THE BODY OF CULTURE: ARCHITECTURE AND PRESENCE IN THE UNIVERSE OF TECHNICAL IMAGES

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Orientador: Roberto dos Santos Bartholo Junior

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Io sono una forza del Passato
Solo nella tradizione è il mio amore.
Vengo dai ruderi, dalle Chiese,
dalle pale d'altare, dai borghi,
dimenticati sugli Appennini o le Prealpi,
dove sono vissuti i fratelli.
Giro per la Tuscolana come un pazzo,
per l'Appia come un cane senza padrone.
O guardo i crepuscoli, le mattine,
su Roma, sulla Ciociaria, sul mondo,
come i primi atti del Dopostoria,
cui io assisto per privilegio di anagrafe,
sull'orlo estremo di qualche età
sepolta. Mostruoso è chi è nato
dalle viscere di una donna morta.
E io, feto adulto, mi aggiro
Più moderno di ogni moderno
A cercare fratelli che non sono più.

Pier Paolo Pasolini, "10 giugno" (1962).

Dedicatória

Este trabalho é dedicado à memória de meus avós Nadir, Nelson, Alda e José.

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O CORPO DA CULTURA: ARQUITETURA E PRESENÇA NO UNIVERSO DAS IMAGENS TÉCNICAS

Felipe Guimarães de Souza Fernandes Loureiro

Agosto/2022

Orientador: Roberto dos Santos Bartholo Junior
Programa: Engenharia de Produção

Segundo o filósofo Vilém Flusser, a consciência histórica surgiu, no Ocidente, como um produto de uma cultura baseada em textos lineares. Esta cultura moldada pela escrita linear é a única que pode realmente ser chamada de "histórica" —as culturas que a precederam eram pré-históricas, e a nossa cultura atual, moldada pelas imagens técnicas geradas por aparelhos como *smartphones*, computadores e tablets é pós-histórica. Esta cultura tem se tornado cada vez mais abstrata, desmaterializando quase todos os meios que formavam o "corpo" da cultura anterior. Mas, enquanto desenhos, fotografias, livros, filmes e músicas foram largamente digitalizados, a arquitectura parece ser um dos últimos pontos de resiliência do mundo material.

Porém, até que ponto as formas pelas quais nos relacionamos com nossos edifícios e cidades—e principalmente as formas pelas quais analisamos e valorizamos estes objetos—ainda são baseadas em critérios históricos? No cada vez mais abstrato universo das imagens técnicas, seria a materialidade da arquitectura uma presença ahistórica conectando mundos diferentes, ou um problema a ser superado? Esta tese explora estas questões, com a intenção de traçar estratégias para ajudar os arquitetos de hoje a estruturar nosso espaço existencial em termos que possam ser compreendidos nesta nova era, moldada por gestos que parecem não ter nenhum precedente histórico.

Abstract of Thesis presented to COPPE/UFRJ as a partial fulfillment of the requirements for the degree of Doctor of Philosophy (Ph.D.)

THE BODY OF CULTURE: ARCHITECTURE AND PRESENCE IN THE UNIVERSE OF TECHNICAL IMAGES

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According to philosopher Vilém Flusser, the emergence of historical consciousness in the Western world was a product of a culture based on linear writing. This culture shaped by linear writing is the only one that can really be called "historical"—the cultures that preceded it were prehistorical, and our current culture, shaped by the technical images produced by apparatuses like smartphones, computers and tablets, is posthistorical. This increasingly abstract culture has engulfed almost all the media that made up the "body" of the previous culture, but while drawings, photographs, books, films and music have all become digital, architecture seems to be one of the last points of resilience of the material world.

However, to which extent are the ways in which we relate to our buildings and cities—and especially the way we analyse and value these objects—still based in historical criteria? In the increasingly abstract universe of technical images, is the materiality of architecture an ahistorical presence connecting different worlds, or a problem to be overcome? This thesis will explore these questions with the intention to devise strategies to help contemporary architects to structure our existential space in terms that can be understood and appreciated in this new era, shaped by gestures that seem to lack any historical precedent.

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1. Prologue

1.1. Motivation

In May 2022, the Royal College of Arts (RCA) unveiled its new studio building in London. According to critic Oliver Wainwright, the architecture of the 16.500 sqm complex, designed by Swiss architects Herzog & DeMeuron, "reflects a shift from art school to science-tech powerhouse" (WAINWRIGHT, 2022). This is surely not the first ontological shift in the institution's long history: founded in the neoclassical Somerset House in 1837 as the Government School of Design, the focus of the institution was expanded towards the teaching of art even before it received the name Royal College of Art, in 1896[1]. In the 1930s and 1940s, the teaching of graphic, industrial, product and fashion design were incorporated, and in 1967 the RCA moved to the nearby Darwin Building, a brutalist block designed by a team of staff members. Despite expanding to smaller campuses in Battersea and White City, the new studio building represents by far the biggest investment ever made in the institution, which may lead us to believe that the practice of art and design may be more valued than ever.

However, according to Wainwright, official discourse—both from the government and the RCA itself—seems more focused on "problem solving" than on artistic creativity, something that is expressed in the new building— "On the one hand it wants to be a hothouse of making, a power station of physical production. On the other, it is styling itself as a hi-tech research centre, pioneering marketable 'thought leadership' at the latest digital frontiers" (Ibid). This shift would be in accordance with the RCA's new five-year strategy: "to use interdisciplinary thinking to solve global issues" (Ibid). It may be argued that training in industrial and product design certainly includes a lot of problem-solving, and that some of RCA's most celebrated alumni—sculptors Barbara Hepworth and Henry Moore, painters such as David Hockney and Peter Blake, filmmaker Ridley Scott, etc—have surely tackled "global issues" through their work, but not exactly in the way the new studio building was built to stimulate.

Of course, the new strategy defined by the RCA may correspond only to a shift in the institution's strategy, but I do think that it symbolizes the way in which the Western

[1] Royal College of Arts—https://www.rca.ac.uk/more/our-history/

world—if we can still use this term— "looks" at art and design today. The idea that artists and designers must be trained to solve global issues sounds very in tune with what Evgeny Morozov calls "solutionism"— "Recasting all complex social situations either as neatly defined problems with definite, computable solutions or as transparent and self-evident processes that can be easily optimized." (MOROZOV, 2013, p. 5). For Morozov, solutionism is an ideology based on a *prometheic* view of technology that tends to oversimplify complex phenomena in order to make them viable for the application of technical solutions. Morozov borrows the term from the field of architecture and urban planning, "where it has come to refer to an unhealthy preoccupation with sexy, monumental, and narrow-minded solutions (…) to problems that are extremely complex, fluid, and contentious." (Ibid). Contemporary solutionism is surely not an unprecedented phenomenon, and neither is Morozov's critique—the author mentions predecessors such as "Ivan Illich's protestations against the highly efficient but dehumanizing systems of professional schooling and medicine, Jane Jacobs's attacks on the arrogance of urban planners, Michael Oakeshott's rebellion against rationalists in all walks of human existence", among others (Ibid, p. 7).

However, a specific trait of contemporary solutionism is particularly relevant: the fact that both the analysis of problems and the design of solutions are developed through electronic apparatuses such as computers, cameras, scanners, data processors, smartphones, etc. According to philosopher Vilém Flusser, these devices are "apparatuses" (FLUSSER, 2011) whose internal functioning is completely invisible, at least to most users. These apparatuses are "black-boxes" (FLUSSER, 2011): we know how to operate them, understand their demand for inputs and have an idea of the possible outputs—which are usually regarded as unbiased products of complex data-analysis. Apparatuses are especially useful for solutionism, and the proliferation of these devices seems to assert the spread of the solutionist ideology.

As a practising architect, it is fairly common for me to stumble into this "faith" in apparatuses: clients who believe that 3D renderings show exactly how a room is going to look, since "the computer simulates everything"; structural engineers who argue that a beam cannot be smaller because "the software will not allow it"; architects who are baffled when a finished building or space does not "look right", even after being modelled and simulated with the latest 3D software. In some cases—such as the latter—, I always felt that there was something wrong in the premise, not in the output or even in the process

that generated it. Some aspects of architectural design are less likely to be translated into the language of apparatuses, and thus working almost exclusively through apparatuses can surely feel, at times, like wearing a straitjacket. This happens because apparatuses work according to programs, so we must also program ourselves to a certain extent in order to work with them.

According to Morozov, the main problem behind solutionism is that its advocates usually have "a very poor grasp not just of human nature but also of the complex practices that this nature begets and thrives on" (MOROZOV, 2013, p. 7). Internalizing the programmatic logic of apparatuses, "It's as if the solutionists have never lived a life of their own but learned everything they know from books—and those books weren't novels but manuals for refrigerators, vacuum cleaners, and washing machines" (Ibid, p. 7-8). A quote by Michael Oakeshott clarifies the main tension behind Morozov's argument: "A cook is not a man who first has a vision of a pie and then tries to make it; he is a man skilled in cookery, and both his projects and his achievements spring from that skill." (OAKESHOTT in MOROZOV, 2013, p. 10). If cooking was just a matter of following recipes, we would need no cooks at all—cookbooks would be enough. However, anyone who has ever tried to follow a recipe knows that what a recipe can provide is only a set of guidelines—the process is so complex that even the most detailed description will never be exhaustive. I believe that the same can be said about art, design and architecture[2].

Of course there are many problems and global issues that can and must be addressed by architecture, and in many cases the use of apparatuses will be fundamental. However, the role of architecture in human existence goes far beyond problem-solving, and its "functioning" is not quite prone to the programmatic language of apparatuses. Architecture deals not only with the concrete structure of our lived world, but also with the images—spatial, temporal, aesthetic—that we build and nurture as our own, as fundamental building blocks of our Selves. The apparent tension between this understanding of architecture and the emerging "Universe of Technical Images"

[2] When Bruno Munari sketched the structure of his proposed design method (MUNARI, 2022, pp. 35-62), he illustrated it with the example of a recipe for "green rice" (rice with spinach for 4 persons). However, Munari not only includes the variable "C", meaning "creativity", but also underlines that this method is not definitive or conclusive, and should be constantly revised by designers in each specific project. As we will see in Chapter 4, Munari's method is basically a set of heuristics.

(FLUSSER, 2011) was the main motivation for the research that is presented in the following texts.

1.2. The Thesis At a Glance

The thesis was built as a development of a paper (LOUREIRO, 2015) presented at the second international conference of the International Society for The Philosophy of Architecture (ISPA), held at TU Delft in 2014 under the theme "Autonomy Reconsidered." The paper discussed the impact of the flusserian concepts of "apparatus" and "technical image", and most importantly of Flusser's model of cultural history, on the practice and experience of architecture. In this model, historical consciousness is interpreted as the product of a culture built on linear texts, and the replacement of linear texts by technical images marks the end of History, inaugurating the age of post-History (FLUSSER, 2011). From these concepts, I have analysed the evolution of architectural representation—following the critical summary made by Alberto Pérez-Gómez (PÉREZ-GÓMEZ, 1982)—and concluded that the descriptive geometry employed by architects and engineers in the eighteenth century could be understood as a "proto-apparatus" that was instrumental for the transformation of academic architects into "efficient designers".

Since the length of an article was surely too short to allow for a further inquiry into the possibilities of applying the overall flusserian view of culture not only to a study of the history of architecture—and perhaps most interestingly to a study of the history of architectural theory—but also to an interpretation of the contemporary status of the discipline, the text became an introduction to Chapter 2, in which these issues will be explored in more detail. Section 2.1. presents a "Declaration of Principles" in which I present my personal view of architecture, acknowledging the possible biases that may have shaped the discussion presented in the following sections—a synthetic analysis of the evolution of modern architectural theory, focusing on specific moments in which there are strong points of contact with Flusser's philosophy:

1. The systematization of linear perspective from the late Middle Ages to the Baroque period, when it culminated in what Dalibor Vesely identifies as the creation of a "divided representation" (VESELY, 2004);

2. The development of this divided representation into the abstract geometrical space of descriptive geometry, which can be interpreted as a "proto-apparatus"- as already presented in the introductory section;

3. The influence of the analytical design method created by Jean-Nicolas-Louis Durand, teacher of architectural design at the *École Polytechnique*, which represents a rupture with the academic training based on the classical tradition and introduces a way of thinking about architecture that can be seen as a "proto-program";

4. The functionalist utopias of modern architecture, in which the main model of reference is no longer the tradition built from Vitruvius to Neoclassicism, but the rational/scientific *modus operandi* of engineering;

5. The fragmentation of theory begun in the 1960's, in which the critique of modern architecture opens the discipline to the direct influence of other fields such as philosophy, literary theory, environmental studies and psychology;

6. And finally, the emergence of virtual space, the dematerialization of the creative processes through the use of apparatuses, and current discussions on materiality and different modes of presence[3].

Chapters 3 to 7 consist of papers written—and most of them published—during the research process. From the overall review of architectural theory presented in Chapter 2, Chapter 3 (published as LOUREIRO and BARTHOLO, 2019) presents a sort of case-study, analysing the architectural copies recently produced in China through the lens of another flusserian concept: the idea that "each language not only expresses a different view of reality, but shapes and creates a different reality" (FLUSSER, 2017). Following this idea, and combining it with the dialogical approach proposed by Martin Buber through the I-It / I-Thou dichotomy, and with Karsten Harries' view that architecture is a representational art (HARRIES, 1997), these Chinese copies—often regarded in the West as mere pastiches—are understood not only as publicity stunts or products of hyper-modern cultural tourism, but also as symbols of cultural affirmation and potential dialogical tools.

In Chapter 4 (published as LOUREIRO et al, 2020a), we go back to the concepts of apparatus and technical image, analysing the architectural models generated by BIM (Building Information Modelling) technologies as contemporary cultural artifacts. The effectiveness and limitations of BIM technologies in the conception and perception of

[3] In this final section, I have chosen to limit my analysis to authors already covered in anthologies and handbooks. Of course, this leaves behind many recent contributions, but the task to gather and analyse such a prolific production was beyond the scope of this thesis. This choice will be further explained and justified at the end of Chapter 2.

architecture are contrasted with the haptic experience of physical space—interpreted through the concepts of meaning effects and presence effects, presented by Hans Ulrich Gumbrecht (GUMBRECHT, 2013)—and with the heuristic, non-algorithmic nature of design, as argued by Billy Koen (KOEN, 2022). This critique leads to the development of an approach in which architecture is seen not—or at least not only—as the spatial and plastic expression of abstract concepts, but as "the art of multiplying presences".

Chapter 5 presents a similar approach, but in a different scale. The concept of Smart City is analysed from an admittedly sceptic viewpoint, based on Flusser's arguments underlining the opacity of apparatuses—and also in the clear risks of overtly optimistic solutionism—and developed into a comparison between the utopian plans of modern urbanism and the programs that some believe to be able to make our cities function in an efficient and sustainable way. Although the current model may seem to be innovative and immune to the failures of modern utopias, it is argued that plans and programs may not be that different after all, and that programs can actually become a real threat to the political dimension of city life.

In Chapter 6 (published in Portuguese as LOUREIRO et al, 2020b), this political dimension is considered in another context. Combining the flusserian theory of technical images with concepts presented by Hans Belting—specially the image-medium-body triad (BELTING, 2005)—the paper presents a simple argument: beyond all materiality, all heritage is intangible. This idea is also strongly based on the buberian notion that the relation with "the other" is the essence of being human, which leads to the acknowledgement that the context in which we encounter an object can turn it into a Thou or an It. Thus, it is argued that preservation efforts should focus not only on the physical maintenance of valued objects, but also consider the preservation of the spatial relation between subject and object.

While Chapter 6 focuses on the immaterial aspects of material objects, Chapter 7 (published as LOUREIRO and BARTHOLO, 2021) presents a symmetrical point of view. Although our culture has apparently become increasingly immaterial in the last few decades, Victor Buchli argues that "the immaterial is always produced materially" (BUCHLI, 2016), and that the tension between these two dimensions plays a fundamental role in the development and establishment of our own personal and collective ontologies. Following the flusserian idea that the cultural medium that is prevalent in a society will most likely shape its ontology, the paper argues that the fact that our culture is already

organized with and through electronic apparatuses—and the apparently immaterial images they generate—seems to be stretching the software/hardware dualism towards a development of the ages-old mind/body dichotomy. In order to explore this possibility, the paper follows a "lead" taken from Buchli and traces parallels between contemporary digital apparatuses and the role of religious icons in late Antiquity, focusing on the ontological structures anchored in these apparently widely different media.

In Chapter 8, the overall conclusions are presented. Drawing on Frye's notion that mythology is "the embryo of literature and the arts", and that "science does not grow out of mythology, so it can never replace mythology" (FRYE, 1980, p.7), it is argued that, even though modern architecture has in fact established a new tradition, the foundations for this tradition are not really as scientific as most of its propagandists seemed to believe. Architecture is still born out of mythology, and the modern myth of technological prometheism is still strong in the universe of technical images. According to Eliade (1954), rituals re-enact myths, and thus an approach built on ahistorical archetypes is proposed as a possible way to "update" this notion to an age shaped by *gestures*—in the flusserian sense (FLUSSER, 2015)—that seem to lack any historical precedent. The "mythification" of these gestures is thus seen as one of the main tasks of contemporary architecture.

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2. *Ars sine scientia nihil est* -Architectural Theory and Modern Science

2.1. Preface - A Declaration of Principles

Before endeavouring into a deeper reflection on theoretical and historical issues, I feel obliged to declare my intentions and acknowledge my biases. First of all, being an architect, I have my own vision of architecture, shaped both by theory and practice. This vision is constantly revaluated, but its foundations were already fairly established when I had my first contact with the work of Vilém Flusser. Therefore, my interpretation of the impact of flusserian concepts on architecture may surely be focused on the impact on my personal conception of architecture. In order to make this clear, I shall provide a short "declaration of principles".

My most fundamental understanding of architecture is based on the notion of *existential space*, as proposed by Christian Norberg-Schulz: "'Existential space' is a psychological concept, denoting the schemata man develops, interacting with the environment, in order to get along satisfactorily. (…) The relationship between man and environment is therefore a two-way process, a real interaction" (NORBERG-SCHULZ, 1971, p. 37). In my presentation at the 12th International Bauhaus-Colloquium, held at the Bauhaus-Universität Weimar in 2013, I have tried to illustrate this interaction with the following sketch:

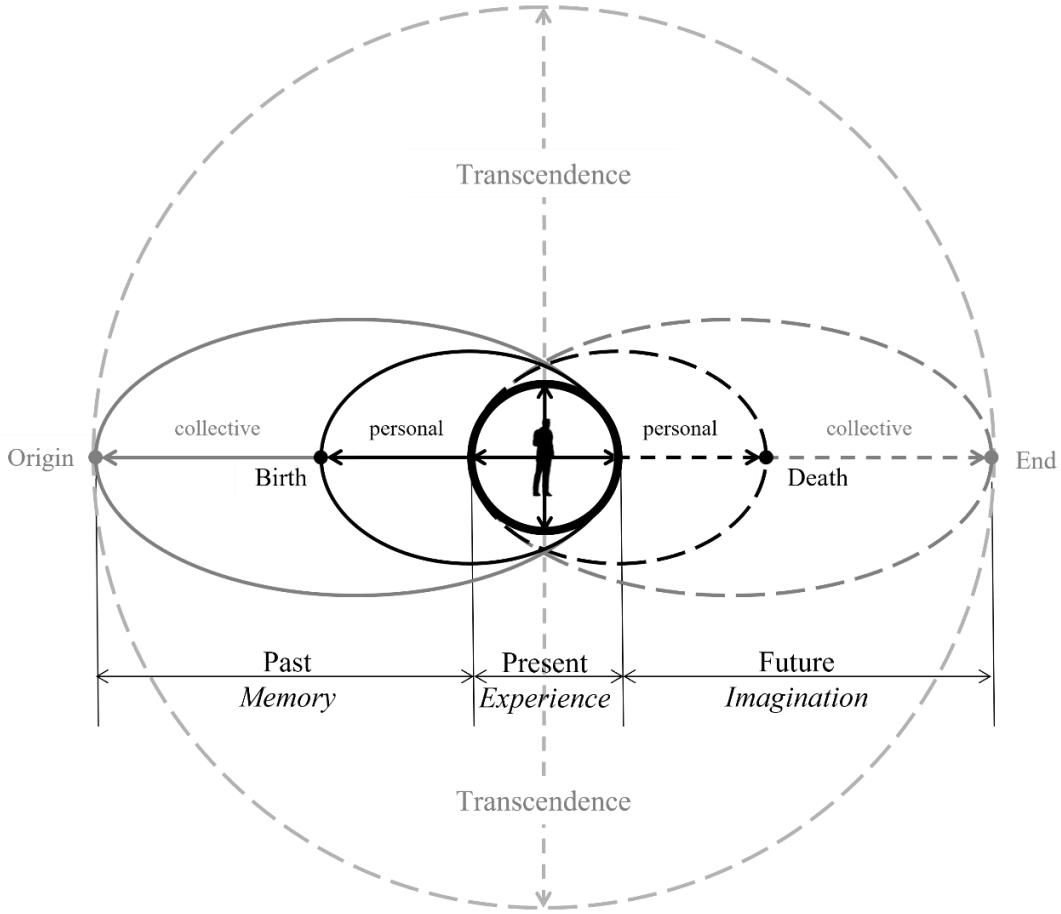

Figure 1 – The various dimensions involved in the interaction "between man and environment". (LOUREIRO, 2013).

According to Norberg-Schulz, architecture is a concrete phenomenon that has always meant to help human beings to give meaning to their existence. Architecture translates existential meanings—derived from natural, human and spiritual phenomena—into spatial forms. In architecture, form means place, length, area—the concrete structure of human environment—, and thus *architectural space* can be defined as "a concretization of man's existential space" (Ibid, p. 12). Architectural space is an artistic space that expresses—most times unintentionally—the structure of the world as a real *imago mundi*. Norberg-Schulz uses the term *aesthetic space* to refer to the ways in which the translation from existential space to architectural space occurs; therefore, aesthetic space is "the theory of architectural space"— "The creation of expressive space has always been the task of specialized persons, that is, builders, architects and planners, while aesthetic space has been studied by architectural theorists and philosophers" (NORBERG-SCHULZ, 1971, p. 11).

These concepts are deeply rooted in phenomenology, relying mostly on the philosophy of Martin Heidegger. Norberg-Schulz published most of his theoretical texts in 1960s and 1970s, a period in which the "fragmentation of theory" (MALLGRAVE and GOODMAN, 2011, p. 17) introduced many new approaches to architecture, most of them building on the translation of concepts from other disciplines—especially philosophy and literary studies—to the field of architectural thought and practice. However, Norberg-Schulz felt that most of these approaches were ignoring the interaction that he saw as fundamental in the understanding of existential space: "We may thus conclude that recent studies on the concept of space in relation to architecture have either tended to leave man out by discussing abstract geometry, or have made man 'enter' by reducing space and architecture to impressions, sensations and studies of 'effects'" (NORBERG-SCHULZ, 1971, p. 14). By mentioning impressions, sensations and effects, Norberg-Schulz includes even other phenomenological endeavours, which focused on the interaction with the environment but on a more analytical way and/or with a focus on psychological effects, dismissing the existential dimension of spatial experience—he mentions recent (1971) studies by Vogt-Göknil, Günther Nitschke, Jürgen Joedicke, and Michael Leonard.

The same could be said about the metaphors and analogies inspired by literary theories, which became popular in the 1980s; the formal explorations of the 1990s, based on 3D software and biologic analogies; and the pragmatic diagrams of the 2000s (VIDLER in SYKES, 2010, p. 249)—and we may include here some of the contemporary experiments with algorithms and programming languages. None of these approaches seem to consider the idea of existential space, focusing on the architectural expression of aesthetic, geometrical and technological concepts. Apart from influencing Kenneth Frampton's development of the concept of Critical Regionalism, the strongly Heideggerian phenomenology of architecture proposed by Norberg-Schulz would only gain more resonance in the field of architectural theory in the late 1990s, through architects and authors such as Juhani Pallasmaa, Steven Holl and Alberto Pérez-Gómez —however, their phenomenology is much more inclined to that of Merleau-Ponty, and includes the analysis of recent findings in neurosciences (MALLGRAVE and GOODMAN, 2011, p. 211).

What I personally find particularly appealing in Norberg-Schulz's theory is the fact that, despite being based on philosophical concepts, it is an essentially "architectural" approach to architecture, in the sense that it considers architecture as a form of knowledge

on its own, and not the spatial or concrete expression of aesthetic, political or even philosophical concepts. Architecture is not meant to express Heideggerian concepts, but these concepts can help us to understand architecture, which exists and operates "by itself". This notion is summarized by Swiss architect Peter Zumthor, who became a prominent figure in architecture in the early 2000s: "Architecture has its own realm. It has a special physical relationship with life. I do not think of it primarily as either a message or a symbol" (ZUMTHOR, 1999, p. 13).

This does not mean that architects should close themselves inside the boundaries of the field, as loose and fuzzy as these boundaries may be. It is fundamental to consider architecture's "expanded field" (VIDLER in SYKES, 2010), a notion that may sound contemporary but that is already present in Vitruvius' defence of liberal education as a vital part of an architect's training. Architecture must be open to all possible fields of investigation, absorbing influences from the arts, sciences, technology, etc., without losing its autonomy. In this sense, K. Michael Hays proposes the infinitive "to architect" —*arquitetar*, in Portuguese—as a way to

> seek after architecture as a specific mode of knowledge; to perform presently a specific activity for the purpose of prolonging or continuing the practice historically authorized as architecture, but which cannot now be done in the same way; to select from among other possible practices (dancing, writing, filming, designing, etc.) this particular course of action; to set it next to other systems; to intend architecture; to desire architecture (HAYS in SYKES, 2010).

The attitude proposed by Hays expands the field of architecture by understanding it as "a domain of cultural representation", an autonomous—but not closed or self-referential— "kind of socially symbolic production whose primary task is the construction of concepts and subject positions rather than the making of things" (HAYS, 2010, p. 1). This broad view is necessary because architectural space, being the concretization of existential space, is not an individual creation or expression, but the product of what Howard Davis calls a "building culture"— "the coordinated system of knowledge, rules, and procedures that is shared by people who participate in the building activity and that determines the form buildings and cities take" (DAVIS, 2006, p. 3). The existential space that is made concrete is necessarily a collective creation, the result of a constellation of interactions between architects, clients, builders, suppliers, workers, authorities, etc. There are, therefore, two different kinds of "relational space": the one

defined by the interaction between those involved in the production of architectural space and then, later, another one that will be created by interactions that will take place in and around the building.

This first relational space has changed dramatically in the last few decades, since most contemporary building cultures are challenged by unprecedented levels of specialization and fragmentation. Analysing the building culture of medieval cities, Davis identifies "continuities of building form, materials, and techniques" that allowed many members of society to share "understandings of building form well enough that simple agreements could be made with confidence directly between owner and craftsmen" (Ibid, p. 43). Today, many buildings are the product of the combined work of dozens of specialists, and all design and management specialists work through apparatuses whose inner functioning they ignore completely. Even architects, those who are supposed to be the overall surveyors of conception and, in some cases, construction, also work through black boxes. The disintegration and fragmentation that some architects proposed as new and exciting forms of architectural expression may be most present not in the shape of our buildings, but in our building culture.

The second relational space has also been transformed by the addition of a "digital layer". Even historic buildings, whose shape may have been kept intact for centuries, are now part of the universe of technical images—they exist not only as buildings, as they always did, but also as photographs, videos, interactive 3D models, memes. Communication technologies have changed the way people interact with space, with objects, and with other people. and all of these changes have a deep impact in the relational space created by buildings. This became evident during the lockdowns caused by the global COVID-19 pandemic—millions of people all around the world were forced to develop new models of interaction, exploring new modes of presence that seem to be completely unprecedented.

In this context, it is urgent to affirm the task of the architect "to help man to find an existential foothold by concretizing his images and dreams" (NORBERG-SCHULZ, 1971, p. 114). This foothold is not only physical, but also theoretical, founded on representations of a shared reality. As Dalibor Vesely puts it, "What we normally refer to as reality, believing that it is something fixed and absolute, is always a result of our ability to experience, visualize, and articulate—in other words, to represent so as to participate in the world" (VESELY, 2004, p. 4). Architects have always contributed to this

participation, creating and/or spreading new forms of representation of the world, from the pyramids to 3D models. This thesis is an attempt to devise strategies to help contemporary architects to conceive relational spaces that may be able to provide an existential foothold in an era of radical transformations.

2.2. Introduction - Architecture and the flusserian Model of Cultural History

The use of 3D renderings—computer generated images that can look very realistic, some of them being easily mistaken for photographs—is widespread in both architectural practice and education. At first glance, these images seem to be incredibly useful for the communication between architects, clients and the general public, since they appear to offer a very clear and detailed vision of the final "product." However, my experience as a practising architect led me to believe that this apparent accuracy is misleading, and that it can actually be counter effective. The "realism" of these images forces architects to be highly precise about aspects that were only supposed to come up at later stages, and they can also trick clients into approving a "beautiful picture" instead of a clearly expressed architectural idea. In addition to these concerns, the indiscriminate use of these images seems to reinforce the idea that a building—or space, in broader terms—is mainly something to be experienced visually, and that a good building or space is one in which our eyes are constantly looking at "good pictures." This picturesque understanding of architecture not only neglects the haptic experience of space, flattening volumes into surfaces and space into perspectives, but it also reduces the work of the architect to the composition of pictures. As an architect, I cannot feel at ease with this reduction, and this unsettling led me to pursue a deeper understanding of the way we experience architectural images.

Figure 2 - A “photo-realistic” architectural rendering.

Source: https://www.cgtrader.com/blog/architectural-3d-renderings-that-look-too-real-to-be-true

Figure 3 - Architectural rendering / Finished building.

Source: http://99percentinvisible.org/article/renderings-vs-reality-rise-tree-covered-skyscrapers/

In his 1985 book *Ins Universum der technischen Bilder*, philosopher Vilém Flusser presents a “model of cultural history” consisting of five rungs that symbolize different

moments, each one being defined by a specific medium which prevailed in "the task of transmitting information crucial to society and to individuals" (FLUSSER, 2011, p. 5). At first, we could only express ourselves and transmit any kind of knowledge through our actions. Then, through the creation of objects, we could perpetuate these actions, leaving their imprints in artifacts which could still speak for us when we were no longer present. These objects have thus created culture and were the first medium for transmitting and perpetuating it. Later, images which depicted or symbolized objects and actions became even more relevant than the objects themselves. These images, such as cave paintings, are what Flusser calls traditional images. They were eventually supplanted, around four thousand years ago, by linear texts, which explained images, creating what he calls the "historical level." Much more recently, texts have collapsed, "into particles that must be gathered up. This is the level of calculation and computation, the level of technical images" (Ibid, p. 7)—images created by apparatuses such as cameras, computers and TV sets.

This model gives us an image of a linear process in which Man is constantly stepping back from the direct experience of the world, going deeper and deeper into abstraction. However, though new rungs are added, the previous ones are not lost or forgotten—they are simply different worlds, created and shaped by different media. Figure 4 is an attempt to sum-up and illustrate Flusser's model.

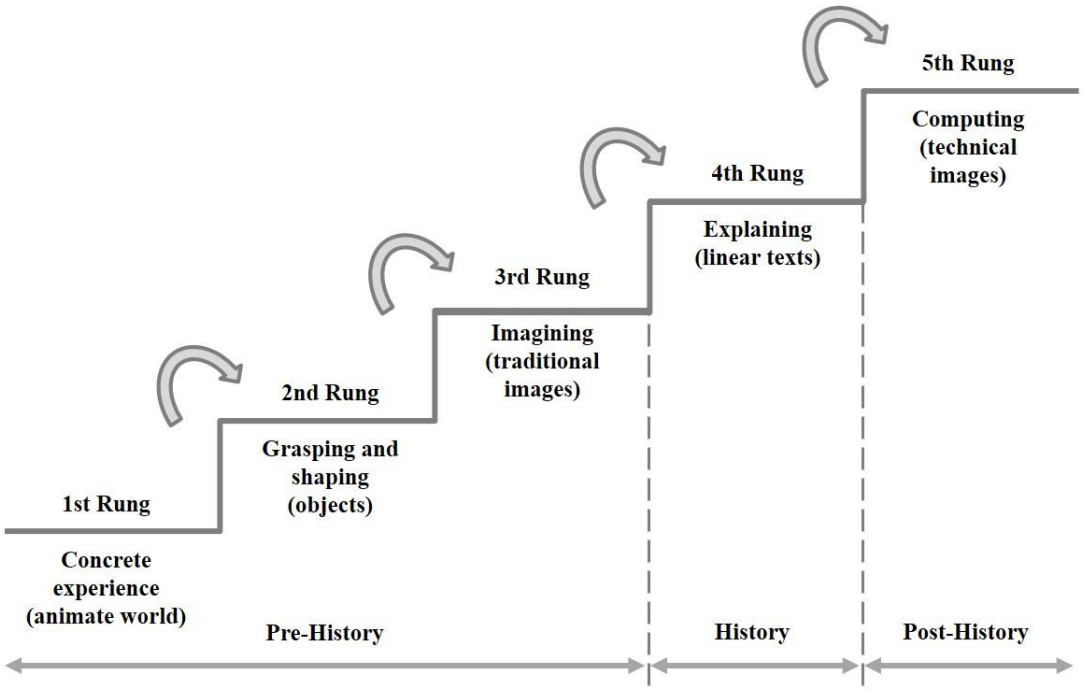

Figure 4 - Illustration of the model proposed by Flusser (LOUREIRO, 2014).

Flusser calls the fifth rung, shaped by the prevailing of technical images, "a new, dimensionless level, one to be called, for lack of a more positive designation, 'posthistory.'" (Ibid, p. 15) The term "posthistory" rises from the notion that History was created by writing, whose linear logic shaped the dominant ontology of an era, and that the prevalence of technical images—which are non-linear, but rather two-dimensional—marks the end of History. Today, the logics of linear writing no longer apply to the way we experience culture, and this experience influences the way in which we perceive reality as a whole. Regarding the production of images, for instance, technical images are made by envisioners, whereas traditional images were created by image makers.

> The gesture of the envisioner is directed from a particle toward a surface that can never be achieved, whereas that of the traditional image maker is directed from the world of objects toward an actual surface. The first gesture attempts to make concrete (to turn from extreme abstraction back into the imaginable); the second abstracts (retreats from the concrete). The first gesture starts with a calculation; the second starts with a solid object. (Ibid, p. 21)

Photographers, for instance, work through an apparatus—a camera—and they, "can only desire what the apparatus can do. Any image produced by a photographer must be within the program of the apparatus." (Ibid, p. 20) The apparatus is itself a kind of medium through which the envisioner works and thinks, since "not only the gesture but also the intention of the photographer is a function of the apparatus. […] a human intention works against the autonomy of the apparatus from the inside, from the automatic function itself." (Ibid, p. 20) Photography provides us with a great example of how we work through and with apparatuses in order to create technical images, but it also gives way for a confusion regarding the essence of these images. Photographs can be seen as snapshots of reality, which arise, "through the capturing and holding of approaching particles or waves from the environment," (Ibid, p. 42) but these depictions are essentially different from those made through traditional images. This can be easily understood if we consider their essential similarity with computer-generated images:

> The photographer visualizes a house as houses seems to be in the outside, objective world. Then he takes an apparatus in hand to "grasp" (with concepts such as "perspective" or "shutter speed") what he has visualized. The apparatus calculates these concepts automatically, and the photographer presses a button to release the machine to carry out these calculations, making the vision of the house into an image. The computer operator visualizes an airplane as one might be found in the outside world. Then he takes an apparatus in hand […] to "grasp" what he has visualized […]. The apparatus calculates these concepts automatically, and the computer operator presses on the keyboard to make the apparatus carry out these calculations, making a visualization of an airplane

> appear on the screen. The same power to envision is at work in both cases, that of the photographer and of the computer operator, only it is more evident with the computer operator, who is more conscious than the photographer of this power. (Ibid, p. 43)

At first, these two kinds of images seem to be very different: the photograph of the house can be seen as a depiction, while the airplane drawing could be understood as a model. However, they are both models. In the example above, Flusser is talking about an activity which was created by an apparatus—there were no photographers before there were cameras—and another which already existed, but that was re-created by the use of an apparatus. Architects and designers have always worked with handmade drawings, and now most of them use computers for drawing. We can say that the handmade drawings were traditional images, and that they were depictions of what the designer or architect had in mind—they were depictions of visions, and these image makers knew how to build these images. On the other hand, anyone can take a picture without understanding how a camera works, and how photographs are built. The camera is what Flusser calls a black box—a mysterious apparatus that blindly, "transforms the effects of photons on molecules of silver nitrate into photographs." (Ibid, p. 16) It is opaque, impenetrable.

Referring to his own work process, Flusser describes the functioning of his typewriter, which can be clearly understood and seen as an extension of his fingers: "I can watch as each pressed key sets a hammer in motion that strikes the intended letter onto the page and how the carriage moves to make way for the next letter." (Ibid, p. 24) The typewriter is transparent, and Flusser seems to believe that this transparency makes it adequate for the craft of writing: "When I write, I write past the machine toward the text." (Ibid, p. 36)

This happens because the typewriter is not a medium, but only a tool. The medium is linear text, which can be handwritten, typed, carved in stone, etc. The act of typing was obviously created by the typewriter, but apparently writers learned to use it as instinctively as their predecessors used their hands and tools. Writers have not become 'typists.' On the other hand, an opaque apparatus does something, which we do not understand, in a way that is invisible to us. Its working has no connection or resemblance to human actions, only its interface can be recognizable. Analysing the development of human-computer interfaces, Bill Verplank argues:

> Piaget described three stages of learning. We are born with ENACTIVE or kinesthetic knowledge; we know how to grasp and suck. At a certain age we

> pay more attention to how things look; our ICONIC thinking is mistaken for example by a tall glass as "more." Only at a certain age do we understand conservation; then we are ready for SYMBOLIC thinking. […] The development of human-computer interfaces has followed the opposite path. The first interactive computers used teletypes (TTY) and the style of interaction was a dialog of symbols; I type and the computer types back at me. […] with the invention of mouse and bit-map display, the iconic graphical "direct manipulation" interface became the dominant style. This progression suggests that the next stage is enactive interfaces. (VERPLANK, 2009, p. 22)

It is interesting to see that Flusser's model for cultural history is quite similar to Piaget's model for human development, and how human-computer interfaces apparently developed in the opposite way, becoming increasingly intuitive. With touchscreens and gesture recognition, this interaction seems much closer to the way we interact with concrete objects, but the process has become even more opaque, since we do not even have to know how to operate the apparatuses—they can read us, understand our gestures, decode and compute them. The apparatus offers a field of possibilities, through which we can browse by repeating recognizable gestures—thus, to a certain extent, it is the apparatus which operates us. It can capture and translate our apparently instinctive gestures, but we have to 'speak' its language. The 'direct manipulation' interface is still dominant, and the opaqueness of the apparatuses is transferred to the images they generate. Flusser states that technical images can never be true nor false—they can only be regarded as probable or improbable. This notion becomes quite clear if we consider how easy it is to manipulate technical images. With Photoshop and other similar software, photographs can be edited in a radical but imperceptible way. We can only tell that a photograph was edited when the editing goes too far, making it look improbable. This reveals how the "reality" of technical images is misleading, which led Flusser to state that "the basis for the emerging universe and emerging consciousness is the calculation of probability. From now on, concepts such as 'true' and 'false' refer only to unattainable horizons, bringing a revolution not only in the field of epistemology but also in those of ontology, ethics, and aesthetics." (FLUSSER, 2011, p. 17)

This revolution has surely affected architecture in many different ways. In his 1982 essay Architecture as Drawing, Alberto Pérez-Gómez describes the development of architectural drawing throughout history, focusing on the Renaissance notion that architectural drawings were images of an architectural idea, "implying 'look', 'semblance', and 'form."

> While the traditional builder, a primeval poet (from the Greek poiesis, to make) made his thoughts into building through the implementation of an operational geometry (in the original sense of giving human dimension to external reality), the Renaissance architect articulated the necessarily "abstract language" of walls, openings, and columns in architectural drawing, by means of plans (ichnographia), elevations (orthographia) and profiles or sections. (PÉREZ-GÓMEZ, 1982)

These drawings were never understood as pictures of the future building—they represented an idea, "to be fulfilled in the building." Since most architects were deeply involved in the construction process, they were also responsible for turning this idea into reality. Thus, architectural drawings formed, "an autonomous realm of expression," somehow independent from architecture itself—but always aiming for it.

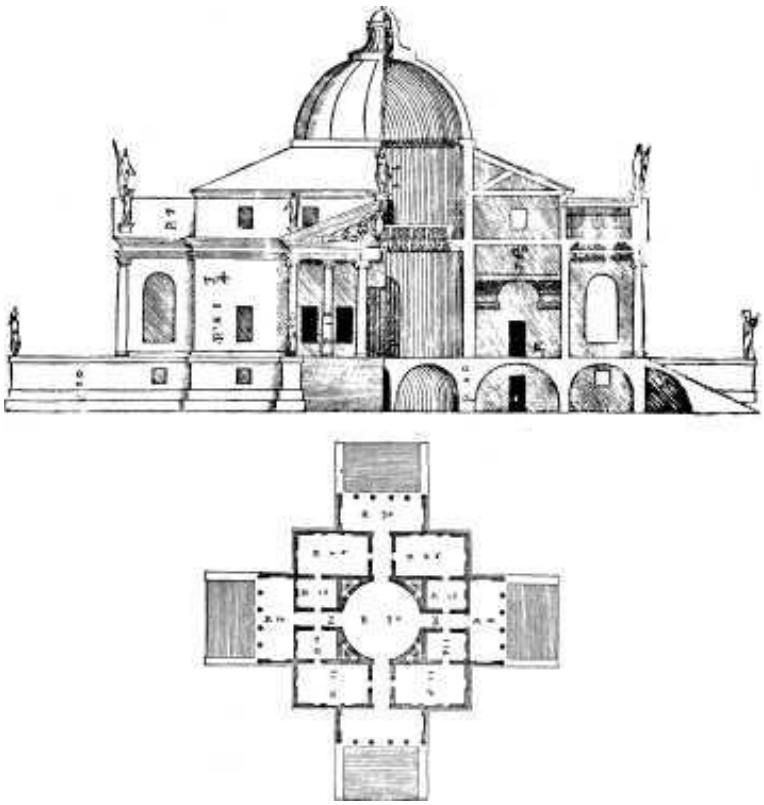

Figure 5 - Palladio's (1508-1580) drawings for Villa Capra or "*La Rotonda*", 1591.

