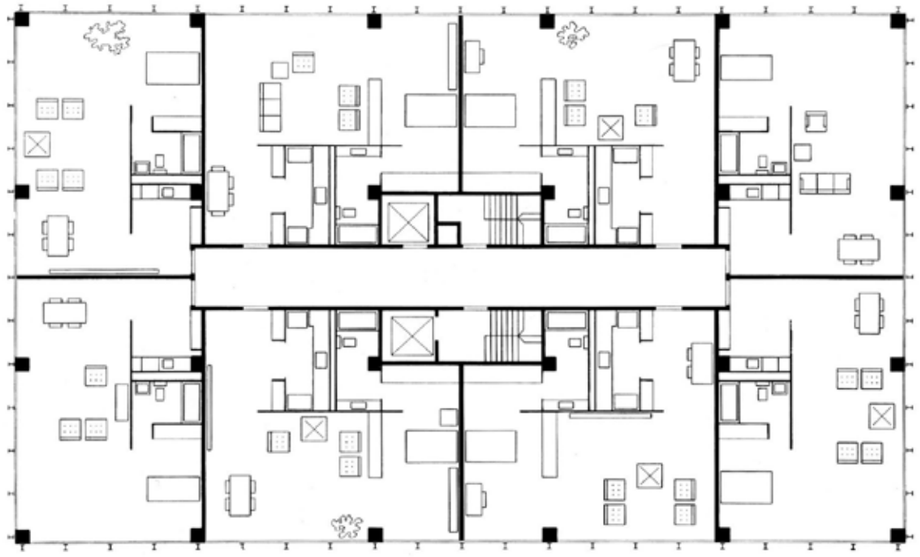


Figure 2-8: Lake Shore Drive Plan, Mies van der Rohe 1951

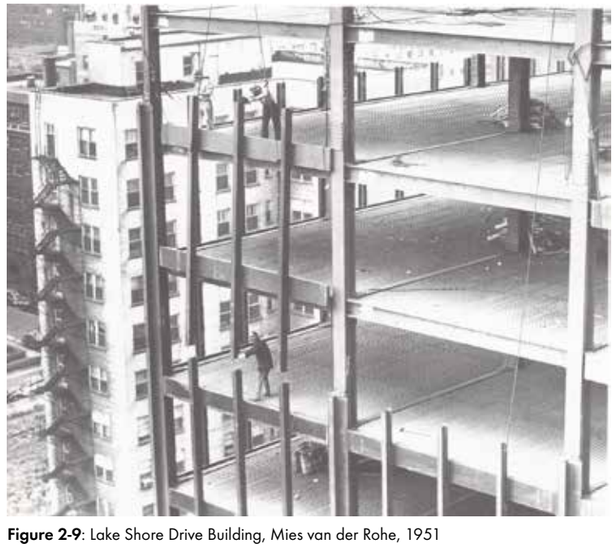


Figure 2-9: Lake Shore Drive Building, Mies van der Rohe, 1951

unity and the internal multiplicity of each monad, along with their understanding as a singular, indivisible and autonomous substance,[64] maintains certain parallelisms with the programmatic independence of each discrete floor. Whereas Leibniz relied on the theory of a pre-established divine harmony to explain the apparently synchronous behavior of monads, in this case there would be a secular pre-established harmony: it would not by exercised by any God, but by a modern architect, ascended to the rank of Promethean hero, intent on arranging into layers each of the "worlds" produced by the multiplication of urban land.

Geometry: Euclidian

The geometry uses in the discrete floor distribution is fundamentally Euclidean plane geometry, that is, the part of geometry that deals with elements whose points are contained within a flat surface. Euclidean geometry must satisfy the five postulates proposed by Euclid.[65] His final postulate does not hold for the other two possible types of homogeneous geometries, which we will see when we discuss continuous floors: elliptic geometry with positive curvature and hyperbolic geometry with negative curvature.[66]

Discrete floors are completely flat. There are no folds or distortions in their surfaces, so their representations in plan provide true geometries with true dimensions. Moreover, it is a gridded surface, "*not in the absolute, clumsy manner of European Platonics (a moralistic system to measure misfit and thus create unhappiness), but on the contrary, through the development of anti-ideological devices.*"[67] In that sense, the Cartesian coordinate system responds to a logic of efficiency, focused on the modular quality of space in order to optimize its performance. Architecture is reduced to an abstract notation system used to synthesize and organize different conditions of construction. According to Dan Hoffman, this abstract system (the development of which Mies provides a good example) has "*strong parallels to the forms of Euclidean geometry; points, lines, planes, etc., and is therefore subject to a questioning that focuses upon the ideality of a given form in relation to its circumstantial execution.*"[68] Because, in this type of plan, geometry is highly idealized and even shows certain Platonic reminiscences, its construction is constantly audited by the constructs of geometry and its inherent perfectibility.

In contrast to the Renaissance poché, the figures projected onto the plane of the discrete floor are elements that float freely on the surface, without being tethered in any way except by keeping within the underlying abstract grid (Fig. 2-10 and Fig. 2-11). Geometry does not act as a limit, but as a guide; in other words, it does not impose via physical means but rather organizes via an ideal. At its core, spaces are defined as an atemporal and idealized realm based on the autonomy of form, which, as opposed to the Renaissance floor, is open to the exuberance and the uncertainty characteristic of the modern metropolis.

Contour: Ideal

In this case, the idea of a limit develops in close relation to the geometric ideal constituted by the discrete floor. Thus, the horizon emerges as a conceptual limit that is constantly "receding", and its vision is celebrated as representing an ideal: that of a culture "of perspective" that sees the horizon as an optimistic symbol of unlimited progress. In contrast to the introspection characteristic of the centralized floor plans and opaque walls of the Renaissance,[69]the discrete floors of industrial modernity emphasize a far-off perspective, charged with progressive symbolism an inherited from the gaze that caught sight of land on 16th-century colonial expeditions.

In any case, the discrete floor promotes a unique, ideal horizon through the flatness of the slabs, the minimization of any interruptions, and the presence of large cantilevers, when they exist (Fig.2-12). In that sense, as Dan Hoffman explains, the case of the Barcelona pavilion is a characteristic example:

> *"In the familiar front view of the pavilion, for example, it is evident that the space of the pavilion is limited by the inside surfaces of the section between the roof and plinth, a space that is filled in elevation by the vertical thickness of the marble-faced walls. When projected towards the horizon, however, the surfaces of the roof and plinth begin to converge into a single line that is conceptually without thickness."*[70]

In vertical buildings, each of the repeated slabs produces its own horizon line, further emphasizing the independence of each slab.

Arrangement: Stratum

In the 1909 theorem, the different virgin sites are stacked one above the other in strata, i.e., in layers. This type of ordering is evident in buildings such as the New York Athletic Club, whose accumulated layers are physically contiguous, although there is no meaning or function necessity in that physical adjacency.

However, it is important to point out that, despite the deep disconnection between those lots in the air, together they make up a single building. Although it may seem contradictory to uphold, on the one hand, the independence of each floor and, on the other, the unity of the whole, here it is worth reflecting on the role of each of the different transversal elements connecting the slabs: such as the structure, the façade and the communication cores. A close reading of those elements shows that

64. Gottfried Leibniz, *Discurs de Metafísica / Monadologia*, ed. Josep Olesti Vila, trans. Josep Olesti Vila, (Barcelona: Marbot, 2018), 101.

65. Euclidean geometry is divided into plane geometry and spatial geometry. In this particular case we are referring to the former.

66. In hyperbolic geometries with negative curvature and positive curvature a modified form of the parallel postulate is applied: in hyperbolic geometry, for any given line r and point P not on r, in the plane containing both line r and point P there are at least two distinct lines through P that do not intersect r.

67. Rem Koolhaas, *SMLXL*, 340.

68. Dan Hoffman, "The Receding Horizon of Mies", in *The presence of Mies*, ed. Detlef Mertins (New York: Princeton Architectural Press, 1994), 99.

69. *"Whereas the maximum expression of traditional space originates in the unitary world of the Renaissance, where there is no analytical separation between elements of space and elements of form, and where conical perspective expresses the image of man as its center, the origin of anti-space lies with the Copernican revolution in 17th-century science. That is when space begins to break free, when it becomes independent and relative to objects in motion within an infinite cosmic system."*
Josep Maria Montaner, *La modernidad superada*, 30.

70. Dan Hoffman, "The Receding Horizon of Mies", in *The presence of Mies*, ed. Detlef Mertins (New York: Princeton Architectural Press, 1994), 106.

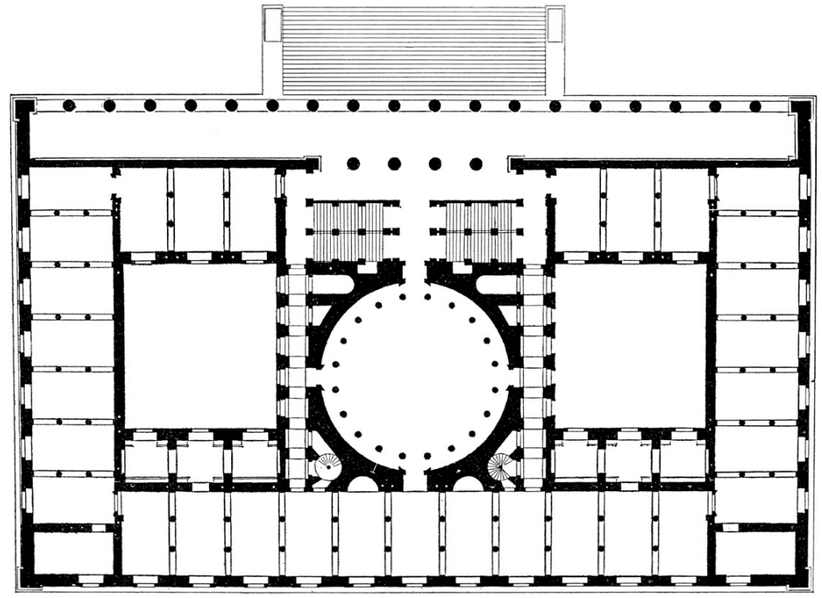


Figure 2-10: Atlas Museum, Schinkel, 1830

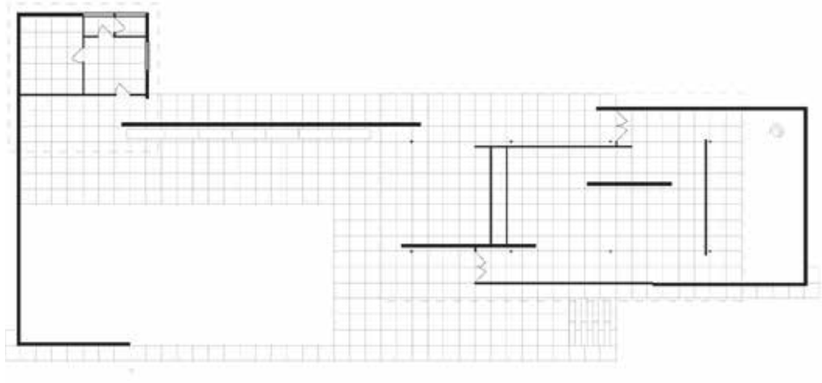


Figure 2-11: Barcelona Pavilion, Mies van der Rohe, 1929

they exist precisely to the extent that they are able to preserve and extol the individuality and autonomy of each level. In that sense, their success has to be measured based on their ability to frame the coexistence of the separate "units", while creating a minimum of interference in their individual purposes. As a result, the building becomes what Koolhaas defines as "*a stack of individual privacies*",[71] something that proposals like the ones by J. Wines[72] had already suggested in a very literal way (Fig. 2-12 and Fig. 2-13).

The layered distribution of discrete floors, along with the independence of each story with respect to the others, allows for their arbitrary distribution within a single building. This aspect is important because it confirms the discrete nature of the system, at the expense of succession, because, despite allowing for physical discontinuity, it requires an ordered relationship among the elements.

In truth, the discrete floor arrangement has broken free from its envelope, and the accord between content and container is no longer required: the façade envelops the floor structures, hiding on the exterior the exuberance of the constant changes that affect the interior. There is a programmatic and structural layering through the repetition of floors, although it is later covered by a single uniform element that separates it from the context of its function.

Growth: Repetition

The growth mechanism characteristic of the discrete floor system is that of repetition. In that sense, there is a certain tension between the autonomy of each story and the relationship of identicalness established with all the others. Indeed, on the one hand, each level develops independently of the others because of its radical autonomy, and in doing so it becomes individualized. On the other hand, the slabs are all identical, since they are merely the repetition in section of the urban plot. In that sense, it is worth differentiating the floor as a "container" repeated in section (and thus identical on every level) from the floor as a unique "content" that develops in each of those identical containers.A skyscraper grows vertically like a giant assembly ling pointed at the sky. The floors are repeated in section like the Ford Model T was produced at the factory: in both cases, the same materials are assembled in the same positions over and over again, in a scenario where the workers appear as passive, nearly ornamental presences. The industrial logic of Taylorism and Fordism is at the root of the glorification of repetition as a production mechanism. It celebrates and promotes ideas like reproducibility, mass production and automation, transformed into emblems of modernity for their logistic efficiency and their economic profitability. Their repeated use in different contexts has made them into true sociocultural values characteristic of an era.The first era of skyscrapers, which Huxtable defines as "pragmatic",[73] is a good example of this reflection, since the use of repetition as a growth mechanism is easily observable. Structures like the Reliance Building are the epitome of this strategy, where the composition of the façade divided by floors along with an emphasis on the slabs invites a reading of the whole by layers.

Figuration: Grounds

When a figure stands out against a ground, the architecture is framed by the land it occupies. The land takes on a fundamentally receptive role, and its passivity allows for reading the features of the architecture as an active figure. In the case of a skyscraper understood as an object, there is an evident figure/ground contrast with the territory where it is located. However, if we follow the argument that a skyscraper is a vertical repetition of the territory, we might describe the discrete system of floors as a vertical series of "grounds", i.e., as a series of independent systems of reference, without any hierarchical relationship between them. Each of them can serve as a framework for action, allowing for the movement and flow of the figures that stand out against them – in contrast to Renaissance floors, where the floor is still a figure, due to the rigidity of the plan.

Once again, the 1909 theorem is a representative example: "*Each of these artificial levels is treated as a virgin site, as if the others did not exist, to establish a strictly private realm around a single country house and its attendant facilities: stable, servants' cottages, etc.*" Indeed, each of these plots hanging in the air has its own figure, represented in the form of a country house. There is an interesting fractal play here, where the skyscraper is a figure against a ground, but each of its floors is laid out as another ground that contains a figure (the country house.) Between the figure of the object it is part of and the figure of the object it contains, the discrete floor of the skyscraper emerges as an infiltrated ground. In that sense, the discrete floor emerges as an element that, when combined with other floors, participates in the gestation of a figure, but in its individual independence produces a ground. As a repetition of the original urban plot, it shares the same degree of validity: in other words, it cannot be described as a lesser ground projected above a greater ground, but rather as identical to the original ground.

Circulation: Spine

The discrete system of floors is the product of an industrial thought process, and it that sense its circulation systems are as well. The circulation takes place in the form of a spine: a primary trunk, through which the elevators provide vertical communications, and a series of secondary branches that provide for horizontal movements. It is an incredibly efficient system, where circulation paths are directed to ensure that movements take the minimum amount of time possible.The main trunk is located at the center of the plan, in suprematist fashion, and it contains the vertical circulation, in the most compact arrangement possible, along with other types of services such as bathrooms, ducts or hallways, which provide the secondary branches for horizontal movement. While Modernity resulted in types of movement very far removed from Le Corbusier's "promenade architectural", the spine circulation characteristic of skyscrapers and the

71. Rem Koolhaas, *Delirious New York*, 85.

72. *"The point is to construct a basic matrix – as the only contribution of the architect/engineer – and then allow the urban dwellers to determine their own choices of residential style and uses of the real estate parcels. Like Duchamp's notion of 'canned chance,' the High-rise of Homes was an idea based on an orchestration of indeterminate elements."*
James Wines, interview by Vladimir Belogolovsky, *Archdaily* (blog), March 9, 2016, https://www.archdaily.com/783491/interview-with-james-wines-the-point-is-to-attack-architecture

73. Ada Louise Huxtable, *The Tall Building Artistically Reconsidered*, 134

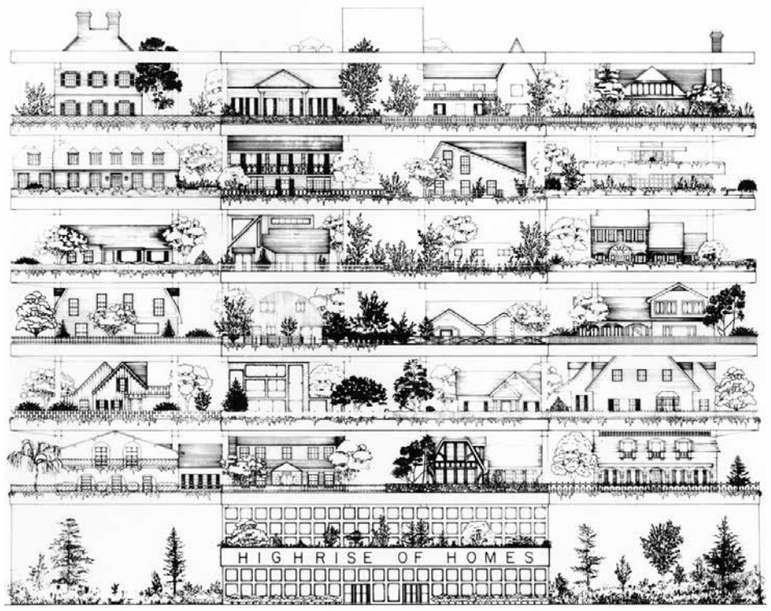


Figure 2-12: Highrise of Homes, J.Wines, Section, 1951

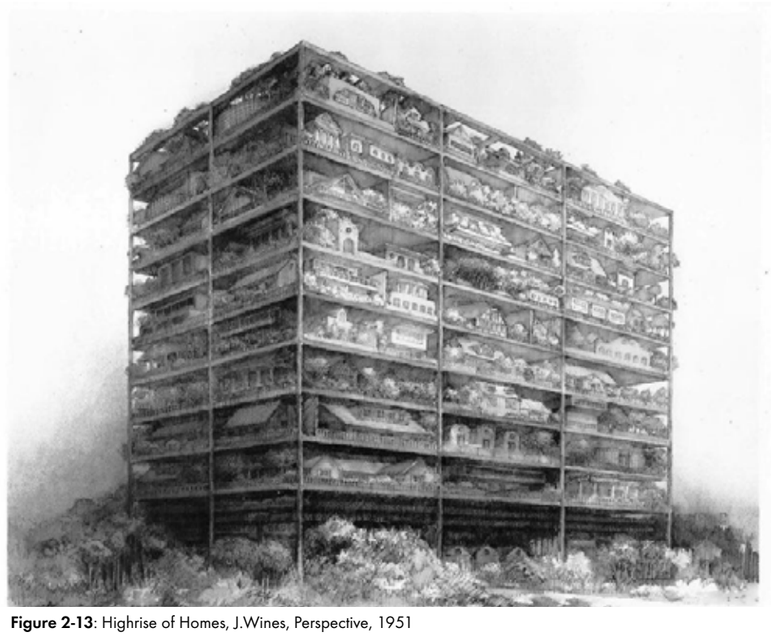


Figure 2-13: Highrise of Homes, J.Wines, Perspective, 1951

discrete floor understands movement as a strictly instrumental exercise, and not as an experience in itself.

In that sense, the liveliness of the industrial era does not permit distractions or rest: the production chain again serves as a metaphor for a strictly operative circulation, devoid of any expressive elements and reduced to its minimum manifestation. The inhabitants of skyscrapers move through the building in the same way products are efficiently transported along the assembly line. It is a fast and efficient mass circulation, carried out by a novel element specifically designed for vertical configurations: the elevator. The elevator appears as a kind of space shuttle, a transitional space that allows for the "impossible leap" between worlds. Its use entails a certain ritual and the setting is constituted as an authentic limbo, a neutral place, a "no-man's land" of sorts, where one can only await the arrival of the new world.

Gaze: Horizon

In contrast to the centered and introspective understanding of space resulting from the Renaissance world, the perception associated with the discrete floor and its open plan is, above all, a perception of openness, where the human gaze is expanded and stretches off into the distance (Fig.2-14).

The unlimited space characteristic of modernity is inherited from the infinite universe posited by Giordano Bruno. While it is common to talk about the Copernican Revolution as one of the most relevant events in science, the associated understanding of space (despite the shift in roles) was still unitary and limited. In that sense, Giordano Bruno's contribution was decisive for modernity: his affirmation that there were unlimited infinite universes definitively broke with the narrow medieval perspective, and for the first time contrasted the finite nature of man with the infinite nature of space, freed from all limits.

Modern space effects a similar operation in blowing up the limits of Renaissance space: industrial man moves through a generic and uniform space dominated by a profound sensation of weightlessness created by the lack of boundaries in plan. This engenders a far-reaching, penetrating gaze which, due to the transparent perimeter characteristic of the discrete floor, stretches off toward the only element that modernity recognizes as a limit condition: the horizon. Space is no longer an enclosure organized into hermetic compartments: the scope of the gaze is no longer limited to the dimensions of those compartments but runs comfortably across the entire length of the floor, even reaching beyond its limits.

Orientation: Core

Modernity is a period that celebrates the presence of a privileged being, a point of reference established as an absolute subject that takes shape in the figure of "man". One of the most quintessential cases of this mentality involves Kant, when he asserts that it is man's cognitive abilities that determine the way in which the objects around him appear before him. In that sense, the subject – object contrast is radicalized, subjugating the presentation of the latter to the "apperception" of the former.

Despite advocating for open, continuous and generic floors, discrete floor systems share this referentiality, so typical of the era. But they do so with a certain tension that occurs between the uniformity established by the underlying grid and the hierarchy imposed by the centrality of the vertical core. It is a different centrality from that of the Renaissance, however. The latter, as can be clearly observed in buildings by Palladio, for example, behaves like a center of gravity which, first, attracts the formal distribution of the rest of floor plan and, second, lends heterogeneity to the space. In contrast, the centrality of modern space is a clean perforation of the ensemble of layers, which does not alter the spatial homogeneity of its floor (Fig.2-15). Indeed, the circulation core appears as a leading element in a suprematist composition[74] that is, on the one hand, an inheritor of Renaissance centrality but, on the other, removed from its spatial hierarchy.

In that sense, in discrete floors, space is distributed uniformly around a core that not only acts as a point of reference in relation to each of the stories, but also in relation to the whole. It is thus constituted as a support element, an axis that runs through each and every layer, and a guideline where the transition occurs between the different autonomous "worlds" that make up the whole.

Retirement: Margin

The presence of the circulation core as a central element that cuts through all of the slabs in a skyscraper is essential to understanding how privacy is distributed in the discrete floor. In contrast to the spatial universality characteristic of open spaces like the Barcelona Pavilion, the floor of a skyscraper is highly conditioned by a strong centrality. The center is set up as a shared space for vertical circulation and is, therefore, public. Stairs, elevators and hallways are defined as "community" spaces, areas which users always occupy during moments of transition when it is difficult to entirely avoid encountering "others". In Renaissance space, the center was also established as a space with a lesser degree of privacy, but in that case it was not a space for circulation, but a living area. Examples include Palladian villas like the Villa Cornaro or the Villa Rotonda, where the monumentalization of their respective "centers" makes them into spaces with a more public use, whereas rooms with increased levels of privacy are located along the perimeter.

Something similar occurs with the discrete floor characteristic of skyscrapers, although with notably less monumentality, in general. In this case, the levels of privacy are established, in plan, according to a radial framework. While the center is set up as public space, because it is shared, the margin is occupied by the different residential units, spaces which are thus provided with increased privacy. In the case of Lake Shore Drive however, although there is a radial layout, the framework is also binary: as opposed to a progressive scale between private and public, there is a sharp break between the two realms. This phenomenon is softened when there is a more flexible program, like in the case of office buildings like the Seagram Building, although the radial framework is still present. It is a bi-directional radiality in this case, however, since the minimum privacy associated with the vertical circulation spaces is joined by the maximum privacy of the bathrooms, which are also located in the center.

74. *"Securely entrenched in the domain of philistinism, Typical Plan actually has hidden affinities with other arts: the positioning of its cores on the floor has a suprematist tension; it is the equivalent of atonal music, seriality, concrete poetry, art brut; it is architecture as mantra."*
Rem Koolhaas, *SMLXL*, 343.

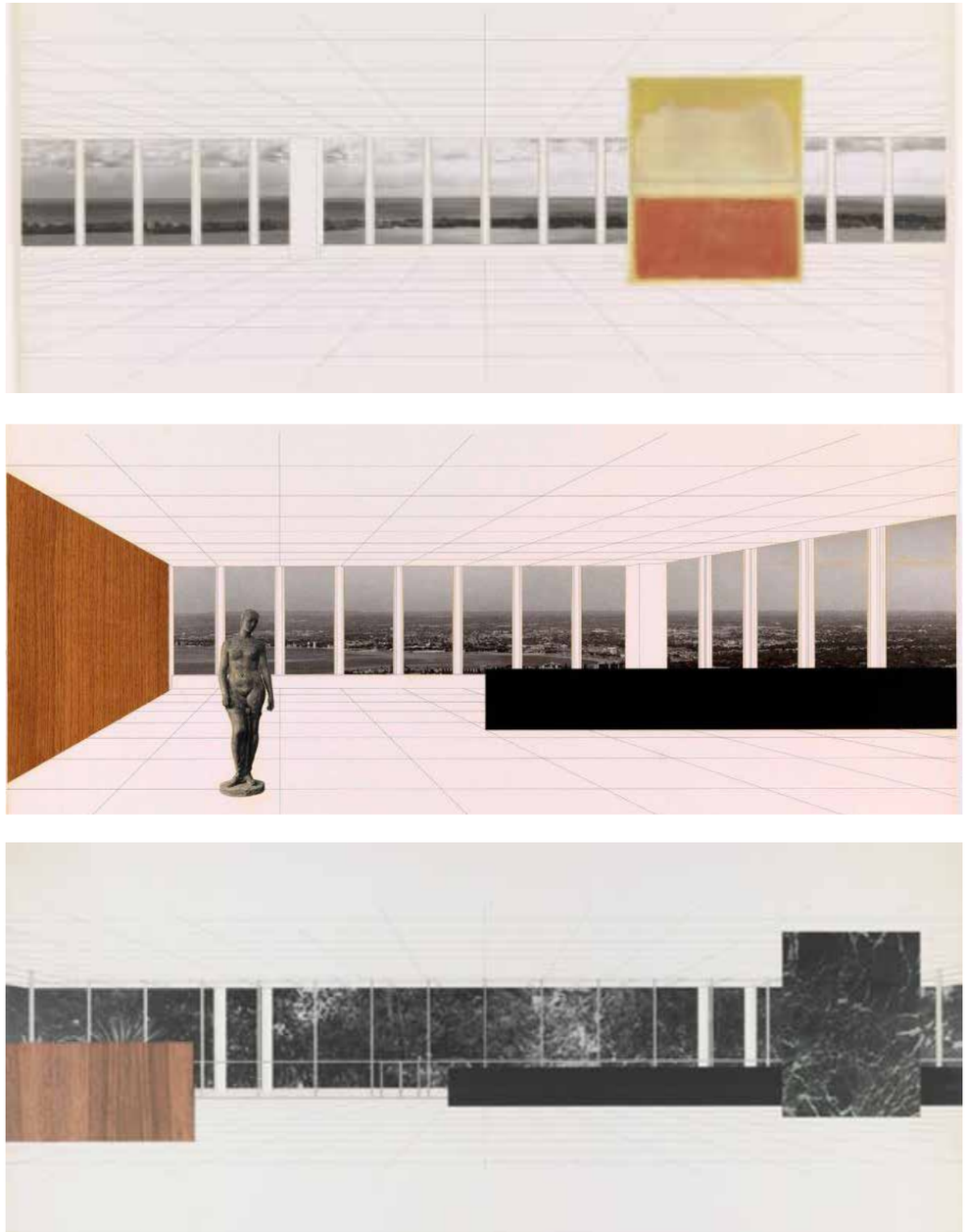


Figure 2-14: Collage, Mies van der Rohe, 1951

Interiority: Opposition
In the discrete floor characteristic of the skyscraper there is a binary approach to the interior-exterior distinction. Beyond the understanding of both concepts as absolutes, they are not presented as the endpoints of a gradual process; rather they maintain a relationship of strict opposition. In that sense, the transition from one to the other always takes place on the ground floor of a building, sometimes occurring through a porch-like element that aim to mitigate the abruptness of the change. However, in most cases, passing the vertical façade occurs as a "jump" between the two spheres without interruption.

While it is true that the lobby may serve as an intermediate space that, to an extent, aims to articulate the private space of the building's interior with the exterior public space, for all practical purposes it is an interior space in the strictest sense of the word. It is a programmatic articulation, if you will, but it is in no way a performative articulation. In that sense, whereas the limit of the discrete floor may be considered ideal from a formal point of view in its constant allusion to the horizon, from a performative point of view it implies a rigid boundary that separates the interior from the exterior.

Access: Single
Access to the discreet floor takes place immediately and on the ground floor. In that sense, there is no transition space within the building itself, as in the case of the continuous floor. There may be elements that are external to the building such as pergolas, changes in paving materials, railings, etc. that symbolically indicate the proximity of a change, especially from the outside toward the inside. However, these elements do not emerge from the building itself; they are external to it and have been added later.

As a result, access to the complex in the case of the discrete floor consists above all in crossing a threshold – in other words, crossing a border constituted in this case by the lowest part of the building's façade. In general, there are no other accesses to the complex except on the ground floor. It is therefore a simple access, because there is one, it is always on the ground floor, and it is be laminar, i.e., without thickness. Accessing the discreet floor is thus set up as an exercise dominated by the simplicity of the binary, and which relies on external elements to soften the crossover from the outside world to the inside and vice versa.

2.3 Semi-continuous floor

Between a discrete floor arrangement, where the parts form a countable series, and a continuous disposition, where the parts form a single whole, there are a number of cases that combine characteristics of the first two without constituting a third system. The combinations are achieved by making the floor a design element: in other words, the stretches of continuity are not achieved through the use of mechanisms for movement such as stairways, elevators or ramps, but through a special treatment of the distribution and shape of the floor itself.

However, these cases do not constitute a third system because they do not form an independent multidisciplinary cluster, as is the case with the discrete system and the continuous system. They are more like offshoots or branches, bastardizations that indicate certain avenues or intuitions, but which are insufficient to be constituted as completely autonomous movements. In any case, although a strictly diachronic relationship between discrete and continuous floors cannot be established, the cases presented below begin to show a certain depletion of the discrete pattern. In that sense, Adolf Loos' Raumplan and some of the mixed experiments by Le Corbusier, like the Strasbourg Conference Center, are ambiguous cases that are difficult to fit into either of the two systems proposed here. As such, we should acknowledge their peculiarity. They can be explained both from a formal and performative point of view through the aforementioned concepts of "succession" and "contiguity" and understood as intermediate cases between the discrete (nearer to succession) and the continuous (nearer to contiguity). Moreover, in their role as "interlopers", they function as a "disciplinary hinge" that is very useful as an introduction to the distribution of continuous floors, which will be presented in the following section.

2.3.1 Raumplan: the floor's formal and performative succession

A succession is a relationship established between various elements that are not in contact, but which maintain an order between them in the form of a constant pattern. As we have seen, discrete floors cannot be described in these terms from a performative point of view, since one can infer that their functional distribution may be arbitrary because there are no operative relationships between them.[75] In contrast, there are both formal and performative relationships between the elements in a succession; consequently, their ordering is relevant.

The Raumplan system devised by Adolf Loos at the beginning of the 20th century can be described in terms of a succession in both formal and performative terms. Indeed, there is an underlying common order to all of the final "Raumplan houses" – a specific and unique floor distribution, which most of the houses seem to be based on: "*The relationship of the main living areas (entrance hall – living hall – dining room – study) is established in a fixed scheme in which "rooms" are not primarily separated by walls, but by their situation at (slightly) different levels.*"[76] Different versions of the schema were proposed depending on the budget and the context. In all cases, however, the following transformation takes place: The traditional bourgeois residence goes from being a house with specialized individual compartments to a house where the rooms are open to one other. The rooms have different heights, determined by their individual functions, which give rise to a series of different floors connected by an ingenious system of stairs. Although the succession is discrete like what you find in a skyscraper, it is different in two ways. On the one hand, it is much more complex than the formal progression typical of the skyscraper typology, since the formal relationship between the floor slabs cannot be reduced to a displacement with a constant value. On the other

75. There is a formal relationship between the various slabs in a discrete floor system because each slab is identical and shares the same xy position. However, from a performative point of view each slab is independent, because it is a world in itself and thus does not depend on any external element. That is why its distribution can be considered arbitrary from that perspective.

76. Max Risselada, "Documentation on Houses", in *Raumplan versus Plan Libre*, ed. Max Risselada (Rotterdam: 010 Publishers, 2008), 114.

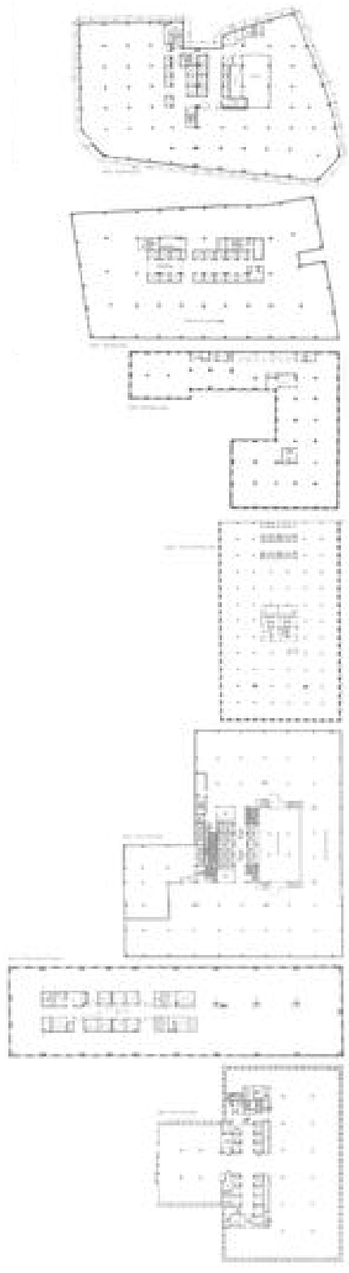


Figure 2-15: Typical Plan, Rem Koolhaas, 1993

hand, unlike the skyscraper the succession is not strictly formal. It is also performative because there are functional, visual and circulation-based relationships between the different slabs.

Although Adolf Loos never discussed a "Raumplan theory", the results have been broadly documented based on the Viennese architect's work. Some of the Raumplan principles can already be seen in the Rufer House (1922) and the Dice House (1925). Although the former still articulates them rather timidly, the latter appears as the basic model from which most of the Raumplan houses were developed. That includes two projects that demonstrate the maturity and brilliance of the Raumplan system: the Moller House (1928) and the Müller House (1929). In the former, the articulation of the space across different levels is fundamental in separating the rooms. They are completely open in terms of sightlines and they are connected by small flights of stairs. The treatment of materials is used as a tool to reinforce the differences in character between the various living areas, forming what some authors have referred to as "theater stages". On the one hand, the dynamism of the entrance hall is characterized by a variety of elements such as balustrades, beams, banisters, etc. which are also painted in bright colors. On the other, the tranquility of the dining space and the music space is embodied by wood-paneled walls and white ceilings. The entrance hall, in a central position, is established as articulating element, and the rest of the floors in the plan orbit around it at different heights.

The Müller house (Fig.2-16) applies the Raumplan principles using a different strategy. In this case, the entrance hall is not located in the center; rather it occupies the entire short side of the floor plan. It is accessed via a staircase from the ground floor, and the hall then connects to the other floors. In this case, the connection via flights of stairs is not as apparent as in the previous example, although there is a clear visual connection between the rooms, especially between the entrance hall / living room and the dining area. In any case, it is another series of floors that maintain visual relationships and are located at different heights depending on their intended program.

There are essentially two formal similarities between the Raumplan floor and the discrete floor characteristic of the open plan: in both cases the floors are separate from one another (that is, they can be distinguished and counted); and in both cases their surface is completely flat, without folds or bends. However, while the open plan of discrete floors is an isolated and generic plan (and therefore multifunctional), Raumplan floors are connected and specific: their dimensions and heights respond to a single function. The necessary connection between functions calls for a both a formal and performative regulation between each slab, while in discrete floors this regulation is only formal and not performative, since each slab is functionally autonomous and independent. The Raumplan does not participate in the industrial logic of the objet-type and its unlimited repetition; instead, it seeks out the "topological specificity" of continuous floors. In that sense, and from a formal point of view, Raumplan floors can be read as a pixelated representation of the continuous floor, i.e., a "low-resolution" continuum.

Likewise, the constant presence of the horizon as a conceptual limit of the discrete floor is eliminated in the Raumplan, which is much more focused on offering an introspective play of visuals. Beatriz Colomina refers to this when she writes that *"in Loos' earlier houses, the eye is directed towards the interior, which turns its back on the outside world."*[77] In fact, Loos himself claimed that "*a cultivated man does not look out of the window...*"[78] Here, there is an underlying understanding of the urban exterior that contrasts with Le Corbusier: whereas Le Corbusier admired the industrial city through his fenêtre en longeur, Loos saw the outside an essentially messy, dirty and congested place. As a result, the Viennese architect transformed the centrifugal gaze characteristic of Le Corbusier's open plan into a centripetal gaze, turned in toward a sexualized interior with hardly any windows, where, according to Colomina, a certain voyeurism unfolds in the sightlines between the floors: dues to their differences in height, they allow for observing without being observed, a situation that continuous floors also emphasize.

In any case, the Raumplan can be seen as similar to the discrete system: its formal separability and the flatness of its surfaces are indisputable. However, although they are monofunctional, the Raumplan floors establish a series of visual relationships and connections via circulation that cannot be fully explained in discrete terms, because they incorporate aspects of both formal and performative succession. It is therefore a hybrid model, and due to the absence of its own unique characteristics, on the one hand, and its inability to fit in with a larger multidisciplinary context, on the other, it is not constituted as a third system but as an offshoot of the discrete system.

2.3.2 Strasbourg Congress Hall: the floor's formal and performative contiguity

The concept of contiguity implies a relationship between elements whose limits are adjoining but not identical, and therefore they do not form a single whole. In the case of discrete floors, the limits are not identical, nor are they adjoining. Therefore, there is no relationship of contiguity. This is not the case for continuous floors either, since their limits are identical. Because they form a single whole, they cannot be described in terms of contiguity, since that always requires a plural whole.

In his design for the Strasbourg Congress Hall (Fig. 2-17 and Fig. 2-18), Le Corbusier employs a treatment of the floor that can be read in terms of contiguity. The proposal contains, on the one hand, several apparently discrete floors in section, with different façade solutions depending on the level. However, the overall complex is characterized by a long arm, exterior to the main volume, that connects the first floor, second floor and roof by way of a large covered ramp. The whole can be read as a compositional exercise, where a continuous element is attached (although not fused) to a discrete element, becoming what we could call a discrete and continuous floor. It is important to note, on the one hand, that the ramp cannot be read as a mere extrinsic mechanism for circulation; its nature is not comparable to that of an elevator or a staircase. One of

77. Beatriz Colomina, "The Split Wall: Domestic Voyeurism", in *Sexuality and Space*, ed. Beatriz Colomina, (New York: Princeton Papers on Architecture, 1990), 88.

78. Le Corbusier's book Urbanisme (1925), in which Le Corbusier describes how Loos mentioned the idea to him: "*Loos m'affirmait un jour: 'Un homme cultivé ne regarde pas par la fenêtre; sa fenêtre est en verre dépoli; elle n'est là que pour donner de la lumière, non pour laisser passer le regard.*"
Charles-Édouard Jeanneret-Gris, Urbanisme, trans. Frederick Etchells, (New York, Architectural Press, 1929), 175.

Figure 2-16: Villa Müller, Adolf Loos, 1928

the most characteristic examples to contrast it with would be the Carpenter Center: there, the ramp is a narrow, open, extrinsic, bypassing element that "jumps" through the project from one street to the other. In contrast, in the Strasbourg Congress Hall, the ramp is a broad, closed, external element that emerges from the design and then re-enters it, in a movement that is simultaneously centripetal and centrifugal. There is another crucial difference: in the first case, the ramp does not alter the floor as it passes, it simply cuts cleanly across. In the second case, as the floor approaches the ramp it gradually deforms, recognizing the ramp's presence not as a discrete element but as an element with which it maintains a certain continuity.

In relation to the discrete floors from the Dom-ino system, Eisenman sees a fundamental contribution in the Strasbourg project: "*Strasbourg is significant in Le Corbusier's oeuvre as a departure from the grid/figure dialectic. This departure appears in two different conditions: as a partial figure and as an undecidable condition of the ramp.*"[79] In that sense, whereas Le Corbusier traditionally set up a contrast between a figure and a background grid, in Strasbourg (and in Le Corbusier's post-war work in general), the grid-figure relationship changes dramatically with respect to his inter-war buildings (Fig. 2-19). Although the grid is still readable, it is not contrasted with a simple two-dimensional figure, but with an object in three dimensions. In that sense, and following Eisenman again, "*the rotation developed at Strasbourg is no longer dialectical with respect to any frontal plane, but rather registers simultaneously as centripetal and centrifugal in plan and section.*"[80] Eisenman thus emphasizes the three-dimensional emancipation of the grid that Le Corbusier applies in Strasbourg: figure and ground begin to merge timidly, leading Eisenman to describe this project as a "missing link" between the formal strategies of the Modern Movement's "five points" and those of buildings such as the Jussieu library.

Indeed, the Strasbourg Congress Hall falls between the discrete and continuous systems. In that sense, the design's formal strategy is focused on providing contiguity between floors. The various floors in the proposal all have the same shape and are distributed one above the other: each has its own limits, and they are neither identical nor adjacent. However, the large external arm designed by Le Corbusier is merely an operation to "join edges" – in one side of one story is pulled around to connect it with the story above it. There is no continuity, because both stories are still understood as distinct elements whose limits are not identical. Moreover, the arm and the larger volume are the result of attaching different elements together, where both origins are easily identifiable in the resulting composition. However, the term discrete is not appropriate either, since on a performative level the ramp is not a mere addition but is read as a deformation of the floor itself. Nevertheless, it is important to highlight that, in the case of the roof story, the deformation is also formal in addition to performative, anticipating much of the formal and performative radicality characteristic of late-20th century topological slabs.

In any case, it is another a hybrid model, and due to the absence of its own unique characteristics, on the one hand, and its inability to fit in with a larger multidisciplinary context, on the other, it is not constituted as a third system. The fact that combines discrete local characteristiques and continuous local characteristiques which are accidentaly adjacent but not structurally linked permits a reading of this floor as a continuous and discrete floor.

79. Peter Eisenman, *Ten Canonical Buildings 1950-2000*, (New York: Rizzoli, 2008), 77

80. Ibid., 79.

2.4 Continuous floor

The floor disposition defined as "continuous" refers to a configuration of levels whose limits are identical, and which therefore form a single object. Thus, we do not see the independent, autonomous and countable slabs of the discrete floor system, but rather a single slab where the parts are indiscernible because their fusion is complete: it is not the result of a composition, but an integration. As we have seen, the discrete floor layout is based on the concept of a typical flat open floor plan: this facilitates, on the one hand, horizontal fluidity and, on the other, vertical repetition. As a result, the discrete floor layout provides horizontal continuity for each floor (unlike the Renaissance floor), and discreteness in the vertical floor arrangement. In contrast, the continuous floor is not perpendicular to gravity; rather its slope is variable: it is folded and bent, providing continuous circulations both horizontally and vertically.

2.4.1 Parametricism as a variation of a single slab: the field

There is no diachronic relationship between discrete and continuous floors: in other words, neither of them precedes the other chronologically. On the contrary, both have occurred in parallel for thousands of years, although the discrete floor has been much more common for practical and constructive reasons.

The use of the continuous floor is age-old. The Greek historian Diodorus Siculus (90-30 BC) asserted in the first century BC that the pyramids had not been built not using the system of cranes and pulleys later cited by Herodotus, but using a gigantic system of ramps that constituted veritable floors due to their breadth. There could have been several or just one, and in any case, the system would adapt to the growth of the pyramid as it gained in size. Likewise, several representations of the Tower of Babel, such as the "Viennese version" or the "Rotterdam version", both developed by Pieter Bruegel the Elder in the mid-16th century, were depicted showing a system of peripheral ramps. In fact, Bruegel was inspired by Herodotus' description from 420-440 BC, which stated that "*the ascent to the top is on the outside, by a path which winds round all the towers.*"[81]. However, there are remnants of the tower that refute this description: after a thorough reconstruction, the tower built by King Nimrod in Babylon about 610 BC, near what is the present-day city of Hillah in Iraq, looks a lot like a ziggurat with a central stair core. The only tower with a known ramp that corresponds Herodotus' description is the Assyrian Ziggurat of Dur-Sharrukin (707 BC), excavated in 1853 by the archaeologist Victor Place.

Rome in the time of the insulae was also the setting for some emblematic ramps. The Clivus Capitolinus was the main approach to the Capitoline Hill. There was a ramp that started in

81. Herodotus, *The Histories*, trans. Tom Holland, (London: Penguin Press Ancient Classics, 2014) 1.181.

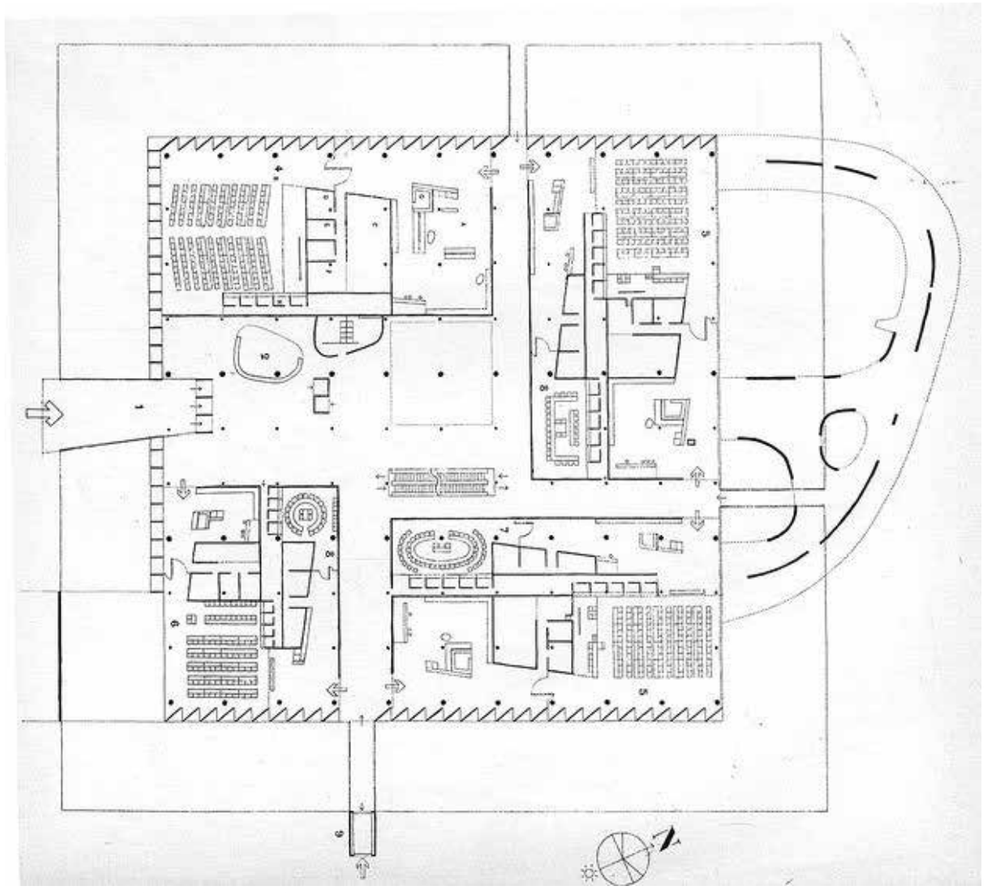


Figure 2-19: Strasbourg Palace, Le Corbusier, 1964

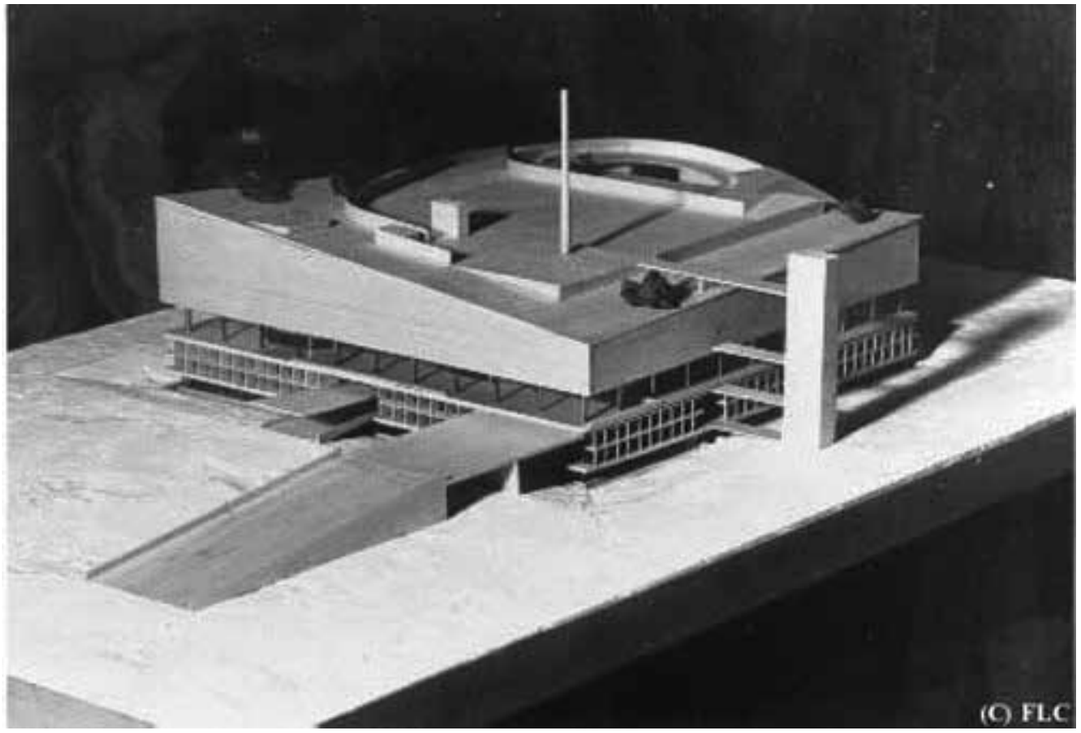


Figure 2-17: Strasbourg Palace, Le Corbusier, 1964

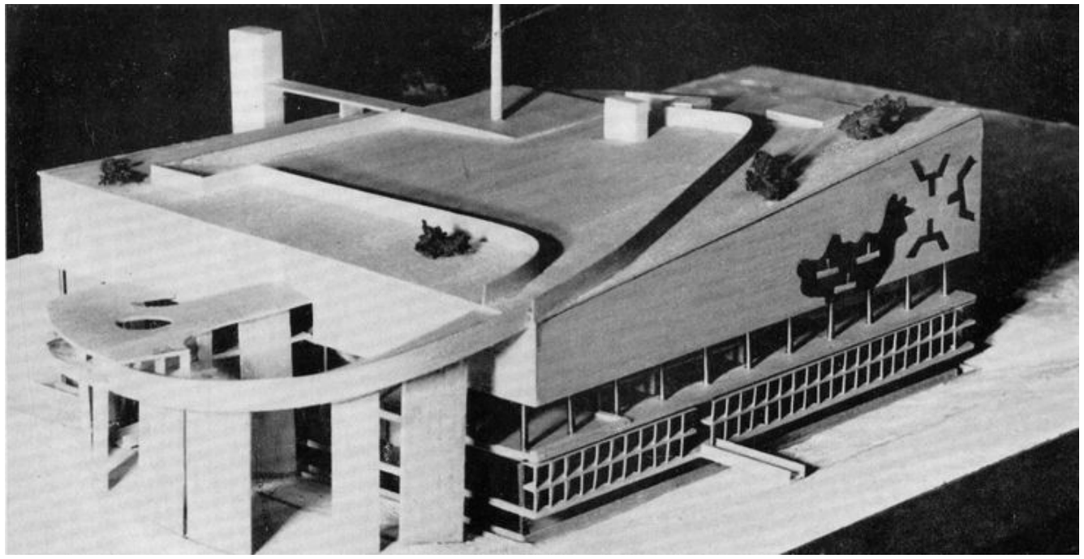


Figure 2-18: Strasbourg Palace, Le Corbusier, 1964

the Area Volcani and arrived at its destination through the Temple of Saturn and the Porticus Deorum Consentium. It is possible that part of the route was covered by triumphal arches. With the fall of the Roman Empire, the Capitoline Hill and the Forum fell into decline. Nearly a thousand years later, with the arrival in Rome of the Holy Roman Emperor Charles V in 1536, the decision was made to restore the complex. Michelangelo contributed the efforts with a staggered ramp of almost 70 meters in length, the Escalera Cordonata, which reached the Piazza del Campidoglio. This ramp-staircase had the peculiarity that it could be used by horses, since the distance between the successive steps was very wide. Michelangelo, who died before seeing his finished work, designed a monumental and triumphal ramp, a metaphor for the 16th-century rebirth of Rome.

During the Industrial Revolution, although it was an emblematic time for discrete floors, the ramp also took on a certain importance for its efficiency in moving all kinds of cargo, especially in industrial warehouses, or in transporting animals. It was not until after the First World War that it took on greater relevance, and for one main reason: the rapid increase in the density of cars circulating in American cities in the 1920s began to be difficult for the authorities to manage, and as a solution they resorted to large-scale containers for cars. In 1905, the city of Paris had already built buildings like the Garage Ponthieu intended to relieve road congestion. However, it included a large car elevator that was operated by the parking lot workers, which proved to be too expensive and slow for systematic use. American architects decided to combine vehicle circulation and car storage when they realizing that "*a sloping floor is the wheel's best ally*"[82]. In 1919, Ferdinand de Humy patented the first car ramp, stating that he was aiming to "provide a storage building consisting of several floors that would be built in such a way so that the vehicles could move from floor to floor under their own power, to and from the storage spaces across the different levels, and with the cars following ascending and descending paths the same direction." This model, an emblem of the continuous floor, was imitated throughout the 20th century. The first construction following its guidelines was built in concrete and overseen by Albert Kahn, mentioned earlier as the architect of the Ford factories.

But America was not the only place that applied the idea of a continuous floor to industrial purposes. Their Russian counterparts, through Melnikov, designed the "sleeping houses" in 1930. Based on a series of scientific studies, they were posited as constructions that could optimize the sleeping process. The buildings consisted of two bedrooms located on continuous floors, sloping in opposite directions, with a flat space for bathrooms in the center. According to Melnikov, slope induces sleep, and moreover (also according to the Russian architect) it does away with the need for a pillow.

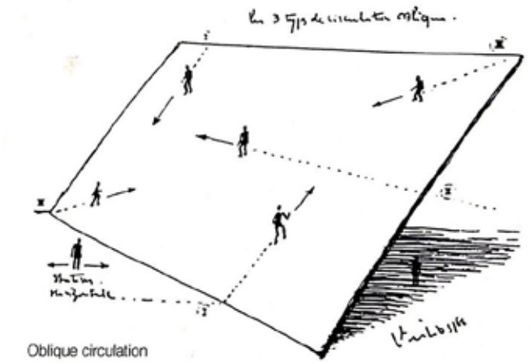
Turning back to the United States, and as a prelude to Wright's Guggenheim, several designs tested out the idea of a spiral as an approach to the continuous floor. Projects such as the Morris Gift Shop (1947), Pittsburgh Point Park (1947), Phoenix House (1952) and the Showroom Park Ave. (1955) acted as inspiration for Wright, who began construction on the Guggenheim Museum in 1956. It was finished in October 1959, six months after the American architect's death. The continuous spiral floor is much more than a mere circulation ramp: along with the atrium, it becomes the leitmotiv of the design and a space to inhabit, not just a space for circulation. Indeed, that particular floor is a space for observing – not just the works of art, but also the other visitors, who can be seen from any number of points of view at different heights. Through the continuity of the floor, without the need for a staircase or an elevator, you can climb to the top floor of the building, the sixth floor, at a 3% slope, the lowest inclination of all the projects presented here so far.

Le Corbusier also experimented with the use of continuous floors in his church in Firminy, begun in 1971. It is the most similar case to the 90s designs that became the maximum expression of continuous floors. Although the access takes place along an exterior ramp that should be understood more as a device than as a floor, once it reaches the first story, it gradually bends and twists to take us to the next story, simultaneously generating bleachers that climb up toward the altar. It is an inhabitable continuous floor, which, as opposed to the lengthwise tendency of a ramp, emerges as a space for stillness and contemplation, through a series of free and open paths in section. Although these examples are valid approaches to the continuous floor, this floor type began to take on more disciplinary relevance in the 1960s. The most elaborate theory on the architectural implications of the radicalization of the continuous floor was developed by Claude Parent and Paul Virilio. In 1964, Parent and Virilio announced the hypothesis of the "oblique function". Contrasted with the horizontality of urban movement and the verticality of private spaces, the inclined plane is posited as the best support structure for human settlements. The authors do not propose this difference from the standpoint of the opposition discrete/continuous opposition, but rather based on the opposition flat/sloped. However, for practical purposes the two oppositions are equivalent: the discrete floors analyzed earlier and characteristic of the open plan are flat, whereas the continuous floors capable of providing a change of level are sloped (Fig. 2-20).

The work of both thinkers negates the 1909 theorem and the deductions that Le Corbusier draws from it: "*Le Corbusier's famous sketch, which compares a vertical building's occupation of the land with that of a garden city, to the benefit of the tower, is false. Vertical occupation does not imply any decrease in the amount of land invested. The land is simply invested in a different way.*"[83] In that sense, the skyscraper is not the result of multiplying n times the original surface of the land, because these new plots generate the need for services such as parking areas, roads and facilities. These services are distributed across the land adjacent to the building, such that the total surface area is, strictly speaking, greater than the mere multiplication of the original plot's dimensions. Parent asserts that the schema is wrong because there are huge interstitial spaces, of very poor quality, between the vertical growths: a "no man's land" made up of an abandoned ocean of cars and asphalt that cuts off human contact. The problem, continues Parent, is that "*those two terms, dwelling and circulation, should never have been*

82. Irma Boom, "Ramp", in *Elements of Architecture*, ed. Rem Koolhaas, (Rome: Marsilio, 2014), 15.

83. Claude Parent, Vivir en lo oblicuo, trans. Jorge Martínez, (Barcelona: Gustavo Gili, 2009), 13.



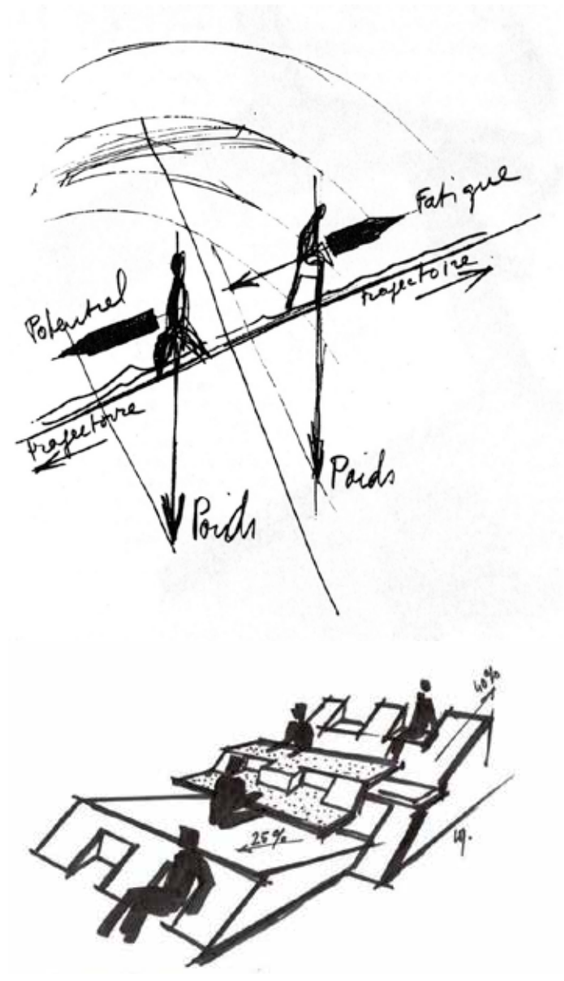


Figure 2-20: Oblique Function, Claude Parent, 1964

considered equivalent values in a single equation. The hierarchical pre-eminence of dwelling must be preserved."[84]From there, the French architect proposed a true spatial revolution based on the oblique, and which consisted of two fundamental principles: the surmountable obstacle, on the one hand; and integrating circulation and dwelling, on the other. In the first case, Parent refers to an enclosure that can be walked on: in other words, people can circulate along the exterior surface of a private space, since it is inclined; in that sense, it is a obstacle that can be surmounted or climbed. In the second case, Parent refers to the idea of a circulation space that can be inhabited, where the two activities are no longer separated, as in the Athens Charter, but rather they coexist in the same space.

Parent and Virilio proclaimed the advent of a "New World" where a sloping floor would change our domestic and urban habits. The oblique function is a multi-scalar proposal intended for domestic, neighborhood, urban and territorial scenarios. In any case, and in relation to continuous floors as a category opposed to discrete floors, the second principle developed by Parent is fundamental: floors must be habitable, not mere tools for circulation. Continuous floors should be understood in light of this principle. As such, a ramp like the one we have analyzed at the Carpenter Center cannot be interpreted as a continuous floor, since its nature is closer to the concept of a mechanism for circulation, analogous to the case of a staircase or an elevator. The clearest example is given by Claude Parent himself in one of his most emblematic projects: his apartment in Neuilly sur Seine. In one of the most well-known images, taken in 1973, his friends can be seen occupying the different slopes of the floor in a variety of ways. As opposed to being a place for circulation, it emerges a place to eat, to sleep, to play, to talk, etc. The floor is folded meticulously following carefully studied angles of inclination. In addition, the finishes are fundamental: in conjunction with the slopes they provide different degrees of traction and a wide variety of spatial possibilities. The architect's daughter, Chloé Parent, refers to this spatial richness when she explains that "*Living in the oblique is not an adventure or an experience, I never like a guinea pig. It isn't a concept. Living in the oblique is one of the most natural and smartest ways of living. It's one of the most dynamic, mobile, progressive, admirable, interactive, natural and healthy ways of living. It makes you an accomplice of the architecture you're living in. It makes you reconsider your way of life, developing your perception of space and people, and, ultimately, it forces you to be fit."*

Parent explored the possibilities of his system in a large number of projects, including his Pavilion in Venice, the Church in Sainte Bernadette du Banlay, in Nevers, and a supermarket in Sens. All of them reveal a concerted effort to build the principles of the oblique function he had laid out, although, perhaps with the exception of the pavilion, none of them achieve the radicality of his apartment in Neuilly or, even more so, that of his drawings. In any case, at a conceptual level, Parent's work represents a completely opposite approach to the flatness and repetition of Le Corbusier's Dom-ino diagram. In that sense, it is a real instruction manual for dealing with the complexity of this type of variable surfaces, which as we will see, will later be corrected and expanded by computational parametricism.

84. Ibid., 14.

This idea of bending and folding was also approached from other disciplines of similar times. Francis Bacon often referred to his painting as "*an attempt to bring figuration onto the nervous system, more violently and more incisively than any abstract expression.*"[85]A close observation of his 1973 self-portrait (Fig. 2-21) confirms the British painter's statement: it cannot be explained in terms of a figure since it is not intended to be faithful to the face it portrays. Nor is it an abstraction, since we do not see a conceptual isolation of one or more properties. On the contrary, Bacon was interested in what he defined as a "very ambiguous precision", in other words, a painting that takes the human figure into account, while distorting and disfiguring it.

In his 1981 book, Francis Bacon: The Logic of Sensation, Deleuze distinguishes between figuration and the figurative.[86] For Deleuze, the first expression refers to a form that maintains a certain relationship with the object it represents. On the contrary, the figurative, instead of the representation of a form, is a matter of capturing forces. In the case of the 1973 portrait, the image is deformed by pressures, dragging, folds: the figurative does not express a form or an iconic Figure; it documents the meeting between the physical stuff of painting (canvas, paint, painting, painter) and a series of forces (both physical and psychological). Therefore, and in its condition as a "record" of those forces, the human figure is no longer expressed in a "clear and distinct" way, as if it were a representation. On the contrary, it is blurred, becoming an amalgam of figures that are not intended to create a defined and understandable form, but rather to document the forces affecting it.

This difference between the figurative and figuration is fundamental in understanding the shift from the discrete floor to the continuous floor. Whereas the discrete floor of Le Corbusier's plan livre is shaped by a tension between the grid that defines it and the figures inscribed in it, the continuous floor behaves more like the capture of a field of forces, where figure and ground constitute a single unit. Sanford Kwinter gives a precise definition of the concept of field, stating that it "*describes a space of propagation, of effects. It contains no matter or material points, rather functions, vectors and speeds. It describes local relations of difference within fields of celerity, transmission or of careering points, in a word, what Minkowski called the world.*"[87] This notion of "fields" is not limited to the treatment of floors. It is part of a much broader movement that, from different areas, has been referred to as Parametricism.

One of the authors who has theorized most extensively about Parametricism is Patrick Schumacher, asserting its condition as a style and its capacity to replace the Modern Movement as "mainstream"[88]. Supported fundamentally by the idea of variation,[89] parametricism developed based on the concepts

85. Francis Bacon, interview by David Sylvester, *Interviews with Francis Bacon: The Brutality of Fact*, (London: Thaames and Hudson Ltd, 2016), 12-13.

86. Eisenman, *Ten Canonical Buildings 1950-2000*, 73.

87. Sandford Kwinter, "La Cittá Nuova: Modernity and Continuity" in *Architecture Theory since 1968*, ed. Michael Hays, (New York: Columbia Books of Architecture, 2000), 591.

88. Schumacher, 617-709.

89. The concept of variation is understood here in the sense of a change that is not entirely free, but rather is controlled through a systematic process.

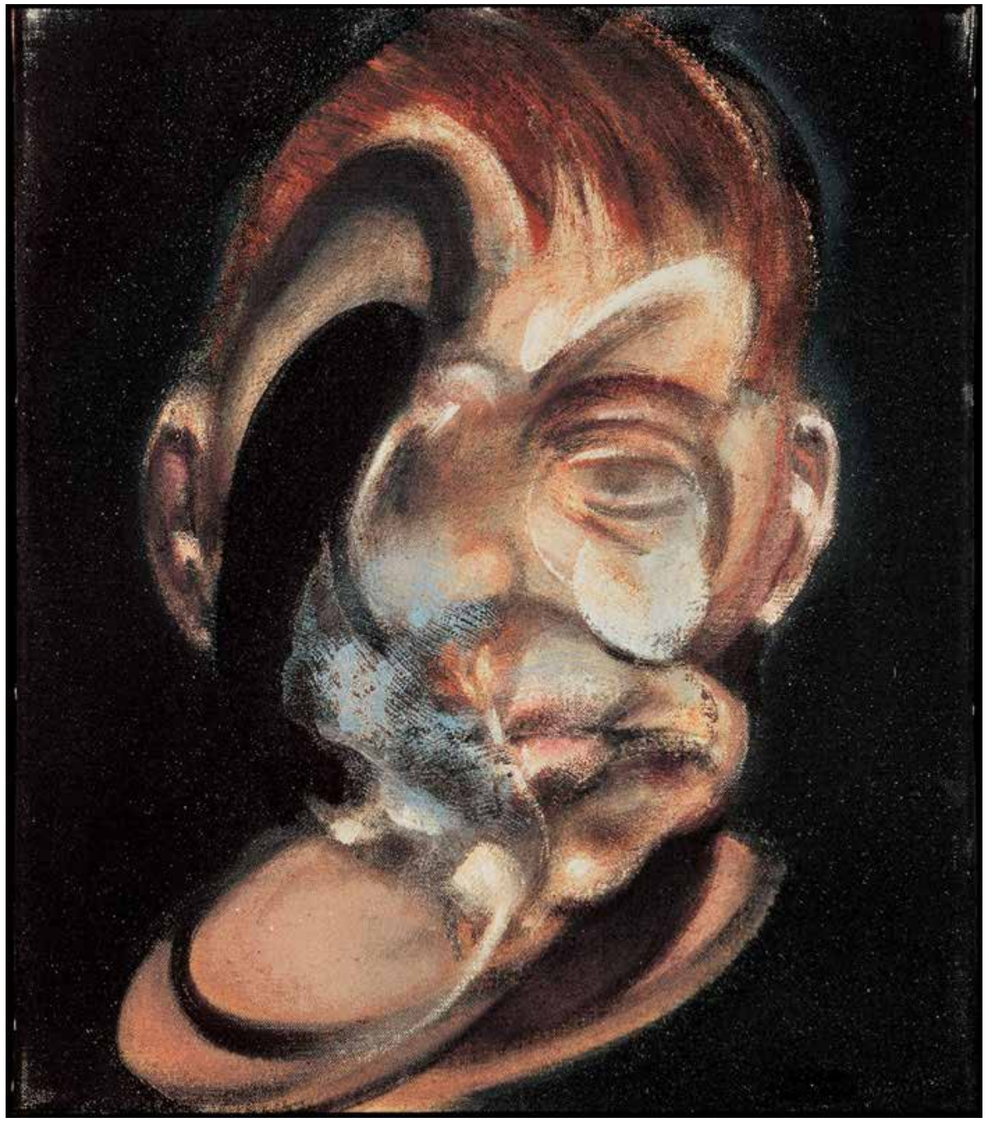


Figure 2-21: Self-Portrait, Francis Bacon, 1973

of continuity, holism and topology, which were also essential in Deleuze's relational approach to subject, which will be addressed in the next section. Bauman also developed his sociological interpretations using similar conceptual tools, which let him propose a liquid conceptionof the human being: humanity is now faced with living in an unprecedented state of uncertainty and ambivalence that will spark a return to a nomadic and fluctuating way of life.[90]

The ideas of continuity, holism and topology developed by Deleuze are not only in tune with sociological conceptions, but also with other disciplinary contributions, in architecture for example. In that vein, Schumacher defines Parametricism as a style whose application "implies that all architectural elements and complexes are parametrically malleable."[91]As such, each element is subject to continuous variation. Thus, parametricism aspires to "*organize and articulate the increasing diversity and complexity of social institutions and life-processes within the most advanced arenas of Post-Fordist network society.*"[92]

Indeed, Parametricism is above all a relational strategy and, in that sense, it is aligned with new post-structuralist ontologies. Unlike Modernity and its tendency to separate and repeat, the parametric architecture emphasizes continuity and differentiation above all. In that sense, the way to produce something that can be differentiated within a continuum is through a topology – a geometric resource that, as we have seen, is related to the concepts invariant and virtual as developed by Deleuze. Parametricism avoids rigid forms because of their lack of adaptability. More importantly, however, it moves away from two concepts that are fundamental to the discrete floor disposition. First, seriality, understood as mere repetition, is avoided, because it implies a lack of diversity. Second, collage, understood as the simple juxtaposition of isolated elements, is also avoided because the goal is to establish relationships and, therefore, systems.

Often, Parametricism from the 1990s is described as the combination of two working models based on Eisenman's "folded" formalism and Koolhaas' programmatic functionalism "in layers". In fact, the soft forms of Parametricism had already been cemented earlier in the 20th century, as seen in the work by Nervi, Moretti, Dieste or Candela. However, the beginnings of the use of computers in architecture in the 80s and 90s fueled the spread of this kind of design, because computers made it easy to manage those types of configurations. In that sense, Manuel Gausa asserts that, from the 1990s forward, the modern notion of figure and the post-modern notion of calligraphy begin to share space with the notion of formula: it emerges as a tool for operative design, whose nature as a "variable structure" makes it possible to leave behind working with "positions" to begin designing with "dispositions".[93] Dispositions would be rid of the modern logic of the "campus", understood as an ensemble of discrete elements, so as to work with a "dispersive" logic – in other words, a dynamic organization of singularities that belong to a single underlying magma.

90. Zygmunt Bauman, *Liquid Modernity*, (London: Polity, 2000), 27.

91. Schumacher, 654.

92. Ibid., 655.

93. Manuel Gausa, *Open*, (Barcelona: Actar, 2010), 361-69.

2.4.2 The relational subject: System, holism and mediation

In sharp contrast the uniformity and generality of the discrete floor, the continuous floor is established as a heterogeneous and specific floor. Its constant variability in height relates it to the relief of a topographic structure and, above all, positions it within the system of relationships characteristic of a topological geometry. So it is constituted as a field of intensities where it is possible to travel across the entire surface along a series of slopes. These concepts are closely linked to the late 20th-century understanding of the human being and the subject, when socio-cultural and philosophical values relativized modern self-sufficiency to emphasize the concepts of perspectivism, relation and mediation. This approach led to the emergence, in the 80s and early 90s, of a series of projects that, through their radicality, consistency and density, embodied – like skyscrapers with discrete floors – the maximum expression of continuous floors.

Put into perspective, Modernity has been a long process of resistance. In parallel to its rise, its principles began to be questioned, with increasing intensity over time. The absolute understanding of man which began in the Renaissance and was celebrated by Descartes, Kant and Hegel, was gradually relativized over the centuries in scientific, philosophical and socio-cultural spheres. Copernicus landed the first blow: The Earth is not in the center of the universe; it is just one of a series of planets that move around the sun. Giordano Bruno also contributed to this relativization of humanity by suggesting that our universe is not at the center of space either; it is just one of an infinite number of unlimited universes: it does not possess any geometrical or ontological privilege. In spite of it all, during the Enlightenment man continued to hold an optimistic view of his abilities to dominate nature and progress: the Scientific Revolution contributed greatly to this. However, the publication of On the Origin of Species in 1859 once again demonstrated, this time from biology, that man is not a privileged being: his origin is not divine but animal. He is just one more species among many, the result of an evolutionary process that is beyond his control.

In philosophy, and following 19th-century German idealism that, through Hegel, had revered the concept of the absolute subject, these principles were also questioned. The "masters of suspicion" – to borrow Paul Ricoeur's famous expression – questioned the human subject's authority over the world. They did so by asserting that the alleged solidity of human consciousness is mere appearance: according to Marx, it is corrupted by economic interests; according to Freud, due to the unconscious; and according to Nietzsche, through the resentment felt by the weak. Later, his work on ontological difference and the conception of language as the house of being were taken up and developed by French Structuralist and post-Structuralist thought as expressed by Foucault, Nancy, Deleuze, Derrida ...

However, the culminating event that definitively signaled the end of the Modern subject was the Second World War. It laid bare the extent to which the science of positivist man was not necessarily leading humanity into a better world. The advances in industrialization were harnessed in the service of horror, and as Adorno and Horkheimer wrote, with deep sadness and profound despair, the modern narrative was damaged beyond repair. Instead of humanity's entrance into a state of true humanism, there had been a return to radical barbarism, during

which a concept of Western reason had been forged that was based in equal parts on a desire for freedom and an will to domination. Hegel's dialectic thus became a negative dialectic, where the dialectical movement of thought does not end in a superior synthesis of opposites but leaves the rawness of every contradiction wide open.

In the mid-20th century, the modern narrative falls apart and a new conception of the human being emerges in its place. Far from the modern interpretation of a strong and secure man, it posits a soft, pliable being, which thinkers like Vattimo have preferred to qualify as "weak"[94]. Their human being no longer defends the possibility of possessing an absolute and objective knowledge of the Truth; instead the old positivism is replaced with a much more complex and cross-cutting perspectivism. However, this position does not necessarily lead to the relativism of postmodernity: between the universal truth of rationalism (which is a truth without an individual) and the truth of relativism (which is a truth valid only for the individual) Ortega asserts, based on his 'ratio-vitalism'[95], that all truth is found "in perspective" – valid from one perspective and complementary from the others. In that sense, perspective is the form taken on by reality for each individual, and each individual has his own part of truth. However, there are not as many realities as there are individuals; there is only one reality, which can be approached in as many individual ways: "*The definitive existence of the world is not matter or soul; it isn't something determinate, but rather a perspective [...]. No other pupil can be where mine is.*"[96]As a result, our individuality becomes relevant, because it determines our perception of one truth or another, both of which are valid and complementary. As will be discussed later in this dissertation, continuous floors also place great importance on the unique position of the user in plan, since the constant variation in height of the floor slab makes each point of its surface into a unique point. There are no two identical positions in a heterogeneous topographic environment – as opposed to a discrete flat and uniform space, whose generic character makes the singular spatial position of the subject irrelevant.

As a result, a perspectivist human approach to reality is proposed, in which man no longer occupies a central position but rather a relative position – in constant dialogue and dependence with other elements. As Deleuze says, it is precisely those elements "*that make up a multiplicity which should be determined by reciprocal relationships that do not allow any independence for what subsists.*"[97] Those relationships are established as a series of links between man and reality, where the relationship is no longer immediate but becomes mediated by a series of holistic systems.

Paradoxically, however, human beings continue, indirectly, to occupy a central and humanist position: all the structures that apparently distance human beings from an immediate access to reality are not neutral structures; they are human structures. Levy Briant is very clear in this regard when he states that "*it is noteworthy here that most of the positions referred to as 'anti-humanists' would still, from the standpoint of the Principle of the Inhuman, be counted as humanisms insofar as while they 'split the subject' or demolish the Cartesian subject, they nonetheless shackle all beings to human related phenomena such as the signifier, language, culture, power, and so on.*"[98] Indeed, Freud with the unconscious, Foucault with power, Althusser with the political apparatus, or Derrida with language all turn to human structures in order to access reality. The correlationism[99] initiated by Kant – according to which we can only access the relationship between thought and object, not the object itself – is still relevant. And that thought, is still human thought. As a result, man is not decentered from his hegemonic position; the figure of man is simply place in a relative position, subjugated to privileged systems that are still human. From that point of view, we are no longer looking at the dominant human being of modernity, but rather a human being who is more interested in activities focused on mediation between different systems than in exercising authoritarian control over the objects around him.

Whereas the presence of an absolute subject was established in Modernity, the currents of thought in the second half of the 20th century defended the idea of a relational subject. As we have seen, Kant emerged as a thinker whose work was fundamental to understanding the centrality of the modern subject – a reflection that later, along with other elements, gave rise to the industrial man associated with discrete floors. In that sense, Deleuze was the main reference for a holistic and monist thought that gave rise to a relational subject. The topological and rhizomatic nature of his thought will be very productive in architecture overall during the 80s and 90s, particularly when it comes to continuous floors, as we will see in the next section. Indeed, when Deleuze talks about the virtual and the actual, he describes the former in terms of ontological monism – which Manuel Delanda asserts when he writes "*Deleuze asks us to imagine a continuum of multiplicities that is differentiated through our own familiar three-dimensional space and its structurally differentiated content.*"[100] What Delanda suggests is that the virtual consists of a single continuum, such that there is but a single virtual – a single substance that later, in the actual, is divided into apparently discrete entities. This approach draws on Spinoza's idea of substance and on Leibniz's "infinitely folded" Baroque territories.[101] It seems to suggest, as L. Bryant explains, the existence of a transition between a singular state of continuity and a plurality of discrete elements. The former would

94. Gianni Vattimo and Pier Aldo Rovatti, *El pensamiento débil*, trans. Juan Pérez Andrés, (Madrid: Catedra, 2006), 34.

95. Ortega y Gasset aims to combine reason and life through 'ratio-vitalism'. The goal is to create a homogeneous synthesis and a coherent system through a critique of false rationalism, which does not consider concrete things because it is too abstract, and false vitalism, which reduces life to a mere biological phenomenon.

96. José Ortega y Gasset, *Verdad y perspectiva*, 18.

97. DELEUZE, Gilles:

98. Levi Bryant, "The Ontic Principle: Outline of an Object-Oriented Ontology" in *The Speculative Turn*, ed. Levi Bryant, Nick Srnicek and Graham Harman (Melbourne: re.press, 2011), 268.

99. The term correlationism was proposed by Meillassoux in 2008 and, as he explains it, it is based on an equally simple and powerful argument, which can be formulated as follows: No X without givenness of X, and no theory about X without a positing of X.

100. Manuel Delanda, *Intensive Science & Virtual Philosophy*, (London: Bloomsbury, 2013), 23.

101. It is worth highlighting how the concept of a monad serves as a point of reference for both floor types. In the case of the discrete floor, as an autonomous and independent element. In the case of the continuous floor, as an internally folded element: in other words, as an element capable of treating difference in an inclusive way, like the fold concept does.

be a pre-individual state, whose effects would give rise to the individual entities of the latter, which would be constituted as mere products of a single original being.

The concepts of system, holism and mediation are fundamental in Deleuze's approach and, as subsequent analysis in this dissertation will show, they are essential to understanding the relational function of the continuous floor. When Deleuze develops his concept of multiplicity, he defines it as a series of structures in which all of the elements are determined reciprocally according to a specific organization. As such, the elements are united by relationships, and this union is at the root of their holism, understood as a system in which all the parts depend on each other because they are determined reciprocally. That is precisely what Deleuze seems to argue when he writes that "*the reality of the virtual consists of the differential elements and relations along with the singular points which correspond to them. The reality of the virtual is structure.*"[102] Here, Deleuze refers to the concept of structure as what remains invariant despite experiencing changes on its surface. That is precisely what a topology is: an invariant structure that is also capable of undergoing variations in its metric properties. As Lars Spuybroek writes in his book The Architecture of Continuity, a topology "*understands that a single organization may contain many possible structures (invariants), because an object can change its features and shape without changing its organization.*"[103] It follows that an architecture of variation does not necessarily imply a free architecture, much less one that is out of control. On the contrary, it is an architecture whose variations are controlled by a specific system. In that sense, the architecture of "blobs",[104] which is so characteristic of some late-20th century work, is based on uncontrolled variations: in a topological architecture, the elements are a result, i.e., a product of relationships as opposed to something a priori.

From that point of view, topological domains would correspond to the virtual (as a single, underlying organization), whereas Euclidean domains would refer to how certain substances are materialized through local, fixed qualities. This topological thinking, understood as a holistic system, is the geometric foundation that fuels the continuous floors of the 80s and 90s. They are difficult to explain without referring to Deleuze's ideas of topology and holism, understood as systems of relations. Deleuze's description of a living organism in Difference and Repetition is representative of this dissertation's arguments up to this point. The French philosopher presents a model based on a relationship between three levels; an internal level defined by its genes; an external level defined by its relationships with other organisms; and a horizontal level defined by the relationships between its internal parts. However, as Levy Briant points out very opportunely, this relational model of the organism leaves out the agent's participation in its own construction. The agent is instead posited as an object that is the effect of the dynamic relationships that occur in its surroundings – in other words, the interactions between environments. That is precisely why the Kantian subject characteristic of Modernity is so different from Deleuze's subject: whereas the former argues for an absolute subject that is incarnated in man, the latter defends a relational subject that takes shape through a system of relationships. The focus is no longer on the human being as an individual, but on the relationships as a system, despite the fact that the system has been "humanized" by human structures like language, power, the unconscious, etc. In any case, there is still a subject (i.e., there is still an ontologically privileged entity): relationships, in this case, since objects (like in the case of Latour's actants) can also be reduced to relationships; in other words, they are mere correlatives.

In that sense, the univocal being described by Deleuze is no longer distributed across a striated space with a sedentary, exemplary and normalizing form (attributes of the discrete floor whose grid constituted a comparative and moralizing framework). Instead, the Deleuzian being rambles across a smooth space that is nomadic and erratic in form. Contrasting with the circulation of the discrete floors organized in a spine, the concepts associated with smooth space emphasize the errant circulation characteristic of Situationist drifts.

The crisis of the modern absolute subject goes hand in hand with the crisis of the Fordist industrial man. The social and technological conditions characteristic of Fordism were toppled mid-century by their own success. The increases in wage stratification caused by the increment in labor diversification forced the market to diversify. As a result, instead of addressing uniform market that had called for the strategy of repeating a single standard en masse, greater value was placed on the ability to innovate and make production more flexible, like in The Toyota Way with its 5 Whys. The globalization of markets in the 70s cut back on the stabilizing ability of States, since their economies had come to depend on large international flows that were difficult to control. In consequence, capacities for prediction were also reduced, which further discouraged the production of large stocks for mass consumption. In addition, computational productive strategies such as digital manufacturing technologies began to allow for a greater product diversity without the associated high costs of hand-made products. Production became much more flexible, both in terms of time and space, such that "*the static organizing principles of Fordist mass society – separation, specialization and mass repetition – have been replaced by the dynamic principles of self-organization of the emerging Post-Fordist network society. Variation, flexible specialization and networking.*"[105]

Flexibility, dynamism, heterogeneity, relationships, perspectives, topologies, mediations, diversity, systems, holisms... The shift from the absolute subject to the relational subject, on the one hand, and the advent of a "soft" conception of the human being on the other, brought into consideration a series of concepts that had never been combined before. Architecture in general maintained a productive dialogue with those concepts, reinforcing, expanding and enriching their scope. There was not a simple diachronic relationship of cause and effect between late 20th-century philosophy and cultural theory, on the one hand, and 1990s architecture on the other (nor was this the case for the architecture of Modernity). On the contrary, both shared a series of common concepts that were expanded on from within their own disciplinary fields. As we will see, the problem of the ground contributed to and was enriched by this new conceptual world, which it related to through a particular disciplinary contribution based on the Deleuzian notion of objectile.

2.4.3 The topological slab as an objectile: floor as continuum

The digital technologies of the 90s and the posterior digital manufacturing technologies were fundamental to engage in a dialogue from an architectural point of view with the reflections on the relational subject that we have just described. The emergence of software such as Catia, Rhinocerous, Photoshop, and 3D Studio allowed for the manipulation of topological spaces with the precision demanded by what Mario Carpo calls "the notational bottleneck".[106] The digital manufacturing technologies that appeared some time later, such as 3D printing, laser cut or milling, made it possible to convert digital forms into empirical reality in an accessible and immediate way. In fact, Deleuze "*had famously anticipated this technological shift in his studies of difference and repetition [through] his dual notion of 'objet' and 'objectile'*"[107]. The expression objectile was introduced by Deleuze to express a new idea of the object based on Leibniz's mathematics of continuity: differential calculus does not describe objects, but rather their variations. In this sense, an objectile would be a "*function that contains an infinite number of objects*"[108]. Each individual object is one crystallization of a mathematical algorithm that is common to all. As Aristotle would say, an objectile is a form in many events. In that sense, Bernard Cache developed the objectile concept in his book Earth Moves from 1995, where he defines it as a new concept of the technical object – not mass produced mechanically, but digitally and based on variations of nonstandard series.[109] As such, the emergence of the continuous in the field of architecture in the 1990s occurred through multiple complicities, including the computational revolution that took place during that decade, the topological thinking of Deleuze and Guattari, the recovery of Leibniz's mathematics of continuity, and a reaction against the fracture worship that characterized 1980s deconstructivism.