Source:

https://en.wikipedia.org/wiki/Villa_Capra_%22La_Rotonda%22#/media/File:PalladioRotondaPlan.jpg

Figure 6 - Palladio's Vila Capra.

Construction was guided by the drawings, but these were not seen as an exact image of the future building. Source: http://www.vicenza-unesco.com/villa-almerico-capra-la-rotonda.html

During the 18th century, the development of descriptive geometry allowed architects to elaborate geometrically precise drawings. Architects could then distance themselves from the building site, drawing, "universal projections that could […] be perceived as reductions of buildings, creating the illusion of drawing as a neutral tool that communicates unambiguous information, like scientific prose." (PÉREZ-GÓMEZ, 1982) We can thus say that descriptive geometry is the "mother" of photography, since these drawings created the same illusion created by photographs—that of an impartial, direct depiction of reality. These "realistic" drawings have freed architects from the craft of building, turning them into "efficient designers." Thus, the craft of the architect changed from conceiving an architectural idea—that could be communicated through the abstract language of drawings—and getting it built, to conceiving and creating drawings that illustrated how parts of a building should be built. This is why, following the development of descriptive geometry, architects like Boullée and Ledoux created another meaning for architectural drawings:

> Their drawings constituted a set of theoretical projects that they assumed to be true architecture, in opposition to their actual buildings. Not surprisingly, both architects felt that architecture was deeply akin to painting. Thus architecture became primarily the making of the drawing (or the model), the same poetic act that has always magically revealed the truth of reality. (PÉREZ-GÓMEZ, 1982)

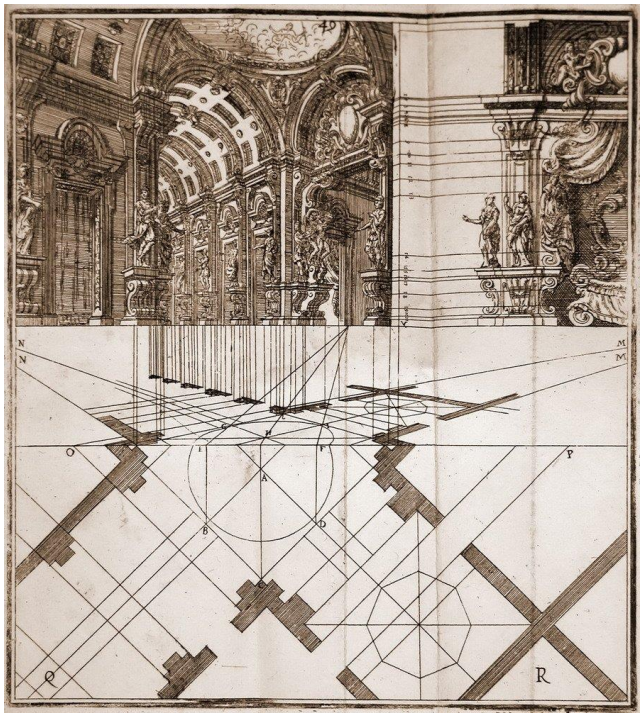

Figure 7 - Ferdinando Galli Bibiena (1657–1743), Plate 49, “Direzioni della Prospettiva Teorica”, 1732.

Source: https://drawingmatter.org/ferdinando-galli-bibiena/

The emphasis on this relation between architecture and painting may signal an attempt to keep the craft of architecture close to traditional imagery, protecting it from the proto-technical images created through descriptive geometry. Thus, at this point, we can say that there were two kinds of architectural drawings: instructional drawings made for the construction site and poetic drawings made for the expression of “true” architectural ideas. Although the poetic drawings to which Pérez-Gómez refers illustrated utopian, sometimes “unrealistic” buildings, actual buildings were still conceived through similar images, that is, from images of architectural ideas. If we compare them with those made by Renaissance architects, the only difference would be that these images were now developed and divided into a set of instructional drawings which would guide the construction process.

Today, most architectural drawings are made through apparatuses, and even handmade drawings are inserted into a world dominated by technical images. Figure 8 below combines the process described by Pérez-Gómez with the model presented by Flusser. The visualization of this combination seems to highlight the fact that the current role of architectural images does not seem to be quite clear.

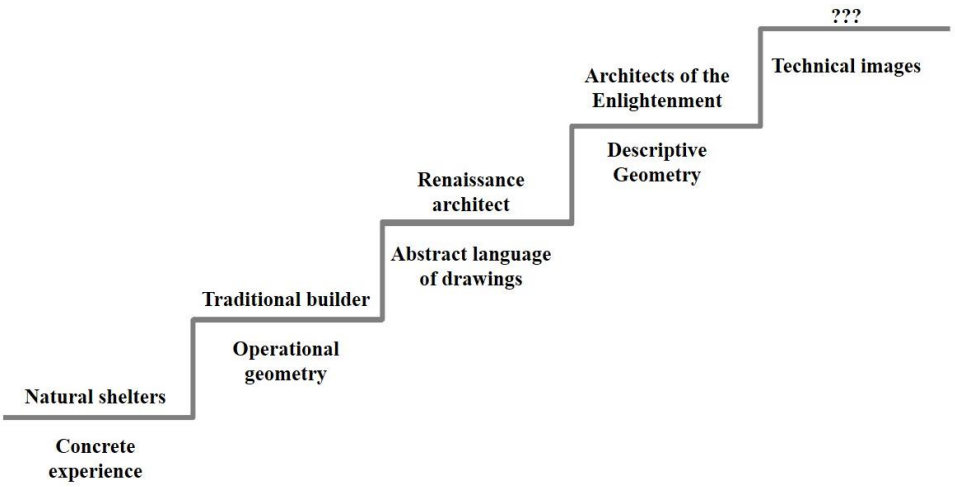

Figure 8 - A model of the history of architectural drawing, based on Flusser and Pérez-Gómez (Adapted from LOUREIRO, 2014).

In a 1990 lecture held in Budapest, Flusser states:

> The idea was that image should document politics. But, in the first half of the XX century, and more strongly after the Second World War, this relationship began to change. All of the sudden, politics were made in order to get into an image. The purpose of politics was an image—the purpose of the Arabs hijackers of airplanes was to be taken in television. Politics is aimed at being taken in an image. (KLENOY, 2011)

To a certain extent, the same inversion happened to architectural images Now, it is the picture that generates the building. Photo-realistic 3D renderings "look" real, as if they were photographs taken in the future, after the building is complete. Thus, these images are "models for photographs," and not depictions of architectural ideas. While most architectural drawings aim to represent a building which will only exist in the future, these images try to represent photographs that can only be taken in the future.

In a New York Times article on the role of renderings in the real estate market, Elizabeth A. Harris states that "the real purpose of these drawings is not to predict the future. Their real goal is to control it." (HARRIS, 2013) This idea of controlling the future by providing an apparently objective vision of it can be traced back to the 18th century architectural drawings, and has reached its peak with the apparent photorealism of computer generated images—which look even more objective and 'neutral.' However, to a certain extent, these images only exist as instructions to be interpreted by apparatuses. They have the same logic of the instructional drawings which made possible the creation of industrial design—they are a set of instructions, the numerical description of a

composition. This is the logic of programming, the internal logics of the apparatus which is, at the same time, tool, surface, and frame.

Becoming envisioners, architects have lost the connection to the craft of image-making. This affects the expression, representation and communication of architectural ideas, and also the construction of the ideas themselves. Descriptive geometry created the theoretical background for the emergence of photography, and technical images as a whole, since its "neutral" depiction is something like an apparatus; it is a system that is already somehow "outside" of the architect's mind, and through which he must work, keeping himself inside a limited field of possibilities.

The role of the architect, like we usually see it now, is still the one forged in the 18th century. By working through and with descriptive geometry, architects are almost like industrial designers, the main difference being that construction has remained a much less automated process. Industrial design, including not only the design of industrial products but of the machines themselves, was only possible after the creation of descriptive geometry—and, if we see it as a "mental apparatus," we can say that this apparatus has created industrial designers, as much as the camera has created photographers. After all, how could one conceive a machine to manufacture a product without being able to predict and translate the shape of the product with extreme precision? The machine had to be programmed.

Following the process described by Pérez-Gómez, we can sketch a progression that starts with the traditional builder, the primeval poet who worked directly on the building itself, develops into the role of the builder/ artist/intellectual of the Renaissance, who worked with abstract drawings while still being deeply involved with building, and moves forward to the efficient-designers of the Enlightenment, who made instructional drawings in their studios, detached from the construction site. Figure 9 demonstrates a growing separation between thinking and building, which was mediated by drawing. Now, we give instructions to an apparatus that "draws" instructional images, which will then be interpreted by the builder. However, with 3D printing, another apparatus is responsible for the production of the object itself. In this case, a software—which can be the same the designer uses for drawing—decodes and transmits instructions for the apparatus that is going to mould, cut, or sculpt the object. Thus, there is no need for dialogue between different people—architect and builder, or designer and production engineer; the dialogue happens between apparatuses, and it is obviously opaque to us. All the designer needs to

do is to give instructions to the software. Thus, we can say that this technology frees designers from having to create instructional drawings—they can focus exclusively on the creation of the object, of its form.

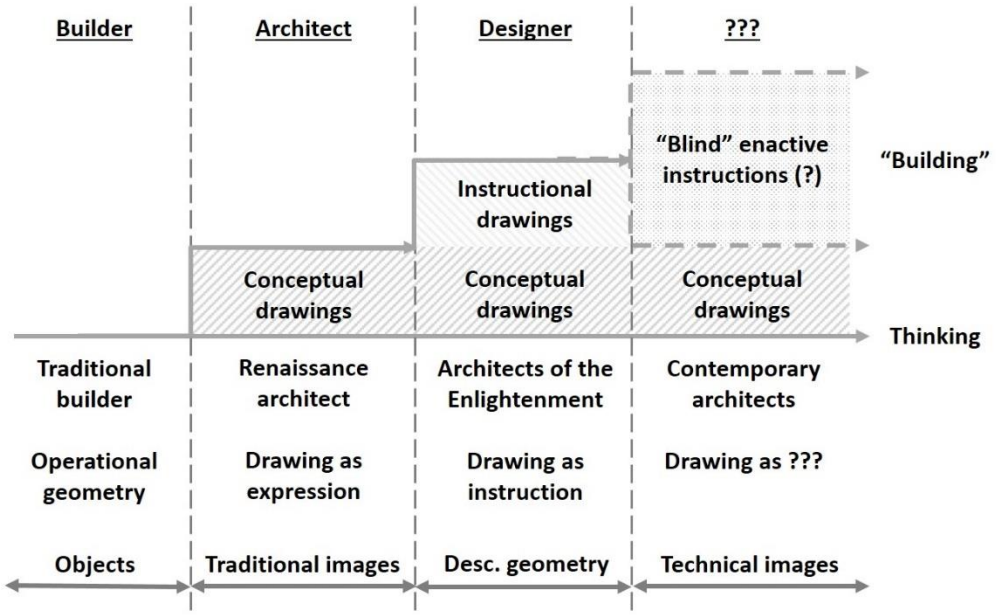

Figure 9 - From builder to architect, to designer, to…envisioner? (LOUREIRO, 2014).

In a fairly near future, 3D printers may become widespread, so that anyone will be able to design and print (build) objects. Thus, no instructional images will be needed at all. Would anyone need designers then? Or should we expect designers to be the ones creating the best conceptual models for printing? The dialogue between apparatuses may free architects and designers from the need to create instructional images, but can this freedom be demeaning to their practices? Bill Verplank believes that the development of enactive interfaces can bring us closer to the objects we shape, like the traditional builder mentioned by Pérez-Gómez:

> This direct engagement with the materials, producing immediate results, is what makes for a craft tradition. There is no time to step back and plan or abstract and analyse. We need no principles, textbooks or classrooms, only studios. Masters pass on their practices to apprentices; the only learning is by doing. The introduction of architecture and engineering as distinct from construction and manufacture made explicit the role of drawings and design. Are we returning to craft and forgetting design? (VERPLANK, 2009, p. 2)

Verplank seems to consider craft as a practical skill learned through imitation and repetition, and design as an intellectual activity for 'anticipation and reflection.' Many of us may share this notion, only using the word "craft" when talking about a hands-on

activity such as woodworking or shoemaking. These craftsmen use different tools and different gestures, whereas computers are now the main—if not the only—tool for intellectual work. Architects, engineers, lawyers and accountants work in similar workstations—desks with computers—and repeat the same gestures—typing and clicking. Thus, in physical terms, these activities have been levelled. These professionals work with different software, which provide different possibilities, but they are all envisioners. Their work is seen as a set of intellectual activities that can be reduced to the logics of programming—to information processing, to computation. Thus, while working, they can only imagine what was already imagined by the programmer, and this limitation can be really damaging to the poetic dimension of creative work.

Figure 10 - Rabih Hage, Hyde Park pavilion, London, 2008.

The shape of the pavilion comes from a crumpled sheet of paper, scanned and processed by 3D software. The project can be "printed" directly, with no instructional drawings needed, and the finished building will correspond exactly to the model.

Source: http://www.rabih-hage.com/architecture/fast-forward/

Architects and designers begin their work not by envisioning images or manipulating form, but by discovering and selecting possibilities in which—and with which—to work. We can only discover possibilities by imagining them, and everything that can be imagined can become a possibility. When working with black boxes, we can surely use our imagination to discover possibilities inside those provided by the

apparatus, but we are necessarily limiting our imagination, which was open to the whole of reality—as captured by our sensitive nature—to the program of the apparatus.

When we draw through apparatuses, we are necessarily creating a gap between thinking and drawing. Actually, we are not really drawing, but only giving instructions to an opaque, mysterious black box which will draw for us. Even though enactive interfaces can make this process more direct and intuitive, there is still this gap, this barrier—we are still losing something along the way. Pérez-Gómez refers to the platonic concept of Chora, which is, "both cosmic place and abstract space, and is also the substance of human crafts. […] It is the 'region' of that which exists." (PÉREZ-GÓMEZ, 1994)

When we design through apparatuses, the computer is not just a substitute for the pencil—it is actually a substitute for the pencil, the paper and, ultimately, a "virtual" substitute for Chora. Apparatuses try to create a virtual Chora, an immaterial region for that which exists—but only exists as information, as numbers which can be rearranged into images. Its hidden functioning emulates the aura of mystery that one can sense in the dimension of the possible, but it cannot really emulate the complete realm of possibility, the reach of the imaginable.

In any creative work, the process of imagining never stops, and it is actually made not only through thinking, but also through testing and prototyping. Architects and designers draw to visualize what they imagine, and to test possibilities. These drawings are not "printed ideas"—snapshots of what they are envisioning in their minds—but part of the process of imagining, of unravelling possibilities. Irish architect John Tuomey, for instance, draws inspiration from the 'constellations' of drawings made by Carlo Scarpa, who filled pages with small conceptual sketches in which he tested many variations of the same solution. Scarpa stated: "I want to see things, that's all I really trust. I want to see, and that's why I draw. I can see an image only if I draw it." (SCARPA, 1985, p. 164, apud TUOMEY, 2008, p. 14) Palladio's sketches for the reconstruction of the Baths of Agrippa, for instance, are of the same nature, and so are James Stirling's "doodles" for the *Neue Staatsgalerie* in Stuttgart. These drawings have 400 years between them, but their similarities allow us to believe that the process behind them was fairly the same. At least in this conceptual stage, Palladio and Stirling worked in a very similar way—they were not thinking and drawing, but thinking through drawing.

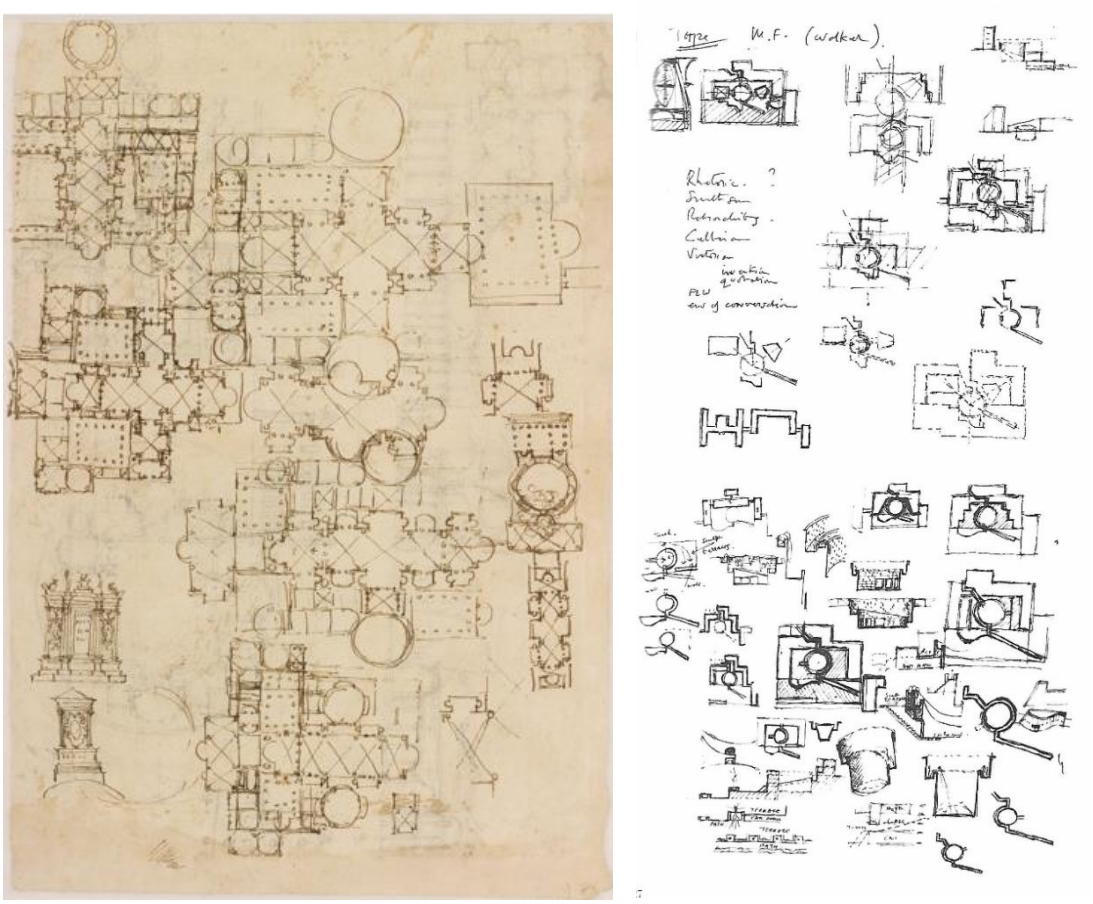

Figure 11 - Andrea Palladio, sketches for the reconstruction of the Baths of Agrippa, Rome (c. 1550) / James Stirling, sketches for the Neue Staatsgalerie, Stuttgart (1979-1984).

Sources: https://www.ribapix.com/sketches-for-the-reconstruction-of-the-baths-of-agrippa-rome-sketches-for-the-reconstructed-plan-and-elevations-of-two-tabernacles_riba125337#

RODIEK, T. James Stirling—Die Neue Staatsgalerie—Stuttgart, 1984. Stuttgart, Verlag Gerd Hatje.

Computers and 3D printers may seem to free us from a secondary activity which is—or at least was—part of the intellectual activity of design. However, this activity is not secondary—it is actually what makes design a craft. There is no design without drawing, especially without the kind of drawing which works as a way of thinking, "imagining, shaping, seeing, all at the same time." (VERPLANK, 2009, p. 3) This kind of drawing can never be delegated to apparatuses, since these black boxes can never be poetic in the sense of making reality transparent to us. Architecture does this in a deep and direct way, by shaping the world in which we live.

The emergence of parametricism may lead us to believe that, in the future, the work of an architect can actually be reduced to just inserting data into a software, which will then create forms. (SCHUMACHER, 2008) However, architecture cannot be reduced to

a set of choices, to data processing. Any creative work develops in what Jorge Luis Borges calls, “the ambiguous time of art,” or, “In real time, in history, whenever a man is confronted with several alternatives, he chooses one and eliminates and loses the others. Such is not the case in the ambiguous time of art, which is similar to that of hope and oblivion. In that time, Hamlet is sane and is mad.” (BORGES, 1999)

Architectural design is a creative, poetic activity based on reflection and synthesis, and achieved through drawing and visualization. Apparatuses can surely be very useful for architects, as long as they do not let themselves be “tricked” by the apparently unbiased, objective outputs made by these devices—and they also should not use them for tricking others. As Flusser puts it: “From the standpoint of so-called common sense, technical images are objective depictions of things out in the world. The critical project is to show that in defiance of common sense, they are not mirrors but projections that are programmed to make common sense appear mirror like.” (FLUSSER, 2011, p. 49) Architecture is indeed a craft, responsible for creating a connection between our lived-world and our culture, making some aspects of reality transparent to us. Its scope is that of the imaginable. This scope should not be reduced, and it just cannot be programmed.

2.3. (A very brief note) On the ~~Hi~~story of Architecture

Going back to the flusserian model of cultural history, it may be difficult to know whether we are already in the fifth rung or climbing up towards it with a foot still strongly fixed on History. Of course, we must remember that, according to Flusser, the very notion of History is a product of the centrality of linear texts in Western culture:

> Linear codes demand a synchronization of their diachronicity. They demand progressive reception. And the result is a new experience of time, that is, linear time, a stream of unstoppable progress, of dramatic unrepeatability, of framing: in short, history. With the invention of writing, history begins, not because writing keeps a firm hold on processes, but because it transforms scenes into processes: it generates historical consciousness (FLUSSER, 2002, p. 39).

Thus, even though it would be safe to say that we already live in the universe of technical images, it would not be so easy to affirm that we have lost or abandoned historical consciousness. Northrop Frye’s explanation for the shift from mythological to scientific discourse may clarify this apparently unclear situation:

> The cultural aura, or whatever it is, that insulates us from nature consists among other things of words, and the verbal part of it is what I call a mythology, or the total structure of human creation conveyed by words, with literature at its centre. (...) It is designed to draw a circumference around human society and reflect its concerns, not to look directly at the nature outside. When man finally gets around to doing that, he has to develop the special language of science, a language which becomes increasingly mathematical in idiom. Many things have to come together in a culture before science can begin, and when it does begin it does not descend from or grow out of mythology directly. Mythological statements about nature are merely grotesque or silly if they are thought of as pre-scientific explanations of it" (FRYE, 1980, p. 6-7).

Frye mentions the "verbal" part of culture, inside which the "textual" part—literature—is central. Mythological cultures were based on stories—and we could even say that these were very "imagetical" stories—, not exactly on texts, and much less on linear writing. When Frye mentions the scientific language, he does not seem to be talking about the language of modern science, but probably the language of Pythagoras, Archimedes and Euclid—who lived in societies built on myths, but in which the verbal part of culture was preponderant. This reminds us that the model proposed by Flusser is just a model, and that each rung does not represent the invention of a new medium, but the emergence of a new consciousness shaped by a new centrality.

Today, the logics of linear writing no longer apply to the way we experience culture, and this experience influences the way in which we perceive reality as a whole. When material supports are dematerialized—for instance, when a book is replaced by a PDF file—, we begin to notice, at the same time, the relevance and the indifference of the physical object. One can surely be moved by a poem read on a smartphone screen, and then render a book to be superfluous; but it is also possible to become enamoured with a book—its cover, binding, weight, smell—almost regardless of its content. When these two dimensions come together, the object usually becomes something special to us, something we can really hold dear. Thus, this process of dematerialization described by Flusser highlights the fact that what really matters in our experience of any object—be it a book or a text in a PDF file—is the relation we develop with it. The object is not an end in itself—it can only be relevant if it is relevant to someone. This may sound obvious, and it is, to a certain extent. This is why, for instance, we can develop bonds with mass produced objects. Your favourite childhood toy was probably not unique—most likely, it was one out of millions made from the same mould—, but for you it was unique, because it was yours. The object itself could be exactly the same as many others, but the relationship developed between you and the toy was unique. In an increasingly immaterial

culture, we may become more aware of this—and turn our focus from objects to relationships. This focus can be specially interesting as the basis for a reappraisal of the role of architecture, which can be understood as very akin to the "function" that Frye identifies in language— "It is designed to draw a circumference around human society and reflect its concerns, not to look directly at the nature outside". (FRYE, 1980, p. 7)

The approach to the History of Architecture that we find in most specialised books is, essentially, a History built by objects. It is common to find timelines and timetables that make this approach more evident and enhance the notion that the monuments of an era are expressions of the dominant culture of that time, crystallising that culture into something we usually still call "style". Times change, ideas change, styles change accordingly—and thus the renaissance is replaced by mannerism, which is then surpassed by the baroque, etc. Even though the modern movement has apparently eliminated the notion of style, the overall vision of a structurally historical succession of styles remains—the last style is still a style—, and so does the focus on buildings as objects, as historical artifacts that embody the spirit of the times.

Figure 12 - "The Architect's Dream", Thomas Cole, 1840

https://en.wikipedia.org/wiki/The_Architect%27s_Dream#/media/File:Thomas_Cole_-_Architect%E2%80%99s_Dream_-_Google_Art_Project.jpg

Gustavo Rocha-Peixoto describes "three epistemological foundations of professional knowledge concerning the relationship between history and architecture": The historicist mode, "prevalent in the academicist design of the profession" and

illustrated by a picture of a set of movable types that relate to the idea of architecture as a composition of elements according to a grammar or language—or, as we have mentioned before, according to a historically defined style; The historic-modernist mode, "responsive for the large historical narratives of the twentieth century" and illustrated by an assorted shish kebab on a skewer—a straight line in which different elements are lined-up according to a defined, irreversible order, like the succession of styles that was finally overcome by modern architecture; The culturalist mode, "marked by post-structuralist thought and operated by the linguistic turn in the social sciences in the final quarter of the last century", illustrated by Spider Man's web—an intentionally pop image that relates both to a non-linear structure of enquiry and creation and to the acceptance and incorporation of popular culture (ROCHA-PEIXOTO, 2013, p. 23).

These are, as the author states, three modalities of a relationship "between historical consciousness and architectural production", which means that these are modes in which architects, the official producers of architecture, have related to history, acknowledging and affirming the prevalence of historical consciousness as one of the main faculties behind the interpretation and production of architecture. Thus, if we are interested in conceiving—or at least discussing—a post-historical approach to architecture, we must assume that none of these modes will apply, and that we must conceive new ways of interpreting and producing architecture without relying on historical consciousness.

There are probably many ways to do that, and here I would like to propose one: to move the focus away from buildings (as objects) and towards the relationship between people and buildings. However, this is not just a shift from object to subject—it is an acknowledgement that the categories of object and subject are not that clear anymore, and that, in the universe of technical images, these concepts may no longer make sense. I would like to focus on the "architectural act", that is, in the acts of human intervention in space in order to shape it, understanding that these include but are not limited to concrete, physical interventions. I do not claim originality in this endeavour: in the last decades of the twentieth century, Spiro Kostof already argued that "Architecture, in the end, is nothing more and nothing less than the gift of making places for some human purpose" (KOSTOF,1995, p. 17), acknowledging, for instance, that the history of architecture does not begin with the construction of the "primitive cabin", but with the "discovery" of fire—"(...) the burning fire moulded an ambience of companionship, a station for the hunter to

pause, cook his game, harden his tools, and communicate with his band of fellows" (Ibid, p. 21).

What was the style of the first fire? Would it make sense to call it "prehistoric architecture"—as we usually refer to dolmens and menhirs? And if I light a fire today, will I be copying a style from the past? Wouldn't that be anachronistic? Beyond theoretical discussions, human beings still need heat, and especially the "ambiance of companionship", a "station to pause". The first fire is the archetype of communal space, of relational space, something that human beings would recreate in living rooms, cafés, *botequins*, etc. The immateriality of fire affected the immateriality of the (apparently) void space around it, differentiating it from the "rest" of space and thus creating the indoor/outdoor dichotomy that would echo in the cosmos/chaos relationship between roman cities and their surroundings, in the walled cities of medieval Europe and in the gated residential communities of today.

We may thus understand the history of architecture as the constant revaluation and actualisation of spatial archetypes. This is similar to what is proposed by philosopher Karsten Harries through the concepts of natural and conventional symbols (HARRIES, 1997). According to Harries, natural symbols "(…) have their foundation in those aspects of our human being in the world that have remained more or less constant throughout history." (Ibid, p. 130). As an example, the author describes what he calls "the symbolism of vertical and horizontal":

> The symbolism is not limited to any particular tradition nor projected into the world. It can be called natural in that it has its foundation in the nature of human being in the world, in experiences of lying down and getting up, of climbing and descending, of lifting, raising, and supporting: experiences of the opposition of earth and sky, darkness and light, matter and spirit. (Ibid, p. 187).

Harries seems to imply that this symbolism was not created by Man. It is not an "idea", but an aspect of human life identified as a common experience lived by all of us. It is not an abstraction that can be inserted into the real world, but quite the opposite: it is born out of concrete experiences. Interpreting these natural symbols, we have created conventional symbols, which are specific responses to the general aspects of our experience of space—a menhir, for instance, is an architectural symbol that creates a "humanized space" around it, simply because it stands as a vertical element amidst the horizontality of natural space. However, throughout time, these symbols became themselves models for the creation of new symbols, and thus new buildings usually

related to existing buildings, growing apart from the original, natural models—a process of distancing similar to the one proposed by Flusser in his model of cultural history.

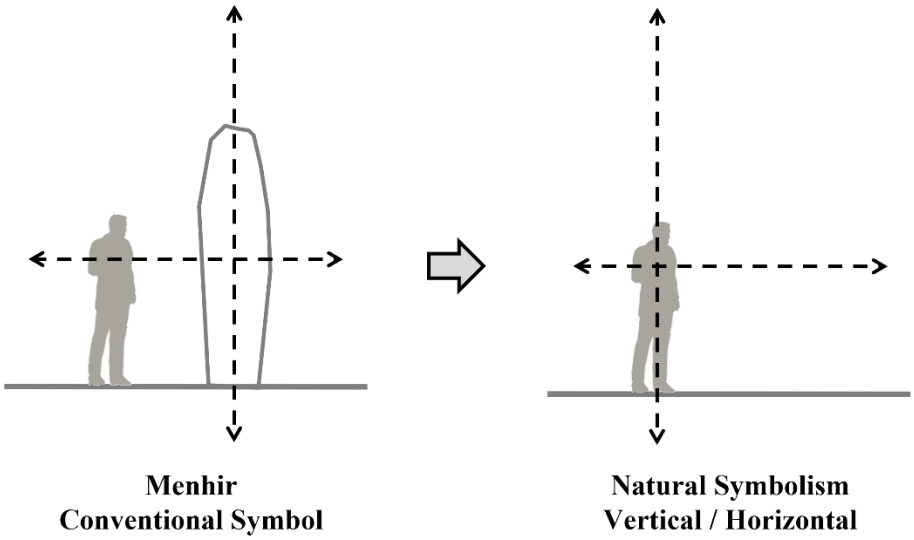

Figure 13 - A conventional symbol and the natural symbolism to which it refers.

(Illustration by the author)

This is why Harries argues that architecture is an art of representation: "Representing other architecture, the work (…) re-presents itself in the image of an ideal, thus creating a fiction about itself. (...) By its choice of what to represent and of the form of representation it communicates a particular understanding of what is taken to matter in architecture, signifying a particular ideal of building and thus of dwelling" (Ibid, p. 120). The architectural act is thus understood as the outcome of a critical analysis of existing models, through which the architect/builder reinterprets conventional symbols and creates a new one. This approach is not historical in its essence, since it does not include the values that are to be used in the interpretation of the models. However, if we insert these values in the process, it becomes easier to understand not only revivalist movements like German neoclassicism or *Beaux-Arts*—which operated according to the historicist mode—, but also the modern movement—defended by the historic-modernist mode—and its attempt to conceive new, rational, scientific—and therefore somehow "natural"—symbols that should be the new models for a new architecture of a new era.

Working in and through the web of the culturalist mode, contemporary architects seem free to choose their models. However, this freedom is many times limited to the models created by modern architecture—the "new tradition" defended by Giedion

(1967)—, as it is clear in the treatment that academics and the specialised media give to the contemporary Palladian architects active in the United Kingdom. Anyway, in a post-historical era, it may be natural to become suspicious of historic references, as the current debates regarding the notion of authenticity in the fields of architecture, tourism and heritage studies seem to suggest (ASSI, 2000; PENDLEBURY, 2009). In this context, and keeping in mind that the conventional symbols that we experience directly, in a concrete manner, are rooted in natural symbols, Harries argues that "If architecture is to help to re-present and interpret the meaning of our daily life, it first has to open itself to these symbols. Needed today is a recovery of the natural in inherited conventional symbols" (HARRIES, 1997, p. 132).

Contemporary architecture seems to lack a coherent language, especially if compared to almost any other period. Does this mean that architecture has already surpassed the notion of History? Since contemporary architects seem to be free to choose among an apparently infinite set of references and models—a quick search on Pinterest can illustrate this—, does this mean that they are drifting through surfaces in a non-linear logic, operating in accordance with a post-historical era shaped by technical images? In order to address these questions, we must go deeper into architectural theory and history, but keeping our focus not on the "objects"—celebrated buildings or canonical texts—but on the relations built by/with/around them.

2.4. Architectural Theory before Theory

Considering the contemporary notion of theory, we can only talk about the theory of architecture already as a modern theory of architecture. From antiquity to the beginning of the seventeenth century, theoretical reflections on the practice of architecture were enmeshed with what we would now call other fields or disciplines, such as theology, mechanics, geometry, optics, art theory, etc. Only in the Baroque period can we find the emergence of a somewhat independent line of thought, sprung from the disintegration of the model of the renaissance man—well versed in the arts and sciences—caused by the emergence of modern science. It is not a coincidence that the words *theory* and *modern* "both first came into prominence in the late seventeenth century" (MALLGRAVE, 2005, p. xv):

> The Greek and Latin word *theoria*—related to the Greek words *theoros* (spectator), *theos* (divine being), and *theatron* (theater)—had several meanings in early antiquity. It could refer to a person consulting an oracle, someone participating or assisting in a religious festival, or (perhaps most anciently) the

> experience of looking at a god. (…) In later antiquity, the term came to mean "looking at, viewing, or contemplation." Aristotle, for instance, employed *theoria* to signify "to contemplate, to consider," as well as to refer to an "object of contemplation." Cicero, in a letter to Atticus, used the Greek word loosely in this sense, but this interpretation remained relatively rare in Latin until the word was applied to philosophical matters during the Middle Ages. The Roman architect Vitruvius, in making his famous distinction between theory and practice, for instance, employed *ratiocinatio* for the former, a word meaning "the process of reasoning, calculation, ratiocination, or theorizing". (…) "In 1656, Blaise Pascal, in his seventh Provincial Letter, used *théorie* entirely in the modern sense, that is, to refer to the opposite of practice" (Ibid, p. xv-xvi).

In the modern sense of theory as opposite to practice, or as the conceptualization and/or explanation of what is done in practice, we are of course talking about texts. Thus, it is not surprising that, although there are records of architectural treatises that circulated in Antiquity but were unfortunately lost, and that we know that medieval architects used notebooks that included not only practical instructions but also more theoretical issues, there is a huge disproportion between the production of theory—meaning texts—before and after the seventeenth century. In the anthology edited by Harry Francis Mallgrave, subtitled "from Vitruvius to 1870", the only texts that appear between the Vitruvian treatise (c. 25 BC) and Abbot Suger's writings on the Abbey of Saint Denis (c. 1144 AD) are excerpts from the old and new testaments. These excerpts were included because Mallgrave understands that "Architectural theory, for all its occasional abstraction, is nothing less than the history of our ideas regarding our constructed physical surroundings" (MALLGRAVE, 2006, p. xxi), and that these ideas can be found not only in texts written by architects such as Vitruvius, patrons like Abbot Suger or theorists like Claude Perrault.

While editing an anthology, Mallgrave was obviously limited to texts. However, the concrete experience of architecture has preceded not only architectural treatises and the very notion of an autonomous architectural theory, but it may have preceded language itself. According to Norberg-Schulz, the languages of early civilizations were filled with terms that expressed and communicated spatial relations—above and below, before and behind, right and left. However, these terms were not abstract, like in many modern languages—they had "direct reference to man himself as well as to his environment", and expressed "his 'position' in the world[4]" (NORBERG-SCHULZ, 1971, p. 9). This reveals

[4] This notion is fundamental to the theory developed by Karsten Harries, which was already mentioned but will be further discussed in Chapter 3.

that “a cognitive concept of space had not been abstracted from the direct experience of spatial relations” (NORBERG-SCHULZ, 1971, p. 9)—that is, there was no general concept of “under” or “above” in general, one could only think of “under” or “above” something. In fact, according to geographer Yi-Fu Tuan, spatial experiences can provide concepts that are then extrapolated to other “fields”: “First man creates the circle, whether this be the plan of the tepee or the ring of the war dance, and then he can discern circles and cyclical processes everywhere in nature, in the shape of the bird's nest, the whirl of the wind, and the movement of the stars” (TUAN, 2001, p. 112). A similar argument is made by physicist Max Jammer, who argued that

> Historically and psychologically, a discussion of space is preferable to that of time, since most probably the category of space preceded that of time as an object of consciousness. Language proves this assumption: qualifications of time, as “short,” or “long,” are taken from the vocabulary of spatial concepts. We say “thereafter’ and not the more logical “thenafter”; “always” means “at all times”; we even speak of a “space” or an “interval” of time: “before” means etymologically “in front of” (JAMMER, 1993, p. 3).

With the emergence of Greek philosophy, space becomes an object of reflection. Aristotle developed a theory of place (*topos*) that defined the concept of *space* as “the sum of all places” (NORBERG-SCHULZ, 1971, p. 10), while later theories were built on Euclidean geometry, abstracting the notion of space into an infinite, homogeneous and autonomous entity. Thus, Aristotelian space only exists as a subordinate aspect of things—as an “accident” (JAMMER, 1993, p. 18)—, while Euclidean space exists even if no things exist at all, providing an abstract understanding of space that will later be instrumental for the development of linear perspective, descriptive geometry, Kantian philosophy and computer-aided design. However, it is of course difficult to determine to which extent the debates of Greek philosophers over different concepts of space may have influenced the work of architects throughout Antiquity. According to Spiro Kostof, Imhotep, the prototypical architect of ancient Egypt, “was revered for his great wisdom as a scribe, astronomer, magician, and healer. As healer, he was later deified. Architecture for him represented one of the fields of learning he commanded” (KOSTOF, 1986, p. 3). In a sense, Imhotep—who was responsible for the construction of the first stone buildings in Egypt—was both a practitioner and a theoretician (Ibid, p. 4). However, despite his “intellectual”/mystical achievements, his “theory” of architectural design “was seemingly empirical, and only minimally indebted to mathematics” (Ibid, p. 4). In ancient Egypt, architects usually conceived form through a modular system based on multiples and

fractions of a specific element—a column, or the dimensions of a room. This may seem as an overtly practical approach, devoid of any theory—but the notion of theory was quite different at the time.

In Greece, the supposed birthplace of reflections on the nature of space, the archetypal architect, Daedalus, was known as "inventor of both form and contraptions" (Ibid, p. 4), creating not only the famous labyrinth and the wings with which him and his son Icarus tried to escape Crete, but also buildings and reservoirs (Ibid). However, the status of the architect in ancient Greece was quite different from the *quasi*-divine figure of Imhotep: the term "architect"—*architekton*—meant "master carpenter", and the architect was essentially a craftsman. This may lead us to believe that the theory of architectural design in Greece was probably even more empirical than in Egypt, but that is not exactly the case. Since there are few precise records or descriptions of architectural practice in Greece, we must resort to Vitruvius, the closest available source. According to Vitruvius, "Practice is the continuous and regular exercise of employment where manual work is done with any necessary material according to the design of a drawing", while "Theory, on the other hand, is the ability to demonstrate and explain the productions of dexterity on the principles of proportion" (VITRUVIUS, apud KOSTOF, 1986, p. 38). These conceptions of practice and theory surely seem to refer to a craft, but Vitruvius underlines that an architect must "be educated, skilful with the pencil, instructed in geometry, know much history, have followed the philosophers with attention, understand music, have some knowledge of medicine, know the opinions of the jurists, and be acquainted with astronomy and the theory of the heavens (VITRUVIUS, apud KOSTOF, 1986, p. 39).

According to Kostof, Vitruvius was trying to make a case for the inclusion of architecture among the Liberal Arts, so his defence of a multifaceted education may be more of an exhortation than an account of the actual state of the profession at the time. Anyway, there is a clear understanding that an architect, understood as someone who is responsible for both the conception and the construction of buildings—most notably of public and/or large-scale buildings—cannot be just a craftsman or a skilful practitioner—and the liberal education advised by Vitruvius would eventually become the norm in the roman world (KOSTOF, 1986, p. 51). We must remember that, in many ancient cultures, the most important buildings—those that seem to have had a more central role in the societies that built them—were often religious buildings—temples, tombs, etc.—and that

many of these buildings were based on models of supposedly divine origin (Ibid, p. 5). Thus, the architect was not considered as the creator of these forms; in this case, theory meant the ability to comprehend these God-given forms and to translate them into conceptual form, models, drawings and instructions. The practice, of course, meant the construction of the building, the concretization of theory. This is why Imhotep's theory may seem too empirical, especially coming from a "mystic": the architect was meant to express established beliefs such as the overall conception of the universe, of space and even of some architectural forms, not to create or criticize these beliefs through his work.

In the case of ancient Greece, the Orders provided a universal language, and theory meant the knowledge of "the proportions and properties of the Orders, ornament, and the like" (Ibid, p. 17). Overall proportions were determined by convention, and the design method was modular—as in Egypt, "the form came about not through an external standard of measurement, but in terms of some arbitrary unit derived from within the building itself" (Ibid, p. 13). In a broad sense, this design method based on conventional proportions and modular composition was the standard not only in the roman world of Vitruvius, but also in the Middle Ages.

However, the medieval architect was no longer the builder/intellectual promoted by Vitruvius; with the fall of the Roman Empire, architecture went from an established discipline that demanded a liberal education to "an empirical skill that could be learned within the restricted compass of apprenticeship" (Ibid, p. 60). Curiously, it is in this period in which architects were apparently downgraded back to the status of craftsmen that the modular design method will be developed into a much more complex geometrical system. In Gothic architecture, "The design process evolved from a geometric progression that started with basic figures, such as equilateral triangles, circles, and squares, ending up, through a series of simple geometric steps, in elaborate constellations of form. In this dynamic manipulation of geometry the module had, as it were, to fend for itself. "(Ibid, p. 85)"

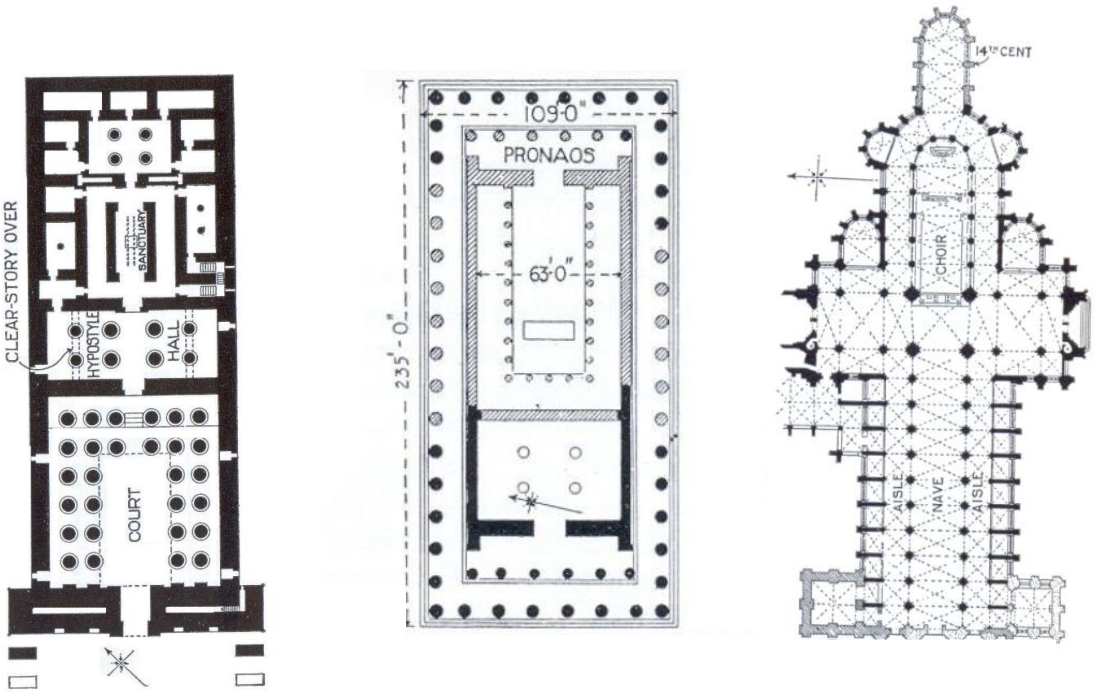

Figure 14 - Floor plans for the Temple of Khonsu (Karnak, c. 1186–1155 BC), The Parthenon (Athens, 447-438 BC) and Rouen Cathedral (XII-XIII century).

Sources: https://upload.wikimedia.org/wikipedia/commons/4/40/Mammisi_Temple_-_Island_of_Elephantine_%2B_Temple_of_Khons_-_Karnak%2C_Egyptian_Architecture_38.jpg https://upload.wikimedia.org/wikipedia/commons/1/1a/Comparative_Plans_of_Greek_Temples_107.jpg https://upload.wikimedia.org/wikipedia/commons/0/05/Fr_Gothic_plans_561.jpg

This impressive development of the modular system was both practical and theoretical. In one hand, it was built on the dialogue between local traditions and the exchanges between craftsmen and guilds from different regions, made possible by the unification of Europe that followed the fourth Crusade (1198–1216)— "the Latin Church had achieved its apogee as a political and military power and essentially unified Europe with its language, law, and theology" (MALLGRAVE, 2006, p. 5). On the other hand, the Greco-Roman classical tradition was reintroduced in Europe through the contact with Arab scholars, "and the production of books increased dramatically" (Ibid). Vitruvius' treatise was among the texts that were now circulating throughout Europe, but the classical language would only regain its centrality in the Renaissance. In the Gothic period, the formal and structural complexity of cathedrals were based on both conventions and advanced geometry, and aimed to express the complexity and beauty of God's creation. The symbolism of the cathedral as a whole and of each of its parts "remained

wedded to theological and pedagogical interests. The great monuments of the Middle Ages were extensions of the Church's teaching" (Ibid).

At the time, these two poles—practice and theory—were identified by the words *ars* and *scientia*. "*Ars* here meant practical building knowhow; *scientia*, the rational theory of architecture based on geometry" (KOSTOF, 1986, p. 86). However, the *scientia* of the gothic master builder was of course not scientific in modern terms, since "it was not deduced from general laws and scientific principles; it was not an 'applied science'. The set of rules and procedures were deduced empirically from the observation of existing buildings" (HUERTA, 2006, p. 23). A famous example can illustrate this distinction between medieval *scientia* and modern science. In the late fourteenth century, French experts were hired as "consultants" to help with the structural design of the new cathedral to be built in Milan. The experts argued that the Lombard masters neglected the geometrical language already stablished in France and elsewhere, relying too much on local traditions and "constructional common sense"—they insisted in a modular designed based on a ten-*braccia* unit, while the French builders argued that the proportions of the elements had to be defined by a geometric procedure (KOSTOF, 1986, p. 86). This argument was based on the established convention that, from "the proper geometric formula decided upon by the architect, both the aesthetic and the structural correctness of the building could not help but be assured" (Ibid, p. 87). Form and structure are one single whole, engendered through theoretical reasoning—that is, following geometric formulae. "*Ars*, or the craft of masonry, guarantees that the theoretical construct will be executed in a predetermined, correct way" (Ibid). In the minutes of the meetings between French and Lombard builders, we find the famous dictum by French master Jean Mignot—*Ars sine scientia nihil est* (Art without science amounts to nothing).

The theory of gothic architecture is therefore not written in texts, but expressed in the buildings that it produced. Although strongly based on theological concepts, gothic architecture does not express these concepts directly, but interprets them in spatial and formal terms that, in their turn, allow the contemplation of "the mathematical nature of the Universe, which was directly linked to the Divine, the architect of the Universe as

illustrated in the famous painting of God the Geometer. To seek these principles would thus be worshipping God[5]" (RAMZY, 2015, p. 135).

Figure 15 - "God as Architect/Builder/Geometer/Craftsman, The Frontispiece of *Bible Moralisée*"- Codex Vindobonensis 2554, f.1 verso.

Source: https://commons.wikimedia.org/wiki/File:God_the_Geometer.jpg

In this light, Erwin Panofsky's famous interpretation of the architecture of gothic cathedrals as derived from the structure of the scholastic Summa (PANOFSKY, 1976) may sound more like an analogy made *a posteriori*. It is not that the building directly translates a literary structure into a building structure; both building and text are products of the same integrated culture, and thus share a vast common ground which surely provides the possibility of tracing many parallels. The same can probably be said about

[5] If we consider that the cathedrals also somehow expressed the current "return to Aristotelianism and the formation of a new philosophy of light and optics" (VESELY, 2004, p. 110), we may extend the famous notion of the cathedral as a "Bible for the illiterate", including philosophy and science among the contents of those "books of stone".

the architecture of Antiquity—there was no need for an autonomous theory of architecture, since architecture was not only integrated in culture, but was one of its cornerstones. We can of course be biased by our distant and hopelessly historical point of view—the eras of the past usually seem more homogeneous and harmonious than our current time, since our vision of them is always somehow filtered and structured, while we experience our times in the flesh, and in all of its tensions and contradictions. Anyway, considering what we can grasp from historical research, it seems reasonable to assume that in fact there was, in the gothic period, a sort of harmonious interplay between many spheres of life, as described by Huizinga: "To take every idea by itself, to give it its formula, to treat it as an entity, next to combine the ideas, to classify them, to arrange them in hierarchic systems, always to build cathedrals with them, such, in practical life also, is the way in which the medieval mind proceeds" (HUIZINGA, 1987, p. 217).

In the Renaissance, the contact with the Greco-Roman tradition that was regained in the Middle Ages sprung a revolution that would forever change not only the contents of *ars* and *scientia*, but especially the relationship between the two. The production of inexpensive paper and the invention of the printing press provided the raw material for a proliferation of experiments in art and the distribution of texts; and the systematization of linear perspective, "the first plausible anticipation of modernity" (VESELY, 2004, p. 6), initiated a gradual process in which space, "connected originally with the luminosity of the visible world" became a new kind of space, "space as a pure conceptual construct" (VESELY, 2004, p. 6). In this process, the medieval notion of the architect as master builder will be slowly replaced by a new kind of architect, concerned mainly with the manipulation of this new conceptual space. According to Alberti, in one of the most famous treatises of the period, "An architect is not a carpenter or joiner… the manual worker being no more than an instrument to the architect, who by sure and wonderful skill and method is able to complete his work… To be able to do this, he must have a thorough insight into the noblest and most curious sciences" (ALBERTI, apud KOSTOF, 1986, p. 98).

This new conception of the work of the architect would be developed by Giorgio Vasari into a comprehensive theory of artistic creativity called *disegno*[6]—"the foundation of the liberal status of the practice of art, without which it would not have been possible

[6] Here, there is an obvious relation with the modern designer, as exposed in section 2.2.

to distinguish painting, sculpture, and architecture from, say, silversmithing or furniture-making, and the artist from the craftsman" (KOSTOF, 1986, p. 134). However, Vitruvius—one of the main sources for renaissance architects who were eager to recreate the grandness of the classical period—argued that "a mere practitioner cannot give sufficient reasons for the forms he adopts, while a theoretician 'grasps a shadow instead of substance'" (VITRUVIUS, apud KOSTOF, 1986, p. 98). Thus, the architect as artist—and not a craftsman anymore—was to a great extent still a practitioner, and not only in the field of architecture—many architects of the time were also painters, sculptors and even poets, like Michelangelo. The renaissance architect was therefore a practising artist with theoretical and scientific knowledge—in this case, not limited to geometry—, working in a culture that was not as homogeneous as Gothic Europe, but in which there seemed to be a common goal—to learn from classic examples and use them as models for the creation of a new world. In the following centuries, the rise of modern science will cut its ties to art, and the field of action of the renaissance man will be split into the sometimes opposing poles of art and science.

2.5. Modern Theory and "Divided Representation"

According to Vesely, "The primary conditions for a new relationship between architecture and technology were first established in the seventeenth century when a gap opened up between the traditional symbolic and the new instrumental representation" (VESELY, 2004, p. 17). By the early eighteenth century, the new developments in the natural sciences were already engulfing architectural thinking, "which had always been closely associated through its long history with the mathematical representation of its principles" (Ibid), but the traditional approach and the new instrumentism were quickly merged. The foundation of engineering schools created a new kind of competition to traditionally trained architects, who also had to deal with a "general formalization of culture", a declining appreciation of tradition, and, most importantly, with "the discontinuity between the means and the content of representation" (Ibid).

> Because we usually see Baroque science as an independent domain of knowledge, we tend to overlook the fact that science was then an integral part of the general intelligibility of culture and that it becomes autonomous or independent only under particular and more precisely defined conditions. Indeed, such conditions had never existed before, and their emergence was one of the main characteristics of the transitional period. They were created in unique historical circumstances, by attempts to overcome a deep cultural crisis.

> (…) If we look at the politics, philosophy, literature, visual arts, and everyday life of that time, we find a common search for order and certainty in an environment dominated by fragmentation, relativism of values, skepticism, and pessimism. The radicality of the response, which was based on a dogmatic faith in the mathematical nature of the world order, created for the first time in human history a mode of representation that could claim both that it was fully independent and, at the same time, that it could be universally applied. Because any representation, despite its claims to universality, is inevitably partial, there is always a residuum of reality left out, which has to define its own mode of representation. The result is a duplication that may best be described as "divided representation" (Ibid, p. 176-177).

This duplication or "divided representation" has its most direct origins in the linear perspective developed in the Renaissance, which was eventually turned into "an illusionistic mode of representation", and is, according to Vesely, "the main source of modern relativism" (Ibid, p. 173), since it inaugurated "the slow perspectivization of the culture as a whole" (Ibid, p. 110). In this process, the medieval concept of space—which we may call, in a simplified way and with special focus on the conception and perception of architecture, as Aristotelian[7]—was gradually replaced by an interpretation of Euclidean space, which was, until then, only available as an ideal to be discussed in abstract terms. In the development of perspective, Euclidean space became accessible, at least to modern philosophy and science— "The notion of a homogenous Euclidean space is a modern invention; it largely coincides with the development of perspective, leading to the formation of the Cartesian space and eventually to the discovery of non-Euclidean geometries" (Ibid, p. 113). For Vesely, "This development undermined the more than two-thousand-year-old foundations of geometry and the centuries-old faith in the existence of Euclidean space", since this new conception was quite different from the original Euclidean notion of *to chorion*, "which refers to an area enclosed within the perimeter of a specific figure; it is an abstraction not dependent on the existence of physical space"[8] (Ibid, p. 113). This modern invention "was not fully accepted as a

[7] The term Aristotelian is used here to recall the idea of a space that is made of the sum of all places, that is, of the accidental positions off all "things". This conception seems more attuned to the experience of architecture in the Middle Ages, when "space is still part of a phenomenal reality in which it cannot be treated in isolation from the conditions of its embodiment" (VESELY, 2004, p. 139). In the case of perspective, the prevailing reference was Plato– "A more important source for perspective is the tradition, going back to Plato, that space is structured by light; it culminates in the thirteenth century in a synthesis that directly influenced the development of Renaissance perspective" (VESELY, 2004, p. 113).

[8] And thus related to the concept of Chora, as presented by Pérez-Gómez in section 2.2.

structure of the natural world before the seventeenth century, when it became identical with Cartesian space" (Ibid).

In architecture, the rupture created by divided representation can be clearly illustrated by the concepts of "positive beauty" and "arbitrary beauty", proposed by Claude Perrault (1613–1688). Perrault, who besides designing the east façade of the Louvre and the Paris Observatory, and translating Vitruvius to French, was also a physician and philosopher, argued that there is an "objective" beauty, universally recognizable by all human beings—and thus "positive"—and an arbitrary beauty that is transient, dictated by customs, fashions, etc. In the early nineteenth century, these concepts will be interpreted by Durand in a very synthetic definition, differentiating aspects of beauty that "spring from the nature of materials" and those that "custom has in a sense made necessary to us" (PICON, in DURAND, 2000, p. 40). For Vesely, the dichotomy proposed by Perrault expresses "the more fundamental, historically constituted tension between the symbolic-communicative and the instrumental-noncommunicative representations of reality. This tension grew out of a long process in which perspective played a decisive role" (VESELY, 2004, p. 178).

The tendency, in perspective, to "reduce that larger context to a fixed point of view or 'mind' and to a 'picture' is the most explicit characteristic of perspective representation, and also its chief contribution to the formation of divided representation" (Ibid). While working in a perspective drawing, the draftsman positions himself outside of the space to be represented, in a God-like stance from which he sees the positive reality of geometrical space emerge, almost automatically, in the paper. Through the divided representation created by development of perspective into an actualization of Euclidean space, architecture was disconnected "from the cosmology and metaphysics of the European tradition", becoming, probably for the first time in Western history, "an introverted domain, with buildings designed either according to criteria of personal judgment and taste or as anonymous constructions fulfilling only the most elementary requirements or strict technical specifications" (Ibid, p. 236). In architectural practice, this division will become clear in the emergence of the architect-engineer, and in the inability of most architects to deal with the new programs demanded by the Industrial Revolution.

The medieval idea of *ars sine scientia nihil est*, symbolizing that "art engages with the sciences in the fulfilment of its meaning but is not transformed by science in the

process" (Ibid, p. 282), is surmounted "when the practical nature of arts—*technai*—was absorbed by the theoretical project of instrumental thinking" (Ibid, p. 282). On a theoretical level, "the cosmic paradigm of order was gradually replaced by a historical one" (Ibid, p. 236). The historical consciousness shaped by linear writing finally enters—and quickly dominates—architectural thinking[9], and thus the theory of the eighteenth and nineteenth centuries will be focused on the development of "nationalist and 'stylistic' lines that we generally subsume under the ambiguous concept of historicism" (MALLGRAVE, 2006, p. xxiii-xxiv), "speculation about the role of primitive precedents (…), and the realization of utopia" (VESELY, 2004, p. 236).

2.6. From Historicism to Durand's Method

In the late seventeenth century, French king Louis XIV and his chief minister and superintendent of building Jean-Baptiste Colbert founded a number of institutions that were instrumental in the formalization of the arts, and especially architecture. The Royal Academy of Architecture was founded in 1671, following the French Academy (1635), the Royal Academy of Painting and Sculpture (1648), the Academy of Dance (1661), the French Academy in Rome (1666), and the Academy of Music (1669) (MALLGRAVE, 2005, p. 2). Not surprisingly, the period would be later known as the period of French academicism, in which "The rules of each discipline were now to be strictly mandated; further, they were to be based on ancient and Renaissance precedents" (Ibid).

This reliance on ancient models would develop into neoclassicism, in which the rapport to the classic period was quite different from the previous renaissance ethos. Although borrowing aesthetic references and ideals from classic models—with a strong preference towards Greece—, the austerity and grandeur of neoclassical architecture is much more of a reaction to the decorative complexity of the baroque and rococo periods than a systematic recreation of the logic and aesthetic of classical architecture. "If Greek and Roman motifs were important sources for design, they were by no means the only ones, or even the predominant ones. For neoclassicism, especially as it came to maturation

[9] During the Renaissance, even though Antiquity—and thus the past— was seen as the main reference for the development of a new culture, it would be imprecise to classify this particular ethos as a form of "historicism". The Renaissance can be seen as a transitional period between the supposedly harmonious cosmos of the Gothic world and the Age of Divided Representation, in which the rapport to history will be essentially transformed by the rupture between art and science.

in the late 1760s, principally defined itself through the erosion of classical values" (Ibid, p. 36).

This erosion quickly developed into historicism, which rose as an attempt "to resolve the apparent discrepancy between greater historical understanding (increasingly viewed in absolute and teleological terms) and an emerging modern industrial state (bourgeois life) that tended toward relativism in both historical and cultural terms" (MALLGRAVE, 2006, p. xxiii-xxiv). By the end of the nineteenth century, the exhaustion of historicism would result in a supposedly anti-historical view, "that worldview of more modest persuasion which we—too narrowly—refer to as modernism" (Ibid). According to Vesely, the combination between the emphasis on theoretical knowledge and the new modes of representation— "made possible by the development of technical drawing, as well as new projective and descriptive geometries" (VESELY, 2004, p. 236-237)—transformed architecture, already in the eighteenth century, "into a highly formalized discipline. It is scarcely surprising that form and formalization came to dominate modern architecture, as the debates that accompanied its development made clear" (Ibid).

Two institutions would have a strong influence in the course of European architecture throughout the nineteenth century. The *École Polytechnique* (founded in 1794 as the *École Centrale des Travaux Publics*) and the *École des Beaux-Arts* (the old art academy, reopened by Napoleon in 1806). To put in very simple terms, we can say that the Polytechnique trained engineers—with a broader curriculum if compared to the specialist schools like *École du Génie, the École des Mines, École des Ponts et Chaussées*—, while the École trained architects. Engineers learned systems and methods for arriving at rational solutions, while architects learned by models or imitation, following a traditional master-apprentice system but also resorting to a catalogue of solution types (PFAMMATTER, 2000). It may seem that the École and the Polytechnique clearly marked the separation between "the symbolic-communicative and the instrumental-noncommunicative representations of reality", but the division was not that clear. At the Polytechnique, engineers had and architecture course that, at first, had a secondary role in the curriculum. However, an architect who taught at the Polytechnique would create a method that, in spite of its limited resonance at his time, encapsulated and prefigured what we may call a modern or "modernist" view of architecture.

Jean-Nicolas-Louis Durand (1760-1834) developed an architectural theory—summarized in his *Précis des leçons d'architecture données à l'École royale Polytechnique* (1802-1805)—which "included the didactic and systematic interconnection of environmental references, spatial qualities, of rules related to material construction and building structures, underpinned by a systematized method of design that brought about the modern architect" (PFAMMATTER, 2000, p. 302). Combining the abstract space created by divided representation with a new attitude towards historical models, Durand developed a method that could be applied to the design of any building, as summarized in his *Marche à suivre dans la composition d'un projet quelconque.*

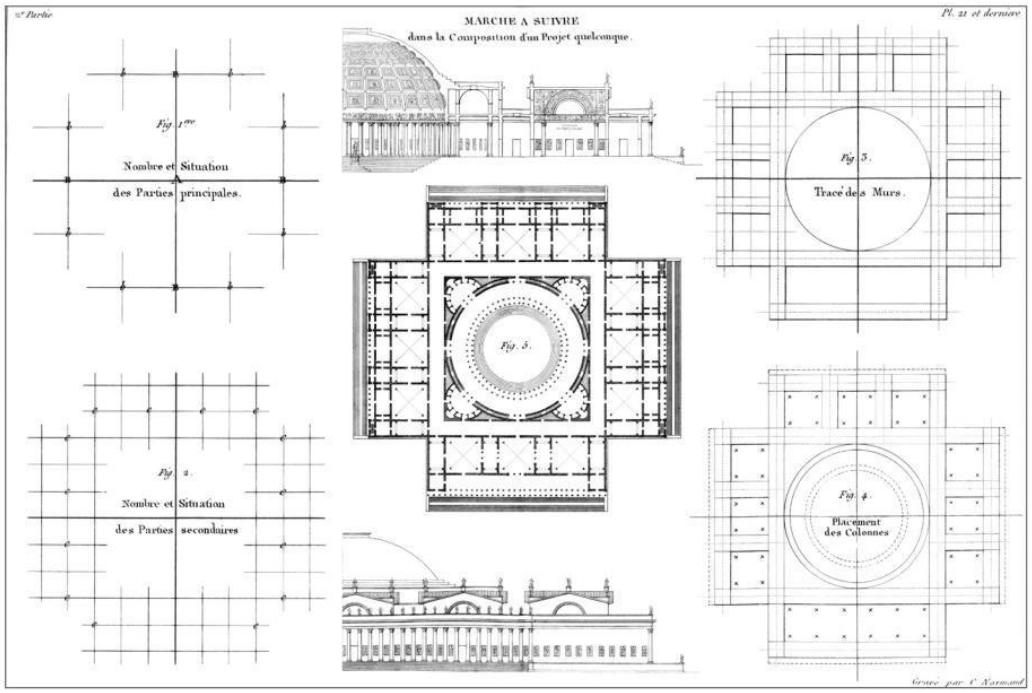

Figure 16 - Durand, *Marche à suivre dans la composition d'un projet quelconque* (1802-1805).

"The 'Marche à suivre' in the 'Précis' of 1802-1805 illustrates in four steps the basic operations in the design process: basic grid, layout of the room system, wall sections or layers and placement of columns. From this the composition is developed. The spatial order and not the order of the columns rules the drawing" (PFAMMATTER, 2000, p. 63).

Durand's method is essentially an attempt to format architectural composition into a computational language, a proto-program. This is why Antoine Picon's introduction to the first English translation of the *Précis* is titled "From the 'Poetry of Art' to Method" (PICON, in DURAND, 2000, p. 1).

> Durand introduces on a single plate different construction materials, exposed as the irreducible elements of architecture to which he refereed as “notes.” Once the students are briefed, their preoccupations abandon the physical realm of construction and enter an abstract space where—similarly to music—all becomes dots and lines guiding the mind. It is the conceptual space—where architecture exists as a project deprived from building—which was previously formulated by Durand’s master Étienne Louis Boullée (RIPPINGER, 2018, p. 558)

Durand was a practising architect, but built very little—despite winning a number of prestigious governmental competitions for public monuments, none of his big-scale designs were built; Durand only built a few houses in the outskirts of Paris, including his own house at Thiais, all following his method and expressing the current neoclassic idiom (PICON, in DURAND, 2000, p. 1, 7). However, the influence of his book would soon extend from the Polytechnique to the Beaux-Arts school, becoming a work of reference for architectural education throughout the nineteenth century. The influence of Durand’s method would only wane with the emergence of the modern movement and its aggressive rejection of the academic tradition. However, it would eventually be rediscovered in the postmodern period, becoming a reference for “all those fascinated by its ambition of refocusing architectural thought on the issue of design” (Ibid, p. 1).

This is the main force behind Durand’s method: “For Durand, what counts in architecture is the inaugural act, that is, design” (HUET, apud PICON in DURAND, 2000, p. 2). The act of design, that is, of architectural creation, is completely detached from the context of building. The building is seen as a problem to be solved through a sequence of rational, pre-ordered operations. Ideally, the architect/designer acts almost like a tool being operated by the system. It may thus seem that Durand was downgrading the role of the architect, but if we consider his context, we can see that he aimed at quite the opposite. The École Polytechnique was focused on “the formulation and transmission of scientific and technological knowledge”, and architecture was therefore an important but secondary discipline, at first “presented as a straightforward application of Gaspard Monge's descriptive geometry”. (PICON, in DURAND, 2000, p. 3). Teaching architecture for future engineers, Durand seems to have felt a need to produce “a manifesto in favor of an architecture as rigorous as the sciences of observation and deduction and as efficient as engineering” (Ibid). Thus, in a world already shaped by the emergence of modern science—most clearly expressed by the concrete works of engineering like railroads, factories, etc—, Durand was trying to “elevate” architecture and include it in this new pantheon of human endeavour.

For Pérez-Gómez, Durand was “a desiccated functionalist, the embodiment of architecture's loss of symbolic meaning—a loss caused, in Perez-Gomez's view, by the advent of modern science” (Ibid, p. 2). However, at Durand’s time, the loss of symbolic meaning could in fact be seen as an advantage. In the age of divided representation, space had become an abstract entity—as proposed by the Newtonian concept of absolute space—, and the symbolic tradition of classicism—recovered and reinterpreted in the Renaissance, and reassessed again by the neoclassicism of the eighteenth century—was being confronted both by its inadequacy to conform to the new ethos shaped by modern science and by a new-found distrust in its sources, including Vitruvius.

> By presenting architectural proportions as a kind of dogma, like religious articles of faith, the Vitruvian tradition renders itself liable to be falsified by experience. The falsification was supplied by eighteenth-century travelers, who revealed the diversity of exotic architectures, ancient and modern, Egyptian, Arab, and Chinese, and who also explored the variations in Greco-Roman architecture itself. Revealed to the French public by Charles-Nicolas Cochin II, Gabriel Dumont, and Jacques Germain Soufflot, the squat columns of the Temples of Paestum shook the foundations of Vitruvianism as surely as did the study of Chinese pagodas (Ibid, p. 15).

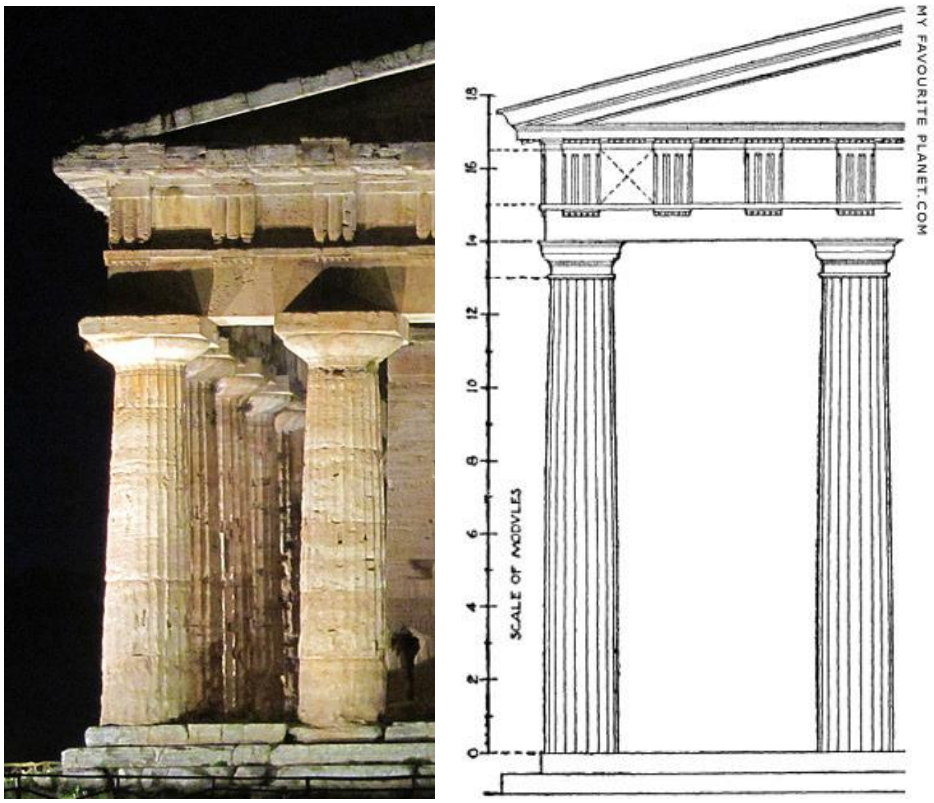

Figure 17 - The Temple of Neptune, in Paestum / An (ideal) Doric column, according to Vitruvius.

Sources: https://en.wikipedia.org/wiki/Paestum#/media/File:Tempio_di_Nettuno_-_Paestum.JPG

The inadequacy of the classical vocabulary became especially evident in the new programs demanded by the Industrial Revolution. Before, architects were artists with academic training who devoted themselves to the design and construction of palaces, churches and mansions, usually working for the nobility, for the church or for the monarch himself. Now, there was the urgent need to build not only factories, mills, and railways, but also "Schools, courthouses, bourses, and markets", now understood as "facilities, with functional objectives that soon took over from the monumental imperatives of the assertion of royal power" (Ibid, p. 16). Thus, even buildings that did not seem to have the technical imperatives of a factory or mill were also, in a way, understood in the same terms— "the notion of the monument" was replaced "with that of the facility, *l'équipement*" (Ibid). The more traditional programs such as urban town houses became increasingly complex—both by the incorporation of technical systems like heating, plumbing, electricity, etc., and by growing demands in the "specialization" of specific rooms—, and a new variation also emerged: speculative buildings made specifically for rental, both for offices and for residential use. "Here, too, tradition had almost no contribution to make" (Ibid). Thus, even in its most traditional programs, architecture was overwhelmed by "the imperative of utility. Architecture must be useful: it must conform to needs, habits, and customs, and to their evolution" (Ibid, p. 17). Durand's method is a response to these tensions, which were especially clear to him—an architect teaching architecture in an engineering school.

This tension between architecture and engineering and the apparent anachronism and lexical inadequacy of the classical tradition were acknowledged by many architects such as Schinkel, one of the most prominent neoclassicists, who, impressed by the new industrial buildings he saw during a trip to England, raised the question that would be answered by early twentieth century modernists: "why should we not seek to discover a style for our own age?" (SCHINKEL, in KRUFT, 1994, p. 299). Even architects recognised that the most significant works of the time were the large-scale utilitarian structures built in iron and glass (NORBERG-SCHULZ, 2001, p. 171), and usually designed by engineers trained in Durand's method. The prevalence of utility was based in the sensationalist philosophy of John Locke and Etienne Bonnot de Condilla, which argued for the moral value of utility and its centrality in both private and public life

(PICON, in DURAND, 2000, p. 17). This notion led many theorists to revaluate the history of architecture from a utilitarian viewpoint—the most famous example being Laugier's theory of the "primitive hut" (first published in 1753), the first shelter built by Man and which would have been the archetype for all subsequent building types, especially the Greek temples revered by neoclassicism. This is of course a vision that is quite distant from the idea of existential space—illustrated by Kostof's view, in which fire is considered the most primitive architectural archetype. Of course, the primitive hut also created relational space—not only "inside" or under it, but also in its artificial stance amid the natural environment—, but Laugier's focus is not on the space, but on the utility provided by construction.

Figure 18 - Frontispiece of Marc-Antoine Laugier's "*Essai sur l'architecture*", 2nd ed. 1755 by Charles Eisen (1720–1778). Allegorical engraving of the Vitruvian primitive hut.

Source: https://en.wikipedia.org/wiki/The_Primitive_Hut#/media/File:Essai_sur_l'Architecture_-_Frontispiece.jpg

Durand's analytical method was revolutionary for architecture, and similar proposals were also emerging in different fields, from the new chemistry of Lavoisier to new analytical theories in music, art and landscape design. This new way of thinking is quickly identified, as Picon puts it, as akin to the very structure of reason. As summarized by the Ideologue Joseph-Dominique Garat in 1795, analysis was the "method of the human mind" (Ibid, p. 21). Thus, an analytical approach such as Durand's was rational and therefore natural, in accordance with the laws of nature that were being unveiled by human reasoning. Even though Durand's influence waned in the twentieth century, one of his main concepts remains relevant for architectural practice until today: the notion of building "types". The type is a combination of form and function— "a generic formula, a crystallized usage; it is the physical correlative of utility" (Ibid, p. 21). A "patio house" is a type, and so is a "row house" or a "skyscraper". The type tells you a lot about the building—its typology, as it will later be known—, and in Durand's theory they replace classical examples as references for new designs. This may seem like a detail, but referring to a generic type that does not really exists—only in the new space created by divided representation—is quite different than relying on an example endorsed by tradition, be it an actual building or an idealised or "adjusted" version of it. According to Picon, "At this point the break with Vitruvian tradition is complete. The meaning of architecture, for the heirs of Vitruvius, was that it manifested an order external—as divine creation is external—both to man and to society" (Ibid, p. 22). Now, architecture aimed at creating its own order.

From a flusserian point of view, Durand's analytical method can be interpreted as a proto-program, such as Gaspar Monge's descriptive geometry can be seen as a sort of proto-apparatus—as seen in section 2.2. In both cases, the practical applications of the method become a secondary issue—their impact "had more to do with the mental habits of order and precision that it tended to establish" (Ibid, p. 27) than with the practical outcome of their applications. This new mentality allowed engineer Claude Louis Marie Henri Navier to state that "To project a building is to solve a problem" (Ibid, p. 29), clarifying that we may find, here, the origins of contemporary solutionism, as defined—and criticized—by Morozov. Thus, can an endeavour that sought to assert the autonomy of architecture, levelling it with all other fields of modern science, have actually contributed for its debasement to a potentially automatable form of problem-solving?

Picon argues that Durand sought “to deconstruct everything that might appear chimerical in the chosen objectives of architecture” (Ibid, p. 33), but that, although his method claims to be positivist—not exactly in the sense established by Comte, but in similar terms—, “it actually inclines toward the very opposite, namely, utopianism. It is Utopian to seek to free architecture from technical and economic constraints while simultaneously proclaiming their preeminence” (Ibid, p. 34-35). There is therefore an essential contradiction in Durand’s theory: on one hand, it argues that “architecture is justified by its social utility”, while on the other hand it attempts “to turn the architectural project into a self-referential entity” (Ibid, p. 35), independent from external restraints that include its natural and social contexts. The “trap” of self-reference is however not confined to the method, but stretches throughout the discipline as a whole and is also present both in the teaching of the arts and sciences, with each field developing its own set of analytical methods. “Instead of the Enlightenment dream of the union of art and science, there emerged the confrontation between the 'two cultures’, scientific and artistic” (Ibid, p. 52).

However, Durand’s longevity is proved by a recent attempt to develop a computer script that emulates the method presented in the *Précis*, considered by the authors as “particularly suitable to be investigated by a computer script capable of automating the composition process” (RIPPINGER, 2018, p. 560). This is a common procedure in the exploration of contemporary shape grammars, but in this case the program—to which the author refers as the *mécanisme*—was written more than two hundred years ago:

> The procedural model developed in order to execute the *mécanisme* is an encoding in the programming language Python of a sequence of operations applied to various variables and executing different functions—a process commonly termed as a script. In order to generate a visual outcome, the script interacts with the open-source 3D computer graphics software Blender, through which graphical primitives—or meshes—are created. The primarily goal of the script is to randomly generate a model of a building which fully respects Durand’s prerogatives. It also aims to further grasp the *mécanisme*’s internal logic by translating it into code (Ibid).

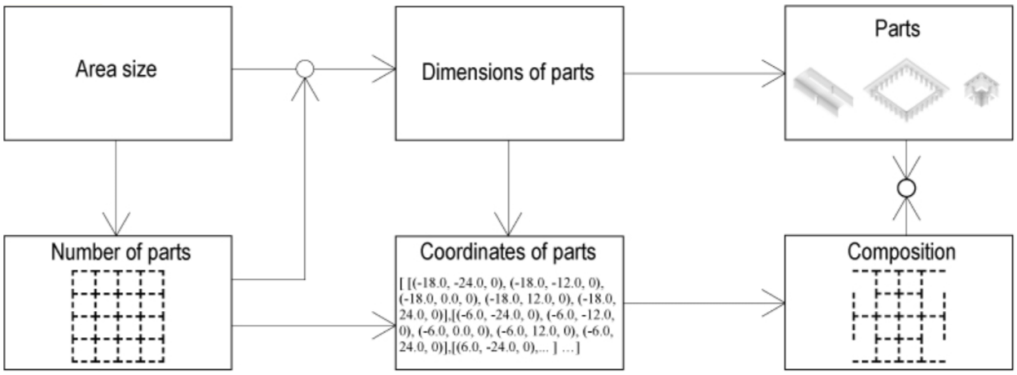

Figure 19 - Schema of the script's execution (RIPPINGER, 2018, p. 560).

The experiment is essentially an enhancement of the combinatorial logic already present in the *mécanisme*, translating the operations described by Durand into code and thus allowing its automation. The goal was to see if the script would create "architecture" in Durand's terms, but of course with a main difference—despite the absence of a human designer—: the method changed from the operation of graphical means "towards the completion of a design predefined through formal relationships, actualized by the script (Ibid, p. 561). Thus, an analytical graphic process becomes a dimensionless numeric operation that produces graphics—technical images—only as outputs. The image is no longer part of the process, but only its goal—and therefore only apparatuses can take part in its production.

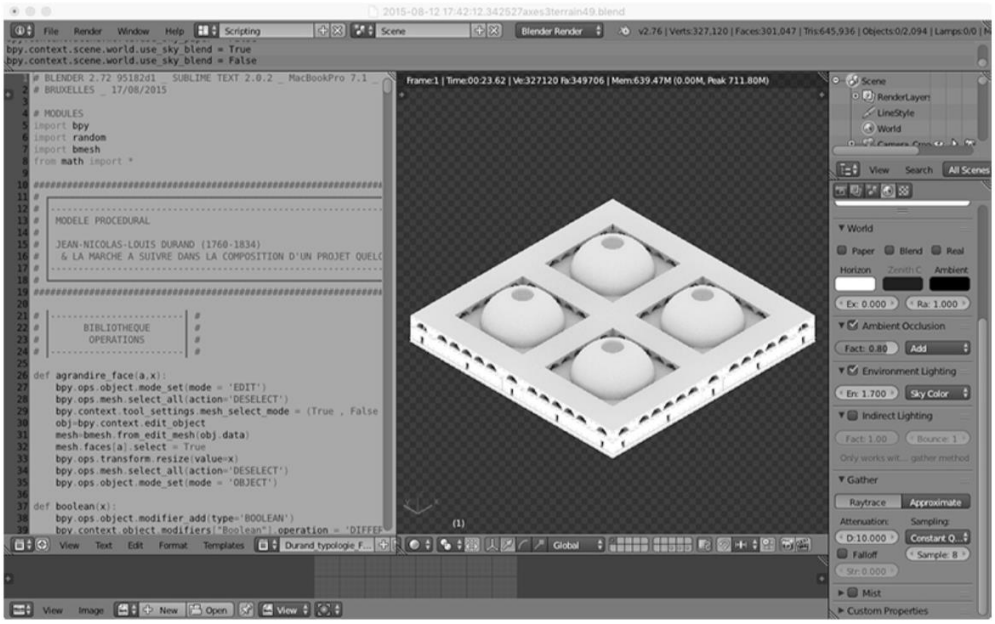

Figure 20 - "Blender UI with script and generated model" (RIPPINGER, 2018, p. 561).

The author also resorts to Pérez-Gómez, to whom "The practice of drawing, once standing on a philosophical ground and incorporating myths and beliefs, is by Durand replaced by an autoreferential setting of scientific and exclusively operational value" (PÉREZ-GÓMEZ, 1983 in RIPPINGER, 2018, p. 563), and concludes that "The recent developments in numeric architecture, and in particular its algorithmic turn, can be regarded as positioning itself in that same tendency." (RIPPINGER, 2018, p. 563).

2.7. Modern Architecture - Utopias for the Machine Age

Even though Durand's method provided the compositional basis for the eclecticism that dominated nineteenth century architecture—with volumes generated from Durand's types being "dressed" in ornaments and motifs taken from different periods of History—, its analytical logic already pointed towards a sort of a-historical attitude. According to Mallgrave, this attitude was already present in the architectural theory of the time, but its first influences in practice would only become evident in the period between 1889 and 1912 (MALLGRAVE, 2005, p. 204). Despite of their decorative richness, movements such as the emerging *art nouveau* of Victor Horta, the *Wiener Secession* of Otto Wagner and the Catalan *Modernisme* of Antoni Gaudí presented a break with the ornamental historicism of *Beaux-Arts* architecture, drawing both from local traditions and technical innovations such as the recent advances in the production of cast iron structures. In the United States, Louis Sullivan designed the Wainwright building, proudly announcing "that he had solved the 'skyscraper' problem" (Ibid)—a new building type born out of the development of light steel frame structures, elevators and heating, ventilation, and air conditioning systems, but that still lacked an architectural "formalization".

The break with historical forms and the creation of new forms attuned with the logics of the industrial world would of course be one of the most fundamental tenets of Modern Architecture, and the *modus operandi* of modern engineers would be one of its main references. According to Vesely, the "contemporary engineering approach to design" is the product of a long process that begins with the emergence of divided representation, and in which "the concreteness of the primary human situation was transformed through idealization and abstraction into its schematic equivalent." (VESELY, 2004, p. 306). It can be said that Durand's method presents a very similar attitude, but its association with eclecticism prevented it from being embraced by modern

architects. The urge to promote a clan break with the past did not seem to allow the incorporation of any small trace of "academicism".