This new way of approaching space freed architects from the rigid section of the discrete floor. This resulted in a stimulus for the creation of new techniques for manipulating the floor, which led to an increase in the complexity of its determining factors, its limits and its nature. In that sense, Alejandro Zaera-Polo asserts that "*the exploration of the surface of the ground is established as the most unstable and revealing component of the emerging forms of space. [...] Our surface designs don't deal with the absence of ground, but with its redefinition and the creation of a series of techniques: a new discipline of the ground.*"[110] Zaera emphasizes the importance of the floor in the creation of this new space. This is very evident in his work, brought about through three strategies anchored in the same concept with close ties to the Deleuzian objectile: ambiguity.

First, in contrast to the categorization of the floor in modern architecture, Zaera promotes the recovery of a floor with varying intensities and differentials. In this case, the ambiguity between surface and space (2D and 3D) is one of the constants in these designs: the surface no longer only envelops space; it also determines it.

Second, instead the modern contrast between floor and envelope, there is an ambiguity between the two, based on indetermination. Architecture is no longer an active vertical presence above a passive floor; the floor becomes a constructed surface, already containing architecture.

Third, contrasting with the clear and distinct edges of the discrete floor, the continuous floor is presented as a floor with ambiguous limits, and its outline merges with the existing floor.

The nature of continuous floors is fundamentally active. Whereas the discrete floor characteristic of the 1909 theorem was understood as a foundation that was repeated vertically in an unlimited way, the continuous floor should be understood as a single platform, i.e., a single operating system that does not function as a mere "background", but as a self-referential entity. In that sense, Zaera differentiates discrete floors from continuous floors based on 6 points:

"Unlike traditional floors, the new floors:

1. are an artificial construction, and not a natural space, from both the physical and the cultural point of view;

2. they are not abstract, neutral or homogeneous, but concrete and differentiated; in other words, they are not figure or ground, but rather operating systems

3. they do not have a particular framework, since the field where they exist is not a fragment, but a differentiated field affected by external processes; in other words, they are inseparable from our intervention;

4. they do not constitute a datum or a point of reference;

5. they are not solid but empty;

6. and their structure is diagonal, as opposed to a structure determined by gravity."[111]

Discrete floors and continuous floors have relevant disciplinary differences. Beyond the eventual structural self-sufficiency of continuous floors, what is noteworthy above all is their lack of limits and their capacity to act simultaneously as container and content. However, they cannot be qualified as non-referenced floors. Instead, they constitute self-referential elements: in other words, the floor is established as a reference for itself, given the unity achieved as a result of its continuity. This is something that does not happen with discrete floors, since the sepa-

102. Gilles Deleuze, *Difference and Repetition*, trans. Paul Patton, (New York: Continuum International Publishing Group Ltd, 2004), 182.

103. Spuybroek, 209.

104. Also known as blobitecture, blobism or blobismus.

105. Schumacher, 677.

106. *"This notational bottleneck was the inevitable companion of all allographic architecture form its very start. Forms that are difficult to draw and measure used to be difficult or impossible to build by notation."*
Carpo, *The Alphabet and the Algorithm*, 31.

107. Carpo, *The Alphabet and the Algorithm*, 99.

108. Ibid, 91.

109. *"A nonstandard series is defined not by its relation to the visual form of any constituent item, but by the variances, or differentials, between all sequential items in the series. A nonstandard series is a set in which each item has something in common with all others. In technical terms, all objects in a nonstandard series share some algorithms, as well as the machines that were used to process those algorithms and to produce the objects themselves."*
Bernard Cache, *Earth Moves: The Furnishing of Territories*, trans. Anne Boyman, (London: Writing Architecture, 1995), 43.

110. Alejandro Zaera, "Nuevas topografías. La reformulación del suelo," in *Otra mirada: posiciones contra crónicas*, ed. Manuel Gausa and Ricardo Devesa, (Barcelona: Gustavo Gili, 2010), 116.

111. Ibid., 118.

ration between the units along with the total autonomy of each unit makes an external element necessary (in this case the vertical communications core) as a referential element.

The folded or wavy nature of this continuous floor has some similarities with the fluctuating subject of the late 20th century. In continuous floors, the singularity of each of the points on the surface leads to a situation in which, according to Eisenman, "*No longer is the subject in a one-to-one relationship with another subject but, because of the inclined planes, it views other subjects – and is viewed by them – as objects.*"[112] The fact that the one-to-one relationship is lost is not anecdotal: the philosopher E. Levinas argues that true existence does not lie in oneself as an isolated and unique subject, but in a transcendent subject that is only achieved in time and through the other, but above all, through the "face to face" encounter with the other:

> *"The face-to-face situation would be the fulfillment of time; the overlap of the present in the future is not the event of a single subject, but an intersubjective relationship."*[113]

First, Levinas argues for an existence through otherness: i.e., an existence that is such if and only if it opens up to the other. This openness implies a relationship with the other, but it is an asymmetrical relationship, since one must be responsible for the other without expecting anything in return. It is precisely that gratuity, and nothing else, that makes for an authentic subject. Second, Levinas argues that the face-to-face encounter is the culminating moment of the relationship with the other: absolute alterity occurs through the face, always unique, which can only be approached with infinite responsibility. In this way, Levinas posits the face-to-face as the only way to recognize an "other subject". While it may seem that there is something metaphorical in Levinas' argument, it is interesting to note how it can be applied to discrete and continuous floors. While discrete floors offer a relationship between absolute subjects that can only occur in a face-to-face encounter, continuous floors transform that relationship into a relationship between fluctuating subjects: depending on their position, the face-to-face encounter disappears, resulting in a mutual objectivation of the other. Here again, and in a very literal way, we see a relationship between the formalization of floors and the conception of the subject, expressed in this case through the experience of the other.

Although continuous floors, as we have just described them, have some precedents dating back a thousand years, and others from the first and second thirds of the 20th century like Firminy (Fig. 2-22), their great moment of splendor took place at the end of the 20th century. As we have seen, the reasons for this championing that took place in the 80s and 90s had to do, first off, with a contemporary culture that upheld a philosophical understanding based on a relational subject, a sociocultural understanding of man based on a fluctuating, Toyotist and ambivalent individual, and a technological reality with the potential to proliferate difference.

Related in different degrees with the parametricism of the time, there are a series of continuous floors that provide paradigmatic examples of this category. In the design for a Convention Center in Agadir, Morocco, from 1990, the ground is no longer a datum, as it was with discrete floors. Nor is it the horizontal didactic continuum of the Cartesian x and y axes characteristic of Le Corbusier's open plan; rather the section shifts from generic to figurative: Koolhaas alters the horizontal of the section with the aim of producing a series of artificial undulations (Fig. 2-23). And yet, the floor in Agadir still has a horizontal tendency in that it does not provide movement from one story to the next, but only a "vibration" in the floor level.

Something similar happens in FOA's design for Yokohama, from 1995. In this case, the continuous floor has a different scale, but it maintains an undulation with a "horizontal tendency". Like in Koolhaas' project, there is a strategic formal decision that involves the edges of the floor: in both cases, the edges are dictated by the limits of the site, "like the project is a piece of a giant cake." The decision was not self-evident, however, and Alejandro Zaera Polo says as much when he asserts that one of the team's doubts was: "*Do we place importance on the surface as a constituent element, or on the idea of an arbitrary frame for a limitless surface as a conceptual strategy?*" Finally, they decided to define an arbitrary frame, a strategy also used by Sejima in their Rolex Center (2004), which contrasts with other more restrained designs by FOA like the Virtual House (1995).

However, continuous floors are even more important when their tendency is not horizontal but vertical, since their continuity in section is highlighted as a disruptive element in relation to discrete floors. In that sense, the Mercedes Benz Museum is a clear example: in a spiral with clear Wrightian reminiscences, the building resolves the entire program in a continuous and unified way. Alberto Campo Baeza's design for the same competition responds to a similar strategy, although in his case it is an eccentric spiral. And of course, the exercises of single surface floor of Diller Scofidio are among the most representative cases of this category, specially through buildings such as the Education Center in New York (2016) or the Museum of Image and Sound of Rio de Janeiro (2018). However, the most emblematic project focused on continuous floors is Rem Koolhaas' design for Jussieu from 1992. Although it is an eminently vertical project, with a height of 40 meters for a square 60 x 60 meter plan, its warped floors show an evolution that began with the Agadir project. However, unlike Agadir, where the warped slab is still horizontal, as we have seen, the floor slabs of the Jussieu libraries are warped in section so that they rise to reach the slab of the next floor (Fig. 2-24). The section for Jussieu becomes a critique of the 1909 theorem and the New York Athletic Club, producing another diagram based, in this case, on the internal continuity of the surfaces. The fact that the plan is square and that certain heights remains constant between them only serves to further emphasize the curvature of the slabs. In the end, as Eisenman points out, "*the only real volumes in the building are the interstitial spaces between floors. These are bounded as figures by the bow and bend of the floor planes, and in that sense can be viewed as residual, while the linking of circulation with the floor planes suggests that a diagram of circulation is its governing form.*"[114] The cross section of the project is com-

112. Eisenman, *Ten Canonical Buildings 1950-2000*, 205.

113. Emmanuel Levinas, Le temps et l' autre, (Paris: Presses Universitaires, 2014), 69

114. Eisenman, *Ten Canonical Buildings 1950-2000*, 206.

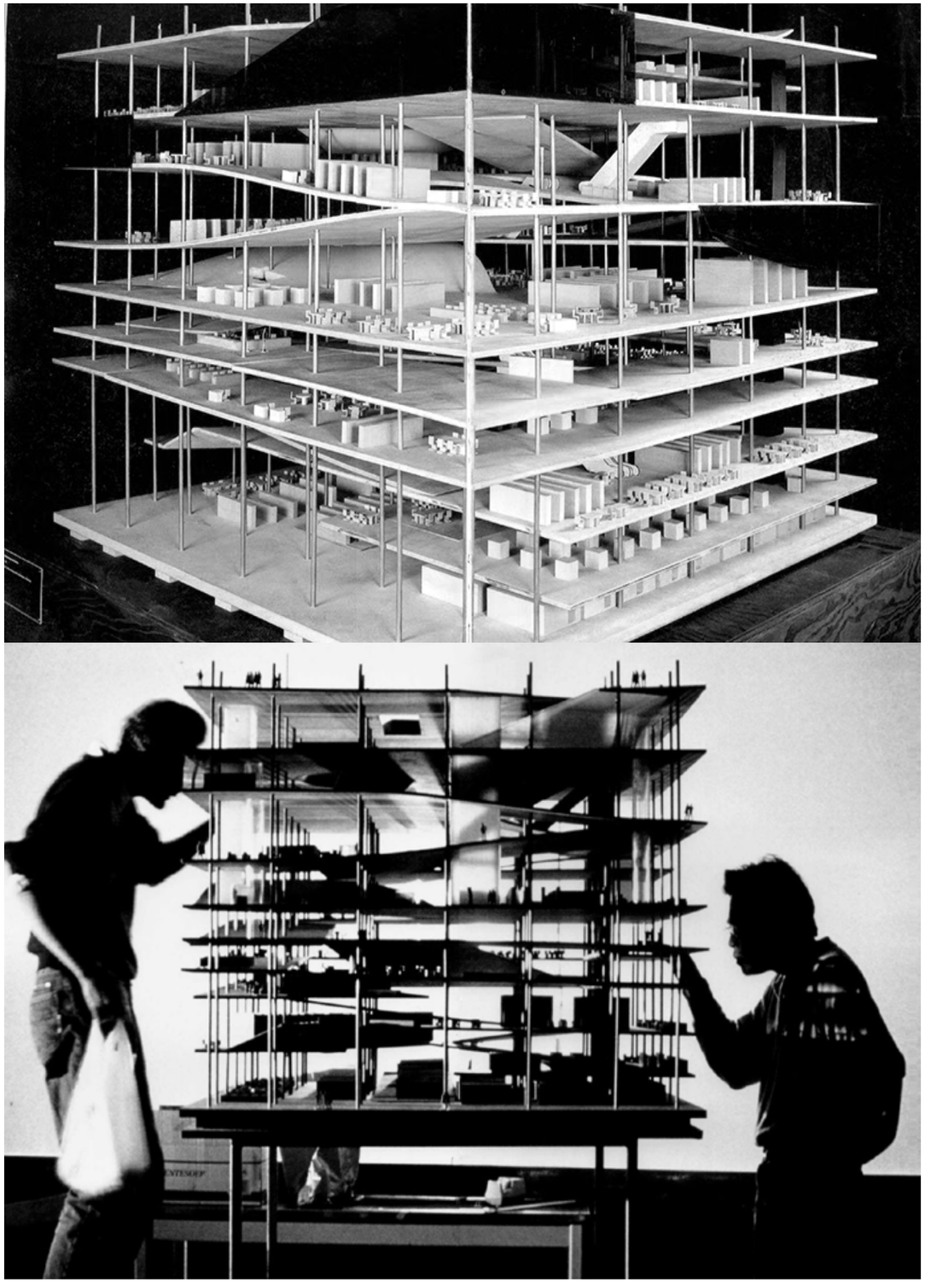


Figure 2-24: Jussieu, Rem Koolhaas, 1992

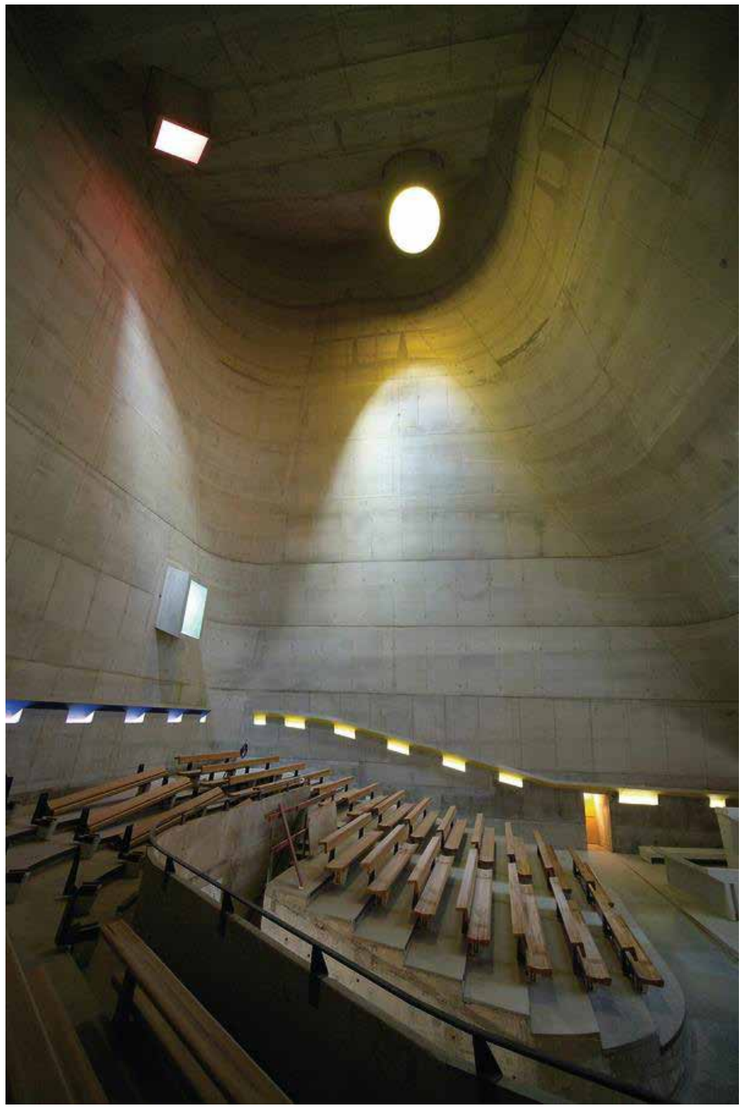


Figure 2-22: Firminy, Le Corbusier, 2006 (Started in 1971)

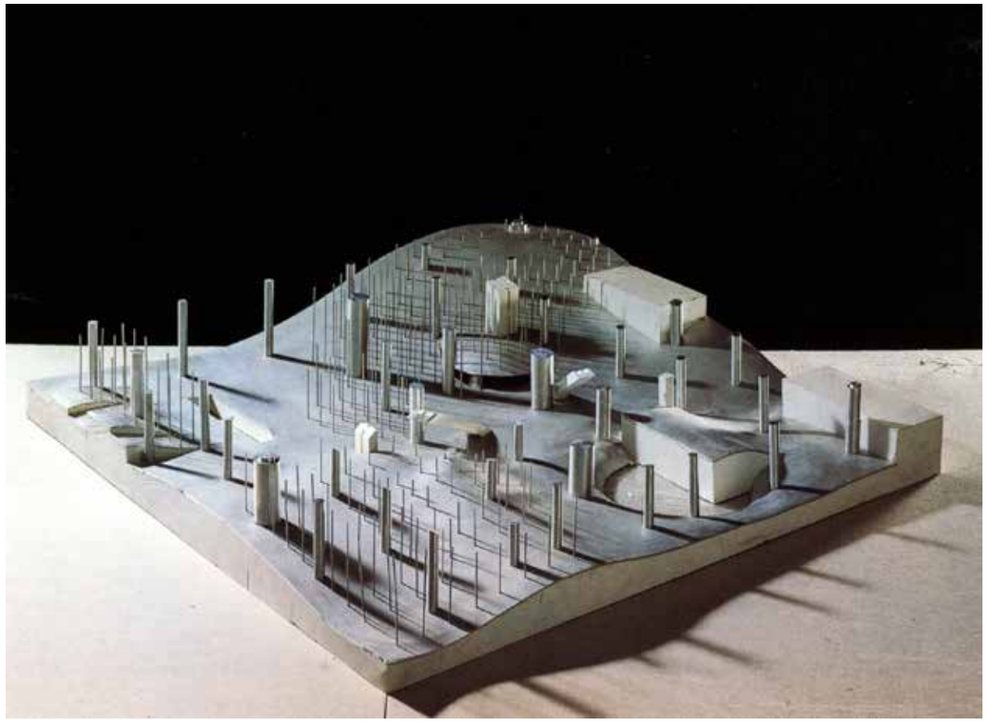


Figure 2-23: Agadir, Rem Koolhaas, 1990

pletely different from a case of discrete floors: we are no longer dealing with the stacked strata of the New York Athletic Club, or the layered system from the Parc de la Villette, but the result of slicing a single warped plane. In plan, there is no obvious centripetal or centrifugal tension; there is a diffuse force that avoids disrupting the edge and that translates into horizontal cuts, spirals or inclined slabs. There are some aspects where certain classic notations can still be read, such as the legibility of the four elevations, or the grid of columns. However, these elements do not form the leitmotiv of the design; rather they stand out as aspects that, by contrast, emphasize the disciplinary innovations contributed by the vertical use of the continuous floor.

2.4.4 Continuous floor: formal and performative qualities

The continuous floor characteristic of topological surfaces uniquely combines a series of spatial attributes that distinguish it from the discrete floor not only in its form, but also in its performance. The following pages will present a systematic analysis of six formal attributes and six performative attributes that will serve to compare (Fig. 2-31) the spatial characteristics of the continuous floor in relation to those of the discrete floor, presented earlier.

Mereology: Whole > Σ Parts

If we conceive of the continuous floor as a single differentiated floor, then when can understand that it is not made up of the sum of separate parts but rather by a single whole that incorporates all of its parts. In that sense, the parts are entirely subjugated to a whole that determines them through their relationships, thus negating their separability and individuality. Where discrete floors were characterized by the complete autonomy of their parts, continuous floors are characterized by the reduction of their parts to the series of relationships that make up the whole. At the point where all the parts depend on each other by virtue of a system that is determined reciprocally, they form a totality. As Sanford Kwinter suggests, "*Every real system is made up of other systems, and they are all continually leaking information to one another in such a way as to link them across a single 'continuum of influence'*".[115] Indeed, this continuity may give rise to formal singularities that appear discrete, but those singularities are always the effects of continuity: in other words, the forms are not fixed elements, but events occurring within an open, dynamic and evolving system.

In that sense, where discrete floors constituted a series of distinct and independent worlds, continuous floors form a single "hyperconnected" and "superunified" world, rooted in the concept of the field. It "*describes a space of propagation, of effects. It contains no matter or material points, rather functions, vectors and speeds. It describes local relations of difference within fields of celerity, transmission or of careering points, in a word, what Minkowski called the world.*"[116]. A complex world which, through folds and bends is constituted as a single whole whose interior blurs its parts and prevents their recognition. However, far from being constituted as a rigid and unmoving whole, as if it were Parmenides' One, it is configured as a fluctuating, heterogeneous and open whole, capable of combining all kinds of differentiations by virtue of its unitary structure.

Geometry: Topological

Whereas the discrete floor of the skyscraper and the open plan of the Dom-ino scheme were based on rigid, hermetic geometric figures like the triangle, the rectangle or the circle, the geometries of continuous floors are, in Schumacher's words, "*animate (dynamic, adaptive, interactive) geometrical entities – splines, nurbs, and subdivs.*"[117] They form open systems, react to points of attraction and, most importantly, they are connected to one another, which allows for their variability overall.

The type of geometry that best represents these attributes is topological geometry. Topological geometry is the branch of mathematics that studies those characteristics of an object that remain invariant despite homeomorphic transformations such as folding, warping or stretching. In that sense, for mathematicians Gauss and Riemann a topology is an "analysis situs",[118] i.e., a geometry of position, as opposed to a geometry of objects, that focuses on systematicness instead of on physical characteristics.

In a Euclidean geometric framework, a triangle and a quadrilateral are completely different figures: if they were to be equivalent it would have to be possible to transform one into the other by means of isometries – i.e., transformations that maintain measurements such as angles, areas, volumes, etc. In a topological geometric framework, however, a triangle and a quadrilateral are equivalent figures. That is the case because triangles can become quadrilaterals (and vice versa) through folding and stretching: you need only take one of the three vertices and fold it over, using the axis between the other two vertices as the axis of symmetry. Because of the relational whole characteristic of topologies, it is impossible to alter one point without altering the others, if only minimally.

In that sense, continuous floor are described via topologies. The case of Yokohama is emblematic: the tectonic play that develops between the floor and the roof is ultimately a symbiotic exchange, a mechanism that becomes a multi-layered topography, rising and falling along the quay. It was developed "*based on a topological interaction between the modification of the terrain and the creation of a roof.*"[119]

Contour: Virtual

The idea of a limit in a continuous floor is problematic. If an element is considered to be continuous, we imagine that it is uninterrupted; strictly speaking, then, we should not assume it that has any limits. FOA's "virtual house" is emblematic in that sense: the moebius strip that forms it does not end at any particular place; on the contrary it twists back into itself. In other projects like Yokohama, Agadir or the Rolex center, the limit of the floor is not constituted by a natural limit on the surface (impossible, since the surface in itself is infinite), but by an arbitrary frame. In all three of the aforementioned projects, the frame is a fixed geometrical element that contrasts by its rigidity, emphasizing

115. Sanford Kwinter, "Landscapes of Change: Boccioni's Stati d' animo as a General Theory of Models", *Assemblage*, no. 19 (1992), 59.

116. Kwinter, *La Cittá Nuova: Modernity and Continuity*, 88-89.

117. Schumacher, 654.

118. This is an expression that has become obsolete, having been replaced by the term topology.

119. Zaera, 116-17.

Figure 2-25: Asphalt Spot, F. Roche, 2002

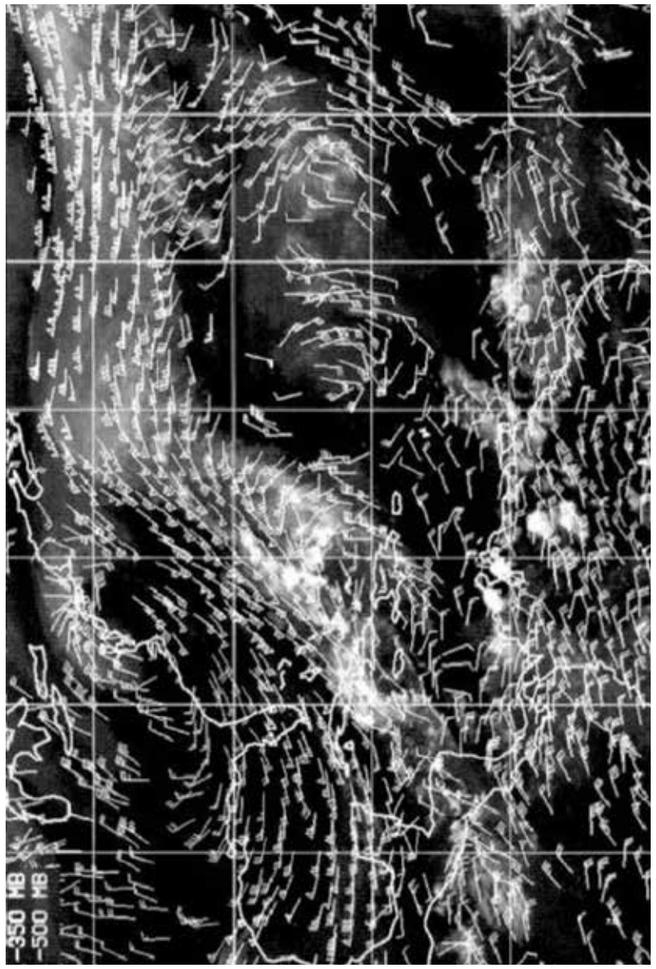


Figure 2-26: Field of forces: Turbulences Map

the variability and expressive richness of the continuous floor that it cuts off.

However, the notion of limit does not necessarily refer to a physical limit. Far from suggesting that the continuous floor's lack of a natural limit implies the complete negation of the idea of a limit, an attentive observation of the continuous floor reveals the exact opposite. If we understand the horizon as the part of a surface that includes the line that separates the surface from the sky, as seen from our perspective, we realize that the fluctuation of a continuous surface produces multiple horizons, not just one or none. They are apparent limits (but not real ones). When a user reaches this kind of limit, he discovers that he can continue moving forward: in other words, the limit is strictly visual. The number of these horizons will depend on the position of the user, and the number of "peaks" in front of him. In that sense, and as we can see in projects like Asphalt Spot of F.Roche (2002) (Fig 2-25) rather than a discrete set of horizons, continuous soils produce a network of horizons, since they are connected to one another through the floor itself, although the connection may be provisionally invisible to the user. Jeff Kipnis asserts something similar when he writes that, in Jussieu, "*the plates are cut and the rims warped, allowing visitors to gaze surreptitiously at others above and below. The effect shatters the ideal horizon line of Dom-ino and folds the fragments back into the space as an eroticized web of partial horizons.*"[120] Kipnis argues that these horizons are erotic and partial: erotic because of the voyeurism they induce, and partial because their nature is multiple and limited. In contrast to the immateriality and universality characteristic of the horizon of discrete floors, the horizon of continuous floors is essentially the material fragmentation of that original, ideal horizon.

Arrangement: Field

In his text "La crise de la musique sérielle", Xenakis criticizes, on the one hand, the seriality of linear polyphony and, on the other hand, the indeterminacy and arbitrariness of John Cage's compositions. As an alternative, Xenakis proposes "stochastic music", understood as "*a world of sound-masses, vast groups of sound-events, clouds and galaxies governed by new characteristics such as density, degree of order, and rate of change, which required definitions and calculations using probability theory.*"[121] In short, it would be what in physics is called a field: i.e., the space-time distribution of one or more physical magnitudes that can be measured around each point in a region of space for each moment in time. In mathematics, fields are associated with non-linear dynamics and simulations of evolving changes (Fig. 2-26). Their application in architecture works in the same sense, where the concept of field is used to emphasize bottom-up processes, defined not by absolute geometric frameworks, but by local connections. In that sense, a field produces an underlying matrix with the ability to unify a series of elements that behave differently. Stan Allen aptly summarizes the architectural consequences of fields, when he states that "*form matters, but not so much the forms of things as the forms between things.*"[122]

Thus, whereas discrete floors are distributed according to stratification strategies based onthe 1909 theorem, continuous floors arrange their singularities drawing on the notion of the field. The case of Jussieu is emblematic in that regard, not only because of its nature as a continuous surface, but above all because of its implicit references to the Dom-ino diagram: Koolhaas' design incorporates Le Corbusier's schema but does away with its uniform infinity through a finite field of fluctuating interactions.

Growth: Deformation

In his book SMLXL, Rem Koolhaas included a photograph where a hand appears lifting up a corner of the floor (Fig. 2-27). It is a didactic image and its spirit it that of contrasting with another image, in this case by Le Corbusier, where a hand is shown sliding a prefabricated unit into a structure. Through this image, the Dutch architect suggests that the surface is no longer a tabula rasa to which assembled elements are added; rather it consists of a variable plane, i.e., an adaptable, foldable element that is part of a vertical continuum. What Koolhaas aims to highlight is that in order to generate continuity, you need only bend or fold a sheet of paper to create a variation in it, there is no reason to repeat it: fields are expandable due to the mathematical nature of the relationship between their parts, and that relationship cannot be broken.Thus, whereas the growth of discrete floors was founded on a simple exercise of repetition inspired by the serialization of Fordist assembly lines, continuous floors grow through an exercise of variation based on folding and warping strategies. These must respect the fundamental principle of a topology: the univocality of the original form cannot be separated into two distinct elements.Projects like Yokohama are the maximum expression of this guiding principle. The manipulation of the floor in FOA's design emerges as a fundamental technique for transforming an element that is usually based on a fixed code, like discrete floors, into what Alejandro Zaera defines as "*an active, complete and shifting field*"[123]. The expressions "deformation" and "manipulation" lose their negative connotations derived from modern morality. At a time when the objet-type was exalted as an ideal model that should be repeated with the utmost fidelity, any alteration was viewed as heresy. However, continuous floors draw on a much less absolutist and Platonic vision than was the case for modern proclamations. Instead, they are based on a Toyotist industrial system that places much more value on concepts such as flexibility or "just in time". In that sense, continuous floors like the ones in Jussieu take part in a kind of Situationist détournement: they take an object created by the modern system (the Domino schema, in this case) and distort its meaning in order to produce a critical and subversive effect.

Figuration: Figure = Ground

Continuous floors no longer take their inspiration from the modern relationships between building and floor based on the opposition between figure and ground. While discrete floors presented as "ground" because of their condition as lots repeated in section, continuous floors no longer participate in "*the*

120. Jeff Kipnis, *A question of Qualities*, (London: Writing Architecture Series, 2013), 126.

121. Iannis Xenaquis, "Towards a Metamusic," *Tempo,* no. 93 (1970), 3.

122. Stan Allen, "Field Conditions" in *Points + Lines, Ed. Princeton Architectural Press*, ed. Mark Lamster, (New York: Princeton Architectural Press, 2012), 92.

123. ZAERA, Alejandro: "Nuevas topografías. La reformulación del suelo," in Otra mirada: posiciones contra crónicas, Ed. Gustavo Gili, 2010, p. 116.

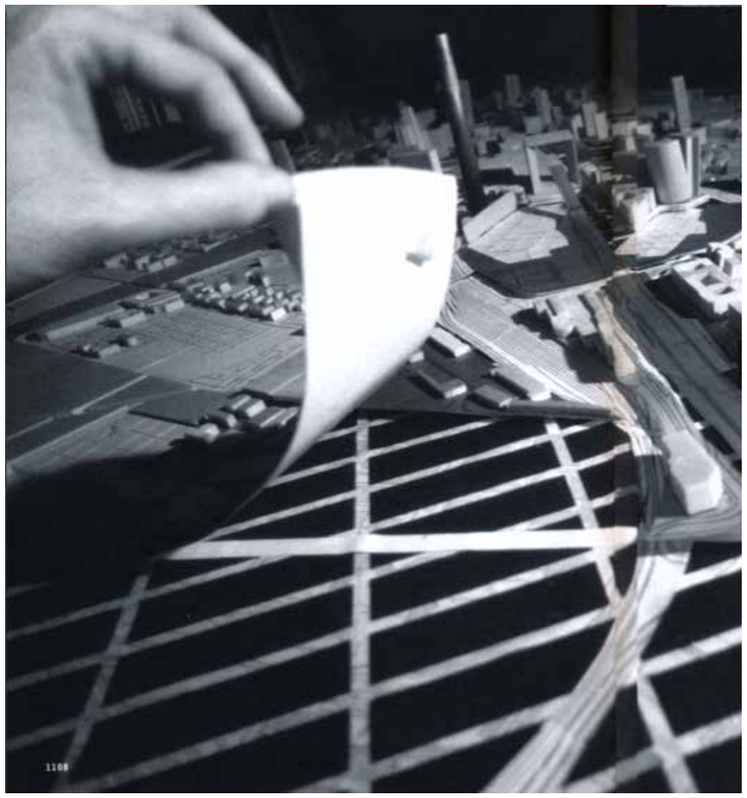


Figure 2-27: Koolhaas bending the floor, 1995

definition of the ground as something defined, stable, horizontal, fixed and homogeneous."[124] As a result, it can no longer be seen as mere ground, since its active condition as a platform negates any strictly receptive function. In contrast, continuous floors posit a marked ambiguity between figure and ground, which ends up making them equivalent: ground is figure and figure is ground. Indeed, their status as "operating systems", to quote Alejandro Zaera relates them further to the landscape condition: i.e., understood as a topographic configuration that simultaneously acts as figure and ground. In that sense, Stan Allen is very clear in asserting that "*one of the potentials of the field is to redefine the relation between figure and ground. If we think of the figure not as a demarcated object read against a stable field, but as an effect emerging from the field itself -as moments of intensity, as peaks or valleys within a continuous field- then it might be possible to imagine figure and field as more closely allied."*[125]The case of the lower platform in the Agadir project is emblematic: on the one hand, its undulating floor blurs together with the softness of the desert dunes that surround it; while, on the other hand, it highlights its nature as a built floor, whose volume houses a convention center and a public space. In this way, the project simultaneously acts as ground and figure, and ambiguity becomes one of the design's leitmotivs; from a disciplinary standpoint, this associates it to the turn-of-the-century understanding of man.

Circulation: Wander

In the 1960s, in the context of the Situationist movement, Guy Debord popularized a series of experiments he called dérives (Fig. 2-28). A dérive generally consisted of an urban trek that unfolded without a specific destination. On the contrary, the dérive consisted in "wandering" through the city in search of an essential freedom: escaping from daily routines and giving in to the arbitrariness and emotions of the moment. This activity was framed within the larger context of psychogeography, aimed at understanding how the geographical environment affects people's emotions and behavior. Dérives result in erratic and seemingly meaningless trajectories, in line with the fluctuating understanding of the subject characteristic of the 20th century. They also stand in direct opposition to the optimized journey of modernity and the understanding of circulation as a mere movement in a "straight line" and "between two points". In that sense, whereas the circulation characteristic of the discrete floor was resolved using a "spine" system based on an optimization of paths in order to minimize travel times, continuous floors produce the opposite effect[126]. With continuous floors, circulation becomes a "wandering" experience, a series of "surfing" trajectories that are never repeated and that unfold across the undulations characteristic of a warped slab. Koolhaas describes that "surfing" movement when he explains, referring to Jussieu (Fig. 2-29), that "*all the planes are connected by a single trajectory, a warped interior boulevard that exposes and relates all programmatic elements. The visitor becomes a Baudelairean flaneur, inspecting and being seduced by a world of books and information by the urban scenario."*[127] As such, the inhabitant of a continuous floor can no longer be defined as a "user"; rather he becomes what Walter Benjamin described as an urban explorer: he is a gentleman of the metropolis, seductive and enticeable, but he is also an adventurer, a daring traveler familiar with the streets; there is nothing lazy in his recreational wandering, but rather a great curiosity for the complex richness of the urban landscape.

Gaze: Slippery

The undulations of the continuous ground produce a series of situations in which other subjects can be observed at higher and lower levels. Unlike the ideal flatness of the discrete floor, where only "face-to-face" encounters can occur, the topographic fluctuation of the continuous floor generates much more complex situations: according to the relative position of two visitors, the other is not approached as an equivalent subject, but is objectified by the subject who is looking down from a higher vantage point. And yet, that same subject can in turn be objectified by another subject, creating a fluctuating situation, where the subject condition is not guaranteed (as in the discrete floor) but is relative to the state of the whole in which it is operating.

This visual complexity derived from gazes that intersect through all three axes of space, moves away from a gaze whose fundamental trait is the horizontal depth associated with the discrete floor. On the contrary, the undulations of the continuous floor offer situations where a person can watch without being seen; this translates into a sexualized space, where the visitor becomes a veritable voyeur. Jeff Kipnis insists on this when he says that "*in his project for the university libraries at Jussieu, the architect revisits Corbusian themes to generate a social setting organized less by the program than by the erotic fantasies of the voyeur."*[128] Here, Kipnis seems to be realizing something that Beatriz Colomina had already suggested in her comparison between the centrifugal gaze of the Ville Savoye and the centripetal gaze of Loos' Raumplan. In the latter, as we have seen, the Viennese architect also created sexualized spaces, almost as though they were a series of stages located at different heights. Continuous floors emphasize a sexualization of the gaze, which no longer seeks out the idealized abstraction of the modern horizon, but rather the particular effects of an eroticized environment.

Orientation: Deviation

Continuous floors stand out, as Alejandro Polo Zaera affirms, because of their condition as an "operating system",[129] i.e., because they are an underlying element that serves as a point of reference for the broad range of circumstances that occur within them. In the same way that 20th-century man relates to reality through human systems of relation, such as power in Foucault's theories, ideology according to Althusser, or language in the case of Derrida, the continuous floors from that period are posited as a platform for mediation between visitors and the architectural events that take place on their surfaces.

Discrete floors use an external element as a point of ref-

124. Zaera, 116.

125. Allen, 97.

126. Ingrid Böck, *Six Canonical Projects by Rem Koolhaas*, (Viena, Jovis, 2012), 221.

127. Koolhaas, *SMLXL*, 1320-21.

128. Kipnis, 124.

129. Zaera, 118.

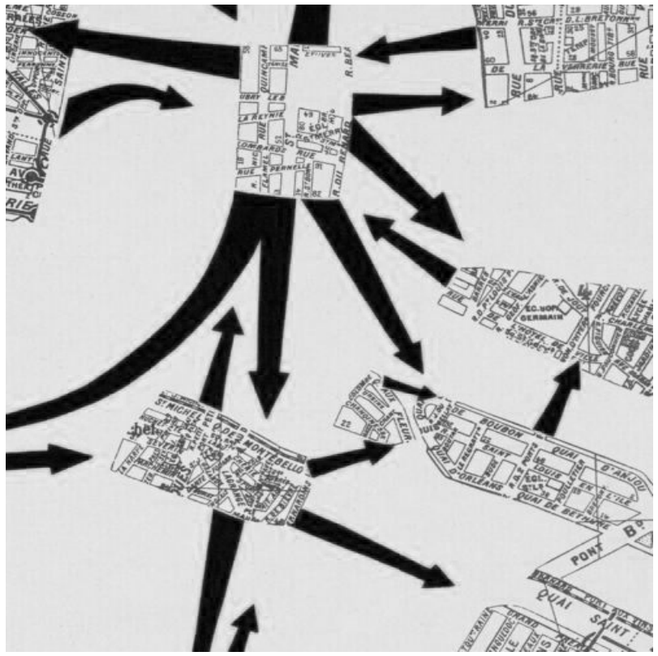


Figure 2-28: Naked City, Guy Debord, 1957

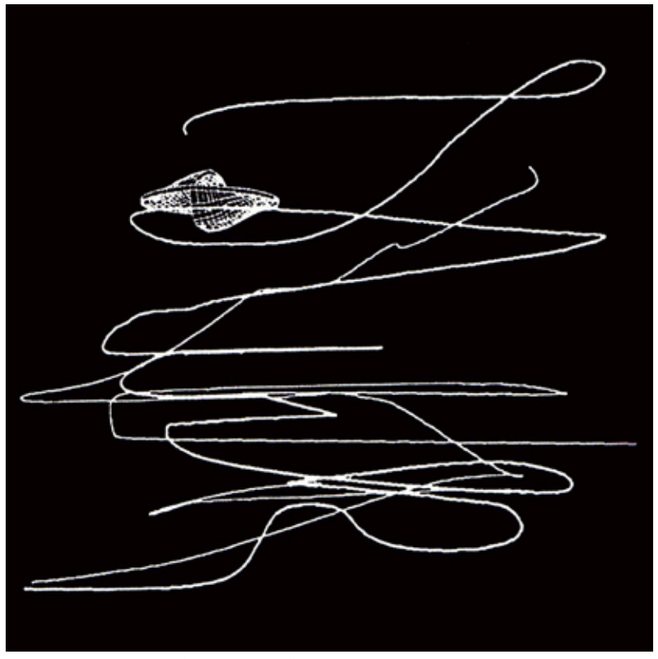


Figure 2-29: Jussieu Circulation, Rem Koolhaas, 1992

erence – the circulation core – which only through its radical otherness is able to a function as a "cosmic" connection between the different autonomous worlds that are repeated in section. It is a transcendent reference that serves as an axis of spatial orientation for the user. In contrast, continuous floors are put forward based on the idea of an immanent reference – in other words, a reference that is established inherently, from the floor itself. Indeed, in continuous floors the surface itself has the ability to unify all the events and circumstances that come to pass in the building; based on its role as a continuous unified system, it can structure and mediate all the different aspects that appear on its surface. As such, users' orientation in space is derived from the direction and magnitude of the slope at any given point on the surface, since that is the source of their specificity. From there, what will be relevant to the user will be the angle between the line of gravity relative to his body and the intersecting angle of the surface at the point where he is standing. The magnitude of that deviation emerges as the unique specificity for each point on the surface and consequently as an element of orientation.

Retirement: Wrapping
Whereas in the discrete floor distribution we saw that public and private spaces were structured according to an absolute radial scheme with the vertical circulation core at its center, in the continuous floor layout, privacy responds to a distributed framework of wrappings. In that regard, we must consider a fact that has been mentioned before: the face-to-face relationship is no longer the only possible visual relationship between subjects. As a result, privacy can no longer be understood in terms of an absolute element, as in the case of the circulation core; here, it is based on the relative position of each user. In that sense, when dealing with a warped floor instead of a flat floor, the different "valleys" and "hills" formed by the floor's topography become the tools for producing more or less intimate spaces. Certain positions, such as the various peaks that can be seen in the examples of continuous floors presented here, generate positions that are more exposed than other spaces where there is greater privacy due to more self-contained forms.

In contrast to what happens with discrete floors, not only does the distribution of degrees of privacy not follow a pre-established pattern, (and in any case, it is much more spread out), it also generates a broad range of intermediate situations. This privacy is not absolute or guaranteed, however; the voyeur vantage points resulting from the differences in height that occur on a single floor allow for intruding on intimate situations without the victim being aware.

Interiority: Gradiation
In this case, the interior concept is developed through a mechanism of gradation. The fact that, in the continuous floor, figure and ground – understood traditionally as interior and exterior, respectively – are fused into a single continuum has consequences that reach beyond the strictly formal sphere.
The blurring of hard borders effected by the continuous floor also implies the elimination of the edges that purposefully separated the interior from the exterior in the discrete floor. While both concepts remain valid in the sense that an absolute interior and an absolute exterior do, in fact, exist, the two categories are no longer opposites within a binary structure; rather, they are the two endpoints of a gradual structure.

Looking closely at the case of Yokohama, we see how, along the path from the outside to the inside, there are several moments characterized by ambiguity (Fig. 2-30): i.e., conditions of exteriority and interiority overlap analogically.

Access: Scattered
Far from the severity of the typical access to a discrete floor, the continuous floor can offer a plural and softened access, scattered across its surface. First off, it is a softened access because the transition from outside to inside is not immediate but gradual. It takes place via a transition that is not centered on the appearance of a series of elements that are external to the whole, as is the case with the discrete floor, but by a deformation of the building's floor itself. The topographic movements that the floor can produce on its surface lend depth to the experience of moving from outside to inside, or vice versa.

Second, the access is plural because it does not have to be concentrated at any single point, either in plan or in section. On the contrary, ideally it occurs at various points along the length of the building and at different heights, through the generation of folds into the interior of the building or "tears" in its surface.

As a result, access becomes an experience with a certain breadth, and it cannot be reduced to the act of crossing through a planar element, as is the case with the discrete floor.

2.5 Discretism and continuity modulations

Within the framework of two theoretical approaches to the subject-object binomial and as we can see in the table of concepts (Fig 2-31), each of the two floor dispositions analyzed here produce spaces with different formal and performative characteristics that vary depending on the discrete or continuous nature of their morphology. As we have seen throughout this chapter (section 2.2.1), in the first case the skyscraper is emblematic of the discrete floor because it is based on the unlimited repetition of an element whose limits are neither the same nor identical to the other elements' limits. Here the modern conception of humanity prevails, where man is understood as an absolute subject whose relationship with objects is one of frank opposition: his control over objects is rooted in science and technology, with an emphasis on mass production in particular, one of the most characteristic products of which is the skyscraper. In the second case, the topological floors of the late 20th century are the clearest case of the continuous floor because they resolve all programmatic needs based on a single regulated surface. Here, the post-modern[130] conception of humanity is dominant, where man is understood as a relational subject whose identity is constructed based on his relationships with objects, and not in opposition to them. The center of this subject is no longer the human being itself, but the various systems of relationships he has produced to situate himself in the world: language, power, will, the unconscious, the economy, etc. It is precisely this underlying network of relationships that weaves together the different singularities in the world, in the same way that the topological floor has the ability to provide a response, from its continuity, to any number of differ-

130. The term should be understood in opposition to the modern myth of Promethean and technocratic man, whose mastery of nature and its objects is absolute.

Figure 2-30: Yokohama, FOA, 2002

ent demands. Both cases encompass emblematic floor layouts, in which the discrete and the continuous are developed in a formal and performative sense, setting aside other symbolic interpretations. In each case, this development occurs based on a particular concept: In the case of the discrete floor, the fundamental concept is that of countability: the disposition of the floor is formed by a series of countable elements – i.e., they can be counted because the limits of each element are different. In the case of continuous floor, the fundamental concept is that of topography: the disposition of the floor unfolds through a single topographic configuration, where variability does not imply a division of the underlying unity. However, neither of the two floor dispositions can be reduced entirely to a single category, whether continuous or discrete, that completely negates the other. Instead, strong in one way and weak in another, or active in one way and latent in another, the continuous and the discrete co-exist in each of the floor layouts. It is a co-existence that does not imply concurrence, however: not only is it an unequal co-existence, there is no interaction between the categories either. In both cases, one of the two is always present in a virtual way. In the case of the skyscraper the discrete is dominant, as we have just seen, through the concept of countability. However, the continuous is also present, albeit in a weaker way, through the concept of succession. Specifically (and unlike the case of the Raumplan floor), on the one hand the succession is strictly formal and non-performative. On the other hand, the succession comes in the form of an arithmetic progression, since the following term in the sequence is obtained by adding a fixed number to the previous one – in this case, the height of 2.5 meters. Indeed, the different slabs are arranged according to a framework based on a vertical order of progression that is emphasized through the repetition of the same element in the same position, altered only by a shift along the z-axis that is always the same. It is in that sense that Koolhaas refers to this operation as "extrusion", where the result is a "mutant building" that has not been designed but generated.[131] However, we cannot call it continuity in the strictest sense because the different elements maintain their formal independence, as they are not in contact, let alone merged. That does not mean, however, that we can entirely ignore the presence of a succession, since there is effectively a rule of order between the elements that determines their form and position. From that point of view, the whole can be described as the coexistence of a form of weak continuity, based on the idea of succession, and a form of strong discretism, rooted in the concept of countability.

In the case of the topological floors typical of the late 20th century, the continuous is the dominant category through the concept of topography. However, the discrete is also present, albeit in an even weaker way than in the previous case. In that sense, something is continuous because it forms a whole with itself. Therefore, it is total and complete in itself, as Parmenides defined it in his famous poem On Nature.[132] To achieve that kind of unity, it must have established limits, otherwise it can not be constituted as such. In the continuous floor, ground and figure form a whole that is unified based on a single shared underlying field. In that sense, the discrete is rooted in the very concept of "oneness": in other words, in the autonomy derived from being complete, closed and independent, as would be the case with Leibniz's monads. However, in the continuous floor there is no repetition or countability beyond one, and of course we cannot refer to a set of elements. Consequently, its understanding from a discrete point of view is, again, strictly virtual, but not invalid. Thus, the topological floor can be described as the coexistence of a form of strong continuity, based on the idea of topography, and a form of weak discretism, based on the monadic concept. As we have seen, the continuous floor and the discrete floor present significant differences not just in their formal spatial qualities, but also in their performative spatial qualities. In both cases, how we operate in a building differs significantly, while at the same time, in each approach, certain complicities are established with the prevailing conception of the subject associated with the zeitgeist. However, the discrete-continuous division is not rooted in the idea of antagonism, but in the concept of opposition: the strong presence of one does not completely nullify the other, although in the two cases we have studied here it does lead the other to appear in a weak or virtual way, that is, not appearing with all of its defining features. In the case of the skyscraper, the continuous is present as the result of a progression, but we cannot refer to a literal continuity because we are still dealing with a set of countable elements. In the case of topological floors, the discrete appears as a monadic element which, as such, must be constituted via limits. However, we cannot refer to a literal discretism here either, since there are no jumps nor is there a series.

Moreover, as we have described in both cases, each layout maintains similarities with a particular understanding of the subject-object binomial characteristic of the zeitgeist of the early and late 20th century, respectively (Fig 2-31). Those complicities are neither total, nor causal, nor affirmative. Rather, they are a series of problematic concepts that permeate the intellectual environment of each period, and which each discipline refers to in one way or another. In the case of the discrete and continuous floor, these "allusions" have already been analyzed in this chapter (sections 2.2.3 & 2.3.3). However, since the end of the first decade of the 21st century, the subject-object relationship has been subject to new approaches put forward by authors like Graham Harman, Levi Briant, Bruno Latour, Timothy Morton, etc. In particular, Speculative Realism and Object-Oriented Ontology have emerged as movements that no longer focus on an absolute subject based on the human being or a relational subject based on a human system; rather they describe the end of the subject as such. As a result, these schools of thought propose a world populated only by objects, where the figure of the subject understood as an ontologically privileged being has disappeared. In the next chapter (section 3.2), we will analyze how objects have taken their place on the intellectual stage of our times as the sole players in the narrative of the world. This will be the first step in order to complete our table of concepts (Fig 2-31). Our aim is to explore to what extent there are alignments between this new "object without a subject" and certain works of contemporary architecture, thus opening up the possibility of working with a third floor disposition that reinterprets the aforementioned categories of the continuous and the discrete.

131. Lucan, 546.

132. In his work On Nature, Parmenides associates the one to the continuous from a metaphysical and not necessarily spatial-temporal point of view.
Parmenides, *Poema*, trans. Alberto Pajares, (Madrid: ISTMO, 2007), B8.6.

SUBJECT INTERPRETATION	ABSOLUT SUBJECT	RELATIONAL SUBJECT	ZERO SUBJECT
FOCUS	Human	System	Collections
POSITION	Axis	Holism	Ex-Centricities
SUBJ - OBJ	Domination	Mediation	Interlacement
EPISTEMOLOGY	Positivism	Perspectivism	Ecognosis
REF. THINKER (SOC)	A. Comte	Z. Bauman	T. Morton
REF. THINKER (ONT)	I. Kant	G. Deleuze	L. Bryant
MOVEMENT	Modernism	Post-structuralism	Spec. Relativism
FLOOR LAYOUT	DISCRETE FLOOR	CONTINOUS FLOOR	DISC while CONT FLOOR
DISCRETENESS	Countable	Sole	Distinct
CONTINUITY	Progression	Topography	Grume
F1. MEREOLOGY	Whole = Parts	Whole > ΣParts	Whole< Part
F2. GEOMETRY	Euclidian - Flat	Topological	Combinatory
F3. CONTOUR	Ideal	Virtual	Singular
F4. ARRANGEMENT	Stratum	Field	Sack
F5. GROWTH	Repetition	Deformation	Incrustation
F6. FIGURATION	Grounds	Figure = Ground	Co-Figures
M1. CIRCULATION	Spine	Wander	Jumps
M2. GAZE	Horizon	Voyeur	Gaps
M3. ORIENTATION	Core	Deviation	Contour
M4. RETIREMENT	Margin	Wrapping	Compression
M5. INTERIORITY	Opposition	Gradation	Matryoshka
M6. ACCESS	Single	Scattered	Nested
SPACE	Homogeneous	Homogeneous	Heterogeneous
DIAGRAM			

Figure 2-31: Table of Concepts, Discrete floor and Continuous floor

Subjectless objects

Chapter III

III. Subjectless Objects

The relational subject characteristic of the late 20th century, which we described in the previous chapter (section 2.4.2), has seen some opposition in recent years from the intellectual avant-garde. That opposition is framed by a renewed intellectual context that, despite its short diachronic trajectory, has succeeded in permeating various different disciplines. In this second chapter we will analyze how this opposition has shaped a unique zeitgeist, whose emergence sheds light on a question that is fundamental to this dissertation: the complete renunciation of the figure of the subject and, therefore, the advent of "subjectless objects" at the hands of speculative realism.

In the previous chapter (sections 2.4.3 and 2.2.3) we saw how certain ways of conceptualizing the subject are aligned with particular architectural protocols – more specifically, with certain dispositions of the floor. In this chapter (sections 3.3.2 and 3.3.3), we will analyze how certain experimental currents in 21st-century architecture come to resonate with "subjectless objects" through three fundamental concepts: collections, ex-centricities and interlacements.

This position will be used to articulate the central hypothesis of this dissertation, which should be kept in mind throughout this chapter: the possibility of revealing a floor disposition that is, on the one hand, disciplinarily original in relation to the discrete and continuous schemas analyzed in Chapter 1 (sections 2.2.4 and 2.4.4) and, on the other hand, intellectually aligned with the absence of subject we will be describing in this chapter (section 3.2).

3.1 The three limits of relational ontologies

The arrival of the intellectual currents we will analyze in this chapter (section 3.2) marked the end of humanity's ontological privilege in turn-of-the-century relational thought. As we have seen, the human being occupied a central position in thought since the Renaissance, confirmed in modernity through Descartes' famous expression, "I think, therefore I am." The legacy of the "masters of suspicion"[1] and the aftermath of the Second World War reduced the ontological primacy of the human being, shifting the focus of the debate towards relationships and structures: in other words, towards a relational subject. However, those relationships and structures remained unmistakably human: the Cartesian subject had been abolished and reality was no longer measured in accordance with it; nevertheless, all beings were still chained to "*human related phenomena such as the signifier, language, culture, power, and so on.*"[2] In that sense, we can assert that relationalist currents, in spite of being considered anti-humanist in their majority, were actually still humanistic. In other words, they continued to consider humans as privileged beings. Those schools of thought rely on a relational subject which, as we saw in the previous chapter (section 2.4.2), is based on systems, holisms and mediations, and emerges from an ontology of fields. However, since the end of the first decade of the 21st century a certain opposition to this ontological approach has been put into practice. The critique is summed up by Graham Harman in three main points: correlationism, relationalism and contextualism.[3]

First off, the relational ontology analyzed in the previous chapter (section 2.4.2) is above all an ontology of access, or as Meillassoux describes it, a correlationist ontology: "*By 'correlation' we mean the idea according to which we only ever have access to the correlation between thinking and being, and never to either term considered apart from the other.*"[4]As a result, we can never make consistent claims about reality independently of our thought or language.

This correlationism does not begin with the relational philosophies of the late 20th century, nor is it exclusive to them; its first proponent was Kant. Before Kant, ontology was focused on substance. Beginning with his work, however, ontology shifted toward thinking about the correlation between the subject and substance. Since substance, which Kant referred to as the noumenon, cannot be apprehended, the subject is only able to access the relationship between subject and substance, and not the substance itself, the manifestations of which are always conditioned by the particular structure of the subject. The question, then, no longer has to do with understanding what the substance is (God, Idea, Soul, etc.) but rather what the correlation is (Language, Consciousness, Ideology, etc.) between the substance and the subject.

Relational philosophies advocated by philosophers such as Bruno Latour represent a particular variant of correlationism, since they focus on prioritizing relationships instead of objects. As a result, any kind of objectivity is definitively abandoned, to be replaced by an intersubjectivity that does not permit dis-

1. Expression coined by Paul Ricoeur to refer to three philosophers who questioned the solidity of modern man throughout the 19th century: Marx, Freud and Nietzsche

2. Levi Bryant, Nick Srnicek and Graham Harman, "Towards a Speculative Philosophy" in *The Speculative Turn*, ed. Levi Bryant, Nick Srnicek and Graham Harman (Melbourne: re.press, 2011), 3.

3. Graham Harman, *Towards Speculative Realism*, (Winchester: Zero Books, 2010), 127-29.

4. Questin Meillassoux, *Después de la finitud*, trans. Margarita Martínez, (Buenos Aires: Continuum, 2008), 13.

cussing reality in itself, but only "correlations". Ontology is thus reduced to epistemology.

Second, late 20th-century continental philosophy focused on generating a "philosophy of networks": in other words, an ontology according to which objects consist of the relationships they establish with other objects. Those relationships become the fundamental element of reality. As Bruno Latour writes, "*There is no other way to define an action but by asking what other actors are modified, transformed, perturbed or created.*"[5] In other words, an actor is what an actor does. However, as Harman asserts, this extreme relationism is problematic in two ways. On the one hand, "if the entire world were exhausted by its current givenness, there is no reason why anything would alter,"[6] which cannot explain the arrival of the future understood as a different configuration of reality. Harman is even more explicit when he argues that " no feedback loop can replace the need for an excess in things beyond their relation, since an object cannot absorb or respond to feedback unless it is receptive, and this requires that it be more than what it currently does".[7] On the other hand, if objects are exhausted in their relationships, there is no way to unify sets of different relationships. In other words, two people can never perceive the same object: since each person has a different perception, and since objects are exhausted in their relationships, the object is dismantled each time it is perceived.

Third, the need to understand philosophers of the past as closed holistic units makes it difficult to use their arguments outside their time. As a result, "*Any past philosophy is too self-enclosed to serve as a possible model of the world.*"[8] The same can be said for any other element whose origins lie outside our context. In fact, if all thought is entirely merged with the context from which it emerges, it will be impossible to extract that thought in order to apply it to a different context, since it lacks the necessary independence to make it exportable: it cannot be a source of ideas or specific arguments, but only a holistic whole. In that case, we would be trapped in a totalizing contextualism, into which it would be impossible to incorporate anything external – either diachronically or synchronically. It would be impossible, for example, to isolate a problem in contemporary philosophical research and propose its reinterpretation through the application of intellectual strategies developed by earlier thinkers, since those strategies could never be isolated for their subsequent transfer.

Other difficulties must also be added to this list of disadvantages:[9] the ecological crisis, the development of neuroscience, new physical conceptions, and the close relationship between humans and machines have all contributed to a new scenario that 20th-century relational ontologies are poorly equipped to address. Given this context, beginning in the first decade of the 21st century there has been an intellectual turn, which a number of adherents have defined (despite internal differences) as a "Speculative Turn". This term is intended as a counterpoint to the well-known "Linguistic Turn"[10] from the mid-20th century, and it is embodied in the philosophical movement known as Speculative Realism. On the one hand, this movement is defined as a Realism because – unlike the repetitive focus on texts, practices and discourses in continental philosophy – it looks to reality itself, whether in the search for noumena, scientific rationalities or mathematical absolutes. In short, the nature of reality is approached independently of the thought processes that examine it. On the other hand, this Realism is speculative because it aims to extend beyond the critical and linguistic turns: it returns to the precritical definition of speculation as a thought process concerned with the Absolute, although its approach is based on a flat ontology – i.e., it does not grant ontological privileges according natural categories (human, physical, imaginary, temporary, etc.).

3.2 Zero subject: collections, ex-centricities and interlacements

The prevalence of humanism had already been questioned in the 1960s and 70s by strong anti-humanist activism. This was cemented in the late 20th century in a series of social movements including indigenism, anticolonialism, feminism and pacifism. In general, these movements consisted in questioning the universalist position of humanity, demanding accountability. In that sense, turn-of-the-century postmodernity advocated for the presence of humanity's "others" who had historically been ignored: women, gays and lesbians, indigenous groups, people with disabilities, etc. Antihumanism defended the idea that all of these groups should be on equal footing with the standard that had been the focus of humanism until then: a white, European, healthy, heterosexual male. Hence the prefix "anti". However, these "other" humans were still humans nonetheless. In that sense, paradoxically, human beings continued to occupy a clearly central position in antihumanism. Moreover, as we have seen, relational approaches to reality were also humanistic from an ontological point of view. The focus of attention shifted from human beings themselves to a system, but it was still a human system because it was based on power, language, the unconscious, etc.

3.2.1 Towards a flat ecology of objects

At the beginning of the 21st century, and driven by speculative realism, there was a growing interest in a more direct approach to reality, in a radical decentralization of the human being as its lynchpin and in an ontological understanding with the potential to limit the relevance of relationships in favor of objects. Faced with this scenario, object-oriented philosophy emerged as a derivative of speculative realism with a specific focus on these issues. It is a school of thought whose focus centers on the notion of objects: they should not be understood as closed-

5. Bruno Latour, *Pandora's Hope: Essays on the Reality of Science Studies*, (New York: Harvard University Press, 1999), 122.

6. Graham Harman, *The Quadruple Object*, (Winchester: Zero Books, 2010), 12-13.

7. Graham Harman, *Inmaterialism*, (Cambridge: Polity, 2016), 10-11.

8. Graham Harman, *Towards Speculative Realism*, 129.

9. Levi Bryant, Nick Srnicek and Graham Harman, "Towards a Speculative Philosophy" in *The Speculative Turn*, ed. Levi Bryant, Nick Srnicek and Graham Harman (Melbourne: re.press, 2011), 3.

10. Although Gustav Bermann invented the term in 1953, it gained popularity after the publication of Richard Rorty's anthology The Linguistic Turn in 1967. The main assertion of the linguistic turn is that there can be no philosophy without a prior analysis of language; this stands in direct opposition to the pretensions of the Speculative Turn.

off, independent monads or as effective and contingent emergences, but rather as unified and autonomous realities[11] that form groups of collections and subcollections.

In that sense, Graham Harman asserts[12] that objects have been marginalized throughout the history of philosophy through two opposing mechanisms: they have either been demolished from below (undermined), or they have been buried from above (overmined).

In the first case, objects are conceived as elements that are too superficial to be the main constituents of reality. Essentially, they are considered to be nothing more than the crystallization of a much deeper principle: water for Tales, the air for Anaximenes, or the four elements for Empedocles. Even Democritus' atoms, aligned with today's quarks and string theory, seem to suggest something similar: "*What seems at first like an autonomous object is really just a motley aggregate built of smaller pieces. Only what is basic can be real.*"[13]The same demolition has also taken place in other philosophies: G. Bruno's infinite matter, Simondon's theories, and Deleuze's notion of virtuality all point in the same direction. In general, the problem with all these theories is the same: if there is a single pre-individual reality, it is impossible to understand why it is fragmented into pieces. However, if we are referring to several distinct and specific pre-individual realities, they would already be objects.

In the latter case, objects are understood as elements that are too profound to be the main constituents of reality. On the contrary, "*an object is exhausted by its presence for another, with no intrinsic reality held cryptically in reserve.*"[14] This would be the case in Hume's empiricism, where objects are nothing more than a bundle of perceptions – in other words, they are replaced by their most direct manifestations. Entombing objects in this way, in a holistic fabric of relationships, brings with it all the aforementioned problems associated with relationalism.

Object-oriented philosophy posits the object as the fundamental element of its ontology. The object is positioned as the final expression of a lineage with its origins in the concept of substance, drawing from philosophers like Aristotle or Leibniz as its main examples. However, the attributes of objects are different from the ones traditionally associated with substance, since the latter was meant to be primary, natural, real and indestructible. The objects in an object-oriented ontology do not necessarily need to possess those attributes, but they do have to be autonomous in two respects: on the one hand, they cannot be exhausted in the parts that make them up; and, on the other hand, they have to transcend the relationships that they establish.

In that sense, Levi Bryant summarizes the object-oriented ontology in four fundamental theses.[15]

First, object-oriented ontology is an ontology that does not privilege any entity as the origin of the others. In keeping with some of the postulates laid out by B. Latour (and unlike other substantialist schools of thought), all objects exist on the same horizontal ontological plane, without being structured via a hierarchical scale. Ian Bogots described it concisely by stating that, "*all objects equally exist, yet they do not exist equally.*"[16] As a result, object-oriented ontology establishes what we might call, using Bryant's terms, a heteroverse or pluriverse, where entities of all scale levels, whether they are natural or cultural, physical or artificial, material or semiotic, exist on the same footing of ontological equality. This point stands out as a fundamental difference with respect to other ontologies, where there is a marked centrality occupied by God, the Soul, Language, Consciousness, etc.

Second, there is no super-object or world – i.e., there is no object that collects the rest into a single, simple unit. Markus Gabriel writes that the existence of an element signifies its appearance in a domain of meaning[17]. If the world, understood as a whole, existed it would have to exist in a realm of meaning that would extend beyond it, such that it would no longer be a whole. Instead, there are collectives and, following Latour, these collectives are formed by human agents and inhuman agents.

Third, there is no subject in contrast to which objects are positioned. On the contrary, the subject is simply another object. As such, there are only object-object relationships. Moreover, not all relationships are mediated by human beings, nor are the relationships in which human beings participate ontologically different from the rest. As a result, the human being loses the ontologically privileged position it had enjoyed since the Renaissance.

Fourth, "*Existence, being, is a binary, such that something is or is not.*"[18] Although some elements may disrupt particular collectives with more or less intensity, that does not mean that their ontological existence is greater. Existence does not have degrees. In that sense, all objects exist with the same degree of reality.

By reducing the subject to just another object, object-oriented ontology implies a radical change with respect to earlier ontological paradigms based on an absolute subject or a relational subject. The emergence of this "Zero Subject" is articulated through three fundamental concepts: collections, ex-centricities and interlacements. Not only are they part of a specific ontological approach rooted in speculative realism, they also include a particular socio-cultural attitude that has been voiced in recent years by thinkers such as Rosi Braidotti, Timothy Morton and Cary Wolfe. In all of their work, there is also a profound re-examination and dismantling of humanism, understanding that it was also present, paradoxically (as we pointed out earlier), in late 20th-century anti-humanist thought.

3.2.2 Collections, ex-centricities, interlacements

Whereas Modernity situated the human being at the center of its thought, and late 20th-century structuralisms and post-structuralisms replaced the human being with the concept of relationships, object-oriented ontology focuses on the idea of col-

11. Graham Harman, *The Quadruple Object*, 116

12. Ibid, 7-19.

13. Ibid, 8.

14. Ibid, 12.

15. Levi Bryant, *The Democracy of Objects*, (Michigan: Open Humanities Press 2011), 245-290.
http://www.openhumanitiespress.org/books/titles/the-democracy-of-objects/

16. Ian Bogots, "Materialisms: The Stuff of Things Is Many", *Blog* (blog), February 21, 2010, http://www.bogost.com/blog/materialisms.shtml

17. Markus Gabriel, *Por qué el mundo no existe*, trans. Juanmari Madariaga, (Barcelona: Pasado y Presente, 2015), 74.

18. Levi Bryant, *The Democracy of Objects*, 285.

lections. Collections should be understood as groupings with a series of very particular attributes: they are fleeting, heterogeneous and horizontal. As we said earlier, in this context objects must be understood as unified and autonomous realities that form groups of collections and subcollections. This is a far cry from the continuous and holistic fields of Deleuze's ontologies. Instead we find collections[19] of discrete elements: i.e., poly-pluralities capable of forming different groups that are not exhausted, however, in the relationships that exist among them. As such, there is no world understood as a unified and unifying super-object; there are only sets and subsets of objects, also called collections.

The concept of a collection should be understood here in opposition to the idea of a "totality". Following T. Morton, we must set aside the traditional understanding of nature according to which it forms a unified whole. Nature understood as a "whole" is a human construct that is no more than 12,000 years old. And it is a construct in two senses. First, it is a terminological construct: in other words, it is a contingent cultural invention, with which we associate all kinds of attributes through mere convention. Second, it is also an artificial construct in its very materiality, since from the first agricultural revolution to the latest consequences of the anthropocene, nature is also the result of human activity; it is not a supposedly original substrate against which culture can be contrasted as a mere emergence.

On the contrary, T. Morton's denatured ecology avoids any holistic reference, tending more toward Latour's approach to "collections" from Pandora's Hope: "*Unlike society, which is an artifact imposed by the modernist settlement, [the concept of collectives] refers to associations of humans and nonhumans. While a division between nature and society renders invisible the political process by which the cosmos is collected in one livable whole, the word 'collective' makes this process central.*"[20]

Latour treats nature and society as two entities whose constituent elements are constantly associated. In consequence, reality is not a holistic whole determined by a series of underlying flows. On the contrary, it consists of elements and collections: in other words, groups made up of different kinds of objects. There is no outside; i.e., there is no whole. There are only collections of objects that eventually enter into relationships with one another, forming fleeting, unique and cross-sectional interlacements. Our era is an exceptional testimony to these heterogeneous viscosities: "*Genetically recombined plants, animals and vegetables proliferate alongside computer and other viruses, while unmanned flying and ground armed vehicles confront us with new ways of dying.*"[21]

As we have seen, the object-oriented ontology (OOO) also effects a radical decentralization of the subject, to the point of making it just one more object, thus eliminating its ontological singularity. That means that there is no element left that can act as a point of reference. Particular attention should be paid to the fact that human beings are understood as just another object. Although they may have certain peculiarities, those qualities are incapable of making humans into a privileged being, as was the case in Modernity and in most relational philosophies. Indeed, as we have already seen, the human being occupied an openly central position in the Modernity; and the second half of the XX century, humanity occupied a relative position, but relative in any case to a system (language, consciousness, power, etc.) that was still human. In that sense, Foucault's anti-humanism was still a humanism, because despite declaring the "death of man", he still maintained a human construct at the center of his thought: power.

This opposition between humanism and antihumanism, which ultimately maintained the centrality of the human being, has recently been overcome by what has been defined by various intellectuals[22] as posthumanism. Rosa Braidotti has described the emergence of three tendencies in which man loses a central position that he must now share with other non-human beings:[23] they are the processes of becoming-animal, becoming-earth, and becoming-machine.

First off, one of the consequences of a radical decentralization of the human being is the destruction of the traditional hierarchy among animal species. Not only is man an animal, he is an animal just like any other; in other words, he does not have any sovereignty over other animals. On the contrary, the use of animals as though they were a zoo-proletariat is increasingly being questioned, while their rights are steadily expanding. Haraway aligns herself with this post-anthropocentric in her comment on the Vitruvian Cat illustration, wondering whether animals like cats or dogs could be the measure of some things. What Braidotti calls a zoe-egalitarianism is established between humans and animals, in which the opposition between the two disappears and the ties that connect them come to the forefront. The increasingly less hierarchical occupation of the planet, the territory, domestic spaces, and the environment has made speciesism a less valid option.

Yet, this animal approach to other beings of a different nature is not just in their ties with humans; there are also complex cultural and technological agents involved. Animals like dogs or cats are considered specifically not only because of our emotional connection with them, but because they are organically hybrid; i.e. they are natural-cultural compounds developed for human beings but also by human beings. It is in that sense that Haraway explains cases like that of Dolly the sheep or the oncoMouse,[24] as examples of animals whose nature has become intertwined with technological tools and human desires. According to the Usonian author, our relationship with the OncoMouse might be called kinship, since it represents a kind of human-animal continuum that was not born but manufactured.

Second, the decadence of anthropocentrism as highlighted by Braidotti also tends toward to a human-planet continuum, which introduces a concept of nature that is radically different

19. A collection is not the same as a collective: in a collective, the objects share some aspects in common that unite them, whereas a collection does not necessarily respond to a particular common focus; it can be a flat series of objects.

20. Bruno Latour, *Pandora's Hope: Essays on the Reality of Science Studies*, 304.

21. Rosi Braidotti, *Lo Posthumano*, trans. Juan Carlos Gentile Vitale, (Barcelona: Gedisa, 2015), 187.

22. Rosi Braidotti, Pramod K. Nayar, and Cary Wolfe are some of the clearest examples.

23. Braidotti, 66

24. One of the most emblematic examples of this continuum between humans and animals is the OncoMouse, also known as the Harvard mouse. The OncoMouse has been genetically modified to increase its chances of getting cancer, so that it is more suitable for cancer research.

from the one we have operated with up to now. In the West, nature has traditionally been understood as a "mother nature": a harmonious, balanced, kind-hearted, beautiful, total and perfect nature, disturbed only by human beings and their technical artefacts. In the words of Žižek,[25] this approach is none other than a secularization of the garden of Eden, in which nature has preserved a certain divinity that, beginning at the end of the 20th century, has been embodied ideologically in the concepts of Ecology and Sustainability. In that sense, both expressions are the new opium of the people: They are presented as an unquestionable authority, they include notions of punishment and sin at their core, they define moral values, obstruct alternatives and, above all, they often emerge as a notably reactionary force.

In any case, we are no longer dealing with the mother nature we described above, but with a "techno-nature" that, in addition to being operative, is also manipulable, imperfect, catastrophic and holistic. There is a shift from a green ecology to what in certain circles is known as a dark ecology, where the meaning of the word "ecology" is expanded to include technological agents, animal agents and human agents[26]. Indeed, the activity of human agents also has serious natural consequences: beyond global warming and rising sea levels, human beings can unleash serious natural disasters much faster and without realizing it. It is in that sense that Timothy Morton highlights the notion of anthropocentrism, describing a "dark ecology" that produces "hyper-objects" like global warming, which are the product of intervention on the part of human, technological and natural agents. In this way, the opposition disappears between pairings such as land and industrialization, nature and culture or environment and society.

Third, in recent years the relationship between humanity and technology has reached a degree of extreme intimacy, resulting in a true human-machine continuum. Rosi Bradiotti gives an account of this when she writes that "*the posthuman predicament is such as to force a displacement of the lines of demarcation between structural differences, or ontological categories, for instance between the organic and the inorganic, the born and the manufactured, flesh and metal, electronic circuits and organic nervous systems.*"[27]

In that sense, one of the main characteristics of contemporary technology, which differentiates it to some extent from the pistons and gears of preceding industrial revolutions, is that today's technology has become a neural agent, distributed and corporeal. It is no longer a mere object at the service of a subject; it is an object embedded in another object, with which it maintains a very close interlacement on an equal-to-equal status. One good example of this are the latest advances in biotechnology: the cloning of Dolly the sheep in 1996, the complete sequencing of the human genome in 2006, and the creation of artificial DNA in 2016 have represented decisive progress, in 10-year intervals, in the understanding and above all in the manipulation of phenomena that were once considered exclusively natural.

However, the idea of "machinic vitality" characteristic of this type of processes and the latest advances in artificial intelligence, cannot be reduced to a mere teleological processes of optimization. On the contrary, "machinic vitality" is based precisely on its capacity for becoming, which Deleuze and Guattari highlighted through their concept of the "becoming machine" or the "desiring machine". This playful and hedonistic understanding of the machinic has little in common with the functionalism traditionally associated with this class of mechanisms. This was clear in their text about a "body without organs" in proposing the use of a body without organizational efficiency. Humanity and technology merge in a radical relationship that generates multiple others. Braidotti defines it as "*a new transversal compound, a new kind of eco-sophical unity, not unlike the symbiotic relationship between the animal and its planetary habitat.*"[28] A deep relationship is thus established between organic matter and machinic artifacts, making machines into agents with their own temporality and with the capacity to evolve over the course of generations.

The decentralizing effort begins with the recognition of animals, the planet and technology as autonomous agents, which implies the assumption that humans being are no longer in a central position with a series of objects orbiting around them. On the contrary, the human being becomes "*a moveable assemblage within a common life-space that the subject never masters nor possesses but merely inhabits, crosses, always in a community, a pack, a group or a cluster.*"[29] As Levi Bryant points out,[30] the most relevant aspect of this exercise in decentralization is that the human being is no longer understood as a subject to which a series of objects are opposed. Instead, it is just one more agent within a heterogeneous community. This isn't a Copernican revolution, because the focus is not on who is in the center; rather, it is the very notion of center that vanishes.

Beyond organizing themselves in collections and taking up ex-centric positions, objects also establish intense relationships of interlacement with one another. The fact that objects cannot be reduced to their relationships does not mean that those relationships do not take place. On the contrary, they exist and they are relevant. However, they operate in a different way compared to the ontological approaches we studied in the first chapter (sections 2.2.2 and 2.2.4). In modernity, there was a relationship of domination between subject and objects: the human being, driven by his condition as a subject, imposed his will on objects that were situated hierarchically beneath him. In relational philosophies, the relationships between objects were mediated by a holistic system that conditioned the whole. The relationships were not based on domination, but on mediation exerted by the underlying system. However, object-oriented philosophy offers a different approach to the question of relationships between objects. As opposed to understanding them as elements that are isolated from their surroundings, they are

25. "Examined Life: Philosophy is in the Streets" by Slavoj Zizek, YouTube video, 5:15, posted by "TOP Documentary, May 6, 2015, https://www.youtube.com/watch?v=j_K_79O21hk.

26. Timothy Morton, Dark Ecology, (New York: Columbia University Press, 2014), 42.

27. Braidotti, 89.

28. Braidotti, 92.

29. Ibid., 193.

30. Levi Bryant, *The Democracy of Objects*, (Michigan: Open Humanities Press 2011), 20. http://www.openhumanitiespress.org/books/titles/the-democracy-of-objects/

presented as elements capable of being disturbed and of disturbing other objects depending on their particular internal constitution. These disturbances appear as temporary and variable interlacements which, despite their intensity, do not eliminate an object's autonomy, since objects always contain something intangible that shapes their identity. As we have seen, although contemporary thinkers have emphasized objects and collections above flows and fields, that does not mean that the objects in question are incapable of establishing relationships. It simply means that objects cannot be reduced to their relationships. Although the continuums noted by Braidotti are formed by elements of different natures, there are deep interlacements between them. However, in contrast to the holism we discussed earlier, these entanglements are limited, temporary and countable, as well as contingent and specific. In fact, they should be understood as "viscosities" that are not intended to create an underlying and "total" field of relations. Instead they form a series of deep but temporary bonds. As Braidotti asserts, this phenomenon is very fitting in the 21st century, because the human being *"is shot through with relational linkages of the contaminating/viral kind which inter-connect it to a variety of others, starting from the environmental or eco-others to include the technological apparatus."*[31] Contrary to what might be expected, in order for there to be true interlacements, there have to be collections: in other words, there have to be distinct elements. Strictly speaking, there can be no interlacements in a single holistic field, because there is only a single underlying continuum.

In short: Where modernity focused on the human being and (post) structuralisms focused on human systems, object-oriented ontology emphasizes the notion of collections. Where modernity situated human beings at the center of its reflections and (post) structuralisms understood the system as a holistic entity, object-oriented ontology not only decentralizes the position of the human being, but by eliminating the notion of subject, it also prevents any entity (human or otherwise) from achieving that centrality. Where modernity celebrated relationships of domination, and (post) structuralisms did the same with relationships of mediation, object-oriented ontology proposes interlacements: i.e., temporary, specific and profound disruptions, always conditioned by the internal structure of the objects involved, but without compromising their autonomy at any point.

Collections, ex-centricities and interlacements seem to compose a new terminological pool to address reality ontologically. However, these concepts are not exclusive to philosophical currents of the XXI century. Similarly to previous paradigms, they are part of a zeitgeist that reaches far beyond particular ontological theses. Many of the conceptions of the human being, society, ecology or technology characteristic of this century share the same referents, without there being a cause-effect relationship that privileges any one discipline over another. On the contrary, these terms have been in the air in intellectual circles during this first quarter century. As such, they are more like dissipative transdisciplinary references than closed-off instructions.

Contemporary thought thus aligns with a conceptual repertoire that seems to be at the core of many of today's ontological, sociological and anthropological phenomena. Collectives, decentralizations and interlacements form a conceptual framework that is differentiated qualitatively from the two formulations we looked at previously. It gives rise to a different approach to reality, which is no longer based on modern positivism or late 20th-century perspectivism but on a very particular awareness: ecognosis.

3.2.3 Ecognosis: the end of anthropocentrism

As we have seen, Modernity was a movement focused on a human figure whose being occupied an axial and dominant position. Faith in science and technical progress led to the establishment of a firm positivism as the main mode of access to reality. After the Second World War, and especially at the end of the 20th century, human systems replaced the human being as the focus of debate. Humanity was still central indirectly, however, through language, power or the unconscious. In that context, relationships took on a fundamental role, and exercises in domination were replaced by operations of mediation. Unlike the absolute subject characteristic of Modernity, a relational subject emerged during that time, whose main attribute consisted of being "relative to": i.e., dependent on an external parameter which, to a certain extent, acts as a center. As a result, the approach to reality became an approach "in perspective": an approach that is aware it does not possess the value of a single absolute truth, but one that is shared with other approaches.

In both positivism and perspectivism we are dealing with a humanistic epistemology – whether directly, in the first case, or indirectly in the second. Yet, as we have seen, in recent years collections have been emerged, along with ex-centricities and interlacements, as the most significant elements in contemporary thought. On the one hand, they demand the disappearance of the figure of the subject, eliminating its ontological singularity, making it just one more object in a set of objects. On the other hand, relationships are no longer understood as underlying networks to be seen as temporary viscosities whose depth never overshadows the objects' autonomy. In this context, reality is no longer a series of events that a subject can access "from the outside" through a perspective or a positive method. On the contrary, the human being is part of an ecology of objects, whose epistemology T. Morton refers to using the term ecognosis:

> *"Ecognosis is like knowing, but more like letting be known. It is something like coexisting. It is like becoming accustomed to something strange, yet it is also becoming accustomed to strangeness that doesn't become less strange through acclimation. Ecognosis is like a knowing that knows itself. Knowing in a loop, a weird knowing."*[32]

Indeed, knowing is no longer the act performed by a subject to grasp an object; it is the act of an object approaching itself and the other objects with which it shares a space-time. It is a reflexive knowledge, beginning from an object and targeting that same object and those around it. It is a process of assimilation, in which the human being becomes aware that reality is made up not only by all kinds of non-human objects, but also by

31. Braidotti, 193.

32. Morton, *Dark Ecology*, 5

all kinds of non-human scales of time and space. This sensation of "scalar disorientation"" is the same thing that happens when we become aware of spatial phenomena like the magnitude of an atom or a galaxy, or time-related phenomena like the speed of light or the age of the universe. In that sense, ecognosis is an epistemological approach to the world that does not begin from the total exteriority of the knowing subject. Instead, it follows a framework like that of nesting dolls – where one object is aware of being part of a second larger object, while at the same time containing a third smaller object within it. Ecognosis emerges, thus, as the mode of knowledge characteristic of a post-anthropocentric human being, whose past humanism has given way to a set of "subjectless objects" without ontological privileges. In that sense, the concepts of collective, decentralization and interlacement point to a radically "subjectless" thought which, in the words of T. Morton, has managed to do what *"two and a half decades of postmodernism failed to do, remove humans from the center of their conceptual world."*[33]

As we asserted at the beginning of this chapter (section 3.1.2), this new ontological and socio-cultural approach to the subject is aligned with other intellectual developments in fields as diverse as sculpture, painting, music, technology and architecture. In the following pages we will study the complicities that appear between the thought based on collections, ex-centricities and interlacements, as described in this chapter (section 3.2.2), and the emergence of a particular current in experimental architecture that is just beginning to develop (sections 3.3.2 and 3.3.3).

3.3 From fields to objects: discrete experimental architecture

The zeitgeist that has begun to cement in the first quarter of the 21st century has implied a significant conceptual and terminological shift with respect to that of the previous century. Attributes that were characteristic of the continuum, such as the field, holism, relation, gradation or topology, have been replaced by terms that are more suited to a thought based on collections, ex-centricities and interlacements like what we have just described. As such, concepts such as separation, hole, interstice, nesting, incrustation and edge emerge as new conceptual tools for approaching reality. This new intellectual context began to cast doubt on the exaltation of continuity in topological architecture, as we discussed in the first chapter (section 2.4.3), articulating a series of critiques based on the dissolution of architecture in its formal or performative context.

3.3.1 The topological vanishing of architecture

As we saw in the first chapter (section 2.4.1), there was a marked period of formal experimentation in the 1980s and 1990s, driven largely by the advent of digital tools. It was a period that, according Tom Wiscombe, *"was driven not only by the availability of new tools from the entertainment industry, but a strong resonance of the philosophy of Gilles Deleuze and its focus on multiplicities, intensive forces, and becoming."*[34] Some of the most advanced architecture engaged in an operational dialogue with those resources. It took place through hybrid and relational forms, fostered by evolving processes and high degrees of variability. The results, as we have seen in the previous chapter (section 2.4.3), emphasized the smoothness of the topologies.

However, according to Wiscombe,[35] one of the most relevant concepts in Deleuze's philosophy was often left out: the disjunctive synthesis, also known as assemblage, was eclipsed by a deep desire for super-unification.

This super-unification took a different direction beginning in the 2000s. Whereas in the 1990s architecture relied on conformative systems to model forms and superimpose programs, in the early 20th century the spread of the internet led to a different type of strategy for materializing this desire for super-unification. The new strategies were based on processes of connecting networks and propagating environments in order to produce distributive systems, marking a shift from mass-customization strategies to mass-collaboration strategies. In this new paradigm, the most important thing about buildings is not their formal continuity, but their operative continuity – i.e., their ability to "connect" with an underlying information flow, thus linking them to other buildings, on the one hand, and to their surroundings, on the other. Designs like the MediaTIC building, the Water Pavilion or the Water Box are clear examples of this tendency. Wiscombe delves further in this shift when he explains that *"architecture, rather than simply a result of abstract outside forces or contexts, became connected to the inner life of humans, essentially completing a giant super-unity of communication between all things in the world."*[36]

In both cases there is a desire to understand architecture as a phenomenon that emerges from a processual, dynamic, unique and invisible reality. In that context, architecture would consist, on the one hand, in "revealing" that reality and, on the other, in setting itself up as a "node" in the informational system in which it operates. David Ruy defines this disciplinary conception as an "architecture of coordination".[37] As opposed to reveling in its own singularity, that kind of architecture aims for the opposite: establishing a maximum of formal and informational complicities with its environment in order to blur the boundaries that separate the two realities.

However, understanding architecture according to these parameters is problematic for two reasons, which can be summarized as follows:

-Operative reductionism: A reduction of architecture's role to a mere responsive mechanics deployed in response to external informational requirements.

-Formal dissolution: A disappearance of architecture behind a topology that absorbs it.