The fathers of the Modern movement have undoubtedly created a new tradition in architecture, as advertised by Siegfried Giedion in the classic book "Space, Time, and Architecture", first published in 1941 (GIEDION, 2008). This tradition was built on the tensions between art and technology, architecture and engineering. In "Pioneers of Modern Design", art historian Nikolaus Pevsner chose the following subtitle: "From William Morris to Walter Gropius". William Morris (1834–1896) was one of the key figures of the Arts and Crafts movement, which argued for a recovery of craftsmanship as a reaction to the poor quality of standardized, machine-made products. This reaction was not based merely in aesthetic appreciation—Morris actually blamed artists for having distanced themselves from everyday life, turning to "dreams of Greece and Italy… which only a very few people even pretend to understand or be moved by." (PEVSNER, 2011, p. 15) Industry had replaced the work of the artisans, producing the utensils for everyday life, while artists focused on producing "fine art." Morris sought to spread the scope of fine art to everyday objects, so that it could be enjoyed by all, —and he believed that he could do this by re-creating the work structure of the medieval guilds.

Pevsner underlines that artists began to distance themselves from society during the Renaissance; thus, the Middle Ages provided the example of an era when one could still find a unity between art and everyday life. This is why, for Pevsner, Morris's socialism has "more in it of More than of Marx"—he looked "backward, not forward." (Ibid, p. 16) However, in spite of his intentions, Morris's "medieval techniques" made his products quite expensive if compared with the competition of mass-produced items. According to Pevsner, in his late speeches Morris changed his tone, from considering all production by machinery as evil to admitting the need for men to become "the masters of our machines." (Ibid, p. 17) One of Morris's followers, C. R. Ashbee, would eventually conclude the process of accepting industrialization, arguing that "modern civilisation rests on machinery, and no system for the endowment, or the encouragement, or the teaching of art can be sound that does not recognise this." (Ibid, p. 18)

This "acceptance" of the machine was developed by some European architects into a reverential enthusiasm not only for the machines themselves but also for their creators—engineers. Austrian architect Adolf Loos wrote that engineers were "our Greeks. We receive our culture from them," (Ibid) a position shared by Belgian painter and architect

Henry Van de Velde, who stated that engineers were “the architects of our time.” (Ibid) In America, Frank Lloyd Wright would write that, in the Machine Age, “locomotive engines, engines of industry, engines of light or engines of war or steamships take the place works of Art took in previous history.” (WRIGHT, 2008, p. xxxii) However, in spite of the enthusiasm shown toward machines and engineering, these architects followed what Morris had preached in his final years: machines should be mastered by men, and not the other way around. They also believed that engineers provided practical and rational solutions to the problems and demands of real life, while architects were focused on ornaments. Thus, architects should recover their relevance, mastering the machines and expressing this dominance through new forms, adequate to the new spirit of the Machine Age.

In 1907, a group of German architects, artists, and writers founded the *Deutscher Werkbund*, which aimed to “ennoble craftsmanship, selecting the best representatives of art, industry, crafts and trades, combining all existing efforts towards quality in industrial work.” (BENEVOLO, 1977, p. 381) The spirit of the Werkbund was summarized by architect Theodor Fischer, who argued that men should turn machines into tools. The main problem, for Fischer, was that “industry has lost sight of its aim of producing work of the highest quality, and does not feel itself to be a serving member of our community, but the ruler of the age.” (FORGÁCS, 1995, p. 9) During the annual assembly of 1914, it became clear that there was a clash in the organization: Hermann Muthesius argued in favor of standardization, which he believed to be the only way for architecture and all related activities to “recover that universal importance which they possessed in ages of harmonious civilisation.” (Ibid, p. 7), while Van de Velde claimed that “As long as there are artists in the Werkbund (…) they will protest against any proposed canon and standardisation. The artist is essentially and intimately a passionate individualist, a spontaneous creator. Never will he, of his own free will, submit to a discipline forcing upon him a norm, a canon.” (Ibid, p. 7-8) These opposing views would also be present in the first years of the Bauhaus, the highly influential design school founded by Walter Gropius in 1919. The Bauhaus manifestos, written by Gropius in 1919 and 1926, clearly express how he was at first inclined toward Van de Velde’s position, reviving the medieval work structure proposed by Morris, eventually being led, also like Morris, toward acceptance of standardization.

In 1919, Gropius, Bruno Taut, and Adolf Behne wrote the leaflet for the *Arbeitsrat für Kunst* exhibition for "Unknown Architects," held in Berlin. Gropius begins his text with the following words:

> What is architecture? The crystalline expression of man's noblest thoughts, his ardour, his humanity, his faith, his religion! That is what it once was! But who of those living in our age that is cursed with practicality still comprehends its all-embracing, soul-giving nature? We walk our streets and cities and do not howl with shame at such deserts of ugliness! Let us be quite clear: these grey, hollow, spiritless mock-ups, in which we live and work, will be shameful evidence for posterity of the spiritual descent into hell of our generation, which forgot that great, unique art: architecture. (GROPIUS, 1970, p. 46)

According to Gropius, early twentieth-century architecture consisted in mere "structures created by practical requirements and necessity," which "do not satisfy the longing for a world of beauty built anew from the bottom up, for the rebirth of that spiritual unity which ascended to the miracle of the Gothic cathedrals." He also seemed to believe that his generation could only conceive the idea— "an ardent, bold, forward-looking architectural idea"—that would, in the future, be "fulfilled by a happier age that must come." (Ibid) In a preview of the first Bauhaus manifesto—to be published in the same year—Gropius warns that "ideas die as soon as they become compromises. Hence there must be clear watersheds between dream and reality, between longing for the stars and everyday labour. Architects, sculptors, painters, we must all return to the crafts!" (Ibid, p. 46-47)

In April 1919, Gropius moved to Weimar to replace Van de Velde as director of the Grand Ducal Saxonian School of Arts and Crafts—Van de Velde was a Belgian citizen and had to resign when the war broke out in 1914; he then appointed Gropius as his successor. Gropius merged the school with the Grand Ducal Saxonian School of Arts, founding the *Staatliches Bauhaus*. The call for a "return to the crafts" is the central argument in the founding manifesto of the Bauhaus, published in April 1919 along with the school's program. Here, Gropius underlines how the different artistic expressions were, at his time, understood as independent disciplines, being thus reduced to mere "salon art". All arts—painting, sculpture, architecture—should be unified once again in architecture— "The ultimate aim of all visual arts is the complete building!" The proposal seems quite straightforward, and his model is clearly identified: "Let us then create a new guild of craftsmen without the class distinctions that raise an arrogant barrier between craftsman and artist!" (Ibid, p. 49) In his text for the *Arbeitsrat für Kunst* exhibition,

Gropius had already showed his admiration for the Gothic cathedrals, and now he tries to imitate or re-create the work structure that produced these buildings, imagining that a similar creative and productive process would be able to create work of similar relevance. This attitude—clearly inspired in previous experiences by Morris and Ashbee—is quite clear in the Bauhaus program, in which the discipline of art history is described to be "not presented in the sense of a history of styles, but rather to further active understanding of historical working methods and techniques." (Ibid, p. 52)

However, the first years of the Bauhaus were guided not only by the ideas expressed in the manifesto of 1919. There was yet another strong influence: the teaching of Swiss painter Johannes Itten, which was based on an idea of "subjective experience and objective recognition." (DROSTE, 2002, p. 25) Itten maintained a cult-like relationship with his students, and this became stronger in 1921, after he had spent considerable time on a spiritual retreat in Switzerland, where he was initiated in the Mazdaznan doctrine—an "updated version of an archaic Persian religion," (FRAMPTON, 2007, p. 125) which demanded a vegetarian diet, periods of fasting, and breathing exercises. Itten would then write of his awakening: "I reached the conclusion that we must counter-balance our externally-oriented scientific research and technological speculation with inner-directed thought and practice. I searched for something, for myself and my work, on which to base a new way of life." (Ibid) However, while Itten was focusing on inner-directed thought and practice, Gropius was interested in getting commissions—not only to solve the school's financial difficulties but also because he saw this practical application of the teachings of the Bauhaus as central to the overall role he envisioned for the school. Itten disagreed, refusing to take any commissions and arguing for the integrity of the individual experiences and expressions of the artist. Thus, the Muthesius–Van de Velde debate was somehow repeated in the Bauhaus. In 1923, the first Bauhaus exhibition was held in Weimar, and Gropius wrote an essay in which he stated, "The teaching of craft is meant to prepare for designing for mass production." (Ibid, p. 126) Itten immediately resigned and left the Bauhaus in April 1923.

This radical shift was formalized in 1926, when Gropius published "Bauhaus Dessau— Principles of Bauhaus Production." Gropius begins by delimiting the new scope of the Bauhaus: "to serve the development of present-day housing, from the simplest household appliances to the finished dwelling." (WINGLER, 1969, p. 109) The following argument, that "the Bauhaus is seeking (…) to derive the design of an object from its

natural functions and relationships," points toward a rational approach to design that aims at identifying, through an objective process, the true and pure nature of objects. In this context, true and pure mean without any influence of history or tradition— "Modern man, who no longer dresses in historical garments but wears modern clothes, also needs a modern home appropriate for him and his time, equipped with all the devices of daily use." (Ibid) Modern man has abandoned "historical garments," that is, for the first time man has positioned himself outside, or above, history. The modern is not part of the historical but, rather, its culmination—it transcends or surpasses it.

According to Gropius, the research into the nature of objects would lead to forms "that are often unusual and surprising, since they deviate from the conventional." Although proposing a "living relationship with tradition," Gropius seems to believe that the rational approach toward design would inevitably lead to originality. (Ibid, p. 109) When describing this new attitude toward design, Gropius defends the following points: "A resolute affirmation of the living environment of machines and vehicles; The organic design of things based on their present-day laws, without romantic gloss and wasteful frivolity." (Ibid, p. 110) A Chippendale-style chair expresses a certain moment in the history of design, as much as a Bauhaus chair expresses another one. The objectivity defended by Gropius tries to place itself outside of history, not being subject to it. Thus, the ahistorical attitude goes way beyond a mere urge for originality, freed from past references; it actually aims at transcending time, creating pure objects that would seem to have been created by nature itself, with almost no human influence. However, if the following generations keep addressing the present-day laws, they will be obliged to adapt these "perfect" objects to new materials and techniques. Thus, Gropius is actually really aiming at the establishment of a new tradition, in which the role of the designer—and not of the artist, who seems to have become obsolete—is to adapt the eternal and universal nature of objects to current technology—that is, to the materials, production processes, and techniques of the present day. Thus, this ideal, pure form can never be achieved—it can only be "translated" through the technical possibilities of the day.

While in 1919 Gropius aimed at creating workshops for artists and artisans, in 1926 he mentions laboratories focused on the creation of "prototypes of products suitable for mass production and typical of our time." In a reference to the attitude that permeated the first years of the Bauhaus, Gropius argues that "the contrast between industry and the crafts is much less marked by the difference in the tools they use than by the division of

labour in industry and the unit of the work in the crafts. But the two are constantly getting closer to each other." (Ibid, p. 110) Thus, the designer should integrate, in his prototype, all the processes that will be divided during production. Then, the outcome would possess the same unity found in handcrafted works. With this proposal, Gropius seems to go beyond a unity between art and craft, incorporating technology in the unified—and unifying—practice of design.

In *La Main et L'esprit* (1963), philosopher Jean Brun asks: "The hand is the measure of man; but is it his measure because it stretches out of him, giving him a prehension of the world, or is it because it defines and limits him, making him feel the experience of being deeply and painfully imprisoned in the world?" (BRUN, 1991, p. 13) This question can send us back to the debates between Van de Velde and Muthesius, Itten and Gropius. The artist can, through the unity of his craft, have a prehension of the world and express his particular apprehension through the work of art. On the other hand, machine production surpasses the reach and strength of the hand, breaking the limits of man's actions in the world— that is, allowing him to scape his "prison." Brun quotes Kant, according to whom "the structure of reason and the organization of the hand define the limits of the ontic region that Nature has destined to man; man can, and should, remove everything from himself, except precisely his hand and his reason." (Ibid) The projection of the hand through the machine finally allowed man to break away from any natural physical limitations to his action over the world. Thus, according to Brun, evolutionism—which turns the creation of man into a historical process— "tries to show that man obtained everything from his past, even his hand, and then, we will add, his reason, since the act of comprehending will be reduced to a mere annex of the faculty of prehending." (Ibid, p. 39) The new approach toward design, as preached by Gropius in 1926, is perfectly in tune with this notion. Why resort to examples of the past, to history and tradition? You can only truly understand the nature of an object through the actual, present prehension of this object, which will then lead to a comprehension of it.

This notion can be traced back to Lamarck, who argued that, if a species started using a part of its body in a different way, the form of this part could progressively change in accordance with the new usage or function: hence the idea that, by shaping the environment—cities, buildings, gardens, everyday objects—one could actually reshape society. On the other hand, realizing that Man, as it exists today, was shaped by the structures and objects created by the previous generations, one can conclude that there

are no universal or everlasting aspects of human existence—all of these aspects were somehow created by Man. Thus, it is perfectly possible to abandon the old shapes and replace them with new, original forms. This is essentially what Gropius argued for in 1926—to replace historical garments with "modern clothes." According to Brun, Darwin considered that "the conquest of verticality" configures "the liberation of the hand and the first human form. From this moment on, the man who manipulates things will have for his mission to conquer space and to give shape to the world that he rules." (Ibid, p. 46) This ruling power given to man by his hands explains why artists such as Morris and Van de Velde saw standardization as a threat—it would create a distance between man and his dominion, putting it at risk and delegating this power to the machines. Gropius, however, apparently understood that "the evolutionisms of the hand lead, then, to the prometheisms of the utensil, to which (…) the essential is to work in the development of a new body: the social Hyperorganism truly born out of the hands of man." (Ibid, p. 53)

This notion extends the ruling power of the hand from the artifact to the whole of society. Since the hand had been liberated from the creation of artifacts, delegating it to machines, it could now be fully used by reason, endeavouring into the design of the future. In 1935, Gropius would state that the machine should be understood as "an instrument which is to relieve man of the most oppressive physical labour and serve to strengthen his hand so as to enable him to give form to his creative impulse." (GROPIUS, 1962, p. 22) This impulse could be used in the design of the social Hyperorganism, to be built by—or through— machines. This notion is grounded on the idea, defended by Marx, that "technology reveals the active relation of man to nature, the direct process of the production of his life, and thereby it also lays bare the process of the production of social relations of his life, and of the mental conceptions that flow from those relations." (MARX, 1976, p. 493) Technology is thus seen as the origin of social relations, which are then the source of mental conceptions.

The unity of art and technology defended by Gropius lies in the desire to reshape society through the combination of the hands of the designer and the projection of these hands in the machines, creating new productive technologies that would then shape social relations and mental conceptions. However, for certifying the unity of the outcome product, the designer must predict all imaginable aspects of the object, since machines can only repeat a process or movement that was also designed. Machines cannot be

operated by the designer himself; thus, they cannot really be used like tools, as observed by Flusser:

> In the case of the tool, the human being is the constant and the tool is the variable: the shoemaker is seated in the middle of the workshop, and when he breaks a needle he replaces it with another. In the case of the machine, it is the constant and the human being is the variable: the machine is situated in the middle of the workshop, and when the human being becomes old or ill, the owner of the machine replaces him with another. (FLUSSER, 1999, p. 45)

The relation between man and tool is, according to Flusser, an architectural question. For the primitive man, working only with his hands, there was no need to create or separate spaces for fabrication. When machines are introduced, since they are "more durable and more valuable in the manufacturing process" than man, "human architecture has to be subordinated to that of the machines." (Ibid) The newfound distance between man and the production of the artifacts of everyday life had a huge impact on those involved in the creation of these objects. According to Flusser, "A shoemaker not only makes leather shoes; he also makes a shoemaker out of himself." (Ibid, p. 44) It is one thing to be a shoemaker, but what does it mean to be a worker responsible for just one small procedure in an assembly line? The detachment between man and the final product affects not only the craftsman's relation with his craft but also his notion of identity—he is no longer someone who has inherited an established, continuous tradition. As Zygmunt Bauman argues, "The modern project promised to free the individual from inherited identity," but "it only transformed the identity from a matter of ascription into one of achievement, thus making it an individual task." (BAUMAN, 1998, p. 30)

This notion that each individual should create his own identity—apart from inherited values and structures—is fundamental to the new tradition of Modern architecture. At the Bauhaus, the preliminary course aimed at fostering direct contact between students and the raw, primitive elements of design, such as colour, rhythm, light, and so on. The Bauhaus masters believed that in this direct, unbiased contact—stripped from any historical references and prejudices—human reason would operate freely, unbounded by canons, allowing the student to have an objective knowledge of these elements. Thus, the student would develop his skills according to his inclinations and would eventually join one of the Bauhaus workshops.

This process is clearly based on the idea that each man is a rational being whose reason can be numbed or even blinded by the overwhelming presence of the works and ideas he has encountered in the past. According to Gropius himself, the preliminary

course “was intended to develop and ripen intelligence, feeling and ideas, with the general object of evolving the ‘complete being’ who, from his biological centre, could approach all things of life with instinctive certainty, and would no longer be taken unawares by the rush and convulsion of our ‘Mechanical Age.’” (GROPIUS, 1962, p. 22) Thus, we can say that the real intention behind this formative process was to allow each student to start from scratch, developing his artistic abilities from the primitive perception of raw materials all the way to the design of industrial products, thus re-creating the evolution from prehistoric times up to the Mechanical Age.

In “Space and Place”, Yi-Fu Tuan states that “An architect has an intuitive grasp, a tacit understanding, of the rhythms of a culture, and he seeks to give them symbolic form.” (TUAN, 2011, p. 164) Considering the widely discussed impacts of the Industrial Revolution, it is undeniable that one of the major transformations caused by this phenomenon was a dramatic change in the rhythms of everyday life. Machines increased the rhythm of production like never before; the development of new means of transportation changed the pace of our daily routines, and communication technologies allowed people to interact in real time, regardless of distance. The very rhythm of these changes was also unprecedented—thus, we can imagine how difficult it was just to grasp these rhythms. On top of that, the means of expression were also changing; thus, the phenomenon made itself almost ungraspable, since it affected the mechanisms of both perception and expression.

In 1953, a seventy year old Gropius gave a speech in which he complained about the fact that he was constantly associated with labels such as Bauhaus Style, International Style, and Functional Style. He argued that “the strong desire to include every vital component of life instead of excluding part of them for the sake of too narrow and dogmatic an approach has characterized my whole life.” (GROPIUS, 1962, p. 11) Almost thirty-five years after the first Bauhaus manifesto, Gropius kept addressing the same main concern, which he described as “our common plight of losing control over the vehicle of progress that our time has created and that is beginning to ride roughshod over our lives.” (Ibid) At this stage in his life, Gropius seemed especially upset with the proliferation of the so-called International Style, which produced very similar buildings throughout the world— “Steel or concrete skeletons, ribbon windows, slabs cantilevered or wings hovering on stilts.” (Ibid) He argued that these elements were only the raw material, which should be used for the creation of local expressions of “certain universal technical

achievements in our period which belong to the intellectual equipment of every civilized nation." In order to justify and exemplify this argument, Gropius turns once again to the Gothic cathedrals: "The constructive achievements of the Gothic period—its vaults, arches, buttresses and pinnacles similarly became a common international experience. Yet, what a great regional variety of architectural expression has resulted from it in the different countries!" (Ibid)

Toward the end of his speech, Gropius sums up an overall attitude that seems to aim for a balance between the opposing approaches presented in the Bauhaus manifestos— "Our present responsibility seems to be to determine which features of our vast industrial civilization represent the best and lasting values and should therefore be cultivated to form the nucleus for a new tradition." (Ibid) We can see how the same problem still puzzled the mind of the old master and how he still aimed at the same solution: we cannot grasp or even keep up with the rhythm of our technological age, and so we must create a new approach, which will consist in teaching ourselves to master technology and express our artistic sensibility through the design and use of standardized products. However, while still evoking the golden age of the cathedrals, Gropius seems quite distant from the utopian visions expressed in the Bauhaus manifestos. One can even say that his balanced approach sounds rather "traditional," but we must underline a very important distinction: This approach works within the boundaries of "our vast industrial civilization"—it is, to a certain extent, already the new tradition.

Throughout the twentieth century, the founding theories of Modern architecture were extensively revised and criticized, but the overall mindset behind them is still quite present in the architectural debate. The ever increasing development of sustainable technologies is usually celebrated as the pathway to a better future, and, for many, this process is actually a matter of survival—we must change the way we produce and consume, or else we might simply disappear. This "faith" in technology is also present in more theoretical speculations, such as Patrik Schumacher's defence of Parametricism, which "offers a new approach to architecture on the basis of advanced computational design tools and techniques." (SCHUMACHER, 2008)

We should not be surprised, then, by the fact that, in most architecture schools, the curriculum is dominated by the new tradition created by Modern architecture. Premodern production is usually relegated to the disciplines regarding the history of architecture, very rarely being considered as a valid reference in the design disciplines. Architectural

education, thus, accepts that the advent of industrial production has changed humanity to such a broad and deep extent that we should think of history in terms of before and after this revolution. However, these prometheisms of technology can be our "historical garments," blinding us to the nontechnological aspects of architecture. In 1965, Christopher Alexander already warned that "the effort to state a problem in such a way that a computer can be used to solve it will distort your view of the problem. It will allow you to consider only those aspects of the problem which can be encoded—and in many cases these are the most trivial and the least relevant aspects." (ALEXANDER, apud RYBCZYNSKI, 2013)

2.8. The Fragmentation of Theory in The Second Machine Age

Despite the establishment of a new tradition, the most orthodox dogmas of Modern Architecture were actually short lived. Until the 1960s, there was still a significant degree of faith in the most fundamental ideal of modernity— "the meliorist belief that by affecting social change and imposing a universal environmental order architects could improve the human lot", and there was also a widespread conviction that "the most efficient way to achieve this amelioration was through technology and its application." (MALLGRAVE and GOODMAN, 2011, p. 1) However, in the 1950's, some criticism began to emerge, most of them coming from "inside" the modern movement. The criticisms of Aldo van Eyck—a member of CIAM (*Congrès internationaux d'architecture modern*), one of the main symbols of the modern architectural establishment—and Ernesto Rogers—editor of the prestigious Italian journal "Casabella-continuità"—found few backers at the time, but would pave the way for the new critical attitude that would explode in the 1960's. Rogers' design for the Torre Velasca, completed in Milan in 1958, reintroduced historical references in architecture, and most notably this was done in a skyscraper, the building type that had become the symbol of the International Style. The reaction of many modernists, such as British theorist Rayner Banham, was fierce: "To want to put on those old clothes is to be (…) like a man who has attained full physical maturity, yet wants to sleep in his cot again, to be suckled again by his decrepit nurse, in order to regain the nonchalance of his childhood" (BANHAM in MALLGRAVE and GOODMAN, 2011, p. 2).

At the time, Banham was on the forefront of the debate regarding the relationship between architecture and technology, arguing for an evolution of the original modernist

approach developed by Le Corbusier and Gropius. In "Theory and Design in the First Machine Age" (1960), Banham argues that the modern masters dealt with the "First Machine Age", reflecting on the functioning—and aesthetics—of airplanes, automobiles and ocean liners, and that a new reflection was to be developed for the "Second Machine Age", shaped by "televisions, radios, electric shavers, hair dryers, tape recorders, mixers, grinders, washing machines, refrigerators, vacuum cleaners, and polishers". (Ibid, p. 3) Banham's attitude towards this new revolution—built on the grounds of a previous revolution—is still acutely modernist:

> The architect who proposes to run with technology knows now that he will be in fast company, and that, in order to keep up, he may have to emulate the Futurists and discard his whole cultural load, including the professional garments by which he is recognized as an architect. If, on the other hand, he decides not to do this, he may find that a technological culture has decided to go on without him." (BANHAM in MALLGRAVE and GOODMAN, 2011, p. 4)

Along with Banham, many architects embraced the challenge to address the Second Machine Age in the terms established by the new tradition of modern architecture, revising some of its concepts and stretching its vision towards a more systemic application. In 1955, Buckminster Fuller criticized modernists "for their superficial concern with the aesthetics of the bathroom rather than with the technology of the plumbing behind the walls" (MALLGRAVE and GOODMAN, 2011, p. 5), and the intention to understand the complex technical systems that were being incorporated into buildings stimulated the development of numerous utopian/theoretical projects. In Japan, the "Metabolists" tackled the problem of urban crowding by devising megastructures inspired on natural biological growth; in London, the Archigram group incorporated pop imagery to the presentation of their utopian proposals such as "Plug-In City" (1964); while in France, Yona Friedman's *Groupe d'Etudes d'Architecture* (GEAM) developed the concept of a "spatial city" based on a "mobile architecture" meant to adapt to the "perpetual transformation" of modern society (Ibid, p. 4).

The "Delos Declaration" of 1963, devised by urban planner Constantinos Doxiadis and supported by Fuller, aimed to "come up with a science (*ekistics*) to solve the problem of random global growth", introducing the idea of "world planning" (Ibid, p. 5)"—a notion that would probably sound too far-fetched even for the most die-hard corbusian, but which would be the focus of Fuller's work in the following years. Thus, the faith in

the ethical project of modern architecture, based on the creation of new forms to keep up with a frantic and almost "natural"—in Hegelian terms—technological progress was still quite widespread in the profession, especially since most of these theoretical projects seemed to be "lauding the architect as the last of the comprehensive thinkers, indeed as humanity's last great hope." (Ibid, p. 6)

However, this was probably not the most popular view among the general public. The work of early modernists was not exactly well received by the public; in Brazil, the first modernist house, built by Gregori Warchavchik in São Paulo, had to be presented to the local authorities with window frames, a cornice and other ornaments in order to gain a construction permit—the architect would later argue that he had no funds to finish the house according to plan, being obliged to settle with a "simpler" version which was, of course, his original design (BRUAN, 2008, p. 65).

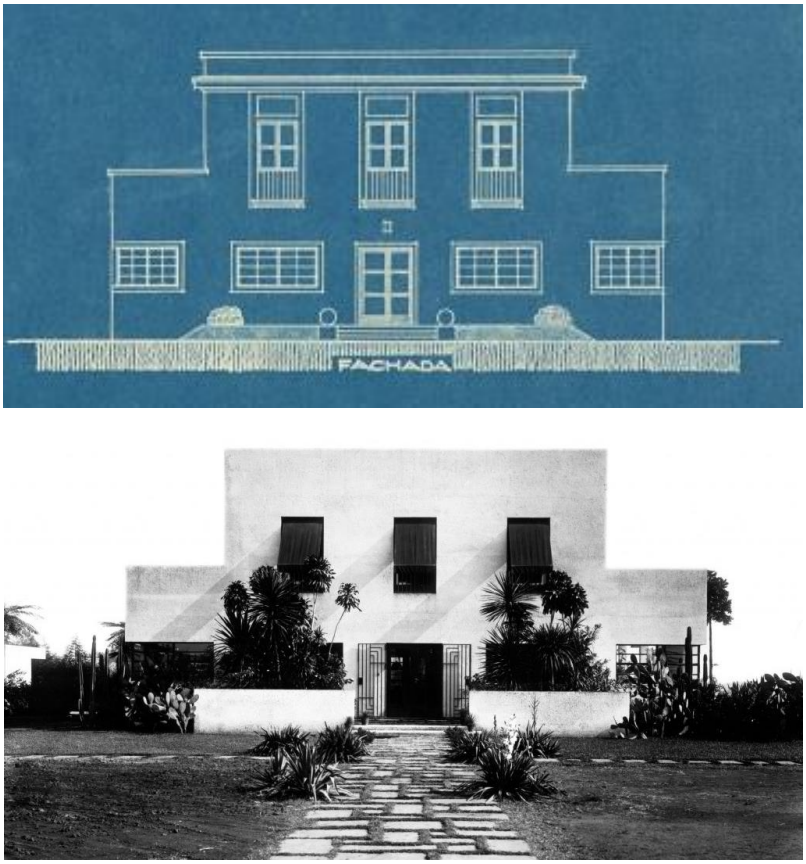

Figure 21 - Gregori Warchavchik, House at Santa Cruz Street (1928). (Top) Façade submitted to the Municipality / (Bottom) Built façade.

Source: https://casacor.abril.com.br/arquitetura/a-importancia-de-gregori-warchavchik-segundo-o-olhar-do-elenco-casacor/

The public's general distaste for modern architecture was not just aesthetic. The high-rise housing projects built throughout Europe and the United States—and later throughout the world—were, for many reasons not exactly related to architecture, quickly associated with segregation, urban alienation, poverty, crime and violence (MALLGRAVE and GOODMAN, 2011, p. 7). The only modern creation that seemed to be well assimilated was the steel-and-glass skyscraper, an evolution from the model created by Sullivan that would be reproduced all over the world, becoming the symbol of the International Style. However, by the 1960's, many architects and theorists began to acknowledge that there was something wrong with the modernist credo—the new architecture had not produced a new society, at least not the kind of new society envisioned by Gropius, Le Corbusier and others.

Sociologists, anthropologists and psychologists such as Edward T. Hall and Robert Sommer developed studies that seemed to prove the social failure of many modern buildings and cities, while Jane Jacobs and Kevin Lynch called for an urgent reappraisal of urban theory, denouncing the disconnection between modern urbanism and long-stablished structures of city-life (Ibid, p. 7-8). These and other efforts seemed to highlight that the focus on technology had blinded modern architects to the social and anthropological dimensions of architecture, and that these were not the "natural" by-product of the built environment. Modern architecture could not shape modern Man so easily.

Thus, in parallel with the technological enthusiasm of Fuller, some initiatives tried to incorporate the logics and recent advances of social sciences to the field of architecture. One example is "Community and Privacy" (1963), by Serge Chermayeff and Christopher Alexander, which aimed to "lay the foundation for 'the development of a Science of Environmental Design,' an architectural discipline that would draw upon and integrate analytical research from other sciences." (Ibid, p. 8) Alexander, who had studied mathematics before architecture, developed "33 design variables for prototypical urban housing, which he organized (with the aid of IBM's 704 computers) into sequences of groupings", a parametric design strategy that would be the basis for his doctoral dissertation, "Notes on The Synthesis of Form" (1964) (Ibid, p. 8). Alexander's approach seems to combine the analytical nature of Durand's method with the emerging influence of the social sciences— "His approach was to locate possible design parameters, synthesize them into subsets and tree diagrams, and work through all potential 'misfits,'

or unsatisfactory interactions between form and content." (Ibid, p. 8) However, Alexander quickly acknowledge the inadequacy of tree-like diagrams, since they force a linearity that is not exactly in tune with the design process—and here he was already departing from Durand's line of thought. In "A City is Not a Tree" (1965), the diagrams are replaced by "a semilattice structure, whereby branches can overlay with one another in multiple ways." (Ibid, p. 9), and Alexander argues that "natural" cities like Cambridge were organized in this manner, which sustained and reinforced urban life, while the tree-like functional design of modernist cities like Brasília created the social malaises identified by social scientists (Ibid, p. 9).

The social sciences would also influence architecture through the work of the so-called Frankfurt School, a group of Marxist thinkers who, like Banham and Fuller, were revising their own dogmas in face of the fast-paced transformations of the Second Machine Age. Marxist theory had already influenced the Arts and Crafts movement and its reaction to standardized production, and now authors such as Max Horkheimer and Theodor W. Adorno addressed a similar phenomenon in the development of the "culture industry"—a concept further developed by Guy Debord in "The Society of the Spectacle" (1967), in which Western culture is characterized as a consumer culture "hopelessly addicted to the 'spectacular images' viewed nightly on the evening news" (Ibid, p. 11). According to Flusser, this phenomenon has a significant influence on architecture: news are no longer spread and gathered in the public space, but in the private space that is now organized around the television— "The real information revolution is that, if you want to be informed, you have to stay home. If you go into the public space, you lose information" (KLENOY, 2011). This situation has of course been transformed by portable communication technologies, most significantly by smartphones—but in the 1960s, this inversion was quite radical.

The attitude towards the "spectacular images" produced by the culture industry would be in the centre of the debate between two emerging schools of architectural theory: from the United States, Robert Venturi urged architects to embrace both historic and contemporary references, including the "vernacular", lowbrow architecture of capitalist sprawl and the pop imagery of mass media; while in Europe, Aldo Rossi developed a new approach to typology, creating a "rationalist" language based on primary forms but also incorporating historic references.

Figure 22 - Robert Venturi, Denise Scott Brown, Jackson and Ryan Architects Children's Museum Houston, Texas, (1992) / Aldo Rossi, *Centro Direzionale di Fontivegge*, Perugia (1983).

Sources: https://havingfuninthetexassun.com/2016/07/19/childrens-museum-of-houston-houston/ https://commons.wikimedia.org/wiki/File:Perugia_-_Aldo_Rossi_-_Flickr_-_Daveybot.jpg

Although completely divergent both in their theoretical discourse and in the concrete expressions derived from it, both schools shared and expressed a "widespread perception that modernism had failed because of limited vocabulary—that is, its failure to connect or communicate with people." (MALLGRAVE and GOODMAN, 2011, p. 37) In order to bridge this communication gap, many architects and theorists turned to linguistic theory, specially to the emerging field of semiotics. Ferdinand de Saussure's "Course of General Linguistics" (1916) inaugurated what was then called "semiology", building on the distinction between "the more invariable rules of 'language' (*langue*) from the more individual aspects of 'speech' (*parole*), both operating through conventional signs and meanings." (Ibid, p. 38) Charles Sanders Peirce proposed a similar approach, but called it "semiotics"—the basis for Charles W. Morris's "Foundations of the Theory of Signs" (1938), in which the new field was divided into syntactics—the relations of signs to one another -; semantics—the relation of signs to their *designate* -; and pragmatics—the relation of signs to their interpreters. The signs were also interpreted through three categories: indexical signs that point to or indicate their meaning; icons, which exhibit properties of the content to which they refer; and symbols, which were understood as arbitrary or culturally established signs. (Ibid, p. 38) Morris taught a course on "Intellectual Integration" at the University of Chicago, "intended to unify theories of art, science, and technology under his theory of signs, based on the premise that every human activity can be analyzed as 'a certain type of sign structure.'", a development of

his earlier engagement with the movement known as "Unified Science", which included scientists such as Niels Bohr, John Dewey, Bertrand Russell, and Rudolf Carnap and sought to establish "a theoretical foundation for all knowledge." (Ibid, p. 39)

The influence of semiotics and of this overall notion that knowledge was based on a sign structure was felt both in the United States—through the direct influence of Morris's teaching at Chicago—and in Europe, were it became one of the cornerstones of the emerging *Hochschule für Gestaltung*, founded in Ulm in 1953. One of the main theorists of the new school was Tomás Maldonado, who argued that, in an age dominated by communication technologies, designers should know the work of "linguists, psychologists, social psychologists and sociologists; and also, of course, the representatives of modern semiotics." (MALDONADO in MALLGRAVE and GOODMAN, 2011, p. 39) Christian Norberg-Schulz was one of the first to devise an architectural theory based on semiotics. In "Intentions in Architecture" (1963), the semiotic structure proposed by Morris was combined with concepts brought in from "psychology, system theory, and information theory" (MALLGRAVE and GOODMAN, 2011, p. 40), with the intention to understand the existential meaning of spatial structures and architectural form.

The study of signs was also fundamental to the development of what would soon be known as postmodern architecture. The term appeared in a number of unrelated texts in the 1960's, but began to take shape and become recognized as a new "style" or approach with the writings of Charles Jencks. In "The Rise of Post Modern Architecture" (1975), Jencks acknowledged the previous criticisms of modernism, especially the critique developed by van Eyck and other members of Team 10—a group of "dissidents" from the prestigious CIAM—, but he believed that their architectural language "had remained abstract and for the most part impersonal in its expression." (Ibid, p. 53) For Jencks, architects should embrace "social realism (the sociology of Jane Jacobs), advocacy planning, restoration and preservation, *adhocism*, Ersatz design, radical traditionalism, and political reorganization" (Ibid, p. 53) as their foundational concepts, and develop a formal language based on semiotics and radical eclecticism—"If the architect were trained in four or five different styles, then he could control the ways his forms communicate with much greater effect.'" (Jencks in MALLGRAVE and GOODMAN, 2011, p. 53)

The postmodern discourse would soon gain attention both from the architectural press and from more widespread media, but the new tradition of modern architecture was still deeply rooted in the profession. This is clear in the continuous proliferation of steel-and-glass skyscrapers—still strongly based on the language of the International Style—, in the New Brutalism of England, in the technical sophistication of the structures devised by Frei Otto in Germany and in the Post-Metabolism emerging in Japan. Thus, while some architects proposed a radical break with the modern canons, developing a new kind of eclecticism aimed to explore the communicative potential of architecture, others worked inside the framework of the modern tradition, creating new forms to express and interpret new technologies. Apart from these two broadly defined groups, Christopher Alexander kept on the "lost trail of modernist anthropological thinking that had risen to such glorious heights in the 1960s." (MALLGRAVE and GOODMAN, 2011, p. 85)

In "A Pattern Language" (1977), Alexander presents a manual for architectural design and construction, providing 253 patterns that range from the scale of regional planning down to the design of ornaments. Despite of its combinatorial nature, however, Alexander's pattern language has nothing of Durand's schematic abstraction; all patterns are rather concrete, focused on social relations and individual perception. In "The Timeless Way of Building" (1979), Alexander provides a more theoretical approach focused on qualities such as "aliveness, wholeness, and beauty" (Ibid, p. 86), words that were in no way part of the vocabulary of neither modernists nor postmodernists. One of his main arguments was that "as nature has its underlying morphology or geometrical structure that endows it with support, so should architecture", and from this he argued that aliveness "is found not in formalistic or abstract theorizing but rather in the genome of the human organism." (Ibid, p. 86).

In the 1980's, even though the "high-tech" late modernism of Norman Foster, Richard Rogers and Renzo Piano was shaping large-scale buildings throughout the world, the historicist approach of postmodernism would become quite widespread, shaping a new architectural establishment. In the United States, Robert Venturi, Charles Moore, Robert A. M. Stern, and others exploited "populist notions of history and irony", while in Europe many architects such as Mario Botta, Ricardo Bofill, Christian de Portzamparc, Hans Hollein, James Stirling and Paolo Portoghesi developed personal styles that incorporated different references. (Ibid, p. 92) In broad terms, all of these different approaches shared some of the core concepts presented in a manifesto published in 1980

in the Harvard Architectural Review: “use of history, cultural allusionism, anti-utopianism, urban design and contextualism, and formal concerns.” (Ibid) Cultural allusionism was especially relevant, since it aimed “to bring existing symbols and expressive forms, understood and accepted by broad segments of the population, into the realm of architecture.” (Ibid)

In “The Doubles of Post-Modern”, Robert A. M. Stern divided postmodernism in two groups: the schematic, who argued for a clean break from Western Humanism, and the traditional, who saw the new aesthetic as a continuation of the humanist tradition that was abruptly interrupted by the modern movement. These opposing lines of thought were expressed in the works of American architects Peter Eisenman and Michael Graves, and both lines could be further divided into two subgroups

> characterized by their attitude toward modernism. Against the anti-humanist and anti-historical attitude of Eisenman, Stern argued on behalf of a “traditional” postmodernism—that is, one that wants a clean break from modernism but at the same one that accepts modernism as a valid source for Western humanism. This form of postmodernism also corrects the social and technological failures of modernism with a new cultural awareness; at the same time it does not present the “falsely monolithic” facade of modernism because of its pluralistic popular support.” (Ibid)

The opposing attitudes identified by Stern were both built on linguistic analogies. In “The Case for Figurative Architecture” (1982), Michael Graves likened Modern architecture to “standard language”, while the new Postmodern architecture meant to be a “poetic language”. Graves saw postmodern architecture as “a necessary correction to modern architecture’s lack of anthropomorphic content” (Ibid, p. 93), aiming to “re-establish the thematic associations invented by our culture in order to fully allow the culture of architecture to represent the mythic and ritual aspirations of society.” (GRAVES in MALLGRAVE and GOODMAN, 2011, p. 93) In a similar line, Jencks argued that modernism was a “universal, international style stemming from the facts of new constructional means, adequate to a new industrial society, and having as its goal the transformation of society, both in its taste and social make-up”, while postmodernism aimed to combine “Modern techniques with something else (usually traditional building) in order for architecture to communicate with the public and a concerned minority, usually other architects.” (JENCKS in MALLGRAVE and GOODMAN, 2011, p. 93-94) Jencks’s embrace of the new tradition of modern architecture is also evident in his almost positivist argument that “China and other non-industrialized countries must first go

through a modernist stage in order to arrive at the higher postmodern plateau" (MALLGRAVE and GOODMAN, 2011, p. 94).

However, some architects—especially in Europe—considered postmodern historicism as essentially scenographic, while agreeing with many of the criticisms posed by postmodernists towards orthodox modernism (Ibid, p. 102). These architects expressed their "cultural allusionism" in a more subtle manner, avoiding both the playful pastiches of Venturi and the geometric abstraction of Rossi, and engaging into a dialogue with the site and local materials and traditions. This was not a completely new attitude—the "Prairie Style" developed by Frank Lloyd Wright as far back as the 1890s already expressed a sort of "regional modernism" (Ibid, p. 97)—, but in the 1970s and 1980s theorist Kenneth Frampton—who identified a "trend" that he would eventually synthesize under the concept of "Critical Regionalism". Like Norberg-Schulz, Frampton also traced parallels between the philosophy of Heidegger and the newfound interest in the anthropological and even existential dimensions of architecture. His 1974 article "On Reading Heidegger" drew extensively from "Building Dwelling Thinking" (1951), in an attempt to "break away from the philosophical abstractions of nineteenth-century idealism by engaging in a rigorous description of 'things themselves'" (Ibid p. 100).