First, fundamentally reactive architecture runs the risk of becoming a mere series of mechanical responses. Architecture's ability to respond to certain flows of contextual information is an attribute that is highly valued by several contemporary schools

33. Morton, *Hyperobjects*, (Minneapolis: University of Minnesota Press, 2013), 181.

34. Tom Wiscombe, *New Models of Coherency*, (I.Kahn Studio Book Introduction), 2014, 2

35. Ibid.

36. Ibid., 3.

37. David Ruy, "Returning to (Strange) Objects", *Tarp Architecture Manual*, Spring 2012, 38.

of architecture. This strategy is framed by a cultural logic that Harman describes precisely when he writes that: "*Every event in the contemporary world seems to sing the praises of interconnectivity; globalization, convergence, super-powerful communications media and the new cosmopolitanism, along with the nested feedback loops of climate change.*"[38] In some architectural circles, especially the ones that are more prone to adopting the latest technological advances, there is a prevailing narrative according to which architecture is legitimized based on its participation in larger networks. In that sense, it seems reasonable that architecture should consider and respond to climatic, social and energy requirements. It also seems understandable that architecture should use the most advanced technological means to achieve those goals in the best possible way. However, these considerations are not sufficient to justify the resulting architectural production. In many cases, a desire for optimization has ended up turning the practice of architecture into a process whose evaluation is determined first and foremost by its performative capacity. Mark Foster Gage illustrates this reflection in discussing the phenomenon of LEED certifications[39]. A LEED certificate details a building's degree of sustainability: having such a certificate implies recognition of the building's excellence in terms of its environmental impact. When a work of architecture is evaluated fundamentally based on this parameter, it sets aside "the architectural qualities of the building as an object" placing emphasis instead on an extra-disciplinary issue – in this case, questions of sustainability. Architecture thus becomes a product that can be comprehended immediately, since the status of its certification is all you need in order to assess it. In that vein, and to a certain extent, the general public is more willing to value architecture for its ecological function than for its value as a work of architecture. To begin with, it is much simpler – all what is needed is to check its certification. No further explanations are required. On the other hand, it also seems more reasonable: What could be more appropriate than concern about a building's ecological and social behavior?

Nevertheless, "*that architecture and discrete buildings are connected to the larger world is not in dispute, but whether buildings can be legitimized as architecture by these relations should be.*"[40] If architecture becomes but a series of reactions that are activated in response to its socio-ecological context, it loses all its subversive, critical and emancipatory potential. In other words, it loses its status as a cultural contribution to become a technical gadget. The mechanical execution of a series of external informational precepts dilutes the disciplinary relevance of architecture, making it into a mere contextual result: architecture becomes the logical consequence of the sun's movement, of the wind's trajectory, the paths of driverless cars or the biological needs of algae. An effectively relational, interactive and sensorized architecture, belonging to a gigantic multi-nodal network and capable of optimizing any kind of process. A sustainable, accessible, flexible and performative architecture, but one that nonetheless lacks the necessary autonomy to have a voice of its own – as opposed to being a mere correlate – in the contemporary cultural landscape.

Architecture's incorporation into an informational network where it becomes merely the consequence of that network's processes is not the only problematic aspect of an architecture "of continuity". Although the previous case involved an "informational" continuity, in other cases the continuity is strictly "formal". The desire to "integrate" and even "meld" architecture with the surrounding landscape comes from a certain attraction to a chameleonic character, but also amorphousness and indefinition. In many cases, this tendency has resulted in the dissolution of the architecture into its environment; in recent years this has been referred to as the landscape-building. This typology "*assumes little distinction in between the architecture and the rest of the world, often appearing in lump or hill-like formation.*"[41] In this case, the building has a complete relationship with the terrain around it. The aim is not to highlight the distinction between building and terrain, as might have been typical in other periods, but rather to create an absolute communion.

Andrea Palladio's Villa Rotonda is a good example of the former situation. Far from blending together land and building, the Italian architect designed a potent base to clearly separate the two. This tactic also allows lets him emphasize the singularity of his work, understood as an object that floats above the landscape of the Veneto, as opposed to an element emerging from it. The Farnsworth house by Mies van der Rohe or La Ville Savoye by Le Corbusier go even further by nearly entirely separating the building from the land. In both cases, although with nuances, a forest of pilotis lifts the main body of the building, letting the land slip underneath. Something similar happens in other residential buildings by the Swiss architect such as the Unité de Marseille, where the main volume is raised to let the land slide by uninterrupted.

However, buildings like FOA's Yokohama Terminal, the City of Culture by Peter Eisenman or Diller Scofidio's Water Pavilion do just the opposite. As opposed to standing out against their surroundings, these projects seem to want to go unnoticed by dissolving into their environment. The dissolution takes place by way of two main strategies. First, the formal (and often tectonic) development is extremely similar to the immediate landscape, avoiding any abrupt interruptions. Second, the "edges" that separate the building from its surroundings are blurred to emphasize the continuity between the two realities.

In any case, how the architecture imitates its surroundings can be read as the architecture dissolving. The desire to integrate the architectural object into the surrounding landscape reduces its impact on our perception. As a result, the work of architecture is no longer a "clear and distinct" element, instead becoming an "open and diffuse" emergence. The need for evolution, adaptation and flexibility entails a lesser degree of architectural definition, prioritizing dissipative architectural processes over unique architectural results.

3.3.2 New ancients, neo-naturalism, objectualism

In all these cases, whether it is through informational complicities or formal affinities, there seems to be an underlying understanding of the world based on a single network system. This interpretation is entirely aligned with concepts characteristic of the late 20th-century zeitgeist. However, as we have already seen, it touches on several problems both in conceptual and disciplinary terms.

38. Graham Harman, *Bells and Whitles*, (Winchester: Zero Books, 2010), 123.

39. Mark Foster Gage, "Killing Simplicity: Object Oriented Architecture", *Log*, no. 33 (2015), 99.

40. Ibid, 99.

41. Tom Wiscombe, "Discreteness, or Towards a Flat Ontology of Architecture", *Project: A Journal for Architecture*, no. 3 (2014), 41.

An awareness of these problems and the replacement of the concepts "system", "holism" and "mediation" with "collection", "ex-centricity" and "interlacement" have contributed, together with a wide variety of disciplinary contributions, to the emergence of a new zeitgeist. Architecture has also actively participated in the conformation of this conceptual shift through a series of contributions that suggest a change in its formal and methodological understanding. That change is not a mere mannerism; it centers a renewed understanding of the parts and the whole. This mereological contribution can be summed up in two fundamental points:

In the first place, there is no "whole". As Todd Gannon[42] points out, there is a growing interest in understanding "how part-to-part relations can produce a kind of weird coherence that doesn't depend on values of unity and balance from classical composition." The lack of "totality" does not necessarily imply a lack of coherence. The relationships between parts can be independent of a supposed whole, while still producing a result that, although strange, is consistent.

Second, these relationships between the parts are "strange". On the one hand, the parts are not independent worlds and therefore relationships take place. On the other hand, these relationships do not allow total access between parts, nor do they permit some parts to become others. In other words, relationships between parts take place, but each part remains "discrete". Like in Sylvia Lavin's idea of "kissing architecture": when two parts come into contact, a number of qualities can transfer from one part to the other, but the independence of the parts is not compromised.

Mike Kelley's installation Deodorized Central Mass with Satellites (Fig 3-1) is an initial formal approach to both these points. From the spherical compression of hundreds of stuffed animals, Kelley "*produces a lumpy but distinguishable overall silhouette while retaining their individual features within the mass.*"[43] The work casts doubt on what is a part and what is the whole: The stuffed animals do not lose their individuality by forming spheres, nor do the spheres lose their individuality in shaping the constellation. Unlike his other pieces, such as Zen Garden, Deodorized Central Mass with Satellites supports a reading based on the three fundamental concepts we have just mentioned. First, Kelley presents, above all, a collection of individual objects, and not a field of attractors like in Zen Garden, another of his pieces. Second, he leaves behind the classical ideas of "center" and "axis", yet he does not articulate his work based on the continuity characteristic of a holistic system: what we find are ex-centricities. Third, this collection of objects is not a collection of monads; rather they are compressed with one another, creating contingent but profound interlacements.

Kelley's work in the 1990s is a return to discrete objects avant la lettre. However, the idea is not to bring them back in the context of a totality, as they were understood in the classical world or the modern world. On the contrary, the aim is to investigate the limits of a part – for example, where it begins and where it ends – and, above all, to understand how parts can relate to on another once they are freed from a supposed "whole".

The collections, ex-centricities and interlacements we observed in the ontological, sociological and artistic approaches also have their derivative in the technological sphere. As Mario Carpo suggests, in recent years we have shifted from an arborescent structure, intended to manage data, to a flat structure – i.e., a aggregate of data in strictly quantitative terms.[44] The reason for this paradigm shift has to do with the exponential growth in the performance of processors: they can handle increasingly large calculations, to the extent that, today, "computers search, don't sort". The classification tables and arboreal structures so common in work by Petrus Ramus or Ramon Llull made sense for use by the human mind, whose power of processing data is limited. With differentiations of qualitative data, we can access the required information faster. One example of this is the dictionary: we don't have to remember the order in which all of the words appear, just the order of the alphabet. Computers don't work that way: to search for a single word in a body of text, processors scan the entire corpus for the right sequence until they find it. Even the whole as such is irrelevant to finding the required part. The hierarchy of this structure is also irrelevant: computers search, they don't sort. That is the strategy of the Gmail system: we don't need to sort emails, because the data processors can search for the faster than we can sort them. The logic is valid for all kinds of applications: the books in a library, Amazon's entire inventory, a grocery list, etc. These hierarchy-free data series are based on a conception similar to the flat ontology characteristic of the object-oriented ontology. In both cases, the hierarchy of arboreal structures, in which the central trunk enjoyed a qualitative privilege, has been eliminated. In that sense, the slogan "search don't sort" is based on the same principle that underlies some of the main postulates of the flat ontology: any element is qualitatively equivalent to any other; they only differ in quantitative terms.

In the second decade of the 21st century, the relevance of the concepts of collections, ex-centricities and interlacements, evident in the areas we have analyzed up to now, extended into a series of architectural productions that were aligned with these investigations. Yet it would be too hard to classify as a consolidated architectural trend: on the one hand, a common agenda has not been developed in depth and, on the other, a large volume of designs and built work does not yet exist. In addition, as Tom Wiscombe points out, "*because OOO makes no specific or obvious overture toward architecture, multiple niches and generations in contemporary architectural discourse, some with opposing agendas, seem to have affinities for it.*"[45] Ruy identifies some of the most notable currents in this turn, highlighting three main branches.

42. Tom Wiscombe in conversation with Todd Gannon, Graham Harman and David Ruy, "The Object Turn: A Conversation", *Log*, no. 33 (2015), 84.

43. Ibid., 84

44. Mario Carpo, *The Second Digital Turn*, (Massachussets: MIT Press, 2011), 29.

45. Tom Wiscombe in conversation with Todd Gannon, Graham Harman and David Ruy, "The Object Turn: A Conversation", *Log*, no. 33 (2015), 79.

First, Wiscombe refers to the "new ancients", represented by contemporary figures such as Sarah Whiting, James Payne, Sarah Blankenbaker and Andrew Atwood. This group stands out for its suspicions regarding the veracity of perception, which leads them to revisit conceptual design through the medium of drawing. There is a contrast between sensual objects and real objects – a theme that has been studied in depth since Graham Harman's quadruple theory, which we will analyze later on.

Second, there are the neo-naturalists, represented by architects like Marcos Cruz, Nery Oxman, Phillip Beesley, M. Joachim, Claudia Pasquero and Marco Poletto. Their work is part of the long disciplinary tradition that thematizes the relationship between nature and architecture. This group takes up an understanding of nature that is characteristic of the 21st century – a man-made nature. The relationship between man and nature is no longer a relationship of alterity but of continuity. Nature is thus incorporated into architecture through its operative capacity, leaving its traditional value in terms of contemplation in a secondary position. In line with this theoretical approach, the work of the aforementioned architects consists in establishing a profound interlacement between technology and biology, which results in hybrid bio-synthetic artifacts.

Third, Wiscombe points to a group of formalist architects generally with ties to Sci-Arc and trained by professionals like Tom Wiscombe himself, Peter Trummer, David Ruy and Mark Foster Cage. This group produces architecture through discrete and non-totalized entities, leaving behind the language of "emergences" typical of the 1990s. Number 33 of Log magazine dedicates a monograph to the relationship established between OOO and this group of architects, also with the participation of thinkers like Graham Harman.

Finally, we might add another group of emerging architects to the list, a by-product of the previous group. The Eco Meta Discrete Parts Symposium organized in 2016 by D. Kohler, brought together a series of projects that – despite sharing a certain formalist interest with the works of Wiscombe or Trummer – had their own agenda. Figures like Gilles Retsin, Casey Rehm, Rasa Navasaityte, José Sánchez, Harald Trapp, and Daniel Kohler himself participated in the event, aimed at highlighting the commonalities in their work.

Of the three main positions described by David Ruy, the third has particular relevance for the purposes of this dissertation, due to the formal nature of its approaches. In the first case, the notion of "history" is dominant. Its sudden appearance in the work of this group of architects, curators and theorists characterizes their academic approach. In the second case, the concept of "nature" is fundamental, although always according to the "performative" interpretation used in the world of contemporary culture. In the third case, however, we discover a series of concerns that are eminently formal. That makes it interesting in the context of this dissertation, because, in our case, the problem of the floor is approached as a strictly spatial problem (formal and performative), not as a "historical" problem or a "natural" problem.

In spite of the internal differences seen in the different components of the group, a series of shared disciplinary vectors can be found that indicate a shift in direction when compared to the paradigm that took hold in the 1990s. These shared vectors are based on the three concepts we have defined as fundamental for understanding the lack of a subject, characteristic of the contemporary cultural panorama. In each of these cases there is a particular formal emphasis on the notions of collection, ex-centricity and interlacement. These notions are aligned, "*after a long period of focus on fluidity and connectivity, [with] a new formal lexicon in order. Chunks, joints, gaps, parts, interstices, contour, near-figure, misalignment, patchiness, low-res, nesting, embedding, interiority, and above all, mystery.*"[46]

In that sense, the work that Peter Trummer has been developing over the last five years is a fitting example. Tom Wiscombe defines Trummer's aggregated cities as an exercise in "*reconsideration of the extruded city as a spherical, self-contained entity, like Spartan city-states or planets.*"[47] Trummer's aggregated cities, in the form of pile (Fig. 3-2), are the collection of a series of objects which, as opposed to being ordered on the city's 0 level, are piled in a variety of positions, orientations and heights. In this environment, the roof of one building becomes a support for another, which recalls one of Joel Shapiro's most famous pieces. The piece 20 Elements (2005) (Fig. 3-3) by the American sculptor resonates with some of Trummer's the most suggestive images, emphasizing the presence of a certain common transdisciplinary formal vocabulary.

This type of configuration does not correspond to a specific whole. Rather, as Trummer himself suggests, "*in the city as an aggregated object, every building provides the access, the construction, and the ground for the next building.*"[48] Thus, "part-to-part" relationships occur, where, first off, the unitary and harmonious whole of the classical world disappears, and second, all collections of objects are decentralized since each particular object has its own coordinate axis. Moreover, on the one hand the objects preserve their ability to be distinguished as autonomous, but on the other they maintain certain interlacements that allow for the continuous use of space.

Where Peter Trummer's work is based on the notion of the "aggregate", Wiscombe's work is characterized by participating in a return to objects drawing on three specific concepts: tattoos, supercomponents and ground-objects. With his concept of tattoos, Wiscombe breaks free from the panels of parametricism, where each panel had to lose its autonomy as an object in order to dissolve into a whole. Wiscombe's tattoos "*are not an ornament, in the sense that they do no hang off of architecture. They are also distinct from the supergraphics of Venturi, which float on the surface of architecture. Architectural tattoos are instead embedded in the building mass, without losing their elemental autonomy.*"[49] This type of operation is an apt expression of the apparent mereological schizophrenia capable of establishing relationships between parts without those parts losing their elemental autonomy. They do so by being able, simultaneously, to follow the form of the building at some times and engage in autonomous movements at others.

This independence of the parts with respect to a whole can also be seen in his supercomponent strategy. This concept recalls the matryoshka (nesting dolls), and it refers to the fact

46. Ibid., 76.

47. Ibid, 84.

48. Peter Trummer, "The City as an Object", *Log*, no. 27 (2013), 57.

49. Tom Wiscombe, "Discreteness, or Towards a Flat Ontology of Architecture", *Project: A Journal for Architecture*, no. 3 (2014), 41.

Figure 3-1: Deodorized Central Mass with Satellites, Mike Kelley, 1999

Figure 3-2: Pile City in Vienna, Peter Trummer with Elisabeth Sinnesberger, IOUD, University Innsbruck, 2015

Figure 3-3: 20 Elements, Joel Shapiro, 1999

that some objects can be placed inside other objects without it entailing a loss of their autonomy. As Wiscombe himself points out, Le Corbusier already tried this strategy in his Heidi Weber Museum, as did Bernard Tschumi, more recently, in Le Fresnoy. Wiscombe himself, however, is more ambiguous in his National Center for Contemporary Art in Moscow (2003) (Figure 3-4). The objects are not completely outside or inside another object. Rather, we see them in several different positions: attached to the inside, attached to the outside, or with one part inside and another part outside. The interstitial spaces that are generated between these objects create moments of tension that the design harnesses to emphasize certain perceptions, and which ultimately highlight the preserved autonomy of each of the objects.

His strategy in relation to the floor is particularly interesting in the context of this dissertation, and we will return to it later. However, for now we should note that Wiscombe does not treat the floor as an independent entity to mark a distance from, as Le Corbusier does in the Ville Savoye or as we see in Palladio's villas. Nor does he advocate for following in the steps of Yokohama and dissolving the floor's autonomy into a total "landscape-object". On the contrary, in designs like the Collider Activity Center, Wiscombe takes his inspiration from the "ground-effect vehicle" (Fig 3-5).[50] As a result, the floor "is treated as mass and not as surface"[51]. The floor thus takes on a certain degree of autonomy, and far from constituting a "total tabula rasa" on which the architectural object rests, the two maintain a part-part dialogue as opposed to a whole-part relationship.

For his part, Mark Foster Gage shares with the "old ancients" a particular interest in the tension between what Graham Harman defined as real objects and sensual objects. For Gage, "*architects design qualities that wrap around and allude to the existence of deeper realities lurking below the perceivable surface, instead of distilling big, singular ideas into simplistic diagrams or metaphors.*"[52] However, that underlying reality is not a network of relations that can be diagrammed, but rather that part of the objects that escapes our perception. By moving away from the capacity for total understanding characteristic of the Enlightenment, architecture would be freed from its "functional confines", making able to engage in greater degrees of cultural speculation. Gage attempts to construct these reflections in his proposal for the Guggenheim Helsinki (2014) (Fig 3-7 and Fig 3-8). The design is a combination of parts that follows a cross-shaped outline, and which does indeed have a mysterious look. The parts are not merely attached; they are interlaced, yet without losing their own identity. The design is formed by a collection of interlocking parts, which is nonetheless included within a more general idea of symmetry. This reappearance of the monumentality associated with a symmetrical schema can be found in another project by the same designer: his skyscraper for Manhattan (2016). In both projects, the idea of a totality returns, and, in that sense, the concept of decentralization does not emerge as a guiding element.

Although the production of this group of architects can be explained in general through the concepts of collection, ex-centricity and interlacement, it is also marked by the appearance of a fourth element advocated for insistently by several of the authors involved: mystery.

In fact, object-oriented ontology, as outlined by Graham Harman and Levi Bryant, accepts and to a certain extent celebrates the mysterious as the distance that mediates between the real object and the sensual object. This distance is precisely what prevents the object from dissolving into a bundle of relationships: there is always something in it that remains hidden. This fact gives rise to the strange – i.e., something we can't completely understand but which is nevertheless familiar. In all the projects we have seen, this concept has a certain importance, although Gage's work is the most extreme case. Particularly in his design for Helsinki, the attempt to produce "mystery" seems to be given greater importance than the other three concepts, and the result is certainly disturbing. Its "neo-Gothic" monumentality also contributes to this effect: it is not only enhanced by symmetry, but also by a giant scale. On a formal level, there is a return to an axial framework which enhances the extreme amount of ornamentation that shapes the building. And yet, although the design has a formal focus as opposed to a merely "historicist" or "naturalist" purpose, its affiliation with OOO seems to take place, above all, through this notion of mystery. In that sense, one of the most unique aspects of Gage's design is the very high density of ornamentation that covers its façade: its appearance is quite strange due to the excessive amount of information it brings together. Again, this question is associated with the technological change we pointed to earlier, which Mario Carpo calls "The Second Digital Turn": the computational capacity to work with non-hierarchical flat data makes it possible implement designs with an extreme resolution that are merely the "*outward and visible sign of an inward and invisible excess of data: a reminder of a technical logic we may master and unleash, but that we can neither replicate, emulate, nor even simply comprehend with our mind.*"[53] That is why its appearance seems mysterious.

In any case, Gage's design is articulated through a formal language based on pieces, incrustations, patches, discontinuities and interruptions, which definitively distances it from the fields and attractors typical of the 1990s. However, to a certain extent the latter are still present in the work of Tom Wiscombe. Proposals such as his Art Museum in Los Angeles, the National Center for Contemporary Arts or the Collider Activity Center seem to follow those topological premises, although the aim of maintaining them seems precisely to emphasize a subsequent break with them through "disruptive episodes". In other cases, like in more recent projects including the National Museum of World Writing in Korea or the Lima Art Museum, the notion of collections of intertwined and decentralized objects provides an apt description of the conglomerate that makes them up. In designs like the West Hollywood Belltower or the LG black diamond, on the other hand, there is a celebration of the isolated object, interpreted based on its individuality and not as an

50. The "ground-effect vehicle" is a kind of aerial vehicle that takes advantage of the aerodynamic interaction that occurs between its wings and a level surface.

51. Ibid.,

52. Mark Foster Gage, "Killing Simplicity: Object Oriented Architecture", *Log*, no. 33 (2015), 103.

53. Carpo, *The Second Digital Turn*, 81.

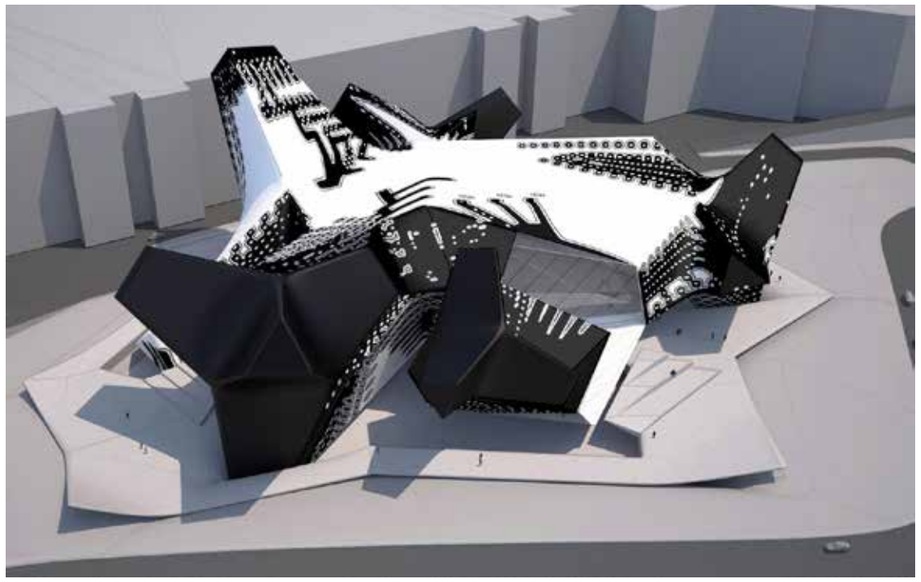


Figure 3-4: 20 National Center for Contemporary Art, Tom Wiscombe, 2003

Figure 3-5: Ground Effect, 1999

Figure 3-6: Guggenheim Helsinki, Mark Foster Gage, 2014

Figure 3-7: Guggenheim Helsinki, Mark Foster Gage, 2014

object in a collection.

The use of collections, ex-centricities and interlacements is not the same in all cases, and in some projects one of the three dominates over the others. When it comes to this group of architects, the work of Peter Trummer has the closest ties to these concepts. Although some of his piles are roughly symmetrical, their spherical shape suggests a certain autonomy and self-containment – in other words, the impossibility of (con)fusion with a totalizing context. On the other hand, the individuality of each object in the pile is preserved, despite certain interlacements that are established with the objects around it, for which it serves as a floor. This relationship between the individuality of the different buildings and the individuality of the pile as a whole suggests a relationship between non-totalizing parts. As a relationship, it is very similar to the notions of collection and interlacement that we have been discussing.

3.3.3 Eco Meta Discrete Parts

The work presented at the Eco Meta Discrete Parts symposium[54] emerges as a derivative of the previous discourse, although there are some important differences. In the first place, any appeal to mystery or to the strange as fundamental elements in the design process is relegated to a secondary role or completely avoided. Second, the role of computing is much more significant, both in relation to the design process and the result obtained. Programming algorithms becomes a common method for all those architects. They argue that the expression "digital system" should be understood in its literal sense – i.e. a system that can only take in "discrete values", as opposed to the "continuous values" characteristic of analog systems. Third, the meaning of the concepts "collective", "ex-centricity" and "interlacement" definitively leaves behind the metaphorical plane to take on an operative sense. The designs are real collections of individual objects that do not respond to any totalizing centrality; nevertheless they establish certain relations of disturbance with one another. In that sense, the title of Eco-Meta-Discrete-Parts symposium is very significant. Daniel Kohler, the organizer, offers a brief explanation:[55]

- Eco: Architectural products are not only comprehended abstractions, but in themselves comprehend a plentitude of other things. They are defined, as such, by the resonance of their parts.
- Meta: The associations between parts should be understood as parts themselves. Oscillating between the One and the Many, the Meta is the between of that which comprehends and that which is comprehended.
- Discrete: The discrete describes autonomy through the resonance of its parts. The discrete forms, behave, interact and resist.
- Parts: Starting from individuals, the city is partial: a comprehended part of its architecture. Therefore, the city becomes cities, discrete beings as parts of its architecture.

Kohler understands architectural objects as products comprehended by associations. Those products should be understood as pure purpose; furthermore, they are constituted as couplings between form and content.

This understanding of the architectural object articulated using the terms "Eco", "Meta", "Discrete" and "Part" stands as the theoretical foundation that ties together the variety of work presented at the symposium. A careful reading of the proposed definition for each of the four terms highlights the extent to which their relationships with the concepts "collection", "ex-centricity" and "interlacement" reaches beyond a mere affinity.

This insistence on the concept of "part" reveals the extent of the absence of the notion of "whole" characteristic of holistic systems. Indeed, there are only parts that resonate with one another other, that comprehend or are comprehended by other parts. In no case is there a "whole", but there are "collections": that is, individual objects that are grouped according to certain affinities. Kohler emphasized this individuality with the concept of discrete, guarantor of their autonomy. However, these autonomies are organized through an ecology, understood as the "meta" resonance that takes place between parts. These resonances generate associations that respond to the interlacements described in this dissertation: the different objects in the collection are not simple monads; they are entities with the capacity for interaction.

The practical application of this reflection is evident in the experimental work done by the emerging architects who participated in the symposium.

Gilles Retsin proposes a new production system defined as Mereological Mass Production. Whereas the modern production system was based on parts, each of a different nature (column, floor, staircase, etc.), Retsin posits the line as a multifunctional part for the production of architecture.

His exaltation of the line as a fundamental resource ties in with a certain historical interpretation of architecture. According to this reading, the premodern era was centered on mass as the main element. Work by architects like Alberti, Palladio or Ledoux exemplifies this formal assertion. The advent of Modernity saw mass replaced by the surface. This is very clear in work by Mies van der Rohe or Van Doesburg, for example. Then, with the parametricism of architects like Zaha Hadid or Ben Van Berkel, those surfaces become fluid, establishing relationships of material continuity from one to another. Finally, with the emergence of discretization, the line becomes the fundamental element. While the line had largely been left behind in architecture – in 1907 Karl Scheffer asserted that, unlike mass, the line made no sense in architecture – Retsin recovers it to work with what Levy Briant defined as "strange mereologies":[56] relationships where each part is a whole in itself, which cannot be reduced to its parts, and where each part, in turn, cannot be reduced to the whole. In architecture, according to Retsin, "*This non-strange mereological character is typical for top-down design methods, but also for continuous design in general.*"[57] In continuous design – like the case of the bricks in the "Programmed Wall" by Gramazio Kohler or the panels in the continuous surfaces designed by Hani Rashid – each element is understood as a part that sacrifices its autonomy to the "whole". In contrast, and following the title of Levy Briant's book The Democracy of Objects, Retsin refers to a democratic interaction between parts, in which each part is equal, resulting in a "homogenous population".

Design like Blokhut or Diamond Strata (Fig. 3-8) present an architecture that claims to be digital not only in its processes, but also in its formal results. Retsin, however, argues against this, citing Neil Leach's claim that "*While there is clearly a practice of designing that involves the use of digital tools, there is no product as such that might be described as 'digital.'*"[58]

The architecture Gilles produces is based on the notion of collection – specifically, a collection of lines. However, the mereological understanding of the line is not always the same. In Softkill (2012) (Fig. 3-9), the lines act as parts whose autonomy dissolves into a centralizing whole. In contrast, in the Diamond Strata and Blokhut projects, the line takes on a "democratically mereological" sense: it is no longer subordinate to a whole through continuities, fields and topologies. Instead, drawing on its "autonomous resonance", it engages other kinds of formal resources such as "crossing", "interruption", "breaking" and "obstruction". Retsin often speaks of "discrete assemblages", in the sense that these autonomous parts are not monadic; certain relationships are established between them. However, these relationships are never viscous: in other words, they never produce material interlacements. Instead, they produce positional affinities, which never compromise the autonomy of any of the parts, under any circumstances.

Setting aside the formal, aesthetic and constructive interest of Retsin's proposals, projects such as the Diamond Strata do not suggest any renewed understanding of categories such as interior-exterior, private-public, circulations, etc. Instead, we find an almost literal interpretation of Le Corbusier's Domino schema, built, in this case, on the basis of parts understood as lines, rather than parts understood as different elements (columns, floors and stairs). In that sense, part of the work by Rasa Navasaityte consists precisely in finding out how contemporary formal research can transform certain architectural categories. Through a process that shows strong similarities with Retsin's part-part relationships, Navasaityte investigates the relationships between the multiple and the one, taking Ungers' seven diagrams as a starting point. The diagrams take on the role of organizational matter, and by multiplying, deforming, scaling and shifting each of the diagrams, Navasaityte creates a series of decentralized arrangements which question the notion of architectural interiority. It is no longer defined by its opposition to a supposed architectural exteriority. Instead, following the formal model of matryoshka (nesting dolls), interiorities are produced within other interiorities – a resource that shares complicities with T. Morton's dark ecologies. As a result, there is no longer a total and absolute exteriority, but rather a collection of endo-interiorities. The discrete is no longer limited to the elements that make up the space; the space itself becomes discrete in its sequential disposition. This phenomena has been deeply studied by Peter Trummer in his work Architecture as Subdivision (Fig. 3-18), as we will see later.

In her proposal for the competition for the museum area in Jyväskylä's Ruusupuisto, Navasaityte develops a formal investigation of the concept of collection. The building's façade consists of the repetition of a single element, where the arrangement is determined through different collections. Each of these collections maintains a certain degree of freedom; this decentralizes the whole and lends it a certain arrhythmia. In addition, the collections generate successive sub-collections, and the interrelations between them contribute to stabilizing the whole in structural terms. Unlike Retsin's design, this proposal does not highlight notions like interruption or crossing; rather, it generates a succession of local micro-continuities that establish relationships of overlapping, rotation or displacement with one another.

The absence of a "super-collection" in Navasaityte's work implies abandoning the notion of a "whole". This is a characteristic shared by the combinatorial work of José Sánchez. Sánchez approaches architectural design through a profound reevaluation of modern serial repetition. As opposed to harnessing a logic of parametric differentiation, Sánchez works with combinations of elements where the differences lie not in the elements themselves, but in the patterns they can articulate in resonance with their equivalents. Whereas C. Alexander believed that design was the sum of a holistic system (whole) and a generative system (kit of parts), Sánchez eliminates the former from the equation: parts no longer need a whole to create architecture. The research Polynomio (Fig. 3-10 & Fig. 3-11) recalls some of Navasaityte's images, although in this case there are no sub-collections and the notion of interruption is more present through the changes in scale of the pieces. The fact that, in most of his designs, the combinations involve identical elements makes manufacturing easier – a characteristic shared by Retsin's chairs or Navasaityte's models. Since the units are identical or undergo only slight variations, manufacturing is simplified, cheaper and reversible. Sánchez calls these discrete configurations "granular assemblages", referring on the one hand to their conglomerate makeup and, on the other, to the part-part relationships that take place between the units.

As in the previous two projects, Sánchez's designs establish positional relationships between elements in the same collection, but there are no viscosities between them. The reason is that Sánchez, like Retsin and Navasaityte, does not create variation by differentiating elements, but by differentiating patterns. They do not modify the materiality or the form of the elements; only their position (and sometimes their scale) is altered.

However, Sánchez goes even further by articulating his formal combinatorial strategy around "gaming" processes, something he shares with Shawn Spetch, who was also a participant in the symposium. Games are especially appropriate in the context of combinatorial design because their plurality allows for the playful participation of a large number of people. This is evident, for example, in Sánchez's Block'hood project.

Part-part combinatorial strategies can also be applied to elements of a different nature. Unlike the cases we have seen up to this point, Casey Rehm does not work with a specific material object. He uses the pixels from certain photographs, including

54. The symposium took place in the University of Innsbruck on June 23rd of 2016. Beside the participation of many experts in the discussion on today's modes of part to whole condition, the event included the book launch of "The Mereological City", authored by Daniel Kohler.

55. Daniel Kohler, "Symposium: Eco Meta Discrete Parts", last modifed June 13, 2016, http://cargocollective.com/ecometadiscreteparts.

56. Bryant, *The Democracy of Objects*, 246.

57. Gilles Retsin, "Discrete Assembly and Digital Materials in Architecture", *eCAADe*, no. 34 (2016), 146.

58. Neil Leach, "There is No Such Thing as Digital Design", in *Making, Machines and Models for Design Agency in Architecture*, Ed. David Gerber and Mariana Ibañez, (London: eVolo Press, 2014), 53.

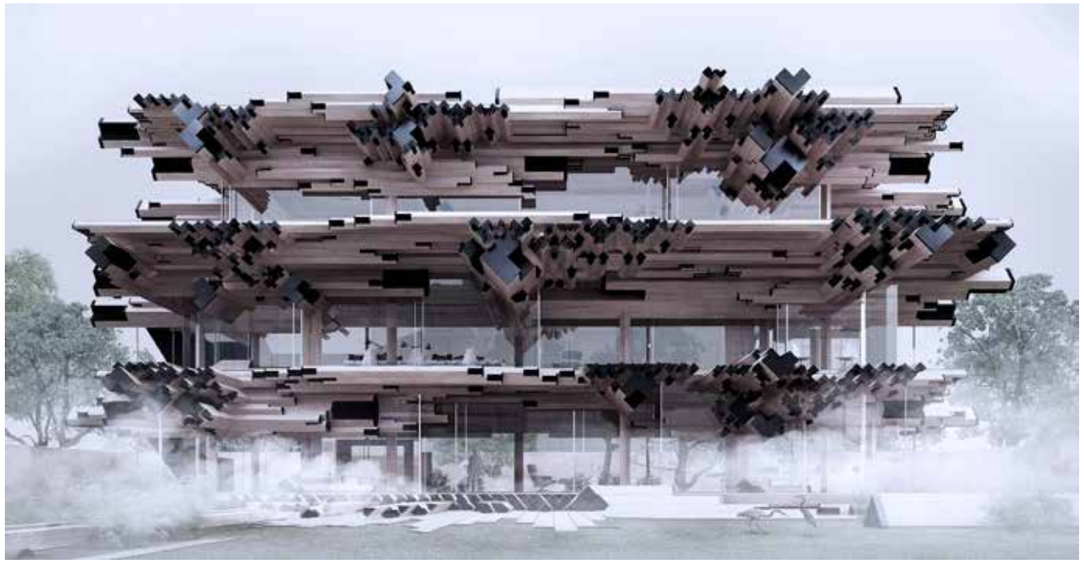


Figure 3-8: Diamond Strata, Gilles Retsin, 2016

Figure 3-9: Softkill, Gilles Retsin, 2012

landscapes, portraits and still lifes. The pixels are understood as a collection of discrete elements that maintain a particular part-whole relationship in the initial images in order to generate an overall figurative meaning. Rehm's job is precisely to re-organize those parts (pixels), setting aside part-whole relationships to focus exclusively on part-part (i.e., pixel-pixel) relationships. As a result, the pixels are grouped according to other non-holistic criteria, such as similarities in color, brightness, contrast, etc. This results in unexpected effects and textures that make up images belonging to a strange mereology: images no longer pursue a consistency determined by a "figurative whole". Instead, they are understood as a collection of pixels that can establish strictly horizontal relationships (Fig. 3-12). This celebration of part-part relationships becomes even more prominent when Rehm adds a third dimension (Fig. 3-13). The Vanna Pier Study is a clear example of this. Although it maintains vague photographic reminiscences because of its chromatic variations, the ensemble takes on a massive aspect when it is distributed three-dimensionally. Unlike earlier work, the ensemble is not made up of a series of identical elements whose relationships to one another are merely positional. On the contrary, the parts establish viscous interlacements. However, the interlacements are temporary and contingent; in other words, they do not participate in the systematicness of a holistic structure. It is important to emphasize the uniqueness of Rehm's work, since the viscosity of the relationships that are generated lets him move past the strict aggregate of discrete units we have seen so far. In his formal studies, the parts are able to engage in deep interlacements without losing their identity. The ensemble displays a broken form, full of holes, interstices, breaks, overlaps, jumps and dislocations. This was already happening in the treatment of the original photographs and it resonates with the object postulates put forward by Levi Bryan or Graham Harman. Those formal resources from the world of the discrete contrast with the superficial chromatic continuity, whose formal language is still that of fields and topologies.

The concept of ecology is fundamental in all this work. However, in the words of Daniel Kohler, traditionally *"the ecological integrity of an architectural object is judged by means of a technical, extra-disciplinary artifact. But not by the articulation of the architecture itself."*[59] In fact, today the idea of architectural ecology is associate above all with a series of gadgets such as solar panels, algae systems, rainwater cisterns, geothermal installations, etc.

The works presented at the Eco Meta Discrete Parts symposium should be interpreted in keeping with the etymology of the Greek term oikos. Oikos means "house", understood as the set of people and objects that form a domestic space, which is regulated by the eco-nomy. As Kohler suggests, when other disciplines make use of the term 'political ecology' today, they are not using it in the sustainable sense of the term, but in the ontological sense. The philosophical approaches of Bruno Latour, T. Morton or L. Bryant, which we mentioned earlier, respond precisely to a crisis in the oppositions between nature-culture, human-nonhuman and subject-object. In a flat ontology such as the one proposed by these contemporary authors, there are no hierarchies or totalities, only parts. The term ecology, according to Kohler, implies the resonance of these parts: a collection of objects of all different kinds, comprehended within other objects, which establish certain relationships to one another that are not mediated by a whole. Kohler is thus interested in a mereological reading of architectural form, particularly the possibility of a kind of architectural disciplinary knowledge that could be described as ecological.

In that sense, Kohler establishes a common theoretical framework for his work and the work of the architects participating in the symposium. His main contribution comes from a mereological rereading of the work by Hilberseimer, in which the German architect proposes a series of variations of the "vertical city". Hilberseimer establishes a series of relationships based on distance: from room to staircase core, from staircase core to apartment, from apartment to building, from building to street, etc. Likewise, the city block is understood as the intersection of two subway stations and the house as the intersection of two staircases. As a result, it is possible to describe the city exclusively through part-part relationships.

In his House of Frames (Fig. 3-14), Kohler explores these part-part relationships through exercises that experiment with pairs such as: column-floor, floor-wall, wall-wall, corner-floor etc. These relationships are always articulated through a single discrete element, whose movable joint lets it create positional links with other elements. Those elements become collections of objects that eventually form architectural parts, such as floors or walls, which are in turn constituted as sub-collections on another organizational level. The compositions do not suggest the presence of a privileged center or axis, nor the involvement of a transcendent holistic system to explain each of the emergences.

His work, formally speaking, is thus very similar to that of the other architects who participated in the symposium: groups of ontologically unprivileged elements which, through part-part relationships of a positional kind, form discretized combinations that do not respond to any underlying totality. All the participants' contributions make use of a formal language that very obviously distances itself from the fields, attractors, topologies and holisms of the 1990s. Their resonance with the world of objects, as described in the discrete ontologies of Levi Bryan, Timothy Morton and Graham Harman, is articulated through a profound decentralization and through the successive breaks and ruptures in their designs. There is no longer a topological continuum, but rather a collection of elements that, unlike in the classical or modern world, are not mediated by a whole.

However, in most cases this kind of experimentation is limited to formal issues such as geometry, mereology, growth, space, limits, figure-ground etc. These categories are determining factors in the production of a renewed aesthetics, which – while it maintains certain formal affinities with other productions of a Metabolist and deconstructivist kind – differs from them in important ways.

First, contemporary discrete design cannot be reduced to the part-dwelling analogy, which is the case in Metabolist designs such as the Nakagin Capsule (1960) by Kurokawa, Isosaki's Clusters in the Air (1962) or Kikutake's Residential Towers (1963). The aforementioned designs can be understood as a collection of discrete elements which, on the one hand, are articulated through different combinations and, on the other, emphasize notions such as crossing or breaking. However,

59. Daniel Kohler, *The Mereological City*, (London: Transcript, 2016), 8.

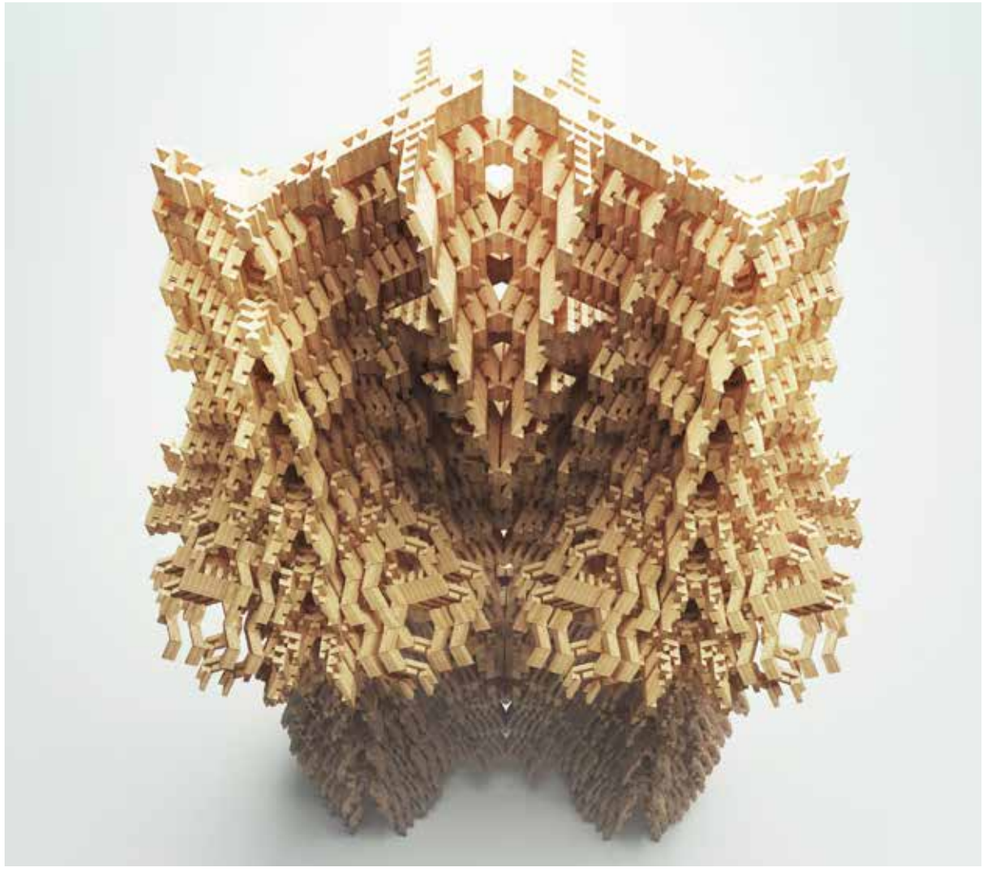


Figure 3-10: Polyomino Research, José Sánchez, 2015

Figure 3-11: Polyomino Research, José Sánchez, 2015

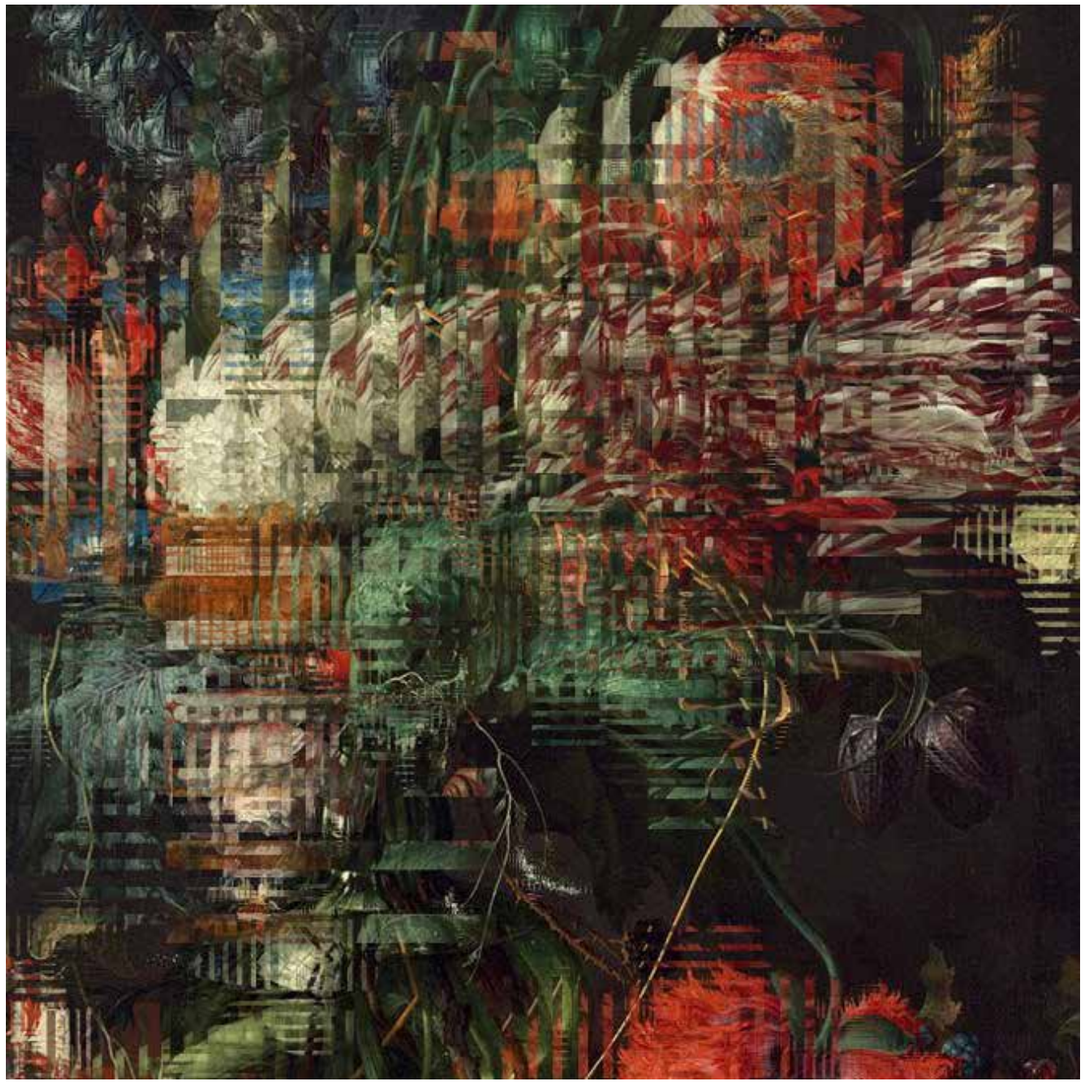


Figure 3-12: Narcisim of Small Differences, Casey Rehm, 2015

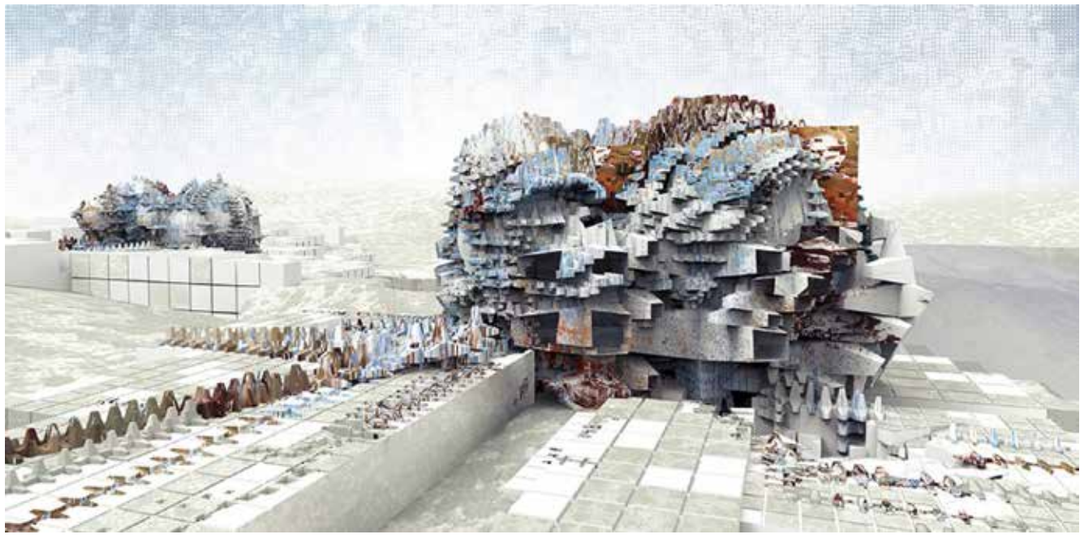


Figure 3-13: Narcisim of Small Differences, Casey Rehm, 2015

part-part metabolic relationships always occur in the light of part-whole relationships: in the three projects cited above, the housing capsules are always connected to a central core that acts as a communication axis, but also as a structural axis. In contrast, the part-part relationships typical of the papers presented at the symposium are not framed within a broader scope of the type part-whole. They have greater autonomy. In that sense, the comparison with the built version of Habitat 67 (1967), by Moshe Safdie, is interesting and, even more so, with the original design, which was much broader. As in the previous Metabolist projects, the housing complex consists of a collection of discrete residential units. They are articulated around three central axes, although formally this is less evident than in the Japanese projects for one particular reason: in Safdie's case, the discrete dwelling elements are not engaged in a mere positional relationship; they enter into relationships of formal viscosity. As a result, the units maintain their identity but, at the same, time they are physically intertwined. This lends them a distributed structural meaning that is absent in the Metabolist projects.

The projects presented for the symposium show significant affinities with the Metabolist projects: collections, objects, combinations, crosses, interruptions, etc. However, the absence of a part-whole base for the part-part relationships is fundamental in the former. This feature singles them out as an ex-centric design, tied to a flat ontology that has little to do with the remnants of a vertical hierarchy typical of metabolic designs.

Second, the deconstructivist proposals of the 1980s also produced a ruptured, fragile and broken aesthetic, which created interstitial spaces and broke free from any obligations of harmony. Its formal strategy can be summarized in 6 basic points: fragmentation, overlapping, twinning, twisting, fold and grid.[60] Iconic projects such as the Jewish Museum (1999) by Libeskind, the Vitra Fire Station (1994) by Zaha Hadid, the follies in the Parc de La Villette (1987) by Bernard Tschumi and the Dresden UFA Cinemas (1998) by Coop Himmelb(l)au, share with the projects from the symposium a certain aversion to formal resources such as continuity, topology, holism and totality. Likewise, both work with a multifocal perspective (similar to Deleuze's rhizome or Borges' the Aleph), which results in de-centrality and a lack of symmetry. However, the aim of the deconstructivist project was completely different, since it was based on the Heideggerian concept of Destruktion. It "*is not a destruction, but a de-structuring to undo some structural stages within the system.*"[61] While both Mark Wigley and Philip Johnson, organizers of the exhibition Deconstructivist Architecture, insisted on the need not to understand deconstructivism as a method or as a movement, over time it has come to be understood as what Patrick Schumacher would call a transition style.[62] The de-structuring purpose of deconstructivism is one of the constants of the style, whose necessary consequence is the virtual presence of the whole that it deconstructs. Indeed, in deconstructivism, the idea of a whole remains in force, if only for the purpose of deconstructing it later. The whole thus becomes a virtual, phantasmagorical entity: it is a referent without a physical presence but to which the formal configurations of the projects are constantly referred, since the deconstructive act can not be understood without the prior-whole. In contrast, the emerging experimental projects by Retsin, Kohler, Sánchez or Rehm not only begin with an affirmative gesture, they also eliminate any presence of the whole or any reference to it. The concept of collections, generally absent in deconstructivist compositions, becomes fundamental here. It emphasizes the poly-plural, aggregative and autopoietic nature of the analyzed projects, in contrast to the fragmentations, contortions and gestures characteristic of the deconstructivist agenda.

As we said, the papers presented at the symposium represent a significant change in the formal understanding of the designs and in the aesthetics they produced. Issues such as geometry, mereology, growth, space, limits, figure-ground, etc. are given new readings as discrete formal resources, whose broken aesthetics contrasts with the softness of the 90s. However, in most cases this formal and aesthetic renewal is not accompanied by a performative renewal – i.e., a renewal that affects fundamental architectural categories such as interiority, circulation, privacy, orientation, access, etc.

The clearest case is Retsin's experimental project, Diamonds. In this proposal, the formal and aesthetic renewal is joined by a particular attention to a coherent system of prefabrication aligned with a formal strategy that is rooted in the discrete. However, the project is in line with Le Corbusier's Domino diagram – that is, an example of a discrete floor: the building consists of a series of floors that are repeated in section and supported by pillars that allow for a lightweight non-structural façade. Retsin himself contrasts both schemes, highlighting that the main difference does not lie in the nature of the scheme itself, but in how it is produced: in one case, it is created through the distribution of different parts (slabs and pillars); whereas in the other, it is created through the distribution of a single part – the line – which forms both slabs and pillars. As a result, categories such as interiority, circulation, privacy or orientation remain intact.

Something similar can be said about the design for the expansion of the Alvar Aalto museum by Rasa Navasaityte. The project lays out an extension through a renewed façade which, as we have seen, is realized through a collection of discrete elements whose positional relationships offer a broad variability of decentralized patterns. However, the architectural categories associated with a façade such entrance, interior or opening are not subject to a renewed approach. Nor does José Sánchez's work branch out in this direction. While it is true that the Chilean architect goes beyond strictly formal contributions to connect with issues of gaming and participation, his contributions do not produce significant changes in the use of architectural space. The same is true for the work of Casey Rehm. In his Houses of Frames series, Daniel Kohler presents formal studies based on various groupings of parts; their novelty lies in the lack of a whole as a presence or a point of reference. Yet, in this case, issues such as circulation, privacy, interiority or orientation do not seem to be the main focus either.

The same is true for the formalists based in the United States. Neither Tom Wiscombe, nor David Ruy nor Mark Foster Cage focus on these issues in their work. However, Peter Trummer's piles are the examples that most obviously thematize them. The groupings of buildings designed by the Austrian architect do

60. Vicente Esteban Medina, *Forma y composición en la arquitectura deconstructivista*, (Madrid: UPM, 2007), 13.

61. Ibid., 40.

62. Patrick Schumacher, *The Autopoiesis of Architecture, vol 2*, (Wiltshire: Wiley, 2012), 644.

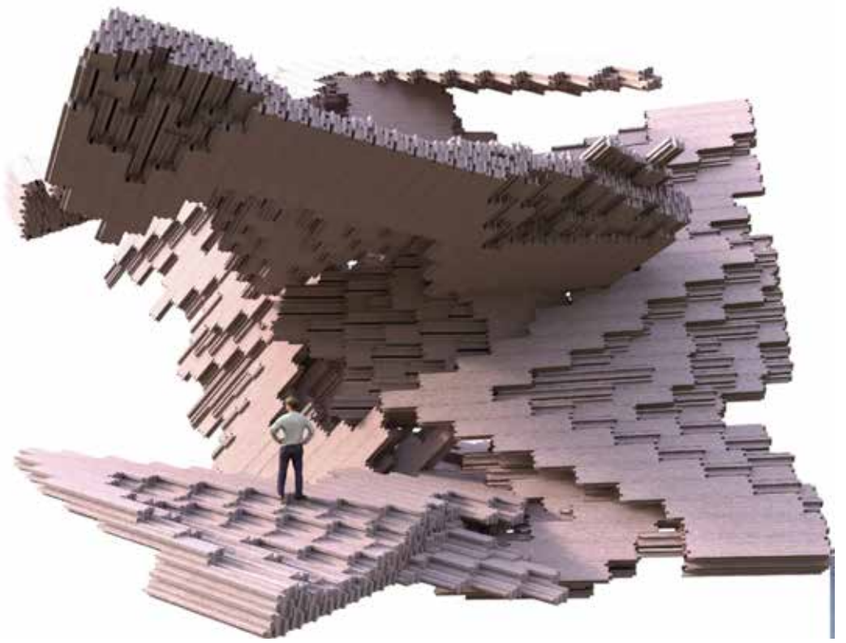


Figure 3-14: House of frames, Daniel Kohler, 2016

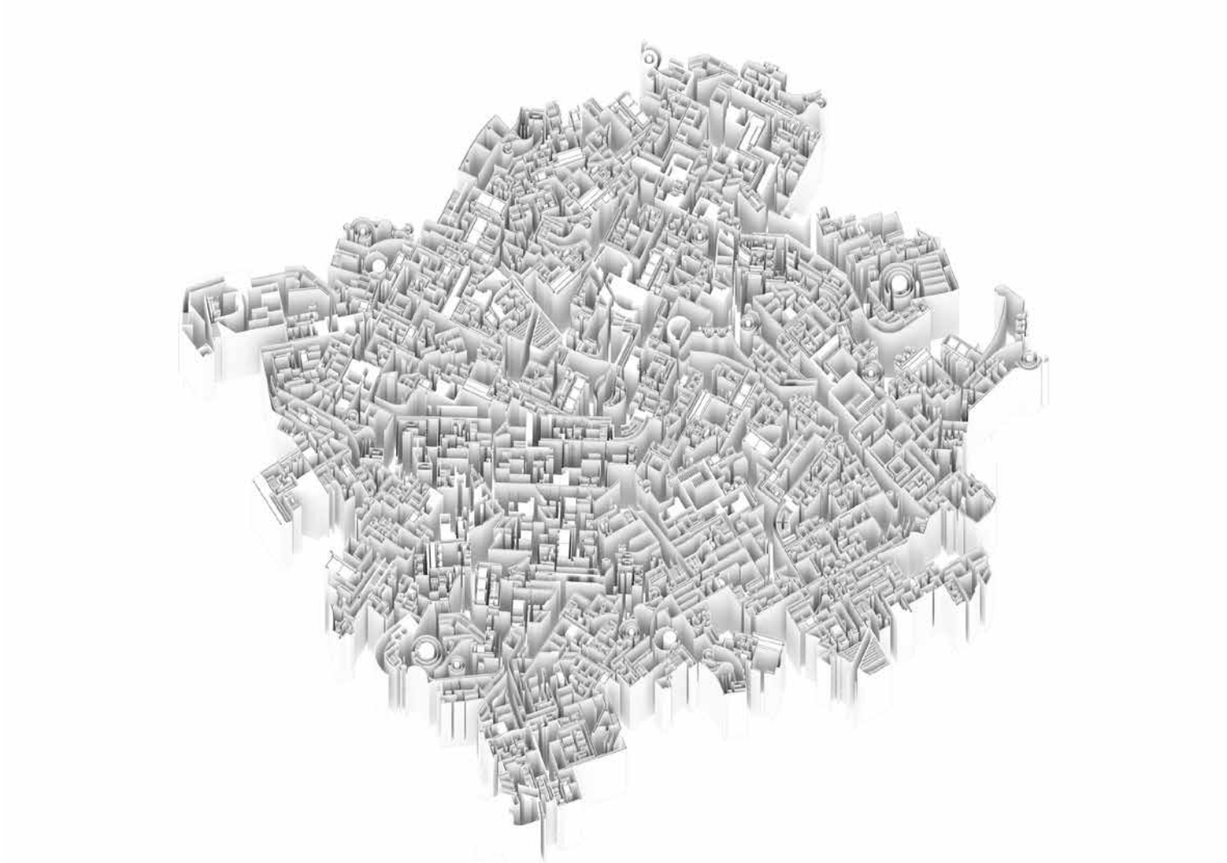


Figure 3-15: Architecture as Subdivision, Peter Trummer with David Marco, Students Ana Gras and Michaela Cho. Studio Peter Trummer in Sci-Arc, 2016

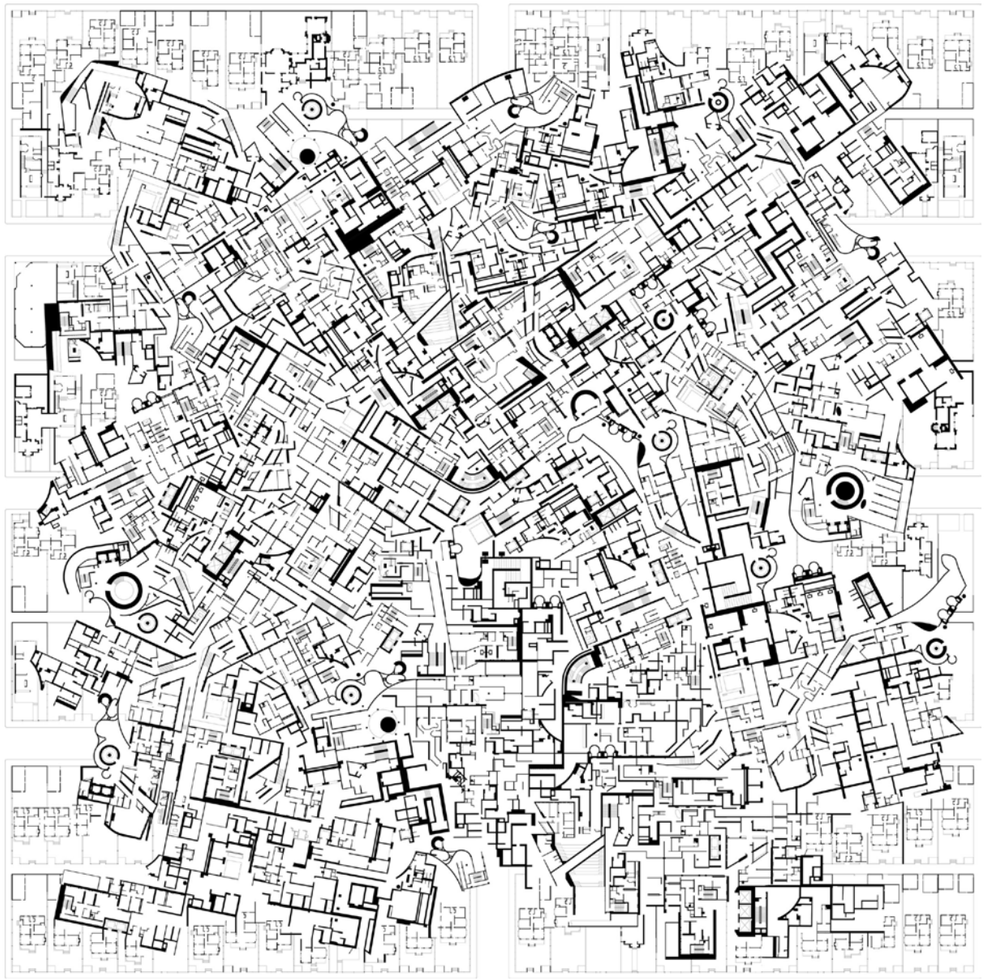


Figure 3-17: Architecture as Subdivision, Peter Trummer with David Marco, Students Ana Gras and Michaela Cho. Studio Peter Trummer in Sci-Arc, 2016

Figure 3-16: Aggregated Figure: The City as Folded Blocks, Peter Trummer, Students Sarah Mansson and Federico Pessani. Studio Peter Trummer in Sci-Arc, 2014

point to a reevaluation of circulation, access and interiority in their architectural ensembles. In exercises like "Aggregated Figure" (Fig. 3-16), this interest is especially evident: Beyond formal novelties based on the concepts of "collection", "ex-centricity" and "interlacement", Trummer transforms several architectural categories linked not only with the form of space but also with its use. First off, access no longer occurs exclusively on the ground floor. Because each building is constructed on the floor of the following, the access points to the interiors occur at different heights. Secondly, an interior is not necessarily accessed from an exterior; sometimes the interior of a building is accessible from the interior of another, something that is very evident as well in the project Architecture as Subdivision (Fig. 3-15 & Fig. 3-17). Third, circulations do not occur exclusively in interior spaces; sometimes a path may necessarily run through exterior spaces.

Some of the work by Rasa Navasaityte and Daniel Kohler also introduces novelty in the use and understanding of space, especially in the projects' interiors. However, as we have seen in most cases, the formal renewal in the designs is not accompanied by a change in the framework for their use. In nearly all cases, fundamental architectural categories such as circulation, privacy or orientation are not a topic of study: either they are left out of an investigation that is strictly formal (as would be the case of some combinatorial exercises by José Sánchez) or because earlier established models are taken up (as is the case in Retsin's Diamonds project).

3.4 The possibility of a subjectless floor

The emergence of a new zeitgeist based on contributions from philosophy, sociology, art and architecture has found complicities with the renewed architecture's formal vocabulary that we have described in the previous section. Collections, ex-centricities and interlacements are the backdrop against which an architecture of objects, discontinuities, jumps, holes, joints, edges and disturbances is projected. It is not an "object-oriented architecture": no philosophers from that school of thought have positioned themselves in that sense.[63] Instead, it is an architectural contribution to a series of concepts that have been in the air in the intellectual atmosphere of the 21st century – concepts that also admit philosophical, artistic, sociological or technological readings. In the case analyzed in this chapter (section 3.3.2 and 3.3.2), we find an architectural contribution whose spatial characteristics break away from the topologies of the nineties: the exaltation of continuity characteristic of those years is left behind to make way for a return of the discreet. However, this return occurs with one crucial difference in relation to its classic or modern predecessors: the part-part relationships no longer take place in the light of a "whole". The emancipation of the parts with respect to the whole implies an autonomous development rooted in a horizontal hierarchy, similar the flat ontologies posited by Bruno Latour and Graham Harman.

However, as we have mentioned, architecture very seldom makes use of the formal renewal to transform performative disciplinary categories such as circulation, privacy, orientation, access or interiority. On the contrary, in most cases this formal renewal is limited to establishing a series of connections with the discrete thought of our days, but it is lacking in any specifically disciplinary contributions.

However, as we explained in the second chapter (sections 2.2.3 and 2.4.3), the zeitgeists of Modernity and (Post) Structuralism were able to transform a particular set of formal resources into relevant disciplinary contributions. In particular, the problem of the floor was approached using different formal strategies, associated with different frameworks of thought, and capable of offering different disciplinary solutions. Indeed, both the discrete floor and the continuous floor are constituted as frameworks that align with certain intellectual approaches to the problem of the subject. Not only do they differ in their formal resolution – evaluated in terms of mereology, geometry, contour, arrangement, development, and figuration – but also in their performative resolution – evaluated in terms of circulation, gaze, orientation, privacy, interiority and access.

In that context, this research centers on the following hypothesis: The emergence of the "zero subject" and its articulation through "collections", "ex-centricities" and "interlacements" is associated with the advent of a new formal architectural language capable of developing a floor arrangement that is original in disciplinary terms with respect to the discrete and continuous schemas we have analyzed, problematizing therefore the stablished zeitgeist of the 90s. In relation to our methodological table (Fig 3-18), this hypothesis presumes the possibility of a third floor diagram which can be analysed in the same terms used in the other two diagrams.

This floor layout is neither discrete, nor continuous, nor discrete and continuous; it is discrete while continuous: on the one hand, it forms collections and should therefore permit a discrete reading; on the other hand, it creates interlacements and should thus allow a continuous reading. It is not just a simple sum, however. In other words, it is not the continuous and discreet floor of Le Corbusier's Congress Hall in Strasbourg, since the intention is not to add a continuous element to a discrete one or vice versa. In contrast, our hypothesis proposes a floor layout that simultaneously offers a continuous reading and a discrete one. In that case, the floor layout would be formally and performatively original in relation to the preceding ones, and, second, it would resonate with the concepts of collections, ex-centricities and interlacements described in this chapter (section 3.2.2).

The method used to develop this hypothesis will be based on an experimental process of resonant piling. In the next chapter we will provide a detailed description of how this experimental process is conducted (section 4.5), the theoretical principles that support it (sections 4.1 and 4.2), how it is structured (section 4.4), what tools it requires (section 4.5) and how it differs from other processes typical of experimental contemporary architecture that may seem similar (section 4.3). It will emphasize above all the ability to establish a relationship between parts where the whole does not act as a centralizing element. The goal is the production of a floor layout that meets the requirements established in the hypothesis, the results of which will be evaluated in Chapter 5 (section 5.2).

63. Carpo, *The Second Digital Turn*, 91.

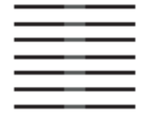
SUBJECT INTERPRETATION	ABSOLUT SUBJECT	RELATIONAL SUBJECT	ZERO SUBJECT
FOCUS	Human	System	Collection
POSITION	Axis	Hollon	Ex-Centricities
SUBJ - OBJ	Dominion	Mediation	Interlacement
EPISTEMOLOGY	Positivism	Perspectivism	Exogenesis
REF. THINKER |SOC|	A. Comte	Z. Bauman	T. Morton
REF. THINKER |ONT|	I. Kant	G. Deleuze	L. Bryant
MOVEMENT	Modernism	Post-structuralism	Spec. Realism
FLOOR LAYOUT	DISCRETE FLOOR	CONTINOUS FLOOR	DISC while CONT FLOOR
DISCRETENESS	Countable	Scale	Dilated
CONTINUITY	Progression	Topography	Grains
F1. MEREOLOGY	Whole = Parts	Whole > ΣParts	Whole< Part
F2. GEOMETRY	Euclidian - Flat	Topological	Combinatory
F3. CONTOUR	Ideal	Virtual	Singular
F4. ARRANGEMENT	Structure	Field	Sack
F5. GROWTH	Repetition	Deformation	Incrustation
F6. FIGURATION	Grounds	Figure = Ground	Co-Figures
M1. CIRCULATION	Spine	Wander	Jumps
M2. GAZE	Horizon	Voyeur	Gaps
M3. ORIENTATION	Core	Derivation	Contour
M4. RETIREMENT	Margin	Wrapping	Compression
M5. INTERIORITY	Opposition	Gradation	Malyeable
M6. ACCESS	Single	Scattered	Nested
	Homogeneous	Homogeneous	Heterogeneous
DIAGRAM			

Figure 3-18: Table of Concepts, Discrete floor, Continuous floor and Zero Subject

Resonant piling

Chapter IV

IV. Resonant Piling

The collections, ex-centricities and interlacements characteristic of 21st-century subjectless objects have been developed by a wide variety of disciplines, including, as we saw in the previous chapter (sections 3.3.2 and 3.3.3), the experimental architecture of recent years. However, in most cases, there has been a formal renewal that has not been accompanied by a substantial change in typical 20th-century architectural diagrams.

In that sense, the problem of the floor is emblematic because the dispositions articulated by these new designs still respond to the continuous or discrete diagrams we analyzed at the beginning of this dissertation.In this chapter (section 4.4), we will provide an in-depth description of the method used in response to the hypothesis that structures this dissertation. As will be illustrated in the following pages, we will begin with the slab typical of the discrete floor, understanding it as part of a whole, from which it will be freed through a process of resonant piling. This should not be understood as a process of "swarm intelligence", but as a series of "regimes of attraction" in which the parts are no longer subordinate to the whole from which they emerge. Instead, they establish free resonances that are local, partial, contingent and temporary. The ensemble is thus aligned with the concepts associated with the subjectless object, as a particular formal interpretation of those concepts. That formal interpretation will be systematized through a computational simulation, the results of which will be evaluated in Chapter 5 (section 5.2), as a response to the hypothesis posited by this dissertation.

4.1 The subjectless floor as a re-articulation of slabs under a gravitational scenario.

As we saw in the introduction, this dissertation draws on the premise that architecture is a critical cultural discipline based on the re-articulation of its parts within a gravitational scenario in order to produce interiorities. As such, the production of a type of floor able to critically engrane with the contemporary cultural scenario, as described in the previous chapter (section 3.2), will also consist in the re-articulation of "parts". This new floor type will not be "new" in the sense of ex novo; it will be new because it involves an original articulation of a series of pre-existing parts.

In this case, the reorganization must be based on the floor arrangements analyzed in the first chapter (sections 2.2.4 and 2.4.4) and classified as paradigmatic: the continuous floor and the discrete floor. As we have seen, both cases represent opposing formal positions which, through their contrasts, give rise to different qualities: formal categories such as mereology, geometry, contour, arrangement, development, figuration, or performative categories such as circulation, gaze, orientation, privacy, interiority or access are given different, and often, opposite treatments. Of all these categories, the one that is fundamental when it comes to redistributing parts is the first: mereology. As we have already mentioned, in the case of discrete floor, the whole is explained through the sum of its parts; whereas in the case of the continuous floor the whole is explained through the integration of its parts. In the first case we find an accumulation of different layers; whereas in the second we are faced with a single territory of intensities. The fact that, in the latter case, the parts are integrated within a single slab and not merely girdled together makes it difficult to identify and extract them for a formal re-distribution. In the former case, on the other hand, each of the parts that make up the discrete floor consists of a slab that is formally independent, and its identification and extraction is immediate.

For that reason, we will consider the parts of the discrete floor (coinciding with the different slabs) as the parts to be redistributed. An eventual redistribution of parts based on the continuous floor layout will be left for another occasion.

As we saw in the first chapter (section (2.2.1)), the distribution of discrete floor is based on the concept of repetition. This applies in two different ways. First, as the repetition of an object – in this case the slab – whose shape and materiality remain constant in each of the slabs that make up the floor of the building. Second, as the repetition of a position, where the [x] and [y] coordinates remain constant and the z coordinate varies at regular intervals.

This exercise in repetition is fundamental because it articulates one of the main characteristics of this floor distribution: its centrality. The distribution of discrete floors is centralized to allow for the emergence of a series of continuities perpendicular to the plane of the slabs, which respond to three main functions: structure, façade and circulation. In all three cases, vertical continuity is created, on the one hand, by keeping the [x] and [y] coordinates constant and, on the other, by maintaining the shape of the slab and its central hole. As a result, the system is structured by a series of elements that are external to the geometry of the floor, and which restrict the distribution of the slabs, adapting it to a centralized arrangement. The vertical circulation core plays a predominant role in this centrality, since its path connects the different slabs in the form of a spine.

In the first chapter (section 2.2.2) we argued that this attention to centrality and repetition is connected to the axiality of the modern subject. On the one hand, that subject becomes the center of modern discourse beginning with Descartes.[1] On the other hand, the desire for progress and confidence in technology leads to the development of a serial production system based on the repetition of an optimized element. In that sense, the skyscraper is understood as a gigantic vertical production chain, strung together by a structure and a circulation core that centralize each of the elements.

However, as we saw in the previous chapter (section 3.2), in contrast with modernity, which was based on a axial and dominant human subject, the cultural landscape of our times has eliminated the figure of the subject. In the absence of the subject, cultural contemporaneity is articulated exclusively through objects, whose particularity is structured around three fundamental concepts. First, objects are grouped into collections. Second, no object holds ontological privilege; therefore all objects occupy an ex-centric position. Third, these objects are not isolated monads; they can establish viscous, ephemeral, and contingent interlacements with one another.

The schema for a floor tied in with the 21st-century cultural landscape must be able to make a critical contribution to that landscape; as such, it must be able to enter into a dialogue with a scenario that is inhabited by objects of all kinds but lacks a subject. Therefore, any re-distribution of the slab-parts intended to reimagine the problem of the floor must be sensitive to those concerns. This effort cannot be based on mere passive recognition, however, since that would imply a cause-effect relationship between an ontological position and an architectural contribution, respectively.[2] On the contrary, both disciplines participate on equal footing in the construction of a common zeitgeist, so that any contribution must take place in a critical and operative way.

The discrete floor layout has a mereological characteristic that sets it apart from the contemporary lack of a subject: its parts are mediated by the whole. Indeed, each of the slabs, understood as parts of the floor, is determined in its form and position by a series of transcendental vertical continuities that act in with a totalizing force: the continuity of the façade, the continuity of the core, and the continuity of the structure. This exercise in subjugating the slab-parts in relation to a transcendent-whole contrasts with a cultural contemporaneity that attempts to eliminate traditionally privileged elements such as the world, the whole, the subject, etc. On the contrary, in today's ontological approaches, part-whole relationships are replaced by exclusively part-part relationships, the exercise of which is no longer dependent on any whole. As a result, a contemporary approach to the problem of the floor must begin with a complete freeing of the parts from the whole. Most experimental architecture at the turn of the century achieved this through processes of emergence. However, as we will see below, the global teleology characteristic of those processes has impeded a real liberation of the parts involved.

1. Descartes' famous expression cogito ergo sum is considered by a number of authors to be the beginning of Modernity, because it implies the beginning of a radical human-centric thought.

2. Todd Gannon in conversation with Tom Wiscombe, Graham Harman and David Ruy, "The Object Turn: A Conversation", *Log*, no. 33 (2015), 84.

4.2 Emergence as "Emergence for"

In recent decades, and in academic experimental architecture, a number of proposals inspired by natural phenomena have attempted to use computational processes to unravel the classical/modern yoke that has constrained the parts to the whole. In that sense, Neil Leach makes reference to four main strategies[3]: L-Systems, Fractals, Cellular Automata and Swarm Intelligence. All these strategies have their origins in processes that had been used in other disciplines throughout the 20th century, and their architectural development gained prominence especially with the emergence of computational tools. The latter use complex mathematical and geometric models to produce a series of formulations that are of great formal interest to architecture. However, none of these four strategies achieves a complete decentralization, although the swarm intelligence characteristic of emergentist systems come the closest.

4.2.1 Formal centralization in L-Systems, Fractals and Cellular Automata

First, L-Systems are inherently hierarchical. They were first proposed in the late 1960s to model and simulate the growth of plant substances, and artistically explored in the 1970s by artists such as Alexander Calder, specially in his studies of motion (Fig 4-1). Lindenmayer developed them mainly as a formal grammar based on a set of rules and symbols. However, their reference to branching in plants implies the assumption of diverse orders that are designated as primary branches, secondary branches, tertiary branches, etc. In addition, as François Roche objected, "*L-Systems attempt to simulate the branching of plants in nature, but they can never fully simulate the permanent logic of re-adaptation in growth, or photosynthetic exchange or the search for equilibrium in trees as an incremental and recursive process.*"[4] The computational recreation of a natural phenomenon like branching is reductive: it is a formal simplification that ignores the intelligence inherent in the biological processes from which it draws its inspiration.

As a result, despite their greater flexibility, L-Systems still maintain the strong centralization of earlier frameworks. This fact is evident in the series of projects by Michael Hansmeyer called "*L-Systems in Architecture*" (2003).[5] Through several modeling exercises, the architect explores how L-Systems algorithms can create new possibilities in the field of architecture. In cases like "Parametric L-System with sub-system" the centralization is very evident: the ensemble is articulated through a main nucleus from which a series of branches break away. In turn, those branches contain several sub-branchings. In other projects by the same author, like "Stochastic L-System with modules", this centrality is more ambiguous because there is no single element from which the rest of the project develops formally. However, the idea of a center is still present through a series of axes that act as the

3. Neil Leach, "Swarm Urbanism", in *Swarm Intelligence, Architectures of Multi-Agent Systems*, ed. Neil Leach and Roland Snooks, (Shanghai: Tongji UP, 2017), 77

4. François Roche: "Short Stories of an Acephala Body" in *Swarm Intelligence, Architectures of Multi-Agent Systems*, ed. Neil Leach and Roland Snooks, (Shanghai: Tongji UP, 2017), 85.

5. http://www.michael-hansmeyer.com/projects/l-systems_info.html?screenSize=1&color=1#undefined

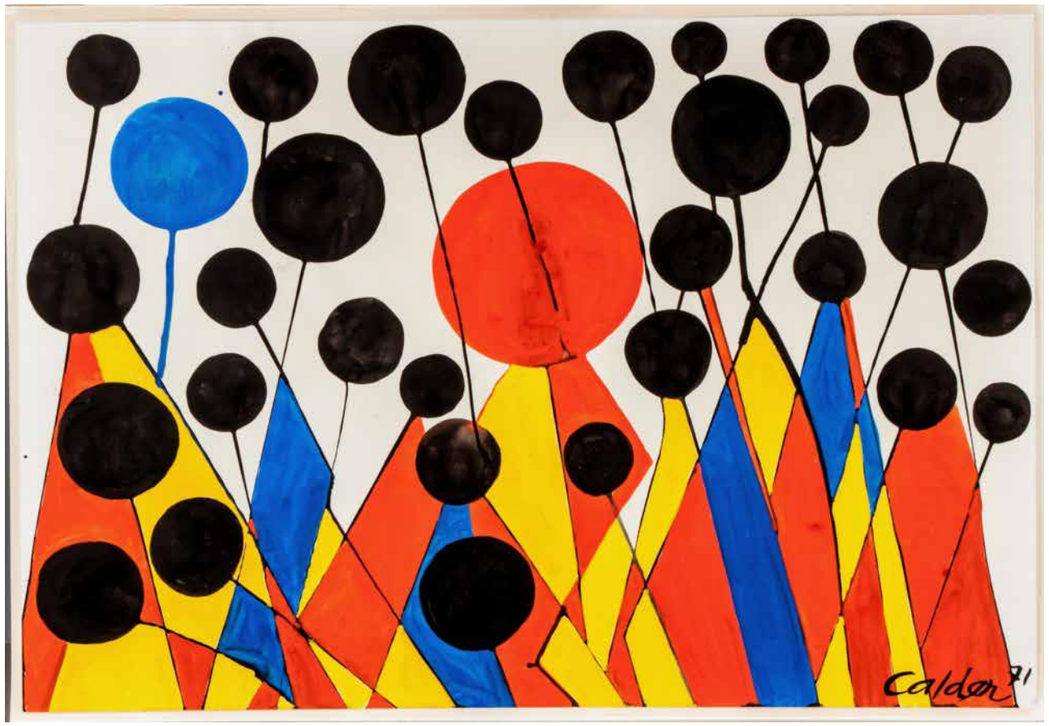


Figure 4-1: Motion Studies, Alexander Calder, 1971

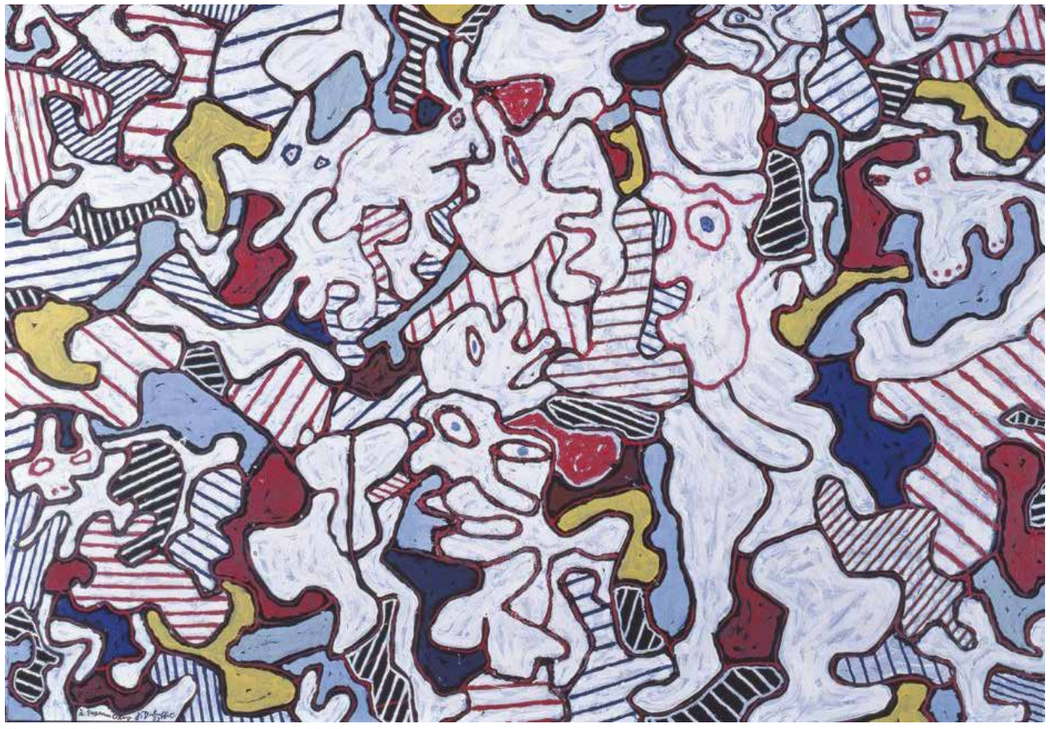


Figure 4-2: Opéra Bobèche, Jean Dubuffet, 1963

main branches, from which smaller light beams "sprout".
Secondly, as Neil Leach himself states, and similarly to L-Systems, fractals "*are programmed to behave in a particular way, and in general cannot adjust their behavior in response to external stimuli. A further limitation of fractals is that they typically involve the subdivision of an already known whole.*"[6] One of the main characteristics of a part-part relationship is its independence from a whole that it does not even "know". However, a fractal system consists precisely in the scaled repetition of a whole, and therefore the whole is constantly present. According to J.M. Montaner,[7] fractals – along with folds and rhizomes – are included among the new paradigms of Post-Structuralist thought, incorporating other logics related to the phenomena of chaos and the processes of mutation. In that sense, "*their logic is anti-representational; they are more suited to the disorder, unpredictability, individuality, transience and fluidity of daily life than to the public sphere's desire for perfection, legislation, representation and control.*" [8] The fractal geometries theorized by Benoit Mandelbrot emerge as a way of geometrizing the randomness of natural elements like plants, coastlines, clouds, craters, galaxies, etc. However, these structures have a distinctive property: their structure is invariable regardless of scale. Mandelbrot defines this as internal homothety. Indeed, the parts and the whole share the same topology, which makes the whole omnipresent.
As Montaner points out[9] , Jean Dubuffet's doodles (Fig 4-2) are good examples of the implicit presence of fractal logics in artistic disciplines. Although they are not being the result of a computational exercise, the Dipoli student assembly building at the Helsinki Institute of Technology, designed by Reima and Raili Pietilä, is an emblematic example of fractal architecture. In contrast with Aalto's refined organicism, the pair of Finnish architects propose an irregular, harsh and aggressive architecture, with multiple entrances and an utter demonumentalization. However, despite its openness and flexibility, the part-part relationships still occur in the light of a whole, the formal structure of which is omnipresent.
Third, cellular automata represent an important decentralization exercise compared with L-Systems and fractals. They are based on computational agents, which Manuel Delanda defines concisely as "*software entities that can sense their environment and act on it.*"[10] When, on the one hand, there are several agents that interact and, on the other, their individual activity requires a certain level of coordination, the ensemble of computational agents involved is referred to as a "multi-agent system". This type of system has applications in a variety of environments, like computer systems that can learn about human habits to improve user interaction, online e-commerce systems, systems that can interpret and model social behaviors, etc.

The fundamental element incorporated by cellular automata is their capacity for self-organization. Guy Theraulaz defines this as "*a set of dynamical mechanisms whereby structures or decisions appear at the global level of a system from interactions among its lower-level components, without being explicitly coded at the individual level.*"[11] In addition, Theraulaz highlights four main characteristics. First, self-organizing processes give rise to emergent properties – in other words, properties that are more complex than each agent's individual contribution. Second, they are dynamic systems that require continuous interaction between the different agents and their environment. Third, the non-linear interactions characteristic of these systems produce bifurcations – i.e., new stable configurations that occur when there is a change in one of the system's parameters. Fourth, self-organized systems can be multi-stable: in other words, given a set of parameters, the system can achieve different states of stability depending on the initial conditions and random fluctuations.
There are two multi-agent systems that are particularly fitting in illustrating self-organization systems because of their simplicity: the Game of Life (Fig. 4-3), designed by John Horton Conway in 1970; and Sugarscape, presented by Joshua M. Epstein and Robert Axtell in 1994. The first case involves a population formed by the simplest automata – i.e., they do not use any kind of memory to carry out computational operations. It is also a zero-player game, since its evolution is determined by the initial state and does not require any subsequent input. Each agent is a cell that can be alive or dead, depending on the state of its neighboring cells:
any dead cell with exactly three live neighbors becomes a live cell in the next step.
A live cell with two or three live neighbors remains alive. In any other case, the cell dies or remains dead either due to isolation or overpopulation.
Based on these rules, the sequence of steps create all kinds of patterns that have interested scientists, mathematicians and economists because of their emergent characteristics and self-organization behaviors. However, their emergence is problematic. As M. Delanda points out,[12]the interactions between automata are strictly defined through rules that determine their state (alive or dead) from the outset. It follows that the effect of any interaction on an automaton's subsequent state is not emergent. However, the secondary results of the process – which generate global patterns of movement like landslides, oscillations or rotations – are emergent. In these cases there is a coherence in the resulting whole that transcends the rules determining the state of the parts.
Sugarscape is presented as an evolution of the Game of Life. It picks up the original idea, while adding another level of complexity. As in the Game of Life, the simulation consists of a population of agents, a flat environment and a series of laws that determine the agents' relationships with each other and with the environment. The Sugarscape model is more complex

Figure 4-3: Cellular automata, Conway, 1970

6. Leach, "Swarm Urbanism" in Swarm Intelligence: Architectures of Multi-Agent Systems, 77.

7. Josep Maria Muntaner, *Sistemas arquitectónicos contemporáneos*, (Barcelona: Gustavo Gili, 2008), 172.

8. Ibid., 173.

9. Muntaner, *Sistemas arquitectónicos contemporáneos*, 175 .

10. Manuel Delanda, "Multi-Agent Systems" in *Swarm Intelligence, Architectures of Multi-Agent Systems*, ed. Neil Leach and Roland Snooks, (Shanghai: Tongji UP, 2017), 39.

11. Guy Theraulaz, "Stigmergic Building Algorithms for Smart Architecture" in *Swarm Intelligence, Architectures of Multi-Agent Systems*, ed. Neil Leach and Roland Snooks, (Shanghai: Tongji UP, 2017), 189.

12. Delanda, "Multi-Agent Systems" in *Swarm Intelligence, Architectures of Multi-Agent Systems*, 41.

than the Game of Life because it includes more variables that are activated in response to the environment: agents can leave pollution, die, reproduce, inherit resources, transfer information, trade resources, transmit diseases, etc. In short, in Sugarscape the agents' metabolism is not merely binary; it can take on any number of states. As in the Game of Life, the local behavior of the agents is not emergent, since it is regulated by deterministic laws. However, the secondary patterns generated by that behavior are emergent. Delanda gives a very clear example of this:

> *"If the food is initially distributed in two separate sites, the population ends up forming two separate 'colonies'. This outcome is emergent since there is no rule specifying that coherent groups must form in the neighborhood of a concentration of sugar, but it does not generate any further significant insight."*[13]

There is no law in the local behavior of the agents that determines a division into two groups. However, the result as a "whole" can be consistently explained as an emergent logical process of division, which shows that *"it may not be necessary to invoke individual complexity to explain nest complexity."*[14]
However, the Game of Life and Sugarscape share a characteristic that is common to the vast majority of cellular automata: they travel across a game board in the form of a grid. In the case of the Game of Life, the board is a flat grid made up of squares, which extends endlessly in all directions, so that each individual cell has eight neighboring cells. In the case of Sugarscape, the original model is based on a two-dimensional grid made up of 51x51 squares. The agents move across the grid on paths that let them obtain resources and enter into contact with other agents. Neil Leach's comment on this question is fundamental:

> *"Although cellular automata can respond to their neighbours, they are fixed spatially, and therefore tied to certain underlying grids."*[15]

The part-part relationships that occur in a system of cellular automata are mediated by the presence of a whole. This whole exists in the form of an infinite grid, which determines the type of paths the agents can follow. As a result, the parts do not relate to one another free from any whole. They have to recognize the whole as an underlying foundation. It is a weakened "whole", much less determinant than the whole typical of modernity. Nevertheless, it persists in the form of a game board, which swarm intelligences will finally dispense with.

4.2.2 Swarm intelligence as a teleological whole

From the early 21st century, swarm intelligence has emerged as one of the most common formal decentralization strategies in experimental architecture. This strategy is founded on a collective behavior that follows "swarm logics". They represent *"a shift in understanding from conceptualizing form and organization at a macro scale to looking at the interaction of lower level systems which give rise to global order."*[16] As Neil Leach points out, this type of system generates a series of patterns that are not the frozen expression of a particular process, but rather behaviors based on open dynamics of adaptation.
Although cellular automata are also capable of interacting to generate collective behaviors, swarm intelligence processes differ from the former in two fundamental ways. First, they are not constrained by an underlying grid. Second, the set of laws that determines individual function can evolve. As such, those individuals move through a fundamentally intensive and non-regulated space. These characteristics foster processes of emergence that, on the one hand, are radically varied and unique, and, on the other, can incorporate phenomena of adaptation.
This kind of computational processes originate with the observation of certain natural phenomena. The animal kingdom offers emblematic examples: colonies of ants, swarms of bees, schools of fish, herds of sheep, flocks of starlings, etc. For centuries, this type of behavior has fascinated people in all kinds of disciplines. Guy Theraulaz[17] explains that even novelists like Michael Crichton have experimented with spiritual explanations, referring to a supposed *"swarm spirit"*, an idea introduced earlier by the Belgian poet Maurice Maeterlinck.[18] Since the beginning of the 20th century, the efforts of naturalist disciplines like biology to find explanations for this type of phenomena have given rise to clearly anthropocentric interpretations. It was assumed that the individuals belonging to a group had a certain *"group representation"*, which meant that their individual decisions were also meaningful on a collective level. As Theraulaz asserts, *"people were thinking that there was some direct causal relationship between the complexity of the decisions and patterns observed at a colony level and the behavioral and cognitive complexity that was supposed to be required at the individual level to generate these decisions and patterns."*[19] A very clear example of this was the role attributed to the queen bee – understood as an individual capable of organizing, evaluating, punishing and ruling over the rest of the group with the aim of pursuing certain collective achievements. The prevailing schema in these interpretations is anthropocentric, because it emulates an essentially human type of social organization based on the concepts of centralization and vertical hierarchy.
However, since the mid-20th century, through work in a number of disciplines, a completely different model has been proposed to explain these phenomena. As opposed to attributing the decision-making capacity to each individual through a representation of the collective they belong to or by obeying the orders of a supposed central supervisor, this kind of colony should be understood as "a decentralized system made of autonomous units that are distributed in the environment and that may be described as following simple probabilistic stimulus-response

13. Ibid.

14. Theraulaz, 191.

15. Leach, "Swarm Urbanism" in Swarm Intelligence: Architectures of Multi-Agent Systems, 77.

16. Neil Leach, "Introduction", in *Swarm Intelligence, Architectures of Multi-Agent Systems*, ed. Neil Leach and Roland Snooks, (Shanghai: Tongji UP, 2017), 1.

17. Theraulaz, 181.

18. Michael Crichton describes a swarm of insect-like nanorobots governed by a collective mind that lets them make complex decisions and even predict the future. The poet Maurice Maeterlinck had already made reference to this type of phenomenon in several of his essays: "The Life of the Bee" (1901), "The Life of Termites" (1927) and "The Life of the Ant" (1930).

19. Theraulaz, 181.

behaviors."[20] That means that order is produced through processes of emergence: individuals acting according to local laws produce global patterns. They have no knowledge of the whole to which they belong, and yet their continued local interaction provides for the emergence of collective logics.
One of the most broadly documented cases is that of ant colonies (Fig. 4-4). In his book Emergence,[21] Steven Johnson wonders how ants, despite their tiny size and their lack of human mind power, have managed to become a dominant presence in the world.[22] The answer has to do with their ability to produce "swarm logics". These create a series of fundamental biological benefits: they increase social interaction (facilitating reproduction); they offer protection against predators (increasing longevity); they facilitate foraging (improving nutrition) and they increase the efficiency of locomotion (facilitating movement). These benefits are obtained through structures determined by basic parameters like density, polarity or position. Ants regulate these parameters through simple local laws of individual behavior, such as maintaining the same the speed and direction as neighboring ants or keeping a certain distance from neighboring ants. Another fundamental characteristic of this type of structure involves the persistence of the whole despite the temporary nature of the parts. Effectively, *"generations of ants come and go, and yet the colony itself matures, grows more stable, more organized."*[23] The whole, therefore, is greater than the sum of its parts – not only on a spatial or distributive level, but also on a temporal level.
Since the mid-20th century, this type of emergent logics have been appropriated by a variety of disciplines, including computer science, philosophy, economics and sociology. In all cases, it has involved building models with the ability to approach reality through bottom-up processes. However, in the field of architecture, the most relevant aspect centers on the interpretations that have been made of these processes through computing. The exercise has resulted in a series of highly operational tools. In that sense, John Holland's invention of "genetic algorithms" is fundamental. His contribution is responsible for the emergence of *"complex adaptive systems"*,[24] computational ensembles capable of operating based on the interactions of simple agents, which evolve according to a variable context. As Roland Snooks points out, the conjunction between complex adaptive systems and genetic algorithms operates at different levels: as an understanding of reality and as a creation of reality. In the case of complex adaptive systems, Holland tries to prevent the type of laws that regulate the interaction between agents from becoming a static set. The reason is because, although those low-level processes of interaction could permit high-level processes of emergence, they would be tied to predefined local decisions, and therefore they would be predetermined to some extent.
In any case, the main goal is to free the parts of the whole, with the intention of achieving unexpected but coherent results. In that sense, the application of these phenomena to other disciplines such as sociology, economics or architecture implies the ability to understand those agents as computational agents. Manuel Delanda defines computational agents as *"software entities that can sense their environment and act on it."*[25] Those entities are managed through object-oriented programming, a software paradigm that breaks with the centralized control of other computer languages like Fortran, Pascal or C. In the latter type of systems, there is a master program that controls processes through subroutines. These subroutines can eventually be broken down into other subroutines to carry out minor tasks, but in any case the control always remains with the master program. The main difference between this type of software and object-oriented programming languages like C ++ is that there is no centralized element that acts as an execution manager. Each subroutine is an autonomous software entity that enters into action not in obedience to a higher order, but in response to the presence of certain information patterns. In that sense, the fact that these software objects enjoy a certain autonomy allows for the introduction of heterogeneous processes into the collective system.
As Delanda points out,[26] the development of this type of programming languages was inspired by the work done by analytical philosophers decades before the appearance of the first computers. Beliefs, thoughts and desires were modeled by the aforementioned school of philosophy through propositions – i.e., statements that determine facts with values of truth or falsehood. This propositional tradition offers a good starting point for creating simulated agents whose behavior is not rigidly specified by a set of laws. On the contrary, and according to Delanda, [27]the computational behavior of a series of agents emerges from a sequence like the following: *"factual information about a simulated world, such as information about the distribution of resources in space, is used to update an agent's beliefs; these beliefs are then used to generate a set of optional behaviors that are checked for both desirability and feasibility; options that are both desirable and achievable are used to create goals; and finally, a commitment to those goals becomes an intention to act."* This forms a particular type of software model called Belief-Desire-Intention, capable of generating individual emergent behavior, as opposed to the collective emergence characteristic of cellular automata behaviors like in Sugarscape.
According to Neil Leach,[28] the application of these systems in architecture has followed two basic paths. First, the use of algo-

20. Ibid., 182.

21. Steven Johnson, Emergence: The Connected Lives of Ants, Brains, Cities and Software, (London: Touchstone Press, 2002). 74.

22. It is estimated that there are between one and ten quadrillion ants on Earth, occupying a broad variety of ecological niches. They represent approximately 15-20% of the total biomass of terrestrial animals, up to 25% in tropical areas. This means that the biomass of all the ants on Earth is similar to the total biomass of humans.

23. Ibid., 22.

24. John Holland in conversation with Neil Leach and Roland Snooks, "Excavating Emergence: Conversation with Neil Leach and Roland Snooks", in *Swarm Intelligence, Architectures of Multi-Agent Systems*, ed. Neil Leach and Roland Snooks, (Shanghai: Tongji UP, 2017), 21.

25. Delanda, "Multi-Agent Systems" in *Swarm Intelligence, Architectures of Multi-Agent Systems*, 39.

26. Ibid., 45.

27. Delanda, "Multi-Agent Systems" in *Swarm Intelligence, Architectures of Multi-Agent Systems*, 41.

28. Leach, "Introduction" in Swarm Intelligence: Architectures of Multi-Agent Systems, 5.

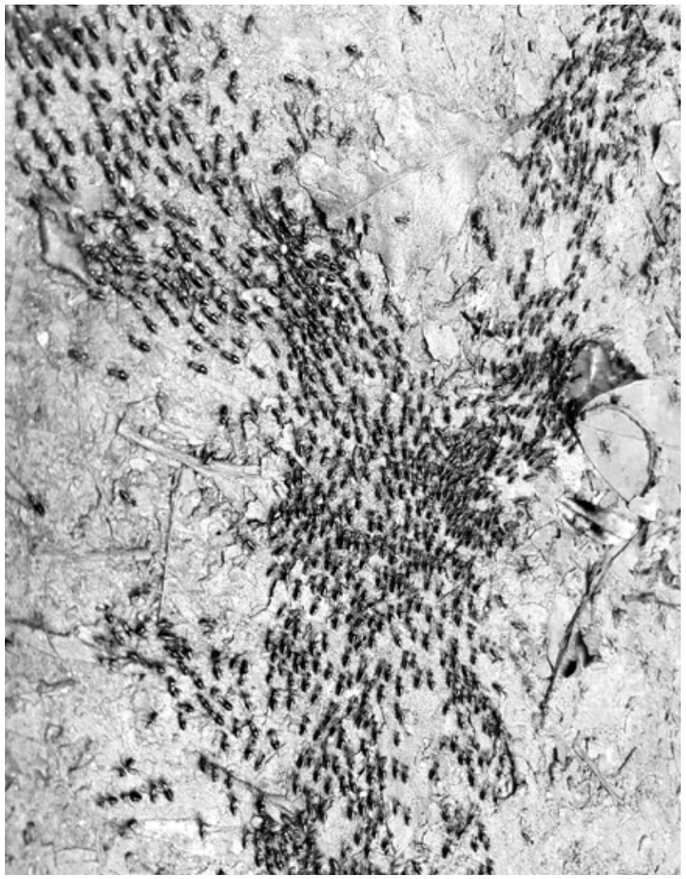


Figure 4-4: Ant collony, 2016.

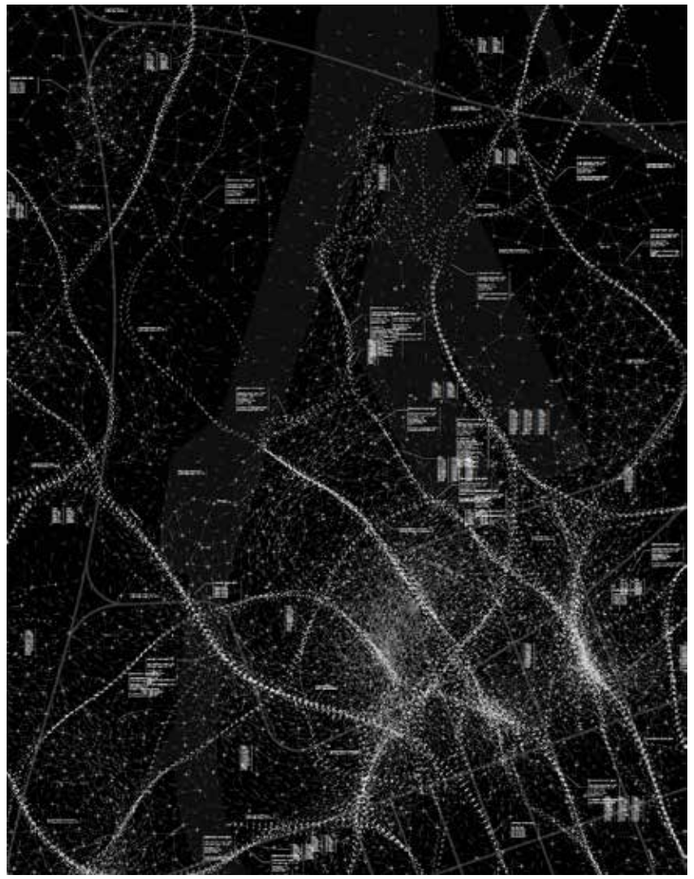


Figure 4-5: Melbourne Docklands, Kokkugia, 2008

rithm-based agents has been used in optimization processes, in simulations of human flows and in the design of interactions. Environments like the ones in Particle Swarm or Ant Colony Optimization have been used for the climatic optimization of buildings. Some examples include the investigations undertaken by Axel Kilian and the Foster & Partners group, whose projects propose a series of complex geometries based on swarm systems. Multi-agent systems have also been used in urban design, as we can see in the work of Kokkugia in the Docklands of Melbourne in 2008 (Fig 4-5). The analysis of traffic flows proposed by Arup in recent years is a good example.

Second, and still following Leach, multi-agent systems have also been used as generative design methodologies. In this dissertation, we are interested in these propositional applications, rather than the simple optimization of processes. However, what is fundamental, on the one hand, is understanding the impact that these systems have on the resulting architecture and, on the other hand, discovering to what extent that architecture can be described through the three concepts that define the contemporary lack of a subject: collections, ex-centricities and interlacements.

Throughout history, architecture has had a recurring interest in nature, particularly in biomimicry. However, architecture's appropriations of swarm intelligence aren't meant to replicate an aesthetic, but rather a logic. In his text "Field Conditions," Stan Allen refers to the complex geometries that bottom-up systems can offer architecture:

> *"Crowds and swarms operate at the edge of control. Aside from the suggestive formal possibilities, with these two examples architecture could profitably shift its attention from its traditional top-down forms of control and begin to investigate the possibilities of a more fluid, bottom-up approach. Field conditions offers a tentative opening in architecture to address the dynamics of use, behavior of crowds, and the complex geometries of masses in motion."*[29]

Allen suggests that the logic of bottom-up systems can be useful to architecture precisely because of their ability to generate geometries that are not only complex, but in motion. The development of this type of multi-agent strategies is part of a larger exploration of generative design strategies that can be divided into several families. According to Neil Leach, these include *"Peter Eisenman's work on the autonomy of form, the animate processes of Greg Lynn, the morphogenetic paradigm expounded by John Frazer and Karl Chu, and the material computation of Antoni Gaudí and Frei Otto."*[30] In that sense, the emergence of generative algorithms and the code techniques characteristic of swarm logics represent a substantial step forward in this type of exploration.

In his Swarm Intelligence, Leach discusses the main professionals who have engaged in similar explorations in academic circles. Alisa Andrasek, Cecil Balmond, Paul Coates, Ed Keller, Leach himself, and Roland Snooks are some of the central figures, supported and promoted by academic institutions as diverse as Columbia GSAPP, the Architectural Association, and Sci-Arc.

Phosphorescent Canyons is a tectonic study developed by the Research Cluster, directed by Alisa Andrasek. Beyond the heterogeneity of the system, the release of the multi-agents that make it up is based on Brownian motion.[31] It focuses on urban studies in complex geographies which, through a series of mathematical algorithms, are able to follow the profile of the mountains. Keeping to the principle of "minimum resistance" typical of rivers that run through the valleys of a mountainous territory, the algorithms are responsible for finding optimized routes between key points on the site.

Other kinds of algorithms[32] are added with the intention of scanning the slopes of the valleys and identifying the places with the best views and grades. At this point, a dynamic matrix is used, which applies sequences of subdivisions to the ensemble; the main purpose is to obtain a heterogeneous set of densities. Swarm intelligence is used in this design as a mechanism that not only helps analyze a series of given morphological characteristics; at the same time, based on those characteristics, it allows for proposing a series of variable configurations with an urbanistic significance.

Since the mid-1980s, Cecil Balmond has been interested in what he calls "local design".[33] After a series of experimental exercises and several years in academia, Balmond decided that multi-agent systems were extremely useful in urban proposals. The reason is that buildings are not simple sets of information (as is the case with urban planning) whose interpretation does not take place through a series of top-down decisions but through a set of interactions between agents of information. However, the Serpentine Pavilion, designed in 2002 with Toyo Ito, includes a multi-agent process that, using a topology based on folds, is able to respond to all the structural demands, which are understood as information flows. In this process, an initial algorithm defines the primary structure of the form, later giving way to a second algorithm that extends the form through a series of arms. The result is a self-supporting structure, where the load is not centralized in one or more elements but rather distributed uniformly through a network system.

In his design studio "Swarm Urbanism" at Sci-Arc, Neil Leach explores emergent systems' potential for urban generation. In 2009, the Spider Urbanism project was aimed at recolonizing the area around Hong Kong's Kai Tak airport, which was abandoned at the time. Using the Processing code system and based on the network theories the German geographer Walter Christaller,[34] the project tries to expand the logic of the remain-

29. ALLEN, Stan: "Field Conditions" in Points + Lines, Ed. Princeton Architectural Press, 2012, p. 101.

30. Leach, "Introduction" in Swarm Intelligence: Architectures of Multi-Agent Systems, 5.

31. Brownian motion is the random movement observed among particles in a fluid medium as a result of their collisions with the molecules in the fluid.

32. One of the most emblematic examples of the use of algorithms in the field of geography and urbanism is Space Syntax, originally conceived by Bill Hillier and based on the idea that, in an urban environment, all spaces are interconnected.

33. Cecil Balmond in conversation with Roland Snooks, "Informal Agency: Conversation with Roland Snooks", in *Swarm Intelligence, Architectures of Multi-Agent Systems*, ed. Neil Leach and Roland Snooks, (Shanghai: Tongji UP, 2017), 118.

34. Walter Christaller was a German quantitative geographer who, through his central place theory, laid the foundations for explaining the organization

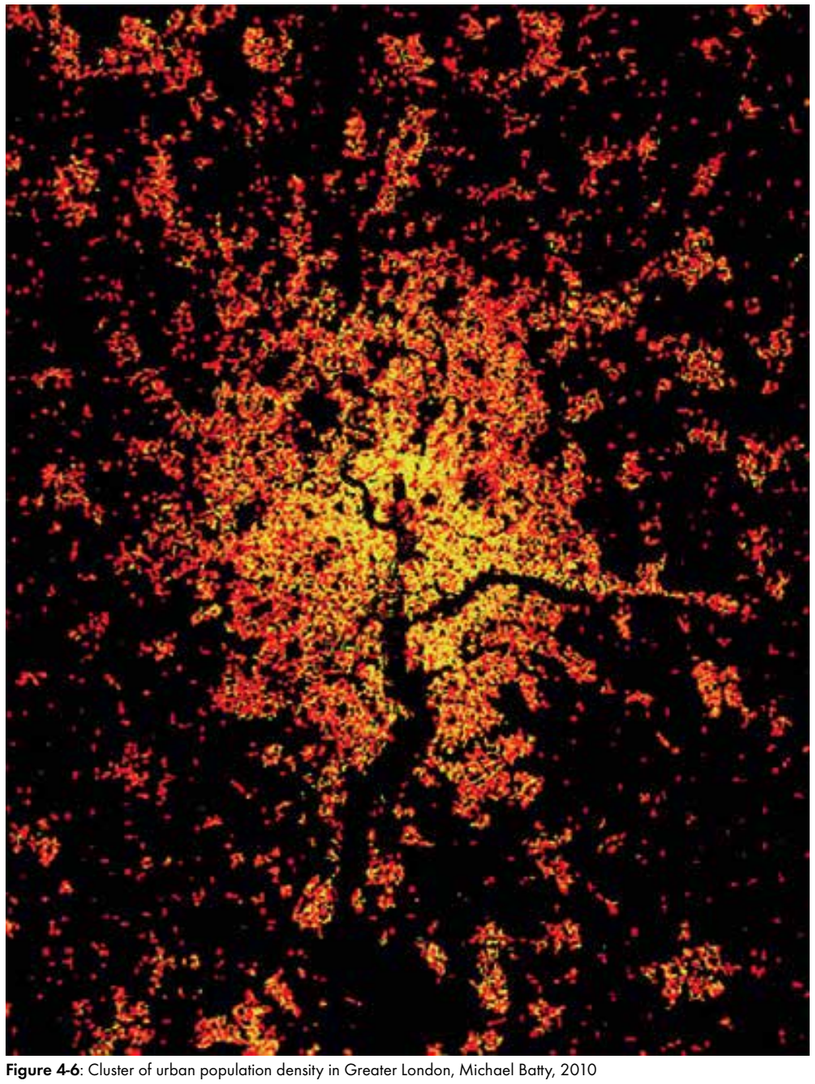


Figure 4-6: Cluster of urban population density in Greater London, Michael Batty, 2010

Figure 4-7: Negotiable Hierarchy, Roland Snooks studio, 2009

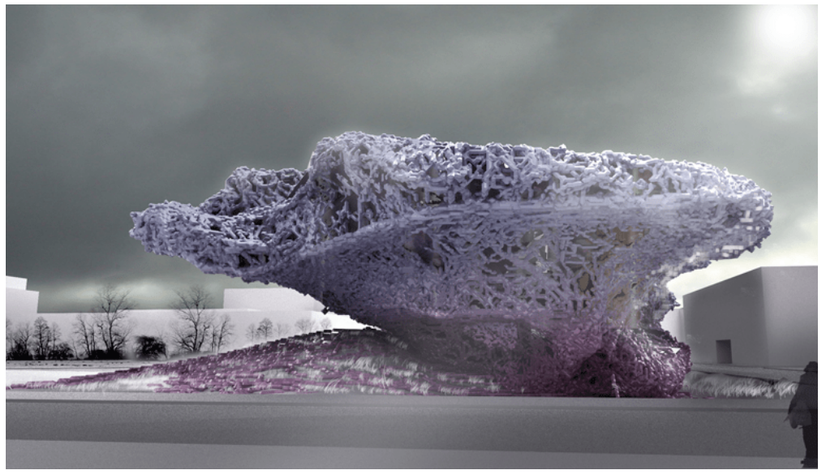


Figure 4-8: Pixel Studio, Cecil Baldmond and Roland Snooks, Students: Joshua Evans, Liwen Mao and Jason Smith, 2009.

Figure 4-9:Stickmergy, Cecil Baldmond and Roland Snooks, Students: Dwight Engel, So Sugita and Dale Suttle, 2009.

ing urban fabric on the site through a network of nodes that contains hospitals, shopping centers, offices and residences. The code also allows for regulating the density and distribution of the program, obtaining a variety of results whose value depends on the desired urban scenario. Thus, the value of the project does not consist in the insertion of a series of patterns into an abstract space, but in recognizing the logic of the site's pre-existing conditions as the foundation for its recolonization.
The issue of AD dedicated to Digital Cities, describes a series of projects that, in line with the aforementioned proposals, apply swarm intelligence to the design of cities. Among the projects are the flow designs proposed by Michel Batty (Fig. 4-6), the research lead by Roland Snooks (Fig 4-7) and Cecil Baldmond (Fig. 4-8 and Fig. 4-9) in Pennsylvania, the experiments in Associative Urbanism conducted by Tom Verebes, , and the Morphogenetic Design proposals developed by Peter Trummer. All of the above – along with the Columbia GSAPP algorithm design research center, Guy Theraulaz's intelligent algorithms for intelligent architecture, and the emerging design advances at Sci-Arc and Pennsylvania universities – represent a series of projects that, due to their breadth, variety of scales and persistence, constitute an significant current of emergent design in the field of architecture and urbanism.

4.2.3 Parts and particles

Nonetheless, the question we asked ourselves before starting out on this journey has not yet been answered explicitly: Do swarm intelligence phenomena entail the complete decentralization of the parts with respect to the whole? Apparently, the answer would seem to be yes. The emergent processes that we have seen in biological processes, computer processes and architectural processes are based on part-part relationships – that is, on exclusively local interactions, which nevertheless generate a coherent whole. The end result is always a "total" behavior: as we have seen, a school of fish, a flock of birds or a herd of sheep exhibit behavior that is coherent on the whole. The situation is very similar to the fields we discussed in the first chapter (2.4.3). Stan Allen is very clear in this regard:

> *"The flock is clearly a field phenomenon, defined by precise and simple local conditions, and relatively indifferent to overall form and extent. Because the rules are defined locally, obstructions are not catastrophic to the whole. Variations and obstacles in the environment are accommodated by fluid adjustment. A small flock and a large flock display fundamentally the same structure. Over many iterations patterns emerge. Without repeating exactly, flock behavior tends toward roughly similar configurations, not as a fixed type, but as the cumulative result of localized behavior patterns."*[35]

Allen emphasizes that any error in a local interaction is not a problem, because it occurs on an underlying field of relationships that can absorb specific errors. The case of flocks of starlings is illustrative in that respect: the local interaction of each starling is governed by three main local rules. First, the starlings have to keep a minimum distance from their neighbors; second, they have to synchronize speeds with their neighbors; third, they must steer towards their neighbors' center of mass. If one starling falls, the others, understood as a homogeneous whole, adapt to absorb that circumstance. This phenomenon introduces a fundamental characteristic that accounts for the global value of the resulting behavior: no agent can be excluded without the other agents being affected to a greater or lesser extent. It is therefore a holistic system based on multiplicities. That recalls one of the fundamental principles of Deleuze and Guattari's philosophy: "population thinking" – in other words, the idea that "*the population not the individual is the matrix for the production of form.*"[36]
Although these relationships are strictly local and, in a purely operational sense, they do not require an understanding of the whole to which they belong, they are the way they are because it produces a more beneficial global result. In other words, those local rules regulate local agents and situations, but their objective (regardless of whether or not it is known to those agents) is a global objective. Emergent processes are, therefore, teleological processes. Timothy Morton refers to precisely this when he writes that "*Emergence is also a sensual object. And thus it's in danger of doing the work of reifying – strangely enough, given its reputation as an unreified, flowy thing, despite its popularity as a replacement for terms such as nature. Emergence is always emergence for.*"[37]
Effectively, processes of emergence are regulated by an objective around which a series of local rules are structured. As we have seen, the execution of these local rules is independent from the whole, but their disposition and evolution is not. As a result, the processes of emergence we have seen are centralized around a "de facto" objective. Generally, the fact that in processes of emergence the parts are defined exclusively by their relationships with other parts of the whole has been interpreted as their emancipation with respect to the whole. However, the opposite is true: the parts dissolve their identity into the whole to which they belong. The starlings' rules define their movement exclusively with regard to other starlings. And they are governed by certain rules and not others precisely because those rules generate an advantageous whole . Morton describes this type of relational process as "*simply the last philosophical reflex of the modernity that creates the sludge.*"[38] The instrumental reason characteristic of modernity is still behind this type of process. Although the result is not exercised from the top-down framework typical of modernity (on the contrary, it emerges from a bottom-up framework), the result is still a "total" behavior. Moreover, that behavior pursues strictly instrumental ends, subjugating the parts to the benefit of the whole. Neil Leach also suggests this kind of reflection when he asserts – referring to phenomena of emergence like Brazilian favelas or Chinese hutongs – that "these forms of urbanism constitute a relatively homogeneous field of operations where individual components do not stand out, but conform to the pervasive logic of their surrounding environment."[39] Indeed, the constituent parts of the ensemble do not stand out from the whole; rather, they constitute it through their uniformity. As such, we are not dealing with a mereology of parts, but rather a mereology of particles: each part is not an incomplete fragment that is unique in its identity, but rather a generic element that dissolves into the whole of which it forms part. Its being is defined precisely by the relationships it establishes with other elements; those relationships are the way they are because they are beneficial to a whole, which is made up of particles that are ignorant of it.
In that sense, Morton says that moving past modernity implies the need for a "*philosophy of sparkling unicities; quantized units that are irreducible to their parts or to some larger whole; sharp, specific units that are not dependent on an observer to make them real.*"[40] Any process of emergence is a process centralized by a global telos. The fact that the individuals that form it are ignorant of it and guided by rules that are local on an operational level is ultimately irrelevant, because it does not rule out the existence of a whole or the "de facto" subordination of the parts to that whole. On the contrary, despite the local character, the rules that regulate individuals undervalue the parts on the one hand and overvalue the whole on the other. They undervalue the parts by fully determining their behavior according to external factors. They overestimate the whole by making those rules contingent on the benefit of the whole. It is understood that this benefit will affect the well-being of all the parts, which are not understood individually (since any individual failure of one of the parts can be compensated for) but in general terms. These laws are effectively local in their execution, but they are the way they are because they meet a certain global objective. Of course, this centrality is not comparable to that of modernity, characteristic of top-down systems. It is an indirect centrality, watered down or, if you prefer, weak. In fact, Leach himself refers to this when he suggests that "*we might understand emergence as operating within the framework of what Gianni Vattimo calls 'weak thought' (pensiero debole).*"[41] What we are dealing with, then, is what Morton defined as the last bastion of modernity: these phenomena of emergence retain the instrumental purpose characteristic of Modernity, but they do so through an implementation whose centrality has not been eliminated, but attenuated.

4.3 From swarm intelligences to regimes of attraction

As we saw in Chapter 3 (section 3.1), the exhaustion of holistic thought has led to the emergence of a theoretical corpus based on collections, ex-centricities and interlacements. The need for each element not to be exhausted in the system in which it operates makes swarm intelligences an obsolete mechanism, since it does not permit any of the parts to dissent from the whole. In contrast, in recent years a series of theoretical strategies have been articulated whose leitmotiv is based on a very particular mereology: on the one hand, the parts maintain their autonomy, and on the other, they are able to establish relationships with one another. Although the concept of assemblage theorized by Deleuze and later developed by Delanda points towards this mereological singularity, Levi Bryant's regimes of attraction emerge as the intellectual device that most precisely responds to this concern. We will now see how the latter are mereologically different from the former and, above all, how this new understanding of the concept of "part" ties in with a possible design method.

4.3.1 Strange mereologies

Developing a contribution to the problem of the floor that is aligned with the contemporary lack of a subject requires a mereological renewal. The key concepts of "collection", "ex-centricity" and "interlacement" we discussed above suggest an interpretation of the parts and the whole in keeping with what Levi Bryant calls a "strange mereology".[42]Its peculiarity lies in proposing a type of relationship between objects in which an object is both part of another object and an object in itself simultaneously. Although an object can enter into relationships with other objects, the objects in question are not exhausted in the relationships that are established between them, as would be the case for Latour[43]; rather, they appear as autonomous. Levi Bryant explains it quite clearly:

> *"The strangeness of this mereology lies in the fact that the subsets of a set, the smaller objects composing larger objects, are simultaneously necessary conditions for that larger object while being independent of that object. Likewise, the larger objects composed of these smaller objects is itself independent of these smaller objects."*[44]

There are two main conclusions from this paragraph: first, the parts are elements that, although incomplete, are autonomous; and, second, the parts can be grouped into supra-parts or be made up of sub-parts, but in no case is there a unifying whole. The processes of emergence that we have seen up to now still take into account the presence of a whole, although it is the result of a series of strictly local interactions. On the other hand, the notion of collection that we discussed in the previous chapter (section 3.2.2) is telling in light of these reflections: on the one hand a collection is a discrete set of elements; on the other hand the elements are grouped in a certain way because they share a specific relationship of affinity. However, each of the objects does not dissolve into the whole; they all maintain their autonomy. Through an ontology of sets, Badiou refers to precisely this kind of strictly "external" relationships: although it is true that the various elements of a set relate to one another, their relationships are necessarily contingent, and therefore they could take

of urban networks, theorizing the planning patterns of urban centers, seen as service centers to provide for the surrounding population.

35. Stan Allen, "Field Conditions" in *Points + Lines, Ed. Princeton Architectural Press*, ed. Mark Lamster, (New York: Princeton Architectural Press, 2012), 99.

36. Manuel Delanda, "Deleuze and the Use of the Genetic Algorithm in Architecture" in *Designing for a Digital World*, (London: Wiley, 2002), 117-18.

37. Timothy Morton, *Hyperobjects*, (Minneapolis: University of Minnesota Press, 2013), 119.

38. Ibid.

39. Leach, "Swarm Urbanism" in Swarm Intelligence: Architectures of Multi-Agent Systems, *77.*

40. Morton, *Hyperobjects*, 120.

41. Neil Leach, "Swarm Urbanism" in *Digital Cities*, ed. Neil Leach, (London: Wiley, 2009), 58.

42. Levi Bryant, *The Democracy of Objects*, (Michigan: Open Humanities Press 2011), 212. http://www.openhumanitiespress.org/books/titles/the-democracy-of-objects/

43. Latour's expression according to which an entity is defined by what it modifies, transforms, perturbs or creates is well known.

44. Ibid.

on a different form. In that sense, Badiou emphasizes how the parts of an ensemble are both objects in themselves as well as parts of a larger object. As a result, the parts are not defined by their relationships. Because they retain their autonomy, they can separate from the group without the group having to readjust entirely (as would be the case in swarm intelligence systems).

However, Levi Bryant goes even further by asserting that objects *"are not merely aggregates of other objects, but have an irreducible internal structure of their own."*[45] The difference is that, for Badiou, the relationships are strictly extensional, that is, they occur between objects, whereas for Bryant they also occur within the objects themselves. In that sense, Bryant's ontological system differentiates between exo-relations and endo-relations. Exo-relations are external to the object, in the sense that the object is not constituted by them and can therefore be separated from them. In contrast, endo-relations are internal to the object, in the sense that they constitute the object's internal being – i.e., its essence. This type of mereology can also be illustrated with examples from the world of biology, which should be differentiated from the examples of swarm intelligence systems. The case of our bodies is a paradigmatic example: although a body cannot exist without cells, it stands to reason that a body cannot be reduced to a simple collection of cells. Nevertheless, that does not imply that the cells dissolve into the body, as parts into the whole. On the contrary, the cells maintain a certain autonomy, which is clear at least in two cases: first, when they those cells produce a cancer; and, second, when a transplant is performed. In both cases the cells act as parts that can engage in a behavior independently from their supposed whole, sometimes even against its best interest.

Levi Bryant gives another example of this type of phenomena in terms of social relationships.[46] While it is true that the United States would not exist without its citizens, the former can not be reduced to the latter. The United States would remain if its population were reduced by half or if the population were distributed across the globe, relating via the Internet. However, the citizens of the United States are not "parts dissolved in a whole". They maintain individual autonomy: they can renounce their citizenship, act against the interests of their country or even emigrate. The mereology illustrated in these examples is therefore a mereology where there is no harmony or identification between the parts and the whole: the parts are not parts "for" a whole. Rather, the parts and the whole remain as separate and autonomous elements, despite the interactions that may occur between them. As such, the holistic mereology characteristic swarms is replaced by a0 matryoshka-type mereology – in other words, a series of sets and subsets where an object can be understood simultaneously in three ways: as an autonomous object in itself, as an object-part of another larger object; and as an object made up of other object-parts. In this mereology, relationships are not an underlying field from which the objects emerge. Precisely because of the objects' internal complexity, each element does not necessarily relate to the rest, but only to some of them and only in a certain way. In short, they are selective relationships. The relationships between objects described by Badiou (and which Levi Bryant defines as exo-relations) should be understood as relations of resonance. They are defined precisely as one system's capacity to be disrupted or irritated by another system.

Bryant carefully studies Deleuze's conceptual approach to the object, highlighting the following quote with special emphasis:

> *"A living being is not only defined genetically, by the dynamisms which determine its internal milieu, but also ecologically, by the external movements which preside over its distribution within an extensity. A kinetics of populations adjoins, without resembling, the kinetics of the egg; a geographic process of isolation may be no less formative of species than internal genetic variations, and sometimes precede the latter. Everything is even more complicated when we consider that the internal space is itself made up of multiple spaces which must be locally integrated and connected, and that this connection, which may be achieved in many ways, pushes the object or living being to its own limits, all in contact with the exterior; and that this relation with the exterior, and with other things and living beings, implies in turn connections and global integrations which differ in kind from the preceding."*[47]

The object model presented by Deleuze is centered on three relationship environments. The first has to do with the genes of the organism itself; the second refers to the relationships that the organism establishes with other organisms; and the third consists of the relationships between the parts that make up that organism. This system is characteristic of the swarm systems we looked at earlier: the object consists mainly of the relationships it is capable of establishing with any of the three environments. However, as Levi Bryant points out, Deleuze treats the object *"as a mere effect of these relations rather than granting the agent a causal role in these developmental processes."*[48] Deleuze's system of relations leaves out the role of the agent itself – in other words, the agent's role in its own construction. In that sense, following Kenneth Burke we might say that in Deleuze's system there is an environment without an agent.

Instead of swarm intelligences, Levi Bryant proposes "regimes of attraction". These are defined as *"interactive networks or, as Timothy Morton has put it, meshes that play an affording and constraining role with respect to the local manifestations of objects."*[49] Understanding local manifestations as the qualities produced by exo-relations, regimes of attraction may include all kinds of components: physical, biological, semiotic, social, etc. However, the fundamental difference between swarm intelligences and regimes of attraction is that the latter do not determine the local manifestations of objects. While regimes of attraction play a significant role in the emergence of objects' local manifestations, the latter are not mere effects of the former. As such, when an object enters into exo-relations with other objects, those other objects disrupt it in various ways, influencing its local manifestations. However, objects are also causes and

45. Ibid., 214.

46. Ibid., 216.

47. Gilles Deleuze, *Difference and Repetition*, trans. Paul Patton, (New York: Continuum International Publishing Group Ltd, 2004), 216-17.

48. Levi Bryant, *The Democracy of Objects*, 197.

49. Ibid., 205.

Figure 4-10: Fish bank adquiring a spheric form in order to protect itself from predators.

actors in the world. Levi Bryant illustrates this reflection using the following example:

> *"A cat that finds that the heat of the fire in the fireplace is a bit too hot does not merely sit there and roast, but rather gets up, paces back and forth a bit, and finds a place to sit more amenable to its desired temperature. In this way, the cat takes an active role in modulating the production of its local manifestations in relation to the milieu in which it finds itself."*[50]

That is the difference we referred to between swarm intelligences and regimes of attraction: although the objects are interrelated with regimes of attraction in various ways, the objects do not dissolve into a regime of attraction, because they maintain the necessary autonomy to act within them, to construct their own environments and therefore modify the circumstances in which they find themselves.
Regimes of attraction are thus a step forward in terms of the relational strategies we have studied so far. As we have seen, L-systems, fractals, cellular automata and swarm intelligence are systems that, to a greater or lesser extent, attempt to move away from the centralization of Modernity's top-down design protocols. Although the latter may not make a direct reference to a concept of the whole, the parts end up dissolving into the whole, since it acts as a telos. As Timothy Morton says: "emergence is always emergence for" (Fig. 4-10). In that sense, although regimes of attraction still present as a network, they are not totalizing because they allow the participating objects to develop independently in a satisfactory way. As such, each object can be understood as a part of a larger object. However, since the first object maintains a certain autonomy, it cannot be completely dissolved into the second object.
"Regimes of attraction" have another unique feature that separates them from swarm intelligences. Because they maintain the autonomy of the parts, regimes of attraction do not present a unified telos. As we saw when discussing with swarm systems, they are organized around a series of strictly local laws that are nonetheless capable of producing dynamic, global and coherent patterns. Moreover, the patterns are not random but rather the result of an evolutionary process of optimization. The configurations resulting from swarm logics are the way they are because, performatively, they fulfil a specific objective, the scope of which is global. In contrast, although regimes of attraction maintain the dynamism characteristic of swarm logics, they do not necessarily result in a whole with a particular coherence. They leave room for what we might call "organized dissidence". Again, the example of a tumor is very illustrative: it occurs within the context of coherence of human cells. However, at some point some of those cells activate an independent behavior. That behavior is not the result of an individual, temporary error, like a starling getting lost in the flock that surrounds it. It is the result of the purposeful organization of a series of agents. In the case of swarm logics, the whole can absorb an incidental error on the part of one of its agents through a general readaptation. In contrast, in the case of regimes of attraction, this "organized dissidence" cannot necessarily be absorbed by the rest of the cells. In that sense, regimes of attraction are not necessarily articulated by a global telos. Instead, despite conditioning and promoting certain dynamics, they allow the appearance of independent logics in their midst.
This type of framework is especially well-suited to a thought based on "collections", "ex-centricities" and "interlacements".
First, the regime of attraction understands objects based on a flat ontology – i.e., an ontology in which existence is a binary phenomenon, not a gradual one.. As a result, there are no ontologically privileged objects. Instead, following the hybrid realities of Latour,[51] objects are arranged in a myriad of "democratic" groups.[52] As we have seen, the concept of collection is just that: an countable set of objects which – despite their diversity and independence – maintain selective affinities with one another. However, they cannot be reduced to those relationships. In addition, the concept of a "collection" admits sub-collections and supra-collections, as long as the object itself maintains its autonomy as opposed to dissolving into a supra-collection or being reduced to a mere aggregate of sub-collections. Swarm intelligences also contain a set of hierarchical individuals, although as we have seen their individual identities dissolve into the whole to which they belong. Second, regimes of attraction are not centralized. This is a quality they appear to share with swarm logics. However, as we explained earlier, that is not the case, because swarm logics are centralized around a common telos. In contrast, regimes of attraction allow for the emergence of several telos within them, which may not only be different but actually at odds with one another. As a consequence, in a regime of attraction there are only ex-centricities: elements and organizations whose fundamental characteristic lies in a temporary, incomplete and non-axialized type of appearance.
Third, regimes of attraction are relational sets. That means that each agent in the set is not a monad; rather, it interacts with the rest of the agents. However, these relationships are selective: they are one way or another depending on the nature of the objects that they bring into contact. Harman illustrates this relationship with the example of cotton and fire:

> *"When fire burns cotton (I adore this example from medieval Islamic thought), it does not make contact with all the properties of the cotton. The color and smell of the cotton, its softness, its price – none of these are of any relevance to the fire, which only encounters the flammability of the cotton ball. It doesn't matter if the cotton is "not conscious" while humans are. Who said that the noumenal/phenomenal rift had to be produced by "consciousness"? On the contrary. This distinction is not the product of exalted or damned special human features, but results from the simple fact that no object can exhaust the reality of any other."*[53]

50. Ibid., 208.

51. In his Actor-Network Theory, and through his flat ontology, Latour avoids purifications of reality like Sokal's naturalism, Bourdieu's constructivism, or Derrida's deconstructivism. Instead, Latour defines reality as a network of animate and inanimate agents: in other words, a hybrid network of actors defined not by their ontological nature, but by their position and their role in the network.

52. The expression is used in the sense of Levi Bryant's The Democracy of Objects, according to which all objects exist in conditions of ontological equality, regardless of their nature.

53. Graham Harman, interview by Brian Davis, *Faslanyc* (blog), July 1, 2012, https://www.archdaily.com/783491/interview-with-james-wines-the-point-is-to-attack-architecture.

Fire is only related to cotton through its quality of being flammable, but not through other qualities like its color or its texture. However, although this relationship is selective, it is not necessarily anecdotal. It can also be a close and meaningful relationship. As such, we are dealing with relationships that – despite their ephemeral and selective nature – can form not only as mild disturbances or irritations, but also as intimate interlacements. However, in no case do these interlacements dissolve the autonomy of the participating objects. Manuel Delanda is very clear on this when he asserts that "if a relation constitutes the very identity of what it relates it cannot respect the heterogeneity of the components, but rather it tends to fuse them together into a homogeneous whole."[54]

4.3.2 Resonant parts

As we have seen, regimes of attraction are, on the one hand, a step forward as a decentralizing system and, on the other, a theoretical framework aligned with the contemporary lack of a subject. "Collections", "Ex-centricities" and "Interlacements" are concepts that tie in with the processes proposed by regimes of attraction. In that sense, a contribution to the problem of the floor based on 1) a conception of architecture as a constant re-articulation of parts within a gravitational scenario and 2) an approach to the subject-object dichotomy that eliminates the first element from the equation and is defined by the three concepts we have just mentioned, must be established through the frameworks of a regime of attraction. To serve as an element of articulation between the disciplinary singularity of the problem of the floor and the abstraction of the ontological framework, we need to establish a productive device capable of generating an array of results. In the emergentist architecture of the turn of the century, this role was played by other productive devices we have already discussed, such as L-Systems, Fractals, Cellular Automata and Swarm Intelligence, which Neil Leach described as decentralization mechanisms and which are based on the relational ontologies of thinkers like Deleuze and Guattari.
We propose an ensemble of resonant parts. It consists of a collection of objects based on an ontology of a regime of attraction and has five fundamental characteristics:

1. Local emergences are generated:
   A series of local interactions occur among the objects belonging to a set of resonant parts, which generate local patterns – i.e., patterns that affect only a subset of the objects. In no case is there a global coherence, merely a new arrangement of objects, some of which are grouped together creating micro-assemblages. These are temporary, contingent, partial, unexpected and operative, setting aside any global impact.

2. If there are objectives, they are always partial:
   Sets of resonant parts allow for the coexistence of partial telos that may be independent, complementary or conflicting with respect to one another. Their local interactions are not a certain way in order to achieve a certain global objective, but rather to maintain particular local qualities in the face of an ensemble that evolves, conditioned by all kinds of external and internal factors.

3. It displays a mereology of poly-pluralities:
   A set of resonant parts is, above all, a collection of objects whose autonomy does not dissolve into a field of global relationships. Therefore, it is not a holistic system where everything is connected, but rather sets and subsets of discrete objects. As a result, the objects in a set are simultaneously objects in themselves and parts of a larger object. In turn, that larger object is itself independent from the minor objects that make it up.

4. Some objects can be separated from the ensemble without affecting it:
   The resonant parts are non-relational objects, in the sense that they are not defined by their relationships and are therefore exhausted by them. Moreover, all the resonant parts are not necessarily related at all times. As a result, when it comes to the objects in a given set, some of them can be removed from the set without the set needing to readjust to the new situation.

5. Some objects enter into relationships with others:
   The continuities that are established between the resonant parts in a set are not total, underlying, necessary or constant; they are partial, added on, contingent and temporary. As such, and due to the internal complexity of those objects, each object is not related generically with all the rest, but only with certain objects and in a specific way.
   Sets of resonant parts are mereologically located halfway between the fields of holistic relations described by Deleuze and Guattari, on the one hand, and Leibniz's set of monads, on the other.

The first case is a single continuous system from which temporary singularities emerge, as a result of certain fluctuating relationships. The second case is a discrete set of isolated monads, which, as Leibniz states, "are windowless".[55] Resonant sets operate in a continuous and discrete way simultaneously. On the one hand they establish local continuities between objects based on relationships that are temporary, contingent, performative and partial. As opposed to a total continuity of the holistic type, there is a "viscous" understanding of continuity: it affects only a subset of the elements that make up the whole, and in no case dilutes the autonomy of the participating objects; it merely interlaces them.
On the other hand, some of the parts of the resonant sets maintain their autonomy, so that the ensemble can be understood as a discrete entity. Moreover, those resonant parts can be considered discrete in two ways: first, because they are countable; and, second, because they are distinct, having been modified by their interlacements.
In that sense, the most relevant characteristic of the sets of res-

54. .Manuel Delanda, *Assemblage Theory*, ed. Graham Harman, (Edinburgh: Edinburgh University Press, 2016), 2.

55. The expression "Monads are windowless" was used by Leibniz to highlight the fact that, in his monadic system, each of the monads had no relationship with the outside world. The apparently coordinated general movement between them corresponded to what the German philosopher called a "pre-established harmony".

onant parts is their selective relationality. At some points, some of the objects in the set temporarily lose their autonomy when entering into resonance with other objects, whereas unrelated objects on the same continuum maintain it. Therefore, this is not a set formed only by autonomous objects at all times, nor is it a total continuum in which there are never any individualities that are not emergences. On the contrary, some parts enter into resonance and establish interlacements as a result, while others maintain a radical autonomy. Because there is no unifying whole in any case (at the most there are "viscosities"), the set is still discrete because those viscosities become full-fledged objects. Although the autonomy of the objects that make up that viscosity seem to have dissolved into it, their autonomy is still virtually present because the interlacement can be undone at some other point in the process and the original objects will recover their prior state.

As such, a set of resonant parts is not an aggregate, and despite its similarities with Delanda's assemblages, they are not exactly equivalent either. For Delanda, in an aggregate *"the components merely coexist without generating a new entity."*[56] In fact, in an aggregate the parts are located in positions adjacent to one another – in other words, they are contiguous. But, as we have seen, a contiguity is not continuity, it is only the positional coincidence of a limit. As such, an aggregate can not be constituted as an object because its parts do not recognize one another, as though they were monads. The collections characteristic of sets of resonant parts permit certain parts to enter into effective resonance with one another, thus generating performative micro-continuities, as opposed to mere positional contiguities.

However, a resonant set is also not an assemblage, although they do share certain similarities. The term "assemblage" is defined by Deleuze as "a multiplicity which is made up of many heterogeneous terms and which establishes liaisons, relations between them, across ages, sexes and reigns – different natures. Thus, the assemblage's only unity is that of a co-functioning: it is a symbiosis, a sympathy. It is never filiations which are important, but alliances, alloys; these are not successions, lines of descent, but contagions, epidemics, the wind."[57] In that sense, an assemblage or agencement[58] is a set of elements whose common functioning is unifying. Again, flocks of birds or schools of fish are good examples of this, because the connections maintained by the individuals are what allows for generating a new unifying function. Delanda offers an interpretation of the term assemblage based on the presence of four fundamental points:

1. Assemblages have an individual identity that is autonomous, historical and contingent.
2. Assemblages are made up of heterogeneous components.
3. Assemblages can in turn become parts of larger assemblages.
4. Assemblages emerge based on the interactions between their parts, but once an assemblage has been produced, it immediately begins to act as a source of limitations and opportunities for its components (downward causality).

In that sense, the main interest of assemblages for this dissertation lies in the fact that, as Delanda points out, the components of an assemblage are full-fledged entities, which possess an existence independent of the assemblage to which they belong. Undoubtedly, this is a step forward with respect to topological fields and, in that sense, assemblages and regimes of attraction share a fundamental aspect that is summed up in the first three points Delanda offers. However, there are two main differences between an assemblage and a regime of attraction, one of which is relevant for the purposes of this dissertation.

In the first case, Delanda differentiates between relationships of interiority and relationships of exteriority, asserting that only the latter exist. The former would be equivalent of Harman's "domestic relations", or Bryant's "endo-relations", while the latter would be equivalent to Harman's "foreign relations" or Bryant's "exo-relations".[59] So, while for Delanda there is only one type of relationship (in this case, called external relations) for Harman and Bryant there are still two types of relationships: internal and external.

In the second case, the difference is more relevant to this dissertation and it ties in with the fourth point: sets of resonant parts and assemblages are differing in that the latter operate transversely (downward causality) in all their components (although their autonomy is respected). That does not happen in regimes of attraction.

Whereas a flock of birds can be understood as an assemblage because it generates an entity whose parts are united by their global functional value, resonant sets do not have a functional unification. Only some of their parts enter into local resonance, generating processes of symbiosis that are also local (never global as is the case with assemblages), whose impact aims to affect all of the parts. In resonant sets there are parts that may not relate to any other part – in other words, they are free parts that may nevertheless enter into resonance with other parts at any given time. If that resonance does not occur, the free parts do not participate in any process of co-function, despite being part of the whole, since regimes of attraction do not attempt to affect all their components, as is the case with the assemblages (although not all the parts of an assemblage are necessarily ultimately affected). As a result, the fourth point Delanda uses to characterize assemblages is not applicable to resonant sets, since they do not emerge as an effect of the interactions between their parts. Therefore, once they are constituted, they do not exert an effect on all their parts either. On the contrary, sets of resonant parts are not emergences; they are a set of elements, some of which produce emergences.

The resonant parts are thus configured through sets, where some

56. Manuel Delanda, *Assemblage Theory*, 12.

57. Gilles Deleuze and Felix Guattari, *Anti-Oedipus: Capitalism and Schizophrenia*, (London: Penguin Classics, 2009), 42.

58. *"The word in English fails to capture the meaning of the original agencement, a term that refers to the action of matching or fitting together a set of components (agencer), as well as to the result of such an action: an ensemble of parts that mesh together well. The English word used as translation captures only the second of these meanings, creating the impression that the concept refers to a product not a process"*
Manuel Delanda, *Assemblage Theory*, (Edinburgh: Edinburgh University Press, 2016), 1.

59. Levi Bryant, "Assemblages Against Totalities", *Larval Subjects* (blog), September 8, 2010, https://larvalsubjects.wordpress.com/2010/09/08/drg-assemblages-against-totalities/

enter into resonance to produce local interlacements, while others remain free, (although they are potentially disruptable at another time). This mereological singularity is fundamental, as we will see in the following pages, to the development of the design method that will let us offer a response to the hypothesis we proposed in the previous chapter (section 3.4).

4.4 Resonant piling: the design method

As we have seen, regimes of attractions establish a mereological approach that operates fundamentally with "resonant parts" whose objectives, relationships and effects are always local and not always affected by a whole. The application of this framework to the problem of the floor involves clarifying the method through which the collection of slabs that make up the discrete floor can eliminate the centrality that totalizes them, while some of them become capable of establishing interlacements that are both and contingent and operative. In the following pages, we will describe the method that will be used for the production of a new floor disposition, in view of the concepts of collection, ex-centricity and interlacement. It is worth recalling that this method operates from an architectural position that understands the discipline as a re-articulation of parts occurring within a gravitational scenario. For the reasons we indicated at the beginning of this chapter (section 4.1), in this case the floor slabs from the discrete layout are taken as the parts to be re-articulated toward the creation of a new floor arrangement.

4.4.1 Ex-centricities as vibrations

An elementary observation of the discrete floor layout reveals that its centralization is derived from a formal and positional repetition of each of the slabs. As we have seen, these are positioned along the same [x], [y] coordinates, in order to preserve the vertical continuity of the circulation core, structure and façade. In that sense, the floor layout characteristic of modern skyscrapers is discrete in the sense of countability, but it is not discrete if we understand it to mean distinct, whether on a positional level or a formal level. Because of that absence of discretism, continuities can be established on the z-axis of the ensemble, with a clearly centralizing purpose.

It follows that the first requisite for the decentralization of the ensemble is to eliminate the vertical continuity generated by the positional repetition of the slabs along the [x] and [y] axes. However, the exercise cannot be undertaken with the intention of developing a global function for the ensemble. In that case, said function would act as a center in the sense of forming a telos shared by all the parts. As we have seen in the swarm intelligence systems of ant colonies or flocks of sheep, although the parts establish relationships that are regulated by strictly local laws, they are the way they are because it results in certain global functional patterns. These are beneficial for the parts altogether, but not necessarily for each of their individualities.

To prevent the parts from dissolving into the whole, the positional decentralization of each of the slabs cannot be produced through a top-down schema, but through the slabs' local interaction. However, this decentralization should not occur in light of a global telos; it should take place with a minimum of common determinants.

In his text "On an Aleatory Materialism", Althusser reflects on the materialism that is aligned with the role of telos in these processes of encounter between parts:

> *"a materialism of the encounter, and therefore of the aleatory and of contingency. This materialism is opposed, as a wholly different mode of thought, to the various materialisms on record, including that widely ascribed to Marx, Engels and Lenin, which, like every other materialism in the rationalist tradition, is a materialism of necessity and teleology, that is to say, a transformed, disguised form of idealism."*[60]

In his defense of the materialism of the encounter, Althusser recovers the concept of clinamen, introduced by Epicurus.[61] He explains that, before the world was formed, an infinite number of atoms were falling constantly through the void. They feel in parallel, so that they was no encounter and, therefore, no origin of any world, although all the matter from it was already contained in that rain. This implies that, before the creation of the world, there was no cause or prior meaning, which completely contradicts the postulates of Plato and Aristotle. Into this rain of atoms falling in parallel, Epicurus introduces the clinamen. It is an infinitesimal deviation, the smallest possible swerve, that takes place "*no one knows where or when or how*", and which causes an atom to deviate from its plummet into the void. As a result, at one point, the parallelism is almost unnoticeably broken, resulting in an encounter with the atom next to it. From this encounter, and in a chain reaction, the world is born.

What is interesting about this Epicurean genealogy is that the origin of the world does not lie with reason or cause, but with a random deviation. The World is created without any telos. From there, Althusser criticizes Marx and Engels' materialism: deep down it is an idealism in disguise, since the teleological meaning the authors apply to history turns it into a centralized process, as opposed to an open evolution. For Althusser, a materialism can only be a random materialism.

Returning to the process of decentralization of the discrete floor, we now understood why it is necessary to set aside any global telos to "dislocate" the [x] and [y] positions of each of the slabs. On the contrary, we need to find an element that can acts as the clinamen in the for the ensemble. In the same way that the atoms in Epicurus' rain fall in parallel and the clinamen diverts them to bring about encounters, the discrete floor layout is also "in parallel", with its parts aligned along the [z] vector of gravity. In this sense, it is necessary to find out how the force of the gravitational vector z that centralizes the parts can be transformed into a telos-free dislocation of the [x] and [y] coordinates of each part. Of course, this dislocation must come from some kind of interaction between the parts, and not from a transcendent force applied to each slab (top-down). The simplest way to generate this phenomenon is through a simulated vibration. It is established as a repetitive movement that acts on all axes, despite

60. Louis Althusser, *Para un materialismo aleatorio*, trans. Pedro Fernández Liria, Luis Alegre Zahonero and Guadalupe González Diéguez, (Madrid: Arena Libros, 2002), 167-68

61. There is some disagreement among specialists on this point, since some versions suggest that it was Lucretius who, when explaining the Epicurus' idea, added the concept of clinamen.

the fact that it is the result of applying a force in a single direction. This vibration can be produced in many ways. It can be inserted directly into each of the slabs that make up the tower's floor; it can be caused by the vibration of the plot itself, some of the pieces could be hit in a certain way, etc. Future exercises may take on different orientations depending on of the strategy selected. For this exercise, we simulate raising all the slabs in the discrete floor (with their respective separations) and then dropping them following the gravity vector z, while respecting the original minimum separation in the collisions. Unlike the previous options, this option only develops along the "continuous" z-axis of gravity, while effecting indeterminate shifts along the x and y axes as a result of the vibration that takes place.[62] As a result, it promotes the encounter between parts, in which their strictly vertical contact generates three-dimensional vibrations in the computational simulation. When several pieces collide, these vibrations accumulate so that shifts along the [x] and [y] axes are significant. These shifts are the result of local, contingent and temporary encounters. Furthermore, they are epistemologically indeterminate: although ontologically the process is pre-determined, because it is computationally repeatable, it is indeterminate in epistemological terms because, for the observer, it is materially impossible to predict precisely what is going to happen. It is therefore a chaotic process. Finally, these shifts are not the way they are because they give rise to a particular result – in other words, they are not committed to achieving a necessary objective. The only determining factors are the global value of gravity, and the local values of ricochet and sliding. An adjustment must be made to avoid two radical extremes. First, absolute immobility: in other words, a scenario in which the parts end up in a position that is identical or very similar to their initial position. Second, instantaneous encounters: in other words, processes in which the ricochet or sliding value is so high that in just tenths of a second each of the parts ends up entirely isolated from any other. Either of these two cases obstructs an architectural contribution to the problem of the floor, either because the parts maintain their previous positions, or because the parts disappear entirely.

This type of process results in the dislocation of each of the slabs along the [x] and [y] axes. As such, positional repetitions no longer occur on either of those two axes. At a certain point in the process, some of the slabs are no longer supported chiefly by the next lower slab (including the original minimum separation). This generates slopes and increases in the separations "between slabs", in addition to new groupings. This slab-stacking process, where the movements bring about unique positional distributions, represents an initial decentralization exercise, in addition to the transformation of a single object into a collection of different objects.

4.4.2 Collections as stacks

This formal strategy founded on stacking has been used on multiple occasions in architecture, offering a formal reading based on a collection of objects without any totalizing centrality. These collections have nearly always been understood as aggregates: in other words, as the co-existence of several parts that never come to form an autonomous object through an irreducible internal structure.[63] In that sense, these projects share a fundamental characteristic: their formal appearance is very similar to the type of "stacked" results we will see with this exercise. However, there are two fundamental differences: first, none of these cases is a resonant set; and, second, none of them represent a contribution in relation to the architectural problem of the floor.

These collections of stacks can be classified according to the degree of freedom possessed by each of the pieces that make them up.

There is an initial group of architectural designs that stack a collection of objects with a degree freedom that is limited to movements within the [xy] plane. This means that the objects are accumulated one on top of the other following an aesthetic that evokes a stack, with the exception that the objects can rotate and change position, but they cannot be tilted. There are three projects in this group that are especially emblematic due to the popularity they have seen in recent years.

First, Sou Fujimoto's residential building in Tokyo (Fig. 4-11) is put forward as a series of houses on top of the other, in various positions along the [x] and [y] axes. The interesting thing about this approach is that each of the houses has a gabled roof: not only are the different elements prevented from merging together, their individuality is emphasized by the contact between planes and ridges. The ensemble should be understood mainly as an aggregate of elements, where the relationships are established, in many cases, via external stairways.

Second, the VitraHaus building (Fig. 4-12) by Herzog and de Meuron is also posited as the repetition of a single element with slight modifications. However, although this design shares the gabled roofs with the previous example, in this case they are interrupted to allow the different elements to merge together. As a result, the relationships between the elements occur only internally – unlike the previous case where they took place through an added element (like an external staircase). In any case, the individuality of each part is completely recognizable because the profile in section is not altered, as is very evident from each of the façades. In that sense, this is another case of an aggregate, because the different parties simply coexist, without establishing any kind of formal relationship between them.

Third, The Interlace (Fig. 4.13) in Singapore by OMA and Ole Scheeren presents a significant change in scale compared to the two previous cases. Here, we see a practically identical piece that is repeated with different orientations. Unlike the two previous cases, each of the elements does not have its own particular orientation, since there are only four different orientations. This systematization of the orientations responds mainly to issues of structural optimization, since it allows for a regularization of the support elements. The ensemble does not intend to blend the different elements together; rather it emphasizes their individuality by highlighting the protruding corners of the different pieces.

A second group of architectural designs makes use of the same

62. In an ideal system, a percussion along the z axis would only produce a movement on the z axis. However, in any real system the presence of "noise" would be unavoidable – in other words, variables associated with the object, the medium or the exerted force would bring about movements on the x and y axes.

63. This structure is what Graham Harman calls "domestic relations" and what Levi Bryant refers to as "endo-relations".

Figure 4-11: Residential Building in Tokyo, Sou Fujimoto, 2008.

Figure 4-12: Vitrahouse, Herzog and de Meuron, 2006

Figure 4-13: Interlace, Rem Koolhaas, 2015

stacking strategy but with a larger degree of freedom: there are movements not only along the [xy] plane, but also along the z axis. This increase in the degree of freedom has two particular consequences. On the one hand, the appearance of the ensemble more closely resembles the disorder of a pile; and, on the other hand, it generates floors with different slopes that provide for the introduction of new functions.

The Annenberg Center by REX (Fig. 4-14) is presented as a set of different-sized boxes, at least four of which are tilted. Although one of the slopes is used for an auditorium, the sloping surfaces of the other boxes are not used in a performative way: they are absorbed by a series of successive flat slabs, like in a staircase. In fact, the lowest plane in most of the tilted boxes does not coincide with the areas allotted for use, which usually break away in order to maintain horizontality. On the other hand, here again there is no interlacement between the different boxes. As such, the ensemble must be understood as an aggregate of pieces that co-exist. This is very clear in the section, where the transition from one box to the other does not take place from the box's interior planes; instead, one of them extends to generate part of the slab for the next. As a result, the corner of the second box is visible and disconnected, which emphasizes each piece's individuality and the spatial singularity of its position.

The National Gallery (Fig. 4-15) by SANAA in Budapest shows a significant difference compared to the previous exercises. In the previous designs, the stacking strategy was applied to different objects, as well as the elements that made up those objects (like façades, columns or roofs). However, the ensemble in the design by SANAA appears as a series of warped slabs that have been stacked with total freedom, yet without involving structural elements or the façades. The stacked ensemble consists of an apparently random and free arrangement of a series of distinct warped slabs that, unlike the previous case, do not require external slabs for the purposes of circulation. As a result, each stacked element has its own performative identity, lending functional meaning to the different slopes. There are even some cases of twinning between them, although in general their individuality is still emphasized by leaving most of the edges open and repeating the same curvature in all of them, although in opposite directions.

Although there are many architectural examples of this type, ending the exercise at this point would be an error for a number of reasons.

In the first place, we have not yet come across a resonant set as we described it earlier: if we stop here, we will have simply produced an aggregate: i.e., a series of elements that co-exist without generating new entities. Although the different slabs are no longer articulated around a center, they now behave almost like isolated bubbles: the only thing that they recognize in each other is their corporeality – i.e., their volume in space, since that is what limits and conditions their spatial trajectory. There are no stable and performative relationships, which is why there are no operational interlacements.

Second, positional repetition has been eliminated, but formal repetition still persists: since no interlacements are generated, there are no viscosities.

Third, as the slabs shift away from their original centralized position, on the one hand all the slabs are no longer covered, and on the other hand several of them have ceased to be accessible and supportable (since they are floating in the air). This phenomenon is not problematic on a methodological level, since it has nothing to do with its belonging to the ontological framework of a resonant set. However, it is a problem in terms of its architectural interpretation. The fact that all of the slabs are no longer covered is a problem for the conception of an inhabitable interior space. In addition, the fact that many of the slabs are inaccessible and insupportable implies a considerable reduction of the usable areas, which in general maintain a slab layout that is very similar to the original.

It follows that an exercise of this kind cannot be upheld as a tool for the production of a floor layout that can contribute to a contemporary reflection on the lack of a subject. On the one hand, when we consider this type of non-relational stacks as simple aggregates and not as resonant sets, they cannot be aligned with an object-oriented ontology that has got rid of the figure of the subject. They collections, and they are ex-centric, but they do not produce interlacements, and therefore they cannot generate local or global emergences. On the other hand, the architectural interpretation that can be made of the ensemble from the standpoint of the floor is quite poor. Although there has been a radical decentralization, it is only operational architecturally when its organizations are similar to the original; as such, the architectural contribution is virtually non-existent.

All the designs we have just analyzed share an aesthetic of stacking – i.e., an image that aims to evoke the formal characteristics of a pile: disorder, randomness, multiplicity, etc. However, these stacks are not the result of a simulation process, but the conscious placement of a series of elements with the intention of recreating the appearance of a pile. In most cases, no specific benefit is derived from this type of configuration, characterized by offering large façade surfaces compared with the volume of space they surround. In contrast to a sphere, these stacks offer a large amount of surface area in contact with the outside, which in cases like the VitraHaus project is not leveraged, since only the front-facing walls provide views to the exterior.

In general, this type of project is based on a logic of aggregates – i.e., a logic in which each object's individuality is highlighted in order to emphasize the plurality of the ensemble. Each part coexists with the others without generating formal viscosities of any kind, beyond the minimum relationships of access between elements, which tend to occur on the inside. The result is effectively an accumulation of discrete individuals, whose relationships are limited to the minimum that is necessary for the proper functioning of the whole, which is not even expressed through a specific formal language.

This type of stacking is more akin to a collage: i.e., the various parts overlap one another or are adjoining, but they interlacements are never formed. Observing a number of Picasso's still life collages, we see that they consist of clippings and patches of all kinds that are arranged on the canvas in a seemingly random way. The objects' different natures, the different perspectives with which they are represented, and their varied lighting only highlight the individuality of each part. In pieces like Juan Gris's Still Life with a Guitar (1913) (Fig. 4-16) we can intuit certain general guidelines that seem to govern the ensemble, like the diagonal line that stretches from the lower right corner towards the opposite side. This guideline contrasts with the hor-

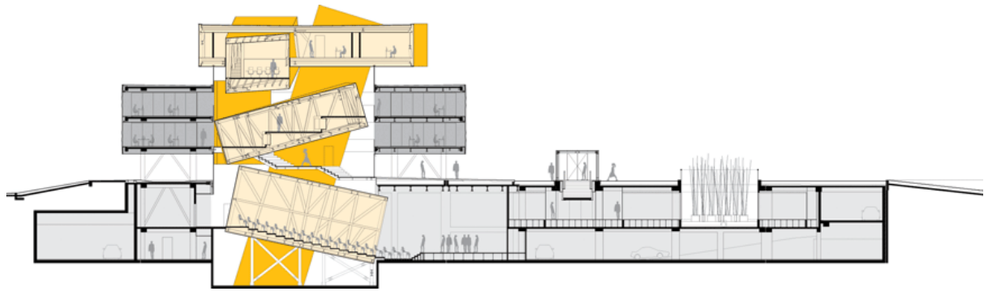


Figure 4-14: Annenberg Center, REX, 2013

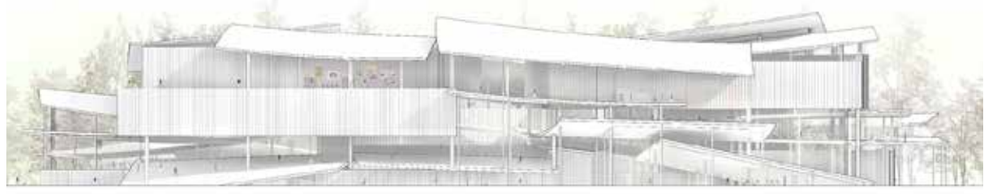


Figure 4-15: National Gallery, SANAA, 2015

izontality of the guitar handle, represented in a light blue color. However, beyond this general layout, no specific relationships are established between the various elements, since they overlap each other seemingly seeking out contrasts and disparity rather than complicity and dialogue.

Just the opposite is true in the installations by Barry Le Va. They generate a field of relationships in which the different objects go virtually unnoticed: they may be transparent glass or fragments of a single material that are laid out like a carpet. As such, the ensemble offers a reading that is much more like a continuum from which certain singularities emerge than a discrete aggregate of individual objects.

Both of these forms appear as extremes: in one case the relations between objects are minimal or non-existent, while in the other it is the objects themselves that are minimal or nonexistent. As we pointed out earlier, the type of mereology that provides the framework for this dissertation has been described by Levi Bryant as "strange" precisely because of its apparent schizophrenia: on the one hand, it aims to maintain the individuality and autonomy of the object-parts that make up the whole, while on the other hand it postulates the presence of interlacements between some of the objects. This ambiguity has been addressed, intermittently but in organized way, by a number of architects. However, within the confines of stacking processes the repertoire is smaller and, above all, largely limited to the field of art. In that sense, it is worth mentioning the "façade" work on the Inntel Hotel in Zaandam done by Wam Architecten. The façade appears as a collection of gabled houses. Unlike the projects by Herzog and de Meuron or Fujimoto, however, the intention is not to highlight the individuality of each part, but to emphasize the tension between the fusion of those parts with the whole, on the one hand, and their autonomy, on the other. The ensemble stands out precisely for the difficulty of its reading: it does not exactly follow a collage logic, nor does it completely forgo the independence of each of the parts. However, this aesthetic tension does not translate into a performative or disciplinary tension. From the point of view of circulations, spaces, visuals, privacy, etc. the building functions just the same as those around it.

In that vein, the work of Filip Dujardin (Fig. 4-17) offers an even more ambiguous reading: unlike the previous case, some of his stacks do not even follow the direction of gravity. In his series Impossible Architecture, the artist exhibits the digital results of a series of fusions between different architectural elements that do not blend entirely into a single undifferentiated continuum. Instead, through operations of scaling, rotation, or translation, the elements are arranged within the whole as a conglomerate of parts, where the sense of an absolute whole has vanished by virtue of the multiple breaks and turns.

Finally, the work by Joris Kuiper and Mike Kelley pursues a similar line in their installations. In his piece Suspended Cloud Paintings (Fig. 4-18), Kuiper consists of a series of flower-shaped layers that are arranged in space without adhering to a centralized logic. This layers, which do not lose their individuality at any time, are grouped together to form a series of clusters of different sizes. As a result, the work offers a variety of readings at different resolutions, since the relationship between the clusters and the whole is analogous to that of the layers and the clusters. There is a matryoshka effect, in which some of the objects are contained within others, which in turn form other objects, etc. Something similar takes place in Mike Kelley's installation Deodorized Central Mass with Satellites, which we commented on earlier. Although it was produced in the 1990s, a decade during which topological ontologies based on fields were very popular, Kelley surprised his audience with a piece that anticipated the clusters we saw in Kuiper's work. Again here, the ensemble offers a reading at several resolutions, in which the different stuffed toys form spheres that in turn interlace with the other spheres. Each stuffed toy is simultaneously part and whole: it does not lose its individuality, because it is still recognizable as such; nevertheless, it contributes to the formation of the spheres through its interlacements. Each sphere, on the other hand, is constituted as an autonomous objects, and not as a mere aggregate of smaller objects. In turn, the spheres contribute to generating the installation's galactic aesthetic. Here again, they can be read as objects in themselves but also, thanks to their capacity for interlacements, as objects that are part of another larger object.

4.4.3 Interlacements as individuations

In order to link this stacking process with a resonant set, along with collections and ex-centricities there also have to be interlacements between the parts, which must be both operative and contingent. These interlacements produce an individuation of some of the parts – i.e., instead of generic (repeated) they become specific (viscous). This type of convergence between parts has been described extensively by Gilbert Simondon in his analysis of the mode of existence of technical objects. Simondon argues that inanimate technical objects go through a process of genesis that is similar to the processes associated with animated objects. Using various examples, like a car motor, Simondon shows how several technical objects become individualized, from an "abstract form" to a "concrete form". An abstract form involves a series of parts that are independent of one another and defined by their function. For example, an old engine is the logical assembly of a series of elements: each piece is recognizable in its individuality, and the whole is an abstract aggregate of parts. However, with the technical evolution of the object in question, there is a convergence between the parts so that the engine gradually becomes a concrete form, whose parts converge into an inseparable whole:

> *"It could be said that the modern engine is a concrete engine and that the old engine was abstract. In the old engine each element comes into play at a certain moment in the cycle and, then, it is supposed to have no effect on the other elements; the different parts of the engine are like individuals who could be thought of as working each in his turn without their ever knowing each other".*[64]

According to Peter Trummer,[65] the formal evolution of the skyscraper – from the overlapping of two architectural objects to the svelte Manhattan skyscraper – can be explained through

64. Gilbert Simondon: *On the Mode of Existence of Technical Objects*, trans. Ninian Mellamphy, (Ontarion: University of Western Ontarion, 1980), 17.

65. Peter Trummer, "An Object-Oriented Approach to Architecture and Its City," IaaC Bits, no. 3 (2015), 7.

Figure 4-16: Still life with a guitar, Juan Gris, 1913.

Figure 4-17: Impossible Architecture, Fillip Dujardin, 2011

Figure 4-18: Suspended Cloud Paintings, Joris Kuipers, 2013

the individualizing logic Simondon uses to describe the evolution of the technical object. Beginning from the collection of designs for the Chicago Tribune in Chicago in 1922, Trummer describes how the vast majority of the projects attempted to produce the skyscraper aesthetic through "*joining, stacking, assembling, melting, unifying and fusing existing objects together.*"[66] In that sense, Trummer continues, we find Gothic churches mixed with ziggurats, circular Roman temples fused with giant Italian palaces, Ledoux-style pyramids stacked atop classical villas, or imitations of the tower of Pisa combined with Chicago School high-rises. Form there, the history of the skyscraper consists of the fusion of those kinds of objects into a single skyscraper object, following the logic that had been described by Simondon. The tower is no longer a collage of the different objects. They lose the recognizable significance of their form and the meaning of their content to meld into what Simondon would describe as a new concrete form of the skyscraper – a previously unknown object.

This logic can be partially applied to the interlacements that take place between some of the Lake Shore Drive's slabs (Fig 4-19) during the stacking process. For the moment, they are generic objects that make up an aggregate. If we applied Simondon's logic to all the parts, such that they all entered into resonance, we would be dealing again with a totalist field of relationships. On the contrary, these relations do not need to generate a global interlacement, but rather one or several local ones. Moreover, as we have seen in the case of Simondon, behind this type of interlacements there is an instrumental purpose – in other words, this type of viscosities are generated by the instrumental coupling of two or more parts.

Taking into account our aggregate's functional problems, the type of interlacements that occur must be able to resolve formal inconveniences in the simplest way possible. The aim is to make the parts that are currently inaccessible, unsupportable and uncovered into inhabitable spaces – i.e. accessible, supportable and covered – while retaining their singularity. Otherwise, the only parts that are maintained are the ones that are very similar to the original in their layout. In that case, there can be no architectural contribution, aside from the fact that the whole does not act as a resonant set as we have defined it. However, since the position of the parts is constantly shifting, these interlacements must also change continuously, since the circumstances at any given moment will be different. As such, the relationships that are established are characteristic of a resonant set – i.e., they are temporary, contingent, local, partial and performative. Although these interlacements are instrumental, the whole is not (unlike swarm intelligences). Indeed, the positional movement of each part does not respond to a telos, because it is the result of a chaotic process in which the vibration acts as the destabilizing clinamen. However, the formal movement of each part – i.e., each part's specific individuation with respect to its initial generic form – does follow instrumental criteria, although their application depends on each part's position in relation to its neighbors.

Similarly to the means of decentralizing the discrete floor layout which we saw earlier, in this case based on stacking, there are many ways of establishing a set of criteria to determine the interlacements. We will leave the study of different systems of interlacement systems for future investigations. In this exercise, we have chosen again to seek out the simplest and most synthetic way to resolve all the cases at hand. The objective of these interlacements is two-fold: on the one hand, their application is necessary to critically align the system with the resonant sets we analyzed earlier; and, on the other hand, their application is also necessary to resolve the practical problems that arise from the simple stacking of slabs and the respective spaces between them. As we saw before there were three basic problems: a lack of access to several slabs, a lack of physical supportability for several slabs, and a lack of coverage of all the slabs.

The system of criteria is established to resolve all cases with the least number of rules and the least possible deformation of each of the slabs. It is important to bear in mind that each slab maintains a minimum open space above it, so that when the slabs collide there is always a certain distance between them that can be occupied. The rules used for the interlacements are the following ones:

1. When a slab has no other slab above it, its façade is folded over at the original minimum height, thus closing the box.
2. When a slab has another slab above it that does not match up, the top slab is extended along the plane to cover the remaining opening. When the top slab sits higher than the minimum height, the façades of the bottom slab are extended to connect with the plane of the top slab.
3. When the top slab is at an angle such that extending it would conflict with the minimum height of the lower slab, the extension folds when it reaches the point of conflict to run parallel to the bottom slab at the minimum height. The façades of the bottom slab extend to connect with the folded plane above.
4. When a slab has two other slabs above it, both are extended until they intersect, completely covering the bottom slab. The façades of the bottom slab are extended until they intersect with the result of extending the two planes above.
5. When a slab has two other slabs above it and the intersection of the extension of both those slabs occurs outside the perpendicular projection of the bottom slab, only the top slab closest to the bottom slab is extended. If part of that extension occurs at a distance that is less than the minimum height with respect to the second top slab, that part is not covered, and along the edges the façade is extended until it reaches the second top slab.

These five laws cover all possible cases in the stacking process. However, these slabs are outfitted with a central hole, which also requires a specific treatment:

1. When a slab has no other slab above it, its facade folds over at the original minimum height thus closing the box. It folds again when it reaches the projection of the hole perpendicular to the plane to intersect with the edge of the hole in the slab.
2. When a slab has another slab above it, the hole in the bottom slab projects in the form of a façade until it intersects with the top slab. The same thing happens if the bottom slab has another slab underneath it.

66. Ibid., 5.

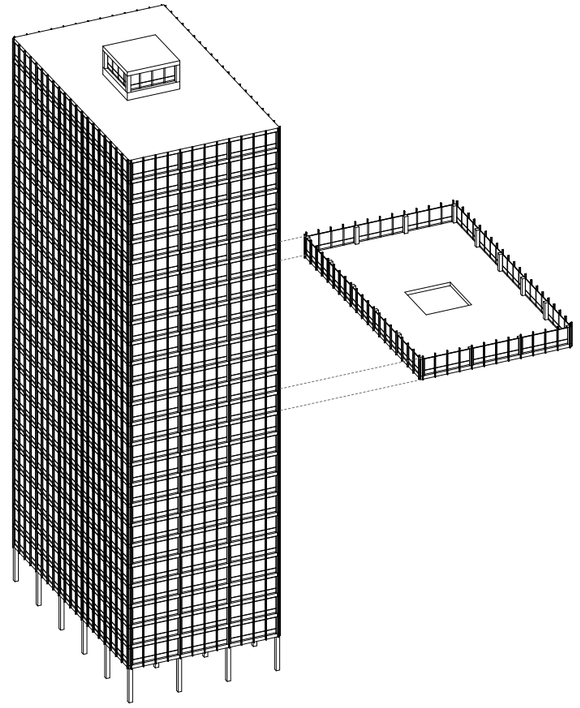
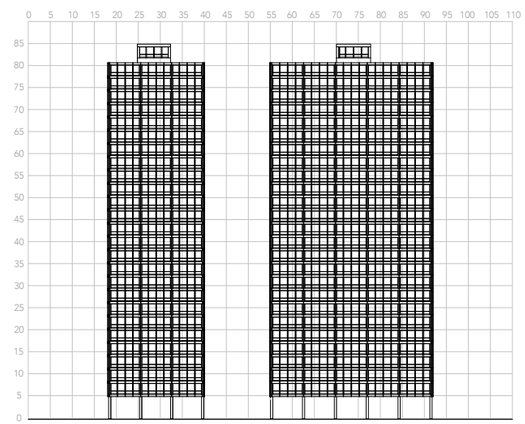
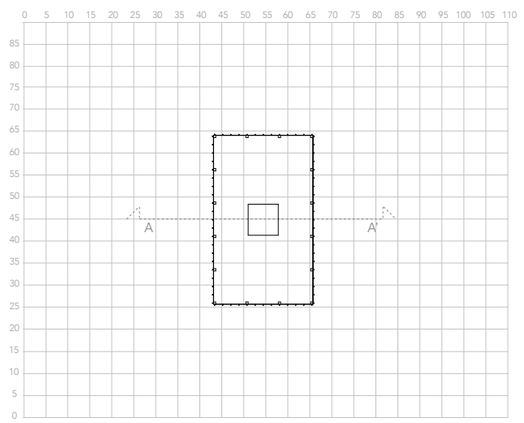


Figure 4-19: Lake Shore Drive, Floor extraction



Lake Shore Drive elevation



Lake Shore Drive plan

3. When the projection of a hole coincides with part of another hole, no façade is projected in that part of the hole.
4. When part of the downward projection of a hole occurs outside the bottom slab, that part is not projected, and the corresponding part of the façade of the bottom slab is cut out by the projection of the hole.