Heidegger's etymological inquiries provided interesting insights: "the English word 'space' derives from the Latin word *spatium,* and as a concept is removed from perceptual experience", while "the German word for 'space' is *Raum*, which is related to the English word 'room,' a physical expression of the idea of a 'place.'" (Ibid, p. 100) The concept of "place" emerged as a concrete alternative to the more rarefied concept of space, whose implicit abstractness had been growing continuously since the advent of divided representation. Thinking about architecture from the perspective of the conception and construction of places, architects would necessarily develop a deeper focus on "the tectonic art of building" while also becoming more integrated into the "public sphere" that permeates the acts of designing and building—summed up by Frampton in the triad "place, production, and nature" (Ibid, p. 100). In 1983, Frampton published the essay "Towards a Critical Regionalism: Six Points for an Architecture of Resistance", in which he introduces an analogy similar to the one proposed by Graves in the previous year: the contrast between "civilization (a concept ruled by instrumental reason) and culture (a civilization's creative expression)." (Ibid, p. 101)

Focusing on "place-form, topography, context, climate, light, tactility, and tectonic form", Critical Regionalism was to be an *arrière-garde* built to resist both the positivist faith of modernism—and of the late-modernists of the time—and the increasingly abstract architectural language inspired by literary concepts and analogies (Ibid p. 101) The latter were built on the theories presented by the Frankfurt School and French structuralism, especially the newfound suspicion of the economic determinism that permeated Marxism and the interplay between the social sciences, psychoanalysis and literature. The Frankfurtian concept of "culture industry" had already influenced architectural theory in the 1960's, along with the notion that artists should be aware of their social duty to present a radical opposition to this industry—and bourgeois society as a whole. But in the 1980's, the combination with French structuralism—an analytical approach to knowledge that attempts to consider phenomena as a complex system of variables operating under certain universal rules" (Ibid, p. 125)—provided a new conceptual basis for architecture.

Many architects and students were increasingly interested in the writings of Michel Foucault, Roland Barthes and Claude Levi-Strauss—who argued that "there was a universal structure to the human mind governed by binary rules, which were the same in all cultures and therefore could eventually be discerned." (Ibid, p. 125) In "The Archaeology of Knowledge" (1969), Foucault interpreted the history of knowledge "as a scheme of discourses—that is, as a complex web of human practices defined by society, culture, its institutions, and various other interested authorities" that had "no particular point of origin and is devoid of any central structure or moral truth." (Ibid, p. 125) A few years later, Jean Baudrillard would argue that, while modern society was shaped by "the organized production of goods and services", postmodern society was "formed on 'simulations' of real work, or the 'hyperreality' of television, cyberspace, computer games, and other forms of virtual reality". These images—technical images, in flusserian terms— "were no longer bound to a factual world; rather they were insidiously displacing this world altogether." (Ibid, p. 127) The postmodern world described by Baudrillard can be seen as the already established Universe of Technical Images, shaped by apparatuses and their essentially binary functioning:

> In Symbolic Exchange and Death (1976) Baudrillard described this process as a "third order" of simulacra, that is, the icons and emblems by which society originally defined itself (mass-produced in the modern era through industrialization, photography, and the cinema) had evolved in the postmodern era to the point where the copy has itself become real.11 For many people this hyper-reality in its vast proliferation has become far more intense and

> seductive than everyday reality. The binary code of the computer has, in effect, become a symbolic code for our existence, because each decision we make (from selecting a particular soft drink to choosing between two candidates in an election) really changes or alters nothing. Hyper-reality propels itself and we are powerless to slow it down. If this position suggests that we are doomed, as it were, to a technological determinism, Baudrillard's references in the mid-1970s to our dependence on instantaneous images and messaging still uncomfortably resemble life for many in the twenty-first century. (Ibid, p. 126-127)

The same could be said about Lyotard's "The Postmodern Condition" (1979), in which the increasing digitalization/virtualization of knowledge is seen as an unavoidable tendency that will eventually supersede the tradition of the liberal arts and their role in education, turning "information" into "a hotly contested commodity to be bought and sold in the marketplace." (Ibid, p. 127) This phenomenon would engulf the grand narratives of both the arts and modern science, including "the Enlightenment belief that with increasing knowledge society advances toward a condition of greater freedom" and the faith of theorists such as Fuller and Friedman in a supposedly rational unification of all knowledge (Ibid, p. 127). The scepticism towards grand narratives and metanarratives is already evident in Jacques Derrida's "Of Grammatology" (1967), which proposes a critical methodology of "close reading" that aims to deconstruct texts and reveal not only "hidden" meanings but also the social and political hierarchies in which the texts were produced. From a flusserian perspective, this may be interpreted as an intentional strategy to avoid "textolatry"— "the inability to read off concepts from the written signs of a text, despite the ability to read these written signs; hence: worship of the text" (FLUSSER, 2000, p. 83)—desacralizing texts and exposing their inner workings. On the other hand, Derrida's approach can also be interpreted both as a creative process of resignification or as an unjustified attempt to associate texts to "foreign" concepts and meanings. Anyway, this approach would become highly influential in some architectural circles in the 1980's.

However, while in Europe the "schools" of postmodernism and poststructuralism were usually understood as slightly different expressions of the same "movement", in the Anglo-Saxon world the latter—whose authors were only translated into English in the beginning of the decade—was largely considered as a critique of the former (MALLGRAVE and GOODMAN, 2011, p. 129). This is why, in the United States, K. Michael Hays proposed a balance between the embrace of "the self-confirming, conciliatory operations of a dominant culture"—identified with the postmodernism of Venturi—and the reduction of architecture "to a purely formal structure disengaged from

the contingencies of place and time"—as evident in the recent experimental projects by Peter Eisenman (Hays in MALLGRAVE and GOODMAN, 2011, p. 130)

Peter Eisenman developed a series of experimental projects for houses throughout the 1970's. The first projects were built on geometrical processes of composition and combination, but in "House X" (1976) the influence of Derrida's "deconstruction" becomes evident, turning the design process into a "heuristic exercise dealing with what Derrida had called 'traces' or vestiges of meaning that are not overtly expressed." (MALLGRAVE and GOODMAN, 2011, p. 133)

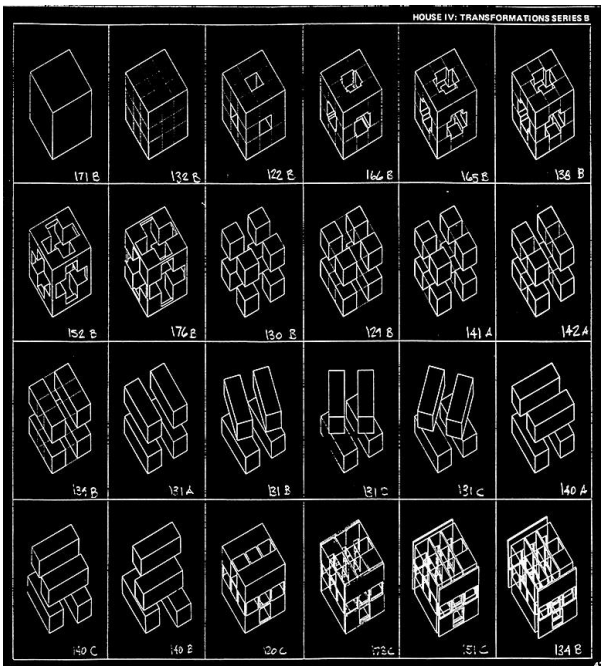

Figure 23 - Peter Eisenman, diagrams for HOUSE IV, Falls Village, Connecticut, 1971.

"In House IV, a limited set of rules (shift, rotation, compression, extension) was applied to a limited set of elements (cubic volume, vertical planes, spatial nine-square grid). This transformational method establishes a code of spatial relationships within the syntactic domain of architectural language. The set of diagrams thus produced is recorded as both substance and indexical sign, which shift the focus away from existing conceptions of form in an intentional act of overcoming materiality, function, and meaning."
https://eisenmanarchitects.com/House-IV-1971

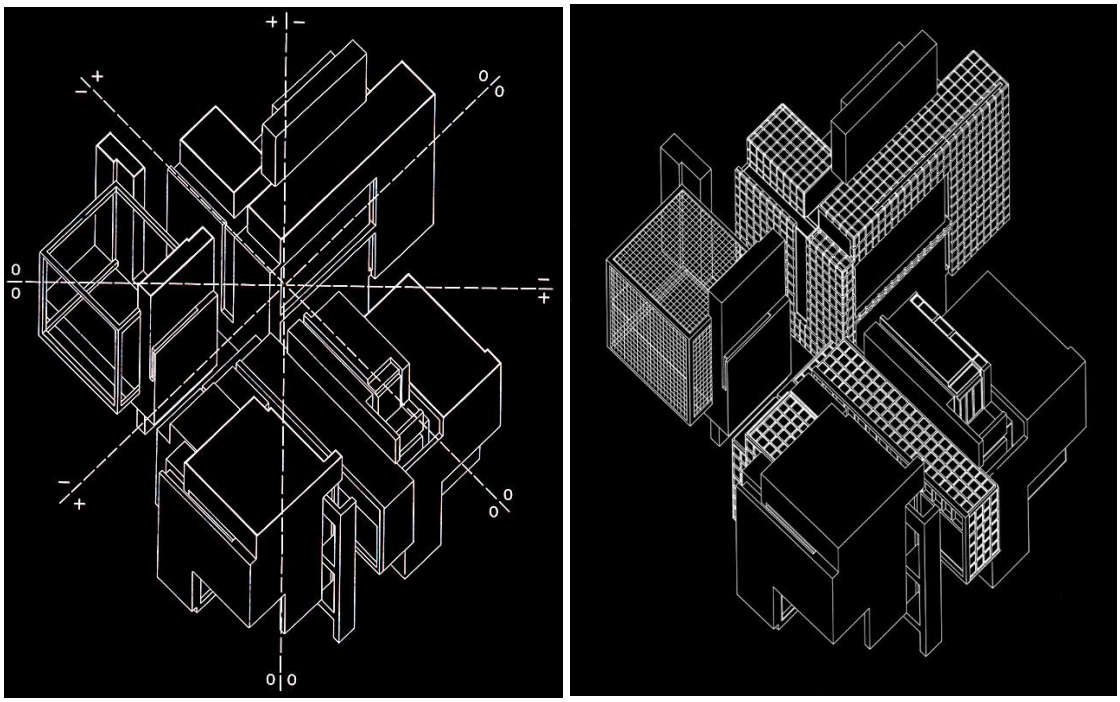

Figure 24 - Peter Eisenman, diagrams for HOUSE X, Bloomfield Hills, Michigan, 1975

"The specific configurations of House X can be understood initially as the juxtaposition of four squares. This configuration is only an initial analogue, a heuristic device used to approach a more complex sign condition, which in itself is only a possible approximation of the reality it signifies."
https://eisenmanarchitects.com/House-X-1975

Eisenman saw this apparently foreign attitude towards architecture as a way to criticize both "modernism (nostalgia for the future), historicist postmodernism (nostalgia for the past), and contextualism (nostalgia for the present)." (Ibid) Thus, deconstruction presented an alternative from late-modernism, postmodernism and critical regionalism/phenomenology. It operated in a completely detached space, treating architectural elements as words to be dissected, shifted and recombined in order to arrive at a "purely architectural" language. The idea was "to destabilize the value of origin, to destabilize the notion of anthropocentrism and to destabilize the aesthetic object." (EISENMAN in MALLGRAVE and GOODMAN, 2011, p. 135) In "The End of the Classical: The End of the Beginning, the End of the End" (1985), Eisenman draws upon Baudrillard and applies the notion of simulation "–of representation, reason, and history—to characterize architectural development since the Renaissance", recognizing the abstraction of space later identified by Vesely as "divided representation" and arguing for "the idea of 'writing' as opposed to 'image': writing not as words or signs but rather

as Derridean ‘traces’ or fragmentary words with ambiguous meanings” (MALLGRAVE and GOODMAN, 2011, p. 135)

Bernard Tschumi would also “borrow” from French structuralism and from the idea of deconstruction, but his approach was more “sensual” than theoretical. In 1975, Tschumi wrote about “the Architectural Paradox”, arguing that it was impossible to address the nature of space as a concept since we are always necessarily doing it from some concrete “place”. Thus, Tschumi argued for the prevalence of the direct, sensory experience of the environment over conceptual or abstract theories (Ibid, p. 136). This is evident in “Violence in Architecture”, where the term violence is used as “a metaphor for the intensity of a relationship between individuals and their surrounding space.” (TSCHUMI in MALLGRAVE and GOODMAN, 2011, p. 136) This approach is expressed in Tschumi’s first large-scale commission, the proposal for the design competition for the *Parc de La Villete*, in Paris. Although the overall masterplan may echo Eisenman’s abstract geometric schemes, the “follies”—sculptural pavilions with no specific use or program, placed in the intersections of an orthogonal grid—explored the aesthetic excitement of crossing and crashing volumes, lines and surfaces. These are not “traces” in the *Derridarian* sense, and if the particular deconstructivism developed by Tschumi was built on any literary analogy, it was closer to the *Barthesian* notion of intertextuality, the “idea that all texts are in effect made up of fragments of other texts.” (MALLGRAVE and GOODMAN, 2011, p. 138)

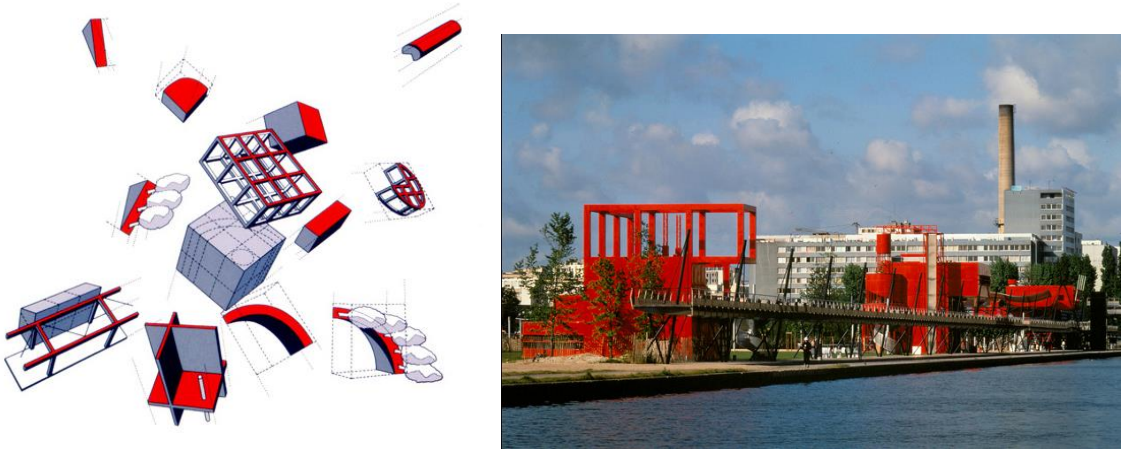

Figure 25 - Bernard Tschumi, diagram for the “follies” (1983) / Three built examples.

Source: http://www.tschumi.com/projects/3/#

At the end of the 1980's, the definition of deconstructive architecture became rather elusive because of the confusion caused by the "Deconstructivist Architecture" exhibition held at New York's Museum of Modern Art in 1988. Envisioned by Philip Johnson—one of the few surviving icons of modern architecture, who had recently shifted towards postmodernism with his "Chippendale-inspired" AT&T Building in New York—, the exhibition presented works from seven architects with very diverse languages: Frank Gehry, Daniel Libeskind, Rem Koolhaas, Peter Eisenman, Zaha Hadid, Coop Himmelblau, and Bernard Tschumi (Ibid, p. 156). Even tough Johnson argued, in his preface to the exhibition catalogue, that there was no new style or movement in the making, and that the title of the exhibition only referred to a certain aesthetic similarity between some works and the Soviet Constructivists of the 1920s, some critics would soon argue that this architecture expressed a "neo-avant-gardist dismissal of social, ecological, and constructional concerns" that was in fact "mocking the revolutionary spirit out of which it was presumably born." (Ibid, p. 158) Additionally, these architects did not seem to express any intention to communicate with the general public—their "cultural allusionism" seemed to be directed only to some of their own peers, who might be interested in the formal complexity born out of philosophical and literary allusions. As Mallgrave and Goodman put it, "never had theory become so utterly difficult to understand." (Ibid, p. 140)

In the 1990's, a similar attitude would permeate the work of architects inspired by the concept of "fold", as exposed by Gilles Deleuze in *"Le Pli"* (1988)—English translation "The Fold" (1993). Deleuze analyses the thought of baroque philosopher Gottfried Leibniz, but only as a means to interpret the baroque "not as a particular historical period but rather as an 'operative function' unconnected to any specific moment in history." This operative function "produced pleats, folds, and twisted surfaces that could be extended into infinity, and thus for Leibniz the 'fold' constituted the basic building block of the universe because mass was created through the endless accretion of fold upon fold." (Ibid, p. 164) This notion is then extended towards the proposal that "folding"—both literally and metaphysically—can synthesize divergences and contradictions— "that is, baroque folding synthesizes the purity of 'classical reason' with its opposite. The result is not the destruction of the classical but instead an inflection; in the baroque, the classical temple front bends but does not lose its authority." (Ibid)

American architect Greg Lynn edited a special issue of the Architectural Design magazine entitled “Folding in Architecture” (1993), promoting “the conception of architecture as a form of writing that admits uncertainty and indeterminacy.” (Ibid, p. 164-165) However, in order to create “folding” in his projects, Lynn explored an apparently less poetical discipline— “Like the early modernists, Lynn is looking to emerging technologies as a driver of form—in this case, the production of computer drawings, which might then be directly converted into buildings.” (Ibid, p. 165) New form-finding processes were developed in accordance with the logics and languages of computer software, allowing for the conception of complex forms that “aimed at a synthesis with a building’s surroundings, in which forces determined to be present on the site would be seen to be pushing, pulling, inflecting, and otherwise deforming an original, and presumably neutral, original form.” (Ibid, p. 166) The complexity sought by Lynn and other architects seduced by the synthetic potential of folding was very different from the deconstructed geometries that emerged in the previous decade. Now, there was an increasing interest in biomorphic shapes, combining the logics of computer software with some of the strategies devised by the Metabolists of the 1960’s.

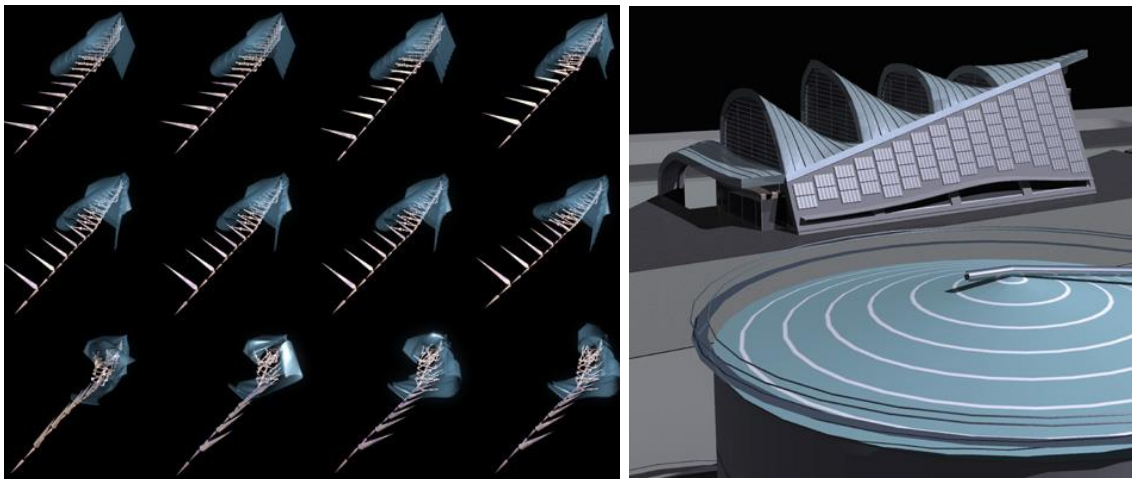

Figure 26 - Greg Lynn FORM, Vienna OMV Corporation, Vienna, Austria, 1996.

“It may be the first building design to use 'Inverse Kinematics' that were rigged to both the movement of the sun through three annual scenarios as well as the movement of traffic on the adjacent autobahn. The scalloped surfaces of the building as well as the bulging photovoltaic skin were captured using these IK rigs.” Source: https://glform.com/buildings/h2-house/

However, another concept introduced by Deleuze would sustain a longer influence: the notion of "objectile" understood as “the capacity of differential and integral calculus

to generate an infinite number of objects that are elements of a continuous series." (PICON, 2010, p. 75). The development of a new architecture—produced by means of differential and integral calculus, combined as "a kind of mathematical engine"—, was already, according to Lynn, creating "animated" forms that were inseparable "from fields of forces that generate geometric mobility." (Ibid) According to Picon, this notion also allow us to understand these forms as "an element or moment of a flow", or as "a section or even a freeze frame obtained by freezing a moving geometry." (Ibid). In simpler words, the form is no longer a stable unity, sustaining its identity throughout time—it has become an "event". This tendency is evident in the systems created by Bernard Cache and Patrick Beaucé in their design workshop—not surprisingly called "Objectile"—that seek "to mobilize this potential for variation in order to produce 'non-standard' furniture and buildings." (Ibid). In this context, the long established tradition of the architectural type seems to be a vestige from a distant past.

The formal experiments of the early 1990s would eventually be developed into much more complex systems that not only allowed playful form-finding exercises, but would actually provide the possibility of creating completely new forms. Some of these forms could not be conceived before the advent of this apparatuses, since there was no form of representation that would allow the development of the design process. Engineer and designer Cecil Balmond explored these new forms/events through a "re-conception of Newtonian physics", replacing the classical depiction of force as an arrow with a contemporary understanding of force "as a minimum path through a field of potential" (BALMOND In MALLGRAVE and GOODMAN, 2011, p. 170) This approach was further developed through "parametric" and "algorithmic" systems "in which a detailed, adaptive digital model of a system or structure is constructed and dynamically modified. As one variable in the system changes—a surface profile, for example—all other variables, such as the profiles of individual structural elements, are immediately recalculated according to the established algorithm." (MALLGRAVE and GOODMAN, 2011, p. 170) Thus, the notion of ambiguous and spasmodic forms also enters the realm of engineering.

Of course, the creation of forms that can only be devised, represented and built through apparatuses—in the flusserian sense—raises questions regarding not only authorship—was the form created by the architect or by the software? —, but also possible concerns regarding the opacity of the dialogue between apparatuses. However,

while these questions began to emerge—still in the early 1990's—, a new approach to the social, critical and ethical role of architecture was emerging, especially in the Netherlands. Rem Koolhaas's office, OMA (Office for Metropolitan Architecture) became a think-thank that focused not only on design and construction, but also on the development and propagation of their belief "that architects, instead of struggling against or resisting the forces of capitalism, should instead seize and exploit them." (Ibid, p. 178) In "Bigness, or the Problem of Large" (1995), Koolhaas argues

> that the technological innovations of the early twentieth century (electricity, the elevator, structural steel, air conditioning) created the condition of "Bigness" by allowing buildings to grow ever larger, gradually undermining traditional architectural concepts like composition, sequence, and the relationship of a building's facade to its internal organization. Most importantly, he notes that when a building reaches a certain size, it detaches itself from the urban fabric into which it is placed. If architects generally respond to this condition with a strategy of "disassembly and dissolution," or by breaking down large programs into "incompatible fractals of uniqueness" through fragmentation or montage, Koolhaas posited another antidote. He proffers "the Whole and the Real," or an approach that compresses disparate events within a single container, allowing them to interact freely in something resembling a "programmatic alchemy." In their internal richness and variation, Koolhaas argues, these buildings can themselves become urban, internalizing, and perhaps will eventually replace the "classical" city. Koolhaas concludes, rather apocalyptically, that "Bigness" will produce the only architecture able to survive the "now-global condition of the tabula rasa" and that these outposts of architecture will become "landmarks in a post-architectural landscape." (Ibid, p. 184-185)

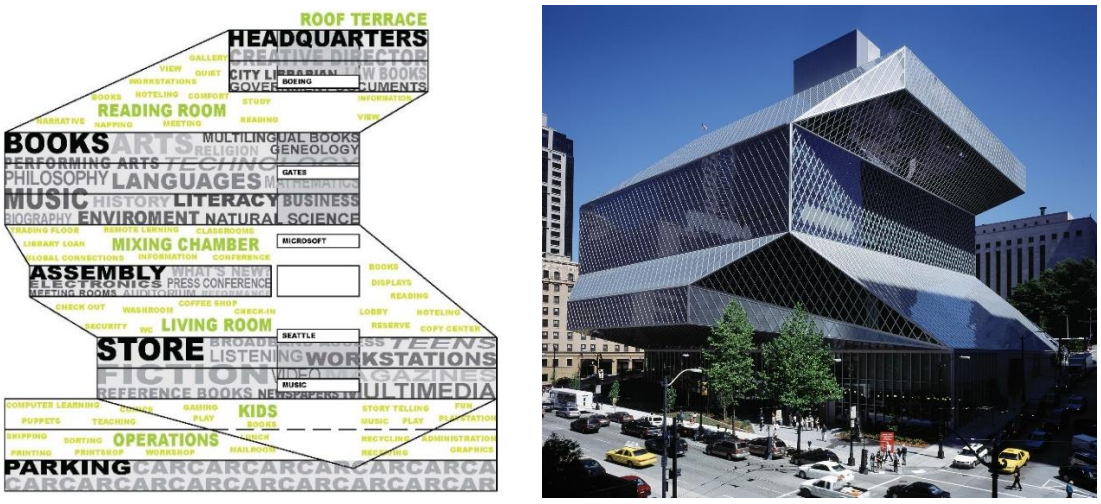

Figure 27 - OMA, Seattle Central Library, 2004. Program diagram and finished building.

Source: https://www.archdaily.com/11651/seattle-central-library-oma-lmn?ad_source=search&ad_medium=projects_tab

A similar attitude permeated the work of another Dutch firm, UN Studio. Their participation both “conventional” buildings and large infrastructure projects lead them to redefine the architect as an “’expert on everyday public information’—that is, as someone who, in leading a team, could process the varied inputs and transform them into ‘ideas and images for the organization of public life.’” (Ibid, p. 188) This notion is of course related to the cultural allusionism of early postmodernism, but now it incorporated the information processing power of specialized software—which on one hand provides more information for the architect to analyse and assess, while on the other it may usurp a part of his or her agency. Curiously, around the same time, an architect-engineer was becoming famous—a real celebrity, known to the general public—because of his aesthetic approach to infrastructure projects. Santiago Calatrava designed bridges such as the clearly “over dimensioned” Alamillo Bridge, in Sevilla (1989-1992) more as “a symbol for civic enlightenment and modernization” (Ibid, p. 190) than as an efficient structure. Curiously, the same structural principle was applied by UN Studio in the Erasmus Bridge in Rotterdam (1990-1996)—but the design led by the architectural firm is much more rational and utilitarian, and its structure is in fact much more efficient—the pylon mass of the Alamillo Bridge is more than 10 times the pylon mass of the Erasmus Bridge, which has a longer span (GUEST et al, 2012).

Figure 28 - UNStudio, Erasmus Bridge, Rotterdam, 1990-1996 (Top) / Santiago Calatrava Architects and Engineers, Alamillo Bridge, Sevilla, 1989-1992 (Bottom).

Sources: https://en.wikipedia.org/wiki/Erasmusbrug#/media/File:Erasmusbrug,_September_2019.jpg
https://commons.wikimedia.org/wiki/File:Puente_del_Alamillo_en_Sevilla.jpg

According to Vesely, "It is one of the paradoxes of our time that as a large number of architects ascend the steps of emancipation toward the zone of purer technological possibilities, they meet a large number of engineers moving in the opposite direction in order to grasp the deeper ground and broader context of their own field and operations" (VESELY, 2004, p. 308). For "pragmatists" such as Koolhaas, architecture was too slow to keep up with the rhythms of global capitalism and software development, and thus the only way to preserve its relevance was to move away from construction and reinterpret architecture as "a way of thinking about anything—a discipline that represents relationships, proportions, connections, effects, the diagram of everything." (Koolhaas in MALLGRAVE and GOODMAN, 2011, p. 192)

This notion was instrumental in the development, in the early 2000s, of what would soon be called green or sustainable architecture. Environmental concerns were present in the discipline since the 1960s, but now they were backed and stimulated by government policies—such as the European Union's Energy Performance of Buildings Directive (2003), which led to the Green Building Programme—and the new possibilities of performance simulation offered by software. At first, the guidelines proposed by certification programs such as LEED—Leadership in Energy and Environmental Design

were focused on the individual environmental performance of each building, but this would evolve, in a few years, into a broader, more systemic view—like the "Cradle to Cradle" design proposed by American architect William McDonough, which is based in the belief that "the ideal relationship between the natural and the artificial would be, like nature itself, productive and mutually reinforcing, not merely sustainable." (MALLGRAVE and GOODMAN, 2011, p. 219)

The idea that artificial systems such as buildings and cities must "create a more inspiring engagement—a partnership—with nature" (McDonough in MALLGRAVE and GOODMAN, 2011, p. 220) is surely very distant from the modernist conception that the environment should be reshaped according to the logics and functioning of modern technologies, and that this would eventually reshape society. However, despite the fact that the efforts of architects such as McDonough and of governments committed to environmental issues have surely turned sustainability into an important part of architectural education and practice, the technological focus of these initiatives "has given too little attention to the human dynamics of a truly sustainable built environment. In simpler terms, ecology needs to be recast in broader human terms". (MALLGRAVE and GOODMAN, 2011, p. 223) One of the many attempts to correct this focus is known as "biophilic design," which is based on concepts from biology and evolutionary psychology and proposes an evidence-based design logic. Human behaviour is understood as "not just a phenomenon of will or cultural training but also of genetic proclivities and behaviors that have long been in place with our hominid ancestors" (Ibid, p. 227)—that is, despite all cultural and environmental influences, we all share a sort of core "program" which makes us hard-wired to behave in certain ways.

Recent findings from neuroscience seem to support this idea, also providing information and insights for evidence-based design. New scanning technologies provide real-time images of the working brain, which can then be seen as a "objectile", that is, as an ever changing form— "We are not only beginning to understand such formerly elusive phenomena as memory-formation and consciousness, but also the means by which people think creatively and evaluate the world artistically." (Ibid, p. 229) The recently established field of "neuroaesthetics," focuses on "the neural processes involved in human art behavior", that is, "how we perceive, implicate, and integrate memories, classify, cognitively master, and evaluate artistic works and buildings." (Ibid, p. 229) According to neurobiologist Semir Zeki, "if the brain has the Darwinian task of acquiring

knowledge about the world to ensure our survival, art must support this task. And if the role of the brain has evolved to seek out those permanent and characteristic properties of objects and surfaces, art must be an extension of these neural processes." (Ibid, p. 230) Building on these and other ideas and concepts introduced by the neurosciences, Juhani Pallasmaa argues that "buildings and their craftsman-like acts of making are profound rites of a culture that shapes our connection to the world and our collective past, and the vehicles of their mediation are principally our perceptual experience and the memories they reignite in a neurological sense." (Ibid, p. 211) Thus, perception "is not just a form of thinking, it is the very act of thought." (Ibid, p. 212)

While in the 1960s architects and theorists acknowledged the need to rethink the discipline in the context of the Second Machine Age—a new world shaped by apparatuses—, now it seems that there is a growing interest in the programmatic logics of software—both the software used for architectural design and the biological software that we seem to carry inside us. While many sustainable design initiatives point to the possibility of creating zero-emission, energy efficient smart-cities constantly monitored and operated by apparatuses processing "big data", many of us seem to be willing to see ourselves in a similar manner. According to Ivan Illich, "sometime during the 1980s the technological society which began in the fourteenth century came to an end. (…) the age of tools has now given way to the age of systems, exemplified in the conception of the earth as an ecosystem, and the human being as an immune system" (ILLICH apud BRAHAM AND HALE, 2007, p. 1). However, Illich "did not welcome the age of systems", since he acknowledged, like Flusser, that systems—or programs, in flusserian terms—are quite different from tools because "when you became the user of a system, you became part of the system." (Ibid, p. 3). Pylyshyn also acknowledged, as far back as 1985, that "The possibility of imitating life by artifact has intrigued people throughout history", but that the use of software allowed us to go beyond the analysis and reproduction of physical movement, focusing on "the imitation (to the extent that this word is even appropriate) of certain unobservable internal processes", which builds on "a certain abstract way of understanding mechanism" (PYLYSHYN, 1985, p. 49).

Writing in 2005, Anthony Vidler argued that "Recently, this word 'diagram' has become quite a magic wand of a word (…); something like the word 'type' in the 1970s, 'postmodern' in the 1980s, and 'blob' in the 1990s" (VIDLER in SYKES, 2010). Now, "algorithm" seems to be our magic word—we may not even need diagrams anymore,

since the apparatus will process all relevant information and give us an efficient output. In the universe of technical images, this may seem to be quite natural. However, the realm of architecture and urban design cannot be restrained to information-processing. As Vesely proposes, "Restoring the communicative role of architecture is a necessary step toward restoring its role as the topological and corporeal foundation of culture. This role can be best expressed in an analogy (…): what the book is to literacy, architecture is to culture as a whole" (VESELY, 2004, p. 8).

2.9. Conclusion - Materiality and authenticity

The recovery of the natural roots of our architectural models, as proposed by Karsten Harries, may be understood as an attempt to get back to pre-history—in flusserian terms—in order to find prehistorical or a-historical archetypes that can respond to the demands of a post-historical era. However, even if these "pure" archetypes can be found, will they really be "natural" models?

According to Flusser, "Human communication is an artificial process", but "After learning a code, we tend to forget its artificiality" (FLUSSER, 2002, p. 3). Thus, if we understand the archetype as a human construct—even if born from the direct observation of natural phenomena—, we must accept that it is also, necessarily, artificial. What may differentiate a natural symbol (understood as an archetype) and a conventional symbol is the classical notion that the natural symbol is the idea, and the conventional symbols are the concrete things that express the idea in particular ways. However, the natural symbol cannot really be natural—it is as artificial as any conventional symbol. All symbols are part of what Flusser calls "the codified world":

> Human communication spins a veil around us in the form of the codified world. This veil is made from science and art, philosophy and religion, and it is spun increasingly denser, so that we forget our solitude and death, including the deaths of others whom we love. In short, man communicates with others. He is a 'political animal', not because he is a social animal, but because he is a solitary animal who cannot live in solitude (Ibid, p. 4).

Thus, a natural symbol is also part of culture, not of nature[10]. Treating it as natural, and therefore "objective", we are transferring to it the kind of faith we used to deposit in

[10] Of course animals can also experience and even acknowledge natural symbols like the vertical/horizontal pair, and the ways in which many species deal with the territory they inhabit (Hall, 1990) may be understood

texts, science or even, more recently, in technical images—a constant seek for an infallible, pure model on which to rely. We seem to trust nature—and things that seem to be only slightly artificial, like organic food, unspoiled primitive cultures, etc.—because the end of history brings distrust towards culture, and especially towards the culture of the past, where we seem to find the roots of our errors, problems and faults. A shift towards nature seems to offer a brand new view, a fresh start. We want to go back to the garden of Eden—before culture, before sin, before shame, before History and its crimes against ourselves. But Eden is, of course, just another code.

Anyway, this does not mean that the "recovery of the natural in inherited conventional symbols" may not be a fruitful endeavour. In a globalised world in which it seems difficult—if not impossible—to identify a common ground of belief and values between people inhabiting the same cities or neighbourhoods, the search for artificial, but somehow more general and far-reaching models, may provide interesting outcomes. The idea that culture is the product of our structural solitude, born from the knowledge that we are alive and that we will eventually die, can be illustrated by the fire, that first architectural act—or at least one of the first.

Fire has the interesting characteristic of being artificial and natural at the same time. There is fire in nature, but man can also "make" it—and it may be difficult to discern between a natural and an artificial fire. Likewise, there is the space of the natural environment, which we can inhabit to a certain extent, and there is the built environment, which cannot avoid including portions of nature. Buildings, cities, roads, diverted rivers—these artificial structures are the visible threads of the veil of the codified world, which Flusser calls a "second nature" (Ibid, p. 4). Many centuries before, Cicero already used a similar term to refer to the world shaped by Man (CICERO, 1979), but Flusser adds the abstract world of ideas to complement this notion.

Flusser does not, however, refer to the objects that make up the built environment as the material expressions of ideas, but emphasises the impact of materiality on the development of concepts through which we interpret the world and create new codes. His model of cultural history is based on this notion, since each rung is the product of a

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as a kind of "sense of belonging". However, it would be much more complicated to assume that these animals can abstract archetypal configurations from these spatial experiences. Thus, when we insert the word "symbol" to "natural", we are already talking about a code.

different medium, and it is the medium that shapes the ideas, the worldview of the era, and not the other way around.

If we carry this notion to the current discussions regarding the authenticity of sites and cultures, we may find that the material artifacts of the past gain importance because they are not the product of a long lost worldview, but the producers of this worldview—and we may well think that the germ for those ideas is somehow inside these objects, like some magic quality that may still exist. However, we can also transfer to the artifacts the judgements we usually make about ideas. The notion that ideas that seem to belong to the past may be revived through the surviving material objects of the time probably makes sense to radicals like the Taliban and ISIL—who destroyed the Buddhas of Bamyan and significant portions of Palmyra and Nimrud—, and is currently a topic of debate in Germany (MOORE, 2018).

In a flusserian view, we may say that the Taliban and ISIL are trying to eliminate the traces of other codes, so that only theirs can exist. On the other hand, the Nazi apologists that want to reconstruct buildings that have symbolic or historical value for them are hoping that these reconstructions will also rebuild the ideas that sprung from them. This relationship between architecture and the motivations and ideas that seem to lay behind it is an old and complex discussion, but maybe we can now address it in different terms.

The "Nara Document on Authenticity", published by UNESCO's World Heritage Committee, stresses that "Conservation of cultural heritage in all its forms and historical periods is rooted in the values attributed to heritage. (…) Authenticity, considered in this way and affirmed in the Charter of Venice, appears as the essential qualifying factor concerning values" (UNESCO, 1994). The notion of authenticity is, as pointed out by Assi, a modern concept "often contrasted with concept of continuing reproduction in traditional societies" (ASSI, 2000), and it can obviously be seen as the product of a historical, text-based culture. Usually, we consider a building authentic if its current material form corresponds, in great extent, to the idea we make of the period in which it was built. It is as if it was able to maintain its essence, the purity and coherence of an idea. However, this is very rarely the case—buildings change throughout time, and these changes are usually imprinted in the current form. This does not stop us from considering buildings that include many elements built in different eras—let us say, for instance,

Winchester cathedral—as authentic. So, in this context of analysing the built environment, what do we mean by authentic?

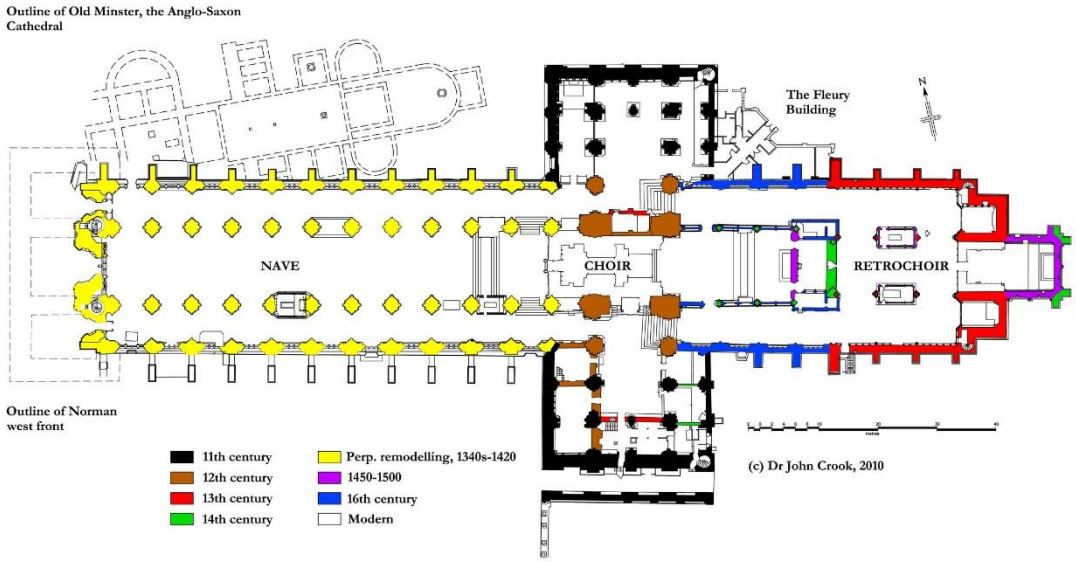

Figure 29 - Plan of Winchester cathedral illustrating the stages of construction.

Source: https://www.winchester-cathedral.org.uk/our-heritage/our-history/building-the-cathedral/

According to Taylor, there is a "culture of authenticity" that "is a child of the Romantic period, which was critical of disengaged rationality and of an atomism that didn't recognize the ties of community" (TAYLOR, 1991, p. 25), and the current obsession with authenticity may be a recurrence of this critique, now directed to the post-industrial societies living in the universe of technical images. In a tone that is fairly similar to Harries', Taylor argues that

> If authenticity is being true to ourselves, is recovering our own '*sentiment de l'existence*', then perhaps we can only achieve it integrally if we recognize that this sentiment connects us to a wider whole. It was perhaps not an accident that in the Romantic period the self-feeling and the feeling of belonging to nature were linked. Perhaps the loss of a sense of belonging through a publicly defined order needs to be compensated by a stronger, more inner sense of linkage. Perhaps this is what a great deal of modern poetry has been trying to articulate; and perhaps we need few things more today than such articulation (TAYLOR, 1991, p. 91).

These arguments are directly related to the etymological roots of the term—"authenticate; authenticity. from Gr *authentikos*, adj. of *authentēs*, one who acts on his own authority, a chief" (PARTRIDGE, 2006, p. 183)—, and also to the correlated notion of "autonomy (whence *autonomic*), self-government" (PARTRIDGE, 2006, p. 2132). In

this sense, authenticity is not related to a correspondence between the "age" of an object and the "style" it conveys through its current form—that is, it is not a question of verifying if the form of the object corresponds to the ideas that we identify with the period in which it was built. The object may be "true to itself" or not, which can be much closer to the notion that a building such as Winchester cathedral is authentic as long as it shows what it has "suffered" during its "life". This is surely not a new way of interpreting heritage sites and buildings, but Taylor's final remarks point toward another aspect of authenticity: the recognition that a part of the built environment is authentic may enhance our connection to the environment as a whole. And, if we consider this in flusserian terms, we may say that the overwhelming artificiality of our digital culture may lead us to search, in the built environment, what Romantic poets sought in nature—this seems to be the only place in which to search for a stronger, more inner sense of linkage.