At any point during the stacking process, the ensemble is covered, accessible and supported. It is also a resonant set, because any result obtained from the slabs meets the aforementioned characteristics for this type of set:

1. Local emergences are generated. Various slabs enter into resonance with one another, but there is no global resonance that unifies them.
2. If there are objectives, they are always partial. As we have seen, the interlacements pursue certain objectives. However, they are local objectives that aim to maintain certain conditions of habitability. In contrast, the whole does not respond to any particular objective, because it is the result of a chaotic system that is not intended to achieve certain results as opposed to others.
3. It displays a mereology of poly-pluralities. Because there is no total continuity, nor is there a mere aggregate, the whole emerges as a poly-plurality: in other words, a set of subsets () among which several interlacements occur.
4. Some objects can be separated from the ensemble without affecting it. Not all slabs participate in the interlacements with other slabs. As such, those slabs can be separated without the whole system undergoing any readjustment.
5. Some objects enter into relationships with others. The relationships that occur in the slabs are partial, local, temporary and contingent.

However, beyond the fact that the process may generate architectural meaning and be aligned with the logic of resonant sets, we also need to be able to evaluate whether or not it makes a disciplinary contribution to the problem of the floor as specified, somewhere between the continuous floor and the discrete floor. If this is the case, we need to know how and in what aspects the proposal represents a disciplinary contribution. To that end, we suggest a specific simulation, the study of which is meant to clarify this question.

4.5 Simulation set up

To carry out a computational simulation that responds to a framework like the one we have just described, we must to follow a series of steps. First, choosing the software to use in developing the process. Second, deciding which set of parts will participate in the simulation. Third, adjusting the parameters of the simulation that determine its development. Finally, once the simulation has been carried out, the results have to be exported and evaluated.
There are several softwares that facilitate the creation of a computational simulation like the one that this dissertation aims to use. They are grouped essentially into two categories.

First, there are standard tools which offer an immediate and relatively accessible application, although the potentials for customization are limited. Tools included in this group are Maya, Blender, and, to a lesser extent, Unity or Grasshopper 3D.
Second, to build the simulation software autonomously. This option requires more time and preparation but it allows to adjust the resulting tool to the specific problem.
In this research we present a computational simulation based on the second type of tools. The reason is that the simulations that can be created with other softwares from the first group do not permit the incorporation of the interlacements we described in the previous chapter (section 3.2.2). They are limited to the strictly "physical" simulation of the given object. In contrast, the possibility of programming the simulation process means that we are able to introduce the necessary modifications into an imported simulation engine, that is to say, it is possible to re-program it in order to incorporate the desired interlacements to the simulation. For those purposes, we chose an engine consisting of an already existing Pythom ODE (Open Dynamics Engine) library. We did not build simulation engine from scratch, but rather imported an existing engine using the functions of the python ODE library, which calculates the movement of all the items and its collisions while the piling process is being executed. In order to apply the formal modifications required by the rules defined by the interlacements mentioned before, the chosen library is Python OCC, based in C ++Open Cascade library. This library includes all the functions that defines the mathematical operations required to apply all the formal modifications that should occur while the resonant piling is being executed (mainly boolean operations and projections).
As for the selection of the set of parts used for the simulation, we selected a slab from an existing building. The decision to base the simulation on a real architectural project ties in a premise cited in the introduction of this research, according to which architecture consists in critical reorganization of existing parts within a gravitational scenario in order to produce interiority. As mentioned as well in the introduction, among the floor dispositions we analyzed, it is easier to extract parts from the discrete floor layout, since they are spatially separate.
As detailed in Chapter 2 (section 2.2.3), one of the buildings that most clearly embodies the discrete floor layout is Mies van der Rohe's building on Lake Shore Drive. We chose this layout as the series of parts for our reorganization.
In the center of each slab there is a square hole measuring 6.4 m x 6.4 m. The slabs have a thickness of approximately 0.5 meters. Therefore, each slab has an approximate surface area of 732 square meters and an approximate volume of 366 cubic meters.
Mies van der Rohe uses that surface area to arrange eight dwellings with a central core and an access corridor. For the computer simulation we eliminated all the elements that are secondary in relation to the form of the floor: partitions, structure, furniture, etc. However, the section of the façade corresponding to each slab is maintained, mainly for two reasons.
First, and as we mentioned above, it is important to maintain the open space between the slabs, the height of which is 2.5 meters. Otherwise, the result of the simulation would not provide the necessary living space for a human occupant. The façade section guarantees that this value is not reduced during the sim-

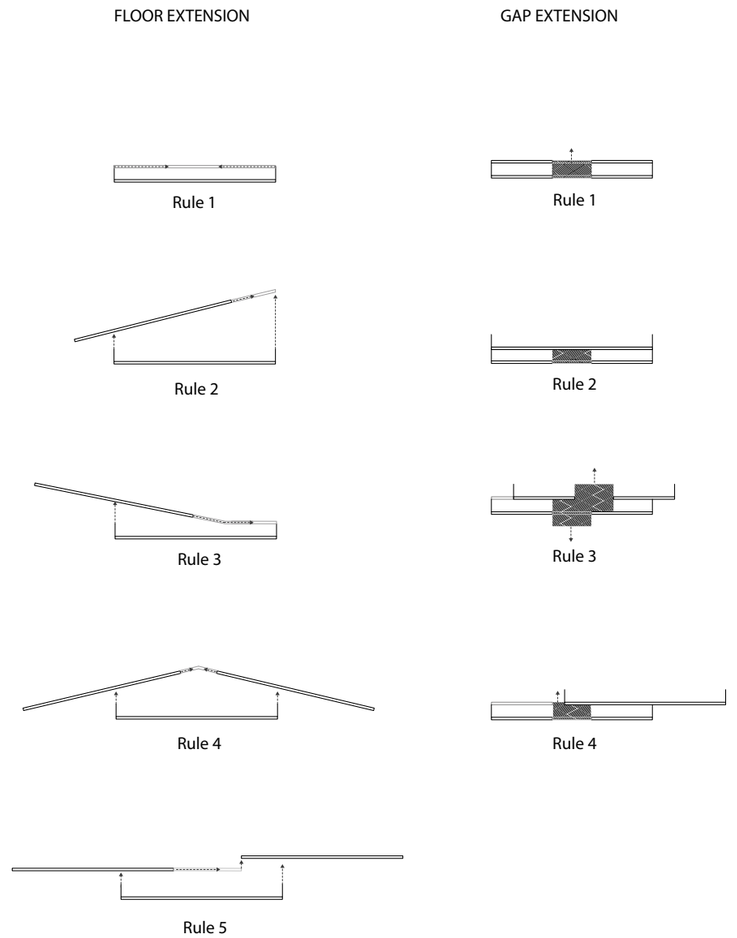


Figure 4-20: Simulation Rules

ulation, leaving the framed interior space as open space. This would not be the case with other elements such as partitions, whose height also coincides with the open space between the slabs. Likewise, partitions are merely set atop the surface of the slab, as opposed to abutting the edge like the façade.
Second, the façades are a key element in the interlacements that occur between the slabs. They take place through a series of inter-projections involving their edges, the application of which results in precise formal modifications of the slabs that enter into resonance. These projections of the edges correspond to the façade section of each slab.
In summary, the 28 parts that are reorganized within the gravitational scenario of the computational simulation correspond to the 28 slabs and their respective façade sections from Mies van der Rohe's building on Lake Shore Drive. It is important to note that working with other elements, such as partitions, structure, or furniture would provide results that could be interesting as the subject of future research due to their singularity and their connection with the present dissertation.
Finally, we need to adjust the different environment variables offered by the computational simulation. There are six of them: gravity [x,y,z], ricochet, friction, position of each of the parts, duration of the simulation, and position of the universal plane. As indicated above, there are infinite possible combinations between the two unusable extremes of compactness.
The first case results from establishing zero or low values of slide, gravity, ricochet and height of fall between the parts themselves, and between the first part and the universal floor. As a result the parts are stacked directly on top of one another, producing a result very similar to the original tower which lacks all novelty. The second case results from establishing high values of slide, ricochet, gravity and height of fall between the parts themselves, and between the first part and the universal floor. This configuration results in a very low compactness in which, within a few tenths of a second, the slabs are distributed so far apart that it obstructs any architectural interpretation of the whole.
From here, there are many possible variables: due to the chaotic[67] nature of the simulation, any infinitesimal variation in any of the variables gives rise to a completely different result. In order to simplify the analysis and after a few tests, we chose a stacking process that offers the maximum variety of results as the simulation runs. This happens with stacks that fall slowly and uniformly, because the slabs have more time to adopt a wider variety of positions. This implies relatively low ricochet and sliding values and, most importantly, a gravity value that is approximately one-third its real value in the Earth. In addition, it is important that the slabs maintain a distance of no more than about 5 meters between them, and the whole no more than 15 meters off the ground. In this way, the stacking process retains a high compactness during most of its development, which also ensures a wide variety of results. Nevertheless, there are many different results within this range of variables, and it could even be useful to study other ranges of different variables.

67. The notion of chaos should be understood here in the mathematical sense of the term, which refers to a deterministic behaviour (althought its aleatory appearence) that is extremely sensible to its initial conditions.

The structure of the coding is organized as follows:

1. INPUT

1.1 Floors Creation, Positionment and Simulation starter:
The first step consists in creating a number of boxes (28) with the specific size of the Lake Shore Drive's floor and minimum height, (32m x 19.2m x 2.5m) and give to each one of them a particular position in the [x], [y] and [z] axes. It is also necessary to create a universal ground, which prevent the slabs from falling indefinetely. In this case, we elevate the set 15 meters from such ground, and the [z] distance among boxes is 5 meters ([x] and [y] remain the same in all boxes because they are vertically aligned).
In this step, we also set up a particular simulation time (16 seconds) to the process, including as well the simulation starter.

1.2 Registration of the set of boxes into the Physics Engine library Python ODE.
Each box is imported to the Physics Engine library. This library is in charge of two main taks: first, defining the behaviour of the boxes while the simulation run, and second, defining the system for the collision detection. It is important to note that this engine does not include the deformations produced by the interlacements that we have previously described, which will be explicitly defined in a later step.

1.3 Definition of the environement conditions.
The Physics Engine operates according to certain parameters that are not just related to the geometric properties of the boxes, but also to the environment attributes in which they behave.
This environment is defined through three parameters: Gravity [0,0,-2], Bounce (0.62) and Ricochet (1) and its consequences in the development of the piling process and crucial. These attributes are applied not only in the collisions among boxes, but also in the collisions among the boxes and the universal ground.

2. ANALYSIS

2.1 Data collection of box's position:
This step collects in each instant of the simulation process the position in the environment of all the boxes of the set. The position of each box is taken from its vertex coordinates in relation to a global referential point [0,0,0].

2.2 Identification of the upper boxes from the nether boxes and detection of overlapping projections.
Once the position of all boxes is collected, it is necessary to discriminate them according to its position in relation to each one of the rest of the boxes. For the purposes of the resonant piling and in order to understand which kind of formal modifications need to be applied in each box, it is necessary to know from all the boxes which ones are above each one of them, and from these ones, which ones have a projection in its relative normal that overlaps with the surface of each box.
2.3 Study of the positional characteristics of the upper boxes.
From all the boxes that are above a particular box and in order to understand which modifications should be applied to that box, it is necessary to know which is the closest one. This operation is done taking the distance inbetween the center of the nether faces of the boxes. Beside that, it is necessary to know if the extension of the floor of the upper box intersects or not with the floor of the nether box.

2.4 Classification of the type of modification required.
According to the data collected and analysed, this step of the code classifies which one of the five rules need to be applied. As mentioned in the previous section, given that the first rule is already applied in all cases (because the box includes the floor and the minimum height) and that the fifth rule is a combination of the other three, it is only necessary to classify each one of the boxes in each instant of the simulation process according to three categories related respectively to rule 2, rule 3 and rule 4. This classification takes into account as well the required rules for the formal modifications of the gaps.

3. DEFORMATION

3.1 Points projection and lateral faces construction.
In order to apply the deformation rules it is necessary to establish a system of projections in between slabs. All formal modifications will be based on these projections and the intersections among them. Beside that, and even if what is crucial is the modification of floors, this step constructs as well the later faces of each modified box, so eventually it could be read as a volume and not just as a set of surfaces.

3.2 Formal modifications according to the defined set of rules.
Based on the stablished set of projections, this step executes the formal modifications of the slabs according to the definition of each one of the rules.

4. OUTPUT

4.1 Visualisation
Althought this point it is not strictly necessary in terms of performance, it is crucial in order to have a visual control of the results and the process of the simulation. This part of the code defines the point of view of the process and the different visualisation parameters used in the rendering of the pile in order to make the visualisation as understandable and light as possible.
4.2 Export
Finally, this part of the code defines the file export format (.stp) in order to be visualised and edited through the 3d modelling program Rhinocerous. It also defines how often an exportation occurs (every 0.2 seconds), and set up the folder where all information is stored.

As it is described in the previous structure, the analysis of the resulting floor layout is undertaken by studying the position of the slabs every 0.2 seconds between second 3 and second 16. Second 3 is taken as the starting point for the analysis because it is the point where all the slabs have come into contact with the rest and the slabs begin moving horizontally. Second 16 is chosen as the endpoint for the analysis because the degree of openness is such that the following seconds no longer provide any new information as compared to the previous cases.
The 13 seconds of the part of the simulation subject to analysis results in 66 three-dimensional models. Each model is analyzed from six points of view which can be divided, in turn, into two groups. The first group includes those analyses that have to do directly with the layout of the floor that has been obtained. These are subdivided into three categories: nestings, arrangements and grounds. The second group includes the analyses that have to do with the fundamental consequences of the floor disposition in terms of volume. These are again subdivided into three categories: fillings, contours and interstitialities.
Based on these categories, in the following chapter (section 5.1) we will engage in a detailed analysis of the 66 models obtained in order to evaluate the degree of originality of each floor layout. This evaluation will be based on the same categories we used to analyze the discrete floor and the continuous floor. As we will see, there are substantial disciplinary differences from both a formal and a performative point of view. This will allow us to posit a new floor layout: discrete while continuous.

The continuous while discrete floor

Chapter V

V. The continuous while discrete floor

In Chapter 2 (section 2.5), the formal categories of discrete and continuous have been applied to the problem of the floor under the assumption that the presence of one does not imply the complete absence of the other. In other words, they coexist. However, that coexistence is asymmetrical, because one category is privileged over the other according to its relation with the definition that we gave of discrete and continuous in the same chapter (section 2.1). According to this and when applied to the problem of the floor, one of them plays an active and primary role, while the other takes on a passive and secondary role.

In this chapter (section 5.1) we will analyze how the floor layout we have developed in this dissertation allows for a reading that is both discrete and continuous, being both categories active and primary. In order to study this floor, we will follow two main steps: First, we will detect which spatial particularities occur in each of the 66 models based on the piling process of the Lake Shore Drive floor. Second, these particularities will be analyzed through the 12 formal and performative categories we used initially to describe both the continuous floor and the discrete floor. This method will be used to measure the degree of originality of the disposition of the floor we have obtained in relation to its precedents, thus confirming or discarding the value of its contribution. As we will see at the end of this chapter (section 5.3) through the methodological table (Fig. 5-4), the obtained floor disposition is qualitatively different in relation to the other two dispositions due to a renewed understanding of the discrete-continuous formal binomial. Its spatial application to the problem of the floor results in a new floor layout that will be named as the "continuous while discrete floor".

5.1 Results analysis

The results of the simulation described in the previous chapter (section 4.5) consist of 66 three-dimensional models, whose geometrical simulated unfolding will be presented in the first part of the analysis. After it, we will study them according to six spatial categories, which have been chosen due to its particular capacity to inform the 12 categories that later (section 5.2) will be used to compare the continous while discrete floor in relation to the discrete floor and the continuous floor. The 6 spatial categories chosen are the following ones: Clumps, Distributions, Fillings, Interstitialities, Contours and Silhouettes. The first two categories and the last one refer directly to the problem of the floor. The other three do so only indirectly and should be understood in a two-fold sense: on the one hand as a complement to the first categories; and, on the other hand, as working avenues for future exercises. In each category, the cases for analysis have been selected by distinguishing between quantitative and qualitative changes. The former occur in a linear, constant and regular way, affecting all models comprehensively. However, not all of them are relevant, rather only those that imply a qualitative formal change – i.e., a change that affects the type and not just the degree. Unlike quantitative changes, qualitative changes occur throughout the process in a non-linear, one-off, irregular manner. These are the only changes that have relevance with regard to the problem of the floor[1].

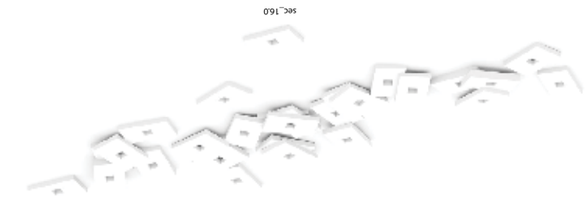
As such, within each category, we will analyze only the qualitative changes, through four sections: Generation, Form, Performance and Subjectlessness. In the first case, we will describe the process of resonance between the parts that has given rise to the disposition we are analyzing. In the second case, we will describe the resulting form in light of the discrete and continuous conditions detailed in this research. In the third case, we will analyze the architectonical operational consequences of each layout for the uses of the floor. Finally, in the fourth case, we will analyze the complicities that can be established between each model and the three concepts associated with the contemporary lack of a subject discussed in Chapter 3 (section 3.2): collections, ex-centricities and interlacements.

As already mentioned, the results of the analysis presented in this section 5.1 will be interpretated under the light of the problem of the floor in the following section 5.2.

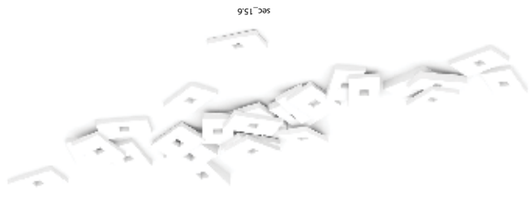
1. By "relevance" we mean those changes that have the potential to suvert any of the formal and performative categories described in the second chapter (sections 2.2.4 and 2.4.4) in relation to the discrete floor and the continuous floor.

SIMULATION UNFOLDING

Axonometries


sec_160


sec_158


sec_156


sec_154


sec_152


sec_150

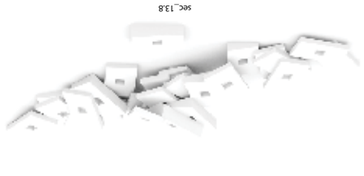

sec_148


sec_146


sec_144


sec_142

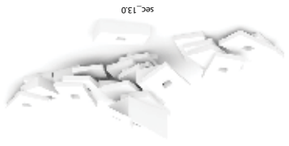

sec_140


sec_138


sec_136


sec_134


sec_132


sec_130


sec_128


sec_126


sec_124


sec_122


sec_120


sec_118


sec_116


sec_114


sec_112


sec_110


sec_108


sec_106


sec_104


sec_102


sec_100


sec_98


sec_96


sec_94


sec_92


sec_90


sec_88


sec_86


sec_84


sec_82

sec_80

sec_78

sec_76

sec_74

sec_72

sec_70

sec_68

sec_66

sec_64

sec_62

sec_60

sec_58

sec_56

sec_54

sec_52

sec_50

sec_48

sec_46

sec_44

sec_42

sec_40

sec_38

sec_36

sec_34

sec_32

sec_30

SIMULATION UNFOLDING

Elevations


sec_3.0


sec_3.2


sec_3.4


sec_3.6


sec_3.8


sec_4.0


sec_4.2


sec_4.4


sec_4.6


sec_4.8


sec_5.0


sec_5.2


sec_5.4


sec_5.6


sec_5.8


sec_6.0


sec_6.2


sec_6.4


sec_6.6


sec_6.8


sec_7.0


sec_7.2


sec_7.4


sec_7.6


sec_7.8


sec_8.0


sec_8.2


sec_8.4


sec_8.6


sec_8.8


sec_9.0


sec_9.2


sec_9.4


sec_9.6


sec_9.8


sec_10.0


sec_10.2


sec_10.4


sec_10.6


sec_10.8

sec_11.0

sec_11.2

sec_11.4

sec_11.6

sec_11.8

sec_12.0

sec_12.2

sec_12.4

sec_12.6

sec_12.8

sec_13.0

sec_13.2

sec_13.4

sec_13.6

sec_13.8

sec_14.0

sec_14.2

sec_14.4

sec_14.6

sec_14.8

sec_15.0

sec_15.2

sec_15.4

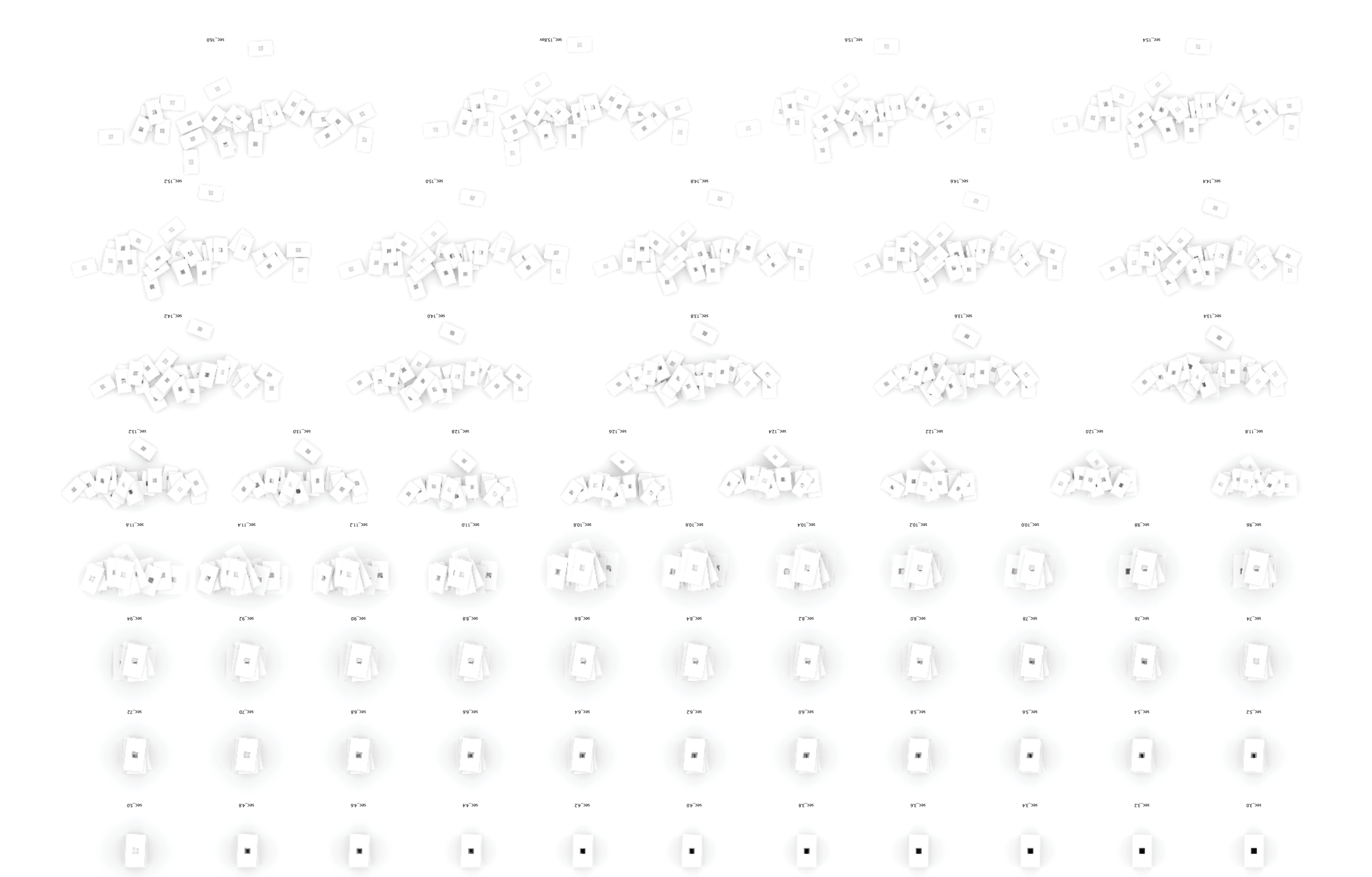
sec_15.6

sec_15.8

sec_16.0

SIMULATION UNFOLDING

Top


sec_160
sec_158av
sec_156
sec_154
sec_152
sec_150
sec_148
sec_146
sec_144
sec_142
sec_140
sec_138
sec_136
sec_134
sec_132
sec_130
sec_128
sec_126
sec_124
sec_122
sec_120
sec_118
sec_116
sec_114
sec_112
sec_110
sec_108
sec_106
sec_104
sec_102
sec_100
sec_98
sec_96
sec_94
sec_92
sec_90
sec_88
sec_86
sec_84
sec_82
sec_80
sec_78
sec_76
sec_74
sec_72
sec_70
sec_68
sec_66
sec_64
sec_62
sec_60
sec_58
sec_56
sec_54
sec_52
sec_50
sec_48
sec_46
sec_44
sec_42
sec_40
sec_38
sec_36
sec_34
sec_32
sec_30

SIMULATION ANALYSIS

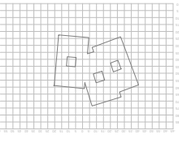
Clumps

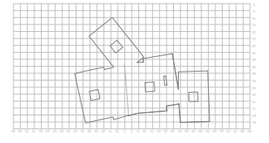
5.1.1 Clumps

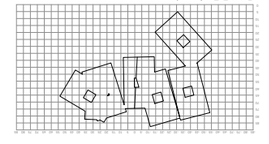
The category "Clumps" studies in each one of the 66 models the type of continuities that are generated through the interlacements that occur between the slabs.

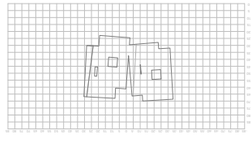
As we have seen, unlike designs of the 1990s focused on emergences or topologies, these are not holistic and necessary continuities that can be read as topographies. Rather, they are local and contingent continuities that should be understood as clumpings, that is to say, grumes of slabs that, as we will further study, open new performative possibilities. However, in each one of the 66 models there may be more than just one clump. From each model, we opted to separate out those continuities that resulted in a larger floor area, since they involve more slabs and their interlacements display greater formal variety. Throughout the process we have detected nine spatial singularities related to the notion of clump: Embedding (5.1.1.1), Perforation (5.1.1.2), Junction (5.1.1.3), Chunking (5.1.1.4), Wrapping (5.1.1.5), Serpentine (5.1.1.6), Esplanade (5.1.1.7), Ascension (5.1.1.8) and Spiral (5.1.1.9).

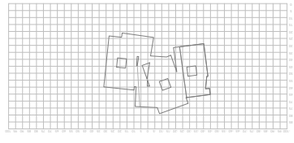
The study of these nine spatial singularities is relevant for the research because as we will see in the next section (5.2), it implies qualitative spatial transformations in the form and performance of the floor. In particular, in the formal categories of Mereology (5.2.1.1), Geometry (5.2.1.2), Contour (5.2.1.3) and Development (5.2.1.6), and in the performative categories of Circulation (5.2.2.1), Orientation (5.2.2.3), Access (5.2.2.6) and Figuration (5.2.1.6).

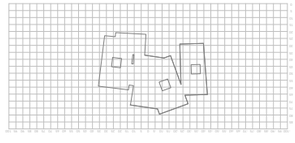

sec_11.8

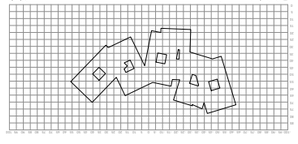

sec_12.0

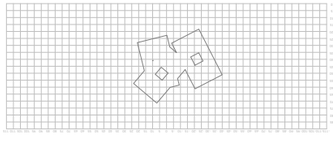

5.1.1.7 Esplanade

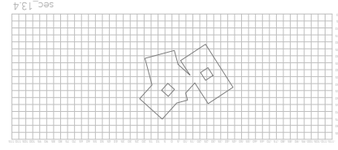

sec_12.4

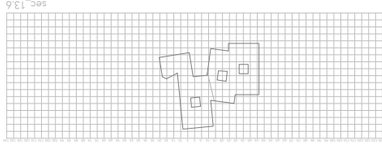

sec_12.6

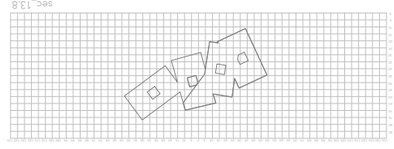

sec_12.8

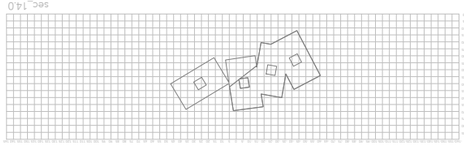

5.1.1.8 Ascension sec_13.0

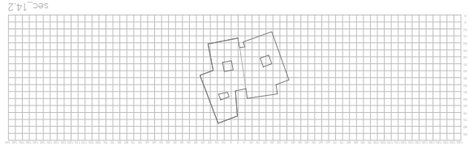

sec_13.2

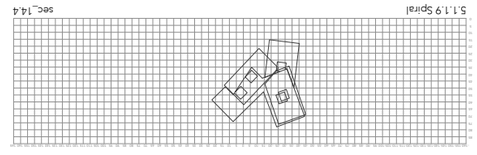

sec_13.4

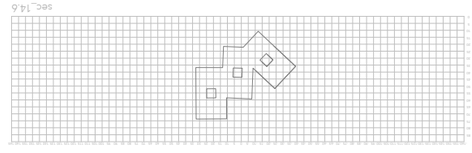

sec_13.6

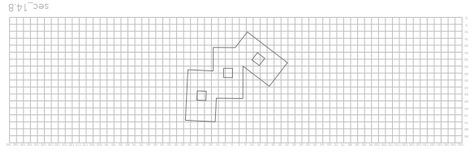

sec_13.8

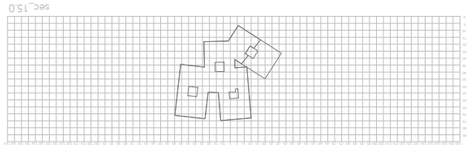

sec_14.0

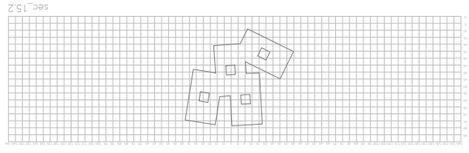

sec_14.2

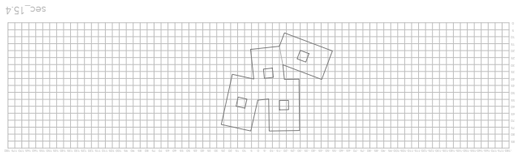

5.1.1.9 Spiral sec_14.4

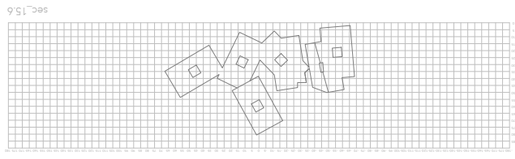

sec_14.6

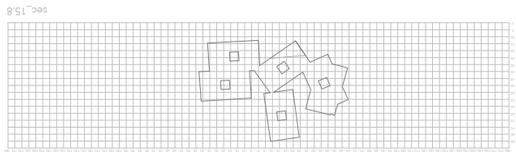

sec_14.8

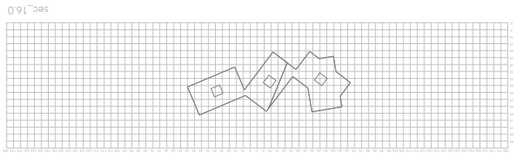

sec_15.0


sec_15.2


sec_15.4


sec_15.6


sec_15.8


sec_16.0

sec_9.6

sec_9.8

sec_10.0

sec_10.2

sec_10.4

sec_10.6

5.1.1.4 Chunking sec_10.8

5.1.1.5 Wrapping sec_11.0

sec_11.2

5.1.1.6 Serpentine sec_11.4

sec_11.6

5.1.1.2 Perforation sec_5.2

sec_5.4

sec_5.6

sec_5.8

sec_6.0

sec_6.2

sec_6.4

sec_6.6

sec_6.8

sec_7.0

sec_7.2

sec_7.4

sec_7.6

sec_7.8

sec_8.0

sec_8.2

sec_8.4

sec_8.6

sec_8.8

sec_9.0

sec_9.2

5.1.1.3 Junction sec_9.4

sec_3.0

sec_3.2

sec_3.4

sec_3.6

sec_3.8

sec_4.0

sec_4.2

sec_4.4

sec_4.6

sec_4.8

sec_5.0

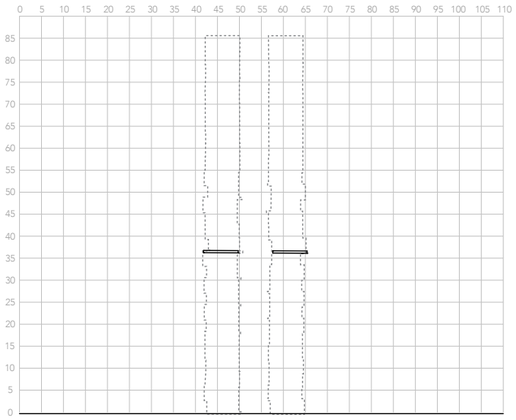
5.1.1.1

Embedding

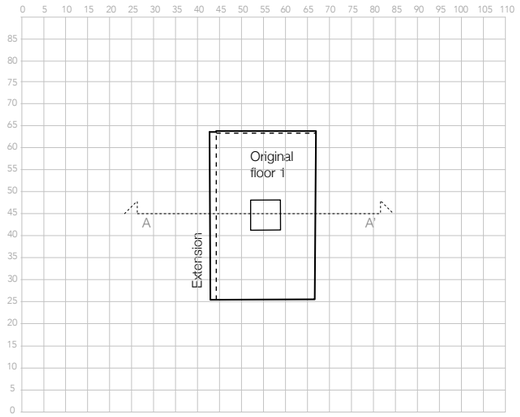
Elevation

Top

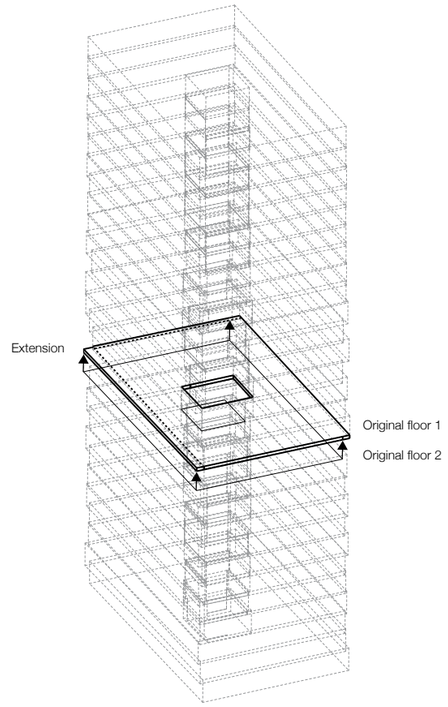
Axonometry



Section AA'



Plan



Sec_3.0

1.- Generation
This figure is the result of the shift from one rectangular slab to the incrusted overlapping of two rectangular slabs that originally are one on the top of the other, with a minimum distance of 2.5m and without sharing orientation in any of the three axes.

2.- Form
Here, the generality characteristic of the original "typical plan" becomes a singularity, since this figure is not repeated in any other slab from any other model. This type of interlacement radicalizes the application of the discrete category to the model: instead of being a discrete element just because it is countable, (as is the case with the discrete floor arrangement studied in the Chapter 2), there is a different interpretation of the discrete. That means that each element is not only countable due to its separability; it is also distinct because of its singularity, in particular in relation to its position and contour. The set can take on multiple forms derived from the juxtaposition of two rectangles, with a minimum of eight sides and a maximum of nine sides. The result forms figures on the same plane that in this particular case involves just two slabs and do not produce perforations.

3.- Performance
The slab is extended into the exterior space, so that the inhabitable surface is no longer limited to the interior, adding instead the possibility of having a balcony and ocasionally a cantilever that operates as a protection for the sun rays.

4.- Subjectlessness
Here, the interlacement is contingent, local and temporary. However, it is also an operative interlacement, since its formal consequences alter how we use the floor.

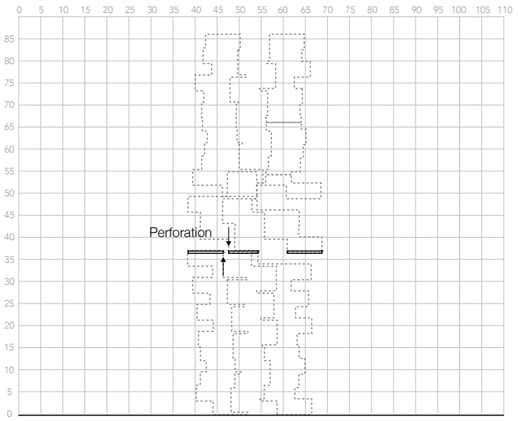
5.1.1.2

Perforation

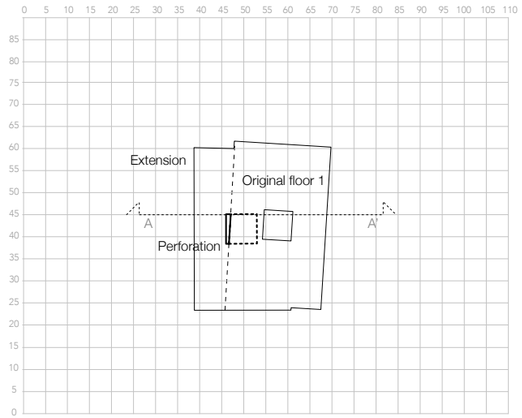
Elevation

Top

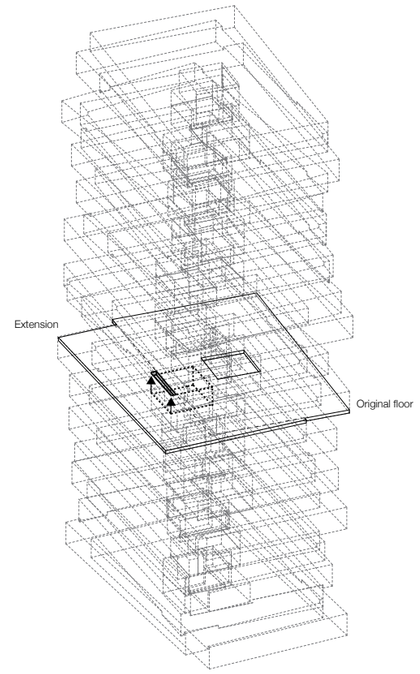
Axonometry



Section AA'



Plan



1.- Generation
The new figure is the result of the projection of the hole in one original slab toward the immediately superior slab.
The part of the projection that falls outside the original limits of the upper slab generates a new perforation, which as a consecuence only occurs in the part of the upper slab which is extended, without perforating the original slab in any case.

2.- Form
The perforation does not retain the square shape of the original slabs; it is cut off by the edge of the upper original slab, with which it establishes a certain relationship of continuity.
The result is organized into irregular shapes that have between two and four sides, and whose surface is always equal or smaller than the original square.

3.- Performance
Depending on the surface of these perforations, they can be used for elevator shafts, stair cores, or both at the same time. When any of these cases happens, the slab has the possibility of being understood as a urban space rather than as a domestic space. The reason is because when it has the option of sustain more than one core of vertical circulation, the surface becomes the horizontal connection between two different buildings, each one of them with its own core of vertical circulation.

4.- Subjectlessness
The perforations produced by this interlacements highlight their performative nature, since they have consequences in the means of circulation established for the set, specially in relation to the vertical cores. Beside that, it emphasizes the idea of descentralisation, opening the possibility for a second core.

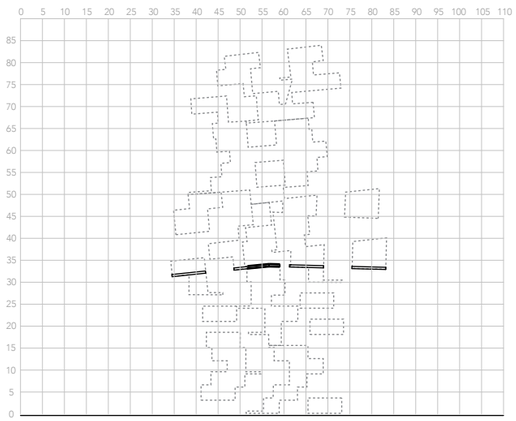
5.1.1.3

Junction

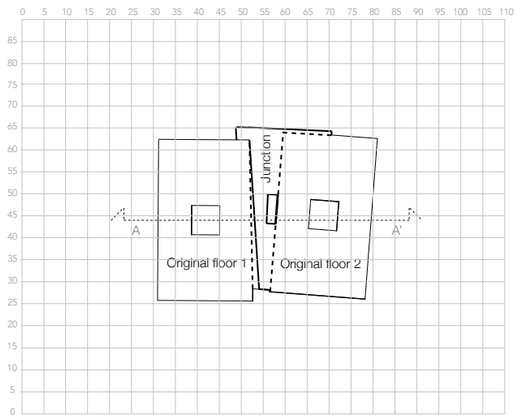
Elevation

Top

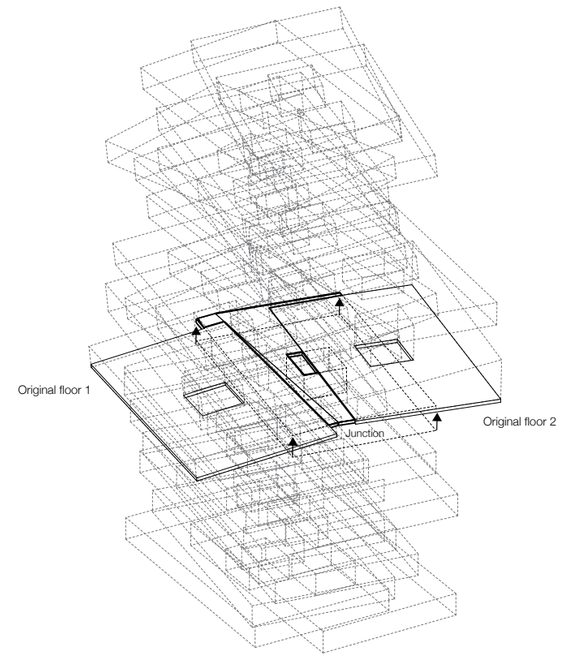
Axonometry



Section AA'



Plan



1.- Generation

The figure is the result of an interlacement between three slabs: two of them are in paralel, separated by a short distance, while the other one is under them in section and in between them in plan.

In this circumstance, the lowest slab is projected along the planes of the two upper slabs. The incrustation of the lowest slab in between the two upper slabs connects both of them like a hinge, producing a single surface folded in two different plans.

2.- Form

A floor is generated with two surfaces that have different slopes, therefore producing an edge. As a result, there is continuity between the two upper slabs through the projection of a third lower slab, resulting in a set that is a structured clumping on two different planes.

3.- Performance

In typical configurations of the original skyscraper, it is only possible to move from one slab to the other through the vertical circulation core, a fact that underlines the strictly discrete condition of the set.

With this new condition, the movement from one original slab 1 to the original slab 2 is not anymore strictly vertical, but has a significative horizontal component. Beside that, the vertical core of circulations becomes irrelevant for this movement.

4.- Subjectlessness

This type of interlacement shows that there may be more parts than just the two that are necessary for a relationship, but that in no case does it involve all the parts in the set, as is the case for emergent systems. In this case, the interlacement can be considered strictly local.

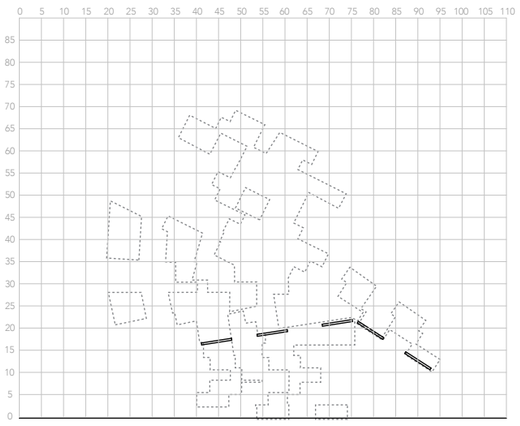
5.1.1.4

Chunking

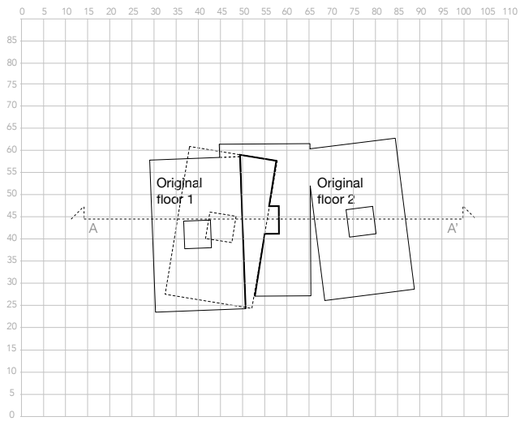
elevation sec10.8

Top

Resonant Pile 10.8



Section AA'



Plan

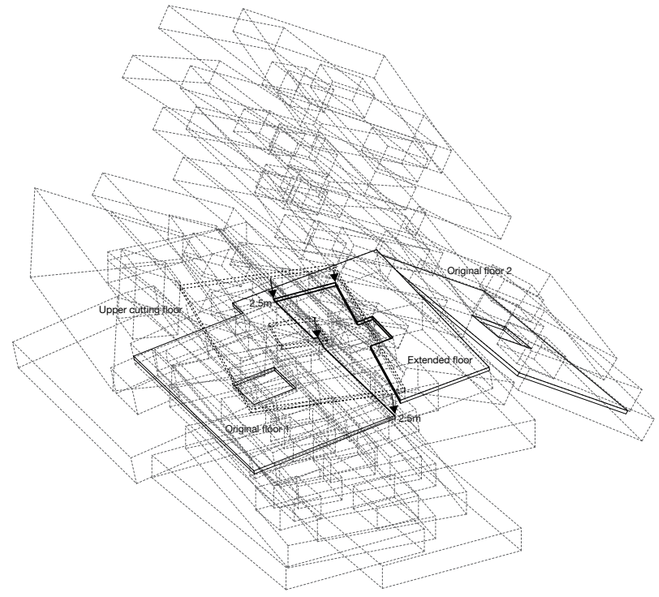
1.- Generation
The figure is the result of the projection of the surface of a slab toward the plane of the slab immediately above it in order to close the volume of the former one. However, this projection cannot be applyed to all the surface of the upper slab, because it would generate a floor that part of it would have a lower height than the stipulated minimum ceiling height.

2.- Form
A cut is made that follows the edge of the top slab – a perforation that, in addition to being asymmetrical, is much larger than the square holes that can be found in the other slabs. Beside that, it is worth to mention that the fact that the upper original have a gap modifies as well the cut of the lower floor, because the minimum height is not exceed in that particular zone.

Although each slab is different, in this case the singularity has a greater impact because there is a break with the geometric familiarity that governs the set.

3.- Performance
The formal result produces a double-height space with an interior balcony. Beside that, the façade acquires an edge that it is not anymore coincident with the edge of any floor, as occurs in the rest of cases.

4.- Subjectlessness
This type of interlacement emphasizes the fact that relationships can be established without the need for material continuity between the parts that enter into resonance.



Sec_10.8

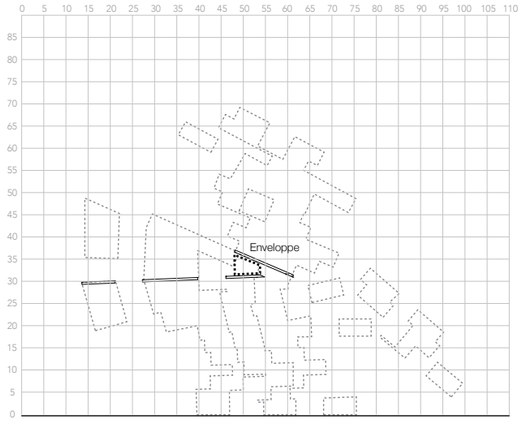
5.1.1.5

Wrapping

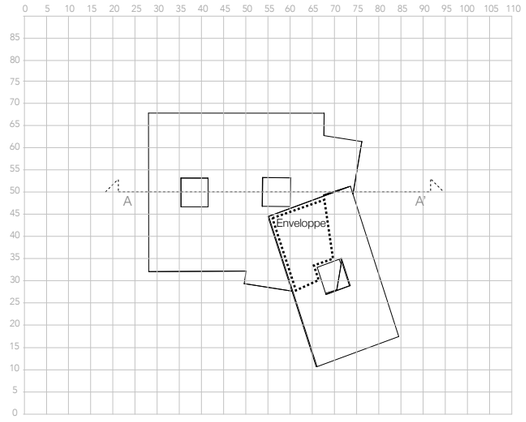
Elevation

Top

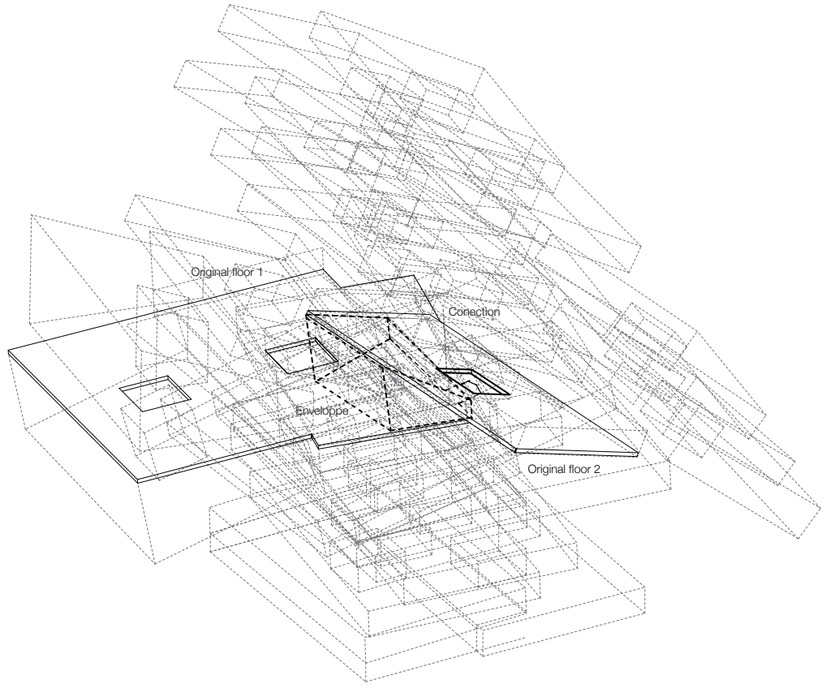
Axonometry



Section AA'



Plan



1.- Generation
The figure is the result of the partial projection of the surface of a slab towards the plane of the slab immediately above it. Part of the lower slab can not be projected because it would generate a floor that would have a lower height than the minimum stipulated ceiling height of 2.5m.
However, unlike other cases, because the upper slab contains a hole, part of the projection under the top slab can take place, since it coincides with the hole and therefore does not interfere with the minimum height.

2.- Form
The disposition produces a space which is embraced by the slabs, and not merely vertically compressed, as it is the usual case in the original skyscraper.
Beside that, a continuity is established through a whole that has two significant points: first, subverts the discrete condition of each of the slabs, and second, eliminates the need to use a transcendent element to achieve vertical connection. Instead of it, in this case the hole allows horizontal walkable continuity from one slab to the other.

3.- Performance
The usual mode of circulation through the holes is subverted: transfers between slabs no longer occur only by way of transcendental vertical elements (like stairs or elevators), but also through immanent horizontal elements like the extension of the slab itself.

4.- Subjectlessness
This type of interlacement allows for the elimination of the absolute need of ontologically privileged elements.

5.1.1.6

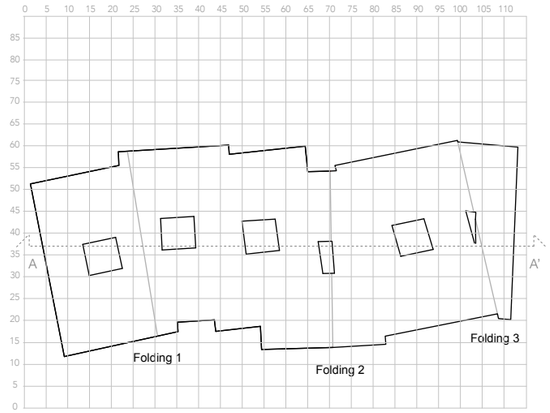
Serpentine

Elevation

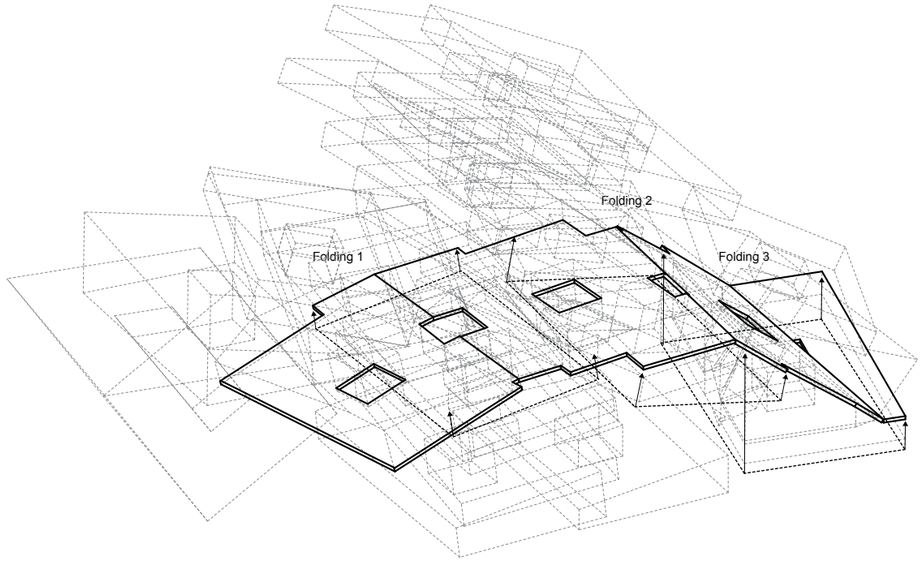
Top

Axonometry

Section AA'



Plan



1.- Generation
The figure is the result of the concatenated projection of a number of slabs with the planes above them.

2.- Form
A linear surface similar to a serpentine is generated. In this linear clump, several slopes of different angles and directions are linked together, along with various perforations and a notched outline.
The set appears as a single continuous surface, although the positions of the different complete holes lets us make out the initial slabs and their final positions.

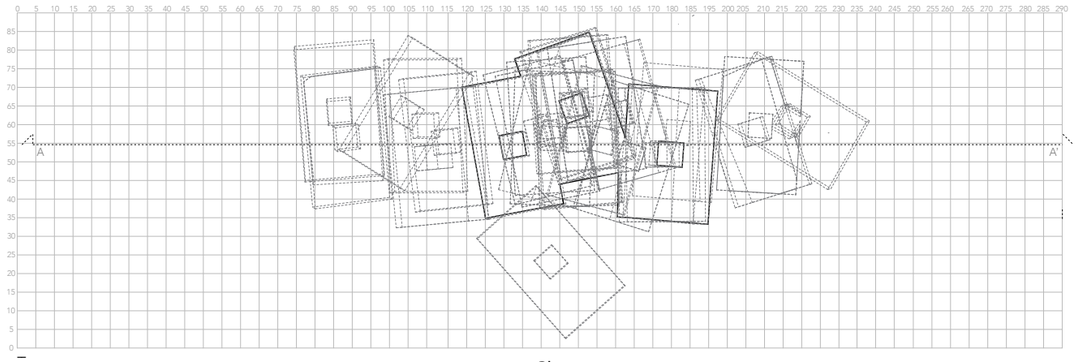
3.- Performance
A surface is produced that allows for long distance travel without the use of scalators or elevators, althought not all the slopes are easily walkable. As a result, the space of a slab can not be reduced to an exclusively sedentary and two-dimensional space, as it is the case of the discrete floor of the skyscraper.
Various three-dimensional trajectories can be drawn without the need for external elements such as stairs or elevators. However, unlike the continuous floor, these trajectories do not cross the entire set, but only a part of it which can be connected with the rest of the parts through the different cores that pass throught the obtained clump.

4.- Subjectlessness
Due to the absence of a complete fusion of the different slabs (since they are still recognizable as individual entities), there is no dissolution of the parts in the whole, but only a state of resonance in which the parts remain identifiable. Beside that, the clump cannot be understood as a continuous topography, because it is limited by edges and it does not connect the whole set.

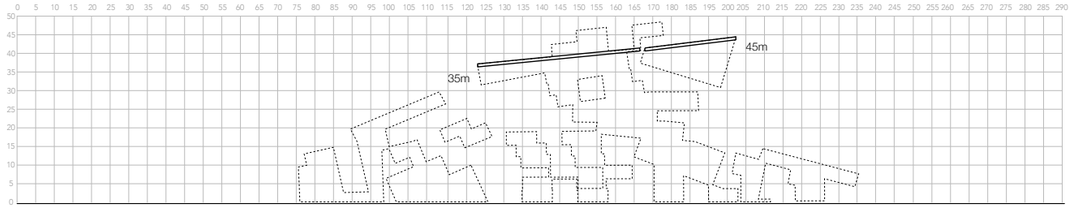
5.1.1.7

Elevation

Axonometry



Plan



Section

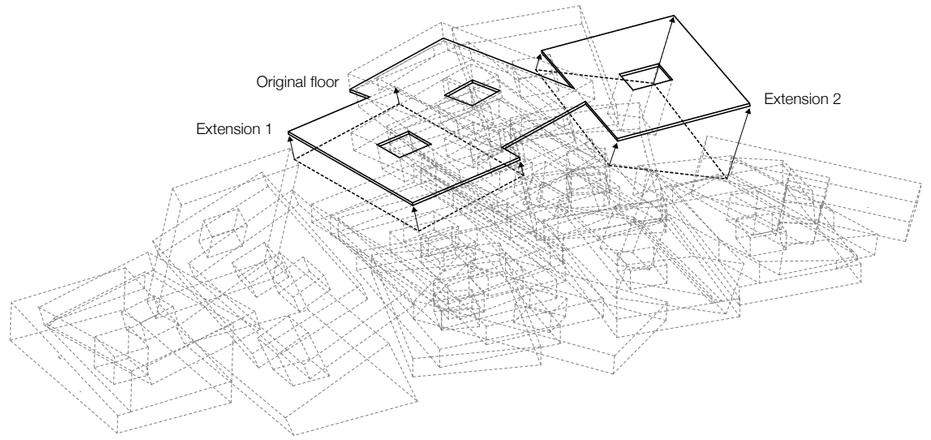
1.- Generation
This figure is not the result of a projection of one slab that unifies two upper slabs, as is the case of a junction, but the projection of two slabs on an upper slab, each one of them in each side of the upper slab.

2.- Form
The figure consists of a large and sloped continuous surface that extends across the top of the stack without interruptions or edges, beside its perforations.
The main formal peculiarity consists, beside the scale of its dimension, in its position, which is not in the base of the building set as usual, but on its top.

3.- Performance
Certain urban programs or sports activities that require large surfaces can take place in this type of configurations. It's high position opens specific programatic opportunities due to its views, light and ventilation.

4.- Subjectlessness
The figure presents a new ground, which we might define as a local counter-ground that differs from the universal floor characteristic of a figure-ground system. This conception is aligned with a thought that does not accept a single global whole against which objects are projected, but rather the presence of several meta-parts which we might define as "local wholes".

Esplanade

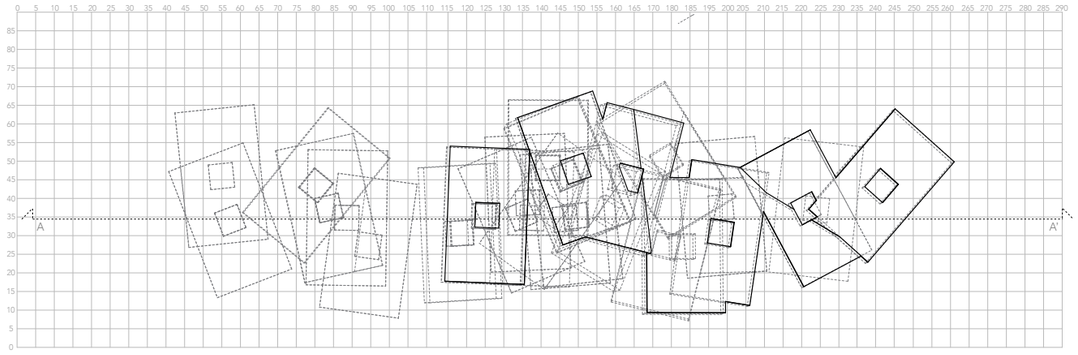


5.1.1.8

Ascension

Elevation

Axonometry



Plan

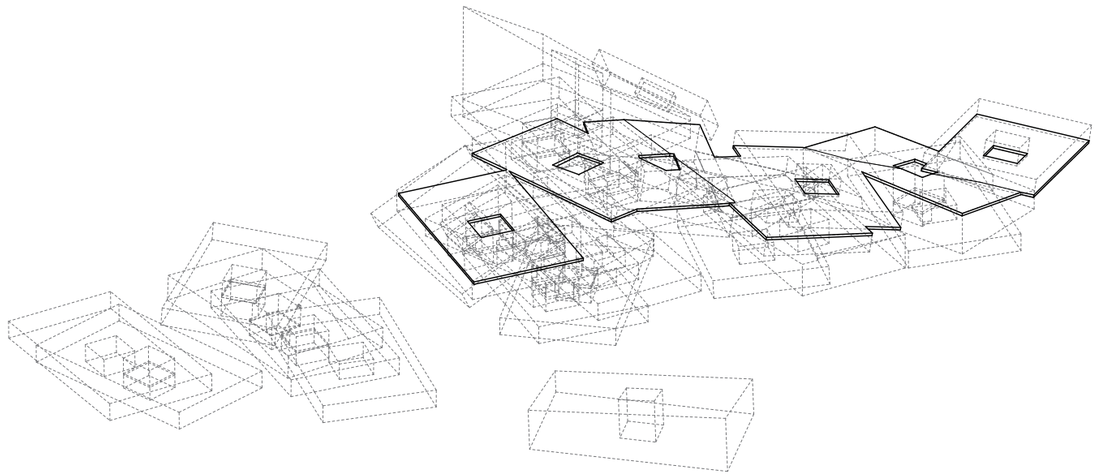
Section

1.- Generation
When certain slabs initially located in higher positions come into contact with the universal floor of the simulation, they can take on the morphology of ramps through the successive projections of the neighboring slabs.

2.- Form
The figure takes on a linear arrangement, ascending and with a notched contour, beginning from the zero level and reaching up to the 16th. Along the way it shares one of the slabs from the more compact vertical volume, then projecting in a cantilever on the opposite side.

3.- Performance
An access to the trunck of the set is produced that no longer functions at the base of the set, but at an intermediate level, without the need for external elements to the slabs like stairs or elevators.
The soft slopes produced by the ensemble permits its walkable circulation along the whole process of ascension, producing a change of height of more than 15 meters.

4.- Subjectlessness
This case represents the negation of the universal soil as the support for a centralized access on the ground floor as it happens in the discrete floor of the skyscraper, making way for a treatment of the access problem without establishing ontological privileges.
Even if it shares some formal similitudes with the notion of topography of the continuous floor, it cannot be fully read as it because it is not holistic, but partial and local.

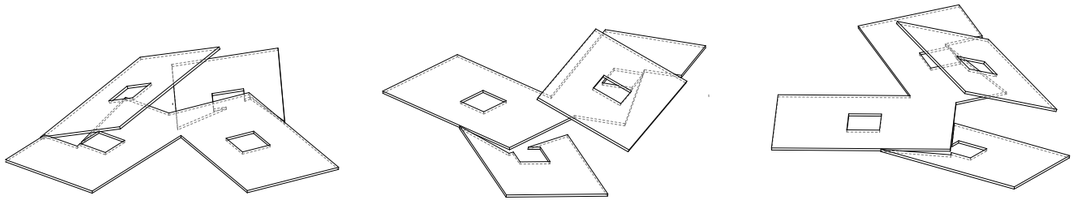


5.1.1.9

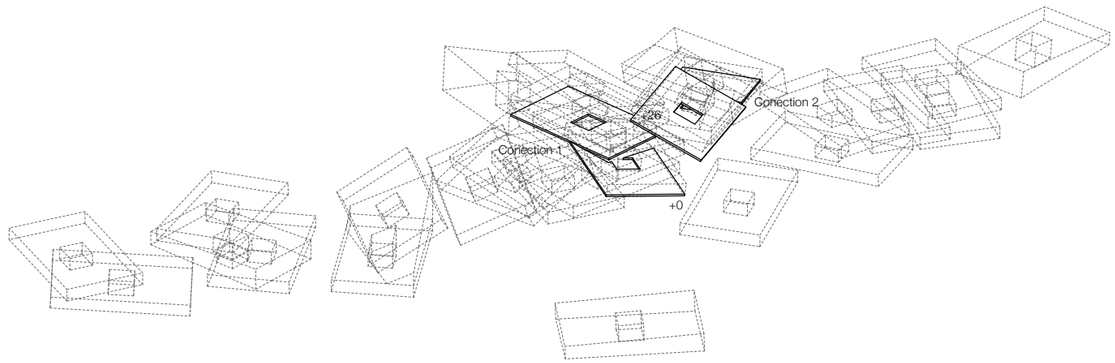
Spiral

Axonometry

Elevation



Axo 1 Axo 2 Axo 3



1.- Generation
At the points where there are cuts between slabs produced in order to avoid infringing the minimum ceiling height, connections are made to provide passage of horizontal circulations. When these elements are repeated successively one above the other following a rotational pattern, it generates a spiral.

2.- Form
The spiral is formed by three slabs that rotate along a center point. One contains a projection in the same plan and is almost flat, while the other two are sloped in opposite directions. In between them there are two punctual continuities that permits the circulation from one slab to the other.

3.- Performance
This type of figure permits the ascension around a common center in a circular and continuous way. Beside that, it also offers a peculiar double three-dimensional circulation: first, along the continuous and ascending path of the spiral itself; and, second, through the vertical communication cores that traverse the sub-set.

4.- Subjectlessness
A spiral arrangement implies the constitution of a specific center. However, that center is not a global center, but an ex-centricity: i.e., a center that is centralizing as such, but whose radius of action is strictly local.

SIMULATION ANALYSIS

Distributions

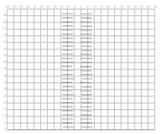
5.1.2 Distributions

The "Distributions" category studies how the set of slabs belonging to each of the 66 models is arranged in section, analyzing in particular the spatial relationships that occur between clumps and free slabs throughout the stacking process. Both must be understood as discrete parts that are sometimes closed off and other times open to relationships of continuity with other parts, whether those other parts are clumps or free slabs.

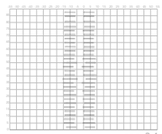
These relations do not imply material continuity, as we have seen in the previous section based on the notion of clump (5.1.1), but are related to states of resonance that can take place in a remote manner.

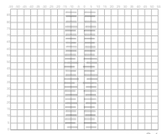
Throughout the process, a number of spatial singularities related to the notion of "distribution" are produced. Three of them affect the entire set: Unalignement (5.1.2.1), Barcode (5.1.2.2) and Hybrid (5.1.2.4). The other two affect only a part of it: Fan (5.1.2.3) and Sautéed (5.1.2.5).

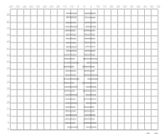
The study of these five spatial singularities based on its distribution is relevant for this research because as we will see in the next section (5.2), it implies qualitative transformations in the form and performance of the floor. In particular, it has a significative impact in the formal categories of Mereology (5.2.1.1) and Arrangement (5.2.1.4), and in the performative categories of Circulation (5.2.2.1), Gaze (5.2.2.2), Retirement (5.2.2.4) and Access (5.2.2.6).

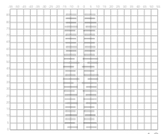

sec_3.0

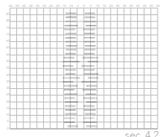

sec_3.2

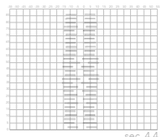

sec_3.4

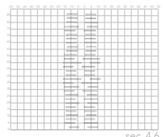

sec_3.6

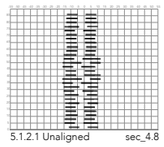

sec_3.8

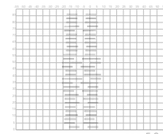

sec_4.0

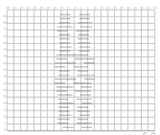

sec_4.2

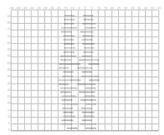

sec_4.4

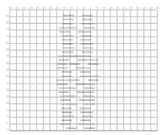

sec_4.6

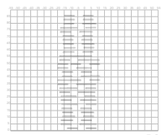

5.1.2.1 Unaligned sec_4.8

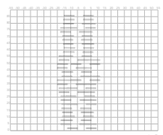

sec_5.0

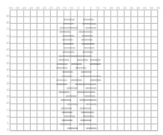

sec_5.2

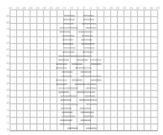

sec_5.4

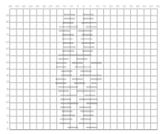

sec_5.6

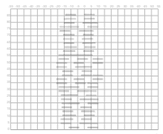

sec_5.8

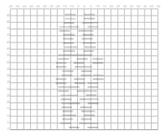

sec_6.0

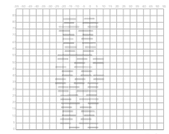

sec_6.2

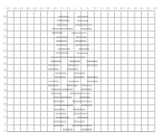

sec_6.4

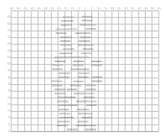

sec_6.6

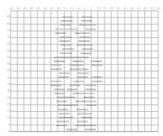

sec_6.8

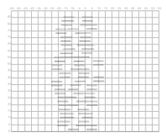

sec_7.0

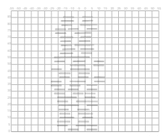

sec_7.2

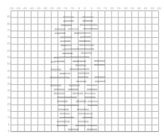

sec_7.4

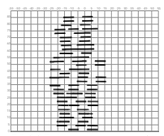

sec_7.6

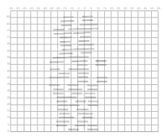

sec_7.8

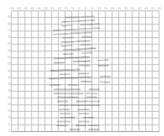

sec_8.0

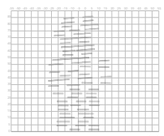

sec_8.2

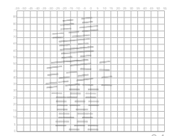

sec_8.4

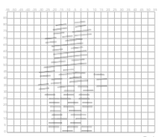

5.1.2.2 Dotting sec_8.6

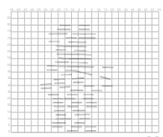

sec_8.8

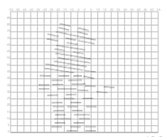

sec_9.0

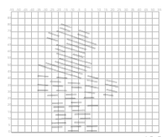

sec_9.2

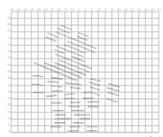

sec_9.4

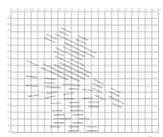

sec_9.6

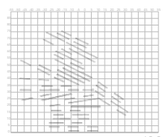

sec_9.8


sec_10.0


sec_10.2


sec_10.4


sec_10.6


sec_10.8

sec_11.0

5.1.2.3 Fan sec_11.2

5.1.2.4. Hybrid sec_11.4

sec_11.6

sec_11.8

sec_12.0

sec_12.2

sec_12.4

sec_12.6

sec_13.0

sec_13.2

sec_13.4

sec_13.6

sec_13.8

sec_14.0

5.1.2.5 Sautéed sec_14.2

sec_14.4

sec_14.6

sec_14.8

sec_15.0

sec_15.2

sec_15.4

sec_15.6

sec_15.8

sec_16.0

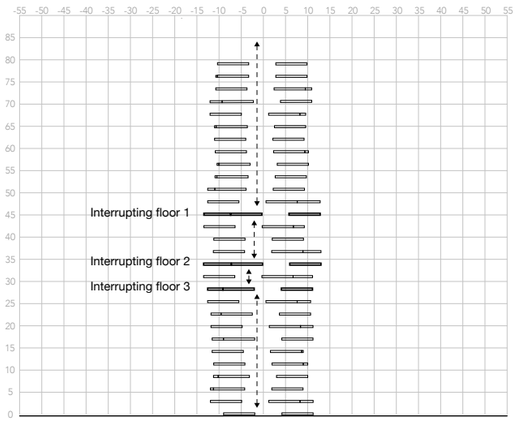
5.1.2.1

Unalignement

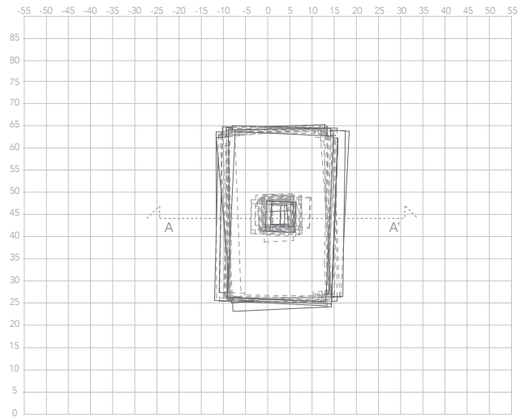
Elevation

Top

Axonometry



Section



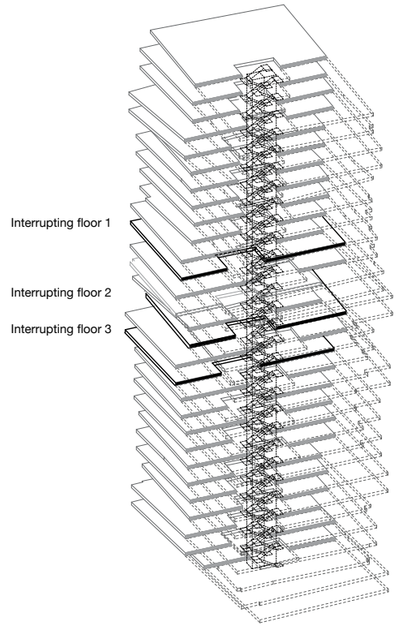
Plan

1.- Generation
The unalignement of slabs is the result of not controlled movements on the [x] and [y] axis. This movements are related to the vibration produced by the contact (taking into account the minimum ceiling height) in between slabs while they are moving throught the piling process.

2.- Form
The vertical continuity in between slabs is interrupted because each slab has it's own [x] and [y] position. While these movements are small, this interruption only affects the continuity of the structure and the façade.
However, in this case, the positional variation is big enough to break the minimum space required to permit the passing of the core of vertical circulation from one slab to the other one.

3.- Performance
The model can no longer be structured through a single circulation core. Instead, it requires several cores: in this particular case, three. This set should be understood as the overlap of three buildings, each with its own circulation core and access.
In addition, two of the slabs work as new "ground", since, on these slabs, one must pass from one circulation core to another in order to continue along the ascending path through the set.

4.- Subjectlessness
This model evidences the lack of a single absolute element to face the shole set: there is not anymore one single core, and there is not anymore a single ground. The addition of new cores produce the creation of different grounds in section, which act as new foundations on which to build, casts doubt on the opposition "ground vs. figure" and the binomial "ground=figure".



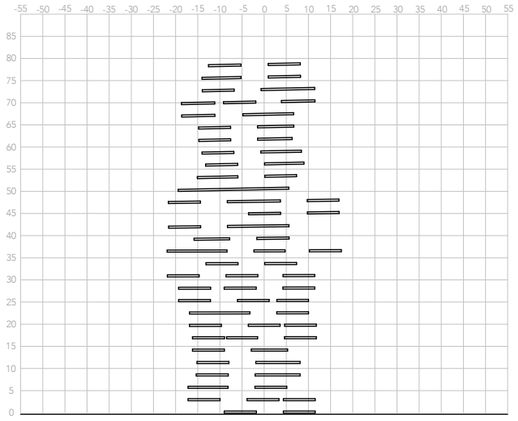
5.1.2.2

Barcode

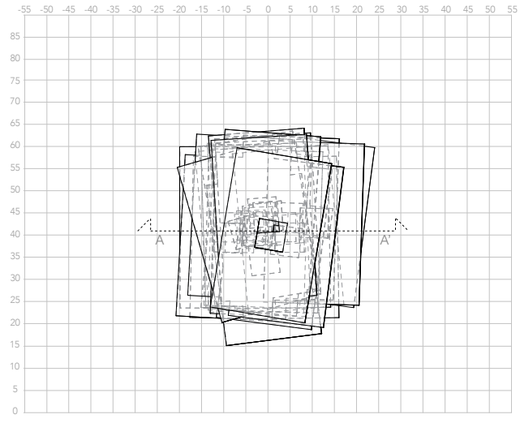
Elevation

Top

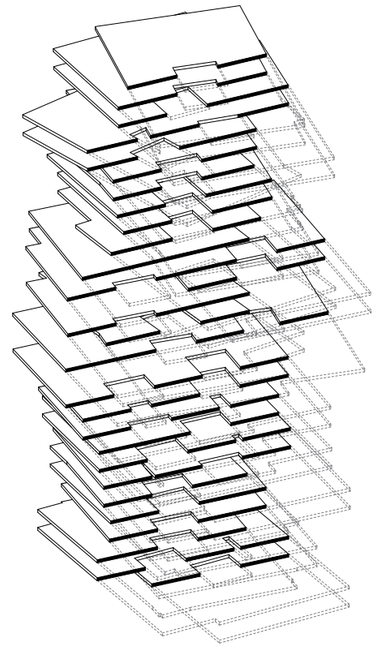
Resonant Pile 9.4



Section AA'



Plan



1.- Generation
The arrangement of the set in the piling process is at its moment of maximum openness in the instant immediately prior to the inclination of the slabs.

2.- Form
The set can be read in section as a collection of discrete horizontal slabs that are distributed following the pattern of a vertical bunch of dotted lines that keep the same distance between them.
Its formal peculiarity consists in the continuous interruption of each one of the levels, whose general configuration vaguely reminds the formal structure of a horizontal barcode.

3.- Performance
There is a constant interruption of vertical circulation, structure and façade. However, this configuration permits multiple manners to move in the building, offering an extemely rich game of visuals. Beside that, the distribution of holes allows for various cores of vertical circulation, which opens up many opportunities realted to the manner of moving inside the building.

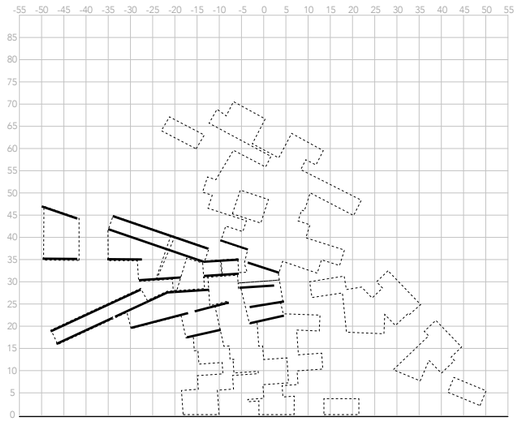
4.- Subjectlessness
The distribution very clearly denotes a collection of countable and distinct elements that are distributed without obeying to an absolute center. The vertical core is fragmented in many pieces, none of them occupying a privileged position in relation to the rest. Because of that, they operate as ex-centricities.

5.1.2.3

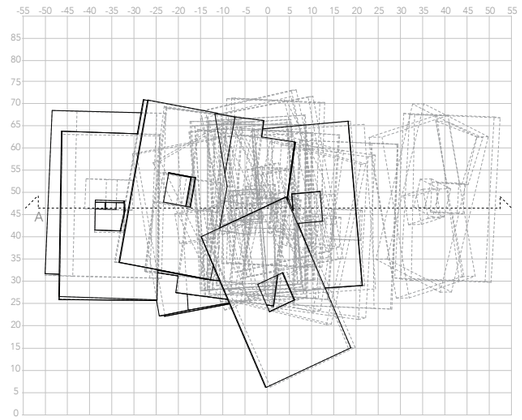
Elevation

Top

Axonometry



Section AA'



Plan

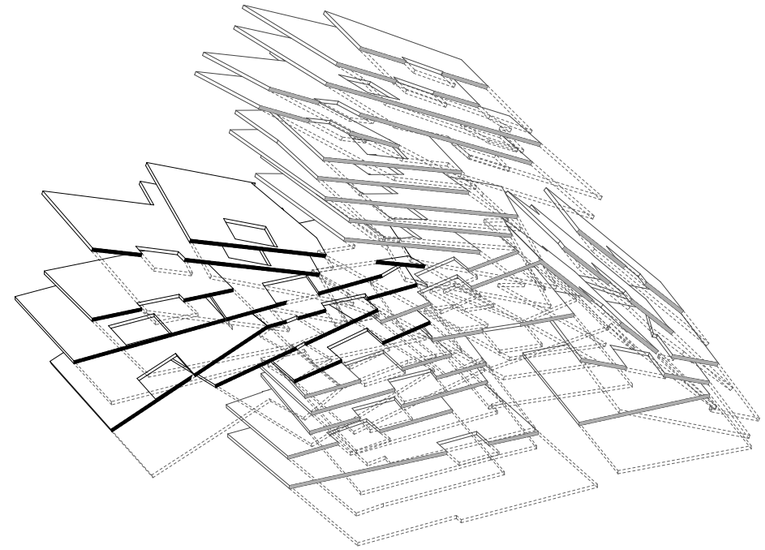
1.- Generation
Here, we find the arrangement of slabs at the beginning of the falling process. The advance of the stacking process opens the distribution of the slabs to the point of tilting them; as the set tilts to one side, the opposite side opens in section.

2.- Form
This sub-set is formed by a series of slabs that are structured according to a fan pattern. The slabs involved in this episode are arranged at different slants that follow a certain gradient, even if the virtual extension of it's geometry in section doesn't coincide at a single center.
As a consecuence, there is thus a formal micro-continuity between the slabs which is produced at a distance.

3.- Performance
The fan structure allows for grouping a series of different programs in response to the different slopes. Besides, it offers a branching circulation in section whose starting point is in the geometrical center of the set.

4.- Subjectlessness
The virtual center of the fan emerges as a centrality that is nevertheless local in scope, since it does not act as a centrality for all the slabs in the set. It is, therefore, a very good example of an ex-centricity: it keeps a certain local relevance but it is never totalized in relation to the whole set.

Fan



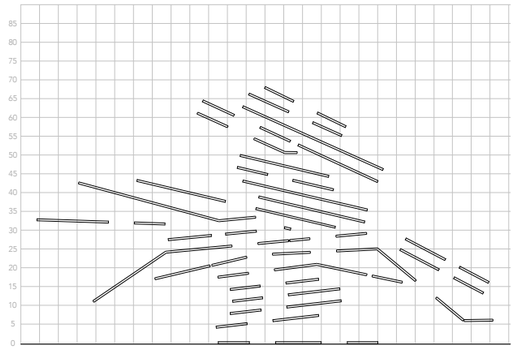
5.1.2.4

Hybrid

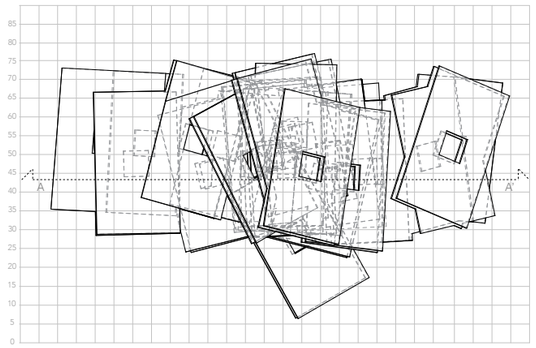
Elevation

Top

Axonometry



Section AA'



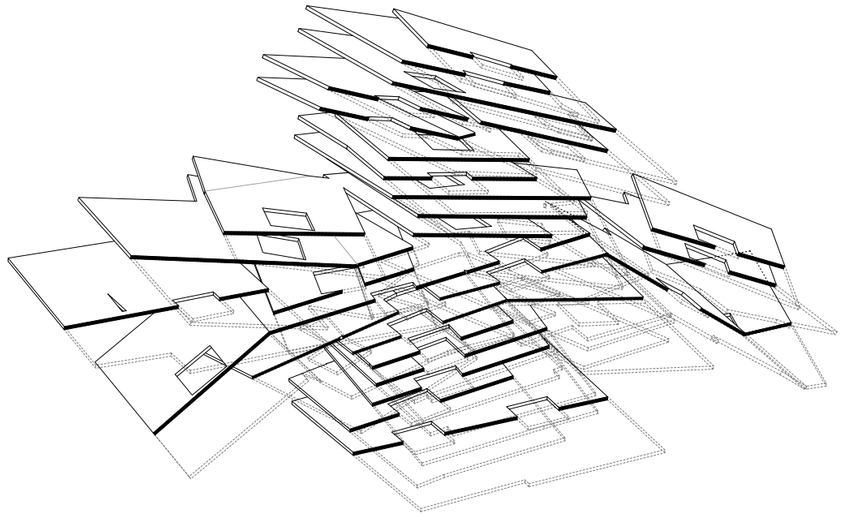
Plan

1.- Generation
The arrangement of slabs is captured at an intermediate point in the process; as such, the configuration of the parts is not mainly vertical as occurs at the start or horizontal as occurs at the end, but mixed.

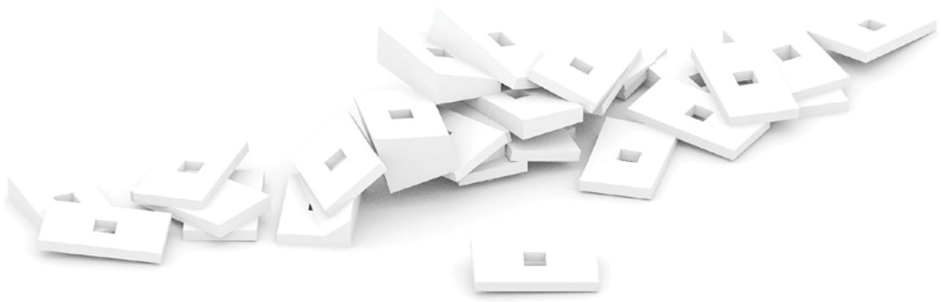
2.- Form
The set is read in section as a collection of different parts that can be divided into three main groups: slabs that remain in their original position; slabs that extend only along their own plane; and slabs that extend forming an edge when they meet the extension of another slab at a different slant.
The general outline refers to the silhouette of a cross, with similar formal proportions in the trunk and the wings.

3.- Performance
The wide variety of slopes and orientations allows for high levels of programmatic diversity, mixing several functions in the same zones, either in plan or in section. Beside that, the circulation along the building cannot be reduced to a vertical or horizontal movement, but needs the combination of both in order to connect the whole set. Finally, in between the different slabs there is open space that behave as gaps that attracts our gaze.

4.- Subjectlessness
This distribution shows that the clumpy micro-continuities are not global but local. In addition, they do not underlie the set, as is the case in a topological system; rather they are scattered throughout it.

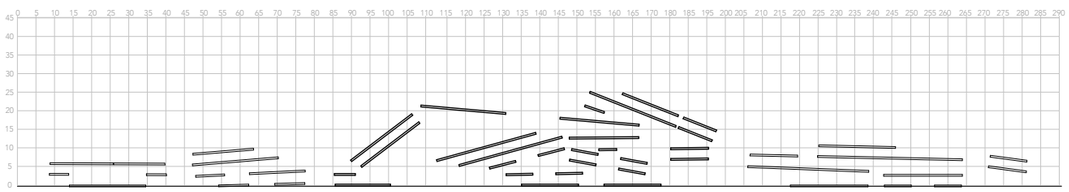


5.1.2.5



Axonometry

Elevation



Section AA'

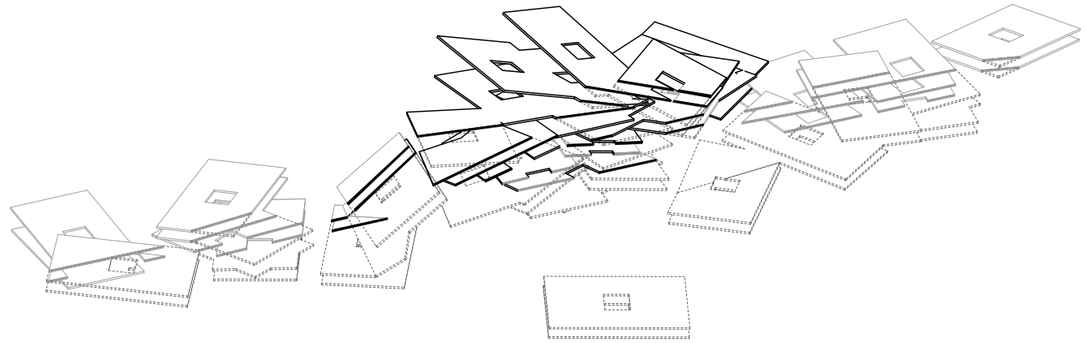
1.- Generation
The arrangement of slabs is captured almost at the end point in the process; as such, the configuration of the parts is mainly horizontal. However, there is still a certain volume in the center of the pilewhich which is quite spongy.

2.- Form
The set is read in section as a collection of different lines that has two main peculiarities. On the one hand, lines are made only from one single segment, that is to say, they never fold. On the other hand, lines have multiple angles and sizes. As a consequence, the result is a sautéed, that is to say, a collection of different segments of lines which do not respond to any centralized order.

3.- Performance
The wide variety of slopes, orientations and sizes permits a peculiar programmatic distribution: each slab is able to respond to a particular program, but at the same time and given that these slabs are next one to the other, the overall spatial result has a big richness of programs, althought each one of them performs as a monade.

4.- Subjectlessness
This distribution represents with precision the concept of collection: each floor has its own autonomy, and none of them has any privilege in relation to the others.

Sautéed



SIMULATION ANALYSIS

Fillings

5.1.3 Fillings

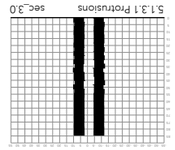
As we have seen in the preceding categories, the floor layout presented in this exercise is produced through a series of geometrical operations, some of them based on the projections of the slabs' edges – in other words, their façades.

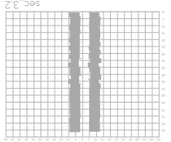
As a result of these projections, the floor arrangement generates a series of closed spaces that, as the simulation proceeds, produce different features in the full-empty diagram of the set, which have certain spatial consecuences in relation to the continuous and discrete categories.

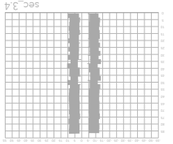
Throughout the process we have detected seven spatial singularities related to the notion of Filling: Protrusions (5.1.3.1), Contact (5.1.3.2), Insertion (5.1.3.3), Separation (5.1.3.4), Atrium (5.1.3.5), Matryoshka (5.1.3.6), and Archipelago (5.1.3.7).

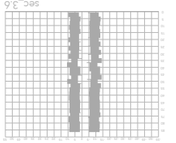
The study of these seven spatial singularities is relevant for the research because as we will see in the next section (5.2), it implies qualitative spatial transformations in the form and performance of the floor. In particular, it has a significant impact in the formal categories of Mereology (5.2.1.1) and Geometry (5.2.1.2), and in the performative categories of Gaze (5.2.2.2), Interiority (5.2.2.3) and Access (5.1.2.6).

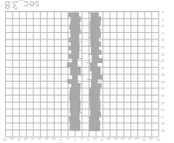
However, the study of Fillings open other opportunities not strictly related to the floor, given that it's main focus is not that much related to the surface and distribution of the slabs, but on the volume that they generate through the piling process, whose impact will be developed in Chapter 6 (6.2).

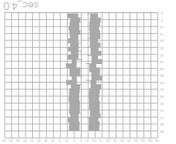

5.1.3.1 Protrusions
sec_3.0

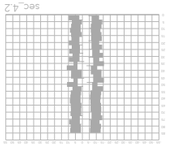

sec_3.2

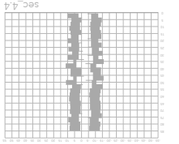

sec_3.4

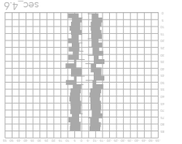

sec_3.6

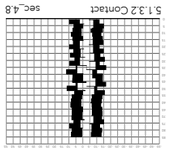

sec_3.8

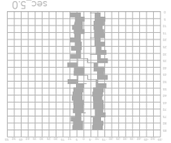

sec_4.0

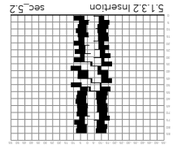

sec_4.2

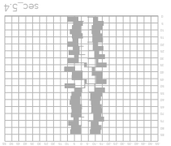

sec_4.4

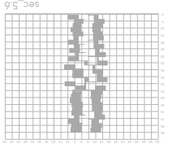

sec_4.6

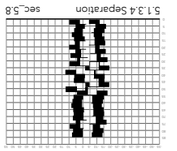

5.1.3.2 Contact
sec_4.8

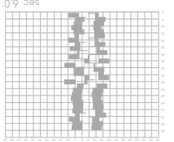

sec_5.0

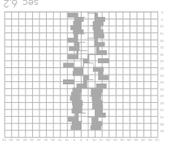

5.1.3.2 Insertion
sec_5.2

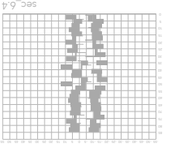

sec_5.4

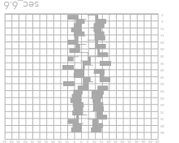

sec_5.6

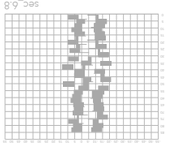

5.1.3.4 Separation
sec_5.8

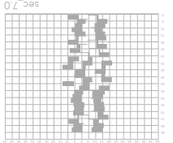

sec_6.0

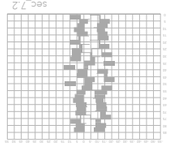

sec_6.2

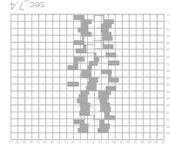

sec_6.4

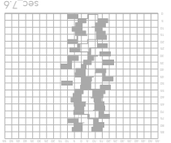

sec_6.6

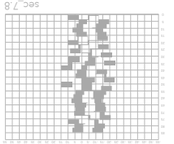

sec_6.8

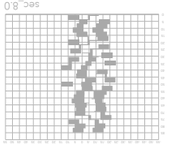

sec_7.0

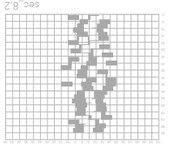

sec_7.2

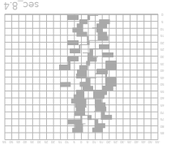

sec_7.4

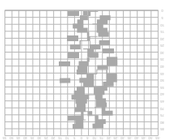

sec_7.6

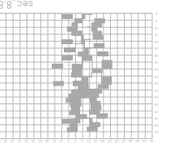

sec_7.8

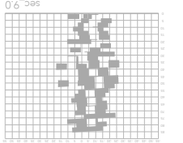

sec_8.0

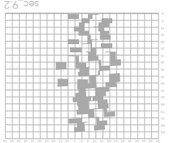

sec_8.2

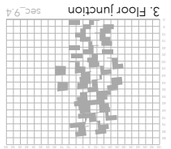

sec_8.4

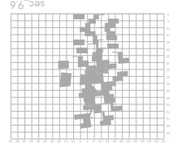

sec_8.6

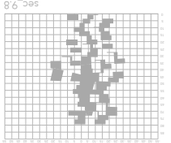

sec_8.8

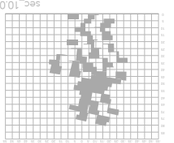

sec_9.0

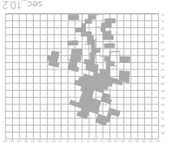

sec_9.2

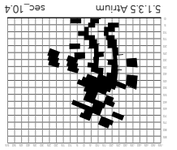

3. Floor junction
sec_9.4

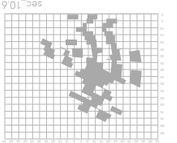

sec_9.6

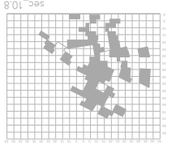

sec_9.8


sec_10.0


sec_10.2


5.1.3.5 Atrium
sec_10.4


sec_10.6


sec_10.8

sec_11.0

sec_11.2

6. Floor folding
sec_11.4

sec_11.6

sec_11.8

sec_12.0

sec_12.2

sec_12.4

sec_12.6

sec_12.8

5.1.3.6 Matryoshka
sec_13.0

sec_13.2

sec_13.4

sec_13.6

sec_13.8

7.1.3.7 Archipelago
sec_14.0

sec_14.2

sec_14.4

sec_14.6

sec_14.8

sec_15.0

sec_15.2

sec_15.4

sec_15.6

sec_15.8

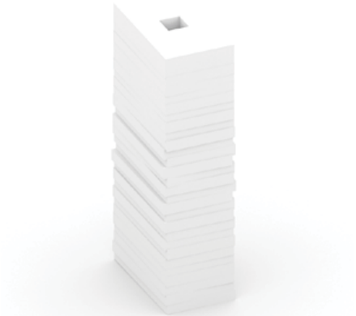
sec_16.0

5.1.3.1

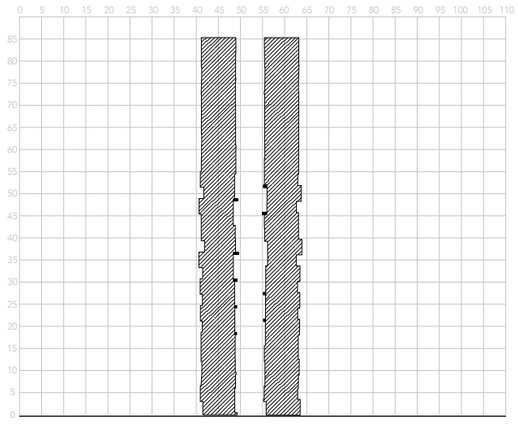
Protrusions

Elevation

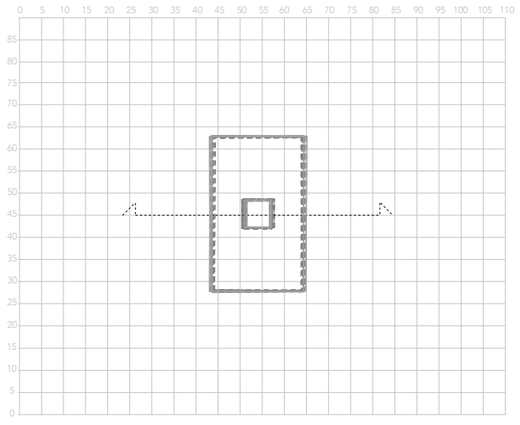
Top



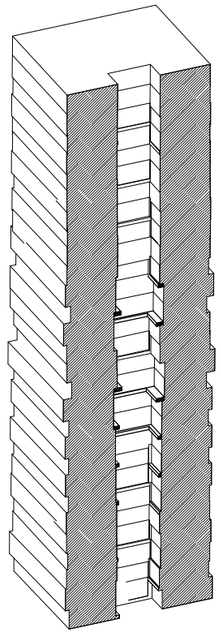
Axonometry



Section AA'



Plan



1.- Generation
The vertical holes in this set are slightly out of alignment due to minor shifts along the [x] and [y] axes. These displacements are produced because of the vibration caused by the contact among slabs. Thisp phenomena occurs from the first instant on of the piling process, and keeps its presence until the end of the development

2.- Form
The slabs in the model protrude slightly into the central perforation, whereas on the exterior they protrude with their full habitable height, breaking the continuity of the façade.

3.- Performance
Analyzed in section, the figure appears with a vibrating outline that seems to suggest the presence of a series of tiny balconies toward the interior and the exterior. These balconies represent a qualitative transformation in relation to the original skyscrapers.

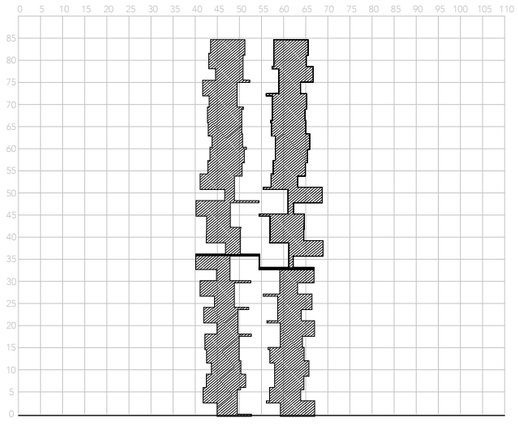
4.- Subjectlessness
The contingency of the protrusions and the singularity of each of the parts are inscribed within a non-totalist framework. In addition, the fact that these elements do not only emerge on the exterior but also on the interior suggests the model's ability to generate an interior space that can be constituted as a "world", as opposed to a mere spatial remnant.

5.1.3.2

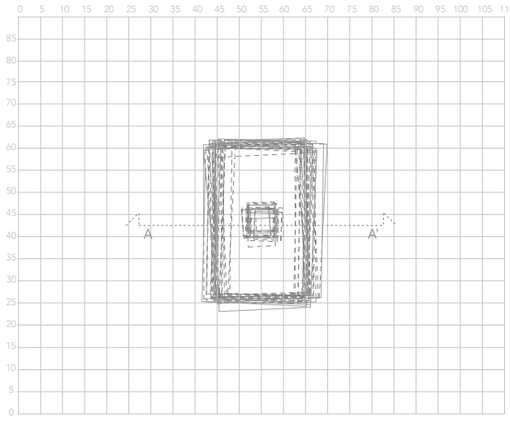
Elevation

Top

Axonometry



Section AA'



Plan

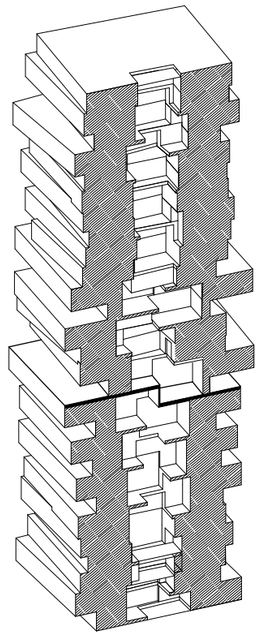
1.- Generation
Toward the middle of the set, the displacement of the slabs is large enough that the projection of their respective holes does not overlap at all. On the contrary, it is projected either on the surface of another original floor or on the surface of the extension of another floor.

2.- Form
The figure produces a material continuity between slabs that are positioned in different levels, while breaking up the vertical continuity of the central hole, something which has significant performative consecuences.
The result is a 90° folded floor that is made out two original floors.

3.- Performance
When two holes do not coincide and are completely separated, a habitable interior space is generated between them. Where once there was just the vertical central hole, a habitable space is produced that breaks up the continuity of the void and connects both sides of the set to one another.
As a consecuence, it is not possible in that point of the section to go from one slab to its inmediat upper one, forcing the user to use the lower floor to go from one core to the other one.

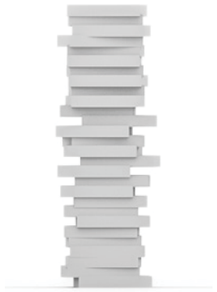
4.- Subjectlessness
There is a local interlacement that, on the one hand, breaks with a centralizing element (in this case the hole) and, on the other hand, emphasizes the different parts' ability to generate formal and local viscosities with one another.

Contact



5.1.3.3

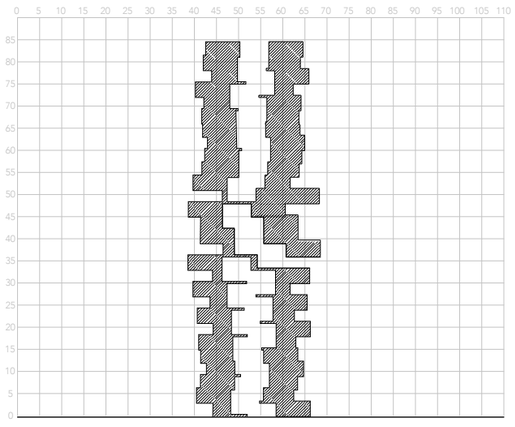
Insertion



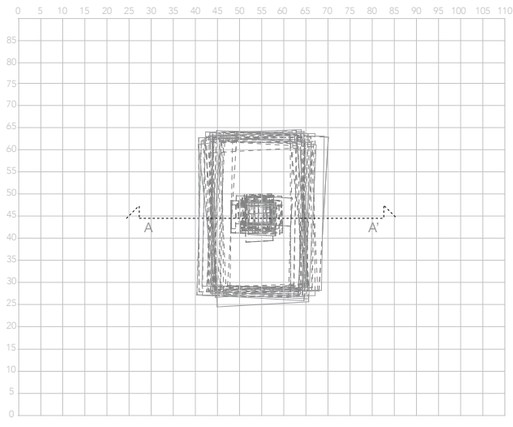
Elevation

Top

Axonometry



Section AA'



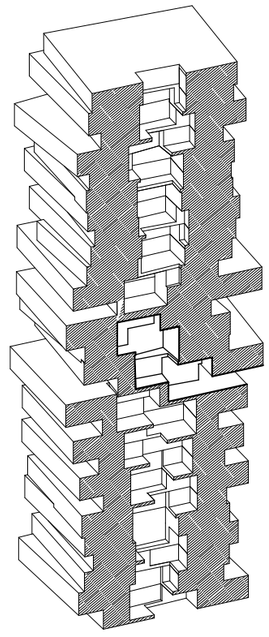
Plan

1.- Generation
Toward the middle of the set, the displacement of the slabs is large enough that the downward projection of one of the holes not only does not coincide with the outline of the hole in the slab beneath it but falls outside the lower slab's outer edge.

2.- Form
This generates a gap in the façade, which extends upward until its continuity is interrupted by a connection between slabs. This makes it a cul de sac, as opposed to a system with two points of entry.
This insertion can be read as well as a vertical opening of the intersticiality that passes through the ensemble, keeping the vibration of its inner volumetric surfaces.

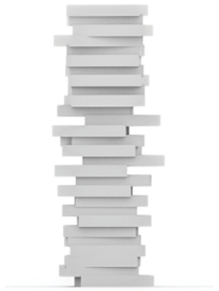
3.- Performance
Here, the interior-exterior dichotomy enters into crisis: the façade is not projected exclusively toward the exterior, but also toward the interior producing an inner façade.
As a consequence, it appears a new exterior that is placed in the interior of the building, a phenomena that suggest programs that were not contemplated in the original skyscraper.

4.- Subjectlessness
The withdrawal of the façade into the interior puts aside any understanding of the exterior as an absolute: the fact that the exterior occupies an interior position relates more to the idea of matryoshka than to the traditional dichotomy between opponents.



5.1.3.4

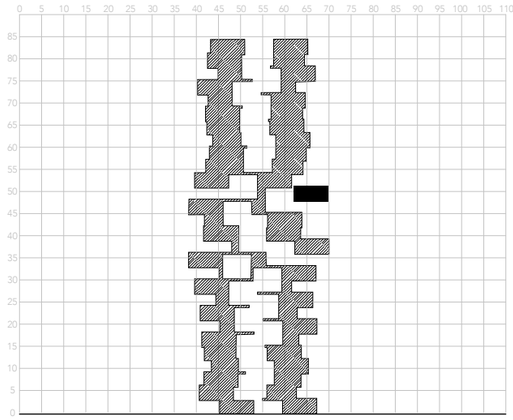
Separation



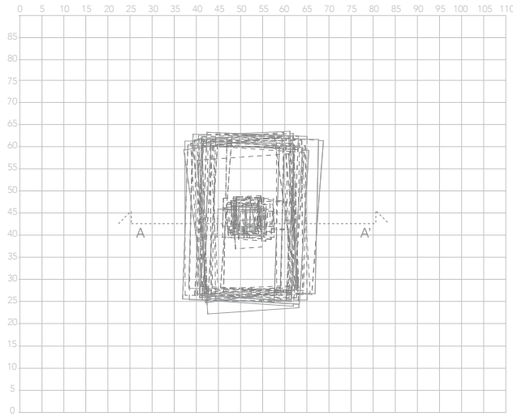
Elevation

Top

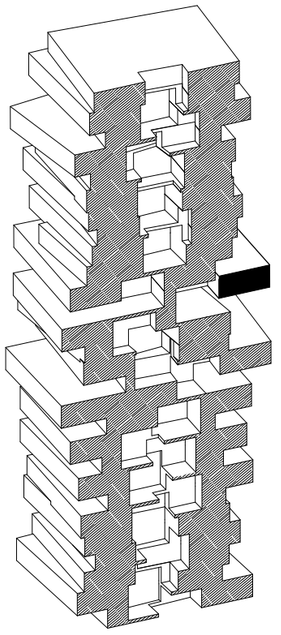
Axonometry



Section AA'



Plan



1.- Generation
Toward the middle of the set, the displacement of one of the slabs is large enough that the hole cannot be projected in its entirely toward the upper slab or the lower slab. As a consecuence, the hole opens to the exterior space through a a system of two points of entry, as opposed to a cul de sac.

2.- Form
The resulting model contains one filled part that is isolated, i.e., it is surrounded by exterior on all sides. In section, that figure does not maintain material continuity with the rest of the set.
In addition, it creates a strong tension in between the corner of the isolated part and the closest corner of the main body of the set.

3.- Performance
The uniqueness of this space surrounded by air offers visual and ventilation conditions that are very different from those of the rest of the set. It offers as well a balcony with open space in both sides.
Finally, it produces a pseudo-interior space in between the isolated part and the main body of the set that can be read as a inner terrace.

4.- Subjectlessness
This phenomenon provides a reading far removed from a holistic system, since one of the elements is located outside it and maintains no formal or material continuity with the rest of the set.

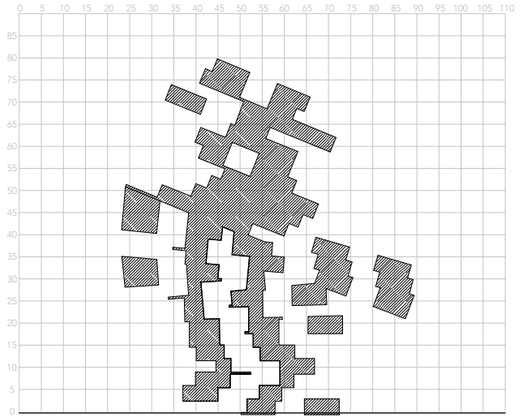
5.1.3.5

Atrium

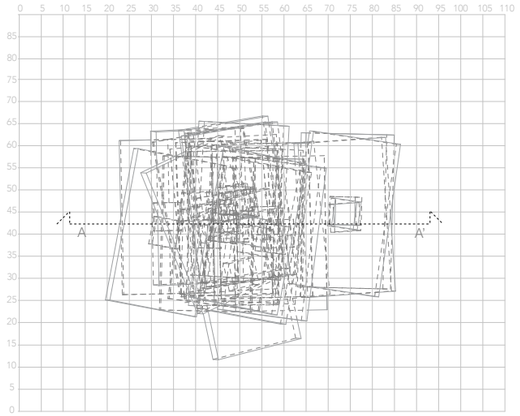
Elevation

Top

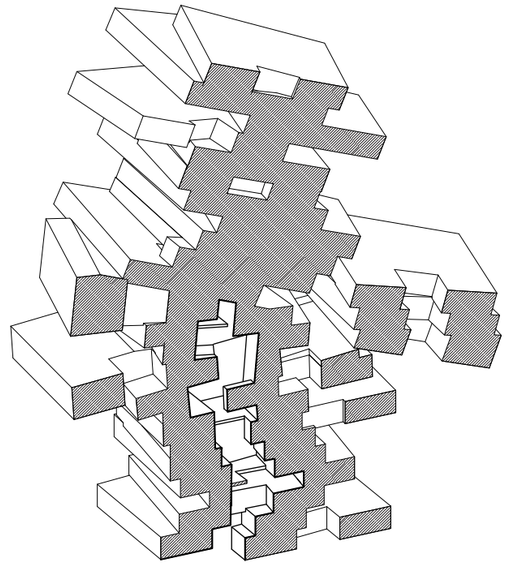
Axnometry



Section AA'



Plan



1.- Generation
In the initial instants, the opening process affecting the slabs is concentrated toward the middle of the set. However, as the process advances, the slabs nearer to the bottom are also affected by significant displacements.
In this case, the movement of the second floor in relation to the first is so wide that opens its hole to the exterior space. However, the following 12 pieces maintain enough compactness to keep the continuity of the hole aproximatelly until the mid part of the body.

2.- Form
The resulting model connects the central hole with the outside. This takes place on the ground floor through a folding of the façade toward the interior.

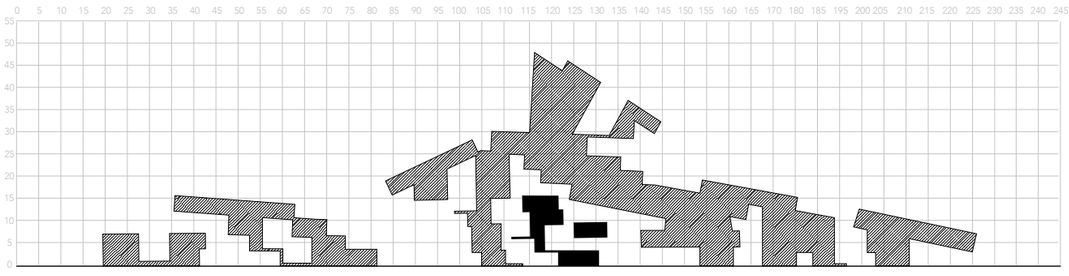
3.- Performance
The central void becomes a large atrium, accessed from the zero level. Along the atrium, many inner balconies and terraces open, producing a second inner façade.
Beside that, it also generates a large cantilever connected to the atrium, emphasizing the main entrance to the set.

4.- Subjectlessness
In drawing the ground plane inside, the set no longer responds to the idea of a ground framing a figure. On the contrary, it takes possession of the ground by pulling it into its interior.

5.1.3.6

Axonometry

Elevation



Section AA'

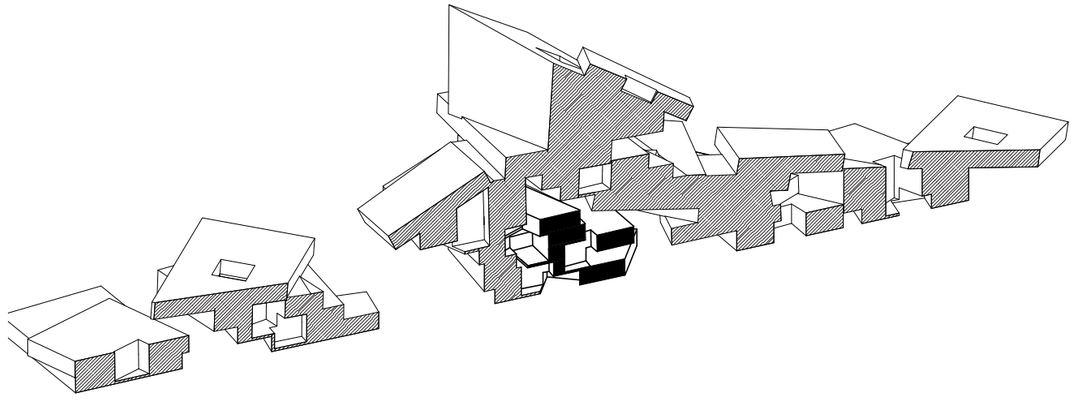
1.- Generation
At the instant when the stacking loses its original vertical compactness, the lowest part of the set is surrounded by a series of parts that close it off.

2.- Form
The resulting model presents filled space that is inside a void generated by further filled space. In that sense it is filled space inside filled space – in other words, a figure within another figure, with an interstitial space that mediates between them as occur with a russian dolls Matryoshka.

3.- Performance
This phenomenon generates a concept of interiority that is no longer understood in opposition to exteriority. Rather, it follows a recursive and introspective framework in which there is no radical exteriority or interiority.
Because that, it generates a buffer space in between the two filled volumes that could be understood as an exterior space placed in between two interior spaces.

4.- Subjectlessness
This framework calls into question the concept of an exterior, understood as an absolute whole that acts as a universal frame of reference. Nor is this an exterior fused with an interior – i.e. it is not a series of parts that dissolve into a whole or vice versa. On the contrary, these are collections that contain sub-collections and that are part of supra-collections. However, at no point is there a super-object capable of encompassing all the other objects.

Matryoshka

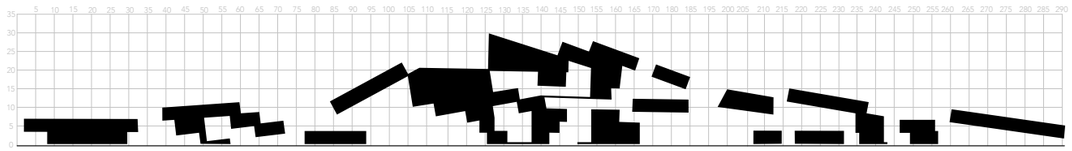


5.1.3.7

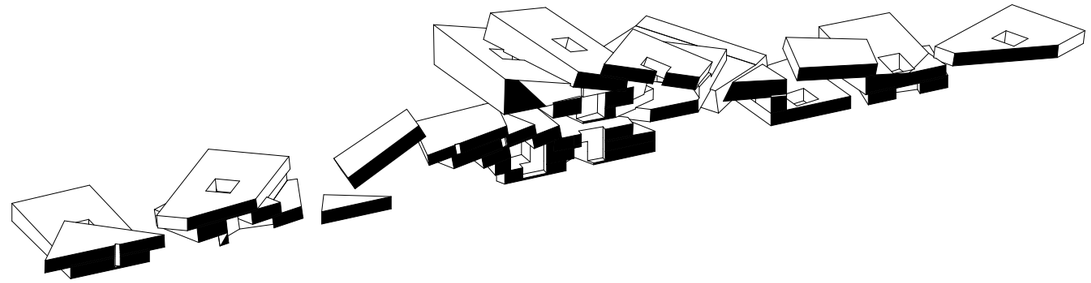
Archipelago

Axonometry

Elevation



Section AA'



1.- Generation
In the final section of the simulation, the degree of dispersion is very high and, therefore, the interlacements produce smaller sub-sets that do not arrange themselves anymore around the idea of a "main body".

2.- Form
The figures are made up of a series of significantly different and independent forms that are the result of diverse interlacements. These figures do not display material or formal continuity with the rest; they are not even part of a pattern that makes it possible to identify them as a particular set.
On the contrary, there is a grouping of various interlacements, which maintain a certain autonomy with respect to one another.

3.- Performance
Given its highly scattered character, this set operates like a low-density urban environment rather than as a large private development. Because of it, the space in between the different elements can be read as urban space with different degrees of privacy according to its formal conditions.

4.- Subjectlessness
This configuration significantly represents a logic of collections that is not subject to the influence of a superior identity. On the contrary, the various slabs co-exist, forming local and contingent interlacements while remaining autonomous and independent.

SIMULATION ANALYSIS

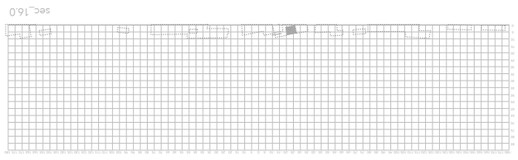
Intersticialities

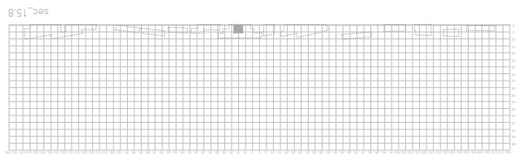
5.1.4 Intersticialites

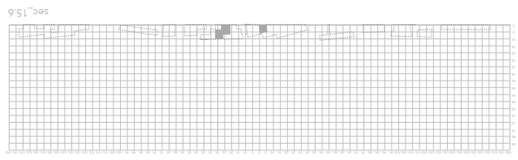
Throughout the resonant piling process, the spatial behavior of the central holes generates a second type of spatiality that is not simply the negative of the filled space studied in the previous section Fillings (5.1.3).
On the contrary, it contains a series of specific phenomena with relevant formal and performative consequences, which is based on the combination of the different perforations produced in the set according to the simulation rules described in Chapter 4 (secion 4.5).
Throughout the process we have detected five spatial singularities related to the notion of Intersticiality: Interruption (5.1.4.1), Isolation (5.1.4.2), Opening (5.1.4.3), Bifurcation (5.1.4.4) and Paralelism (5.1.4.5).

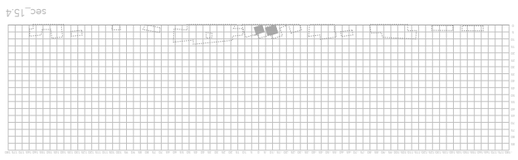
The study of these seven spatial singularities is relevant for the research because as we will see in the next section (5.2), it implies qualitative spatial transformations in the form and performance of the floor. In particular, in the formal categories of Contour (5.2.1.3) and Development (5.2.1.4), and in the performative categories of Circulation (5.2.2.1), Orientation (5.2.2.3) and Access (5.1.2.6).

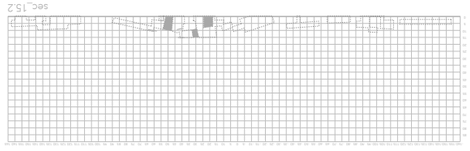
However, the analysis of Intersticialities open up other opportunities which are not strictly related to the floor, given that it's main focus is not only related to the surface and distribution of the slabs. On the contrary, it also focus on the volume that the movement of slabs generates through the piling process, whose impact will be developed with more depth in Chapter 6 (6.2).

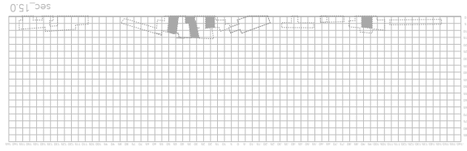

sec_16.0

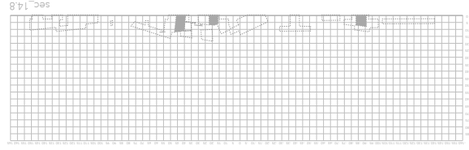

sec_15.8

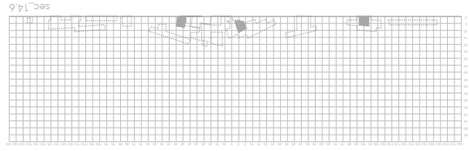

sec_15.6

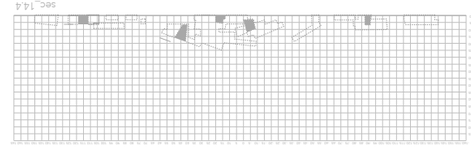

sec_15.4

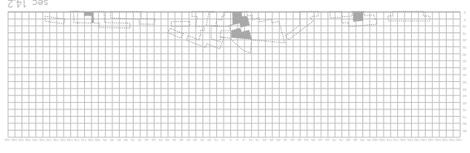

sec_15.2

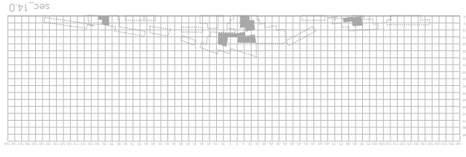

sec_15.0

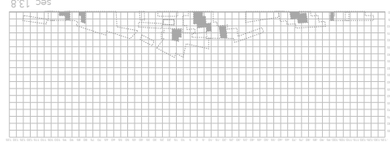

sec_14.8

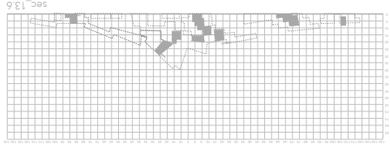

sec_14.6

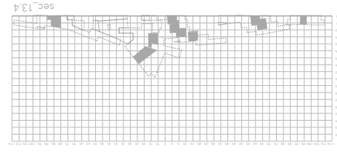

sec_14.4

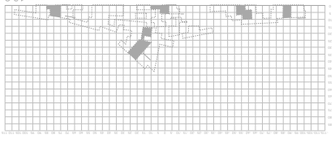

sec_14.2


sec_14.0

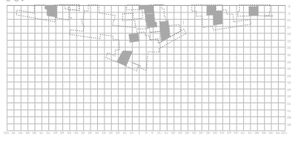

sec_13.8

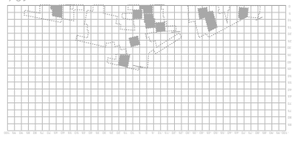

sec_13.6

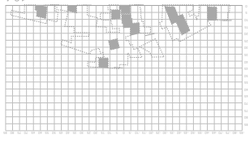

sec_13.4

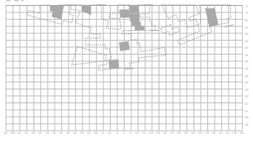

sec_13.2

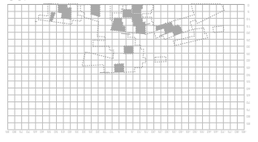

sec_13.0

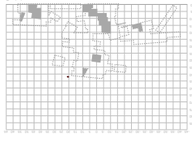

sec_12.8

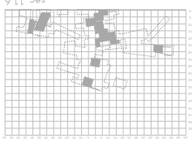

sec_12.6

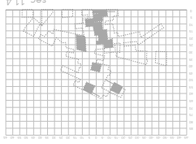

sec_12.4

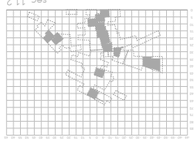

sec_12.2

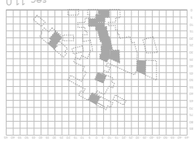

sec_12.0

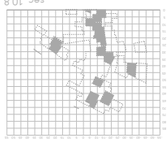

sec_11.8

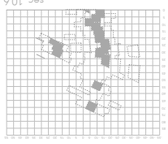

sec_11.6

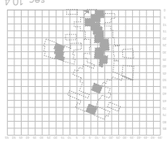

sec_11.4

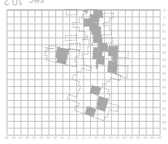

sec_11.2

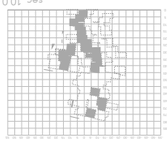

sec_11.0


sec_10.8

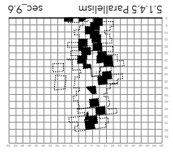

sec_10.6

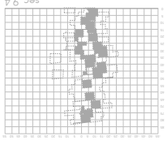

sec_10.4

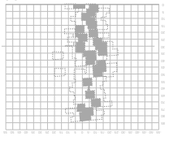

sec_10.2

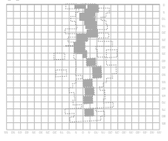

sec_10.0

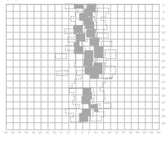

sec_9.8

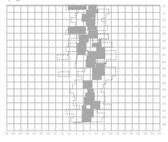

5.1.4.5 Parallelism sec_9.6

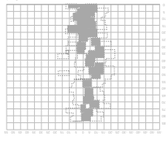

sec_9.4

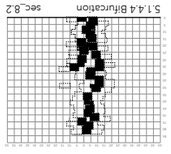

sec_9.2


sec_9.0


sec_8.8


sec_8.6


sec_8.4


5.1.4.4 Bifurcation sec_8.2

sec_8.0

sec_7.8

sec_7.6

sec_7.4

sec_7.2

sec_7.0

sec_6.8

sec_6.6

sec_6.4

sec_6.2

sec_6.0

sec_5.8

5.1.4.3 Opening sec_5.6

sec_5.4

sec_5.2

5.1.4.2 Isolation sec_5.0

5.1.4.1 Interruption sec_4.8

sec_4.6

sec_4.4

sec_4.2

sec_4.0

sec_3.8

sec_3.6

sec_3.4

sec_3.2

sec_3.0

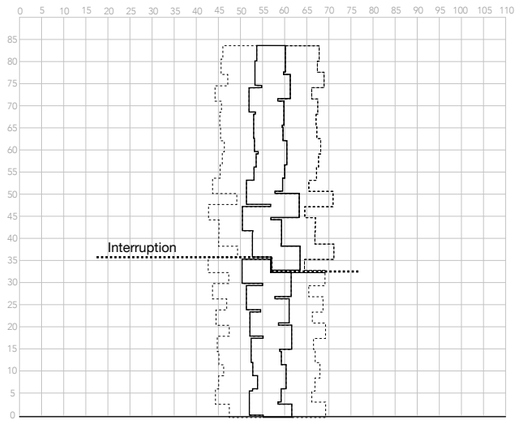
5.1.4.1

Interruption

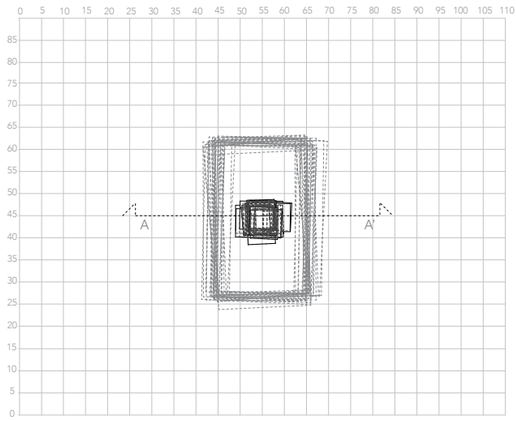
Elevation

Top

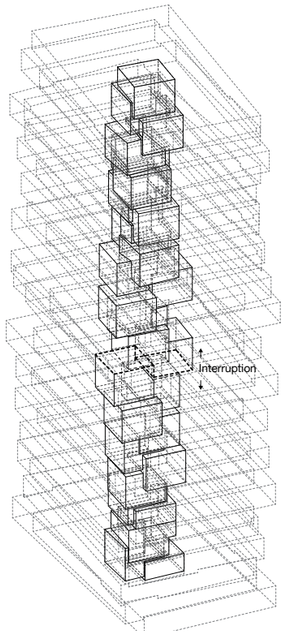
Axonometry



Section AA'



Plan



1.- Generation
The unalignement of slabs is the result of not controlled movements on the [x] and [y] axis. This movements are related to the vibration produced by the contact (taking into account the minimum ceiling height) in between slabs while they are moving throught the piling process. In this particular episode of the process, the displacement of the slabs is large enough that the projection of their respective holes does not overlap at all.

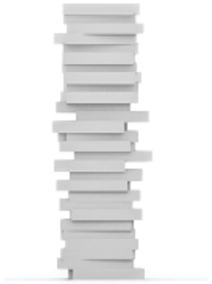
2.- Form
When the two holes do not coincide and are entirely separate, the continuity of the central interstitial space is divided by a floor extension into two sections: a top section that makes contact with the exterior at the top of the set; and a bottom section limited by the universal floor of the simulation.

3.- Performance
The vertical continuity of the circulation core is broken, such that the set can be understood as the superposition of one building on top of an other, each one of them with its own vertical circulation core.

4.- Subjectlessness
There is a local interlacement that, on the one hand, breaks with a centralizing element (like the hole) and, on the other hand, emphasizes the different parts' ability to generate formal viscosities with one another.

5.1.4.2

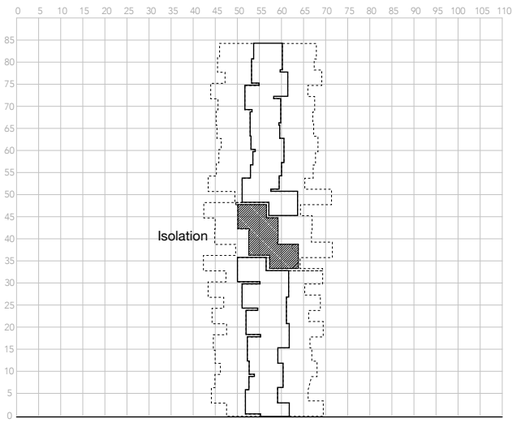
Isolation



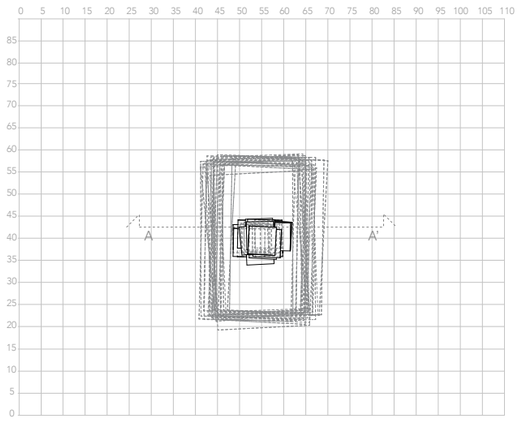
Elevation

Top

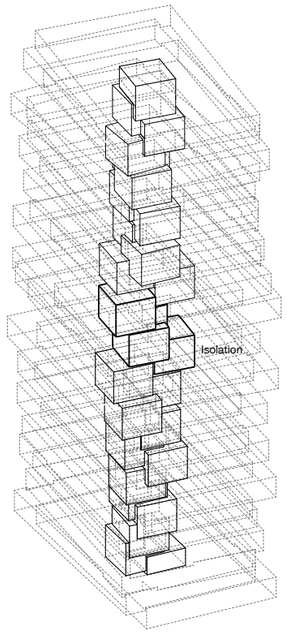
Resonant Pile 5.0



Section AA'



Plan



1.- Generation
Toward the middle of the set, the displacement of the slabs is large enough that the projection of their respective holes does not overlap at all. This phenomena does not only occur on the bottom side of the projection, but also on the top side of it.

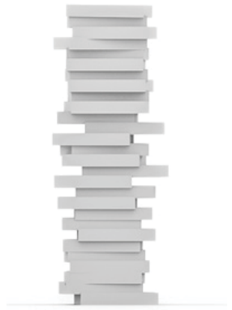
2.- Form
When two holes do not coincide and are completely separated both at the lower and upper ends of the set, a central void is generated that is completely closed off from the outside, forming a negative clump.
It can be read as an inner bubble of space inside the filled volume of the set.

3.- Performance
This negative clump emerges as an element with the potential to articulate the set of slabs that make it up, turning this space into an autonomous element. Beside that, the inner contour of the slab produced by the perforation becomes a singular contour, and not the generic square contour of the original skyscraper.

4.- Subjectlessness
This type of space emphasizes the dichotomy between interior and exterior. In this case, we are faced with a paradox: an exterior space located in an interior, that is to say, an exterior space inside an interior space. This paradox shows the difficulty of working with totalist categories and dichotomical opositions.

5.1.4.3

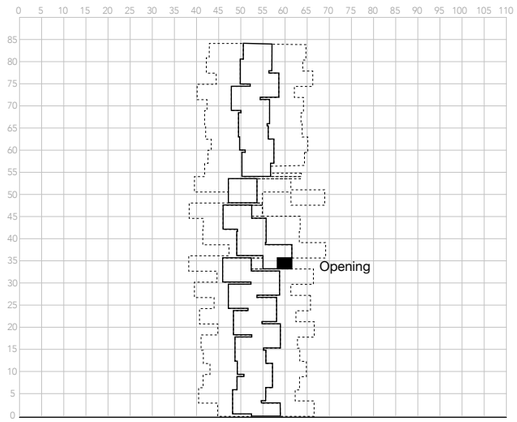
Opening



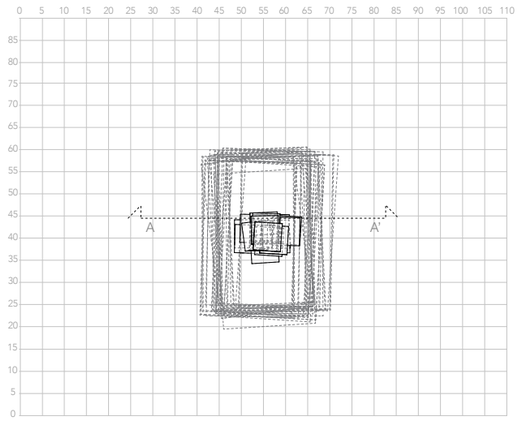
Elevation

Top

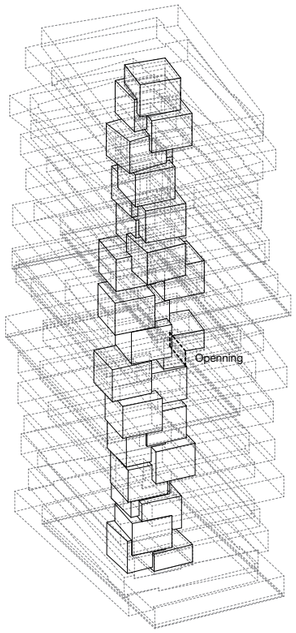
Resonant Pile 5.6



Section AA'



Plan



Sec_5.6

1.- Generation
Toward the middle of the set, the displacement of the slabs is large enough that the downward projection of one of the holes not only does not coincide with the outline of the hole in the slab beneath it but falls outside the lower slab's outer edge.

2.- Form
This generates a gap in the façade, which extends upward until its continuity is interrupted by a connection between slabs. This makes it a cul de sac, as opposed to a system with two points of entry.
This insertion can be read as well as a vertical opening of the intersticiality that passes through the ensemble, keeping the vibration of its inner volumetric surfaces.

3.- Performance
Here, the interior-exterior dichotomy enters into crisis: the façade is not projected exclusively toward the exterior, but also toward the interior producing an inner façade and an access form the terrace.
As a consequence, it appears a new exterior that is placed in the interior of the building, a phenomena that suggest programs that were not contemplated in the original skyscraper.

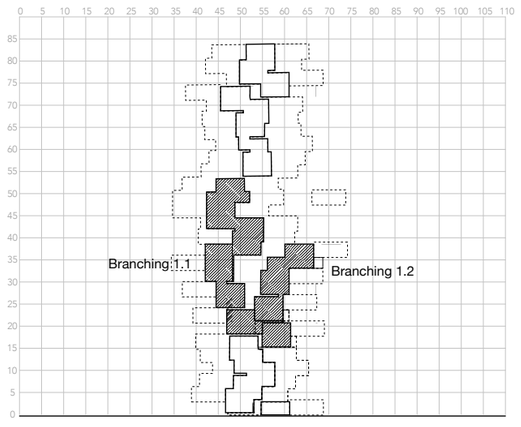
4.- Subjectlessness
The withdrawal of the façade into the interior puts aside any understanding of the exterior as an absolute: the fact that the exterior occupies an interior position relates more to the idea of matryoshka than to the traditional dichotomy between opponents.

5.1.4.4

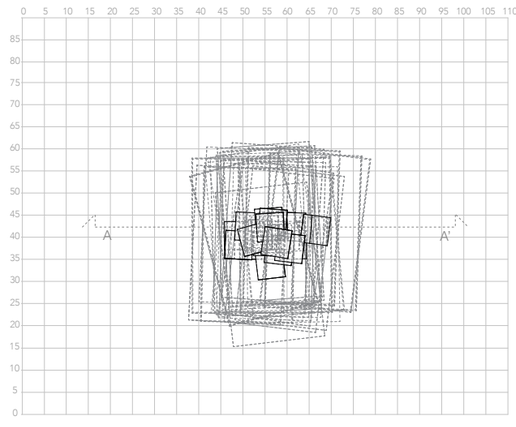
Elevation

Top

Resonant Pile 8.2



Section AA'



Plan

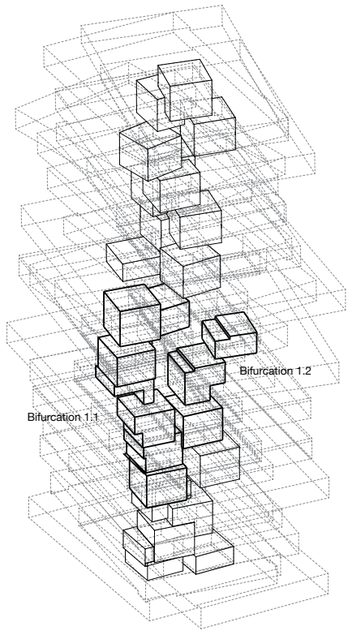
1.- Generation
In the middle part of the set, the slabs open much more than they do in the lower part, which maintains high levels of compactness, as does the top end of the set.

2.- Form
The holes are no longer structured around a single spine. A division is generated that offers a reading of the set in the form of a "V", which does not maintain formal continuity with either the bottom section or the top section. Both sides of the "V" open toward the exterior, along the side in one case and from the top in the other.

3.- Performance
The vertical circulation is no longer linear and becomes tree-like, that is to say, acquires the formal structure of a branching system. As a consecuence, each branch has its own core of circulation, which offers to it a certain level of autonomy.

4.- Subjectlessness
Branching structures suggest the presence of a certain centrality, since both arms emerge from a single common point. However, in this case it is important to take into account that the branching structure is not the only structure present, either in quantity or in quality. On the contrary, it co-exists in the same set with other structures of a different nature and none of them

Bifurcation



Sec_8.2

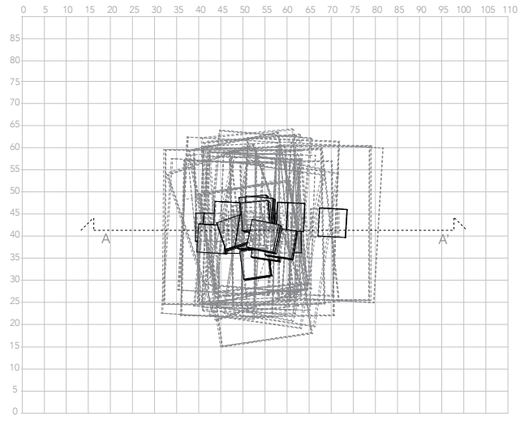
5.1.4.5

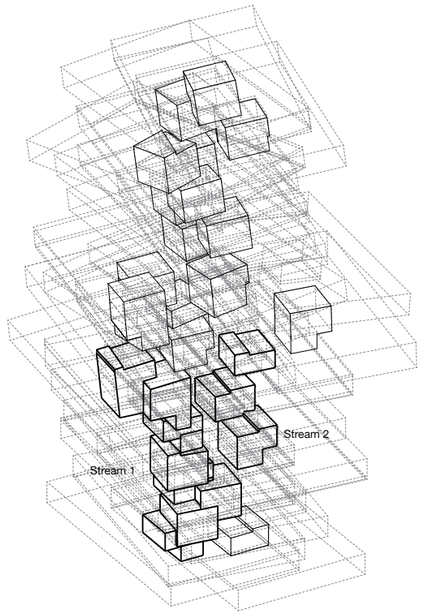
Paralel

Elevation

Top

Resonant Pile 9.6





1.- Generation
In the middle part of the set, the slabs open much more than they do in the lower part, which maintains high levels of compactness, as does the top end of the set.
However, in this case, the bottom part part of the set is open enough to produce a second indepenent hole along the main body of the set which has no relation with the first one.

2.- Form
The holes are no longer structured around a single spine, nor do they adopt a branching structure. Instead, a second spinal column is generated, parallel to the first, althought they present different extensions.

3.- Performance
There is a dual ascending circulation that provides double access to the same space. This phenomena means that the set can be read not only as the overlapping of one building on top of the other, but as the overlapping of one building beside the other.

4.- Subjectlessness
The coexistence of two vertebral columns suggests the existence of two centralities, such that neither prevails over the other on a meta level. These centralities structure certain parts, but they do so only on a local level. Because of that, rather than centralities, they can be defined as ex-centricities.

SIMULATION ANALYSIS

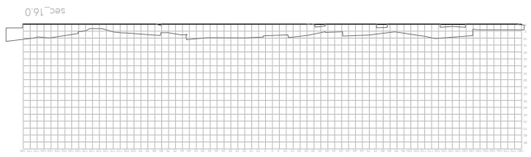
Silhouette

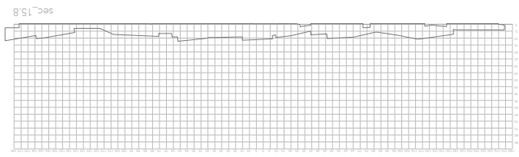
5.1.5 Silhouette

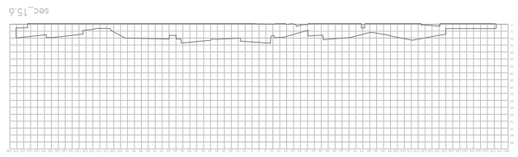
The volume generated by the immediate spatial consequences of the floor layout examined in this exercise produces a series of silhouettes with different characteristics. However, the same model may contain more than one silhouette: in some of the models the compactness is so low that it is possible to identify several volumes spatially separated.
Throughout the process we have detected seven spatial singularities related to the notion of Silhouette: Vibration (5.1.5.1), Jaggy (5.1.5.2), Spine (5.1.5.3), Gap (5.1.5.4), Cross (5.1.5.5), Split (5.1.5.6), and Pic (5.1.5.7).

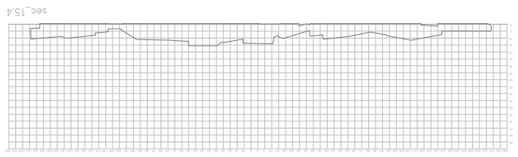
The study of these seven spatial singularities is relevant for the research because as we will see in the next section (5.2), it implies qualitative spatial transformations in the form and performance of the floor. In particular, it has a significative impact on the formal categories of Mereology (5.2.1.1) and Arrangement (5.2.1.4), and in the performative categories of Circulation (5.2.2.1), Gaze (5.2.2.2), Interiority (5.1.2.5) and Access (5.1.2.6).

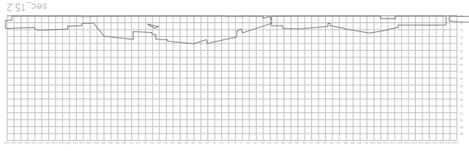
However, the study of Silhouettes open other opportunities not strictly related to the floor, given that its main focus is not only related to the surface and distribution of the slabs, but it focus as well in the volume outline that they generate through the piling process, whose impact will be developed with more depth in Chapter 6 (6.2).

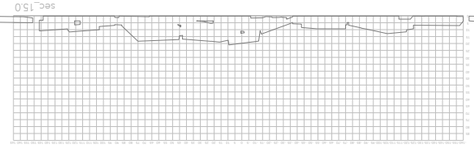

sec_16.0

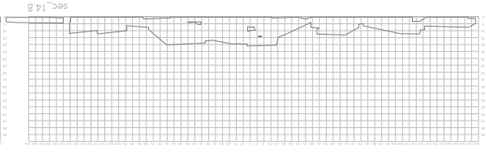

sec_15.8

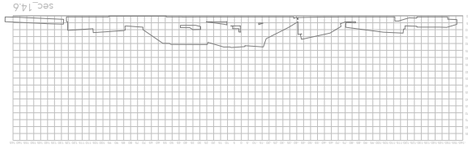

sec_15.6

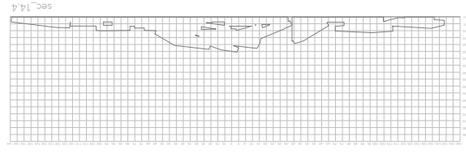

sec_15.4

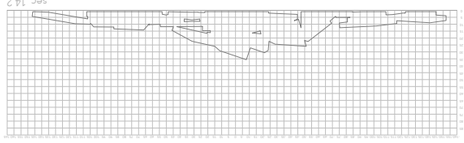

sec_15.2

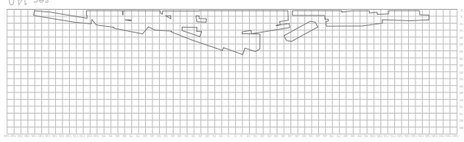

sec_15.0

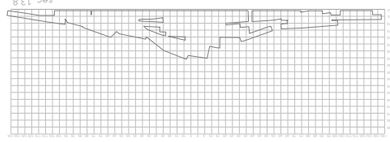

sec_14.8

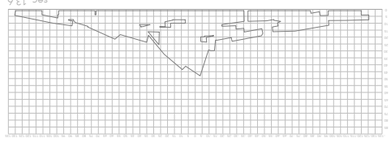

sec_14.6

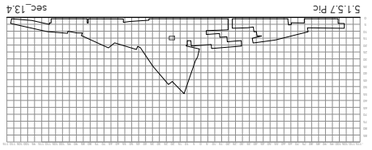

sec_14.4

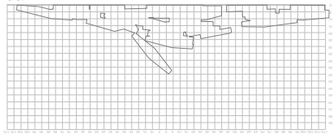

sec_14.2

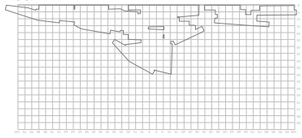

sec_14.0

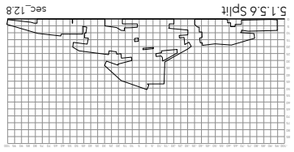

sec_13.8

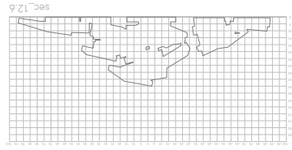

sec_13.6

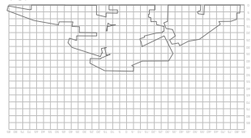

5.1.5.7 Pic
sec_13.4

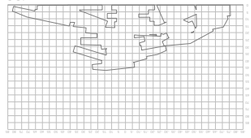

sec_13.2

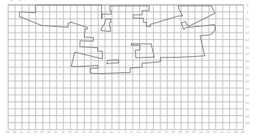

sec_13.0

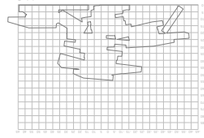

5.1.5.6 Split
sec_12.8

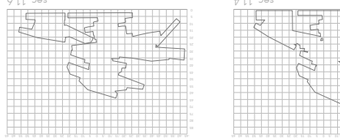

sec_12.6


sec_12.4

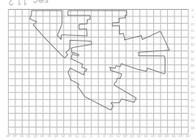

sec_12.2

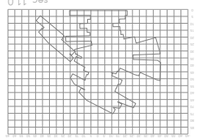

sec_12.0

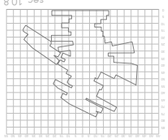

sec_11.8

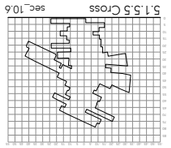

sec_11.6

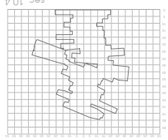
sec_11.4

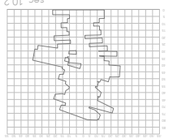

sec_11.2

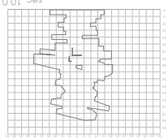

sec_11.0

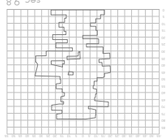

sec_10.8

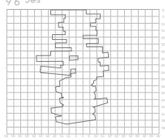

5.1.5.5 Cross
sec_10.6

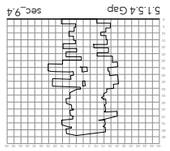

sec_10.4

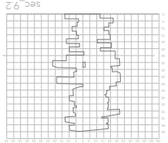

sec_10.2

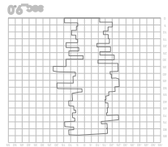

sec_10.0

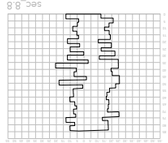

sec_9.8

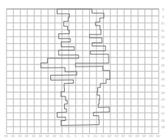

sec_9.6

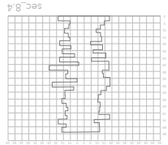

5.1.5.4 Gap
sec_9.4

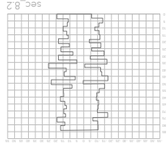

sec_9.2


sec_9.0


sec_8.8


sec_8.6


sec_8.4


sec_8.2

5.1.5.3 Spine
sec_8.0

sec_7.8

sec_7.6

sec_7.4

sec_7.2

sec_7.0

sec_6.8

sec_6.6

sec_6.4

sec_6.2

sec_6.0

sec_5.8

sec_5.6

sec_5.4

sec_5.2

sec_5.0

sec_4.8

5.1.5.2 Jagged
sec_4.6

sec_4.4

sec_4.2

sec_4.0

sec_3.8

sec_3.6

sec_3.4

sec_3.2

5.1.5.1 Vibration
sec_3.0

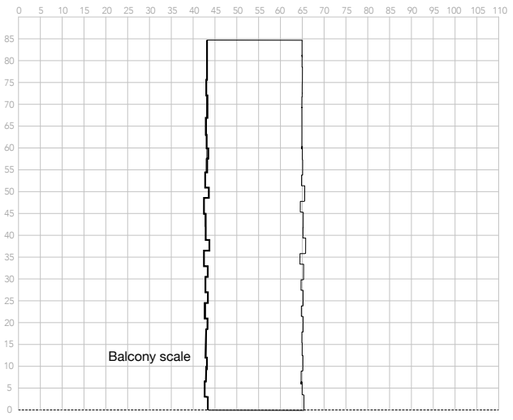
5.1.5.1

Vibration

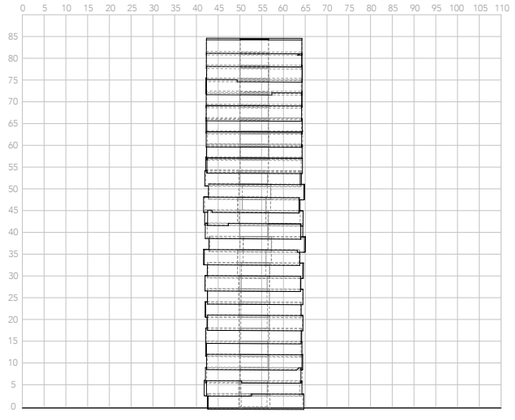
Elevation

Top

Axonometry



Silhouette



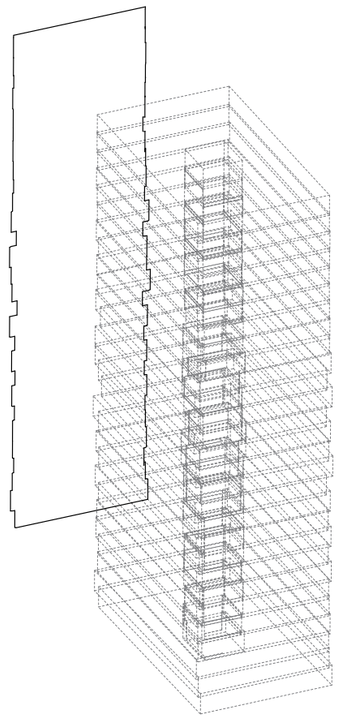
Elevation

1.- Generation
In the first instant of the simulation, the different slabs are arranged according to a fundamentally vertical orientation. However, the arrangement is no longer strictly vertical, because slight movements have already taken place on the [x-y] plane of each of the slabs.

2.- Form
The figure of the contour is no longer an element with one single and continuous edge. Instead, the vibration of the set generates a broken edge that is not completely symmetrical because beside the displacements on the axes [x] and [y], each floor has also a slight rotation.

3.- Performance
The straight stretches are no longer than 2.5 meters, and the majority are just over one meter long. They appear, thus, like a series of small balconies, together with a series of slight cantilevers that provide a certain protection from the sun.

4.- Subjectlessness
The impossibility of producing an unbroken vertical line that can articulate the whole set shows the difficulty of generating elements that are transversal to the whole.



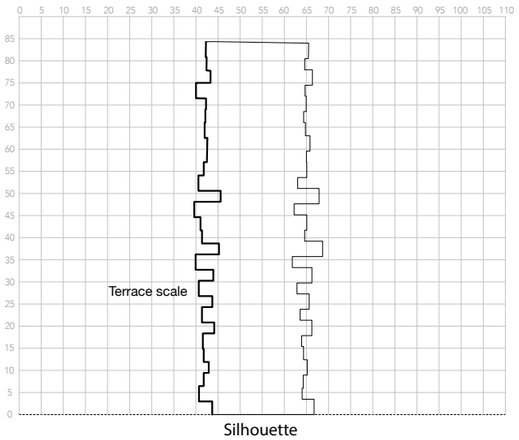
5.1.5.2

Jaggy

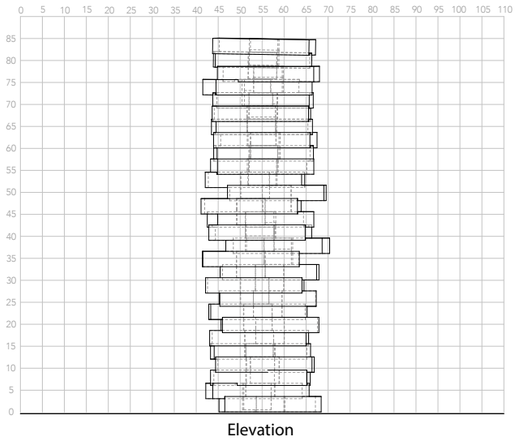
Elevation

Top

Resonant Pile 4.8



Silhouette



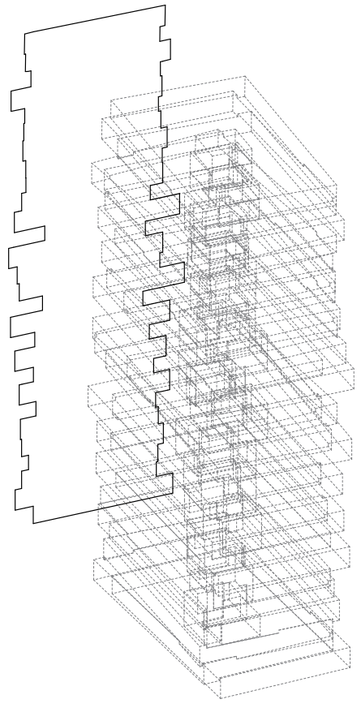
Elevation

1.- Generation
As the simulation advances, the slabs open up, although in this instant the original horizontality of their planes is maintained.

2.- Form
The contour obtained at this instant is not a vibrated contour. It is a notched or jaggy contour, which emphasizes the absence of continuity in the set.
Most of the floors cantilever aproximately in between 1/3 and 1/5 of their extension. Because the main core remains stable, all floors keep their original horizontality.

3.- Performance
A series of terraces are generated, which are larger than the original façade section corresponding to a slab. In most of the cases, these terraces have an extension longer than 2 meters. Beside that, most of them are covered by the slab above, which means that are protected from rain and summer sun.

4.- Subjectlessness
The impossibility of producing an unbroken vertical line that can articulate the entire set shows the difficulty of generating elements that are transversal to the whole.



Sec_4.8

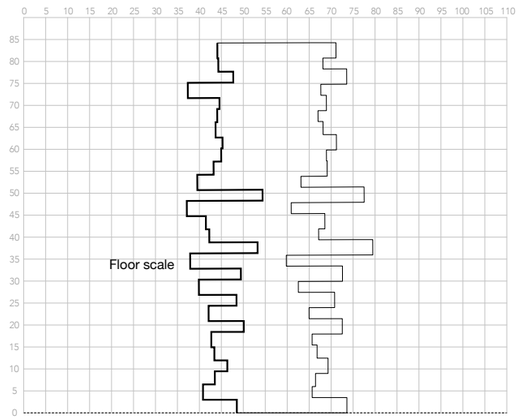
5.1.5.3

Spine

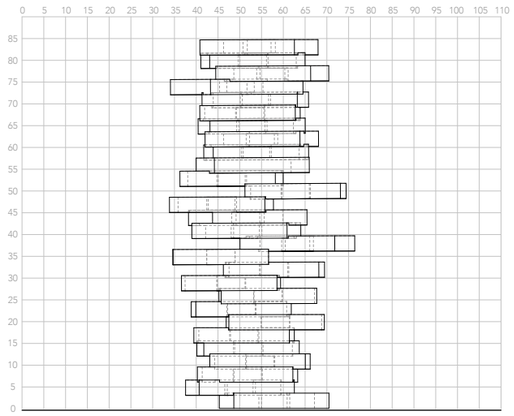
Elevation

Top

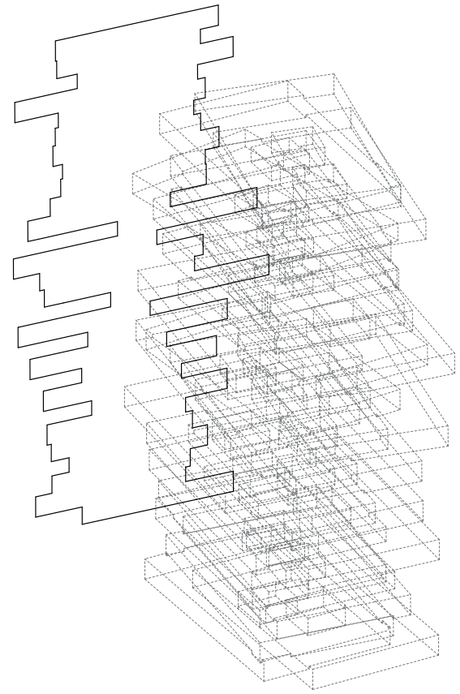
Resonant Pile 8.0



Silhouette



Elevation



Sec_8.0

1.- Generation
As the simulation progresses, the slabs open up. The instant represented here is just before the slabs nearest to the edges begin to tilt. As a consequence, this case represents the maximum opening of the set without loosing the horizontality of its slabs.

2.- Form
The contour obtained at this instant is not a vibrated contour, but it is not a jaggy contour either. Instead, it is a spine-shaped contour where, in some cases, the thickness of the central trunk is inferior to the thickness of the branches.
However, the set keeps a certain compacity in the bottom and in the top part of its body, having two specific parts placed in the center which are particularly thin.

3.- Performance
This set shows large outdoor surfaces at various heights. In most of these cases, the surfaces are covered by long cantilevers that protect these spaces from the sun and from the rain. These surfaces have also a gap in the middle, which allows for crossed vertcial views to other outdoor surfaces.
Beside them, we can also find several terraces and some balconies, which represent a great variety of outdoor spaces.

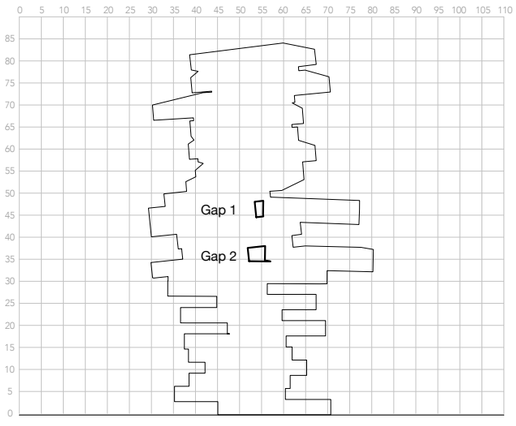
4.- Subjectlessness
The impossibility of producing an unbroken vertical line that can articulate the entire set shows the difficulty of generating elements that are transversal to the whole.

5.1.5.4

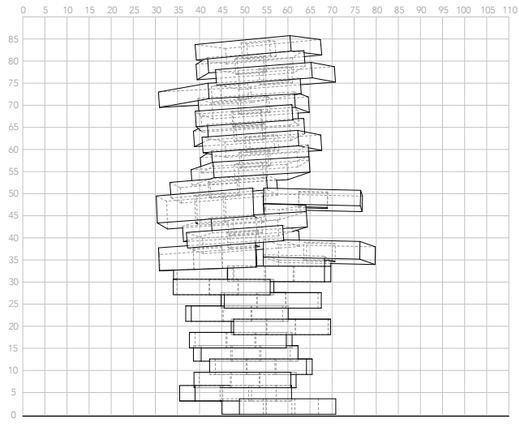
Elevation

Top

Resonant Pile 9.2



Silhouette



Elevation

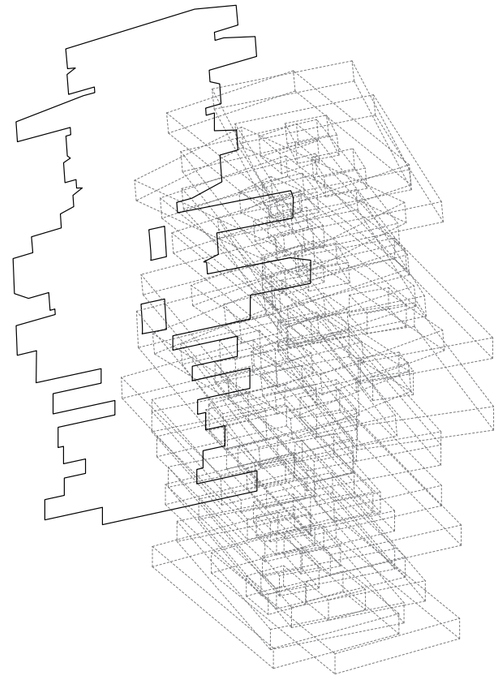
1.- Generation
As the simulation progresses, the set looses compactness while it's slabs are opening. In the case represented here, the slabs are so far in between them that generate certain spaces which produce a second group of contours that appears inside the first one.

2.- Form
A series of small holes are generated that lend transparency to the set. These spaces are surrounded by filled volume, producing openings in the front and in the back of the set, which occur in the center of the pile because is where there is the biggest density of slabs.

3.- Performance
These spaces should be understood as buffer urban spaces in between buildings or as inner connecting spaces.
Beside that, its formal peculiarity allows them to host specific programs that are being unfolded outside but under a rooftop and framed by two façades.

4.- Subjectlessness
The idea of gap breaks with the absolute continuous form that could be associated with any kind of totality. They should be read as moments of disjunction, anomalies that underlines the lack of any holistic consistency.

Gap



Sec_9.2

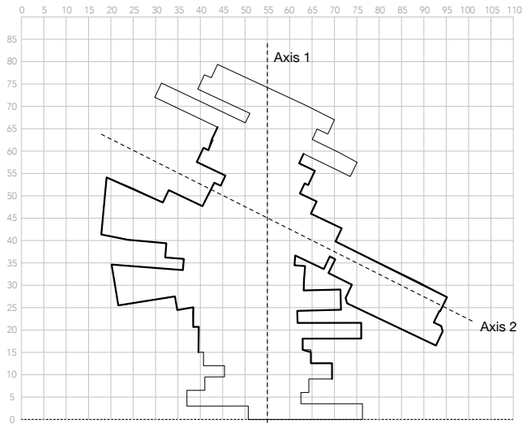
5.1.5.5

Cross

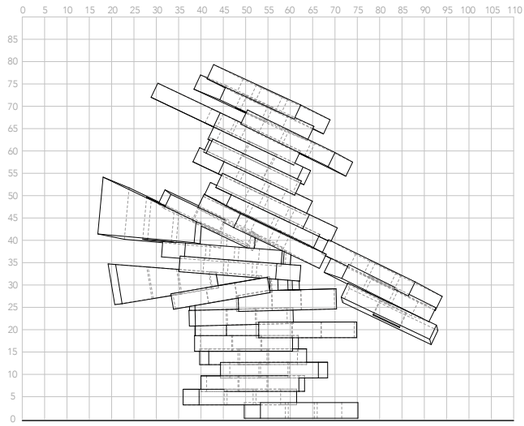
Elevation

Top

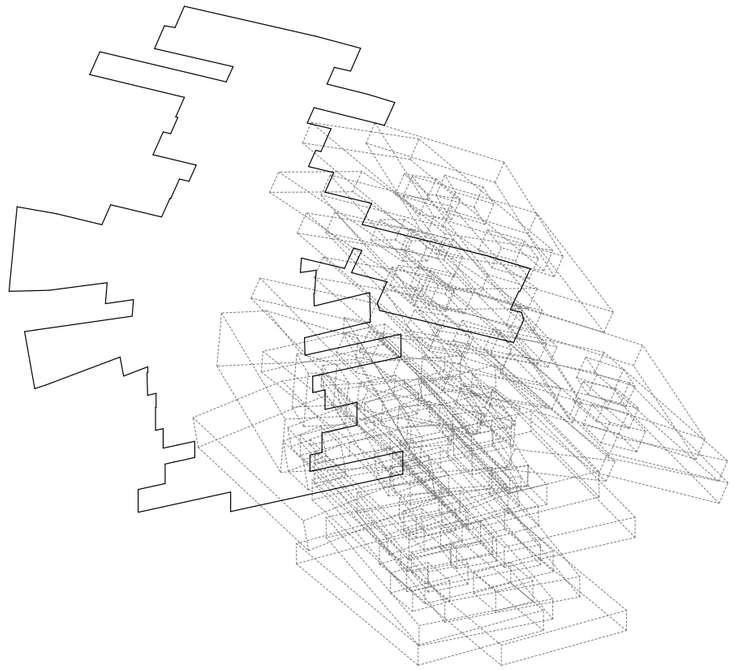
Resonant Pile 10.4



Silhouette



Elevation



Sec_10.6

1.- Generation
As the simulation progresses, the slabs open up. However, the slabs that fall farthest away from the center are the ones near the middle section of the set, while the top and the bottom retain higher levels of compacity.

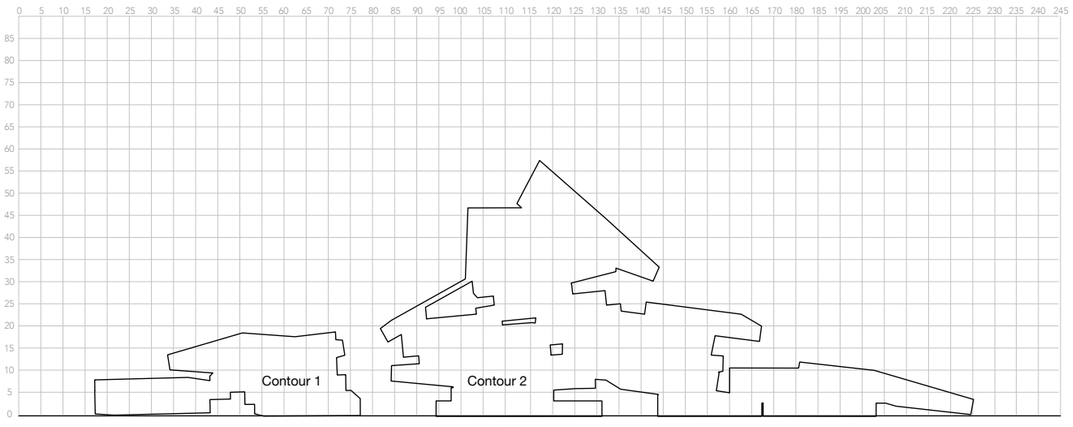
2.- Form
A contour in the shape of a cross is generated. There is an angle of 40 degrees between the axis of the vertical volume and the axis of the secondary volume. The set is near symmetrical in its general structure of cross, but not in its detailed development.

3.- Performance
A large space is produced near the center of the set. The cross produces two large cantilevers in both sides of the main body, which allows on the one side for a covered space on the groundfloor, an one the other side for large open spaces in the rooftop of its arms.The encounter between the horizontal axis and the vertical axis open specific programmatic possibilities.

4.- Subjectlessness
Althought the general form of a cross has a certain monumentality, the aesthetical tension in between symmetry and asymettry produced by its silhouette underlines the importance of locality.

5.1.5.6

Resonant Pile 12.6



Silhouette

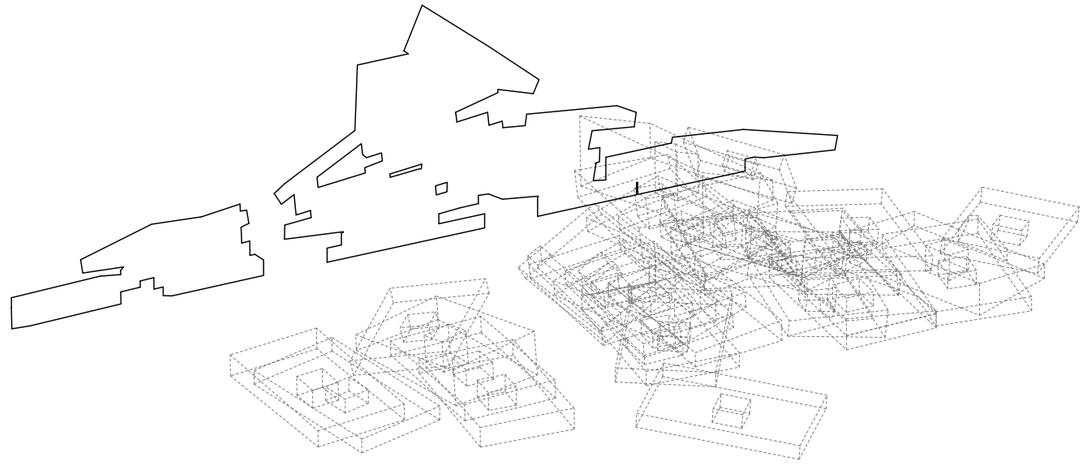
1.- Generation
From a certain moment, the opening of the slabs is such that they form sets of volumes that are separated from one another in space, while keeping each one of them a enough compacity to be read as two different elements.

2.- Form
A second smaller contour is generated that does not have an immediate relationship with the first one. However, at this instant, due to the formal disposition of the two volumes, it can be understood that they were once part of a single body.

3.- Performance
The understanding of the set in two contours emphasizes the urban association the stacking begins to produce as it approaches the end of the process. In this sense, it's reading as city becomes more evident, generating an space in between both bodies that could be understood as a street or square.

4.- Subjectlessness
This configuration significantly represents a logic of collections that is not subject to the influence of a superior identity. On the contrary, the various slabs co-exist, forming local and contingent interlacements while remaining autonomous and independent.

Split



Sec_12.8

5.1.5.7

Axonometry

Silhouette

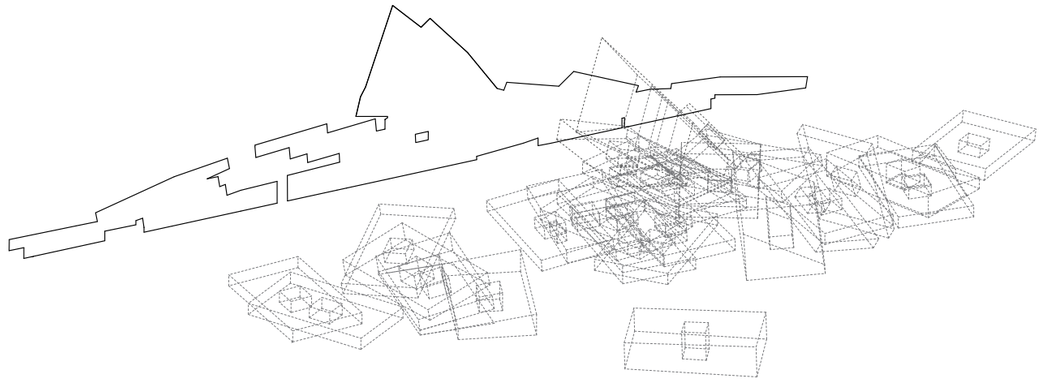
1.- Generation
At various moments during the course of the simulation, when any of the slabs tilt significantly, they generate a peak. In this frame the highest pic reachs its sharpest form due to the strong slope of the upper slab.