However, as Picon underlines, "Initially, the advent of the computer raised anxieties about a possible dematerialization of human life. The development of a virtual realm distinct from the physical was often evoked. This is not what has happened." (PICON, 2020, p. 17) In the universe of technical images, the physical and the virtual are becoming increasingly intertwined, and the proliferation of digital apparatuses may in fact "have brought about a renewed appreciation of all kinds of tangible phenomena, a shift that may be described as a change in the dominant conception of materiality." (Ibid) In this context, architecture can play a fundamental role in the development of a new understanding of materiality, both by anchoring apparently ephemeral phenomena and also by rarefying supposedly monolithic structures.

> materiality is not matter. It designates the way humans relate to matter and materials through the prism of their beliefs, knowledge, and practices, architecture being one of these practices—a key one, actually, because of the part played by matter in its very definition. Materiality is neither an idea or set of ideas nor a series of concrete habits and operations. It corresponds to a field where ideas, but also imaginaries, interact with experiences and practices. (Ibid, p. 19)

The reassessment of the established conceptions of materiality is of course not a new issue in architectural theory. The history of modern theory is filled with examples from Gottfried Semper's *Der Stil* (1861-1863) to Kenneth Frampton's Critical Regionalism (1983), but the emergence of the universe of technical images has of course shifted the focus from tectonics to the interplay between the concrete presence of architecture and the new possibilities brought by digital technologies. These possibilities

could be divided in three main fields: the new realm of virtual space, offering a new set of "actions" such as simulation, interaction, immersion, and telepresence (PIAZZALUNGA, 2005, p. 11); the new design possibilities provided by 3D modelling software, allowing for the development of concepts such as *hypersurface*, *liquidarchitecture*, *transarchitecture*, and *hybrid architecture space* (Ibid), the formal experiments of Greg Lynn, Zaha Hadid and Frank Gehry, and the functional simulations employed in UNStudio's infrastructure projects; and the interaction between design software and construction/fabrication, as in the Computer-Assisted Conception and Fabrication (CFAO) systems explored by Bernard Cache (1995, p. 88) and "file-to-factory processes of computer numerically controlled (CNC) fabrication technologies." (KOLAREVIC, 2003, p. 46)

Many of these new approaches were developed through theoretical/philosophical inquiries into the nature of materials, as in Cache's reading of Deleuze's concept of *objectile*; however, the apparently most pragmatic approaches—usually related to the field of design-production interaction—seem to be, in flusserian terms, to be most in tune with the functioning of apparatuses, and may also point towards a deeper reassessment of the practice of architecture, focusing more on the culture of building than on the buildings themselves:

> By integrating design, analysis, manufacture, and the assembly of buildings around digital technologies, architects, engineers and builders have an opportunity to fundamentally redefine the relationships between conception and production. The currently separate professional realms of architecture, engineering, and construction can be integrated into a relatively seamless digital collaborative enterprise, in which architects could play a central role as information master builders, the twenty-first century version of the architects' medieval predecessors. (Ibid, Preface)

In the introduction to his anthology of writings on digital architecture, Mario Carpo (2013) presents a similar argument, hoping that mass participation would follow the already fairly established process of mass customization. According to Carpo, the beginnings of what he identifies as "the digital turn in architecture" were marked by an "inspiration—and perhaps fascination" with the digital technologies that became more widely available in the early 1990s, and its protagonists seemed to believe that virtual reality "would represent a radical alternative to the physical space of phenomena, existence and building." (CARPO, 2013, p. 8) Even though this assumption would quickly lose its centrality, the new tectonic languages that emerged in this period, and which relied on the technical development of spline modellers—"a new generation of

software that, thanks to the more general availability of cheap processing power, allowed the manipulation of curved lines directly on the screen, using graphic interfaces such as vectors and control points" (Ibid, p. 9)—became "a visual style that defined an epoch and shaped technological change." (CARPO, 2017, p. 8) This new style seemed to finally achieve the post-modern utopia of overcoming Modernist standardisation (CARPO, 2013, p. 10), and its development actually played a very important role in the consolidation of digital mass customisation, since digital fabrication "does not use mechanical matrixes, casts, stamps, molds, or dies", and thus "each digitally fabricated item can be different, when needed, at no additional cost." (CARPO, 2017, p. 3-4) However, digital mass customisation, "which had been proven to work effectively at the small scale of industrial design and fabrication, did not perform well at the full scale of construction", and the participatory nature of the development of the new style did not extend towards the design process as widely and deeply as Carpo had anticipated— "The resulting shift, from mass customisation to mass participation, may be more disruptive for architectural production than the digitally induced dominion of the spline to which we are now almost getting accustomed." (CARPO, 2013, p. 13)

However, Carpo argues that digital mass customization "was developed, honed, tested, and conceptualized in a handful of schools of architecture in Europe and the United States in the 1990s" (CARPO, 2017, p. 4), and that its principles "have moved from the manufacturing of physical objects (teapots, chairs, buildings) to the creation and consumption of media objects (text, images, music), and lastly to the production of immaterial objects, such as contracts and agreements bearing on all kinds of legal and financial transactions" (Ibid, p. 5). Thus, digital mass customization may be, until now, the foremost contribution of the emerging field of digital architecture—or of an architectural theory and practice that aims to be versed in the use and creation of digital technologies—, and those who are engaged in its further development will probably have an active role in what Carpo identifies as a second digital turn in architecture. According to Carpo,

> we increasingly find it easier to let computers solve problems in their own way—even when we do not understand what they do or how they do it. In a metaphorical sense, computers are now developing their own science—a new kind of science. Thus, just as the digital revolution of the 1990s (new machines, same old science) begot a new way of making, today's computational revolution (same machines, but a brand new science) is begetting a new way of thinking." (Ibid, p. 7)

Carpo acknowledges that "the second digital turn has just started, and the second digital style is still in the air" (Ibid, p. 8). This thesis will address some of the current discussions on the role of architecture —and architects in particular—in the development of new conceptions of materiality, but with no intention to present a thorough or systematic analysis of such a prolific field—that would be another research project of its own. Thus, in this introductory chapter, I have relied on the main concepts and authors already discussed and "cemented" in anthologies and handbooks. Of course, this attitude necessarily leaves behind the most recent contributions from many authors; however, the intention behind this thesis is not to analyse or summarize this still unclear constellation of concepts and approaches, but to join it. Thus, the following chapters will focus on different aspects of the role of architecture—and also of art and urban planning—in the emerging universe of technical images, highlighting how these disciplines/activities can provide the "grounding" that our fast-paced, apparently abstract culture, seems to lack.

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3. *Copie Conforme* - Architecture, Representation and Tourism

3.1. Abstract

The article discusses the case of architectural copies to develop a reappraisal of Karsten Harries' (1996) theory of architecture as a representational art. Focusing on examples from contemporary China and nineteenth-century European architecture, it becomes clear that many works of architecture represent and 're-present' other buildings—and that, in some cases, this is the result of an attempt to translate what the 'original' buildings represent.

This representational character of architecture is especially significant in the context of tourist experiences. If, as Salvatore Settis (2016) argues, cities have a 'body' and a 'soul', both are deeply affected by the huge crowds of contemporary mass-tourism. This phenomenon leads to further analogies between urban disorders and relational pathologies, discussed along the *buberian* dialogical approach: a building can be addressed as an 'it', or a 'Thou', but only in the latter case may this relation demand an effort of translation—and representation.

The article closes with a reference to the case of the architectural morphology of the city of Rio de Janeiro—marked by numerous attempts to create 'tropical' translations of other cities, especially Haussmann's Paris—, its tourism patterns and attractions.

Keywords

Architecture and tourism; Architectural copies; Chinese copies; Tourism patterns and attractions; Tropical Paris.

3.2. Introduction

The aim of this article is to present a way of understanding architecture as an effort of both *representation* and *translation*. This proposition is anchored in a reflection on the experience of buildings in the context of contemporary tourism, where the notions of representation and cross-cultural communication become evident.

If, as Salvatore Settis states (SETTIS, 2016), cities have a 'body' and a 'soul', it is reasonable to think that both are deeply affected by the presence of huge crowds of tourists. This body/soul analogy allows the development of further analogies between

urban disorders and relational pathologies—which are interpreted using the *Buberian* dialogical approach, taking 'I-Thou' and 'I-It' relations as primary relational patterns (BUBER, 1937).

The article discusses the case of the Chinese architectural copies built during the last few decades, taking these 'simulacrascapes' (BOSKER, 2013) as the starting point for a reappraisal of Karsten Harries' understanding of architecture as a *representational* art (HARRIES, 1996). Works of architecture represent and 're-present' buildings—made by human hands or nature—, and in doing so shape the world according to the reality of a language, in the sense proposed by Vilém Flusser in his classical book *Língua e Realidade* (FLUSSER, 2011)[11]. Architectural copies are attempts to translate what 'original' buildings represent.

A building approached by the Buberian dialogical approach may be an 'It', or a 'Thou', but only in the latter case this relation may demand an effort of translation. In the case of 'I-It' relations, this effort is dismissed because we, in advance, take for granted that we already have the necessary (instrumental) knowledge required for dealing properly with such building.

The article closes with a reference to the case of the architectural morphology of the city of Rio de Janeiro, forged by a sequence of attempts to create 'tropical' translations of European cities like Lisbon and, especially, Paris.

3.3. Body and Soul / I and Thou

The tourism industry is one of the biggest and most profitable in the World. However, is it culturally sustainable? Anyone who visits a city like Rome during the vacation season will likely find the city crowded with tourists, but almost completely devoid of Romans. This may be a seasonal phenomenon in Rome, but it has become a more enduring situation in Venice. In his book *If Venice Dies,* Salvatore Settis describes how the city's population has been rapidly decreasing over the last few decades, and discusses the impacts of this exodus.

According to Settis, every city has a *body*— 'made of walls, buildings, squares, and streets, etc.'—and a *soul*—an 'invisible city' formed not only by the city's inhabitants,

[11] An English translation has been released recently: Flusser, V. (2017). *Language and Reality*, University of Minnesota Press. Translation by Rodrigo Maltez Novaes.

but also by ‘a tapestry of stories, memories, principles, languages, desires, institutions’, etc. (SETTIS, 2016: 13-14). Even though Venice’s body may appear to be preserved, its soul is changing rapidly. Preservation efforts that focus mainly on the body of the city seem to ignore the fact that its soul is also part of what used to attract visitors from all over the world. Whether this is still the case is questionable, since the ‘death’ of Venice's soul drastically changes the experience of visitors (EDWARDS, 2017; GIUFFRIDA, 2017).

Venetians are not the only ones afflicted by this kind of ‘disease of the soul’. Byung-Chul Han argues that the twentieth century was an ‘immunological age’ in which the greatest threats were poised by the ‘viral violence’ of external agents (the most dangerous of all being nuclear weapons). The new millennium forged a new age in which the greatest threats are poised by ‘neuronal violence’ of internal agents (the most dangerous of all being terrorism) (HAN, 2015, 4-7).

To blame the tourism industry or even tourists themselves for this new ‘Death in Venice’—or maybe for the death *of* Venice—is an attempt to enclose this phenomenon within the immunological framework of the twentieth century. According to Han, we are currently afflicted not by the negativity brought in by an external agent, but by an excess of positivity: too many stimuli. This excess is in the usual routine of millions of tourists who hop off a cruise ship in Venice and run through the streets following a designated circuit, taking pictures of the most famous buildings and then retreating to their floating hotels—eager to rest from an exhaustive day of ‘tourist work’. During this kind of planned, fast-paced visitation, there is no place for meeting the soul of the city, which has been reduced to an object to be captured through (digital) technical images. This rupture is not limited to the experience of the tourist—it becomes a sort of ‘neuronal disorder’, similar to an identity crisis, to the reality of the city itself.

In his famous book *I and Thou*, Martin Buber states: ‘The attitude of man is twofold, in accordance with the twofold nature of the primary words which he speaks’—the combined words ‘I-Thou’ and ‘I-It’ (BUBER, 1937: 3). We can relate in two ways to each and any ‘thing’– people, animals, objects: treating it as a ‘Thou’ or as an ‘It’. However, the ‘I’ that relates to an ‘It’ is of one kind; the relation to a ‘Thou’ demands and creates another kind of ‘I’.

Following this Buberian perspective, we *experience* the ‘It’, while we *encounter* a ‘Thou’ (BUBER, 1937). An ‘I-Thou’ relation is an event, not a product—and thus cannot

be planned. According to Buber, ‘The Thou meets me. But I step into direct relation with it’—the ‘other’ only becomes a Thou when I put myself in relation with it, seeking this encounter (BUBER, 1937). We usually do not seek this in ‘functional’ interactions or transactions like that between a client and a cashier, for instance—we are not really engaging with that other person as an ‘I’, we only have an ‘instrumental’ relation with ‘It’.

As Pedro Abreu argues, the same happens when we relate to an object such as a building or a work of art—we can experience it as an ‘It’, or put ourselves in the position of having an encounter with it, turning it into a ‘Thou’ (ABREU, 2007). Fast-paced tourist routes tend to look to monuments and urban spaces as ‘Its’, as objects to be admired from outside—and photographed, of course. These experiences promote a suppression of otherness—we treat something that could be engaged as a ‘Thou’ merely as an object, an ‘It’. When I deal with an It, I already know what it is and how I should appropriately behave. When I deal with a Thou, I do not. I am open to mutual influence in a meeting, and I accept the risks of learning new things that may change my way of being. The recent technologies of information and communication open new spaces of experience and horizons of expectations. It is possible to make a virtual visitation of a site before travelling there.

Therefore, the touristic experience may be reduced to a plain confirmation of a knowledge I already have. In Buberian terms, it means that the I-It relation excludes the I-Thou. Or, in Han's diction, the touristic experience is built upon a suppression of otherness. However, this should not mislead us to a condemnation of all I-It relations. This would be a mistake since these relations are surely necessary for human institutions and social life as a whole. The danger is to live in a context shaped exclusively by I-It relations, denying time and place for I-Thou relations.

Abreu (2013) argues that a work of architecture can be defined as a portion of space that allows human beings to be fully human. In other words, it allows the ‘I’ to become a ‘Thou’ to itself. This ‘psychoanalytical’ dimension relates to a notion presented by Gaston Bachelard in his book *Poetics of Space* (1994): our imagination builds images of the spaces we inhabit, and we constantly revisit these images not only when we experience new spaces, but also when we endeavor to engage with ‘displaced’ reveries. The image is not exactly a memory fixed in the past—it is revived every time we put ourselves into a new encounter with it. We ‘dwell’ in these images, as Bachelard says

(BACHELARD, 1994). Going back to Buber, we find that 'The I of the primary word I-It (…) has no present, only the past', since '[t]he present arises only in virtue of the fact that the Thou becomes present' (BUBER, 1937: 12). When we put ourselves into a direct relation with something, addressing it as Thou, we make it present—even if it is a memory of a long-gone experience.

This presentification reveals a link between identity and memory, something that becomes clear in the example of Alzheimer's disease, in which the deterioration of the individual's memory leads to a deterioration of his or her identity. Again, according to Abreu, the same goes for architecture (ABREU, 2007). A monument, he argues, is an object that invites us to remember; it is the agent of a 'call to remembrance', and it has a memory content– something similar to what Pierre Nora calls a *lieu de memoire*, defined as "any significant entity, whether material or non-material in nature, which by dint of human will or the work of time has become a symbolic element of the memorial heritage of any community" (NORA, 1996, p. xvii). This memory can become present when the monument is addressed as a Thou; but, if the otherness of the monument is suppressed, it will only be addressed as an 'It'—and this is the basis of the tourist routes we have mentioned before, something Abreu calls 'hyper-modern cultural tourism'. This kind of attitude towards architecture transfers the focus away from local inhabitants and closer to the tourists themselves, who will only have a quick, fleeting encounter—at best—with the building. In the paradigmatic case of Venice, the deterioration of its soul may be causing something like Alzheimer's disease—the city may be losing its memory, and this may eventually cause it to lose its identity.

3.4. Architectural Copies

This objectification of architecture also seems to be present in the copies of Western architecture built in China over the last few decades. Residential developments all over the country replicate parts of cities like Venice and Paris, trying to attract both dwellers and visitors. These residential neighborhoods are built around monuments that seem to pursue some sort of connection with the Western world. These buildings seem to shock, or at least surprise, most Westerners, and such reactions point to the apparently unambiguous relation between architecture and place—something that becomes obvious when one sees a picture of a Chinese worker carrying a ladder in what seemed to be a photograph of an 'authentic' Austrian village (HOELLER, 2015).

Considering the concepts that we have presented before, we may be led to think that someone who builds a copy of a monument like the Eiffel tower is treating the original building as an 'it', as an object that can be replicated just like an image, regardless of the relationship it has with its surroundings—and this seems to be something that cannot be ignored in the case of works of architecture. However, this phenomenon is more complex than it may seem in a first glance.

The notion of authenticity is at the core of any discussion regarding this phenomenon. These buildings and cities may look 'fake' to the Western eye not only because they feel 'out of place', but because we know of the existence of the model, which we see as the original, the authentic. Bianca Bosker (2013) argues that, for the Chinese, the distinction between the original and the copy is not that clear. Wen Fong clarifies this subject pointing to "four methods of forging, known in Chinese as: *mu*, to trace; *lin*, to copy; *fang*, to imitate; *tsao*, to invent" (FONG, 1962, p. 102). Each category of copy is judged and valued in specific terms:

- A tracing copy (*mu*) "aims to produce an exact replica of the original" (FONG, 1962, p. 110);
- A free-hand copy (*lin*) "is like a wild goose which flies along with its companion. Together, they are like two clouds drifting across the blue sky. Swiftly they glide over ten thousand miles, each coming eventually to rest at a different destination" (Yüeh K'o, *Tan-ch'ien Tsung-lu*; in Fong, 1962, p. 113).
- An adaptation (*fang*) may combine elements from different models, such as an example in which the painting "is clearly derived from a leaf in an album attributed to Shih-t'ao and dated 1699", while "the inscription along its top reproduces in smartly sleek strokes, the writing on another leaf of the same 1699 album" (FONG, 1962, p. 115-116).
- In a pastiche (*tsao*), there is "a strange feeling of contradiction between the different parts of the picture", which seems to be "devoid of any true emotion"—"all the elements have been reduced to bare clichés" (FONG, 1962, p. 117-118).

Westerners may tend to see all Chinese architectural replicas as pastiches (*tsao*), since they seem to be "plagued by a strange feeling of contradiction" (FONG, 1962, p. 117-118). However, as Fong puts it, "For an art-historian who is interested in the development of painting style, the difference between a *bona-fide* replica and a cleverly made forgery quickly vanishes, and the all-important question of authenticity seems to

lose all its sensational appeal. A well-made copy, regardless of its original intentions, is obviously valuable historically" (FONG, 1962, p. 102).This value comes from the fact that, in the making of any copy, "Every "slip" of the hand reflects either a change of the physical circumstances, which may be entirely accidental, or a change of the attitudes of the maker, which, we hope, will be significantly meaningful" (FONG, 1962, p. 102).

Figure 30 - Replicas of The Parthenon and the Sphynx in Lanzhou, China.

Source : https://www.gsabrie.com/urban-landscape/ifzi0z2fama3njgegs0gws1pnn682e

Although this attitude towards copies may seem something peculiar to Chinese culture, we can also find similar attitudes in the history of Western architecture. *Le Panthéon*, a popular tourist destination in Paris, is an eighteenth-century building that makes a very direct reference to the 'original, authentic' Pantheon, built in Rome many centuries before. Not too far from this French 'copy', we can find the church of *La Madeleine*, which follows the model of Roman temples such as *La Maison Carrée* in Nimes. However, despite the criticisms made by many modern architects who saw in these buildings mere pastiches of forms copied from the past, they do not seem to shock us as their Chinese counterparts do today.

According to Hillel Schwartz in his book *The Culture of the Copy*, 'The more adept the West has become at the making of copies, the more we have exalted uniqueness. It is within an exuberant world of copies that we arrive at our experience of originality' (SCHWARTZ, 1996, 175). The press and the following process of industrialization changed our understanding of what is an original and what is a copy, since, in the case of a mass-produced item, it makes no sense to think in terms of originals and copies—the first item produced is the same as the last; only the *design*, which is in fact abstract, is unique. Many modern architects aimed at introducing this industrial logic into architecture, but this was only partially achieved. Modern, post-modern and contemporary buildings consist of compositions of prefabricated standardized elements, but the building itself—the composition—is still unique, just like the design of a chair, a spoon or a car. However, in the case of architecture, the design is not an idea that lies 'behind' the product; the design has a concrete presence, and this presence turns it into something unique. Even in the case of identical buildings, site-specific relations are usually enough to affirm the uniqueness of each 'block'.

This is probably why a Chinese critic quoted by Fong uses an architectural analogy to describe a copy made by tracing (*mu*): "To make a tracing is like building a house: even though the beams, the brackets and the rafters all have their strictest measurements, when everything is put together, the spirit and the form (*ch'i-hsiang*) [of each building] will naturally have their own unique merits and faults" (Yüeh K'o, *Tan-ch'ien Tsung-lu*; in FONG, 1962, p. 113).This uniqueness that is characteristic of architecture may contribute to the notion that we can address a building as a 'Thou', since each person is unique—even in the case of identical twins. Thus, we have no trouble in identifying the church of La Madeleine as a unique building, and not just a copy of a Roman temple.

An example presented by Bosker may signal a similar phenomenon in Chinese culture. Interpreting an essay written by Zong Bing, a fifth century Chinese artist and scholar, Jerome Silbergeld concludes that 'a good simulacrum—one that manages to capture the essence of the original—will be imbued with a 'life force', or *qi*, making the sign a perfect substitute for the 'original' referent on which the sign is based' (BOSKER, 2013). We may say that the simulacrum—in this case, a landscape painting—can present itself as a Thou and provide an image that substitutes the image that could be produced by the encounter with the landscape itself. Thus, both the original and the copy can, according to Bing, be experienced in the same way. If we transfer this notion to the field

of architecture, we can say that the church of *La Madeleine* can be addressed as a Thou, and that the encounter with this Thou is not just an encounter with this specific, unique *individual*, but also an encounter with the Roman temples that this individual represents—and *re-presents*. Thus, through its presence, a building such as this can give a visitor a glimpse of centuries of architectural history in a direct, 'personal' way. If the visit does become an 'encounter', the visitor is more likely to regard the building not as something he saw, but as someone he *knew*.

3.5. Architecture as representation

According to Bing, painting is a representational art—it aims at recreating the encounter with its subject matter—, and, according to Karsten Harries, this is also the case of architecture. Harries clarifies this notion by quoting Francesco Milizia, an Italian historian from the eighteenth century, for whom architecture was 'an art of imitation, as are all other arts. The only distinction is that some of them have a natural model on which the system of imitation may be based. Such a model architecture lacks, but she has an alternative one offered to her by the natural industry of men when they built their first dwellings' (HARRIES, 1997, p. 119). Thus, Harries argues, architecture represents buildings—*Le Panthéon* and *La Madeleine*, for instance, which represent their Roman models.

Bringing this notion both to the nineteenth century eclectic architecture of the West and to the contemporary Chinese simulacra, we can understand how '[r]epresenting other architecture, the work (…) re-presents itself in the image of an ideal, thus creating a fiction about itself. By its choice of what to represent and of the form of representation, it communicates a particular understanding of what is taken to matter in architecture, signifying a particular ideal of building and thus of dwelling' (HARRIES, 1997, p. 120). Thus, *La Madeleine* re-presents an ideal image of the classical temple, while the city of Thames Town, built around Shanghai, re-presents an ideal image of the small English town—sunlight included, for some reason (HERBERT, 2012).

Figure 31 - Le Panthéon, Paris, 1758-1790 / The Pantheon, Rome, 113–125 AD.

Sources:
https://commons.wikimedia.org/wiki/Panth%C3%A9on_de_Paris#/media/File:Pantheon_paris.jpg
https://commons.wikimedia.org/wiki/File:Pantheon_(Rome)_-_Right_side_and_front.jpg

As his quoting of Milizia implies, the view proposed by Harries echoes the prevailing view among many eighteenth-century theorists, who believed that the Greek temple was a translation, into stone, of an original building type made of wood. The idea of translation has obvious implications for the dialogue between East and West, and may provide an insight into the essence of the Chinese simulacra.

According to Vilém Flusser, each language not only expresses a different view of reality, but shapes and creates a different reality (FLUSSER, 2011). He argues that there are at least three 'different types of worlds, in which human intellect lives' (FLUSSER, 2011: 68)—the worlds of inflecting, isolating and agglutinating languages. Most European languages are inflecting languages, in which elements (words) are grouped in situations (phrases); inside the situation, the element 'maintains its identity and steps into a relation with other elements' (FLUSSER, 2011).

Chinese is an isolating language, which consists of elements (syllables) with no specific meaning, used as pieces for an 'aesthetic whole' formed by mosaics or sets (FLUSSER, 2011). These sets obey primarily aesthetic rules, not formal, logic rules. Flusser summarizes the difference between inflecting and isolating languages: 'If the ideal of the inflecting phrase is Truth, then the ideal of the syllabical set is Beauty' (FLUSSER, 2011: 72).

Statements about other languages are, at the very best, translations, that is, an effort to approach a limit. Translating, we may come closer, but we never reach the otherness.

In this sense, translating is the most important dialogical tool. Chinese architectural copies express an attempt to 'move' or relocate the thoughts (phrases) of the Western world directly to the Chinese context.

The idea of falsification may only apply to the world of inflecting languages, as the Chinese practice of *shanzhai*—the production of counterfeit name-brand goods—may suggest. The eclectic 'revivalist' architecture produced in the West, especially during the nineteenth century, was probably freer in its re-presentation of classical or gothic architecture because there was no fear of falsification. The copies of Western buildings built in China over the past few decades re-present the history of Western architecture in order to represent an ideal of a Western lifestyle and the dominion of Chinese culture over it.

Going back to the case of Venice, we can surely think that the copies of the city—not only in China, but all over the world—do not actually celebrate the original, but banalize it. These copies usually just represent a stereotyped image of the city, providing picturesque sceneries that may lead those who visit the real Venice to see it in the same way—the way promoted by hyper-modern cultural tourism.

On the other hand, we can also see some more positive outcomes of this banalization of the original. Firstly, if the Chinese really cannot see that much of a difference between the original and a well-made copy, maybe millions of Chinese tourists will be satisfied by visiting the Chinese copies, not feeling urged to visit the original—and thus sparing Venice of a huge flow of tourists. Secondly, following on the attempt to look at this phenomenon from a western perspective, we can also think that these copies may even act as a 'backup'. If something happens to Venice—reports that the city may be 'sinking' are not rare—, these copies may give future generations the possibility of experiencing something like 'the lost city of Venice'. In this case, the assimilation of Venice by other cultures could save it—at least partially.

In a less provocative manner, we can learn from Fong's example and at least include these copies into the "history" of their models— "In the reconstruction of an ancient master as an artistic and historical individual, copies and imitations of all ages must be treated with equal attention as historical 'documents' of different qualifications" (FONG, 1962, p. 102). As an example, we can analyze how European eclectic architecture—which was itself made of "copies" (*Le Panthéon, La Madeleine, etc.*)—was also copied, usually

with the intention of (re)creating a "civilized" environment that echoed the European model.

3.6. Rio de Janeiro, "tropical" Paris

This intention was very clear in a number of urban renovations promoted in Latin America from the half of the 19th century to the first decades of the 20th century. Most of these projects aimed at copying the overall ambiance of European capitals—mostly Paris, seen as the quintessential model for a civilized, modern city—in order to transform colonial towns into cosmopolitan urban centers. It seemed that, by building capitals following the Parisian model, Latin American countries would include themselves in the pantheon of civilized, modern nations.

The city of Rio de Janeiro, for instance, was founded in 1565, after the Portuguese finally defeated the French invaders who had forged an alliance with the Tupinambá leaders and settled in an island in the Guanabara Bay ten years before. However, the Portuguese occupation was focused on exploring and exporting sugar and *pau-brasil* to Europe, and the region only began to develop after 1763, when the Marquis of Pombal transferred the capital from Salvador de Bahia to Rio de Janeiro, following the discovery of gold in the nearby province of Minas Gerais (FAUSTO, 1995).

In the early nineteenth century, a unique event gave an abrupt and frantic drive to the development of the city. In 1808, with Portugal facing an inevitable invasion by Napoleon's army, prince regent D. João VI moved the whole Portuguese court to Rio de Janeiro—which then became the capital of the United Kingdom of Portugal, Brazil and the Algarves. In a very short period, the population of the city doubled, from around 50.000 people—before the arrival of the court—to over 100.000 (FAUSTO, 1995, p. 125). In order to develop the former colony—now the seat of the imperial crown—, D. João opened the Brazilian ports to international trade, and several public institutions were founded. Shortly after the end of Napoleon's rule in France, D. João promoted the so-called 'French Artistic Mission': French artists were sent to Rio de Janeiro with the mission of establishing the Royal School of Sciences, Arts and Crafts, exerting an enduring influence in Brazilian art and architecture.

The presence of these artists—and of the works of art and architecture that they produced during their 'mission'—aimed to include Rio de Janeiro in the cultural environment of Europe—after all, the city was the capital of a European empire. In the

field of architecture and urban design, the urge to replicate the European environment began with the introduction of neoclassicism by Grandjean de Montigny, and culminated in the urban reforms promoted in the beginning of the twentieth century (Villaça, 1999).

The proclamation of the Brazilian Republic in 1889 caused no interruptions in this direct dialogue between Brazilian and European—especially French—architecture. In fact, the young Republic also found, in the 'mimicry' of European buildings and cities, a way to become—or at least appear to be—closer to what was understood as the highest degree of civilization. This becomes evident in the reforms promoted by mayor Francisco Pereira Passos between 1902 and 1906, the most iconic being the construction of the Central Avenue (now Rio Branco Avenue) in downtown Rio. These reforms aimed at transforming Rio into a 'Tropical Paris' (FRANÇA, 1999), and the Central Avenue was conceived as a *haussmanian* boulevard flanked by *beaux-art* buildings such as the Municipal Theatre and the National Library, which were built on French models that, according to the eclectic style that predominated at the time, were already understood as compositions of elements 'borrowed' from different styles, times and places. The intention to produce a homogenous urban environment was so strong that, when the avenue was opened in 1906, some of its buildings were merely facades with no actual buildings behind them—the priority was to provide the city with a 'French face' (ROCHA-PEIXOTO, 2000), tearing down dozens of blocks built according to the previous model of Portuguese colonial architecture.

The construction of this 'tropical Paris' was the culmination of the process begun in 1808—the urge to "transform the village of Rio de Janeiro into the new capital of the Portuguese empire" (HOLANDA, 2003: 150). Architectural copies were used to shape the city of Rio de Janeiro as an extension, or even an 'outpost', of Europe—the urban counterpart of the Portuguese court, still reigning in Portugal, but residing in Brazil. This intention was expressed again in 1908, when a national exhibition—largely built on the eclectic, beaux-Art architecture of Paris—celebrated the 100th anniversary of the opening of the Brazilian ports, and yet again in 1922, when an international exposition celebrated the centenary of the Brazilian independence with a combination of the already established Parisian model and the new trend of neocolonial architecture (ROCHA-PEIXOTO, 2000).The presence of neocolonial buildings aimed to present a local identity built on the foundations laid by the Portuguese, while the eclectic buildings affirmed that Rio was built on the likeness of major European cities.

It was also during the 1920's that organized tourism began to take shape in Brazil, and the focus was also to promote the capital as a modern, cosmopolitan city (Daibert, 2014). However, the overall image of Brazil—and especially Rio—in the imaginary of tourists from all over the world became dominated by a combination of exuberant nature—beaches, hills, forests—and a friendly, welcoming population that celebrates and shares cultural manifestations like music and football (BARTHOLO, et. al, 2005, 2008). This image was largely built in the post-war period, thanks to the Good Neighbor policy promoted by the Roosevelt administration—and the increasing popularity of 'characters' like Carmen Miranda and Walt Disney's Zé Carioca. In its official website, Rio's tourism authority promotes that 'What Makes Rio Special' is mainly its population, the natural settings—the Tijuca forest, the beaches—and popular culture—samba, caipirinha, feijoada, etc.[12] 'Architecture' is one of the last topics mentioned in this section.

At first, it seems that the main attractions in Rio are essentially the landscape and its people. This is manifest both in scholarly studies and in the way the city is usually marketed by the touristic trade. In his classic book *Raízes do Brasil*, Sérgio Buarque de Holanda subscribes to the notion that "the Brazilian contribution to civilization will be that of cordiality—we will give the world the 'cordial man'" (HOLANDA, 2012). There is a long academic discussion in Brazilian anthropological and sociological studies focusing on the concept of the *homo cordialis* as a key for the understanding of Brazilian cultural identity, and Holanda states that "The affability in relationships, hospitality, generosity, and virtues extolled by visiting foreigners are indeed well-defined traits of the Brazilian character" (HOLANDA, 2012). In his study of the collective psychology of the Brazilian people, Meira Penna builds on the analysis made by Holanda—for whom "The respect normally manifested by other peoples has its counterpart in Brazil in the desire to establish intimacy" (HOLANDA, 2012)—, arguing that Brazilians tend to search to create opportunities for I-Thou relationships: "Eros stablishes a concrete *rapport* (...) since the primordial object of affection is the person of the other" (MEIRA PENNA, 1999, p. 179). Thus, "Amiability, cordiality, interest and attention to the external events related to the activities of 'the other'" can be "the positive side of our national psychological type" (MEIRA PENNA, 1999, p. 182).[13]

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[12] http://visit.rio/destaque/o-que-faz-o-rio-especial/

[13] Translation by the authors. Original quotes: "Eros estabelece um *rapport* concreto, (...) porque o objeto primordial da carga efetiva é a pessoa do próximo" (Meira Penna, 1999, p. 179). "Amabilidade,

In the city of Rio de Janeiro, the opportunities for such encounters are usually open in public spaces—beaches, outdoor bars, football stadiums, parks, etc. The space of the city is permeable to intimate encounters that, in other cities, are usually limited to private spaces. Rio is resilient to become the "Generic City" described by Koolhaas, who compared it to the contemporary airport— "all the same" (KOOLHAAS AND MAU, 1995). The fact that the urban space is open to the possibility of encounters makes it difficult to plan—but it is also difficult to "pasteurize it".

Some of Rio's *favelas* provide an exemplary case. Many of them are located in sites with impressive scenic beauty, and the peculiar architecture of the *favelas* intertwines this beauty and dense I-Thou relational opportunities. This combination between landscape and people made *favelas* increasingly popular among foreign visitors (BARTHOLO, 2009), spurring the creation of specific tours and guides[14] in which the urban environment of the *favelas* is the main attraction. However, this is basically an 'unplanned' urban form, something that seems to have developed as naturally as the landscape itself, and this unplanned aspect also evokes a sense of authenticity—the *favela* is a place apparently not yet conformed and standardized by global economy. Anyway, the fact that some of the *favelas* have been turned into touristic products may indicate an attempt to reinforce or even replicate this synthesis of the city's main attractions: landscape and people.

It seems, therefore, that the soul of the city is far more appealing than its body—its value being limited to the 'nudity' of natural settings. However, the landscape of Rio is not that natural. The coastline was redesigned by a series of landfills, most of them built from the rubble produced by the demolition of hills that enclosed the center of the colonial city—including the Castelo hill, the site where the city was re-founded in 1567[15] Even the Tijuca forest, one of the biggest urban forests in the world, is somewhat artificial—local species were planted on a site that was previously occupied by a coffee plantation. The body of Rio de Janeiro is a unique composition of natural and made-made structures, combined in such a way that the distinction becomes blurred. However, this unique feature is usually dismissed—and even ignored—not only by tourists, but also by many *cariocas*—those who were born and/or live in Rio. In this sense, Rio may be seen as an

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cordialidade, interesse e atenção pelos acontecimentos exteriores relacionados com as atividades do 'outro'" (...) "o lado positivo do nosso tipo psicológico nacional" (Meira Penna, 1999, p. 182).

[14] For instance http://guiaculturaldefavelas.org.br)

[15] https://infograficos.oglobo.globo.com/rio/castelo-360o.html

opposite of Venice—the focus on the soul of the city may be responsible for the neglect and the resulting defragmentation of its body.

3.7. Conclusions

As Buber puts it, the basis of our relations not only to other people, but also to things such as buildings and works of art, is necessarily a kind of *dialogue*. Therefore, the preservation of the body of a building is not enough to preserve it as architecture—it is the possibility of engaging in a dialogue that must be preserved. Dialogues happen between an I and a Thou, and both need to be present for it to emerge.

The Portuguese language may help us in pointing the key issue behind this statement. In Portuguese, the word *presente* has a threefold meaning: it may refer to being present in a place; it may refer to the present time; and it may also refer to a *gift*, something that one offers to others. Dialogical relations can happen between people and buildings, but this requires both to be present in the threefold Portuguese meaning- by being "there", in the present, offering their presence to others.

In the context of hyper-modern cultural tourism, it is no easy task to experience dialogical relations, since fast-paced, planned visitations encourage an 'I-It' approach. Architecture communicates (non-verbally) through its presence, and simulacra or copies may also be dialogical tools. What matters is the presence of each 'I' and the openness to the other –questions of originality or authenticity must become secondary. After all, there is no such thing as an authentic building, and the dialogue with a copy or simulacra may be more enriching and interesting than marching along a designated course, taking pictures of buildings that were once important for many people, but that may have been turned into mere carcasses—soulless fossils from a distant past.

Comparing the examples of Venice and Rio de Janeiro, it becomes clear that the identity of any city is in a constant development, built on the relationship between its body and its soul. Focusing on just one of these dimensions, we can affect not only the image, but also the experience and even the identity of a city. To preserve architecture is to preserve both the body and the soul of buildings and cities, for the sake of both inhabitants and visitors.

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4. BIM and Beyond - Architecture and Presence in the Universe of Technical Images

4.1. Abstract

Drawing from Vilém Flusser's theories on apparatuses and technical images, the paper develops an analysis of BIM (Building Information Modelling) and architectural models as contemporary cultural artifacts. The effectiveness and limitations of BIM technologies in the conception and perception of architecture are contrasted with the haptic experience of physical space, leading to the development of an approach in which architecture is seen not—or at least not only—as the spatial and plastic expression of abstract concepts, but as the art of multiplying presences.

Keywords: technical images; building information modelling; architecture; production of presence

4.2. Introduction: Ceci n'est pas un bâtiment

In an age forged by an ongoing and apparently unstoppable dematerialization of culture, architecture remains as a final frontier. While drawings, photographs, texts, films, and music have all become digital, architecture—and also sculpture, to a certain extent—seems to affirm the resilience of the bodily dimensions of the human condition, providing the possibility of experiencing presences "in the flesh." Contemporary culture manifests the blossoming of a renewed interest in presence, and architecture may be at the centre of this new sensitivity.

However, the experience of architecture has also been affected by the digitization of culture. BIM (Building Information Modelling) technologies have changed the dynamics of architectural design—instead of working on drawings, many architects now work on virtual models in which every part of the building is not only a two-dimensional shape, but also a block of information. A wall is no longer represented by a set of parallel lines—it really "is" a wall, since the software can account for numerous metadata referring to the wall's composition, weight, density, cost, etc. As architects work on the digital model, which simulates the building with all its materials, systems, equipment, etc., blueprints—plans, sections, elevations—are no longer the media through which architectural ideas are conceived and expressed, becoming outputs that can be produced

automatically by the software. However, the idea that all the information about a building can be stored and processed by software, creating a reliable simulation of the actual building, may be generating new kinds of design problems.

A famous example is the unpredicted phenomenon caused by Rafael Viñoly's 20 Fenchurch Street building: its concave glass façade concentrated sun rays—acting as a magnifying glass—and damaged cars and bicycles parked in its surroundings. The building had been "simulated" with the latest BIM technology, but the architect eventually admitted: "One of the problems that happens in [London] is the superabundance of consultants and sub consultants that dilute the responsibility of the designers until you don't know where you are." Viñoly added that "[a]rchitects aren't architects anymore. […] You need consultants for everything. In this country there's a specialist to tell you if something reflects. It's the fault of the architectural discipline which has cast itself into a completely secondary thing." (KLETTNER, 2013) It seems that all the designers and consultants involved in that project trusted the simulations performed by the software, believing that this sort of design flaw would have been identified by the program itself, and not by a designer or consultant.

Digital technologies have also affected the way the general public experiences architecture and architectural images. 3D renderings—highly "realistic" computer-generated images—are sometimes understood as "photographs from the future," and not as drawings of things that do not exist (yet), and many people tend to trust these images. However, as Elizabeth A. Harris argues in a *New York Times* article about the role of renderings in the real estate market, "the real purpose of these drawings is not to predict the future. Their real goal is to control it." (HARRIS, 2013) Looking at a realistic image of a project that is yet to be built, we may get the feeling that the building is actually already there—but every architect and developer knows that renderings can lie, or at least omit. And even when architects or developers are not trying to fool the public—at least not intentionally—the focus on realistic renderings suggests that the experience of architecture is mainly visual, and that good architecture is a composition or sequence of "good pictures," overlooking the haptic experience of space, not to mention its ontological dimension.

Therefore, even though architecture may resist dematerialization—it is clear that a 3D model of Chartres Cathedral is something different from the cathedral itself, whereas it may be much more difficult to discern between a manuscript and an e-book version of

the same text—many processes related to the conception and perception of architecture have been digitized. Many buildings—not only notorious works of architecture like Chartres—now have a digital presence made up of pictures, 3D renderings, 3D models, BIM models, etc., that seem to simulate the presence of the building with the utmost accuracy. But how accurate can these simulations be? Can the experience of architecture—or space, in general—be decoded and recreated by a synesthetic simulation? Can presence be simulated?