2.- Form
The contour offers a very acute pic, which emerges from a wide group of basements. The triangle generated by the pic is higher than the thickness of the basement, which results in a proportion where the pic is extremely evident.

3.- Performance
The presence of such a straight pic produces an interior volume with a height of almost 35 meters. It is indicated for certain collective programes related to spectacles that require these type of dimensions, and that are placed not in the base of the set, but on its top.

4.- Subjectlessness
Althought the configuration of the pic has a certain monumentality, the aesthetical tension in between symmetry and asymettry produced by its silhouette underlines the importance of locality.

Pic



SIMULATION ANALYSIS

Grounds

5.1.6 Grounds

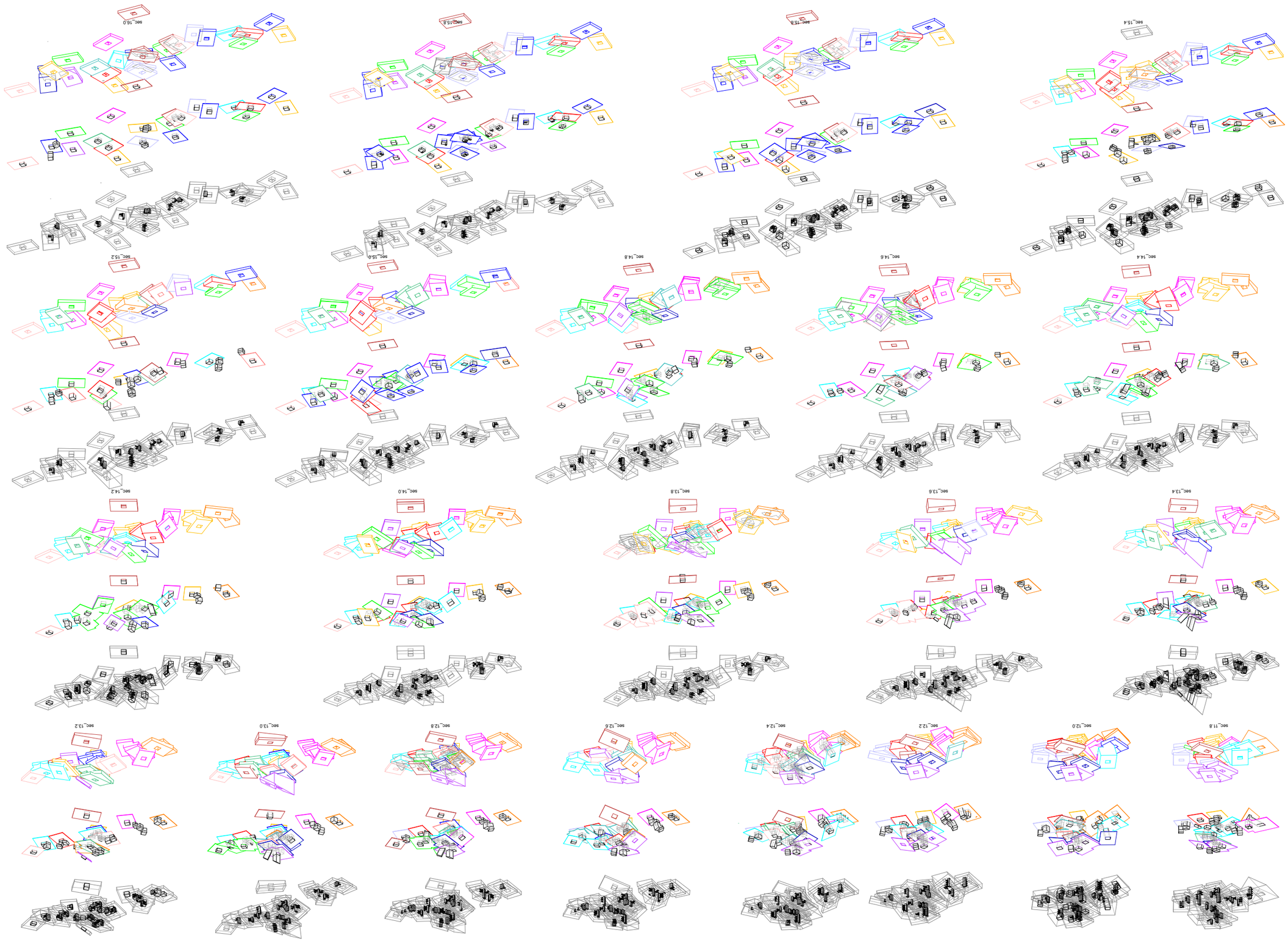
This category refers to the phenomenon according to which new "ground" is generated as the process advances. Effectively, the dis-alignment of the slabs implies that the circulation core is necessarily interrupted before reaching the top-most slab in the set. As we have seen, this occurs for the first time at second 4.8. It follows that, if we understand that the unity of a building is what lets us reach its highest level directly from the bottom level via a single circulation core, in cases when this core is interrupted, it means that a new building sits on top of the first. In that sense, there is not a single building on a universal floor, but two buildings on two floors: the first is the universal floor of the simulation, and the second is the one where there is a passage from one circulation core (and therefore from one building) to the next, along a horizontal route.

As the simulation evolves, it is increasingly difficult to maintain vertical alignments. As a result, there are an increasing number of different buildings. In that sense, there is a shift from a single building in the initial instant of the part of the simulation we have analyzed (second 3) to the presence of nearly as many buildings as slabs (28) at the end of the part of the simulation we have analyzed (second 16). As a result, more and more slabs take on the role of interconnecting different communication cores, i.e., transfers from one building to another. These slabs behave like "ground" in the sense that they offer a foundation for the emergence of another building and its corresponding access.

In this way, several readings can be made of a single set of parts. On the one hand, it can be understood as a collection of slabs. In turn, these slabs can be grouped according to a collection of clumps, but they can also be grouped according to a collection of buildings. While in the first case and the third (but not the second) there is an exhaustive grouping, it is clear that the multiple coherences that can be used to group the parts together obstructs any holistic reading of the set.

The study of this spatial phenomena related to the notion of "ground" is relevant for the research because as we will see in the next section (5.2), it implies qualitative spatial transformations in the form and performance of the floor. In particular, it has a significative impact on the formal categories of Mereology (5.2.1.1), Arrangement (5.2.1.4) and Figuration (5.2.1.6), and in the performative categories of Circulation (5.2.2.1), Interiority (5.1.2.5) and Access (5.1.2.6).


sec_3.0
sec_3.2
sec_3.4
sec_3.6
sec_3.8
sec_4.0
sec_4.2
sec_4.4
sec_4.6
sec_4.8
sec_5.0
sec_5.2
sec_5.4
sec_5.6
sec_5.8
sec_6.0
sec_6.2
sec_6.4
sec_6.6
sec_6.8
sec_7.0
sec_7.2
sec_7.4
sec_7.6
sec_7.8
sec_8.0
sec_8.2
sec_8.4
sec_8.6
sec_8.8
sec_9.0
sec_9.2
sec_9.4
sec_9.6
sec_9.8
sec_10.0
sec_10.2
sec_10.4
sec_10.6
sec_10.8
sec_11.0
sec_11.2
sec_11.4
sec_11.6


sec_16.0
sec_15.8
sec_15.6
sec_15.4
sec_15.2
sec_15.0
sec_14.8
sec_14.6
sec_14.4
sec_14.2
sec_14.0
sec_13.8
sec_13.6
sec_13.4
sec_12.2
sec_12.0
sec_12.8
sec_12.6
sec_12.4
sec_12.2
sec_12.0
sec_11.8

FLOOR EVALUATION

Formal categories

5.2 Floor Evaluation

5.2.1 Formal Categories

The results of the simulation provide a spatial catalogue of cases whose impact has the potential of being relevant to the problem of the floor that we have presented in Chapter 2 (sections 2.2, 2.3 and 2.4).

In order to carry out an effective comparison with the discrete floor and the continuous floor studied in Chapter 2 (sections 2.2 and 2.4), we must evaluate the obtained results through the same categories used in those two cases, emphasizing two aspects that will be fundamental to corroborating our established hypothesis. First, the degree of originality of the set obtained in relation to the previous two floor dispositions. Second, the degree of complicity in between the obtained floor disposition and the three fundamental concepts of subjectless objects explained in Chapter 3 (section 3.2): collections, excentricities and interlacements.

As in the second chapter (sections 2.2 and 2.4), these categories are grouped into two subsets of six categories each one.

The first subset consist on six formal categories, which refer to extensive attributes related to the floor disposition: 5.2.1.1 Mereology, 5.2.1.2 Geometry, 5.2.1.3 Contour, 5.2.1.4 Arrangement, 5.2.1.5 Development, and 5.2.1.6 Figuration. The second subset consists on six performative categories, which refer to intensive attributes related to the floor disposition: 5.2.2.1 Circulation, 5.2.2.2 Gaze, 5.2.2.3 Orientation, 5.2.2.4 Retirement, 5.2.2.5 Interiority, and 5.2.2.6 Access. In this section 5.2.1 we will focus in the first six formal categories.

5.2.1.1
MEREOLOGY

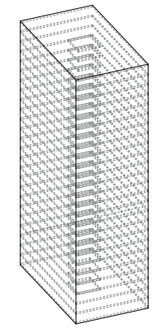
Whole < ΣParts

The disposition of the floor we are presenting does not consist of a whole that is equivalent to the sum of its parts or a whole that is greater than its parts. Instead, there is a relationship between the parts and the whole in which none of the parts are dissolved into the whole. Rather, there is always something in each of the parts that surpasses the whole.

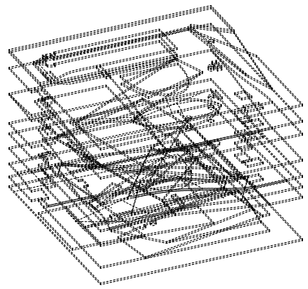
This is made clear by the fact that each slab's final position and form can not be explained based on a total coherence. One of the most obvious cases of this phenomenon is 5.1.1.3 (Junction / sec_9.4). As we can see, there is a deep and operational interlacement, but its impact is strictly local. Other cases such as 5.1.2.3 (Fan / sec_11.2) establish remote relationships between several elements, although the scope of those relationships is, again, limited. In situations like 5.1.2.4 (Hybrid / sec_14.2), the extreme positional and formal singularity of each part shows the difficulty of finding a pattern shared by the entire set, as would be the case in the processes of emergence described by Steven Johnson.[1] In both the discrete floor and the continuous floor this is possible. In the discrete floor, the position and form of each slab is determined by a certain total conception that dictates vertical continuities in order to resolve issues of structure, circulation and façade. In the continuous floor, the slab is already a whole in itself, such that it contains all the parts in the floor disposition, as well as the relationships that are established between them.

In the floor disposition studied in this chapter, each of the parts is greater than the whole. Timothy Morton defines this paradox by asserting that "*the holism in which the whole is greater than the sum of its parts depends on some (false) concept of smooth, homogeneous universality or space or infinity. It depends, in short, on a Euclidean anthropocentric geometry. Since they do not fit into the quaint category of space, what hyperobjects reveal to us humans is that the whole is always weirdly less than the sum of its parts.*"[2] It is a mereology in which the objects do not dissolve into the whole, since "*an object is and is not itself, at the same time, because it has parts that cannot be wholly subsumed into it.*"[3]

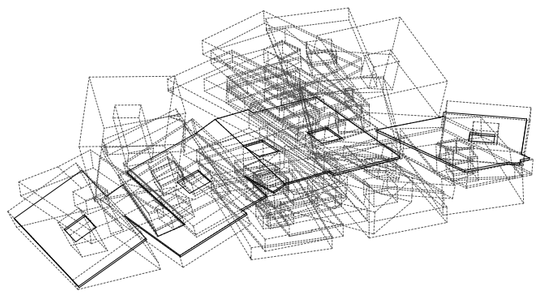
However, the fact that there is no whole does not mean that the different parts do not generate certain groupings, forming what we could call "meta-parts", whose most extreme case can be seen in 5.1.6 (Silhouettes), in particular in 5.1.6.5 (Split / sec_12.8) In that sense, the slabs in this floor layout participate in a series of local relationships that generate interlacements, the results of which have been studied in section 5.1.1 (Nestings). In the six cases analyzed here (and unlike processes of emergence), the interlacements are revealed not only as positionally local, but as the producers of coherences that are also local, and therefore they do not affect the entire set. However, these interlacements can be considered as meta-parts, in the sense that they group together several of the slabs. This is clear above all in 5.1.1.6 (Serpentine / sec_11.4) or in 5.1.1.8 Ascension / sec_13.0) due to the large number of parts involved. These groupings occur through two fundamental means: First, directly, because the materiality of the slab is involved. Secondly, indirectly, because the presence of a slab in a certain position affects a grouping which it does not belong to on a material level. In any case, at no point is there a "total grouping" capable of generating a unifying global coherence. Therefore, we cannot refer to it as a whole, per se, since the fact that the parts can not dissolve into it means that each of the parts exceeds it in some sense. As such, that whole cannot exist, because it is not a "total" whole. It is thus a mereology made up of parts and relationships between those parts, free from any logic that can account for them holistically.



Whole = ΣParts



Whole > ΣParts



Whole < ΣParts

1. Steven Johnson, Emergence: The Connected Lives of Ants, Brains, Cities and Software, (London: Touchstone Press, 2002). 73.

2. Timothy Morton, *Hyperobjects,* (London: University of Minnesota Press, 2013), 12.

3. Ibid.

5.2.1.2
GEOMETRY

Combinatory

The type of geometry that contains and deploys the spaces of the discrete while continuous floor is a combinatorial geometry, also called discrete geometry. It is defined as the branch of geometry that studies the combinatorial properties and constructive methods of discrete geometric objects. Combinatorial geometry deals with discrete and finite sets made up of basic geometric objects such as points, lines, planes, circles, spheres, etc.

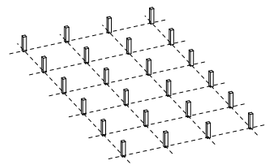
As such, it is not the Euclidean geometry deployed in the plane, as in the discrete floor, nor is it the topological geometry deployed in volume, as in the continuous floor. Instead, it is a geometry that focuses on the combinatorial properties of the aforementioned geometric objects, studying what kind of relationships can be established between them. Therefore, it is not a geometry that operates based on numerical continuities, intervals or ratios. Rather, it functions based on finite discrete sets. [1] This aspect definitively distances it from any parametricism based on NURBS or splines, instead emphasizing limit elements such as surfaces, corners or edges.

Combinatorial geometry recognizes the autonomy and individuality of the parts, generating new supra-parts through them and their relationships and interlacements. This phenomenon is very evident in all the cases in section 5.1.1 (Nestings): the interlacements occur between individual parts, whose individuality is never compromised, despite contributing to the production of a new object, which in this case takes on the form of a clump.

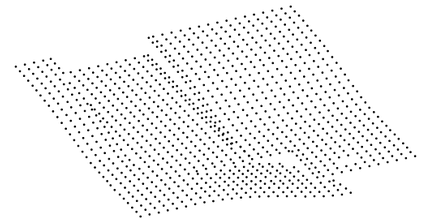
Something similar happens with some cases in 5.1.2 (Arrangements), where remote relationships between several slabs result in local patterns. In that vein, Ian Bogost suggests the concept of "unit operation", understood as units of expressive meaning that form any type of system (poetic, literary, cinematic, computational) through their inter-relations. We are still dealing with a system, but it is a system understood as "the spontaneous and complex result of multitudes rather than singular and absolute holisms." [2]

While topological geometry gives rise to parametric systems designed from the deployment of flows in a field of forces, combinatorial or discrete geometry is based on the articulation of some (not necessarily all) collections and sub-collections of objects in space.

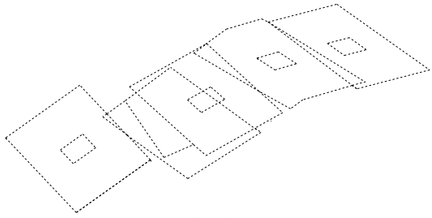
A very clear example of this phenomenon can be found in 5.1.2.3 (Fan / sec_11.2) or 5.1.2.9 (Spiral / sec_14.4). In both cases, the set of parts articulated in a fan or spiral shape is made up of other subsets formed by interlacements between several slabs. In any case, there is never a supra-set that affects all the slabs. Rather, they act as units of meaning, whose articulation by means of a series of relational criteria occurs through geometric operations that involve more than one object: projections, intersections, overlapping, subtractions, additions, extensions, etc.



Euclidian



Topological



Combinatory

1. José Sánchez, "Combinatorial Design" (paper, ACADIA, Michigan, October 27-29, 2016), 2.

2. Ian Bogots, "Materialisms: The Stuff of Things Is Many", *Blog* (blog), February 21, 2010, http://www.bogost.com/blog/materialisms.shtml

5.2.1.3
CONTOUR

Singular

In the floor disposition obtained, the concept of limit functions as a singularity. This differentiates it from the two types of floors discussed in Chapter 2 (sections 2.2.4 and 2.4.4). In the discrete floor, the limit is constituted as an ideal horizon, since the surface of the slab is part of an infinite plane that only connects at the horizon with the parallel planes above and below it. In the continuous floor, the limit is merely apparent: when we reach it, we see that it is not a real limit, since there is always a continuation hidden behind the crest. However, the main characteristic of the limit characteristic of our new floor layout is its distinctive condition: while the material limit of the slab in the discrete floor is generic because it is repeated, and that of the continuous floor is apparent because it can shift, in this case we find a limit that is, above all, unique.

This phenomenon is very evident in category 5.1.1 (Nestings), since the study in plan of the clumping of each model reveals the differences in their contours. Even the first of the 66 models, despite its similarity to the original skyscraper, already shows different contours for each of its slabs. The reason is because the phenomenon of projection observed in 5.1.1.1 (Embedding / sec_3.0) takes place even when the displacements in x and y are minimal, and it is the main cause of each contour being different. However, the variations in the slabs over the course of the process do not follow a linear path; they adhere to a pattern in the form of a "ricochet". At the beginning, the variations are minimal, and as the set opens up, the differences gradually become more evident. However, from a certain moment, and abruptly, the slabs recover their original contour because the degree of openness of the set is such that there is no part of any slab on top of another. In this case, the contour of each slab is no longer formally singular; it is only singular from a positional point of view, as seen with the outlying slabs in model 5.1.2.5 (Sautéed / sec_14.2).

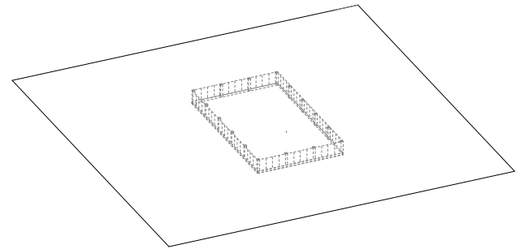
The singularity of the contour implies the singularity of the objects that make up the collection. Contrasting with the mass production characteristic of the discrete floor, in this floor arrangement the contour differentiates identity as opposed to repeating generality. This contour also acts as a limit in the strong sense of the term: it is not intended to be "extensible" as is the case with the flatness of the discrete floor and the transparency of its façade. Nor is it intended to be "apparent", as is the case with the peaks in the continuous floor. Wiscombe talks about this when he asserts that "*after a long period of focus on fluidity and connectivity, a new formal lexicon is in order: Chunks, joints, gaps, parts, interstices, contours...*"[3] Indeed, if the aim is to steer clear of any kind of holism, there will have to be separations, endpoints and conclusions: in other words, limits. Thus, limits are the center of focus once again, because it is thanks to them that we can refer to discrete elements – not only in the sense of countability, as in the discrete floor, as we have seen in the second chapter (section 2.5), but also in the sense of difference.

The contour thus becomes a fundamental formal quality, much more relevant than in the two floor arrangements we looked at before, and the only one that accepts the limit condition in its entirety, because in this case it is not expandable neither displaceable.

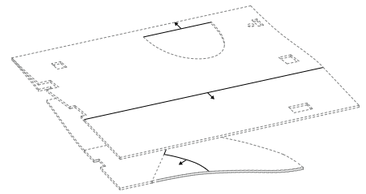
However, the fact that contours exist in this floor arrangement and that they exist in their most exuberant radicality does not mean that all the limits of the set behave as such indefinitely, throughout the entire simulation. On the contrary, in certain instants, they dissolve and are put back together in response to a set of particular circumstances, because unlike the "windowless monads" of the discrete floor, the different slabs "*can nestle, squish, or envelop other things, as long as they do not fuse together or damage one another.*"[4]

3. Tom Wiscombe, *New Models of Coherency*, (I.Kahn Studio Book Introduction), 2014, 2.

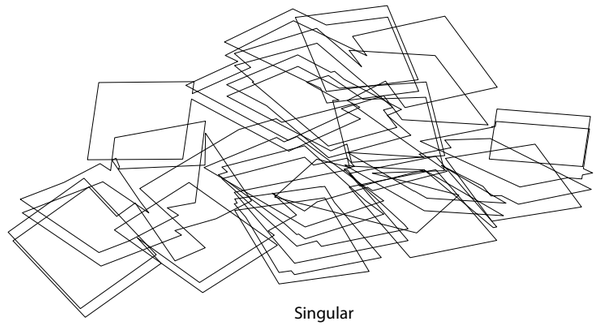
4. Ibid., 3.



Ideal



Virtual



Singular

5.2.1.4
ARRANGEMENT

Sack

The order characteristic of our new floor disposition differs substantially from that of the two floor dispositions we analyzed in Chapter 2 (sections 2.2.4 and 2.4.4). It is a "sack" distribution, marked by two main features. First, the objects contained in a sack are not distributed in an entirely random way, yet they do not follow a pre-established order nor do they aim to achieve a specific global objective. Each object maintains its own autonomy and is recognizable as an independent object. Second, the set of all these objects forms another object that is simultaneously something more and something less than the mere accumulation of objects. It is something more in the sense that a sack is not reducible to the objects it contains. It is something less in the sense that each object in the sack is not reducible to the sack.

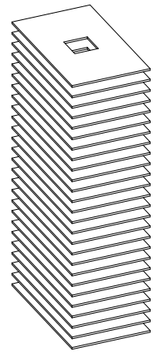
The floor disposition follows this twofold logic. First, the position and form of each of the slabs cannot be explained based on a higher principle, because their distribution is epistemologically unpredictable at any time during the simulation.[5] Nor can their position and form be explained by a common objective that motivates the set, since there is no particular telos that fulfills that function (whereas that is the case with the emergent fields of the continuous floor). The slabs are distributed without following a specific global order, although that does not mean that the resulting collection can not be understood as another object, identifiable as such. Second, the various slabs do not always behave as isolated bubbles. In certain circumstances they enter into direct or indirect relationships with one another, which we have considered in all the categories: 5.1.1 (Nestings) and 5.1.2 (Arrangements). The same is not the case for the discrete floor which we saw in Chapter 2 (section 2.2.4), ordered by strata: the parallelism established between the slabs prevents them from entering into local relationships. As such, relationships can only occur through a series of vertical continuities in the structure, façade and circulations, which are established through a superior total organization.

The notion of a sack has certain similarities with concepts like pile and stack. Both appear as agglomerations of objects whose overall presence produces an extremely specific figure, although its formal coherence is indistinct and indefinite. The difference between a sack of objects and a pile or a stack of objects is that the sack's condition as an object that exceeds the objects it contains is more evident, even though the objects also express their individuality, in turn, through the specific form taken on by the sack. In contrast, the limits of the pile and the stack seem to dissolve into the surrounding context.

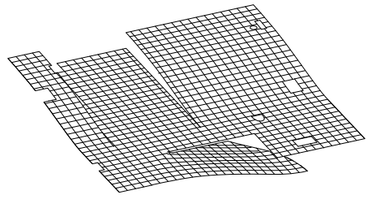
Nonetheless, it is important to keep in mind that a sack is not simply the fabric that forms it. Tristan Garcia makes reference to this when he explains that *"a thing is not a thin skin or film. Instead, a thing is comparable to a sack that is immaterial and without thickness."*[6] The idea is not to understand the sack as the container of a content, but as a content that contains other content.

5. Here, it is again worth differentiating between an epistemological indetermination and an ontological indetermination. We are dealing with the former, since the computational simulation is repeatable and therefore ontologically determined. However, because our epistemological capacities are limited, in practice the process is unpredictable.

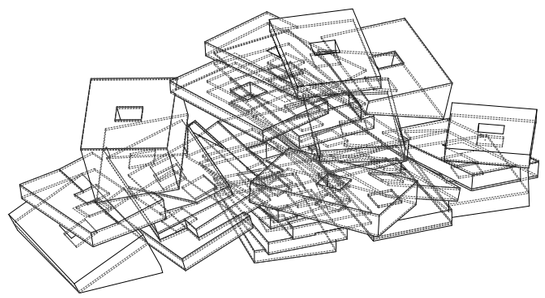
6. Tristan Garcia, *Form and Object*, ed. Graham Harman, trans. Mark Allan Ohm and Jon Cogburn (Paris: Edinburgh University Press), 2014, 78.



Stratum



Field



Sack

5.2.1.5
GROWTH

Incrustation

This new floor disposition responds to a resonant type of growth based on the notion of incrustation. Resonance should be understood simultaneously in two ways: on the one hand, as a mechanical phenomenon of vibration and, on the other, in the sense espoused by Levi Bryant, i.e., as "*the capacity of one system to be perturbed or irritated by another system*."[7] This resonance process produces incrustations: these are not overlappings, but enchastments in which one element penetrates inside the other rather than laying on its surface. A good example of this phenomena in architecture are the notion of tattoos in Wiscombe, in which the tatto is not exatly "on" the surface, but "in" the surface[8]. For Harman, the incrustation is the manner in which a sensual quality is attached to a sensual object[9], that is to say, the manner in which the brightness of an apple in a certain moment collapses on the apple as an object. In this sense, the notion of incrustation is interesting to us because it permits a deep intertwining in between two elements, while at the same time is able to constantly change. In the case of this process, incrustation changes accordint to states of resonance with certain attributes.

First off, we are dealing with a process of formal creation that combines two fundamental shifts. As we saw in Chapter 2 (section 2.2.4), the spaces characteristic of the discrete floor are manipulated by directly altering the materiality of the set, whereas the spaces of the continuous floor are manipulated from points of control that are external to the spline. Consequently, compared to the discrete floor, the continuous floor applies an initial spatial shift in terms of the formal manipulation of space: it no longer occurs through direct material contact, but functions indirectly or "remotely". Our new floor disposition also effects a second shift, in this case time-related: there is no longer an established form being altered, either by direct or remote contact; instead, what takes place is the activation of a process that is epistemologically indeterminate. In this exercise, the value of indetermination lies in the vibration that is characteristic of any resonant phenomenon, in this case associated with a stacking process.

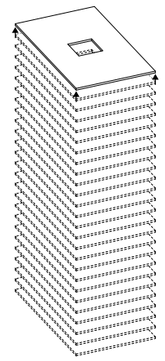
Second, this vibration displaces the slabs into a series of ex-centric positions which, depending on the circumstances, cause them to "enter into resonance" and produce incrustations. This expression is especially apt because it implies that the resonance process is an interim state of the object, as opposed to an essential attribute. Throughout the simulation, the slabs enter and exit states of resonance, which may involve several slabs at once. However, they do not necessarily resonate with all the other slabs or at all times. When a slab enters into resonance with one or more other slabs, its form may be extended (5.1.1.1 Embedding / sec_3.0), perforated (5.1.1.2 Perforation / sec_5.2), connected (5.1.1.3 Junction / sec_9. 4), cropped (5.1.1.5 Chunking / sec_10.8), pierced (5.1.1.6 Wrapping / sec_11.0), etc. Resonances can also take place that do not affect the form of the slab itself but rather its position with respect to other slabs, producing disalignments (5.1.2.1 Unalignment / sec_4.8), ranges, (5.1.2.5 Fan / sec_11.2), paths (5.1.1.8 Ascension / sec_13.0), or dotting barcodes (5.1.2.2 Barcode / sec_8.6).

Thus, the formal growth of the set takes place, on the one hand, based on an indeterminate vibration process that generates positional ex-centricities and, on the other, through a series of resonances between slabs as a result of those ex-centricities. It is a far cry from the system of repeating an object and a position characteristic of the discrete floor, but it also differs from the bending and folding typical of the fields of forces of continuous floors. On the contrary, we are dealing with a series of chaotic growth processes, which neither respond to nor produce a global coherence. Nor can they be described as evolutionary growth, because the process is not gradual. Various jumps in continuity occur throughout the simulation. We are therefore facing a type of growth that takes place through local, temporary and contingent states of resonance, establishing a series of formal interlacements between clusters of slabs from ex-centric positions.

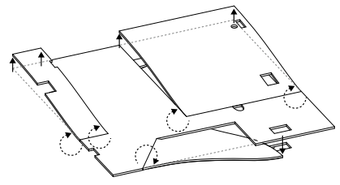
7. Levi Bryant, *The Democracy of Objects*, (Michigan: Open Humanities Press 2011), 222.
http://www.openhumanitiespress.org/books/titles/the-democracy-of-objects/

8. Tom Wiscombe, "Discreteness, or Towards a Flat Ontology of Architecture", *Project: A Journal for Architecture*, no. 3 (2014), 41.

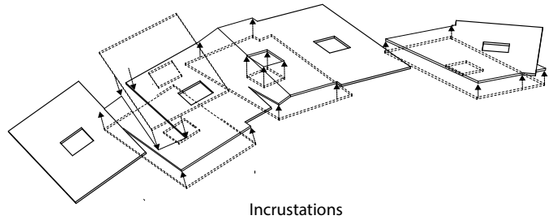
9. Graham Harman, *Prince of Networks*, (Melbourne: re.press, 2009), 203.



Repetition



Deformation



Incrustations

5.2.1.6
FIGURATION

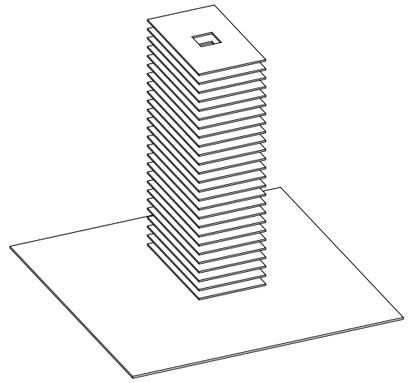
Co-Figures

One of the main characteristics of the formal exercise we have proposed is the lack of a ground that acts as a narrative element. Unlike the disposition obtained through the simulation, both the discrete floor and the continuous floor harness the tension between "figure and ground" as a device capable of articulating an architectural narrative. In the first case, each slab is set up as a background, against which a series of figures dance in the form of a "poche". At the same time, the vertical set of slabs functions as a defined figure that is contrasted with a universal ground. In the second case, ground and figure merge to produce a surface from which a series of singularities emerge, although they do not break up the continuity of the system in any case.

The floor layout we have analyzed does not appear as the projection of a figure against a ground, nor as the fusion of figure and ground. On the contrary, by eliminating the presence of a universal ground, the traditional figure-ground dichotomy is erased, leaving behind only a set of free figures. However, these figures do not have the same nature as the figures in the discrete floor. The latter contrast with a ground, whereas the former contrast with other figures. In that sense, the slabs in this formal exercise are constituted as co-figures – an expression that has a double meaning. On the one hand, it designates elements whose individuality is constructed by their modal difference with other figures, instead of a supposed ontological difference with a ground. On the other hand, it refers to elements that are the result of a collaborative development between several slabs: a set of figures capable of generating an element that can be understood in itself as an expanded figure – in other words, a co-figure. These co-figures can be understood in themselves as a micro-ground, since some of them display functions traditionally associated with a ground, such as serving as the base for other figures or offering communication between figures.[10] This phenomenon occurs for the first time in 5.1.2.1 (Unalignment / sec_4.8): the set has opened to the point of dividing the vertical continuity that once connected the entire building into two sections. Consequently, at the point of departure, the slab acts simultaneously as the culmination of one building and the starting point for another – in other words, it can be read as the ground for a new building. The development of this process has been detailed in category 5.1.6 (Grounds), in which we can see how through the configurations studied in the category 5.1.1 (Nestings) the different slabs are able to become grounds while the piling process unfolds.

It is important to specify that, for instrumental reasons, the programmed simulation was given a universal ground. However, that ground is merely accessory and the consequence of the constitution of a gravitational scenario under which there is a reorganization of the slabs characteristic of the discrete floor. If we understand the ground as a container that contains different objects, and access from one object to another can only take place from the ground, we find that there is no universal container in this exercise and that the slabs themselves act as a base for other slabs, although they do not necessarily establish material or remote continuity with one another. In that sense, we will leave for future research the development of other experiments where the simulation occurs in a floating space, where there is no univeral ground, or where the ground takes on a variety of different formal natures beyond a flat infinite surface.

10. Peter Trummer, "The City as an Object", *Log*, no. 27 (2013), 57.



Grounds

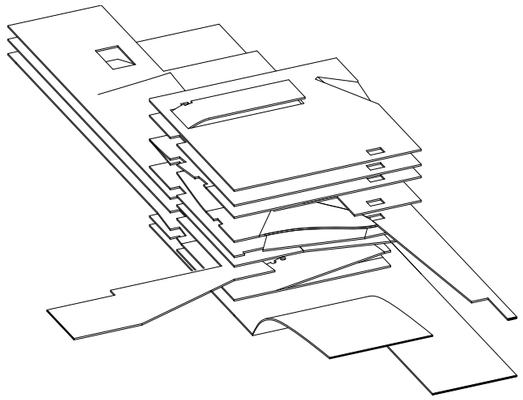
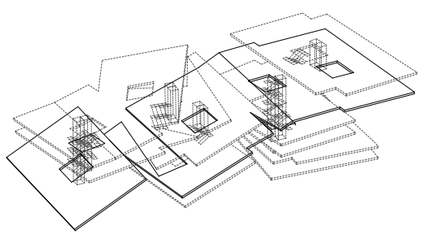


Figure = Ground



Co- Figures

FLOOR EVALUATION

Performative categories

5.2.2 Formal Categories

The results of the simulation provide a spatial catalogue of cases whose impact has the potential of being relevant to the problem of the floor that we have presented in Chapter 2 (sections 2.2, 2.3 and 2.4).

In order to carry out an effective comparison with the discrete floor and the continuous floor studied in Chapter 2 (sections 2.2 and 2.4), we must evaluate the obtained results through the same categories used in those two cases, emphasizing two aspects that will be fundamental to corroborating our established hypothesis. First, the degree of originality of the set obtained in relation to the previous two floor dispositions. Second, the degree of complicity in between the obtained floor disposition and the three fundamental concepts of subjectless objects explained in Chapter 3 (section 3.2): collections, excentricities and interlacements.

As in the second chapter (sections 2.2 and 2.4), these categories are grouped into two subsets of six categories each one.

The first subset consist on six formal categories, which refer to extensive attributes related to the floor disposition: 5.2.1.1 Mereology, 5.2.1.2 Geometry, 5.2.1.3 Contour, 5.2.1.4 Arrangement, 5.2.1.5 Development, and 5.2.1.6 Figuration. The second subset consists on six performative categories, which refer to intensive attributes related to the floor disposition: 5.2.2.1 Circulation, 5.2.2.2 Gaze, 5.2.2.3 Orientation, 5.2.2.4 Retirement, 5.2.2.5 Interiority, and 5.2.2.6 Access. In this section 5.2.1 we will focus in the second six performative categories.

5.2.2.1
CIRCULATION

Jumps

This new floor disposition suggests a means of circulation based on the idea of "jumping". The geometric characteristics of the set obstruct the modes of circulation we studied in the second chapter (sections 2.2.4 and 2.4.4). On the one hand, the spine framework from the discrete floor is not possible, since beginning from 5.1.2.1 (Unalignment / sec_4.8), the slabs in the models do not possess the centralization necessary to establish the vertical continuities required for that type of circulation. This process of de-centralisation of the central core has been deeply analysed in 5.1.5 (Intersticialities). On the other hand, none of the 66 models has the topographic continuity characteristic of the continuous floor, so that the errant movement typical of that layout cannot be applied either. On the contrary, what we have is a broken geometry, in which several episodes of micro-continuity occur in the form of clumps, yet they are not stitched together by any shared element. There are collections and sub-collections of slabs, some of which show interlacements, but there is no overall spine that structures the set.

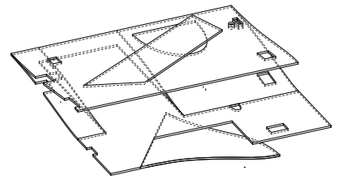
As such, there are some episodes of continuity in which the errant movement typical of continuous floors is possible. However, unlike with continuous floors, in our exercise the continuity is not holistic in nature; it is limited by a specific contour, as can be seen in section 5.1.1 (Nestings). Circulation throughout the set must therefore recognize this variability of countable and distinct elements, since circulation takes place across them but also between them. While the circulation across them may be comparable to a limited version of the "errant" characteristic of continuous floors, the circulation between them must recognize the finiteness of each sub-set, therefore establishing a "jump" between different sub-sets. This means that to travel from one end of the set to the other, there cannot be a simple straight-line circulation (discrete floor) or a contoured circulation (continuous floor). Instead, several jumps in different directions are necessary to reach one's destination.

In that sense, it is important to distinguish the notion of a jump as we have described it here from what is alluded to as characteristic of the discrete floor. In the discrete floor, each slab is considered to be a world in itself – autonomous and individual – which, following the 1909 theorem, forms a self-sufficient scenario. Thus, it could be argued that the passage "between worlds" in the discrete layout implies a jump, because there is an interruption between the slabs. However, this jump does not have the radicality of what we are proposing in this exercise. Ultimately, in the discrete floor there is no jump; rather, there is another step along the continuous vertical trajectory of the circulation core. Effectively, the kind of jump that is characteristic of the discrete floor no longer registers as a jump once we admit that it is part of a continuous spine system. That is not the case of the configuration obtained in our simulation, since the different "jumps" required to cross the set are not systematized – in other words, they are not part of a whole. This can be seen very clearly in 5.1.2.5 (Sautéed / sec_14.2).

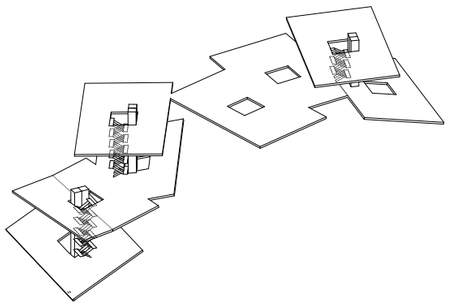
Consequently, the notion of a jump presented in this section established complicities with an ontological understanding that is not based on an underlying continuum, but on the radical difference between objects as described by Harman and Bryant. It is precisely this "abyssal"[11] difference that implies the need for a "jump" in the most radical sense of the word – i.e., a jump that does not just connect horizontal slabs vertically but is also a jump in the ontological sense of the term. As a result, the routes shown in the result are not functional and optimized routes, since the movement between two points in the set is far from being the shortest path. Nor is it a "drifting" route, as though you could access all the points in the set by following the continuous trajectory of Baudelaire's flâneur. It is more like a syncopated movement – i.e., a movement that is not completed in a single gesture: it requires jumps, the presence of which signifies that there can no longer be a defined trajectory (discrete floor) or an indefinite trajectory (continuous floor). Instead, there is a cluster of movements, interruptions, starts and stops, turns and jumps that make the overall circulation through the set into a heterogeneous experience.

11. "The virtual proper being of objects is abyssal and subterranean, such that it itself never comes to presence."
Levi Bryant, *The Democracy of Objects*, 282.

Spine



Wander



Jumps

5.2.2.2
GAZE

Gaps

In the floor disposition obtained through the simulation, our eyes travel across the space, following along the contour of the slabs. Their intersection in perspective gives rise to a series of holes or interstices that become the focal point of the visual experience. In the two cases studied in Chapter 2 (sections 2.2.4 and 2.4.4), the gaze takes other paths: the pronounced horizontality of the discrete floor directs our gaze toward the horizon, while the undulations of the continuous floor interrupt face-to-face encounters, making looking into an exercise in voyeurism.

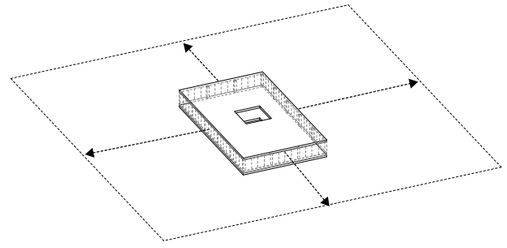
However, the geometric set achieved through our simulation does not allow for the appearance of these phenomena: the different figures are limited by a radically specific contour that obstructs a generic elongation of the gaze or a constant surfing along the surface. Here, instead of gliding across a surface, the gaze carefully follows the singularity of its edges. However, viewed in perspective, and because of the disordered accumulation of the slabs, the different contours overlap visually, leaving a series of holes between them, which end up attracting our gaze. This phenomenon does not occur at the very beginning of the process, as in 5.1.2.1 (Unalignment / sec_4.8) o 5.1.2.2 (Barcode / sec_8.6), because the geometric circumstances necessary for the formation of holes are not yet present. They appear once the set is already open, as in the case of 5.1.2.3 (Hybrid / sec_11.4) or 5.1.2.5 (Sautéed / sec_14.2). However, this is not a linear phenomenon: when the set is in a very dispersed state at the end of the process, there are no holes either because the slabs hardly overlap at all cases of the countours, represented in the group of drawings of the section 5.1.5.

These interstitial spaces are like black holes that draw our gaze, acting as a counterpoint to the holistic surfaces characteristic of the continuous floor. Although it is true that the topographical arrangements in designs like Jussieu also have holes, it is important to note that those holes are the result of a series of pre-defined perforations, which also occur in discrete floors. In contrast, in the floor obtained through our simulation, the holes emerge as contingent "no man's lands" located between clumpings. This conception of the hole as a space of indetermination that obstructs a complete vision of the set is aligned with the conception of the hole as theorized by Žižek, according to whom the hole is associated with the stain on the real represented by the inclusion of our own subjectivity.[12] Timothy Morton also recently theorized about the concept of holes, but through the idea of a mesh: a mesh produces an "*interconnectedness that does not allow for perfect, lossless transmission of information, but it is instead full of gaps and absences.*"[13]

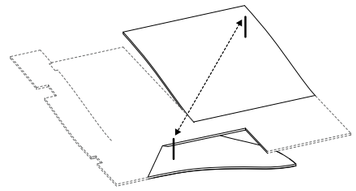
In that sense, the holes Morton describes fit in very well with the holes that attract our gaze in this floor disposition: they are the absences that occur between interlacements, whose local and incomplete development gives way to multiple and indeterminate mismatches.

12. Levi Bryant, Nick Srnicek and Graham Harman, "Towards a Speculative Philosophy" in *The Speculative Turn*, ed. Levi Bryant, Nick Srnicek and Graham Harman (Melbourne: re.press, 2011), 5.

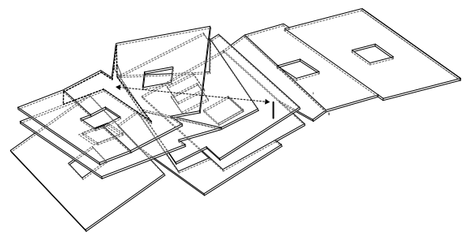
13. Morton, *Hyperobjects,* 83.



Horizon



Voyeur



Gaps

5.2.2.3
ORIENTATION

Contour

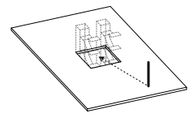
One of the elements that undergoes the deepest modification in this floor disposition has to do with how users orient themselves in space. In the dispositions studied in the second chapter (sections 2.2.4 and 2.4.4), this orientation process occurs through two different strategies. In the case of the discrete floor, the central circulation core acts as a guiding element because it remains unchanged across all the building's floors. In the case of the continuous floor, the slope of each fragment of the slab acts as an orientation mechanism: the three-dimensional angle established between the perpendicular to the slope and the vertical axis of gravity is sufficiently unique to act as a guiding mechanism.

However, in our new floor disposition, none of these characteristics is present. There is no central core nor is the existing slope a determining element in the set. Because there are several clumped micro-continuities, users need to know not only where they are in the clump, but also which clump it is. As such, the element that acquires the most prominence in this exercise, due to its singularity, is the contour of the different slabs, the geometry of which has been analyzed in 5.1.1 (Nestings). In the case of the discrete floor, since all the slabs are identical, this contour is generic and therefore can not fulfill the function of orientation. In the case of the continuous floor, the contour itself is non-existent, because the aim is to establish continuity with the surroundings and ensure an absence of interruptions.[14] However, in this new floor disposition each slab is formally distinct. Therefore each contour is unique and is not repeated. Moreover, the contour is not reduced to an outline on the surface, as is the case with the discrete floor. On the contrary, in some cases it is a figure in space; as such, its contours are three-dimensional and belong to more than one plane, as we saw in 5.1.1.3 (Junction / sec_9.4).

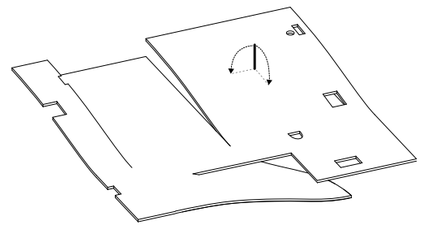
On the other hand, the idea of contour is fundamental in an object-oriented ontological approach like the one we laid out in Chapter 3 (section 3.2). This approach argues for the autonomy of each of the objects within the framework of a discrete ontology, in which, as Graham Harman states, every object contains something that cannot be grasped. This individuality and autonomy that is shielded from any relationship conflicts with the prevailing holistic systems of the early 21st century, reasserting the importance of a contour. The contour emerges as the abyssal and insurmountable limit, which harbors each object's autonomy and individuality.

For that very reason, the concept of contour is positioned as an element with enough prominence and singularity to function as a mechanism for orientation. Thus, there is an understanding of space that does not seek out a specific centrality for orientation, nor does it do so based on the constant variations in height of the continuous floor. Instead, it is a peripheral orientation – in other words, one that uses the limits of the inhabited space as the fundamental elements for understanding and using that space.

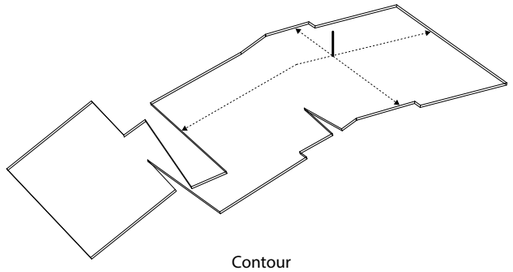
14. We might point out that the Yokohama project displays a very distinct contour in the shape of a rectangular cut. However, it is a transcendent cut, which is pre-determined and generic.



Core



Deviation



Contour

5.2.2.4
RETIREMENT

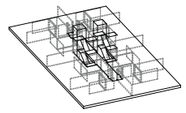
Compression

In the floor arrangement obtained through the simulation, the areas with the most privacy are generated through different operations based on compression. As we saw in Chapter 2 (sections 2.2.4 and 2.4.4), in the discreet floor of the skyscraper, retirement was generated in response to a radial horizontal pattern, whereas in the continuous floor, areas with increased privacy were distributed throughout the space in response to the different topographic features. In contrast, the new floor layout in this exercise cannot rely on either of these strategies for two fundamental reasons. First, unlike the discrete floor, the ceiling height is not always the same. As such, the application of a two-dimensional strategy like a radial approach is insufficient, since it does not account for the z variable. Second, unlike the continuous floor, the habitable surface is not made up of a single warped slab. Rather, there are several collections and sub-collections of interlaced slabs. As a result, there are various inter-spaces between the sub-collections. These spaces alter the understanding of space by producing new sightlines that add greater complexity to questions of privacy.

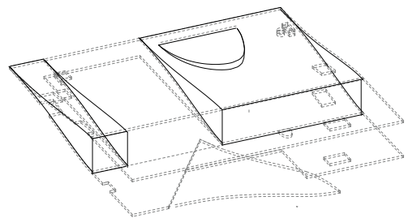
However, throughout the stacking process, some groups of slabs form arrangements with formal characteristics that favor the appearance of more private spaces. They are episodes of compression: situations analyzed in category 5.1.2 (Arrangements) in which a collection of slabs (that do not necessarily share a circulation core) are subject simultaneously to upward pressure on the bottom slab, and downward pressure on the top slab. In case 5.1.2.7 (Esplanade / sec_12.2), this phenomenon occurs very clearly as a number of slabs reach the universal floor of the simulation.

As a result, while preserving the minimum ceiling height at all times, the set is compressed on one side. That compactness contrasts with the large spans and heights that occur in other areas of the set, where there is higher volatility.

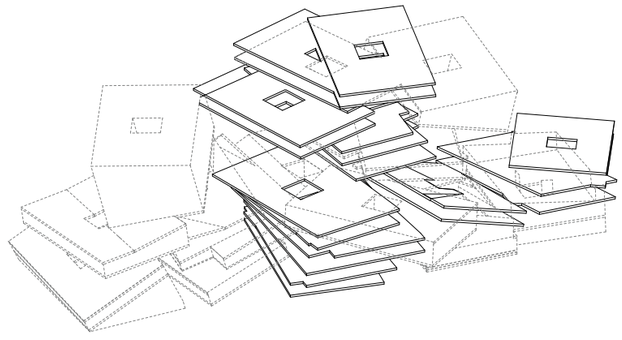
In that sense, the private spaces are associated with episodes of compression that do not necessarily share a single vertical circulation core. In other words, they are not necessarily part of the same sub-building; rather, they may be made up of parts from several buildings. These compressions are distributed throughout the set as clumpings: i.e., as groups with greater density and granularity that can be read as another type of autonomous sub-collections. Thus, we are not dealing with a two-dimensional pattern or a topographical distribution. What we are seeing are nestings of compressions: that is, subsets of slabs that increase their positional density and, as a result, offer the necessary formal conditions for the generation of trans-building situations of privacy.



Margins



Wrapping



Compressions

5.2.2.5
INTERIORITY

Matryoshka

Our new floor disposition suggests a renewed understanding of the traditional formal dichotomy between interior and exterior. This dichotomy has been addressed in different ways in the two floor arrangements from Chapter 2 (sections 2.2.4 and 2.4.4). First, in the discrete floor, the two categories are presented as opposites, clearly separated by a façade. Second, in the continuous floor, the two categories are understood as belonging to the same continuum, such that a gradual buffer is established between them, as opposed to a rigid boundary.

In the case of the exercise undertaken for this dissertation, the interior-exterior dichotomy vanishes entirely. There is no longer a category that can be understood as "exterior" in the absolute sense of the term. Instead, there are only "interiorities" – i.e., objects within other objects. This phenomenon is referred to as matryoshka, due to its formal similarity with Russian nesting dolls. In the context of this exercise, it can be understood in two different ways.

First, there is the simplest way in which this phenomenon occurs, which can be observed in 5.1.1.1 (Embedding / sec_3.0). As we analyze the set, we see how the different slabs are situated one inside the other, which can occur mainly in two different ways. First, as the bottom slab is projected along the plane of the top slab, the resulting figure ends up encompassing both slabs. In this way, when sub-sets or clumps are formed during the simulation, they can be understood as meta-slabs containing other slabs within them. In turn, these sub-sets form other subsets, generating formal interiors embedded within other interiors. This occurs in the stacking process for the first time in 5.1.1.3 (Junction / sec_9.4).

Second, as discussed in 5.1.4.6 (Matryoshka / sec_13.0), several of these subsets may be surrounded by other elements, such that they are also in an "interior" situation from a positional point of view. However, this is not the case of an interior located within an exteriority, but rather within another space that is also an interior.

This succession of interiors maintains certain complicities with the ontological theses developed in Chapter 3 (section 3.2) and argued by Graham Harman and Levi Bryant.

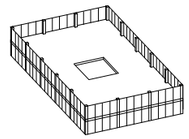
Timothy Morton also refers to this question, first from a spatial perspective and then from a temporal point of view. First, Morton argues that our spatialities develop within other spatialities when he states that "we coexist with human lifeforms, nonhuman lifeforms, on the insides of a series of gigantic entities with whom we also coexist: the ecosystem, biosphere, climate, planet, Solar System. A multiple series of nested Russian dolls. Whales within whales within whales."[15] However, Morton extends this spatial phenomenon to include the temporal field, describing temporalities within other temporalities when he assures that all these spaces "are inextricably bound up with different kinds of timescale: dinner party, family generation, evolution, climate, (human) 'world history', DNA, lifetime, vacation, geology; and again, the time of wolves, the time of whales, the time of bacteria."[16]

In that sense, and based on a mereological approach that does not recognize the presence of a "whole" or even a "world",[17] it seems logical to suppose that the idea of an absolute exterior is not aligned with the contemporary lack of a subject. Indeed, the idea of a "total" exterior, which is assumed to have no other exterior, is not part of an ontological conception in which the figure of the subject disappears, giving way to collections of objects that are grouped into sets and sets of sets. In that sense, the floor arrangement studied here adopts a position similar to this reflection, in that it constitutes a space in which the exterior-interior dichotomy is no longer relevant and a system of interiorities is deployed.

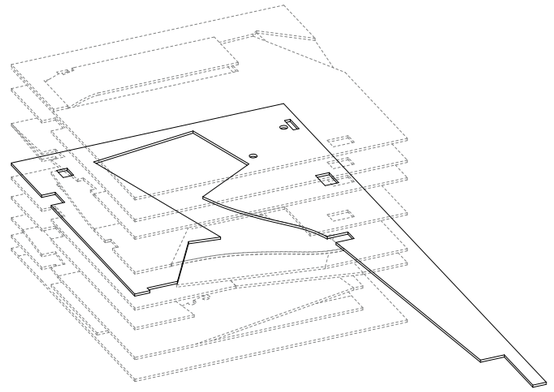
15. Morton, *Hyperobjects,* 128.

16. Ibid., 10.

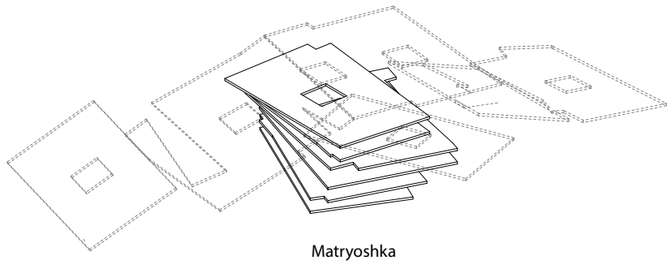
17. Markus Gabriel, *Por qué el mundo no existe*, trans. Juanmari Madariaga, (Barcelona: Pasado y Presente, 2015), 86.



Opposition



Gradation



Matryoshka

5.2.2.6
ACCESS

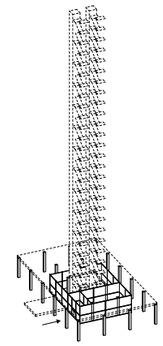
Nesting

In the floor arrangement obtained in the simulation, there can be no notion of one or various entrances to the set, understood as a unit that is accessed from the outside. Rather, there are several "endo-accesses" – i.e., accesses that connect interiorities, whether of a similar or different degree. As the stacking process advances and the set begins to open, its granularity also increases, thus reducing the density of interactions between units. As a result, if we define granularity as the number of buildings contained in the cluster – i.e., the sub-collections of slabs grouped around a circulation core, which we studied in depth in 5.1.6 (Grounds) – we will see how the number of endo-accesses increases in a linear fashion as the simulation advances. In this context, a series of differences emerge as compared with the soil arrangements from Chapter 2 (sections 2.2.4 and 2.4.4).

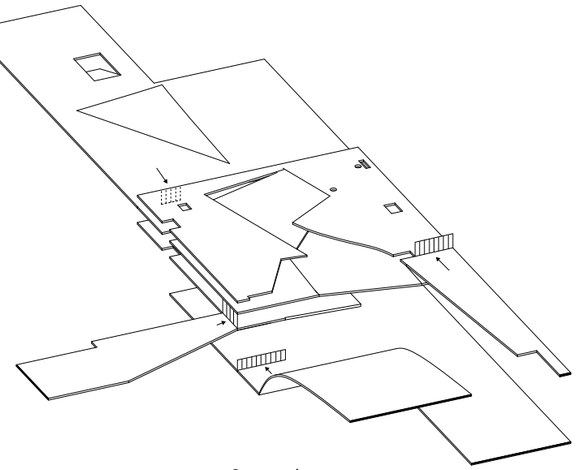
First, the fact of accessing an architectural ensemble is no longer an operation that 1) takes place only from a supposed universal zero-level and 2) connects an exterior with an interior, as is the case in the discrete floor layout of the skyscraper. On the contrary, not only can the continuous while discreet floor be accessed from various points located on different levels, it also provides accesses that are not limited to the connection of an exterior to an interior, such as from an interior to another interior. In model 5.1.2.8 (Ascension / sec_13.0), the access to an interior occurs from the universal exterior of the simulation. However, this access into the set's core does not occur on the ground floor, but at an intermediate level, which is reached by an ascending route. In contrast, in model 5.1.1.3 (Junction / sec_9.4), there is an access that connects strictly interior spaces. Since, in this case, the roof of one building is the ground for the next, access to that unit can no longer take place from a supposed universal and exterior ground floor. The access mechanism is no longer limited to a single "total" access, nor to a topological distribution of accesses. Instead, they are grouped together in the form of clumps. They are the result of greater or lesser degrees of granularity in the set: the more sub-collections of slabs grouped by circulation cores there are, the more accesses there are, as can be observed in the later models studied in 5.1.6 (Grounds).

Second, the notion of access is no longer associated with the smoothness and progression characteristic of the continuous floor. Whereas in the discrete floor access was established as the jump from ground to figure, and in the continuous floor it represented a smooth continuum between ground and figure, now the access is understood as a jump from one figure to another. In that sense, it should still be understood as a jump in the sense that there is no continuity between the figures it connects. However, as we have seen, this jump no longer occurs between exterior and interior, but between interiorities.

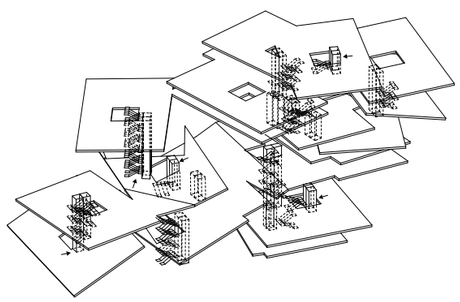
In short, we are dealing with an access that is grouped into clumps, plural in nature, located at different heights, and which takes place mainly between figurative interiors. That means that you can access one building from another in several ways: first, from an interior to another interior, as we saw in 5.1.1.3 (Junction / sec_9.4). Second, moving from the surface of one building to the surface of another, as in 5.1.2.5 (Sautéed / sec_14.2). Third, from the terrace of one building to the interior of another, as appears in 5.1.2.4 (Hybrid / sec_11.4). And, obviously, from one set to another, as in 5.1.5.6.(Split / sec_12.8). This produces a very peculiar system of accessibility, which suggests new and unprecedented programmatic combinations that we will discuss later on.



Single



Scattered



Nested

5.3 Continuous while discrete

The cases studied in the last section represent not only a contribution in disciplinary terms in relation to the previous floor diagrams, but also a shift regarding the zeitgeist based on the relational subject characteristic of the end of the XX century. As we can see in the complete table of concepts (Fig 5-4), the attributes of the continuous while discrete floor are aligned with the idea of a zero subject, while problematizing the established zeitgeist based in fields and relations that engraned the continuous floor.

Certain categories analysed in the previous section produce bigger impact than others in relation to the shift from the floor dispositions studied in Chapter 2 (sections 2.2, 2.3 and 2.4) to the floor disposition obtained from the resonant piling simulation.

There are four main categories to underline. First, the singularity adquired by the notion of Contour studied in (5.2.1.3) and (5.2.2.3) represents a significative contribution, because it converts the contour in an orientative element and not the mere limit of a continent once is read in the radicality that the term "contour" implies. Second, the mode of circulation (5.2.2.1) is completely subverted in relation to the other two floor dispositions, and the impact that this phenomena has in the manner of using the building is determinant. Third, the understanding of ground an figure (5.2.1.6) is deeply modified in the obtained floor disposition, and this is a really relevant issue because it has urban implications: the idea that there are more "grounds" in the building together with other slabs suggest a reading of this building as a city, that is to say, as an urban acumulation of buildings and not only as an architectonical acumulation of slabs. This point has to do with a fourth significant transformation related to the category of Interiority (5.2.2.5). The understanding of this category as a Matryoshka subverts one of the most basic dichotomies in architecture by eliminating one of its components: the idea of a radical exterior.

However, and even if the impact of each category individually analysed and compared leads to significant architectonical consequences, its collective participation has also a relevant effect. In particular, it subverts the understanding of architectonical space, thus going beyond the notion of floor, although being motivated by it.

The formal and performative qualities of the three floor dispositions we have studied respond to different conceptions of space. In fact, the generalization of the word "space" has close ties to the appearance of the modern operativity characteristic of the discrete floor and its "free plan". Umberto Boccioni gave an account of this when, in 1912, he wrote the following:

"*Let's proclaim the absolute and complete abolition of finite lines and the contained statue. Let's split open our figures and place the environment inside them.*"[18] This generalization took place, as Jacques Lucan writes,[19] with the shift from a closed compositional order, based on the Beaux Arts par pièces systems, to an open compositional order based on the Modern Movement's "free plan". Before then, the term "space" referred to the distance between two or more objects. In 19th-century French Beaux Art theory the term was rare, and when it was used, it was "*in regard to an empty surface having no particular qualities and this absence of qualities was never seen positively.*"[20] In that sense, the advent of the open floor plan that would characterize the discrete floor of skyscrapers posited the term "space" from a different perspective: it became a relevant and positive term with a constant presence in the professional realm and the academic spheres of the discipline.

Although the qualities of each of the three floor arrangements have been described based on categories linked to space, each of them responds to a different approach. The three resulting understandings of space respond to three expressions from ancient Greek thought that refer to space: "chora", "topos" and "oikia".

5.3.1 Chora, topos, oikia

Of the three, the expression "chora" is the first that appears in ancient Greek sources, referring to "land/region/ground."[21] The term was used in general to refer to the idea of an occupied or occupiable expanse in two or three dimensions, but without making any reference to a particular location or position.

Plato is one of the philosophers who makes most explicit use of the term "chora". In the Timaeus, the Greek philosopher describes in detail a third type, beyond the world of ideas and objects: "*And the third type is space, which exists always and cannot be destroyed. It provides a fixed state for all things that come to be. It is itself apprehended by a kind of bastard reasoning that does not involve sense perception.*"[22] This type consists of a medium that is unchanging, that has no materiality or quality, yet in its eternity it allows everything to happen. That kind is the "chora", a receptacle for all generation – invisible, amorphous and open to everything. Following Plato, the chora is neither a being nor a non-being, but an interval in which forms are originally held and from which they receive their spatiality.

Whereas traditional architectural space finds its clearest representation in the unitary world of the Renaissance, in Modernity the space produced by the discrete floor exalts many of the characteristics of the "chora": fluidity, transparency, uniformity, secularization, continuity, openness, universality, infinity, etc.[23] In it, space is freed from form, and form becomes an element that is no longer merged with space, instead differentiating itself from space in order to circulate within it. This process can be observed in Sir John Soane's Museum in London, where his collection of paintings and sculptures flows through a slippery space that can no longer be explained based on the centralized rigidity of the Renaissance. Exercises like the gridded, repetitive plans by Jean-Nicolas-Louis Durant also announce the arrival of this infinite space, which will also be seen later in the transparency and lightness of the Crystal Palace in London.

This process culminates with the typical space of the Inter-

18. Umberto Boccioni, "Technical Manifesto of Futurist Sculpture" in Future Manifestos, ed. Umbro Apollonio (London: Vicking Press, 1973), 63.

19. Jacques Lucan, *Composition, Non-Composition*, trans. Theo Hakola (Oxford: EPFL Press, 2012), 385.

20. Ibid.

21. Keimpe Algra, Concepts of Space in Greek Thought, (London: Brill, 1995), 36.

22. Plato, Timaeus, trans. Peter Kalkavage, (New York: Hacket Publishing, 2000), 52b.

23. Josep Maria Montaner, *La modernidad superada*, (Barcelona: Gustavo Gili, 2011), 33.

SUBJECT INTERPRETATION	ABSOLUT SUBJECT	RELATIONAL SUBJECT	ZERO SUBJECT
FOCUS	Human	System	Collective
POSITION	Axis	Hollon	Ex-Centricities
SUBJ - OBJ	Dominion	Mediation	Interlacement
EPISTEMOLOGY	Positivism	Perspectivism	Ecologism
REF. THINKER (SOC)	A. Comte	Z. Bauman	T. Morton
REF. THINKER (CONT)	I. Kant	G. Deleuze	L. Bryant
MOVEMENT	Modernism	Poststructuralism	Spec. Relativism
FLOOR LAYOUT	DISCRETE FLOOR	CONTINOUS FLOOR	DISC while CONT FLOOR
DISCRETENESS	Countable	Solo	Dilated
CONTINUITY	Progression	Topography	Grains
F1. MEREOLOGY	Whole = Parts	Whole > 2Parts	Whole< Part
F2. GEOMETRY	Euclidian - Flat	Topological	Combinatory
F3. CONTOUR	Ideal	Virtual	Singular
F4. ARRANGEMENT	Shelves	Field	Sack
F5. GROWTH	Repetition	Deformation	Incrustation
F6. FIGURATION	Grounds	Figure = Ground	Co-Figures
M1. CIRCULATION	Spins	Wonder	Jumps
M2. GAZE	Horizon	Voyeur	Gaps
M3. ORIENTATION	Core	Deviation	Contour
M4. RETIREMENT	Margin	Wrapping	Compression
M5. INTERIORITY	Opposition	Gradation	Matryoshka
M6. ACCESS	Single	Scattered	Nested
	Homogeneous	Homogeneous	Heterogeneous
DIAGRAM			

Figure 5-4: Complete Table of Concepts

national Style: uniform, universal, eternal and unlimited, framed by a discrete set of horizontal planes that simply encircle a fraction of that space. Its Platonic root gives it an ideal, theoretical, generic and indefinite condition, which can only be approached through mathematization: the modern space characteristic of the free floor is a space that has been measured and calculated by the rigor of science and the efficiency of industry. This gives rise to the myth of transparency,[24] introduced by Bentham's panopticon and later celebrated by modern architects like Le Corbusier through the idea of "hygienic space": a space that apparently leaves behind what is irrational, tyrannical and suspicious, but is handed over to the hermetic rational grids of hospitals and prisons.

The discrete floor layout merely repeats, in section, the abstract horizontality of the "chora", multiplying the free floor seen in other exercises, interrupted only by the circulation core cutting through the set transversally. This detail is not irrelevant, because it encases a certain schizophrenia. On the one hand, through its use of the free floor, the discrete floor layout presents a space that has broken free from the absolute values of Newtonian science characteristic of the Baroque, thus approaching the relative positions inherent in Einsteinian space. However, on the other hand, the centrality of the vertical circulation core is still an absolute reference point in spatial terms. In that sense, Van Doesburg spoke of the presence of a "universal space"[25] referring to "*a space in which any position could be seen as the equivalent of another, a space without compositional hierarchy.*"[26] There is no longer a question of relying on the "room" as an element; rather, space is articulated by a series of rectangular planes without an individual form. That is why the Dutch artist described an anti-cubic house, in which space is not compressed centripetally into a closed cube but emerges from the cube to expand centrifugally toward the outside. In this case, Van Doesburg's spatial understanding aligns fairly accurately with the discrete floor of skyscrapers, where space develops from the circulation core toward the exterior, even extending beyond the building's own limits.

In contrast, the continuous floor we analyzed in Chapter 2 (section 2.4.4) refers back to a different conception of space from ancient Greece, usually associated with the expression "topos". It is important to note that "topos" and "chora" have often been used as synonyms, since there is a certain promiscuity between them.[27] However, in most contexts the expression "chora" refers to an enclosure, and the expression "topos" refers to a place. In addition, the expression "topos" should not be understood to refer to a specific fragment of a larger element, as would be the case with "chora". Rather, both should be treated as spatial categories that are qualitatively distinct but hierarchically equivalent.

One of the peculiarities of the continuous floor is the differential nature of its surface. In contrast to the neutral and homogeneous plane of discrete floors, the constant variability in the [x], [y] and [z] axes of the continuous floor makes it into a topographic surface where every point is a singular point. This results in "*a constant modification of the space that leads to a changing reading of the place*",[28] which implies the shift from a Platonic space (chora) to an Aristotelian space (topos). Unlike the universality and abstraction of the chora as described by Plato in the Timaeus, "In the Physics, Aristotle instead identifies the generic concept of space with another more empirical and limited concept, that of 'place', always referred to with the term "topos". In other words, Aristotle looks at space from the point of view of place. Every body occupies its specific place, and place is a fundamental and physical property of bodies."[29] This is very clear in the following text by the Stagirite:

> *"Again, place (topos) belongs to the quantities which are continuous. For the parts of a body which join together at a common boundary occupy a certain place. Therefore, also the parts of place which are occupied by the several parts of the body join together at the same boundary at which the parts of the body do. Therefore also place is seen to be continuous. For its parts join together at one common boundary."*[30]

> *"...most of all contrariety in quantity seems to appear in the case of place (topos). For 'up' is commonly accepted as contrary to 'down', in that the chora towards the centre is said to be 'down' because it is at the greatest distance from the periphery of the cosmos."*[31]

Aristotle defines "topos" as a continuous and three-dimensional underlying substratum, but above all as an empirical and localized substratum – a far cry from the "chora" as a receptacle described by Plato.

The difference between the discrete floor and the continuous floor plays out in parallel to the difference between the Platonic "chora" and the Aristotelian "topos": whereas the discrete floor engages an indefinite, generic, abstract and ideal condition, the continuous floor has an empirical, specific, articulated and defined character.

As opposed to the tabula rasa characteristic of discrete floors (in other words, a natural "datum"), continuous floors are a continuum of artificial "places". This phenomenon has a lot to do with the topographic structure of continuous floors and what Parent defined as the "inclisite": a site that, due to its slope, takes on a series of formal and functional capacities that make how it is inhabited unique. In this sense, the topos-type space of continuous floors is not only the support for a circumstance that comes later, as is the case with the "chora" of the discrete floor. It is simultaneously support and circumstance, as can be

24. Anthony Vidler, "The Architectural Uncanny: Essays in the Modern Unhomely," in *Architecture Theory since 1968*, ed. Michael Hays, (New York: Columbia Books of Architecture, 2000), 751.

25. Theo Van Doesburg, "L' Évolution de l' architecture moderne en Hollande", *L' architecture vivante*, Winter 1925, 18.

26. Jacques Lucan, *Composition, Non-Composition*, 385.

27. Algra, *Concepts of Space in Greek Thought*, 36.

28. Alejandro Zaera, "Nuevas topografías. La reformulación del suelo," in *Otra mirada: posiciones contra crónicas*, ed. Manuel Gausa and Ricardo Devesa, (Barcelona: Gustavo Gili, 2010), 116-17.

29. Josep Maria Montaner, *La modernidad superada*, 32.

30. Aristotle, *Physis*, trans. W.A. Pickard, (Cambridge: The Internet Classics Archive, 1994), Section 2

31. Ibid.

observed in iconic projects like the Yokohama Ferry Terminal or the Rolex Learning Center in Lausanne.

The floor type we are analyzing in this dissertation generates a spatial understanding that cannot be reduced to either of the previous two. On the one hand, it is not a "chora", because the different slabs do not form an abstract receptacle in which any event can take place. On the other hand, it is not a "topos" either, because the slabs do not meld their individualities into a single continuous super-slab that can be understood as a singularized and singularizing substratum. As we have seen in this chapter (section 5.2), what we are dealing with is a collection of slabs that displays two fundamental characteristics. On the one hand, some of the slabs enter into resonance, generating a number of interlacements as a result. On the other hand, none of them holds a privileged ontological or topological position; rather, they are all ex-centric.

Unlike the discrete floor, and as we have seen in 5.1.1 (Nestings), each slab is unique in both form and position; and unlike the continuous floor, not only do the various slabs not merge completely, they generate sets and subsets. It is therefore a conception of space that simultaneously combines viscosity and interruption, relation and autonomy, and, as we will see in detail later, continuity and discretism.

As opposed to "chora" or "topos", we will refer to this spatial understanding using the Greek term "oikia". Traditionally, this expression has been associated with another very similar one: "oikos". Both have been translated as "house", in the most general sense of the word. Nonetheless, Xenophon[32] outlines a distinction that, although it was not entirely accepted by all Greek authors, is very useful in approaching the question at hand. The Greek philosopher asserts that the expression "oikos" refers to a house in the strict sense of a place of residence, whereas the expression "oikia" denotes not only the house but also the property it contains and its inhabitants. Based on this distinction, the word "oikia" would refer to a collection of elements of different natures and sizes whose coexistence and eventual interlacement would give rise to a specific spatial conception. It is formed not only by the house itself, but also the property it contains (animals, instruments, jewelry, furniture, etc.) and by its inhabitants (free men or slaves). It would therefore be a large composite of objects whose eventual interlacements over time would form what Xenophon defines as domestic space.

However, there is something else that adds even more interest to the expression, which in this case it shares with the term "oikos". Beginning in the 5th century BC several authors gave a new orientation to this expression, relating the nature of "oikos" with that of the polis. Pier Vitorio Aureli[33] explains each of them by referring to different concepts: "oikos", understood as an agglomeration of houses, and "agora", understood as a political space where decisions were made publicly. Later, the Roman city, or "urbs", substituted the political dimension of the polis with the economic dimension of the "oikos", thus coming to understand the city as pure "oikos" without agora – in other words, a mere agglomeration of houses. In addition, while the Greek polis was encircled by its perimeter walls to emphasize its unity, the Roman urbs was not designed to be enclosed; rather, it tended to expand as a way of organizing the territory.

In that sense, the expression "oikia" refers simultaneously to a domestic space and an urban space, both unfolding like a set of Russian nesting dolls. These spaces not only contain and are contained by other spaces simultaneously (as we can see in the case of 5.1.1.1 (Embedding / sec_3.0) or 5.1.4.6 (Matryoshka / sec_13.0), they also never appear as completely closed elements, despite remaining identifiable and extractable. "Oikia" is not produced from a passive receptacle ("chora") or an active substrate ("topos"); it is constructed from the co-existence of various groups and subgroups of objects of all kinds.

Therefore, we might refer to an ecological space – precisely the type of space characteristic of the floor disposition proposed by this dissertation. This floor disposition is inscribed in the pursuit of an ecological architecture – an expression that takes on a very different tone here than what we are used to: today, "*the ecological integrity of an architectural object is judged by means of a technical, extra-disciplinary artifact. But not by the articulation of the architecture itself.*"[34] Ecological space is not a tool intended to solve a natural crisis, it is a construct with the potential to manage an ontological crisis: the crisis of naturalism, positivism and, ultimately, the crisis of a hierarchical understanding of objects that still assumes the subject-object dichotomy. It is therefore an ecology understood in the sense Timothy Morton uses it: an ecology where there is no longer a division between nature and artifice, between substratum and element, between outside and inside. On the contrary, some objects maintain certain interlacements with one another, while at the same time they contain their own substratum, without the need to appeal to any common field to act as a "world". That is precisely the sense in which we use the term oikia, evoking its ability to group together and orchestrate all kinds of objects without distinguishing their nature, while operating from a multi-scalar perspective based on sets and subsets. The floor disposition we have proposed aligns with this ecological thinking, on the one hand, by establishing a formal approach based on a plurality of continuities that should be understood as contingent and temporary viscosities rather than relationships produced by an underlying substratum. The resulting space is no longer understood as a generic region or a unique position; instead, it is conceived as an ecological construct.

5.3.2 Heterogeneous space

In addition to being linked respectively to the three floor arrangements we have been discussing, the spatial approximations defined as chora, topos and oikos also respond to the separation between homogeneous space and heterogeneous space as described by Peter Eisenman.

Eisenman situates the origin of the concept of homogeneous space with Alberti, appearing as a space in which all objects exist in a consistent and calculable medium.[35] Consequently, this spatial structure embraces a mereology in which the parts

32. Keimpe Algra, Concepts of Space in Greek Thought, (London: Brill, 1995), 31.

33. Pier Vitorio Aureli, *The Possibility of an Absolute Architecture*, (London: MIT Press, 2011), 4.

34. Daniel Kohler, *The Mereological City*, (London: Transcript, 2016), 8.

35. Peter Eisenman, "Brief Advanced Design Studio", last modified October 2014, https://www.architecture.yale.edu/courses/advanced-design-studio-eisenman-0#_ftn3

obey the whole, and all the objects in the space are interconnected through universal and mathematical relationships. Mark Wigley defines this type of space as total and non-hierarchical:[36] a measurable and above all notational space, which was fundamental to the allographic conception Alberti introduced in architecture. As a result, homogeneous space emerges as a space where small actions can have large effects because they can easily be extrapolated by mechanical means: it is the space of control, transparency and domination characteristic of Modernity, which Eisenman exemplifies by Le Corbusier's free plan and by Mies's open plan. Homogeneous space is thus set up as the space characteristic of the discrete floor and, therefore, associated with Plato's chora.

Eisenman argues for the existence of another type of space, which he qualifies as heterogeneous. It responds to the concept of an "inconsistent multiple" – in other words, a non self-same repetition. Palladio and Loos are put forward as two of the first architects linked to this type of spatiality. Eisenman dedicates a book to the first case, arguing that

"the articulated architectural elements – portico, transition space, and central space, which are given letter (A,B,C) and color (white, gray, or black) notations in the following analysis – become dislocated from their supposed normative location as well as their meaning and become noniconic spatial inscriptions. These inscriptions often produce conditions where two or more notations become overlaid in a single space. The resultant space no longer has a simple or singular conceptual valence, as in homogeneous space, but rather takes on indeterminate characteristics."[37]

In Palladian villas, heterogeneous spatiality is built up through the superposition of different notational systems in the same space. Consequently, it appears as "different" or "other", both in the experience of the building and in its reading. Thus, the ideal condition of the uniform and universal space conceptualized by Alberti disappears, making way for spatial conditions that Eisenman describes as virtual.

Something similar happens with Adolf Loos's Raumplan. Eisenman introduces the Viennese architect using the evocative nickname "Mr. Heterogeneous".[38] As we saw in Chapter 2 (section 2.3.1), the floor layout in most of his work responds to a schema of slabs that is much more complex than the uniform horizontality of the discrete floor. Unlike the discrete floor, the superposition of different geometries within the same space provides the Raumplan with conditions of spatial heterogeneity based on an idea we mentioned above: that of an inconsistent multiplicity – i.e., multiplicity understood as a set of elements that cannot be reduced to a single universal notational system, as Alberti would suggest. Again, it is the case of a "non self-same repetition".

Although it seems like heterogeneous space should coincide with the Aristotelian topos, associated with the spatiality of the continuous floor, according to Eisenman this is not the case – despite the facilities provided by digital tools: *"while Alberti's notational systems transcribed a single design by a single author, computation has the capacity to produce multiple iterations that the designer must choose from."*[39] In that sense, computers function as generators of multiplicity, which should result in the production of an inconsistent multiple capable of calling into question the homogeneity claimed by Alberti. It seems logical to assume that the continuous floor associated with the "topos" – brought into play especially in the 1990s through the use of digital parametric tools – produces a heterogeneous spatiality.

However, and in spite of the fact that the continuous floor generates a positional singularity, which is lacking in the generality of the discrete floor, the former largely remains a homogeneous space. If we look carefully at the floors in Jussieu, Yokohama or the Rolex Center, we find that the constant variability that defines their slopes does not affect the homogeneity of their spatiality. If we understand homogeneity to mean the presence of a consistent, calculable medium that can be reduced to a single notational system, the unitary surface that characterizes the floor of the three aforementioned projects cannot be described in terms of heterogeneity precisely because of its nature as a continuum. As an underlying field of relations, and despite the positional multiplicity provided by its nature as a topos, because of its topographic condition the concept of a continuum does not allow for the appearance of the radicality of the "other", which is fundamental to achieving a non self-same repetition. However, Eisenman's aim is not to construct a heterogeneous spatiality based on extensive inconsistencies (as was the case with Postmodernism), but rather to provoke heterogeneity within an intensive cohesion.

Unlike the "chora" or the "topos", which are associated with homogeneous space, "oikia" takes on several of the characteristics that Eisenman attributes to heterogeneous space. In fact, the Usonian architect presents aggregation strategies as an appropriate method for dealing with this spatial problem. Although the framework used in our exercise cannot be defined through the concept of an aggregate – understood as a set of elements that have no other relationship to one another than their simple co-existence – there is a certain formal familiarity between both methods due to their shared use of concepts like collection, overlapping, projection, ex-centricity, etc. In any case, our exercise displays several complicities with heterogeneous space:

First, the floor disposition generated by the simulation is an ontological multiplicity, and not merely a positional multiplicity: it is, specifically, a collection of collections and not a single continuum. Unlike the discrete floor, it is not a multiplicity where each slab is a closed element; the slabs are open to interlacements that take place from the first instant of the process in 5.1.1.1 (Embedding / sec_3.0). Therefore, it is not a monadic multiplicity, but rather a cohesive multiplicity.

Second, this cohesion is not total or simply extensive, as

36. Mark Wigley, in conversation with Peter Eisenman, "Eisenman/Wigley X: The Problematic of Homogeneous Space", YouTube video (56:00), conversation on August 8, 2013, posted by "Columbia GSAPP", September 11, 2013, https://www.youtube.com/watch?v=0_b5COTxHuc&t=125s.

37. Peter Eisenman, *Palladio Virtuel*, (London: Yale University Press, 2015), 10.

38. Mark Wigley, in conversation with Peter Eisenman, "Eisenman/Wigley X: The Problematic of Homogeneous Space", YouTube video (58:00), conversation on August 8, 2013, posted by "Columbia GSAPP", September 11, 2013, https://www.youtube.com/watch?v=0_b5COTxHuc&t=125s.

39. Peter Eisenman, "Brief Advanced Design Studio", last modified October 2014, https://www.architecture.yale.edu/courses/advanced-design-studio-eisenman-0#_ftn3

would be the case for the continuous floor; it is partial and also intensive, since it includes remote relationships. A good example of this can be seen in 5.1.1.9 (Spiral / sec_14.4): there is an extensive clumping that responds to a partial consistency of a radial nature. At the same time, however, the set admits other clumpings and remote relationships, specifically perforations. In 5.1.1.6 (Serpentine / sec_11.4) and 5.1.1.8 (Ascension / sec_13.0) this type of micro-continuities also occur, although they are not radial as in the previous case or isotropic as in 5.1.1.7 (Esplanade / sec_12.2), but rather linear.

Third, a repetition occurs that is, specifically, a non self-same repetition. While it is true that we have based the mode of growth of the discrete floor on the concept of repetition, that repetition was simultaneously formal and positional. In the case of oikia, the repetition is based on difference, but it is not totalized by an underlying field of relations; rather, it is open not only to interruptions, but also to jumps.[40] The case of 5.1.2.3 (Fan / sec_11.2) respond to schemas of remote micro-continuities, where there are interruptions in their development but no jumps. On the contrary, in cases such as 5.1.2.5 (Sautéed / sec_14.2) the jump is evident since there is no intent to reestablish a prior continuity.

Fourth, although the space is measurable and calculable, it is impossible to reduce the set to a single notational system. In fact, representing this type of floor is extremely problematic: the superposition of geometries, the variable slope, and the autonomy and singularity of each part/clump require the co-existence of several coordinate systems that are not unified by any meta-system within the set. Although cases like 5.1.2.2 (Barcode / sec_8.6) could be approached from the repetition of a coordinate system like that of the discrete floor, the complexity of models like 5.1.2.3 (Hybrid / sec_11.4) require the overlap of several different notational systems.

In short, we are dealing with a space that, despite being produced using computational algorithmic tools, is capable of generating enough indeterminacy to allow for the constant emergence of what is different or other – elements that are absent in the homogeneous spaces of "chora" and "topos". In contrast, "oikia" produces a spatiality that we can define as post-digital, precisely because it accepts the digital based on the etymological radicality of the word,[41] and not just through its instrumental thematization.[42] In fact, the heterogeneity obtained through the simulation is constructed based on a homogeneous space: the slab from Lake Shore Drive. This shift towards the heterogeneous, beginning from the homogeneous, occurs in the light of a renewed understanding of the discrete/continuous binomial: whereas the discrete floor and the continuous floor respectively emphasize one category over its opposite, the present exercise combines the discrete nature of strata with the continuous nature of fields, as we will see below. As such, the resulting floor disposition is no longer "continuous", "discrete" or "continuous and discrete", but "continuous while discrete".

40. In this context, interruptions should be understood in this context as a discontinuity that occurs in a flow. Once the interruption is left behind, the flow recovers its former pattern – i.e., it reestablishes the same type of continuity. In contrast, a jump can also bring about a change of pattern.

41. aquesta nota estava buida

42. Leach quote there is no digital space / Retsin

5.3.3 Distinct clumps

Both the discrete floor and the continuous floor frame the discrete/continuous binomial through an asymmetric framework that emphasizes one of the two categories, without completely eliminating its opposite. As we saw in the case of the skyscraper, the former depends on countable elements to express the dominance of the discrete, leaving the continuous in the background under the concept of progression. On the contrary, in the latter case continuity is prioritized through the idea of topography, whereas the discrete is reduced to the idea of uniqueness.

The floor arrangement described in this chapter (section 5.2) is called "continuous while discrete" because both formal categories are, on the one hand, essential to understanding the set and, on the other, necessary to one another for the full development of both. This phenomenon is not the result of a mere additive exercise, as is the case with the "continuous and discrete" floor described in Chapter 2 (section 2.3). It is the result of an operation of interlacement that causes its spatial simultaneity.

The continuous while discrete floor is discrete not only because each of its slabs is countable, but also and above all because each slab is different. An understanding of the discrete as different radicalizes this condition, since it is no longer focused only on separating edges at an extensive level (as is the case with a skyscraper) but also on separating content at an intensive level. Repetition is no longer an operative mechanism, making way for an exercise in distinction that functions both formally and positionally. This phenomenon occurs from the first instant of the simulation described in the previous chapter (section 4.5): in 5.1.1.1 (Embedding / sec_3.0) each element is slightly different, both in its geometry in plan and in its positional coordinates. Throughout the process, these differences intensify. This is already very evident in 5.1.2.3 (Hybrid / sec_11.4). Consequently, and unlike the discrete floor disposition in Lake Shore Drive, it cannot be described in terms of a progression: the different elements are not organized according to the continuity of a global pattern; at most, they generate complicities that are exceptional, contingent and temporary.