This kind of relationship with a presence is basically discursive, not dialogical. In his classic book *I and Thou*, Martin Buber argues that "[t]he attitude of man is twofold, in accordance with the twofold nature of the primary words which he speaks"—the combined words "I-Thou" and "I-It" (BUBER, 1937, p. 3). Anything can be addressed as a "Thou" or as an "It," but the "I" that relates to an "It" is of one kind; the relation to a "Thou" demands and creates another kind of "I"—we experience the "It," while we encounter a "Thou."[16] According to Buber, "[t]he Thou meets me. But I step into direct relation with it." The "other" only becomes a Thou when I put myself in relation with it, seeking this encounter. Whenever we treat something like an excuse or support for the creation of a discourse, we are not engaging it as a Thou—we are not open to be affected by its presence. This obvious idea that an authentic encounter can only happen when those involved affect each other is illustrated by Vilém Flusser with this example:

> The artificial—modified by Man as an example. How is that stone out there (which makes me stumble) related to a photograph of it, and how is it related to its mineralogical explanation? The answer seems to be easy. The photograph represents the stone in the form of an image; the explanation represents it in the form of a linear discourse. This means that I can imagine the stone if I read the photograph, and conceive it if I read the written lines of the explanation. Photograph and explanation are mediations between me and the stone; they put themselves between the stone and myself, and they introduce me to it. But I can also walk directly toward the stone and stumble over it (FLUSSER, 2002, p. 26).

[16] Buber uses the term *Begegnung* as in "*Alles wirkliche Leben ist Begegnung* "- Martin Buber, *Ich und Du* (Stuttgart: Philipp Redam jun. GmbH & Co., 2009), 12. In his 1937 edition, Ronald Gregor Smith translates the term as "meeting" (Buber, *I and Thou*, 11), while Walter Kaufmann uses "encounter" in his 1970 translation—Martin Buber, *I and Thou* (New York: Charles Scribner's Sons, 1970), 62.

4.3. Into the Universe of Technical Images

Flusser developed a model of cultural history consisting of five rungs, each one shaped by a medium that prevailed in "the task of transmitting information crucial to society and to individuals" (FLUSSER, 2011, p. 5). The first rung was shaped by human actions; the second, by the creation of objects that perpetuated actions, creating "Culture"; the third, by images that depicted or symbolized objects and actions; the fourth—located around 4,000 years ago—by linear texts that explained images, creating "History"; and the fifth, to which we have been climbing for the last decades, by "technical images," created by apparatuses such as telescopes, cameras and computers.

According to this model, the medium that shapes a new step is usually a form of response to the exhaustion of the previous medium. For instance, images are "mediations between the world and human beings" (FLUSSER, 2000, p. 9) and are needed to make the world comprehensible— they function as maps. However, during the era/rung shaped by images, they eventually became screens: "Instead of representing the world, they obscure it until human beings' lives finally become a function of the images they create" (FLUSSER, 2000, p. 10). Images replace the world, which becomes image-like. In order to regain a direct contact with the world, the reaction "was to tear the elements of the image (pixels) from the surface and arrange them into lines," (FLUSSER, 2000, p. 10) creating linear writing. Writing transcoded "the circular time of magic into the linear time of history," leading to the creation of historical consciousness "and 'history' in the narrower sense" (FLUSSER, 2000, p. 10).

In his "Lexicon of Basic Concepts," Flusser defines "Idolatry" as "the inability to read off ideas from the elements of the image, despite the ability to read these elements themselves; hence: worship of images" (FLUSSER, 2000, p. 83). In the era shaped by linear writing, a similar process occurred, leading to "Textolatry," namely "the inability to read off concepts from the written signs of a text, despite the ability to read these written signs; hence: worship of the text" (FLUSSER, 2000, p. 83). Texts also became so central in our culture that the world eventually became text-like—leading to the apparent detachment of meaning and presence that will be discussed in the last section of this paper.

Flusser argues that textolatry "reached a critical stage in the 19th century," leading to the end of History, since "History, in this strict sense, is the progressive transcoding of images into concepts, progressive explanation of images, progressive demagicification,

progressive conceptualization." At the end of History, technical images were invented "in order to make texts comprehensible again, to put them under a magic spell—to overcome the crisis of history" (FLUSSER, 2000, p. 13). Technical images, created by apparatuses, are substantially different from the traditional images, created by human hands, which led to idolatry: "Ontologically, traditional images are abstractions of the first order insofar as they abstract from the concrete world while technical images are abstractions of the third order: They abstract from texts which abstract from traditional images which themselves abstract from the concrete world" (FLUSSER, 2000, p. 14). Technical images abstract from texts since the apparatuses that generate them are the products of scientific discourses that pointed towards a "tendency to subordinate thinking in letters to thinking in numbers" (FLUSSER, 2000, p. 31). Apparatuses are programmed in the sense that they work within a predefined set of operations. "All apparatuses (not just computers) are calculating machines and in this sense 'artificial intelligences' […]. In all apparatuses (including the camera), thinking in numbers overrides linear, historical thinking" (FLUSSER, 2000, p. 31). This is "a new, dimensionless level, one to be called, for lack of a more positive designation, 'post history'" (FLUSSER, 2011, p. 15).

Even though many technical images can be experienced as visual images—photographs, videos, animations, etc.—and despite the fact that photography was the model chosen by Flusser to explain the concept of apparatus, the technical image is not an essentially visual medium. According to Flusser's concept, a photograph developed from film is as much a technical image as a digital photograph.[17] An analogical 35 mm camera is as much an apparatus as a camera attached to the Deep Space Climate Observatory satellite. If we compare the processes that create analog (or film) photography and digital photography, we may be led to believe that these are completely different—one is chemical and therefore physical, material, whereas the other is digital,

[17] In "Signal. Image. Architecture.", John May uses the term "image" to refer exclusively to digital images – understood as "outputs of energetic processes defined by signalization"—, emphasizing the fundamental differences between these images and photographs produced by chemical-mechanical processes. This distinction leads May to argue that "No one has never produced a digital photograph. We do not carry cameras in our pockets, we carry energy detectors"—John May, *Signal. Image. Architecture* (New York: Columbia University, 2019), 52. Although the distinction between photographs and images (or "digital photographs") is clear and undeniable, Flusser's concept of technical image encompasses both – these are just different kinds of technical images produced by different kinds of apparatuses.

immaterial. However, the immateriality of the digital photograph is of course illusory—its data is stored somewhere. And the optical and chemical processes that create the film photograph are as programmed as the software working inside the digital camera. "The technical image is an image produced by apparatuses. As apparatuses themselves are the products of applied scientific texts, in the case of technical images one is dealing with the indirect products of scientific texts" (FLUSSER, 2000, p. 14).

The processes that generate technical images are unknown by most of the people who operate apparatuses. The operator only needs to understand the interface through which the desired outputs can be produced, and this production can be understood as automatic or even "magical." Many technical images are apparently transparent—we usually take what was photographed or filmed as "true"—but this transparency only hides its opaqueness. We do not know how these images are built, and the same goes for the apparatuses through which we experience them. Flusser calls them "black boxes," (FLUSSER, 2011, p. 16) and these are becoming increasingly opaque for the operators—only the programmers are aware of the scientific concepts behind the complexity of the apparatus.

> This apparently non-symbolic, objective character of technical images leads whoever looks at them to see them not as images but as windows. Observers thus do not believe them as they do their own eyes. Consequently they do not criticize them as images, but as ways of looking at the world (to the extent that they criticize them at all). Their criticism is not an analysis of their production but an analysis of the world (FLUSSER, 2011, p. 15).

There is no fundamental distinction between the scientific (textual) knowledge behind film development and software programming. However, the apparent immateriality of software makes the digital process look even more automatic, reinforcing the apparent objectivity of its output. As digital apparatuses overcome and replace analogical apparatuses, this impression of automated objectivity spreads to almost all fields of human activity. According to Victor Buchli: "Recent technological innovations in fact equate such things as houses and designs as text—as digitized code" (BUCHLI, 2016, p. 9-10). This phenomenon is clear in the process of 3D printing, in which a "dialogue" between apparatuses blurs the distinctions between sign and signified, between drawing and cutting. The code is the only stable entity, and thus "[t]he relation between the material and the immaterial and the hierarchies of our post-Renaissance sensoria privileging 'vision' (and I include text within the visual) need to be reconsidered" (BUCHLI, 2016, p. 9-10).

As we rely on digital apparatuses to perform most of our daily activities, and since these apparatuses are opaque to most of us, there is the risk that our era may develop a sort of *technoidolatry* or *programolatry*—an adoration of technical images and/or of the programs behind the apparatuses that produce them. In popular fictional works like *Black Mirror*, "individuals' minds are extracted into vessels and settings constructed outside of the bodies in which they organically developed," (MULLER, 2019, p. 96) suggesting that the mind can be understood as a software that can be transferred between different hardware. Likewise, the current debates on smart cities suggest that cities may become similar to apparatuses— "many have become enamored with the same idea: What if the people who build circuits and social networks could build cities, too?" (BADGER, 2018). From a flusserian perspective, it can be said that apparatuses eventually replaced the world they were meant to reveal, and that we now live in function of our apparatuses. Even those very few who understand the workings of apparatuses are themselves functioning in accordance with their logic: "Every program functions as a function of a metaprogram and the programmers of a program are functionaries of this metaprogram" (FLUSSER, 2000, p. 29). The world has become program-like, and "there can be no 'final' program of a 'final' apparatus since every program requires a metaprogram by which it is programmed. The hierarchy of programs is open at the top" (FLUSSER, 2000, p. 29).

4.4. To BIM or not to BIM?

The widespread use of apparatuses in the processes through which we shape our built environment reinforces the notion that our worlds have become—or at least are rapidly becoming—program-like. Many architects and engineers work through sophisticated apparatuses such as BIM (Building Information Modelling) software, while having little to no knowledge of the way in which these apparatuses work. It would be fair to say that the definition of BIM is unclear among most architects, and that few of them have the kind of knowledge necessary to assess all available functionalities. In fact, some of the tools and resources that allegedly differentiate BIM from earlier tools like CAD (Computer Aided Design) are closer to the fields of facility management and digital fabrication than to conventional architecture practice (PEREIRA, 2019, p. 68).

Although the development of software oriented towards architecture, engineering and building began in the early 1960s, the use of CAD systems only became widespread

in the 1990s, when image-based user interfaces allowed professionals to operate these programs with no knowledge of programming languages or computing codes. Programs like AutoCAD provided something similar to a virtual drawing board: lines and two-dimensional shapes could be drawn according to the same logics that guided traditional hand-drawing—especially descriptive geometry (PEREIRA, 2019, p. 19). Many processes were more efficient than traditional hand-drawing techniques. It was possible to correct, erase and "undo" in a much quicker and simpler way; it was also possible to copy and reproduce sections of a drawing, change drawing scales and print as much copies as necessary; and finally, the drawing files could be stored in hard-drives and easily transported and exchanged. Of course, these drawings were already technical images, but the logics behind the drawings made through CAD were basically the same as the logics of the "analogical" drawing board.[18] According to Marcel Pereira, CAD systems belong to the Fifth Rung of Flusser's model (PEREIRA, 2019, p. 17). They are apparatuses that simulate hand drawing, adding tools that made the drafting process more efficient—at least regarding repetitive tasks—and producing technical images as both interface and output. However, the model of the digital drawing board was gradually incremented by attempts to incorporate automation and to embed data into drawing files.

In the early 2000s, 3D interfaces became more widespread, allowing architects to work on models that could be "sliced" by section planes, automatically producing two-dimensional drawings. These 3D models became more complex as additional data regarding building regulations and materials were gradually embedded, providing more automatic processes such as the creation of area schedules, window schedules, etc. (PEREIRA, 2019, p. 19). The development of such tools led to the creation of the first BIM suites, evolving "from object-based parametric modelling developed by innovative software companies and university research programs" and aiming towards "engaging design analytics in ways that allow architects to make far better performance-based decisions" (Kensek, 2014, p. xxiii). While CAD merely translated conventional drawings, such as plans, sections and elevations, to the digital realm, BIM "provides the implied promise of integrating all types of needed data into one file or model (perhaps with

[18] In a way, descriptive geometry can be understood as a form of "proto-technical image". See Felipe Loureiro, "The Image In Power: Vilém Flusser and the Craft of Architecture", *Architecture Philosophy*, volume 1, no. 2 (2015), 214-230.

separate but linked files with easy bilateral information transfer)" (GOLDMAN & ZARZYCKI, 2014, p. 3).

Pereira argues that the main purpose of Building Information Modelling, though, is to enhance the management of both design and construction processes, and not design and construction *per se* (PEREIRA, 2019, p. 18). While the promise to integrate all possible variables during the design process already sounds ambitious enough, many authors stretch the notion of BIM towards an integration of design with digital fabrication and facility management. Today, BIM is used in different ways by different professionals, providing tools for form-making/form-finding, simulation of building systems and overall building performance, and the production of documents such as construction drawings, specification and cost sheets, etc.—but the integration between all those functions still poses a lot of complicated questions.

Many of these questions arise from the adoration of programs, which leads to an overly optimistic exaggeration of the possibilities provided by apparatuses. On one hand, many authors argue that there is no intention to automate the design process, delegating it to the apparently objective analysis of apparatuses. "Note that none of these relationships assume an artificial intelligence or machine-determined decision-making process. While that may be possible at some point, its desirability is not assumed" (GOLDMAN & ZARZYCKI, 2014, p. 4). The intention of BIM would be "to provide any member of the building design team with information helpful in making decisions" (GOLDMAN & ZARZYCKI, 2014, p. 4). However, the same authors may regret the fact that "[p]resently, the architectural profession depends on human designers to accumulate knowledge about specific building efforts," (GOLDMAN & ZARZYCKI, 2014, p. 14) since these human designers rely "on intuitive thinking and unquantified experience rather than on sound and current data" (GOLDMAN & ZARZYCKI, 2014, p. 11). Thus, it seems that a human designer can only make good decisions based on "sound data" provided by apparatuses. Again, we rely on the supposed objectivity of technical images, believing them to be mirror-like.

To a certain degree, while working on BIM models, architects are already working within a program, and not just because they can only act according to predefined commands. In most cases, these models are compositions of predefined "components" or "families": smaller models consisting of a three-dimensional drawing of a building element—a door, a brick, etc.—and of metadata regarding the characteristics of the

object—weight, expansion coefficient, cost, etc. According to Glenn Goldman and Andrzej Zarzycki, this composition of components "promotes mainly visually driven design validation in an additive design process," while the database "is usually implemented as an extension of geometry, an attribute of a model. It is rarely a part of a broader datascape that considers user behaviours, functional patterns, relationships between the cost and performance, simulation of energy use, or life-cycle analysis"—(GOLDMAN & ZARZYCKI, 2014, p. 4-5). The authors seem to be worried about the inaccuracy of decisions based on visual information, apparently overlooking "sound data." However, would architects be able to understand and assess these data?

A common complaint among architects learning to use BIM software is that the program demands "too-much-data-too-early"—if you want to insert a wall into the model, you must specify the material composition of this wall. CAD systems asked no such questions—you could draw anything that was "drawable." This issue is usually addressed by increasing the opacity of the apparatus, turning off associated attributes and allowing the designer to work as if the BIM platform was a "dumb software" (GOLDMAN & ZARZYCKI, 2014, p. 5). In some cases, it is just not possible to follow the logics of the program. For instance, you may have to insert a custom-made element to which the corresponding metadata are either unknown or unavailable. This element can be drawn in 2D or modelled in 3D, but from the perspective of the apparatus, it will be out of sight. Without numerical parameters attached to it, the element will be unintelligible to the processes that collect and analyse data for simulation and production of documents.

This happens because these processes rely on algorithms that "allow for a single variable optimization and usually solve for a local optimal solution rather than a global one affecting many variables" (GOLDMAN & ZARZYCKI, 2014, p. 10). While a human designer would probably include a custom-made window in the window schedule, the program will only "see" it as a window if it has the corresponding metadata—the algorithm that "looks for" windows has no common sense to identify "dumb windows." According to Tim Crane, an algorithm is a method for calculating the value of a function—it is therefore not an answer, but "a procedure for finding out whether there is an answer" (CRANE, 2016, p. 61). Algorithms must satisfy two conditions: "At each stage of the procedure, there is a definite thing to do next. Moving from step to step does not require any special guesswork, insight or inspiration […]"; and "[t]he procedure can be specified in a finite number of steps" (CRANE, 2016, p. 61).

The apparatuses that we operate every day—smartphones, notebooks, etc.—work through automated algorithms. The combination of simultaneous automated algorithms provides these devices with an apparent reliability and objectivity that is unprecedented even among apparatuses. Thus, it seems reasonable to believe that "[h]aving access to relevant information at the appropriate level of abstraction or detail would streamline design process and eliminate unnecessary trial-and-error attempts," and that "future BIM platforms could adapt its dataset into the level of the design resolution," since "this is a representational rather than systematic issue" (GOLDMAN & ZARZYCKI, 2014, p. 12). This proposition relies on the assumption that the apparatus will eventually be able to assess all the possible variables involved in the design process, and that the main question would be how to present these data in a way that the operators can understand them and then make informed decisions. "What is needed is a soft constraint platform that communicates to the designer the degree to which the design is working. The qualitative message 'you are 95 percent there' is more effective from the design process viewpoint than the mechanical response 'over constrained; it does not work'" (GOLDMAN & ZARZYCKI, 2014, p. 11). The key issues would be to guarantee that the apparatus can provide the necessary information at the appropriate moment, and that designers are "educated in and facile in the ability to manipulate all of the criteria traditionally associated with good design and architecture" (GOLDMAN & ZARZYCKI, 2014, p. 13).

Building on this assumption, apparently there is no reason to believe that BIM could not include and integrate the variables pertaining to the following processes of construction and facilities management. The BIM platform "would emerge as a broader virtual building model that parallels its physical counterpart and is continuously used to fine-tune building performance throughout the life of the building. In this new role, virtual models become software components that operate physical hardware of an actual physical structure. Digital models that were used to design, analyze, and simulate performance continue their existence as a building operating software" (GOLDMAN & ZARZYCKI, 2014, p. 14). The model that was composed during the design process becomes a virtual counterpart of the concrete building, to which it remains connected.

However, if we understand BIM platforms as apparatuses in the *flusserian* sense, it becomes clear that there are significant limitations to these assumptions regarding the future of BIM. A photographer can only photograph what the camera is programmed to photograph, just as an architect working with BIM can only design what the software is

programmed to design, and a person making a virtual tour of a site can only see what the tour is programmed to show. The apparent transparency of technical images may provoke an illusion—programs have become so sophisticated that they seem to include every possible situation. Thus, they seem infallible, and we, as a society, increasingly trust programs over people, which is why all our most valuable information is managed by automated software. Everything seems to run smoothly, free of biased decisions or human errors, at least until a building melts a car. Then, it becomes obvious that a BIM model is not a building, and that a virtual tour of Chartres Cathedral is neither a visit to nor an encounter with the building. An encounter requires the event of an I-Thou relation and cannot be programmed. This is why Flusser argued that "[f]rom the standpoint of so-called common sense, technical images are objective depictions of things out in the world. The critical project is to show that in defiance of common sense, they are not mirrors but projections that are programmed to make common sense appear mirrorlike" (FLUSSER, 2011, p. 49).

This apparent faith in apparatuses can be illuminated by different ways of working with devices that use automated algorithms. While researching ways of using computer programming languages to solve design problems, Herbert Simon and his team identified many useful methods that would eventually be called "weak methods" (SIMON, 1983, p. 4570). These were essentially trial-and-error methods such as "generate-and-test" and "means-ends analysis," and although the search process could be much longer in some methods, it was never "blind trial-and-error." Simon argued that many issues were so complex that it was virtually impossible for unselective trial and error to be effective—thus, the first step was to delineate the scope of the search. This delineation was not defined by an apparatus, but by the operator, usually relying on heuristics: "rules of thumb that allow search generators to be highly selective, instead of searching the entire space" (SIMON, 1983, p. 4570). A similar solution is mentioned by Crane regarding the development of chess-playing programs that use rules of thumb to select "good courses of action," since the process of analysing all possible outcomes of all possible moves would take so long that it would be impossible for the computer to actually play with someone. Unlike algorithms, though, heuristics "do not guarantee a particular outcome" (CRANE, 2016, p. 75).

Heuristics may seem then to be useful, but rather imprecise. According to Billy Koen: "A heuristic is anything that provides a plausible aid or direction in the solution of

a problem but is in the final analysis unjustified, incapable of justification, and potentially fallible" (KOEN, 2003, p. 28). The same author nonetheless postulates that "[e]ngineering design, or the engineering method, is the use of heuristics to cause the best change in a poorly understood situation within the available resources" (KOEN, 2003, p. 28). Curiously, an engineer like Koen is not only at ease with the inaccuracy of heuristics, but he also believes that heuristics are the very core of the engineering method. This method cannot be replicated by algorithms, at least not in this entirety, but it can surely use algorithms. The (human) designer has both the first and the final word, though, defining the scope of the search, analysing many trials and many errors, and eventually deciding which path will allow him/her to "cause the best change." This approach suggests a balanced way of working with apparatuses that use automated algorithms, with the operator taking the reins—and having no illusions about the apparent infallibility of black boxes.

This attitude towards apparatuses is very similar to what Flusser describes as being the role of "envisioners," "people who press the keys of an apparatus to make it stop at an intentionally informative situation, people determined to control the apparatus in spite of its tendency to become more and more automated and so to preserve human judgment over the machine. Envisioners are people who try to turn an automatic apparatus against its own condition of being automatic" (FLUSSER, 2011, p. 19).

4.5. Conclusion

Hans Ulrich Gumbrecht's interest in the "materialities of communication" led him and a group of scholars to no longer believe that "a meaning complex could be kept separated from its mediality" (GUMBRECHT, 2013, p. 11). This statement is surely open for debate in an age of e-books, digital music files and BIM models, but this is also an age that is becoming increasingly interested in presence—even though this interest is now usually satisfied not by concrete presence, but by synesthetic stimulations like videos, virtual reality, augmented reality, etc.

According to Gumbrecht, whenever we experience something, we perceive meaning effects and presence effects,[19] presence being "a spatial relationship to the world

[19] Today, different kinds of media try to combine all kinds of stimuli to simulate the experience of presence, and the proliferation of technical images may be changing the overall structure of the aesthetic experience

and its objects" and meaning an idea that we attribute "to a thing that is present" (GUMBRECHT, 2013, p. xiii-xiv). Gumbrecht argues that some cultures—like Western culture, in broad terms—tend to emphasize meaning, discovered or created from what is being experienced; while other cultures—like traditional Japanese culture—focus on presence. Thus, Western culture is a "meaning culture" that has been attenuating the presence of things since the emergence of the "Cartesian world picture" (GUMBRECHT, 2013, p. 52). In his immensely popular TV series *Ways of Seeing*, John Berger summarizes this process as following:

> Images were first made to conjure up the appearances of something that was absent. Gradually it became evident that an image could outlast what it represented; it then showed how something or somebody had once looked—and thus by implication how the subject had once been seen by other people. Later still the specific vision of the image-maker was also recognized as part of the record. An image became a record of how X had seen Y. This was the result of an increasing consciousness of individuality, accompanying an increasing awareness of history. It would be rash to try to date this last development precisely. But certainly in Europe such consciousness has existed since the beginning of the Renaissance (BERGER, 1972, p. 12).

This idea of understanding a work of art—and here we include buildings, architectural models and drawings—as a discourse with a somewhat hidden meaning, and not as an object that is present, culminated in the current emphasis on interpretation, illustrated by the works of such thinkers as Derrida and Vattimo. Therefore, whenever we, who are immersed in this culture, experience something, including buildings, we tend to overlook its presence, trying either to discover its meaning or to create a meaning for it on our own. Following Gumbrecht's analysis, we can say that, in our culture—especially in the academic field—meaning has engulfed presence. Of course, we are still aware of the presence of things, but this presence can usually be a mere excuse for the creation of new interpretations, discourses, narratives, etc. In order to illustrate how this phenomenon is not limited to scholarly discussions, we again recall Berger's *Ways of Seeing*, which aimed at the general public and became very popular in the early 1970s:

> When we "see" a landscape, we situate ourselves in it. If we "saw" the art of the past, we would situate ourselves in history. When we are prevented from seeing it, we are being deprived of the history which belongs to us. Who benefits from this deprivation? In the end, the art of the past is being mystified

presented by Gumbrecht. Highly synesthetic – or even immersive—experiences may blur the distinction between presence effects and meaning effects.

> because a privileged minority is striving to invent a history which can retrospectively justify the role of the ruling classes, and such a justification can no longer make sense in modern terms. And so, inevitably, it mystifies (BERGER, 1972, p. 13).

According to Berger, art historians usually mystified the works they analysed, trying to insert meanings that did not belong to the work itself—as a Marxist, Berger believed that the hidden meaning behind the work of these critics was to "justify the role of the ruling classes." Thus, the work of the art critic was also seen as "a record of how X had seen Y," and since the critic could be just trying to turn the work of art into a justification of past and current power relations, his work was not only an opinion, but a biased (and ill-intended) opinion. Therefore, the opinion of non-specialists could be more dialogical than that of the art critic, and thus more relevant. It would constitute a less biased opinion, built from the direct experience of the presence effects of the work of art. Although it may seem that this could correspond to an emphasis on presence, it can also be just the opposite; the presence of the work of art and architectural model can be seen, mainly, as an event that calls for the search/creation of meaning.

The use of BIM technology and the proliferation of renderings show that, even though architecture may seem to resist dematerialization, both the conception and the perception of buildings have been affected by this process. In both cases, dematerialization through the use of technical images aims to (re)construct the virtual presence of a building. From a *buberian* perspective, even the richest synesthetic experience—combining video, sound, immersion, etc.—does not create authentic encounters. Synesthetic stimuli through technical images blur the distinction between meaning and presence effects, suggesting presence but being, in fact, only a simulacrum of presence.

The interest in this kind of digital presence is a reaction to the banalization of meaning that pervades our culture. The obsession with the creation or attribution of meaning has also influenced architectural theory, spreading the notion that a building expresses an idea or concept. According to Italo Calvino, "[a] classic is a work which constantly generates a pulviscular cloud of critical discourse around it, but which always shakes the particles off" (CALVINO, 2000, p. 6). As this paper has proposed, today we encounter a similar attitude towards architecture: almost any building can generate a cloud of (technical) images around it, but one can only encounter such a building by shaking these particles off.

Flusser argued that, in the universe of technical images, "[a]ll objects, without exception, become cheap, lose value, and value is transferred to data, these non-objects" (FLUSSER, 2006)[20]. It may seem that all we need from architecture today is just "architectural information"—the kind of information that we input in our BIM models, and that can be processed by the systems that govern smart cities. Encounters still "take place," though, in specific portions of space in which I-Thou relations can dwell. Architecture creates such places, and only (human) designers that can recognize and cherish these places will be able to envision—in both the conventional and the *flusserian* sense—new ways of creating them. Through their presences, works of architecture allow others to become present. Architecture is not about creating spatial and plastic expressions of abstract concepts; architecture is the art of multiplying presences.

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[20] Original quote: "Todos os objetos, sem exceção, vão se tornando baratos, vão perdendo valor, e o valor vai se transferindo sobre as informações, esses inobjetos." Translation by the authors.

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5. From Plans to Programs - A Flusserian View on Smart Cities

5.1. Abstract

According to philosopher Vilém Flusser, the airplane provided a 'transcendental viewpoint' that added a new dimension to the experience of our cities. Le Corbusier used this new viewpoint both to criticize 19th century cities and to design what he believed to be ideal modernist cities. His ideals were realized, for instance, in Lúcio Costa's plan for Brasília—but it would be safe to say that Brasília did not develop according to plan.

As modernist urban planning rose from the new viewpoint provided by the experience of flying, the emergence of digital technologies and of the internet created yet another layer to the experience of the built world. There is now a new paradigm guiding a number of initiatives all over the world: cities do not need plans; they need to be programmed.

This new mentality is clearly expressed in the 'plans' for the Masdar Initiative (UAE) and in Google's Sidewalk Toronto project, but it may also be more discretely changing the way the public thinks about urban environments. The paper discusses the conceptual differences between plans and programs from a *flusserian* perspective, focusing on the impacts that this new programmatic mentality can have on our cities.

Keywords: urban planning, modernist urbanism, program, smart cities, Vilém Flusser.

5.2. Introduction: From the clouds to iCloud

In the first pages of "*O Último Juízo: Gerações I*", philosopher Vilém Flusser describes the experience of flying over Europe in an airplane, looking down on medieval cities. According to Flusser, the airplane has provided us with a 'transcendental viewpoint' (FLUSSER, 2017, p. 35)—as we look at these cities, we are completely isolated, not only from the city itself, but also from our immediate context, since we do not experience the speed in which we are moving, nor the environment around us. This experience was not available for the people who conceived and built these cities, nor for the people who lived in these places before the first decades of the twentieth century. Therefore, the airplane has added a new dimension to the experience of a medieval city,

one that could not be foreseen by its builders—and therefore could not be inserted into its ‘program’.

In 1923, Le Corbusier published ‘Towards a New Architecture’, a collection of essays in which he advocated his views on modern architecture. In a section called ‘Eyes Which Do Not See’, he praises the mechanical logic of liners, airplanes and automobiles, products of ‘imagination and cold reason’ (LE CORBUSIER, 1986) that should inspire the architects of his age. In the case of airplanes, he argues that the War was ‘an insatiable client’, turning the ages-old dream of flying into a pragmatic question, a life and death problem that had to be solved—and so it was. Thus, the airplane that allowed Flusser to admire European towns from afar an above could also allow a pilot to bomb them. Le Corbusier himself explored this new viewpoint, creating a series of radical urban design proposals for cities like Rio de Janeiro and Montevideo, all based on the aerial view he got from approaching these cities from the sky. These proposals could not have been foreseen if it was not for the experience of flying.

Figure 32 - Aerial view of San Gimignano, Italy / Le Corbusier’s sketch for Rio de Janeiro, 1929.

Sources: https://commons.wikimedia.org/wiki/File:San_Gimignano_aerial.jpg
https://www.archdaily.com.br/br/01-66735/exposicao-le-corbusier-america-do-sul-1929-sao-paulo-sp/lecorbusier_2

It should not surprise us that Le Corbusier also uses the newly conquered aerial viewpoint to illustrate what he saw as the precarious state of 19th century cities:

> Take an airplane... Flyover our 19th century cities, over those immense sites encrusted with row after row of houses without hearts, furrowed with their canyons of soulless streets. Look down and judge for yourself. I say that these things are the signs of a tragic denaturing of human labor. They are proof that men, subjugated by the titanic growth of the machine, have succumbed to the machinations of a world powered by money. (LE CORBUSIER, 1967, p. 341).

This passage illustrates how the emergence of the aerial view had deep theoretical and intellectual implications. Even the notion of seeing things 'from outside'—like an external observer—can be related to the apparently all-encompassing, quasi-metaphysical viewpoint created by the experience of flying.

Likewise, the development of digital technologies—and their spread through the internet—has also created new dimensions that could not be foreseen by our ancestors, and whose emergence has already changed the way we see the world and ourselves. The builders of the Alhambra could not predict that someday we would be able to fly over the palace and see it all at once in a glance, while seating comfortably in a completely controlled and isolated environment; and it would be even more improbable to assume that they could foresee the possibility of making a virtual tour of the palace from just anywhere in the whole world, as we can easily do now. This is also a new dimension, a new layer that was added to our experience of the world.

Nowadays, a quick online search can provide information on almost any building, city or site in the world. The amount and the quality of the information varies, but almost anything that exists in the 'real' world also has a virtual presence. And, since any person equipped with a smartphone can produce pictures, videos and texts about anything, and quickly share them with millions of people all over the world, it has become impossible not only to control, but even to know how a building, city or site—or even a person—is being presented in the virtual environment. Therefore, the biggest portion of this virtual presence is created by 'others'.

This apparent lack of control can, however, be just a veil covering a very different reality. All the people producing and sharing images and texts are feeding a worldwide information network, and some initiatives aim at using this information to create and/or manage entire cities. As pointed by Emily Badger in a recent article in the NY Times, 'many have become enamored with the same idea: What if the people who build circuits and social networks could build cities, too?' (BADGER, 2018). The almost all-encompassing presence of software and technological apparatuses in our daily lives seems to support this idea. Since many practical problems can now be solved—or at least

addressed—through digital technology, why not assume that the people who designed these solutions may also solve the problems that afflict our cities?

5.3. Smart / Programmed Cities X Modernist / Planned Cities

The assumption that the logics that govern our digital apparatuses could also make our cities work better leads to an inevitable analogy: the city as apparatus, as gadget. ‘’Humans currently live in cities that are the equivalent of flip phones,’ said Jonathan Swanson, a co-founder of the company Thumbtack (…). If someone built a better version of San Francisco—the iPhone X of cities—two hours away, people here would demand those upgrades, he said’ (BADGER, 2018). Turning this analogy into something more than just an analogy, we may feel that our cities are out of pace with our technology, and that tech entrepreneurs may be able to bridge that gap— ‘The tech industry tries to produce better versions of familiar things—cheaper phones, smaller computers, faster chips. But cities like San Francisco don’t seem to be evolving into more efficient versions of themselves’ (BADGER, 2018).

Alphabet’s Sidewalk Lab is currently developing a project called Sidewalk Toronto, in ‘roughly 800 acres of underused waterfront that could be reimagined as a neighborhood, if not a full metropolis, with driverless cars, prefabricated construction and underground channels for robot deliveries and trash collection’ (BADGER, 2018). If we imagine a city with a constant flow of self-driving vehicles carrying people and goods around, it is easy to see it as an intelligent, self-governing system—not like clockwork, but closer to some sort of software. The emphasis on efficient and sustainable mobility is clear on the basic description given by Sidewalk Labs on its website: ‘A mobility system that is safer and more convenient than the private car at much lower cost. Self-driving technology and digital navigation tools can give rise to a next-generation, point-to-point transit system that complements pedestrian, cycling, and bus or rail options to improve convenience, reduce costs, and enhance street safety’ (https://www.sidewalklabs.com/).

At a larger scale, we can find a similar example in the Masdar initiative, which aims to build a zero-emission city in the UAE— ‘The community, which is envisioned to house a science and technology park and housing, is designed to be carbon neutral and virtually waste-free. Two-thirds of the power is to come from a 10 MW solar farm, and nearly all water is to be recycled and reused. There will be virtually no waste, as all packaging and material are to be recycled, used for power generation or turned into

compost' (THE ELECTRICITY JOURNAL, 2009). With its focus on sustainability, Masdar exemplifies the intention to control virtually all the processes that take place in a city. The city is seen as a program, a concoction of hardware and software that can be programmed and that should then 'work by itself', automatically. Conceived and built from scratch, the entire city can have the apparently perfect internal logic of a sophisticated software, which includes interactions and decision-making processes that cannot be perceived by the people who use it.

Thus, it should not surprise us that, in order to raise our cities to the state of development of our current communication technologies, tech entrepreneurs propose radical solutions that would be better fitted to new cities, like Masdar— 'The tabula rasa is alluring not just for the lack of buildings, but also the absence of rules' (BADGER, 2018). This attitude is of course very similar to the one proposed by Le Corbusier almost one hundred years ago, but this is not just a new wave of utopian fantasy. Le Corbusier proposed the complete redesign of our built world, according with rational plans that would shape society in the image of the modern, industrialized world. However, even the few cities that were actually designed (from scratch) according with these principles actually became something quite different.

> From the air, Brasilia looked dynamic and exciting: in fact, it was built to resemble the jet plane from which I (and virtually all other visitors) first observed it. From the ground level, however, where people actually live and work, it is one of the most dismal cities in the world. (…) There is a deliberate absence of public space in which people can meet and talk, or simply look at each other and hang around. The great tradition of Latin urbanism, in which city life is organized around a plaza mayor, is explicitly rejected (BERMAN, 1988, p. 6-7).

Marshall Berman's account of his first visit to Brasilia contrasts the transcendental viewpoint of the aerial view and the direct experience of urban space that enrolls at ground level. The Brazilian capital was designed by Lúcio Costa according to many of the principles proposed by Le Corbusier, and it was clearly designed 'from above'— 'In their reading of the city's form as an airplane, the plane's body is taken as a metaphor for the body politic of the city: its cockpit, the center of command, corresponds to the Plaza of the Three Powers; its fuselage, to the ministerial and service sectors; its tail section to the municipal administration ('at the back of the plane' politically); and, in the wings, with no voice along the axis of command, the residents in their *superquadras*' (HOLSTON, 1989, p. 330).

In his ethnographic study first published in 1989, James Holston describes how Brasilia eventually became something very different from the efficient, perfectly functional bureaucratic metropolis envisioned by Brazilian urbanists and politicians in the late 50's. 'In portraying an imagined and desired future, Brasilia represented a negation of existing conditions in Brazil. This utopian difference between the two is precisely the project's premise. Yet, at the same time, the government intended it as a means to achieve this future—as an instrument of change which would, of necessity, have to use the existing conditions it denied' (Ibid, p. 5). Apparently, these conditions were not completely transformed by the city, but actually transformed the city into something that was not part of the plan.

The word *plan* indicates the main difference between the modern mentality that created Brasilia and the contemporary mentality that is currently developing Sidewalk Toronto and Masdar. Brasilia was a plan—both as a 'drawing' and as something that was *planned*—that should be built in order to change the way Brazilian society functioned. Its envisioners had such a faith in the power of urban structures that, even though architects and urbanists could only exert their control during the design process, this was believed to be enough—the modern city would shape modern men. However, the fact that Brasilia has not developed according to the original plan shows that it was not enough. As Almandoz (2016) underlines, 'It was clear from the beginning that the new capital was conceived as an architectural project only with considerations of 'physical design' (…) Partly as result of its original sin of lacking regional planning, Brasília's Pilot Plan was so rigid in design that it failed to provide for either planned expansion or the accommodation of new functions'. It seems that an apparently modern 'hardware' was not enough to build a modern city.

Initiatives like Sidewalk Toronto and Masdar indicate that this lesson was learned. If you want the city to function according to plan, it is not enough to design the roads—you better program the cars. Understanding the city as program—and not as a machine, which was the case one hundred years ago—, the plan is stretched from the design phase to the daily workings of the city. The program is dimensionless—it is much more about processes than 'things' like buildings, roads and viaducts. This is not a plan anymore, in any sense. It cannot be drawn or planned, but only programmed—and, in the city as program, there is much more control. This can mean much more efficiency, but it can obviously mean much less freedom. A self-driving car can only take you where it is

programmed to take you—it is not possible to take a wrong turn or drive through a field. Besides that, every trip is not only programmed, but also recorded and stored. The city's program is fed by this kind of information, which it processes in order to keep the city working. Thus, the program must know where everybody goes.

Despite these more dystopian possibilities, there is another poignant issue: contrary to what happened in Brasilia—and in modernist neighborhoods and projects all over the world—, it must be much more difficult to confront, subvert and adapt a program than to do the same with a plan. Just as the idea of the modernist city influenced numerous interventions in existing cities and sites, the same can happen under the influence of the 'city as program' paradigm. In the special case of heritage sites, the possibility of creating a *tabula rasa* cannot be entertained. For modernists like Le Corbusier, medieval cities should be destroyed and replaced by modern cities—the past was an obstacle to the present and the future, and therefore should be replaced. Today, this is no longer the case. Even the most enthusiastic tech entrepreneur would refrain from proposing anything similar to Le Corbusier's *Plan Voisin*—to demolish most of downtown Paris and replace it with skyscrapers and underground tunnels (LE CORBUSIER, 1925; LUBIN, 2013). The kind of transformation that can be envisioned through the programmatic mentality is much more related to dimensionless processes than to physical interventions, so this mentality also affects heritage sites and the established built environment as a whole.

Even when little can be done about the hardware, software can be reprogrammed. With renovation and conservation plans replaced by programs, the same conflict between efficiency and adaptation, control and freedom, emerges. Through the use of augmented reality or virtual 3D models, historic buildings are included into the virtual/digital dimension—in fact, even things that do not exist anymore may acquire a virtual presence. This virtual dimension is now inescapable, as a mode of presence that may even turn to be, in some cases, more important than the concrete experience of presence. In this new world in which these many layers—both old and new—overlap, to be alive is to be 'searchable' and 'findable'. In flusserian terms: this is the program of our times. What can we do with—or against—it?

> The difference between the apparatus and the universe is that the apparatus continues with its programmed tasks (e.g., with a photograph made by a fully automated satellite camera), and the universe runs past the programmed task toward heat death. For this is, in fact, the definition of automation: a self-governing computation of accidental events, excluding human intervention and stopping at a situation that human beings have determined to be

> informative. The difference between the apparatus and the universe is, accordingly, that the apparatus is subject to human control. But it cannot stay this way forever: in the longer term, the autonomy of the apparatus must be liberated from human beings. This is why the negative entropy of the apparatus changes to entropy (FLUSSER, 2011, p. 19).

Again, the question of control arises. Regarding historic sites, the overwhelming presence of the programmatic mentality limits the actions—both physical and interpretative—of visitors and locals, both in the concrete and in the virtual realms. Digital apparatuses like Google's Knowledge Vault promise to free us from the labor of looking for information, and also from the risks of surprising discoveries: 'Knowledge Vault autonomously gathers and merges information from across the web into a single base of facts about the world, and the people and objects in it. The breadth and accuracy of this gathered knowledge is already becoming the foundation of systems that allow robots and smartphones to understand what people ask them. It promises to let Google answer questions like an oracle rather than a search engine, and even to turn a new lens on human history' (HODSON, 2014).

Thus, even if the concrete presence of a historic site is not directly affected by any sort of program, the information about this site may be engulfed by a program such as Google's Knowledge Vault. Following the classic 'onion metaphor', even though the core—the object itself—is not altered at all, the layers of meaning around it can affect the experience of the object, changing the image that visitors build before experiencing it directly, 'in the flesh'. Again, we may face the conflict between control and freedom, in a less visible but maybe even deeper dimension. It is one thing to not be allowed to get off a programmed path; it is much more serious to not be allowed to know what is not included in the program.

5.4. Conclusion

'We've tried to run the city.... But the city ran away...'

Rodgers and Hart

The new layers created by machines—airplanes—and apparatuses—computers, smartphones, etc.—seem to extend the reach of our view, which is to say the reach of our control over reality. In the latter case, the opaqueness of the apparatus is embraced—we do not need to see what it sees. The external, God-like observer can now allow himself to

have some ‘blind spots’. Hopefully, the dialogue between apparatuses should create an efficient, fluent and (almost) flawless background infrastructure on which human life can flourish, spared from the need to care about traffic, inclement weather, etc. Sensors, computers, self-driving vehicles, big data processing—the city’s organism should keep on going like a self-sufficient living being, fed by information and self-generated energy. Just like machines were supposed to free people from (manual, repetitive) labor, allowing them to dedicate their lives to (more intellectual) work and leisure, smart cities should free its inhabitants from the trouble of caring for it—managing, operating, cleaning, maintaining, restoring, etc. But would that really be a city, or a Disneyland-like experience?