The experimental architectural exercises we described in Chapter 3 (sections 3.3.2 and 3.3.3) as complementary to this dissertation maintain some differences when it comes to their discrete condition. Although those exercises are announced as a return of the discrete, the category is exercised in terms of countability, but not in terms of difference. If we analyze projects such as Polynomio by José Sánchez or the competition for the façade of Jyvaskyla's Ruusupuisto Museum by Navasaityte, we see that the elements in play are, in addition to countable, positionally different, but formally repeated. The same cannot be said for Retsin's pavilion, built for the Bio-Tallinn exhibition at the end of 2017. It is made up of a series of pieces that, although they maintain a certain familiarity from one to the next, cannot be analyzed from the standpoint of formal or positional repetition; they must be approached based on the singularity of each piece. However, the horizontality of the set does not imply, as is also the case with Diamonds, the renovation of an architectural diagram that still relies on Le Corbusier's Dom-ino schema. Projects that are older and much more emblematic, like Habitat 67 or the Nagakin tower, do not work with the discrete from the standpoint of formally difference, but essentially from the point of view of countability. In terms of the repetition of slabs typical

of skyscrapers, they are only separated by their positional difference, not by their particular form. In all these designs, there is a certain trust in mass-production strategies, understood as the ability to solve an architectural ensemble through the systematic production of a single object or a limited number of them.

However, paradoxically enough, the value of difference that radicalizes the discrete condition of the skyscraper is constructed by way of an exercise rooted in its opposite category: continuity. Effectively, the discrete while continuous floor is not formed based on a monadic aggregate. Unlike the anachronistic and contradictory eclecticism of Postmodernism, the different parts that constitute the new floor arrangement are linked by relationships of continuity. Whereas in the continuous floor, continuity is understood as topography, in the present exercise it is understood as a clump. While the former is an underlying, continual and holistic field of relations, the latter is a set of contingent, temporary and local interlacements. Similarly to what happened with the shift from the discrete as countable to the discrete as different, the continuous as a clump radicalizes the sense of continuity when compared to the continuous as topographical. If we understand the concept of continuity as a relationship between elements whose limits are identical, the question arises as to what those elements are in the case of a topography. Precisely because a topography is established as a simple element whose separation into parts is problematic, the continuous floor provides a discrete reading from this point of view, although it is secondary compared to the dominance of continuity.

And yet, how is it possible to establish a relationship of continuity between elements if there is only one of them? The concept of a clump, unlike that of topography, avoids this aporia by admitting the presence of various elements. As such, continuity operates in a much more evident way by maintaining the autonomy of each element, thus demonstrating its unifying purpose and ultimately being constituted as a single element.

Throughout the simulation, there are three cases that are emblematic of this clumping. Neither 5.1.1.6 (Serpentine / sec_11.4) nor 5.1.1.8 (Ascension / sec_13.0), nor 5.1.1.7 (Esplanade / sec_12.2) can be described in topographic terms due to the local condition of their scope as a continuity. That does not mean that their continuous condition is diminished. Just the opposite is true, because of their nature as clumps – i.e., because of their ability to maintain the autonomy of each of the elements that participate in that relationship of continuity. Otherwise, we could not call it a relationship, or at most, it would be a purely tautological relationship. In this way, clumps are established as micro-continuities, in which the limits of several elements become identical. The case of 5.1.1.3 (Junction / sec_9.4) is one of the most obvious examples of this phenomenon.

If we look again at the projects from the state of the art section of this dissertation, we will see that they articulate continuity based on strategies of juxtaposition. Cases like Daniel Kohler's House of Frames or Philippe Morel's stucks join the edges of their elements without making them identical; in that sense, it would be more fitting to refer to contiguity as opposed to continuity. In the latter case, another type of continuity is established, which we might define as low-resolution continuity, in which we catch a glimpse of a certain ascending or descending pattern, which is nonetheless based on a staggered pattern.

In short, and as we can see as well in a basic floor design proposal founded on the results of the simulation (Fig 5-2), the discrete while continuous floor does not consist of the sum of discrete conditions and continuous conditions, as in the discussion on Le Corbusier's Strasbourg Congress Hall from Chapter 2 (section 2.3.2). It is not a contingent coexistence, but a necessary one: each slab is discrete because it is continuous, and continuous because it is discrete. Indeed, it is discrete in that it is different from the others, and it is different because it distinguishes itself by establishing continuities with other slabs. In turn, it is continuous because it is clumpy, and it is clumpy because it can maintain the discrete condition of its parts by preserving their autonomy. The discrete and the continuous are thus like two sides of the same coin: the presence of one is necessary for the presence of the other. As such, the discrete/continuous formal binomial is articulated through a framework that contrasts with the floor dispositions we studied in Chapter 2 (sections 2.2.4 and 2.4.4).

They admit the coexistence of both formal categories, but in an asymmetrical way: one category is privileged over the other. Through the concepts of difference and clumping, the discrete while continuous floor carries out two operations which affect our understanding of that binomial.

First, it radicalizes the components, setting aside the concepts of countability and topography, respectively.

Second, it not only orchestrates them simultaneously and symmetrically, it also establishes their co-existence as necessary for the radical development of each of the two formal categories.

This formal peculiarity emerges as one of the most unique disciplinary features of the discrete while continuous floor associated with subjectless objects, and it also one of the most relevant contributions in relation to the floor dispositions described in Chapter 2 (sections 2.2.4 and 2.4.4).

The production of the continouous while discrete floor has been elaborated through a typology of urban architectonical production based on the sameness of the Lake Shore Drive, understanding the concept of typology not as it is presented by Quatremère de Quincy,[43] but in the sense that Anthony Vidler develops in his seminal article "The Third Typology".[44] The next chapter will conclude this research by associating the continuous floor, the discrete floor, and the discrete and continuous floor with Vidler's three typologies, then proposing a fourth typology for the discrete while continuous floor.

43. Quatremère de Quincy defines the notion of "type" as a pattern that is shared by a set of models. R. Moneo explains it by writing that for Quatremère de Quincy, "type expressed the permanence, in the single and unique object, of features which connected it with the past, acting as a perpetual recognition of a primitive but renewed identification of the condition of the object."
Rafael Moneo, "On typology", *Oppositions*, no. 13 (1978), 28.

44. Anthony Vidler, "The Architectural Uncanny: Essays in the Modern Unhomely," in *Architecture Theory since 1968*, ed. Michael Hays, (New York: Columbia Books of Architecture, 2000), 751.

Figure 5-5: Images Continuous while Discrete Floor, Jordi Vivaldi Piera, 2018.

The Fourth Typology

Chapter VI

VI. The Fourth Typology

The "continuous while discrete" floor proposed in this exercise belongs to a singular typology of urban architectural production. This typology does not rely on elements external to the architectural object; the foundation for its re-composition is the sameness of the architectural object itself. In the case of Mies's Lake Shore Drive building, the qua talis skyscraper acts simultaneously as an emitter and receiver of novelty: its being is not exhausted by the particular relationships that occur in the form of a common skyscraper. Rather, as we have seen during the resonant piling process, it is capable of appearing in multiple and unpredictable formal configurations. Of those configurations, only some make a disciplinary contribution – in this case in relation to the problem of the floor. And only some (not necessarily the same ones) present the necessary conditions of habitability for occupation. In other words, although each formal configuration possesses particular sensual qualities[1], they correspond to the same real object[2], which is never fully deployed through those sets of sensual qualities.

This reflection is based on two arguments. On the one hand, the typology of architectural production based on objectual sameness joins the three typologies coined by A. Vidler in his seminal essay "The Third Typology",[3] culminating the process of disciplinary introspection he described. On the other hand, the understanding of the object as a real element capable of developing different sensual qualities is but one of the four ontological tensions proposed by Graham Harman in his book The Quadruple Object.[4] Harman presents objects as possessing a reality which, since they can never be exhausted by their individual relations, always has unknown depths that may emerge in unpredictable configurations – what he calls the "weirdness" of objects.

The ability of an object to act, through its sameness, as a source of disciplinary novelty gives rise to the appearance of a new typology of urban architectural production, which we will call the fourth typology.

6.1 Nature, technology, city, object

At the end of the 1980s, from the pages of Oppositions 7, Anthony Vidler announced the advent of a new typology in architectural production. It was no longer based on nature or technology[5]; rather, it would be based on the city itself. Vidler was thinking of Aldo Rossi's reflections on the autonomy of architecture and the city when he proposed that, ultimately, the interactive subject of the type was the city itself, understood as a whole. In consequence, based on this ontology of the city, he conceptualized an architecture that no longer established metaphorical relationships with elements external to it, (as was the case with the typologies of nature or technology) but rather created the typological analogies on which it depended. One of the most emblematic cases of this is Rossi's cemetery in Modena. House, city, tomb and cemetery are established as urban typologies, whose interaction gives rise to the Italian architect's design. There are no metaphorical references to any world outside the urban scenario; it is the discipline itself that provides the necessary resources for architectural production.

Vidler called this phenomenon the third typology: it followed the first and the second, conceived by Vidler as typologies based on nature and technology respectively. As Vidler himself asserted, "*in the first two typologies, architecture, made by man, was being compared and legitimized by another 'nature' outside itself.*"[6]

In the first case, beginning in the mid-18th century, nature was presented as an element for legitimation through two essential processes. On the one hand, appealing to an ideal and perfect geometry (revealed by Newton through his Physics), to which the architectural elements were compared, as Laugier did with his "Primitive Hut". And, on the other hand, dividing and classifying buildings and their elements into complex taxonomies (Fig. 6-1) comparable to the classificatory systems developed Buffon and Linnaeus, later including Cuvier and his focus on function.

In the second case, from the end of the 19th century, architecture became a strictly technical matter, meant to operate with the precision and efficiency of a machine. Architecture thus be-

1. Based on Husserl, Graham Harman defines sensual qualities as the "qualities that can be known through the senses, in opposition with the real qualities, which can never appear sensually, but only to the intellect".
Graham Harman, *Object-Oriented Ontology: A New Theory of Everything*, (London: A Pelican Book, 2018), 157.

2. Graham Harman defines the real object as the "object that withdraws from all experience, in opposition to the sensual objects that exists only in experience".
Graham Harman, *The Quadruple Object*, (Winchester: Zero Books, 2010), 49.

3. Anthony Vidler, "The Third Typology," in *Architecture Theory since 1968*, ed. Michael Hays, (New York: Columbia Books of Architecture, 2000), 287.

4. Graham Harman, *The Quadruple Object*, 8-9.

5. Eisenman also supported this theory: "Whether the appeal was to a divine or natural order, as in the fifteenth century, or to a rational technique and typological function, as in the post-Enlightenment period, it ultimately amounted to the same thing – to the idea that architecture's value derived from a source outside itself. Function and type were only value-laden origins equivalent to divine or natural ones."
Peter Eisenman, "The End of the Classical: The End of the Beginning, the End of the End," in *Architecture Theory since 1968*, ed. Michael Hays, (New York: Columbia Books of Architecture, 2000), 527.

6. Vidler, "The Third Typology," in *Architecture Theory since 1968*, 291.

came "*equivalent to the range of mass-production objects, subject themselves to a quasi-Darwinian law of the selection of the fittest.*"[7] Buildings became machines intended to serve human needs in harmony with specific economic criteria (Fig. 6-2).

Vidler's third typology, however, no longer looks to an element external to the architectural discipline for its legitimacy: "*Columns, houses, and urban spaces, while linked in an unbreakable chain of continuity, refer only to their own nature as architectural elements, and their geometries are neither naturalistic nor technical but essentially architectural.*"[8] The city replaces nature and technology as guarantors of architectural production; moreover, it also begins to be understood in a completely different way. In the first typology, the city was understood as a forest that had to be "domesticated" via a gardening effort: the chaos of an apparently disordered nature had to be regulated through the geometric purity of its underlying order. In the second typology, the machine-buildings of the new productive garden dissolved like grains of sand in a green ocean: architecture was reduced to a series of mechanisms dispersed across a landscape in which the city, as artifact and polis, virtually disappeared (Fig. 6-3). However, in Vidler's the third typology, there is a clear desire to extend the form and history of the city. In contrast to the fragmentation produced by the previous typologies, Vidler presents the city as a whole, where past and present are revealed by the urban physical structure. Any element that is not tied to the nature of architectural form is eliminated, including any functional or social allusions.

Through his three typologies, Vidler describes a process of interiorization in architectural production beginning in the mid-18th century. With the transition from a typology based on nature to a typology based on technology, there is an initial definition of the typological framework, shifting from the domain of the "natural" to the more limited domain of the "artificial". The frame of reference is no longer a global and holistic framework, like nature would be. Rather, it is limited to the particular framework of what is produced by humans, specifically technical objects. However, in both cases, architecture is still legitimized by areas of knowledge that are external to the discipline. Precisely for this reason, Vidler effects a second reduction of the typological framework with the proposition of a third typology: the city emerges as a new sphere for architectural production. However, there is a fundamental difference between these two reductions: in this second move, for the first time, architecture becomes an autonomous field of knowledge. This internalization process culminates with architecture's liberation from external references. The main proponents of this new typology are not nostalgic worshippers of the past, nor are they critical of technological progress or the virtues of nature. On the contrary, they are people who "*have directed their design skills to solving the questions of avenue, arcade, street and square, park and house, institution and equipment in a continuous typology of elements that together coheres with past fabric and present interventions to make one comprehensible experience of the city.*"[9]

With the third typology, Vidler limits the scope of architectural production to a strictly disciplinary framework. However, he continues to lend validity to a fundamental principle: the architectural object still looks outside itself for its source of legitimization. What Vidler does is simply define the meaning of that "outside": in the first two typologies, "outside" meant outside in the disciplinary sense, while in the third typology the term "outside" takes on a purely objective sense. In both cases, the production of the architectural object takes place through elements that are external to it – whether or not they belong to the architectural discipline.

Precisely for this reason, the exercise presented in this dissertation could not be classified under any of these three typologies: it does not begin with a mystification of nature or an exaltation of the world of technology, nor does it take the different elements of the city as the leitmotiv for its development. On the contrary, it is the sameness of the architectural object that is established as a typology for architectural production. In that sense, the roles of emitter and receiver overlap: there is no element that receives novelty through an external emitter: nature, technology, the city. Instead, both roles collapse in a single object: in this case Mies's Lake Shore Drive building. And yet, the paradox is evident: how can an object -in this case an architectural object- be the source of its own difference? Or, to be more specific, under what ontological conditions should we posit the concept of 'object' in order to assert that its sameness produces difference?

6.2 The ontological abyss of Lake Shore Drive

According to Graham Harman, an object is "anything that has a unified reality that is autonomous from its wider context and also from its own pieces."[10] This is no doubt a generous definition, since an object could be anything from a tree to an atom, a song, an army, a bank, a sports franchise, a fictional character, etc. The extensive physical existence of an object is irrelevant to determining its condition as an object. Although this definition might be seen as similar to that of substance, it is important to highlight certain differences. According to Harman, substance has been defined in the past as "*the smallest, the simplest, the most eternal, the most natural, or the most real thing in the world.*"[11] Yet, for Harman, none of these characteristics makes something an object: to that effect, the only important thing is the simple fact that it possesses a unitary reality that cannot be reduced neither to its effects nor to its pieces.

From here, Harman makes a distinction that is fundamental to understanding how the sameness of an object is capable of producing difference. He distinguishes between two modes of being for objects: real objects and sensual objects, with the premise that every level of reality has two sides. Real objects are those that exist independently of us, similar to Kant's things-in-themselves. In that sense, for Harman, real objects are inaccessible, constantly withdrawing from any relationship: "*by definition, there is no direct access to real objects. Real objects are incommensurable with our knowledge, untranslatable into any relational access of any sort, cognitive or otherwise. Objects can only be known indirectly. And this is not just the fate of hu-*

7. Ibid.

8. Ibid.

9. Ibid.

10. Harman, *The Quadruple Object*, 116.

11. Graham Harman, *Towards Speculative Realism*, (Winchester: Zero Books, 2010), 173.

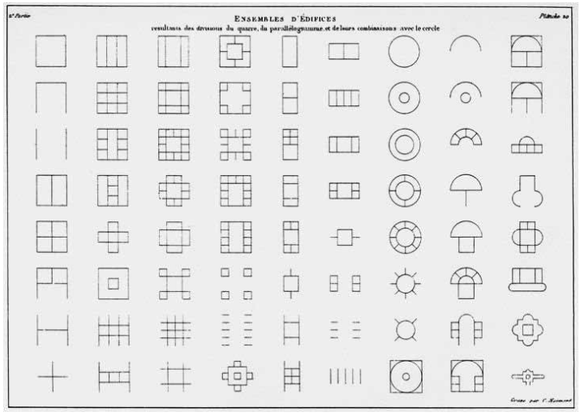


Figure 6-1: Precis des leçons d' architecture, J.N.Durand, 1975

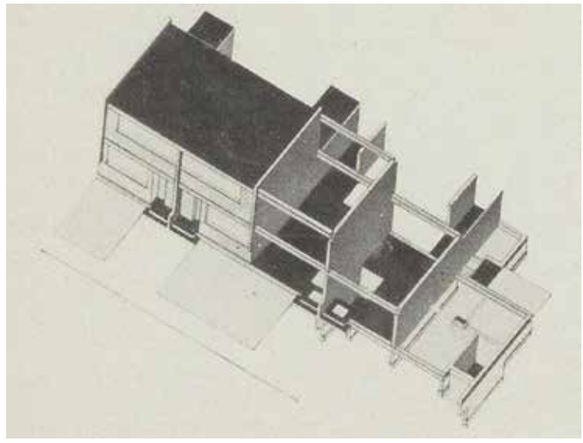


Figure 6-2: Constructive Schemes of a Housing Unity, Walter Gropius, 1927.

Figure 6-3: Ora questo è perduto, Aldo Rossi, 1975

mans – it's the fate of everything. Fire burns cotton stupidly..."[12] Therefore, in every object there is a background of sameness that is incomprehensible to other objects, regardless of their human condition.

Along with real objects, cut off from any access, there are also sensual objects. These objects depend on us – that is, they depend on how we access them: "*We have immediate access to the sensual object from the moment we intent it, since that is all it takes for a sensual object to exist.*"[13] They are what Kant and phenomenology would call phenomena. While real objects are always hidden, sensual objects can only be encountered through experience. Nonetheless, these two categories share three relevant similarities: both are autonomous units; both are irreducible to an accumulation of properties; and both are polarized around two different types of qualities. Those qualities are, on the one hand, real (essential and intelectual) qualities and, on the other hand, sensual (accidental and sensitive) qualities.

Summing up, according to Harman there are two types of objects: real objects, which are removed from experience, and sensual objects, which exist only in experience. In addition, there are two types of qualities: sensual qualities, which are found only in experience, accidental and constantly changing; and real qualities, which are accessible only through the intellect and essential to the constitution of the object. From there, Graham Harman organizes a quadruple structure with four poles: real objects, sensual objects, real qualities, and sensual qualities. Four relationships emerge between these poles, each involving an object pole and a quality pole: real object with real quality or sensual quality; and sensual object with real quality or sensual quality. Of these four tensions noted by Harman, in this research we are particularly interested in what the philosopher calls "space", which he describes as "*the tension between the real objects that lie beyond all access and their sensual qualities that, to exist, must be found.*"[14] Thus, according to Harman, space would be the tension established between a real object and its relations with its sensual qualities, since relating with an object only provides us with a specific range of sensual qualities, not the thing itself. In that sense, space is simultaneously both distance and proximity: on the one hand, it is distance because the real object, isolated in an inaccessible locus, can never be grasped; on the other hand, it is proximity, because it appears through the contact we make with the sensual qualities. This case is very different from the tension between a sensual object and a sensual quality: they are united ahead of time, one implies the other, and they give rise to realities like our everyday experiences: that is, routine, predictable realities without mystery or open-endedness. In contrast, a real object and sensual qualities never meet, unless it is through a fusion: according to Harman[15], the concept of fusion means that the sensual qualities are freed from their attachment to a particular sensual object, entering into the orbit of a withdrawn real object, an invisible sun that subjects them to its will.

There are two very clear examples of this phenomenon. First, works of art. The sensual qualities of a work of art do not merely refer to the sensual object that is on display; they refer to a world that is more like an abyss – in other words, a mystery that is never completely resolved because we cannot access it. Second, Heidegger's tools. Heidegger highlights that there are certain objects that we only perceive when they fail. Their sensual qualities intersect with us – like the ground that we perceive through our senses – but we can never really access their reality because we take them for granted, except when they fail. To describe the phenomenon revealed by both examples, Harman uses the word "allure". It refers to "*a special and intermittent experience in which the intimate bond between a thing's unity and its plurality of notes somehow partially disintegrates.*"[16] At that point, the sensual qualities no longer refer to the sensual object with which they are compressed; rather, they refer to a withdrawn real object to which they can only allude indirectly, since there is a veritable ontological abyss between them.

Ontology and architecture are two distinct disciplines, each producing its own body of knowledge and terminological definitions. Consequently, any displacement from one to the other cannot take place literally. However, that does not mean an approach in architectural theory cannot rely on a specific ontological structure, as long as it is able to interpret it throught architectural lenses. Otherwise, we would be dealing with a merely metaphorical connection, whose symbolism would mask the structural nature of the complicity.

In this case, there is an extremely significant connection: the theoretical proposal of a fourth typology centered on the sameness of the object itself makes the object a fundamental element. Consequently, an ontological approach like the one we have presented here is essential to understanding its ability to produce novelty without appealing to external entities. It is not a relationship of inter-disciplinarity, but rather trans-disciplinarity: in other words, the reading of ontological structures based on patterns inherent to architecture.

In this dissertation the real object is Mies's building on Lake Shore Drive (Fig 6-4)), and the novelty resulting from its sameness is a floor disposition that is continuous while discrete instead of discrete. As Harman points out, the sensual qualities are generally compressed into the sensual object, and in that sense the "conventional" perception of Lake Shore Drive becomes a routine experience: the building becomes an internalized and habitual object, similar to Heidegger's tool-being.[17] As long as Lake Shore Drive remains a useful object "ready-to-hand", its presence goes unnoticed. Objects in this situation "*withdraw into a subterranean background, enacting their reality in the cosmos without appearing in the least.*"[18] Fundamentally, our conscious observations of objects make up a small portion of our lives: in general, objects withdraw into a shadowy, subterranean realm sustained by our conscious activity, without making us aware of them explicitly. This phenomenon is the result of the

12. Graham Harman, interview by Skepoet, *Disloyal Opposition to Modernity* (blog), June 1, 2012, http://disloyaloppositiontomodernity.blogspot.com/2012/06/marginalia-on-radical-thinking_1.html?q=graham+harman.

13. Graham Harman, *Prince of Networks*, (Melbourne: re.press, 2009), 203.

14. Harman, *The Quadruple Object*, 100.

15. Ibid, 99.

16. Graham Harman, *Guerrilla Metaphysics: Phenomenology and the Carpentry of Things*, (London: Open Court, 2005), 143.

17. Graham Harman, *Tool Being*, (London: Open Court Publishing Co, 2002), 31.

18. Harman, *The Quadruple Object*, 35.

Figure 6-4: Lake Shore Drive, Mies van der Rohe, 1951

compression between sensual qualities and the sensual object. The real object, however, remains withdrawn, although eventually its sensual qualities may detach from their sensual pairing to allude indirectly to the real object. This indirect access "is achieved by allowing the hidden object to deform the sensual world, just as the existence of a black hole might be inferred from the swirl of light and gases orbiting its core."[19] Indeed, in these circumstances, the real object becomes a kind of invisible sun that, through a series of deformations, separates the sensual qualities from the sensual object to which they were attached. One of the most obvious examples of this "gap" between sensual qualities and real objects comes in H.P. Lovecraft's stories. The descriptions of the mutants that feature in his horror stories often acknowledge their inability to grasp the totality of the real object they are describing. Faced with the idol Cthulhu, the real object never appears present. However, that does not mean there can't be an indirect access to that real object – unlike Kant's noumenon. That is precisely what an allusion does: it points towards an object without making it explicitly present.

> *"If I say that my somewhat extravagant imagination yielded simultaneous pictures of an octopus, a dragon, and a human caricature, I shall not be unfaithful to the spirit of the thing... but it was the general outline of the whole which made it most shockingly frightful..."*[20]

As Graham Harman[21] points out again, when Lovecraft refers to "the spirit of the thing" or the "general outline", he is alluding to the real object, since both expressions never come to crystallize as a palpable sensual object. Under no circumstances does Lovecraft present the real object – the idol Cthulhu – directly. That does not mean that he presents it in a vague and entirely indeterminate way, nor does it imply that he considers any attempt at approximating it to be disloyal. On the contrary, Lovecraft offers a series of known physical qualities like dragon, octopus and humanoid, while also referring to an inaccessible unit (the spirit of the thing or the general outline) with the ability to embrace and organize all these characteristics. The relationship established between the real object and its sensual qualities is comparable to a black hole and its ability to deform rays of light despite not being a visible object. Harman refers to this tension as "space": "*For it embodies the fact that objects spatially removed from us are both absolutely distant (since they are not directly melted together with us), but also near to us insofar as they inscribe their distance in directly accessible fashion.*"[22]

In the case of this dissertation, we have followed a similar method; however, in this case, we have assumed the presence of a gap between the real object and its sensual qualities. In that sense, the sensual qualities that are attached to the sensual object consist of the Lake Shore Drive building as we have incorporated it into our own imaginary. The skyscraper as an object tends to go unnoticed and is rarely thematized, because in our daily routine we take its operativity for granted. Unlike a Platonic approach, our exercise does not propose accessing the real object (what Plato would call the eidos or archetype) directly. On the contrary, we assume that the real object cannot be accessed directly, whether through the intellect or otherwise. As we have seen, however (and unlike the Kantian noumena), the real object can be accessed indirectly. This dissertation focuses on separating the sensual qualities from the sensual object, not in order to access the real object directly or indirectly, but to study which other sets of sensual qualities exist in the same real object. It is precisely from this point of view that we can talk about a fourth typology in the sense established by Vidler: the architectural object itself takes on the role of architectural producer, since in certain circumstances it is capable of offering different sets of sensual qualities, beyond what our routine experience can provide.

The resonant piling process involving the different existing slabs undoes the adherence between the sensual object and its sensual qualities to bring out new sets of sensual qualities from the same real object. In this case, the studies developed at Fillings (section 5.1.3), Intersticialities (section 5.1.4) and Silhoueetes (5.1.5) are particularly important, because they are not just realted to the floor, but they also indicate other spatial qualities related to the notion of types (in the sense of the term according to Quatremère de Quincy and explained at the end of the Chapter 5 (section 5.5.3)). Throughout the process, we can observe the presence of several types that are already familiar to us, specially in the study of the contour in 5.1.5 Contours: the tower in 5.1.5.1 (Vibration / sec_3.0), the mountain building in 5.1.5.7 (Pic / sec_13.4), the mat-building in 5.1.2.5 (Sautéed / sec_14.2), etc. They are all set of sensual qualities of the real object Lake Shore Drive building. What, to some extent, seem to be autonomous and distinct types (the tower-building, the mountain-building, the mat-building), become actually "instants" within a larger process. However, in all cases there is an effect of "weirdness": on the one hand, the new object is different from the sensual object we were accustomed to perceiving; but at the same time, it bears a certain familiarity with the original object and with the other sets. This weird feeling of familiarity is a result of the elevated presence of three formal aspects throughout the process. First, the maximum size and position of the holes in the slabs is almost always the same. Second, the same is true for sides of most of the slabs: they may form interlacements with one another, but the dimensions of their length and width are identifiable in nearly all the configurations. Third, there are certain organizations of slabs that are repeated in most of the instants – particularly the vertical ones involving at least five slabs. Moreover, if we look beyond the configurations as they are presented here and we imagine extending the façades and pillars of each of the floors to close off the volume and ensure the stability of the whole, the weirdly familiar effect is even stronger: in these new sets of sensual qualities, it is possible to recognize the sensual object Lake Shore Drive through the thickness and color of the window frames, the color of the glass, the size of the pillars, etc. despite the disciplinary novelty they represent. It is precisely this effect of familiarity that occurs between the different sets of sensual qualities – the "spirit of the thing" or the "general outline" Lovecraft described – that emerges as an allusion to the real object, which is indirectly indicated. The similarity of the real object Lake Shore Drive to the "spirit of the thing" of the idol Cthulhu, or to a hypothetical "invisible sun", is strictly metaphorical. Its value lies in facilitating the understanding of something that is performative, which is at the heart of this dissertation: the production of disciplinary novelty based on the sameness of the object itself, and, in particular, in relation to the problem of the continuous and discrete floor. This contribution does not function through its symbolic value (which is the case for Lovecraft's descriptions intended to produce terror). The resonant piling process we designed has no value as a metaphor for disorder or chaos, nor is the aesthetics of "stacks" it seems to suggest a relevant question for this dissertation.[23] For that very reason, the exaltation of the object which occurs in this text is of a very different nature from that of deconstructivism or minimalism. In the first case, deconstructivism advocates for an elementarist and volumetric fragmentation[24] of a supposed original object that is incompletely present. The deconstructivist object always refers to a complete object that can be accessed directly and which it simply presents as "fractured" – in other words, "*destabilized and dislocated, not by an exterior action, but from the interior as if infected by a parasite.*"[25] However, this fracture occurs in an aesthetic and metaphorical sense, because the performativity of the building itself is not compromised. In the second case, as Barbara Rose describes it referring to the work by Donald Judd and Robert Morris, in minimalism "the thing, thus, is presumably not supposed to mean other than what it is; that is, it is not supposed to be suggestive of anything other than itself."[26] In that sense, a minimalist work of architecture appears as a finished, closed off and resolved object. There is no possibility of openness either toward the exterior or the interior: that would be a fetishization of the sensual object – i.e., a metaphorical monumentalization of its sensual qualities. On the contrary, during the process of resonant piling undertaken in this exercise, the importance given to the concept of stacking is strictly methodological. Of course, aesthetic and symbolic readings of the formal configurations are possible (Fig. 6-5), and while these readings may be the subject of future research, it is essential to emphasize that the value of the results obtained here is performative: as we have seen, the qualities that have been obtained not only produce formal novelties, but novelties in terms of how we operate within the building itself. The fourth typology thus emerges as a mechanism for architectural production that operates simultaneously, in this exercise, in two directions. First, it functions introspectively, because as we have seen, it generates novelty by delving into its own sameness – in other words, focusing on the interior of the object itself as opposed to the exterior. Second, it also functions extrospectively, because this novelty does not (only) affect each user's internal "cogito" (via symbolic or aesthetic resources, which we have left for future study). On the contrary, in this exercise there is an alteration of the building's "performance", the consequences of which reach beyond strictly internal or intellectual aspects of the user to effect their psychomotricity.

6.3 Continuity and discretism as typologies

The continuous/discrete formal values are not only associated with certain modes of operating in space; they also establish complicities with the types of architectural production Vidler described.

The continuous floor ties in with the first of his three typologies – i.e. to a fundamental order based on nature. If we analyze the main cases of the continuous floor seen in Chapter 2 (section 2.4.4), we find that this analogy is not built on allusions to a perfect geometry or to a Linnean exercise in classification, as was the case in the 18th century according to Vidler. On the contrary, the reference to nature is based on similarities in appearance, which in some cases respond to a desire for mimesis with the surrounding natural environment. The projects for Yokohama and Agadir are paradigmatic in this regard.

In the first case, the ferry terminal is generated based on a gently warped roof that alludes to the waves of the surrounding sea, although it could also refer to a topographical extension into the water, like a peninsula. Moreover, in the case of Yokohama, the reference to nature is also of a procedural nature. It is based on the concept of phylogenesis, understood, as Kenneth Frampton described it, as the "transformable evolutionary system" used by FOA in the design.[27]In that sense, as opposed to the selection of an arbitrary figure, the geometric framework for the project is the result of an evolutionary process of morphogenesis.

In the second case, the Agadir Convention Center proposes a sunken public space whose surface blends in with the dunes of the surrounding desert. As Koolhaas writes in SMLXL, "*the heterogeneous elements of the convention center – auditoriums, conference rooms, foyers – form artificial dunes, a seamless continuation of the surroundings.*"[28]

In the same book, the architect juxtaposes an image of the project with a photograph of an empty desert,[29] demonstrating the link between the two morphologies. In that sense, it is also significant how the floor of that level is represented in plan,[30] allowing the dotted line used to represent the surroundings to be introduced into the project without acknowledging any limit.

In nearly all the cases of the continuous floor disposition, the reference to nature occurs through the concept of topography. Aside from Wright's Guggenheim, where the reference is still natural, although it is through the idea of a spiral, projects such as SANAA's Rolex Center, Koolhaas's Jussieu library or even the Mercedes Benz Museum by UNStudio can be explained through topographic formulations, thus evoking a "mountainous" imaginary.

19. Graham Harman: *Weird Realism: Lovecraft and Philosophy*, (Winchester: Zero Books, 2016), 238.

20. Howard Philips Lovecraft, *The Call of Cthulhu*, (London: Createspace Independent Publishing Platform, 2017), 38.

21. Graham Harman: *Weird Realism: Lovecraft and Philosophy*, 237.

22. Ibid., 239.

23. The Best Product Company Buildings by Site Architectures is a very obvious case of ironic use of the piling aesthethics, rather than a performative one.

24. Vicente Esteban, "Forma y composición en arquitectura deconstructivista", (PhD thesis, Escuela Técnica Superior de Arquitectura de Madrid, 2004), 46.

25. Jacques Lucan, *Composition, Non-Composition*, trans. Theo Hakola (Oxford: EPFL Press, 2012), 541.

26. Barbara Rose, "ABC Art", in *Minimal Art: A critical anthology*, ed. Gregory Battcock, (London: University of California Press, 1995), 308.

27. Kenneth Frampton, *Modern Architecture: A Critical History*, (London: Thames and Hudson, 1992), 360.

28. Rem Koolhaas, *SMLXL*, (New York: Monacelli Press, 1995), 382.

29. Ibid.., 380.

30. Ibid.., 387.

Whereas the continuous floor is associated with Vidler's first typology, the discrete floor fits in with the second. Today the world of technology is our main point of reference. As we saw in Chapter 2 (section 2.2.1) , the discreet floor of the skyscraper uses repetition as its main growth mechanism, like early 20th-century industry manufactured its products on the assembly line. Although, as Banham asserted in his Theory and Design in the First Machine Age,[31] the link that the International Style sought to establish with technology is debatable, in the case of the problem of the floor, that link reaches far beyond the scope of mere metaphor. In that sense, as we detailed in Chapter 2 (section 2.2.1), Le Corbusier's Dom-ino diagram is fundamental to understanding how skyscrapers literally become vertical production chains. Each slab is produced as an optimized element that is repeated indefinitely in form and position through a structural skeleton that acts as a frame. Thus, it is not an analogy based on a metaphor – as is the case with the continuous floor and nature, through the concept of topography – but a performative analogy based on the mode of growth established through the concept of serial production.

Unlike the two previous cases, the discrete and continuous floor does not display such profound ties with any of Vidler's three typologies. However, there are certain complicities, in this case, with the third typology proposed by the English author. Where there is a metaphorical relationship between the continuous floor and the first typology, and a performative relationship between the continuous floor and the second typology, in this third case we find a somewhat weaker relationship, which we might describe as methodological. Indeed, when Vidler describes the third typology as a mode of architectural production based on the city, he asserts that it operates through fragments, and that they "*are selected and reassembled according to criteria derived from three levels of meaning – the first, inherited from the ascribed means of the past existence of the forms; the second, derived from the specific fragment and its boundaries, and often crossing between previous types; the third, proposed as a re-composition of these fragments in a new context.*"[32] The third typology emerges through a process of re-composing fragments, based on a principle that coincides with the mechanism that shapes the discrete and continuous floor. The discrete and continuous floor does not have the appearance of a city, nor is it constituted in the same way as a city, but it is produced through a re-composition of continuous fragments and discrete fragments. As we saw in Chapter 2 (section 2.3.2), the case of Le Corbusier's Congress Hall in Strasbourg is emblematic. Its floor layout is understood as the composition of two elements with contrasting formal natures: a discrete system that forms the trunk of the building, and a continuous system that generates an ex-centric ramp. The ramp acts as a prosthesis – an addition attached to one of the four façades of the trunk, in the same way that the architecture referred to by Vidler in the third typology consists of a re-composition of independent urban fragments, which the author illustrates with references to several designs by Rossi. In both cases, it is an exercise in the composition of fragments of different natures that coexist under the same umbrella.

In summary, the first typology is linked to nature and the continuous floor through the concept of topography. The second typology is linked to technology and the discrete floor through the concept of the production chain. The third typology is linked to the city and the "discrete and continuous" floor through the concept of re-composition. In this context, the fourth typology we are proposing in this chapter also maintains ties with a particular element and a certain understanding of the continuous-discrete debate: specifically, it is tied to the notion of "object" and the "discrete while continuous" floor, through the concept of resonant piling.

The floor disposition typical of the fourth typology, described in depth in Chapter 5 (section 5.2), appears above all as promiscuous: in the process of its generation, each slab is interlaced with some of the others through contingent, temporary and local relationships, although the autonomy of the rest is not compromised at any point. It is precisely this promiscuity that allows us to separate the concepts of continuum and continuity,[33] which are joined together in the continuous floor: while the idea of continuum is subject to a totality, understood as a system in which all the parts are determined reciprocally, the concept of continuity can be local – and, consequently, it can be plural.

The continuous while discrete floor thus emerges as a disciplinary formal and performative contribution resulting from a fourth typology of architectural production centered on the object (Fig. 6-6 and Fig. 6.7). In this dissertation, the fourth typology has been applied to a very limited architectural realm, specifically the problem of the floor. There is room for other elaborations, where the focus may be broadened or shifted toward other disciplinary matters, a task that will no doubt be taken up in future research.

31. Reyner Banham, *Teoría y diseño en la primera era de la máquina*, (Barcelona: Paidós, 2015), 303.

32. Vidler, "The Third Typology," in *Architecture Theory since 1968*, .

33. Jeff Kipnis, in conversation with Graham Harman, "On Enchantment", Youtube video (55:00), conversation on April 12, 2017, posted by "SciArc Media Archive, September 10, 2017, https://www.youtube.com/watch?v=VDUNEGM12B0.

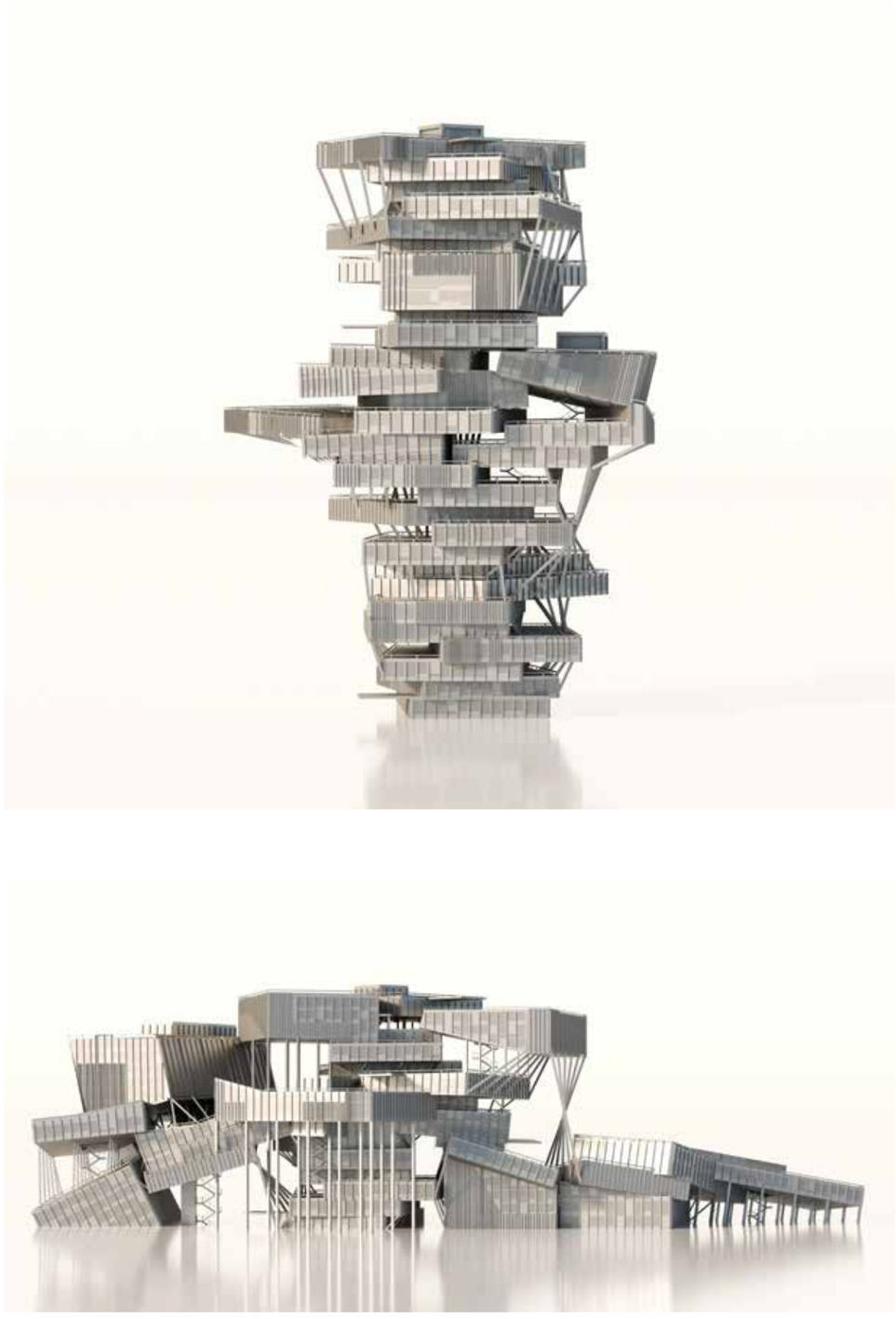


Figure 6-5: Piling Process Elevations 12.0, Jordi Vivaldi Piera, 2018

Figure 6-6: Piling Process Render 12.0, Jordi Vivaldi Piera, 2018

Figure 6-7: Piling Process Render 14.2, Jordi Vivaldi Piera, 2018

Bibliography & List of Figures

Chapter VII

VII. Bibliography & List of Figures

7.1 Chapter I: Introduction

7.1.1 Bibliography:

Bryant, Levi, Nick Srnicek, and Graham Harman. "Towards a Speculative Philosophy." In *The Speculative Turn*, edited by Levi Bryant, Nick Srnicek, Graham Harman. Melbourne: re.press, 2011.

Eisenman, Peter. *Palladio Virtuel*. London: Yale University Press, 2015.

Eisenman, Peter. "The End of the Classical: The End of the Beginning, the End of the End." In *Architecture Theory since 1968*, Edited by Michel Hays. New York: Columbia Books of Architecture, 2000.

Garcia, Tristan. *Form and Object*. Edited by Graham Harman, Translated by Mark Allan Ohm and Jon Cogburn. Paris: Edinburgh University Press, 2014.

Morton, Timothy. *Hyperobjects*. London: University of Minnesota Press, 2013.

Trummer, Peter. "Peter Trummer. What is architecture?". By Luca de Giorgi. Produced by whatisarchitecture.cc. *What is architecture?*. July 12, 2013. Video, 00:11:03. accessed June 8, 2018. https://vimeo.com/70166958.

Vidler, Anthony: "The Third Typology". In *Architecture Theory since 1968*, edited by Michel Hays. New York: Columbia Books of Architecture, 2000.

7.2 Chapter II: Continuity and Discretism in floor's layout

7.2.1 Bibliography:

Allen, Stan. "Field Conditions". In *Points + Lines*, Edited by Mark Lamster, New York: Princeton Architectural Press, 2012.

Aristotle, *On Sophistical Refutations*. Translated by W.A. Pickard. Cambridge: The Internet Classic Archive, 1994.

Aristotle. *Physis*. Translated by W.A. Pickard. Cambridge: The Internet Classics Archive, 1994.

Aureli, Pier Vittorio. "Means to an End", in *The City as a Project*. Edited by Pier Vittorio Aureli. London: Ruby Press, 2011.

Baudrillard, Jean. *Fatal Strategies*. Translated by Phil Beitchman. London: Semiotext, 2008.

Bauman, Zygmunt. *Liquid Modernity*. London: Polity, 2000.

Benjamin, Walter. *The Work of Art in the Age of Mechanical Reproduction*. Translated by Claude Kipper. London: CreateSpace Independent Publishing Platform, 2011.

Böck,Ingrid. *Six Canonical Projects by Rem Koolhaas*. Viena, Jovis, 2012.

Boom, Irma: "Ramp", in Elements of Architecture, edited by Rem Koolhaas. Rome: Marsilio, 2014.

Bryant, Levi. "The Ontic Principle: Outline of an Object-Oriented Ontology" in *The Speculative Turn*, edited by Levi Bryant, Nick Srnicek and Graham Harman. Melbourne: re.press, 2011.

Cache, Bernard. *Earth Moves: The Furnishing of Territories*. Translated by Anne Boyman. London: Writing Architecture, 1995.

Carpo, Mario. *The Alphaber and the Algorithm*. Massachussets: MIT Press, 2001.

Berlage, H.P. et al. "CIAM'S La Sarraz Declaration (1928)", Modernist Architecture, uploaded by Ross Wolfe, last modified September 8, 2001. https://modernistarchitecture.wordpress.com/2011/09/08/ciams-la-sarraz-declaration-1928/

Colomina, Beatriz. "The Split Wall: Domestic Voyeurism", in *Sexuality and Space*, edited by Beatriz Colomina. New York: Princeton Papers of Architecture, 1990.

DAVID, Sylvester. *Interviews with Francis Bacon: The Brutality of Fact*. London: Thames and Hudson, 2016.

Delanda, Manuel. *Intensive Science & Virtual Philosophy*, London: Bloomsbury, 2013.

Deleuze, Gilles. *Difference and Repetition*. Translated by Paul Patton. New York: Continuum International Publications, 2004.

Deleuze, Gilles. *La filosofía crítica de Kant*. Translated by Marco Aurelio Galmarini. Madrid: Cátedra, 2017.

Eisenman, Peter: *Ten Canonical Buildings*. New York: Rizzoli, 2008.

Farrington, Benjamin. *The Philosophy of Francis Bacon*. Chicago: University of Chicago Press, 1966.

Fraijó, Manuel. *Filosofía de la Religión*. Madrid: Trotta, 2010.

Gausa, Manuel. *OPEN*. Barcelona: Actar, 2010.

González, Moisés. *Introducción al pensamiento filosófico*. Madrid: Tecnos, 2016.

Herodotus. *The histories*. Translated by Tom Holland. London: Penguin Press Ancient Classics, 2014.

Hoffman, Dan. "The Receding Horizon of Mies", in *The Presence of Mies*, edited by Detlef Mertins. New York: Princeton Architectural Press, 1994.

Huxtable, Ada Louise. *The Tall Building Artistically Reconsidered*. New York: The New Criterion, 1982.

Jeanneret-Gris, Charles-Édouard and Amédée Ozenfant. "Idées personelles." *L' Esprit Nouveau*, no. 7 (1922).

Kipnis, Jeff. *A Question of Qualities*. London: Writing Architecture Series, 2013.

Kipnis, Jeff. "Discrimination". Youtube video, 23:30. Lecture on July 15, 2013. Posted by Harvard GSD", July 23, 2013. https://www.youtube.com/watch?v=vur3TRzFztQ.

Koolhaas, Rem. *Delirious New York: A retroactive Manifesto*, New York: Monacelli Press, 1994.

Koolhaas, Rem. *SMLXL*, New York: Monacelli Press, 1994.

Kwinter, Sanford: "Landscapes of Change: Boccioni's "Stati d' animo" as a General Theory of Models." *Assemblage*, no. 19 (1992).

Jeanneret-Gris, Charles-Edouard. *Urbanisme*. Translated by Frederick Etchells. New York: Architectural Press, 1929.

Leibniz, Gottfried. Discurs de Metafísica / Monadologia. Edited by Josep Olesti Vila, Translated by Josep Olestí Vila. Barcelona: Marbot, 2018.

Levinas, Emmanuel. *Le temps et l' autre*. Paris: Presses Universitaires, 2014.

Lucan, Jacques. *Composition, Non-Composition*. Translated by Theo Hakola, Oxford: EPFL Press, 2012.

Martínez, Pablo. "The interior City", in *Sobre Arquitectura Moderna y Contemporánea*. Edited by Anton Capitel. Madrid: Diseño, 2016.

Martino, Eva. El laberinto de la continuidad en G.W. Leibniz. Madrid: Biblioteca Nueva, 2011.

Marullo, Franceso. "The Typical Plan as Index of Generic", in *The City as a Project*. Edited by Pier Vittorio Aureli. London: Ruby Press, 2011.

Max, Risselada. "Documentation on Houses", in *Raumplan versus Plan Libre*. Edited by Max Risselada. Rotterdam: 010 Publishers, 2008.

Mertins, Detlef. "The Receding Horizon of Mies", in *The Presence of Mies*, edited by Detlef Mertins. New York: Princeton Architectural Press, 1994.

Mirandola, Pico della. *Oration on the Dignity of Man*. Translated by Robert Gaponigri. London: Gateway Editions, 1996.

Montaner, Josep Maria. *La modernidad superada*. Barcelona: Gustavo Gili, 2011.

Musil, Robert. *The Man Without Qualities*. London: Knopf, 1995.

Neumeyer, Fritz. *The Artless Word*. London: The MIT Press, 1991.

Ortega y Gasset, José. *En torno a Galileo*. Madrid: Biblioteca Nueva, 2005.

Ortega y Gasset, José. *Verdad y perspectiva*. Madrid: Biblioteca Nueva, 2005.

Parent, Claude. *Vivir en lo oblicuo*. Barcelona: Gustavo Gili, 2009.

Parmenides. *Poema*. Translated by Alberto Bernabé Pajares. Madrid: ISTMO, 2007.

Sancho, Juan Carlos. *El sentido cubista de Le Corbusier*. Madrid: Munilla-Leria, 2000.

Schumacher, Patrick. *The Autopoiesis of Architecture, vol 2*. Wiltshire: Wiley, 2012.

Shakespeare, William. *Hamlet*. London: Digireads, 2005.

Spuybroek, Lars: The Architecture of Continuity, Rotterdam: V2/ NAi Publishers, 2008. Sylvester, David. *Interviews with Francis Bacon: The Brutality of Fact*. London: Thames and Hudson, 2016.

Vattimo, Gianni and Pier Aldo Rovatti. *El pensamiento débil*. Translated by Juan Pérez Andrés. Madrid: Cátedra, 2006.

Von Moss, Stanislau. "Le Corbusier and Loos", in *Raumplan versus Plan Libre*. Edited by Max Risselada. Rotterdam: 010 Publishers, 2008.

Wines, James. Interviewed by Vladimir Belogolovsky, Archdaily (blog), March 9, 2016, https://www.archdaily.com/783491/interview-with-james-wines-the-point-is-to-attack-architecture

Xenakis, Iannis. "Towards a Metamusic," *Tempo* no. 93 (1970).

Zaera, Alejandro. "Nuevas topografías. La reformulación del suelo" in *Otra mirada: posiciones contra crónicas*. Barcelona: Gustavo Gili, 2010.

7.2.1 List of figures:

Figure 2-1: Hotel Guadet, Paul Guadet, 1913.
"Hotel Particulier Guadet", PSS-Archite.EU. Accessed March 19, 2018. http://www.pss-archi.eu/immeubles/FR-75056-1716.html

Figure 2-2: Vladislav-Hall, Benedikt Reit, 1493
Lars Spuybroek, *The Architecture of Continuity*, (Rotterdam: V2/ NAi Publishers, 2008), 223

Figure 2-3: Reliance Building, John Root, Charles B. Atwood,1880.
Ada Louise Huxtable, The Tall Building Artistically Reconsidered, (California: The New Criterion, 1982), 36.

Figure 2-4: 1909 Theorem, J. Walker, 1909.
Rem Koolhaas, *Delirious New York*, (New York: The Monacelli Press, 1994), 83.

Figure 2-5: Dominó diagram, Le Corbusier, 1914
Pier Vittorio Aureli, "Introduction: Means to an End" in *The City as a Project*, ed. Pier Vittorio Aureli (London: Ruby Press, 2011), 36.

Figure 2-6: Ford T Mass Production, 1908.
"History of the Model T Ford. The car that really did change everything", Hover Motor Company. Accessed 3 January, 2018. http://www.hovermotorco.com/2011/09/history-of-model-t-ford-car-that-really.html

Figure 2-7: Ford Highland Park Plan, Albert Kahn, 1908
Francesco Marullo, "The Typical Plan as Index of Generic" in *The City as a Project*, ed. Pier Vittorio Aureli (London: Ruby Press, 2011), 222.

Figure 2-8: Lake Shore Drive Plan, Mies Van der Rohe,1951
"AD Classics: 860-880 Lake Shore Drive / Mies van der Rohe", Archdaily. Last accessed 3 January, 2018. https://www.archdaily.com/59487/ad-classics-860-880-lake-shore-drive-mies-van-der-rohe

Figure 2-9: Lake Shore Drive Building, Mies van der Rohe 1951
Fritz Neumeyer, *The Artless Word*, (London: The MIT Press, 1991), 112.

Figure 2-10: Atlas Museum, Karl Friedrich Schinkel, 1830

"Atles Museum / Karl Fridrich Schinkel", Archeyes. Last accessed 3 January 2018. http://archeyes.com/altes-museum-karl-friedrich-schinkel/.

Figure 2-11: Barcelona Pavilion, Mies Van der Rohe, 1929
Fritz Neumeyer, *The Artless Word*, (London: The MIT Press, 1991), 189.

Figure 2-12: Highrise of Homes, Section, J.Wines, 1951.
"Homestacker", Skyscraper dictionary, Last accessed 27 Februrary, 2018. https://www.skyscraperdictionary.com/?project=homestacker.

Figure 2-13: Highrise of Homes, Perspective, J.Wines, 1951.
"Highrise of Homes, project, Exterior perspective", MOMA, Last accessed 27 Februrary, 2018. https://www.moma.org/collection/works/709.

Figure 2-14: Collage, Mies van der Rohe, 1951.
"The Architect Mies van der Rohe as a visual Artist.", Goethe Institute, Last accessed: 22 April, 2018. https://www.goethe.de/en/kul/bku/20931979.html.

Figure 2-15: Typical Plan, Rem Koolhaas, 1993
Rem Koolhaas, *SMLXL*, (New York: Monacelli Press, 1995), 344-346.

Figure 2-16: Villa Müller, Adolf Loos, 1928
Beatriz Colomina, "The Split Wall: Domestic Voyeurism", in *Sexuality and Space*, ed. Beatriz Colomina, (New York: Princeton Papers on Architecture, 1990), 75.

Figure 2-17: Strasbourg Palace Plan, Le Corbusier, 1964
Richard Klein, *Le Corbusier, Le Palais des Congrès de Strasbourg*. (Paris: Picard, 2011), 70.

Figure 2-18: Strasbourg Palace Plan, Le Corbusier, 1964
Richard Klein, *Le Corbusier, Le Palais des Congrès de Strasbourg*. (Paris: Picard, 2011), 71.

Figure 2-19: Strasbourg Palace Plan, Le Corbusier, 1964
Richard Klein, *Le Corbusier, Le Palais des Congrès de Strasbourg*. (Paris: Picard, 2011), 53.

Figure 2-20: Oblique Function, Claude Parent, 1964
Claude Parent, *Vivir en lo oblicuo*, trans. Jorge Martínez, (Barcelona: Gustavo Gili, 2009), 53.

Figure 2-21: Self-Portrait, Francis Bacon, 1973.
France Borel, *Bacon: Portraits and Self-Portraits*, London: Thames & Hudson, 1997, 36.

Figure 2-22: Firminy, Le Corbusier, 2006 (Started in 1971).
"Eglise Saint Pierre Firminy", Foundation Le Corbusier. Accessed March 23, 2018.

Figure 2-23: Agadir, Koolhaas, 1990.
Rem Koolhaas, *SMLXL*, (New York: Monacelli Press, 1995), 392.

Figure 2-25: Asphalt Spot, F. Roche, 2002
"Asphalt Spot", Architecture for Guerrillas, Accessed 30 June, 2018. http://architectureforguerillas.blogspot.com/2009/06/asphalt-spot.html.

Figure 2-26: Field of forces: Turbulences Map
Manuel Gausa, *Open*, (Barcelona: Actar, 2010), 361-69.

Figure 2-27: Koolhaas bending the floor, 1995.
Peter Eisenman, *Ten Canonical Buildings 1950-2000*, (New York: Rizzoli, 2008), 202

Figure 2-28: Naked City, Guy Debord, 1957.
Ingrid Böck, *Six Canonical Projects by Rem Koolhaas*, (Viena, Jovis, 2012), 221

Figure 2-29: Jussieu Circulation, Rem Koolhaas, 1992
"Corbu & the Dominos: Jussieu", Arquitectura entre d' altres solucions. Accessed 30 June, 2018. http://jaumeprat.com/corbu-the-dominos-jussieu/

Figure 2-30: Yokohama, FOA, 2002
"Farshid Moussavi 1965", Un dia una arquitecta, Accessed 20 June, 2018. https://undiaunaarquitecta.wordpress.com/2015/11/28/farshid-moussavi-1965/.

Figure 2-31: Table of concepts, Discrete floor and Continuous floor.

7.3 Chapter 3: Subjectless Objects

7.3.1 Bibliography:

Bogots, Ian. "Materialisms: The Stuff of Things Is Many". In *Blog* (blog). February 21, 2010. http://www.bogost.com/blog/materialisms.shtml.

Braidotti, Rosi. *Lo Posthumano*. Translated by Juan Carlos Gentile Vitale. Barcelona: Gedisa, 2015.

Bryant, Levi, *The Democracy of Objects*. Michigan: Open Humanities Press, 2011. http://www.openhumanitiespress.org/books/titles/the-democracy-of-objects/.

Bryant, Levi, Nick Srnicek, and Graham Harman. "Towards a Speculative Philosophy." In *The Speculative Turn*, edited by Levi Bryant, Nick Srnicek, Graham Harman. Melbourne: re.press, 2011.

Carpo, Mario. *The Second Digital Turn*. Massachussets: MIT Press, 2011.

Gabriel, Markus. *Por qué el mundo no existe*. Translated by Juanmari Madariaga. Barcelona: Pasado y Presente, 2015.

Gage, Mark Foster. "Killig Simplicity: Object Oriented Architecture". *Log*, no. 33 (2015).

Harman, Graham. Bells and Whistles. Wichester: Zero Books, 2013.

Harman, Graham. *Inmaterialism*. Cambridge: Polity, 2016.

Harman, Graham. *The Quadruple Object*. Winchester: Zero Books, 2011.

Harman, Graham. *Towards Speculative Realism: Essays and Lectures*. Winchester: Zero Books, 2010.

Kohler, Daniel. *The Mereological City*. London: Transcript, 2016.

Max, Risselada. "Documentation on Houses", in *Raumplan versus Plan Libre*. Edited by Max Risselada. Rotterdam: 010 Publishers, 2008.

Medina, Vicente Esteban. *Forma y composición en la arquitectura deconstructivista*. Madrid: UPM, 2017.

Meillassoux, Quentin. Después de la finitud. Translated by Margarita Martínez. Buenos Aires: Continuum, 2008.

Morton, Timothy. *Dark Ecology*. New York: Columbia University Press, 2014.

Morton, Timothy. *Hyperobjects*. London: University of Minnesota Press, 2013.

Latour, Bruno. *Pandora's Hope: Essays on the Reality of Science Studies*. New York: Harvard University Press, 1999.

Latour, Bruno. *Reensamblar lo social*. Translated by Ariel Dilon. Madrid: Manantial, 2008.

Leach, Neil. "There is no such thing as digital design", in *Making, Machind and Models for Design and Architecture*. Edited by David Gerber and Mariana Ibañez. London: eVolo Press, 2014.

Retsin, Gilles. "Discrete Assembly and Digital Materials in Architecture". *eCAADe*, no. 34, (2016).

Ruy, David. *Returning to (Strange) Objects*. Tarp Architecture Manual, Spring 2012.

Trummer, Peter. "The City as an Object". *Log*, no. 27, (2013).

Wiscombe, Tom. "Discreteness, or Towards a Flat Ontology of Architecture". Project: A Journal for Architecture. no. 3 (2014).

Wiscombe, Tom. *New Models of Coherency*. I. Kahn Studio Book Introduction, 2014.

Wiscombe, Tom in conversation with Todd Gamon, Graham Harman and David Ruy. "The Object Turn: A Conversation", *Log*, no. 33, (2015).

Zizek, Slavoj. "Examined Life: Philosophy is in the Streets". Youtube video, 5:15. Posted by "TOP Documentary, May 6, 2015. https://www.youtube.com/watch?v=j_K_79O21hk

7.3.2 List of figures:

Figure 3-1: Deodorized Central Mass with Satellites, Mike Kelley, 1999.
Tom Wiscombe in conversation with Todd Gannon, Graham Harman and David Ruy, "The Object Turn: A Conversation", *Log*, no. 33 (2015), 85.

Figure 3-2: Pile City in Vienna, Peter Trummer with Elisabeth Sinnesberger, IOUD, University Innsbruck, 2015
Peter Trummer, "Pile City in Vienna", Accessed in 18 May 2018, http://www.petertrummer.com/projects-1/#/new-gallery-1/

Figure 3-3: 20 Elements, Joel Shapiro, 1999
Amy Newman, *Joel Shapiro, Recent Sculpture and Drawings 2001*, London: Wildenstein, 2001.

Figure 3-4: 20 National Center for Contemporary Art, Tom Wiscombe, 2003.
Tom Wiscombe, "Discreteness, or Towards a Flat Ontology of Architecture", *Project: A Journal for Architecture*, no. 3 (2014), 40.

Figure 3-5: Ground Effect, Tom Wiscombe, 1999.
Tom Wiscombe, "Discreteness, or Towards a Flat Ontology of Architecture", *Project: A Journal for Architecture*, no. 3 (2014), 41.

Figure 3-6: Guggenheim Helsinki, Mark Foster Gage, 2014.
"Be The To-Mark Foster Gage Architect's-Helsinki Guggenheim." Architizer. Accessed 24 April, 2018. https://architizer.com/projects/mark-foster-gage-architects-helsinki-guggenheim/

Figure 3-7: Guggenheim Helsinki, Mark Foster Gage, 2014.
"Be The To-Mark Foster Gage Architect's-Helsinki Guggenheim." Architizer. Accessed 24 April, 2018. https://architizer.com/projects/mark-foster-gage-architects-helsinki-guggenheim/

Figure 3-8: Diamond Strata, Gilles Retsin, 2016.
Gilles Retsin, "Discrete Assembly and Digital Materials in Architecture", *eCAADe*, no. 34 (2016), 146.

Figure 3-9: Softkill, Gilles Retsin, 2012.
Gilles Retsin, "Discrete Assembly and Digital Materials in Architecture", *eCAADe*, no. 34 (2016), 148.

Figure 3-10: Polyomino Research, José Sánchez, 2015.
José Sánchez, "Combinatorial Design" (paper, *ACADIA*, Michigan, October 27-29, 2016), 2.

Figure 3-11: Polyomino Research, José Sánchez, 2015.
José Sánchez, "Combinatorial Design" (paper, *ACADIA*, Michigan, October 27-29, 2016), 3.

Figure 3-12: Narcisim of Small Differences, Casey Rehm, 2015.
"Narcissism of Small Differences", Kinch-d, Accessed 22 May, 2018. http://kinch-d.com/Research-Narcissism-of-Small-Differences.

Figure 3-13: Narcisim of Small Differences, Casey Rehm, 2015.
"Narcissism of Small Differences", Kinch-d, Accessed 22 May, 2018. http://kinch-d.com/Research-Narcissism-of-Small-Differences.

Figure 3-14: House of frames, Daniel Kohler, 2016
"Daniel Köhler: Opening, in the advent of the Mereological City. / Eco Meta." Vimeo. Accessed 21 January, 2018. https://vimeo.com/173485471.

Figure 3-15: Architecture as Subdivision, Peter Trummer with David Marco, Students Ana Gras and Michaela Cho. Studio Peter Trummer in Sci-Arc, 2016.
Peter Trummer, "Architecture as Subdivision", Accessed in 15 February 2018. http://www.petertrummer.com/studios/#/architecture-as-subdivion/

Figure 3-16: Aggregated Figure: The City as Folded Blocks, Peter Trummer, Students Sarah Mansson and Federico Pessani. Studio Peter Trummer in Sci-Arc, 2014.
"The City as Folded Blocks", Suckerpunchdaily. Accessed June 25, 2018. http://www.suckerpunchdaily.com/tag/peter-trummer/

Figure 3-17: Architecture as Subdivision, Peter Trummer with David Marco, Students Ana Gras and Michaela Cho. Studio Peter Trummer in Sci-Arc, 2016.
Peter Trummer, "Architecture as Subdivision", Accessed in 15 February 2018. http://www.petertrummer.com/studios/#/architecture-as-subdivion/

Figure 3-18: Table of Contents, Discrete Floor, Continuous Floor, Zero Subject. Jordi Vivaldi Piera, 2018.

7.4 Chapter 4: Resonant Piling

7.4.1 Bibliography:

Allen, Stan. "Field Conditions". In *Points + Lines*, Edited by Mark Lamster, New York: Princeton Architectural Press, 2012.

Althusser, Louis. *Para un materialismo aleatorio*. Translated by Pedro Fernández Liria, Luis Alegre Zahonero and Guadalupe González Diéguez. Madrid: Arena Libros, 2002

Baldmond, Cecil: "Informal Agency: Conversation with Roland Snooks" in *Swarm Intelligence: Architectures of Multi-Agent Systems*. Edited by Neil Leach and Roland Snooks. Shanghai: Tongji UP, 2017.

Batty, Michael. *The new Science of Cities*. London. MIT Press, 2013.

Bryant, Levi, *The Democracy of Objects*. Michigan: Open Humanities Press, 2011. http://www.openhumanitiespress.org/books/titles/the-democracy-of-objects/.

Bryant, Levi. "Assemblages Against Totalities". Larval Subjects (blog), September 8, 2010. https://larvalsubjects.wordpress.com/2010/09/08/drg-assemblages-against-totalities/

Delanda, Manuel. *Assemblage Theory*. Editor Graham Harman. Edinburgh: Edinburgh University Press, 2016.

Delanda, Manuel: "Deleuze and the Use of the Genetic Algorithm in Architecture" in Designing for a Digital World, Edited by Neil Leach. London: Wiley, 2002.

Delanda, Manuel. "Multi-Agent Systems", in *Swarm Intelligence: Architectures of Multi-Agent Systems*. Edited by Neil Leach and Roland Snooks. Shanghai: Tongji UP, 2017.

Deleuze, Gilles: *Difference and Repetition*. Translated by Paul Patton. New York: Continuum International Publishing Group Ltd, 2004.

Deleuze, Gilles; Guattari, Felix. *Anti-Oedipus: Capitalism and Schizophrenia*. London: Penguin Classics, 2009.

Descartes, René. *El discurso del método*. Edited by Manuel García Morente. Translated by Manuel García Morente. Madrid: KRK, 2012.

Leach, Neil. "Swarm Urbanism". *In Digital Cities*. Editor Neil Leach. London: Wiley, 2009.

Gamon, Todd, in conversation with Tom Wiscombe, Graham Harman and David Ruy. "The Object Turn: A Conversation", *Log*, no. 33, (2015).

Holland, John. "Excavating Emergence: Conversation with Neil Leach and Roland Snooks" in *Swarm Intelligence: Architectures of Multi-Agent Systems*. Edited by Neil Leach and Roland Snooks. Shanghai: Tongji UP, 2017.

Johnson, Steven: *Emergence: The connected Lifes of Ants, Brains, Cities and Software*. London: Touchstone Press, 2002.

Latour, Bruno. *Pandora's Hope: Essays on the Reality of Science Studies*. New York: Harvard University Press, 1999.

Leach, Neil. "Introduction" in *Swarm Intelligence: Architectures of Multi-Agent Systems*. Edited by Neil Leach and Roland Snooks. Shanghai: Tongji UP, 2017.

Leach, Neil: "Swarm Urbanism" in *Swarm Intelligence: Architectures of Multi-Agent Systems*. Edited by Neil Leach and Roland Snooks. Shanghai: Tongji UP, 2017.

Leibniz, Gottfried. *Discurs de Metafísica / Monadologia*. Edited by Josep Olesti Vila, Translated by Josep Olestí Vila. Barcelona: Marbot, 2018.

Lucretius, Titus. *On the nature of things*. Translated by William Ellery Leonard. London: Dover Publications, 2004.

Maeterlinck, Maurice. *The Life of the Bee*. London: Dover Publications, 2006.

Morton, Timothy. *Hyperobjects*. London: University of Minnesota Press, 2013.

Muntaner, J. Maria. *Sistemas arquitectónicos contemporáneos*. Barcelona: Gustavo Gili, 2008.

Harman, Graham. Interview by Brian Davis, Faslanyc (blog), July 1, 2012. https://www.archdaily.com/783491/interview-with-james-wines-the-point-is-to-attack-architecture.

Simondon, Gilbert. *On the Mode of Existence of Technical Objects*. Translated by Ninian Mellamphy. Ontarion: University of Western Ontarion, 1980.

Roche, François. "Short Stories of an Acephala Body" in *Swarm Intelligence: Architectures of Multi-Agent Systems*. Edited by Neil Leach and Roland Snooks. Shanghai: Tongji UP, 2017.

Theraulaz, Guy. "Stigmergic Building Algorithms for Smart Architecture" in *Swarm Intelligence: Architectures of Multi-Agent Systems*. Edited by Neil Leach and Roland Snooks. Shanghai: Tongji UP, 2017.

Trummer, Peter: "An Object-Oriented Approach to Architecture and Its City," *IaaC Bits* no. 6, 2016.

Vattimo, Gianni, and Pier Aldo Rovatti. *El pensamiento débil*. Tranlated by Juan Pérez Andrés. Madrid: Cátedra, 2006.

7.4.2 List of figures:

Figure 4-1: Motion Studies, Alexander Calder, 1971.
S. Barron and L. Mark, Calder and Abstraction: From Avant-Garde to Iconic, (London: Prestel, 2013), 43.

Figure 4-2: Opéra Bobèche, Jean Dubuffet, 1963.
Raphaël Bouvier and Andreas Franzke, *Jeann Dubuffer: Metamorphoses of Landscape*, (London: Hatje Cantz, 2016), 61.

Figure 4-3: Cellular automata, Conway, 1970 .
"What is Cellular Automata? Playing god in the world you create." Steemet. Accessed March 21, 2018. https://steemit.com/life/@bazmus/what-is-cellular-automata-playing-god-in-the-world-you-create-steemit-special

Figure 4-4: Ant collony, 2016.
"Ant Collonies", Golosio. Accessed 22 May. https://golos.io/psk/@varja/drugie-primery-slozhnykh-yavlenii-v-neravnovesnykh-sistemakh

Figure 4-5: Melbourne Docklands, Kokkugia, 2008.
Neil Leach, "Swarm Urbanism" in *Digital Cities*, ed. Neil Leach, (London: Wiley, 2009), 60.

Figure 4-6: Cluster of urban population density in Greater London, Michael Batty, 2010.

Figure 4-7: Negotiable Hierarchy, Roland Snooks studio, 2009.
Cecil Baldmond and Roland Snooks, "University of Pennsylvania", in *Swarm Intelligence, Architectures of Multi-Agent Systems*, ed. Neil Leach and Roland Snooks, (Shanghai: Tongji UP, 2017), 56.

Figure 4-8: Pixel Studio, Cecil Baldmond and Roland Snooks, Students: Joshua Evans, Liwen Mao and Jason Smith, 2009.
Cecil Baldmond and Roland Snooks, "University of Pennsylvania", in *Swarm Intelligence, Architectures of Multi-Agent Systems*, ed. Neil Leach and Roland Snooks, (Shanghai: Tongji UP, 2017), 55.

Figure 4-9: :Stickmergy, Cecil Baldmond and Roland Snooks, Students: Dwight Engel, So Sugita and Dale Suttle, 2009.
Cecil Baldmond and Roland Snooks, "University of Pennsylvania", in *Swarm Intelligence, Architectures of Multi-Agent Systems*, ed. Neil Leach and Roland Snooks, (Shanghai: Tongji UP, 2017), 52.

Figure 4-10: Fish bank adquiring a spheric form in order to protect itself from predators.
"Cardúmen", Enrique Uribe, Accessed May 12, https://luisenriqueuribe.wordpress.com/cardumen/cardumen-2/

Figure 4-11: Residential Building in Tokyo, Sou Fujimoto, 2008.
"Tokyo Apartment by Sou Fujimoto Architects", Contemporist. Accessed 21 May, 2018. http://www.contemporist.com/tokyo-apartment-by-sou-fujimoto-architects/

Figure 4-12: Vitrahouse, Herzog and de Meuron, 2006.
"VitraHaus", Plataformaarquitectura. Accessed 22 May, 2018. https://www.plataformaarquitectura.cl/cl/02-37562/vitrahaus-herzog-de-meuron

Figure 4-13: Interlace, Rem Koolhaas, 2015.
"The Interlace / OMA", Plataformaarquitectura. Accessed 22 May, 2018. https://www.plataformaarquitectura.cl/cl/766765/the-interlace-oma

Figure 4-14: Annenberg Center, REX, 2013.
"REX architecture: Vakko headquarters, turkey", Designboom. Accessed 22 May, 2018. https://www.designboom.com/architecture/rex-architecture-vakko-headquarters-turkey/

Figure 4-15: National Gallery, SANAA, 2015.
"Sanaa's proposal: New National Gallery / Ludwig Museum [I/II]", Metalocus. Accessed 22 May, 2018. https://www.metalocus.es/en/news/sanaas-proposal-new-national-galleryludwig-museum-iii

Figure 4-16: Still life with a guitar, Juan Gris, 1913.
Mark Rosenthal, *Juan Gris*, London: Abbeville Pr, 1983, 34.

Figure 4-17: Impossible Architecture, Fillip Dujardin, 2011.
"Impossible architecture by Filip Dujardin". Designboom. Accessed March 28, 2018. https://www.designboom.com/art/impossible-architecture-by-filip-dujardin/

Figure 4-18: Suspended Cloud Paintings, Joris Kuipers, 2013.
Jobson, Christopher. "Suspended Cloud Paintings by Joris Kuipers", last modified June 6, 2013. http://www.thisiscolossal.com/2013/06/suspended-cloud-paintings-by-joris-kuipers/ .

Figure 4-19: Lake Shore Drive's floor extraction, Jordi Vivaldi Piera, 2011.

Figure 4-20: Simulation Rules, Jordi Vivaldi Piera, 2018.

7.5 Chapter 5: Continuous while Discrete Floor

7.5.1 Bibliography:

Algra, Keimpe. *Concepts of Space in Greek Thought*. London: Brill, 1995.

Aristotle. *Physis*. Translated by W.A. Pickard. Cambridge: The Internet Classics Archive. 1994.

Aureli, Pier Vitorio. The Possibility of an Absolute Architecture. London: MIT Press, 2011.

Boccioni, Umberto. "Technical Manifesto of Futurist Sculpture". In *Future Manifestos*, edited by Umbro Apollonio. London: Vicking Press, 1973.

Bogots, Ian. "Materialisms: The Stuff of Things Is Many". In *Blog* (blog). February 21, 2010. http://www.bogost.com/blog/materialisms.shtml.

Bryant, Levi, *The Democracy of Objects*. Michigan: Open Humanities Press, 2011. http://www.openhumanitiespress.org/books/titles/the-democracy-of-objects/.

Bryant, Levi, Nick Srnicek, and Graham Harman. "Towards a Speculative Philosophy." In *The Speculative Turn*, edited by Levi Bryant, Nick Srnicek, Graham Harman. Melbourne: re.press, 2011.

Eisenman, Peter. *Palladio Virtuel*. London: Yale University Press, 2015.

Eisenman, Peter: "Brief Advanced Design Studio", last modified October 2014, https://www.architecture.yale.edu/courses/advanced-design-studio-eisenman-0#_ftn3.

Wigley, Mark, in conversation with Peter Eisenamn. "Eisenman/Wigley X: The Problematic of Homogeneous Space", YouTube video, conversation on August 8, 2013, posted by "Columbia GSAPP", September 11, 2013, https://www.youtube.com/watch?v=0_b5COTxHuc&t=125s.

Gabriel, Markus. *Por qué el mundo no existe*. Translated by Juanmari Madariaga. Barcelona: Pasado y Presente, 2015.

Garcia, Tristan. *Form and Object*. Edited by Graham Harman, Translated by Mark Allan Ohm and Jon Cogburn. Paris: Edinburgh University Press, 2014.

Johnson, Steven. *Emergence: The connected Lives of Ants, Brains, Cities and Software*. London: Touchstone Press, 2002.

Kohler, Daniel. *The Mereological City*. London: Transcript, 2016.

Leach, Neil. "There is No Such Thing as Digital Design". In *Making, machines and models for Design Agency in Architecture*. Edited by David Gerber and Mariana Ibáñez. London: eVolo Press, 2014.

Lucan, Jacques. *Composition, Non-Composition*. Translated by Theo Hakola, Oxford: EPFL Press, 2012.

Moneo, Rafael. "On typology". *Oppositions*, no. 13 (1978), 28.

Montaner, Josep Maria. *La modernidad superada*. Barcelona: Gustavo Gili, 2011.

Morton, Timothy. *Hyperobjects*. London: University of Minnesota Press, 2013.

Plato, *Timaeus*. Translated by Peter Kalkavage. New York: Hacket Publishing, 2000.

Sánchez, José. "Combinatorial Design" (paper, ACADIA, Michigan, October 27-29, 2016.)

Trummer, Peter. "The City as an Object". *Log*, no. 27, (2013).

Van Doesburg, Theo. "L' evolution de l' architecture moderne en Hollande". *L' architecture vivante*, Fall Winter, (1995)

Vidler, Anthony: "The Architectural Uncanny: Essays in the Modern Unhomely,". In *Architecture Theory since 1968*, edited by Michel Hays. New York: Columbia Books of Architecture, 2000.

Wiscombe, Tom. *New Models of Coherency*. I. Kahn Studio Book Introduction, 2014.

Zaera, Alejandro. "Nuevas topografías. La reformulación del suelo" in *Otra mirada: posiciones contra crónicas*. Barcelona: Gustavo Gili, 2010.

7.5.2 List of figures:

Figure 5-1: Resonant Piling Process Axonometries, Jordi Vivaldi Piera, 2018.

Figure 5-2: Resonant Piling Process Elevations, Jordi Vivaldi Piera, 2018.

Figure 5-3: Resonant Piling Process Top, Jordi Vivaldi Piera, 2018.

Figure 5.1.1: Clumps, Jordi Vivaldi Piera, 2018.

Figure 5.1.1.1: Embedding, Jordi Vivaldi Piera, 2018.

Figure 5.1.1.2: Perforation, Jordi Vivaldi Piera, 2018.

Figure 5.1.1.3: Junction, Jordi Vivaldi Piera, 2018.

Figure 5.1.1.4: Chunking, Jordi Vivaldi Piera, 2018.

Figure 5.1.1.5: Wrapping, Jordi Vivaldi Piera, 2018.

Figure 5.1.1.6: Serpentine, Jordi Vivaldi Piera, 2018.

Figure 5.1.1.7: Esplanade, Jordi Vivaldi Piera, 2018.

Figure 5.1.1.8: Ascension, Jordi Vivaldi Piera, 2018.

Figure 5.1.1.9: Spiral, Jordi Vivaldi Piera, 2018.

Figure 5.1.2: Distributions, Jordi Vivaldi Piera, 2018.

Figure 5.1.2.1: Unalignement, Jordi Vivaldi Piera, 2018.

Figure 5.1.2.2: Barcode, Jordi Vivaldi Piera, 2018.

Figure 5.1.2.3: Fan, Jordi Vivaldi Piera, 2018.

Figure 5.1.2.4: Hybrid, Jordi Vivaldi Piera, 2018.

Figure 5.1.2.5: Sautéed, Jordi Vivaldi Piera, 2018.

Figure 5.1.3: Fillings, Jordi Vivaldi Piera, 2018.

Figure 5.1.3.1: Protrusions, Jordi Vivaldi Piera, 2018.

Figure 5.1.3.2: Contact, Jordi Vivaldi Piera, 2018.

Figure 5.1.3.3: Insertion, Jordi Vivaldi Piera, 2018.

Figure 5.1.3.4: Separation, Jordi Vivaldi Piera, 2018.

Figure 5.1.3.5: Atrium, Jordi Vivaldi Piera, 2018.

Figure 5.1.3.6: Matryoshka, Jordi Vivaldi Piera, 2018.

Figure 5.1.3.7: Archipelago, Jordi Vivaldi Piera, 2018.

Figure 5.1.4: Intersticialities, Jordi Vivaldi Piera, 2018.

Figure 5.1.4.1: Interruption, Jordi Vivaldi Piera, 2018.

Figure 5.1.4.2: Isolation, Jordi Vivaldi Piera, 2018.

Figure 5.1.4.3: Opening, Jordi Vivaldi Piera, 2018.

Figure 5.1.4.4: Bifurcation, Jordi Vivaldi Piera, 2018.

Figure 5.1.4.5: Paralel, Jordi Vivaldi Piera, 2018.

Figure 5.1.5: Silhouette, Jordi Vivaldi Piera, 2018.

Figure 5.1.5.1: Vibration, Jordi Vivaldi Piera, 2018.

Figure 5.1.5.2: Jaggy, Jordi Vivaldi Piera, 2018.

Figure 5.1.5.3: Spine, Jordi Vivaldi Piera, 2018.

Figure 5.1.5.4: Gap, Jordi Vivaldi Piera, 2018.

Figure 5.1.5.5: Cross, Jordi Vivaldi Piera, 2018.

Figure 5.1.5.6: Split, Jordi Vivaldi Piera, 2018.

Figure 5.1.5.7: Pic, Jordi Vivaldi Piera, 2018.

Figure 5.1.6: Grounds, Jordi Vivaldi Piera, 2018.

Figure 5.2.1.1: Mereology: Whole < Part, Jordi Vivaldi Piera, 2018.

Figure 5.2.1.2: Geometry: Combinatory, Jordi Vivaldi Piera, 2018.

Figure 5.2.1.3: Contour: Singular, Jordi Vivaldi Piera, 2018.

Figure 5.2.1.4: Arrangement: Sack, Jordi Vivaldi Piera, 2018.

Figure 5.2.1.5: Growth: Incrustation, Jordi Vivaldi Piera, 2018.

Figure 5.2.1.6: Figuration: Co-Figures, Jordi Vivaldi Piera, 2018.

Figure 5.2.2.1: Circulation: Jumps, Jordi Vivaldi Piera, 2018.

Figure 5.2.1.2: Gaze: Gaps, Jordi Vivaldi Piera, 2018.

Figure 5.2.1.3: Orientation: Contour, Jordi Vivaldi Piera, 2018.

Figure 5.2.1.4: Retirement: Compressions, Jordi Vivaldi Piera, 2018.

Figure 5.2.1.5: Interiority: Matryoshka, Jordi Vivaldi Piera, 2018.

Figure 5.2.1.6: Access: Nesting, Jordi Vivaldi Piera, 2018.

Figure 5-4: Complete Table of Concepts, Jordi Vivaldi Piera, 2018.

Figure 5-5: Plan & Elevation Continuous while Discrete floor, Jordi Vivaldi Piera, 2018.

7.6 Chapter 6: The Fourth Typology

7.6.1 Bibliography:

Banham, Reyner. *Theory and Design in the First Machine Age*. London: MIT Press, 1980

Eisenman, Peter. "The End of the Classical: The End of the Beginning, the End of the End." In *Architecture Theory since 1968*, Edited by Michel Hays. New York: Columbia Books of Architecture, 2000.

Esteban, Vicente. "Forma y composición en la arquitectura deconstructivista". PhD thesis, Escuela Técnica Superior de Arquitectura de Madrid, 2004.

Frampton, Kenneth. *Modern Architecture: A Critical History*. London: Thames and Hudson, 1992.

Harman, Graham. *Object-Oriented Ontology: A New Theory of Everything*, (London: A Pelican Book, 2018), 157.

Harman, Graham. Bells and Whistles. Wichester: Zero Books, 2013.

Harman, Graham. *Inmaterialism*. Cambridge: Polity, 2016.

Harman, Graham. *The Quadruple Object*. Winchester: Zero Books, 2011.

Harman, Graham. *Towards Speculative Realism: Essays and Lectures*. Winchester: Zero Books, 2010.

Harman, Graham. Interview by Skepoet. Disloyal Opposition to Modernity (blog), June 1, 2012. http://disloyaloppositiontomodernity.blogspot.com/2012/06/marginalia-on-radical-thinking_1.html?q=graham+harman.

Harman, Graham. *Prince of Networks*. Melbourne: re.press, 2009.

Harman, Graham. Guerrilla Metaphysics. *Phenomenology and the Carpentry of Things*. London: Open Court, 2005.

Harman, Graham. *Tool Being*. London: Open Court Publishing Co, 2002.

Harman, Graham. *Weird Realism: Lovecraft and Philosophy*. Winchester: Zero Books, 2016.

Kipnis, Jeff, in conversation with Graham Harman. "On Enchantment". Youtube video, conversation on April 12, 2017, posted by "Sci-Arc Media ARchive, September 10, 2017. https://www.youtube.com/watch?v=VDUNEGM12B0

Koolhaas, Rem. *SMLXL*, New York: Monacelli Press, 1994.

Lovecraft, Howard Phillips. The Call of Cthulhu. London: Createspace Independent Publishing Platform, 2017.

Lucan, Jacques. *Composition, Non-Composition*. Translated by Theo Hakola, Oxford: EPFL Press, 2012.

Rose, Barbara. "ABC Art". In *Minimal Art: A critical anthology*. Edited by Gregory Battcock. London: University of California Press, 1995.

Vidler, Anthony: "The Third Typology". In *Architecture Theory since 1968*, edited by Michel Hays. New York: Columbia Books of Architecture, 2000.

7.6.2 List of figures:

Figure 6-1: Precis des leçons d' architecture, J.N.Durand, 1975
Jacques Lucan, *Composition, Non-Composition*, trans. Theo Hakola (Oxford: EPFL Press, 2012), 38.

Figure 6-2: Constructive Schemes of a Housing Unity, Walter Gropius, 1927.
Giulio Carlo Argan, *Walter Gropius y la Bauhaus*, (Barcelona: Actar, 2004), 137.

Figure 6-3: Ora questo è perduto, Aldo Rossi, 1975.
Rafael Moneo, *Inquietud teórica y estrategia proyectual*, (Barcelona: Actar, 2004), 112.

Figure 6-4: Lake Shore Drive, Mies van der Rohe, 1951.
"860-880 North Lake Shore Drive." Chicago Architecture Foundation. Accessed June 25, 2018. http://www.architecture.org/architecture-chicago/buildings-of-chicago/building/860880-north-lake-shore-drive/

Figure 6-5: Piling Process Elevations 12.0, Jordi Vivaldi Piera, 2018.

Figure 6-6: Piling Process Render 12.0, Jordi Vivaldi Piera, 2018.

Figure 6-7: Piling Process Render 14.2, Jordi Vivaldi Piera, 2018.