Picon also traces a parallel between smart cities and the industrial cities of the past, interpreting both as the urban ideals of their eras—two eras shaped by technology:

> Our cities are on the verge of a radical transformation, a revolution in intelligence comparable in scale to the one that, in its time, brought about industrialisation. The smart city, driven by digital technology, is poised to replace the typical networked city of the industrial era, whose success was built on its hard infrastructure, from roads to water supply and sanitation systems, not only as a technological optimum but also as a social and political project. This conviction is shared by many. Coined initially around 2005 to characterise a series of new urban uses of information and communications technology, the expression ‘smart city’ has spread everywhere, in both mass media and specialist literature, and in the discourse of businesses such as IBM and Cisco as well as out of the mouths of politicians. A new urban ideal is born (PICON, 2005, p. 9)

Similarly, for Flusser, *homo faber* was replaced by *homo ludens*. While working with programmed apparatuses such as cameras, computers or smartphones, we ‘dominate the apparatus, without, however, knowing what goes on inside the box’ (FLUSSER, 2011b, p. 38). Thus, digital apparatuses are black boxes, opaque objects which we operate, but whose workings remain a mystery. ‘By controlling input and output, the photographer controls the apparatus, but through his ignorance of the processes inside the box, is controlled by it. This overlap of controls—functionary controlling an apparatus that controls him—characterizes the whole functioning of apparatuses. In other words: functionaries control games for which they cannot be fully competent’ (FLUSSER, 2011b, p. 38). Thus, by treating a city as an apparatus, we are necessarily making its inhabitants not fully competent to govern it—it is the program that will govern them. Following Flusser’s advice, we must ask: who programs the programmers?

While Picon argues that "Contrary to the arguments of its less informed detractors, the looming new urban revolution cannot be reduced, even in its narrowest sense, to a mere plan to equip the city with digital tools. It is inherently linked to questions of anthropology, sociology and, ultimately, politics." (PICON, 2005, p. 11), the opacity of apparatuses and the solutionist impetus of many of its supporters can surely raise suspicions. Brasília and Toronto Sidewalk (or Masdar) may not be that different at all. The faith in rational planning gave way to a faith in algorithms. In the plans for Brasília, the planner can still be seen behind the plan—in smart-cities, parts of the program will be necessarily invisible to us. The plan 'wanted' to be a program, but it failed; now, we may have the 'real stuff'. What is it easier to fight: bureaucrats or self-driving vehicles?

Picon argues that these suspicions rise in regard to just one of two types of political projects that are emerging today. There is in fact a project focused "on controlling the urban organism, in an outlook not dissimilar to cybernetic research of the period from 1950 to 1970 into the running of complex systems" (PICON, 2005, p. 11). These are the heirs of Friedman and Fuller, who already thought about "world planning" more than forty years ago. Picon recognizes that this project "carries risks of technocratic drifting," but these risks are to be mitigated by the other current project: "cities that call more upon the initiative of and cooperation between individuals than on coordination driven from above" (Ibid).

However, the programmatic mentality may be just as utopian as the planning mentality that arose in the previous century. Modern urbanism aimed at creating cities that would work as machines—rational, efficient, reliable. These cities would then rise, from their concrete and steel bodies, toward the mathematical perfection of the scientific concepts that govern machines. This is the basic intention behind what Flusser calls technical images—images created by apparatuses:

> There is the stream of events, as it is perceived by historical consciousness. Everything flows, nothing never repeats itself, every opportunity lost is lost forever, and everybody is within that stream of events. Above it is science. Science formulates eternal, timeless and space less algorithms. There is no sense is saying that the law of freefall is a historical event. It stands outside time and outside space. And the whole of scientific and technological knowledge is in this formal, trans-historical region. Now, in that region, you build a machine, and that machine delves into history, takes out part of history, and lifts it to this trans-historical level. This is a photograph (languagevirus, 2009).

The programmatic mentality seems to propose the same road, but the opposite direction: algorithms can come down from their dimensionless, immaterial realm and descend upon our cities, imbuing and animating them with their rational, mathematical perfection. Instead of lifting bits of history towards the level of science, we can reprogram history—as initiatives like Google's Knowledge Vault seem to propose. Artificial intelligence is surely a central point in the conception of smart cities, and Picon likens it with the very definition of the term:

> What is a smart city? Having outlined the various current stances on the subject, it appears to be both an ideal and a process. As an ideal, it consists of a city whose digital tools allow the optimisation of its functioning and sustainability, as well as of its inhabitants' quality of life and the types of relationships they can maintain with one another. In so doing, this city demonstrates a form of intelligence with no past equivalent. In the smart city, some mechanisms for learning, understanding and reasoning are internalised; they become intrinsic to the city itself, instead of residing in the minds of the humans who live in it. (PICON, 2005, p. 29)

The idea of a literally "smart" city, or of a "spatialized intelligence", as Picon puts it, is surely problematic if we consider the opaqueness of apparatuses and the risk of delegating political decisions to the mute dialogue between that occur between them. But anyway, it is important to acknowledge a quite obvious fact: many cities all over the world have survived the rational plans of modernists and will most likely also survive to whatever comes out of the spread of the programmatic mentality. It can be very difficult to apprehend to which extent an urban plan may be held responsible for a city's qualities or shortcomings, especially in the case of recent plans—"Planning perceptions of compact cities, smart cities and new urbanism fall short as they overestimate the significance of the built spatial environment" (SCHUBERT, 2018). The very essence of cities as collections of meaningful places that bound human ties together cannot be reduced to a plan or a program. The danger that lies beneath the idea of the city as program is exactly the negation of this dynamic and existentially essential nature of the city. Programmed cities may be efficient, but reality is not. The program denies—or at least reduces—the freedom that is needed to engage in risky and unpredictable human relations— 'These trade-offs demand political choices. And so technologists hoping to avoid politics are bound to encounter them again' (BADGER, 2018).

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6. The Invisible Collection - Towards a Relational Approach to Heritage

6.1. Abstract

This paper aims to present a simple argument: beyond all materiality, all heritage is intangible. What we consider meaningful in an object is not the object itself, but the relationship we build with it. This can obvious, but the focus on the physical preservation of artifacts and sites may lead to the adoption of restrictive measures that can limit or even extinguish the possibility of meaningful encounters—and thus destroying the relationship that was meant to be preserved.

This idea was built on two main references: the *buberian* notion that the relation with "the other" is the essence of being human, according to the I-Thou / I-It dichotomy; and the concepts of technical image and post-history, developed by Vilém Flusser. Additionally, the distinction proposed by Hans Ulrich Gumbrecht between "meaning effects" and "presence effects" explains how the context in which we encounter an object can turn it into a Thou or an It, and how the concepts we attach to the object can preformat the experience of its presence to the point of annulling it. To illustrate a possible development of this theoretical approach, the paper proposes ways of intervening in objects and sites with the intention to preserve and enhance not its physical form, but the "relational structure" built around it.

Keywords

Heritage. Relational heritage. I and Thou. Technical images. Post-history.

6.2. Introduction: Relational Heritage

This paper aims to present—and "build a case for"—a simple argument: beyond all materiality, all heritage is intangible. This argument builds on the principle that the "heritage value" we identify in certain objects and sites does not lie on the objects and sites themselves, but on the relationship that individuals or groups have built—and keep on building—with them. Although this may sound obvious, the focus on the physical maintenance of objects and sites can lead to the adoption of strict measures that can diminish or even extinguish the possibility to develop or sustain a significant relationship with these objects. This can occur not only as a consequence of excessively zealous policies, but even with slight changes in the dynamics of the encounter between subject and object.

In another paper (LOUREIRO et. al, 2019), we have presented what Abreu and Malheiro (2011) identify as "hyper-modern cultural tourism", a second phase in the development of cultural tourism—the first being initiated in the 1970's, with the massification of a kind of tourism focused on "historic neighbourhoods" and world heritage sites—in which the dynamics of the tourist experience becomes itself an obstacle for the fruition of heritage sites. Programmed, fast-paced itineraries tend to turn buildings, monuments and even people into "objects" to be quickly apprehended—and usually photographed. This attitude not only reduces the time—and space—needed for the development of a deeper relationship, but it also tends to prioritize places and objects that are more prone to be quickly "consumed" instead of experienced—endowing these objects with a greater "heritage value".

The dynamics of the encounter with an object or site may, therefore, "drain" its "heritage quality". This is surely a loss, but not only for the object itself—while turning works of art, monuments and landscapes into mere sightseeing entertainment or distraction, we are contributing to the impoverishment of the very notion of heritage, something that bears much deeper consequences. In the following lines, we will try to present the conceptual basis for an approach that is not only focused on the relationship with heritage sites and objects, but build from the idea that there is a "relational heritage" to be acknowledged, discussed and constantly revitalized.

In previous papers, we have constantly worked with two main theoretical references: the idea that the relationship with the "other" is the essence of being human, as proposed by Martin Buber through the I-Thou / I-It dichotomy; and the concepts of

technical image and post-history, developed by Vilém Flusser. In this paper, we will combine these references with the distinction proposed by Hans Ulrich Gumbrecht between "meaning effects" and "presence effects". According to Gumbrecht, presence is "a spatial relationship to the world and its objects", while meaning is an idea that we attribute "to a thing that is present" (GUMBRECHT, 2004, p. xiii), and that "Western culture" as a (broad) whole is focused on meaning—discovered or created from what is being experienced—, while other cultures—like traditional Japanese culture—are focused on presence.

This distinction echoes Larkham's observations regarding the contrast between the western notion of authenticity—exemplified by UNESCO's Nara Document (UNESCO, 1994)—and the traditional culture of the place in which the document was signed:

> It is perhaps no coincidence that the Nara Document was drawn up in Japan, where a quite different tradition exists. Regular demolition and rebuilding of key national monuments, particularly Shinto shrines, occurs in some cases. Authenticity rests not in the material fabric but in the continuation of the building tradition and techniques and in sustaining the continuing use (LARKHAM 1996, apud PENDLEBURY, 2009, p. 25).

Apparently, the "presence culture" built and sustained by the Japanese values and preserves the "shape" and the traditional building techniques of Shinto shrines, but not their materiality—building materials can be replaced, but the shape and the construction methods must be anchored in the local tradition. In the West, the most probable attitude would be to preserve the "original" materials as much as possible, employing modern preservation techniques and allowing only partial reconstruction of bits and pieces that could not be preserved. These different attitudes may seem antagonistic, but both aim, though different means, to preserve the presence of a form—its concrete existence, something that can be encountered face-to-face and addressed as a "Thou".

At this moment, we must clarify that the words "form" and "shape" will from now on be used in Aristotelian terms. "Form" (*morphe*) is understood as the overall organization of the parts of an object, its "formal cause"; while "shape" (*hyle*) is a physical—and therefore specific and accidental—manifestation of this formal cause. As Adler summarizes,

> The leather out of which the shoe was made by the shoemaker was not a shoe before the shoemaker went to work on it. It became a shoe or got turned into a shoe by the work he did, which transformed it from being merely a piece of leather into being a shoe made out of leather. That, which at an earlier time was leather not having the form of a shoe, is now at a later time leather formed

> into a shoe. That is why Aristotle says that "shoeness" is the formal cause in the production of shoes (ADLER, 1978, p. 42-43).

It could be then said that the regular reconstruction of a Shinto shrine aims to preserve its form, while westerners would probably focus on preserving the shape of each individual shrine. However, in both cases the goal is to preserve the presence of the form—the Japanese prefer to build a new shape following the same formal cause or "shrineness", while westerners are more prone to preserve the existing shape. Anyway, it is the relationship to the form, made possible by the encounter with the shape, that both attitudes aim to preserve. This points toward the possibility of gently pushing the focus on the material authenticity of the shape to the background—the essential element to be sustained is the possibility to encounter the presence of the form.

6.3. Image, presence and alterity

In a recent survey focused on British travellers, the Mona Lisa was elected the most disappointing tourist attraction in the world (YOUNG, 2019). In such an extreme case – indifference or even despise towards a work of art of apparently undeniable value—it is always possible to blame the ignorance of the general public, but this may not be neither an accurate diagnosis nor the most adequate strategy to deal with this problematic phenomenon.

It can be argued that the public has always behaved like this, and that this kind of uninformed opinion has only become more visible through online polls and social media. However, back in the 1950's, E.H. Gombrich already stated, regarding the Mona Lisa, that "We become so used to seeing it on picture postcards, and even advertisements, that we find it difficult to see it with fresh eyes as the painting by a real man portraying a real woman of flesh and blood" (GOMBRICH, 1995, p. 300). Of course, it was already difficult to see the painting as something real amid the numerous concrete reproductions in postcards, posters and advertisements, this difficulty has probably increased dramatically with the avalanche digital reproductions that include collages and manipulations of the original form.

Besides that, the experience of "visiting" the Mona Lisa has also changed drastically in the last few decades, making it increasingly difficult to have the direct, unprejudiced contact proposed by Gombrich—

> Like a living being, she seems to change before our eyes and to look a little different every time we come back to her. Even in photographs of the picture we experience this strange effect, but in front of the original in the Louvre it is almost uncanny (GOMBRICH, 1995, p. 300).

Gombrich seems to suggest that the visitor must try to face the painting as a Thou; however, according to a 2004 article—still in pre-Instagram years—, due to the sheer volume of tourists visiting the Louvre, the average time each visitor spent actually looking at the painting was around fifteen seconds (GENTLEMAN, 2004). Therefore, it would be reasonable to conclude that both the explosion in digital reproductions and the changes in the dynamics of the encounter with the painting may have "worn out" the heritage content/value of the object, turning it into a disappointment for many visitors.

Figure 33 - Leonardo da Vinci, The Mona Lisa, as exhibited in the Louvre Museum, Paris.

Source: https://www.nytimes.com/2019/11/06/arts/design/mona-lisa-louvre-overcrowding.html

This example may seem banal, but it does illustrate some of the deep changes caused by the dissemination of technical images, which, according to Flusser, are at the centre of a new culture. In the universe of technical images, most cultural products are produced by apparatuses, not (directly) by human hands. Our thoughts are transmitted to apparatuses that translate them into technical images—temporary, transmissible visualizations that we can concretely see with our eyes, but that do not permanently occupy a portion of space. These images can actually occupy many spaces at the same time, without really occupying no space at all. Therefore, our culture inhabits a new kind

of space: an invisible space of viewable bits of information that can only be experienced through the concrete support of a screen. It can be argued that our culture was able to free itself from almost all its physical media, finally allowed to realize itself as what it has always essentially been: information[21]. In this context, the original Mona Lisa may seem like a flawed version—too small, too dark, too difficult to see—of a bit of information that can be easily found and manipulated through apparatuses.

This does not mean, necessarily, that concrete objects such as paintings, sculptures or buildings have lost or will eventually lose its value, but it does point to the necessity of developing a new way to understand and discuss these objects. The disappointment caused by the original Mona Lisa reveals once again that the relationship built with an object is more important than the object itself. If it is not possible for current and future generations to develop meaningful relationships with the Mona Lisa—encountering it as a Thou –, the painting may well lose its heritage value, despite all efforts to preserve its materiality.

If the artistic or heritage value of an object does not reside in its materiality, but in the relationship built with it, we can then say that this value cannot be permanent; it is not a presence, mas it can become present. Belting (2006) argues something similar regarding images as a whole: "Images are neither on the wall (or on the screen) nor in the head alone. They do not exist by themselves, but they happen; they take place whether they are moving images (where this is so obvious) or not" (BELTING, 2005, p. 302). Belting differentiates "physical artifacts"—pictures—and "mental images"—images *per se*, which are always created by us and inhabit our minds –, underlining how the German language unites these two aspects through the word *Bild*, which encompasses both notions of picture and image. The relationship with images is built, then, in these two dimensions—picture (perceived, experienced) / image (created) –, and digital images—essentially temporary pictures/visualizations—enhance the tensions between these dimensions, which seemed, until then, to be clearly bounded.

> When we distinguish a canvas from the image it represents, we pay attention to either the one or the other, as if they were distinct, which they are not; they

[21] This distinction between material medium and immaterial content is surely problematic, and it will be more thoroughly discussed ahead. However, we believe that this vision expresses a way of thinking that is clearly anchored in the universe of technical images: to see the whole of culture through an extension—or at least an analogy—of the hardware/software dichotomy.

> separate only when we are willing to separate them in our looking. In this case, we dissolve their factual "symbiosis" by means of our analytical perception. We even remember images from the specific mediality in which we first encountered them, and remembering means first disembodying them from their original media and then reembodying them in our brain. Visual media compete, so it seems, with the images they transmit. They tend either to dissimulate themselves or to claim the first voice (BELTING, 2005, p. 304-305).

In the Universe of Technical Images, the notion of "original medium" has become fluid. The same image can be seen simultaneously in numerous screens—smartphones, tablets, computers, TVs—and also in physical media such as posters, billboards, etc. The intangibility of technical images seems to disassociate it from its mediality, which becomes a "mute" infrastructure—the screen only makes images visible, without affecting them and with no accountability for their content. When turned off, the image-less screen is as good as dead. This phenomenon allows us to draw an analogy—or maybe it is born out of an analogy—with our own "internal" experience of images: "It is our own bodily experience that allows us to identify the dualism inherent in visual media. We know that we all *have* or that we all *own* images, that they live *in* our bodies or in our dreams and wait to be summoned by our bodies to show up (BELTING, 2005, p. 305-306). The images that we store in the (not so) hard disk of our memory emerge and become visible to us in what ancient Greeks called "the eye of the mind"—and once again the German language offers terms that can clarify Belting's concepts: *Gedächtnis*—"memory as an *archive* of images"—and *Erinnerung*—"memory as an activity, that is, as our recollection of images" up (BELTING, 2005, p. 306). These relived images may or may not include the memory of their mediality, but, for Belting, the activity itself occurs through and inescapable medium—the body. We "have and own images", and our bodies (or more specifically our brains) "serve as a living medium that makes us *perceive*, *project*, *or remember* images and that also enables our imagination to censor or to transform them (BELTING, 2005, p. 306).

It is surely possible to question the notion that the body is the medium/support for the activity—*Erinnerung*—through which images emerge from memory—*Gedächtnis*—, arguing in favor of an immaterial consciousness instead of the brain. We will not engage here into the discussion regarding the materiality of consciousness, since Belting's proposal does not seem to rely on the identification of the brain as the source or *locus* of consciousness, but from an analogy drawn from his analysis of the origin of physical images:

> Images, preferably three-dimensional ones, replaced the bodies of the dead, who had lost their visible presence along with their bodies. Images, on behalf of the missing body, occupied the place deserted by the person who had died. A given community felt threatened by the gap caused by the death of one of its members. The dead, as a result, were kept as present and visible in the ranks of the living via their images. But images did not exist by themselves. They, in turn, were in need of an embodiment, which means in need of an agent or a medium resembling a body. This need was met by the invention of visual media, which not only embodied images but resembled living bodies in their own ways (BELTING, 2005, p. 307).

Belting sees media as "technical or artificial bodies designed for substituting bodies via a symbolical procedure" (BELTING, 2005, p. 306), a definition that encompasses both the most traditional analogic supports and contemporary digital media—and even those who will emerge in the future. Understanding that "Images live, as we are led to believe, in their media much as we live in our bodies" (BELTING, 2005, p. 306), we may infer that the Mona Lisa lives in the canvas painted by Leonardo da Vinci—but that is nothing that can hinder it from also living in the screen of a smartphone. The first medium can only act as the body of one single image, while the second can act as the (temporary) body for numerous images. The portrait painted by Da Vinci represents Lisa Gherardini, extending her presence—by transforming it into an image—far beyond—in both space and time—the presence of her body. The image on the smartphone represents the portrait, also extending its presence in space and time. To remember the Mona Lisa is to remember the image that lives in these different bodies; to relive the specific memory of the portrait or of one of its many physical and digital reproductions is, according to Belting, already a second step into the process of *Erinnerung*.

The interaction with images occurs, then, through a "triadic constellation" composed by body, medium and image (BELTING, 2005, p. 307). This constellation is clear in the origin of images— "The image of the dead, in the place of the missing body, the artificial body of the image (the medium), and the looking body of the living interacted in creating iconic presence as against bodily presence" (BELTING, 2005, p. 308)—but it may be more difficult to identify it in the experience of technical images. Anyway, if we understand images as individual constructs that "live" inside us, then the materiality or immateriality of a medium becomes an irrelevant principle.

> Digital images usually address our bodies' imagination and cross the borderline between visual images and virtual images, images seen and images projected. In this sense, digital technology pursues the mimesis of our own imagination. Digital images inspire mental images, much as they are inspired

> by mental images and their free flux. External and internal representations are encouraged to merge (BELTING, 2006, p. 309).

The universe of technical images may seem to be drastically different from the universe in which traditional images—to use Flusser's terms—emerged. However, Belting warns about a possible confusion between the history of media and the history of images, which would be a "sequence of collective imagination" (BELTING, 2005, p. 310). This confusion is born out of the notion that images are external to us—independent objects harnessed to specific media. In this view, an image would be the sum of the elements that compose Belting's triad—an object such as the Mona Lisa would be the combination of the body (the presence of the work of art), medium (canvas, paints and pigments) and image (the portrait of Lisa Gherardini). The proliferation of technical images highlights the autonomy of each of these dimensions, revealing how the image replaces a presence not with another presence, but through a "visible absence":

> Images live from the paradox that they perform *the presence of an absence* or vice versa (which also applies to the telepresence of people in today's media). This paradox in turn is rooted in our experience to relate presence to visibility. Bodies are *present* because they are *visible* (even on the telephone the other body is absent). When absent bodies become visible in images, they use a vicarious visibility (BELTING, 2005, p.312).

This vicarious visibility—which is evident in the videoconferences that gained an unpredictable centrality amid the COVID-19 pandemic—is unavoidable in the case of technical images. Apparatuses such as telescopes and space probes expand our perception of the world far beyond the limits of our senses, to the point that we believe to be seeing Mars, while in fact it is the telescope who is seeing it—apparatuses "simulate the immediacy of a perception, one that seems to be our own but, in fact, is theirs" (BELTING, 2005, p. 313). The focus on the (technical) images makes us forget the apparatuses that replace and extend our eyes. However, apparatuses may eventually become visible themselves, and their biases may be finally revealed.

> Painting lived on in photography, movies did in TV, and TV does in what we call new media in visual art. This means not only that we perceive images in media but also that we experience images of media whenever old media have ceased to serve their primary function and become visible, on second look, in a way they never had been (BELTING, 2005, p. 314).

This would not necessarily mean that apparatuses have been surmounted. When media that seemed to be precise and impartial become visible, the analysis of the images that live in these media can focus on its "mental content"—something that paradoxically does not occur when the medium is ignored. Belting illustrates the distinction between the physical (medium) and mental (image) dimensions with a brief account of the attitude of Spanish colonizers towards Aztec culture. "The Spaniards denounced Aztec images as merely strange objects, which they defined as *cerniés* and thus excluded from any comparison with their own images" (BELTING, 2005, p. 318). Uncapable of accessing the mental content of these images—the images themselves, which lived in the minds of Aztecs—, the focus of the colonizers had to be directed to their media, and specially to the replacement of these "strange objects" with the media in which the images of Spanish culture live, such as canvases and sculptures. "The project of the Spaniards, which was carried out with relentless zeal, provides an easy insight into the mechanics of image transmission, which never spares the mental part but considers it the true target also in the public space" (BELTING, 2005, p. 319).

Curiously, some Aztec objects were taken to Spain, where, stripped from their original mental content, they gained a new live: those strange objects were labelled as "art", gathering the interest of collectors throughout Europe. Belting suggests that this new mental content was imposed deliberately, in order to drain out any other content from those objects and assure that they would be "deprived of any political or religious significance" (BELTING, 2005, p. 319). Identified as "works of art", these objects would apparently become harmless. Surely, different relational dynamics create different mental contents: for an Aztec, a *cuauhxicalli*—a stone sculpture in which offerings were placed for the gods, including human hearts and blood—was a medium inhabited by an image that was not only familiar to him, but which had a structural role in his worldview. Transported to Europe and transformed into a work of art, the same sculpture becomes an exotic, curious object, a decorative collectible. The medium is the same, but the images are completely different—and even though it is surely possible to educate the "new" bodies that step into relation with the object about its original mental content, it would be impossible to transport the image together with its medium.

6.4. Conclusions

In the introduction of "*O Patrimônio em Questão: Antologia para um Combate*"—a text written for a non-specialized public as an introduction to the concept of heritage—Françoise Choay remembers the original meaning of the term *patrimoine*, according to Émile Littré's dictionary, published between 1863 and 1872: "property of inheritance which, according to the law, descends from parents and mothers to their children" (Émile Littré, *Dictionnaire de la langue française* apud CHOAY, 2011, p. 11—translation by the authors[22]). Following this description, with would surely be easier and more logical to guarantee the transmission and/or preservation of media, and not of images—since it would be very difficult to identify, at least legally, an image as "property". However, the concept of heritage has obviously not been restricted to this definition, eventually encompassing a series of diverse cultural manifestations, both tangible and intangible, which seem to come closer to the concept of image as understood by Belting. Choay underlines the distinction between monuments—artifacts created with the intention of addressing collective memory—and historical monuments—artifacts in which the appeal to memory was not intended by its creators, but acknowledged *a posteriori*. A monument would therefore be an "intentional memorial device" (CHOAY, 2011, p. 12)—like the Great Pyramid of Giza or Lutyens' Cenotaph in London—, while an object such as our hypothetical *cuauhxicalli* would be a historical monument, an object in which we can see—or at least convince ourselves to be seeing—the/a memory of the Aztec people[23].

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[22] Original quote: "bem de herança que, seguindo as leis, descende dos pais e mães para seus filhos".

[23] Alois Riegl makes the same distinction, but argues that "the modern cult of monuments is not restricted to caring for historical monuments; it also requires consideration for monuments of mere age-value. Just as intentional monuments are part and parcel of historical monuments, so all historical ones can be categorized as monuments having an age-value. Outwardly these three classes of monuments can be thought of as contained within one another, while the scope of their memory-value widens. To the class of intentional monuments belong only those works which recall a specific moment or complex of moments from the past. The class of historical monuments is enlarged to include those which still refer to a particular moment, but the choice of that moment is left to our subjective preference. Finally, the category of monuments of age-value embraces every artifact without regard to its original significance and purpose, as long as it reveals the passage of a considerable period of time. These classes form three consecutive phases of the generalization of what a monument means." (RIEGL, 1982) In the case of the Mona Lisa, it could be understood as an intentional monument made to "commemorate" the presence of Lisa Gherardini; as a

According to Choay, the notion of historical monument begins to take shape in the Italian *quattrocento*, spreading throughout Europe and stimulating the study of what was then called "antiquities". In the following centuries, the study of ancient buildings keeps more focused on the accumulation and development of theoretical knowledge than on physical preservation; and, in parallel, objects identified as "historical" were gathered, preserved and transmitted through private collections that would provide the foundations for the creation, already in the eighteenth century, of the first public museums—such as the Louvre, in which millions of visitors gather every year to be disappointed by the fact that Da Vinci's painting is apparently much less interesting than the historical monument that is the Mona Lisa.

In the nineteenth century—the "century of History"—European nationalisms stimulate the identification—or creation—of numerous historical monuments, assigning a memorial content to many objects and buildings that were not deliberately or explicitly built with this purpose (CHOAY, 2011, p. 21). In the same period, the proliferation of museums offers to the general public the possibility of encountering objects that were, until then, secured in private collections—and scrutinized, almost exclusively, by scholars focused on their meaning effects. At the turn of the twentieth century, the popularization of photography begins to delineate the emerging universe of technical images, in which new relational dynamics will cause deep transformations in the body-medium-image triad proposed by Belting.

In the twentieth century, the term heritage (*patrimoine*) will evolve to include both monuments and historical monuments, and this undifferentiation seems to be supported by what Gumbrecht identifies as "a broadly institutionalized tradition according to which interpretation, that is, the identification and/or attribution of meaning, is the core practice, the exclusive core practice indeed, of the humanities" (GUMBRECHT, 2004, p.1-2). If the discussion on cultural artifacts and phenomena is focused on their meaning effects, and if it is accepted that all meaning is a construct, to a great extent independent from the object—to the point that there is no distinction between identification and attribution of meaning—, then there is no reason to differentiate intentional and nonintentional

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historical monument that expresses the art and ideals of Italian Renaissance; and also, of course, as a monument of age-value.

monuments. All human creation can be considered a part of culture, and its meaning can be as diverse as the diversity of the subjects that may be willing to interpret it.

This notion seems to resonate the arguments proposed by Belting. Meaning would be analogous to the image—a production of the subject, based on the contact with the presence of a medium. The media on which "original" images—those that sought to replace the presence of the dead (Belting)—would be intentional monuments, since they were created with the intention to appeal to memory. However, when these images are transported to another cultural context in which the subjects are not capable of grasping their original meaning—in consonance to the intentions of their creators—the invisibility of this intention of monumentality leads to the attribution of new meanings, born out of the new context. In a cultural context dominated by a sense of History—built, according to Flusser, on the linearity of texts—it would make sense to "infuse" historicity into these mysterious objects, turning them into historical monuments. This would explain the attitude of Spanish colonizers, as mentioned by Belting: by resignifying Aztec objects as works of art, European culture was able to create its own images from the encounter with these media, which were then inserted into the long timeline known as The History of Art.

Going back to Flusser, we can say that the sense of History is not an aspect of reality and not even a universal cultural construct, but a specific worldview built on the prevalence of a specific medium in a specific culture. This explains the creation, in Western Europe, of the concept of historical monument; and the deterioration of this worldview, caused by the gradual emergence of technical images as the new prevailing medium and identified by Flusser as a transition towards a post-historical era, may explain the dissolution of this concept. Thus, the notion of heritage presented by Choay seems to already express the looming obsolescence of the sense of History, pointing towards a post-historical conception of the objects, buildings and sites that were, until recently, understood as historical monuments.

In the context of hyper-modern cultural tourism, there is room for each and every kind of heritage—built, immaterial, cultural, gastronomic, natural, etc.—, and the distinction between monuments and historical monuments was replaced by the possibility of attributing different meanings to the same object. The narratives created by European nationalisms—largely responsible for the proliferation and popularization of museums and for the celebration of works understood as expressions of national identity—may

have been supplanted, but not by a vision that seeks to deconstruct "artificial" heritage contents; the monuments of the Age of History—intentional or not—are now seen as resources that can be exploited and products that must be commercialized.

Choay identifies this phenomenon as a "commercialization of heritage" that culminated in a "universal commodification of heritage"[24] (CHOAY, 2011). The physical preservation and maintenance of buildings, artifacts and sites creates a constant demand for resources, what usually seems to justify their commercial exploitation. However, as we can see in the apparent "disenchantment" of the Mona Lisa, this cycle can wear out the images that led us to consider these objects as valuable in the first place. The dynamics of the encounter with works of art have been the subject of many recent studies—Foreman-Wernet e Dervin (2016) provide a comprehensive summary of studies on the difference between the perception of specialists and the general public—, but the transformative potential of this kind of experience seems to push us towards a more poetic—and less analytical—approach. In an unfinished novel, published posthumously in 1982, Stefan Zweig describes the encounter of a poor post-office worker from a small Austrian village with the Swiss alps, which she sees for the first time while travelling by train:

> (...) her eyes (thawed out now) follow each of the granite slopes up to the icy epaulet at the top, discovering, with growing excitement, new magnificence everywhere. (…) Again and again she returns to these Alps sprung overnight from her sleep, an incredible sight to someone leaving her narrow world for the first time. These immense granite mountains must have been here for thousands of years; they'll probably still be here millions and millions of years from now, every one of them immovably where it's always been, and if not for the accident of this journey, she herself would have died, rotted away, and turned to dust with no inkling of their glory. She's been living as though all this didn't exist, never saw it, hardly cared to; like a fool she dozed off in this tiny little room, hardly longer than her arm, hardly wide enough for her feet, just a night away, a day away from this infinitude, these manifold immensities! Indifferent and without desires before, now she's beginning to realize what she's been missing. This contact with the overpowering is her first encounter with travel's disconcerting ability to strip the hard shell of habit from the heart, leaving only the bare, fertile kernel (ZWEIG, 2008, p. 33-34).

When an encounter touches us deeply, an image emerges and begins to inhabit inside us. Our Self is transformed and enriched, and these images may well survive the destruction of the bodies from which they have emerged. However, if these images die

[24] Original quote: "mercantilização universal do patrimônio".

inside of us, no government policy or private sponsor will be able to revive them. When we consider the conservation of an object, building or site that we identify as valuable, the main goal may just be to preserve the conditions that have seemed to allow many people to have significant encounters with these objects. These conditions include a necessary "openness", without which it is impossible to address the object as a Thou. If this potential Other is addressed as a commodity, it will never be the focus of a transformative experience. Instead of enriching our lives with an image that may accompany us for years and even change our Selves in deep, unpredictable ways, we will be just pinning a new accessory in the hard shell of habit.

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7. Sailing to Byzantium - Icons, Apparatuses and The Mind-Body Problem

7.1. Abstract

Although our culture has apparently become increasingly immaterial in the last few decades, Victor Buchli argues that "the immaterial is always produced materially", and that "This apparent paradox, (…) is its generative power and what girds the productive dualisms of social life and sustains the metaphysics that secure our given ontologies" (BUCHLI, 2016, p. vii-viii).

Likewise, Vilém Flusser argues that societies are shaped by the medium that dominates the organization of their cultures—the idea of History, for instance, would be derived from the linear structure of texts. Thus, a culture organized with and through electronic apparatuses—and the apparently immaterial images they produce—would then replicate their inner structure. However, since most of us do not understand how these apparatuses work, we usually settle with a simplified description: apparatuses are a combination of software and hardware, a new dualism that actualizes the ages-old mind/body dichotomy and plays an essential role in contemporary ontologies.

Drawing from Buchli and Flusser, the paper argues that it is possible to trace enlightening parallels between the digital apparatuses that shape contemporary culture and the role of religious icons in late Antiquity, focusing on the ontological structures anchored in these apparently widely different media.

Keywords: apparatuses; technical images; icons; immateriality.

7.2. Introduction

Fifty years ago, Norman Mailer covered the Apollo 11 mission for Life Magazine. For him, the sheer magnitude of the numerous technical challenges behind the moon landing "set electronic engineers and computer programs to dreaming of ways to attack the problems of society as well as they had attacked the problems of putting men on the moon" (MAILER, 1970). Back in 1969, this statement could be regarded as futuristic or even sensationalist, but the current debate regarding "smart cities" shows us that Mailer could be right: "many have become enamored with the same idea: What if the people who build circuits and social networks could build cities, too?" (BADGER, 2018). The efficiency of the interconnected electronic apparatuses we use every day makes us dream

about a time when our cities—or even our environment as a whole—will function with the same speed and reliability we find in our smartphones, tablets, and notebooks.

According to Vilém Flusser, societies are shaped by the medium that dominates the organization of their cultures. The emergence of historical consciousness in the Western world, for instance, was a product of a culture based on linear writing. Thus, the culture shaped by linear writing is the only one that can really be called "historical"—the cultures that preceded it were prehistorical, and our current culture, shaped by the technical images produced by apparatuses like smartphones, computers, and tablets, is posthistorical. This increasingly abstract culture seems to have engulfed almost all the media that made up the "body" of previous cultures, creating an apparently unprecedented way of being-in-the-world that combines different modes of presence.

However, as Rushkoff (2010) points out, our relationship with the apparatuses in which we rely on to perform many of our daily activities has a peculiarity: most of us have no idea of how these apparatuses work.

> When human beings acquired language, we learned not just how to listen but how to speak. When we gained literacy, we learned not just how to read but how to write. And as we move into an increasingly digital reality, we must learn not just how to use programs but how to make them. (…) Program, or be programmed. Choose the former, and you gain access to the control panel of civilization. Choose the latter, and it could be the last real choice you get to make (RUSHKOFF, 2010, p. 7).

The linear structure of texts is evident for every literate person in the world, and even the illiterate can still capture it in speech. Electronic apparatuses, however, are what Flusser calls "black boxes"—we know how to work with them, but their inner workings are completely opaque to most of us. Unable to understand the structure of these mysterious devices, we usually settle with a simplified, palatable description: apparatuses are a combination of software and hardware. This simplistic description may then be replicated in our attempt to understand other complex and opaque things such as cities, organizations, people and—why not? —ourselves. Stretching the software/hardware duality towards a new understanding of the mind/body problem, and acknowledging the speed in which hardware becomes obsolete, we tend to identify our Self—or our conscience—with a software whose hardware seems to be as "upgradeable" or replaceable as an old mobile phone. This notion is evident in recent works of fiction—like the fifth season of the Black Mirror series—and in public debates regarding gender identity and transhumanism.

The opaqueness of the medium that sustains our culture may well be unprecedented, but the tension between the material and immaterial dimensions of culture is by no means a new issue. Victor Buchli argues that "the immaterial is always produced materially", and that "This apparent paradox, (…) is its generative power and what girds the productive dualisms of social life and sustains the metaphysics that secure our given ontologies" (BUCHLI, 2016, p. vii-viii). This notion drives Buchli's analysis of the history of the relationship between the material and immaterial aspects of culture and its impact on the ontological structures of past and present societies. This analysis begins in Byzantium, a culture dominated by the debates between iconoclasts and iconophiles over the complexities of a new form of image-making that would play a fundamental role in the shaping of Western culture from Late Antiquity to the Early Renaissance. The paper proposes that this apparently distant debate may illuminate our current discussions regarding the increasing immateriality of contemporary culture. Drawing from Buchli and Flusser, the paper argues that this apparent immateriality of contemporary culture is not exactly an unprecedented phenomenon, and that the religious icons produced in Late Antiquity had a role that can be related to the apparatuses that shape contemporary culture. Thus, it is argued that a philosophical approach to the study of heritage may point toward new ways of interpreting the current cultural environment.

7.3. Apparatuses and Technical Images

That is no country for old men. The young
In one another's arms, birds in the trees,
- Those dying generations—at their song,
The salmon-falls, the mackerel-crowded seas,
Fish, flesh, or fowl, commend all summer long
Whatever is begotten, born, and dies.
Caught in that sensual music all neglect
Monuments of unageing intellect.
(YEATS, 1996, p. 193-194)

7.3.1. The flusserian Model of Cultural History

In *Ins Universum der technischen Bilder*, Vilém Flusser proposes a model of cultural history consisting of five rungs, each one symbolizing an era in which a specific medium prevailed in "the task of transmitting information crucial to society and to individuals" (FLUSSER, 2011). At the first rung, human beings were immersed in the

Lebenswelt and could only express themselves through actions. Later, the creation of objects allowed them to extend and perpetuate these actions, leaving imprints and registers that could outlive them. This, according to Flusser, corresponds to the creation of culture. The third rung represents the world shaped by images that depicted and/or symbolized both actions and objects—Flusser calls these images "traditional images". Traditional images were overthrown around four thousand years ago, when linear texts began to explain images and gave rise to the historical consciousness. More recently, texts have been disassembled "into particles that must be gathered up", creating another level— "the level of calculation and computation, the level of technical images".

Flusser's model suggests a linear process of self-distancing—we are constantly stepping back from the direct experience of the world, going deeper into abstraction. However, when a new rung emerges, the previous ones are not forgotten. The movement from one rung to the next is a movement between different worlds shaped by different media. Flusser calls the fifth rung, shaped by the prevailing of technical images—images created by apparatuses such as cameras, television sets and computers, "a new, dimensionless level, one to be called, for lack of a more positive designation, 'posthistory". The term posthistory comes from the notion that History was created by the linear logic of writing, and that the prevalence of technical images—which are non-linear, but rather two-dimensional—marks the end of History.

> Linear codes demand a synchronization of their diachronicity. They demand progressive reception. And the result is a new experience of time, that is, linear time, a stream of unstoppable progress, of dramatic unrepeatability, of framing: in short, history. With the invention of writing, history begins, not because writing keeps a firm hold on processes, but because it transforms scenes into processes: it generates historical consciousness (FLUSSER, 2002, p. 39).

It may be difficult to know whether we are already in the fifth rung or climbing up towards it with a foot still strongly fixed on History. Northrop Frye's explanation for the shift from mythological to scientific discourse may clarify this situation:

> The cultural aura, or whatever it is, that insulates us from nature consists among other things of words, and the verbal part of it is what I call a mythology, or the total structure of human creation conveyed by words, with literature at its centre. (...) It is designed to draw a circumference around human society and reflect its concerns, not to look directly at the nature outside. When man finally gets around to doing that, he has to develop the special language of science, a language which becomes increasingly mathematical in idiom. Many things have to come together in a culture before science can begin, and when it does begin it does not descend from or grow out of mythology directly.

> Mythological statements about nature are merely grotesque or silly if they are thought of as pre-scientific explanations of it (FRYE, 1980, p. 6-7).

Frye mentions the "verbal" part of culture, inside which the "textual" part—literature—is central. Therefore, mythological cultures were based on stories—and we could even say that these were very "imagetical" stories –, not exactly on texts, and much less on linear writing. When Frye mentions the scientific language, he does not seem to be talking about the language of modern science, but probably the language of Pythagoras, Archimedes and Euclid—who lived in societies built on myths, but on which the verbal part of culture was preponderant. This reminds us that the model proposed by Flusser is just a model, and that each rung does not represent the invention of a new medium, but the emergence of a new consciousness shaped by a new centrality.

7.3.2. Into the Universe of Technical Images

The Hyper Suprime Cam installed on the Subaru Telescope has recently allowed astronomers to discover Virgo I, a new ultra-faint galaxy that could not be seen through previous telescopes. An ultra-faint galaxy is obviously something that we understand as foreign, distant to the point of becoming abstract—and we are thus not estranged by the fact that we can only experience it through a sophisticated technical apparatus such as the Subaru Telescope. To say that we can only see something through an apparatus is the same as saying that we can only perceive and experience it as an image—which seems perfectly fine in the case of an ultra-faint galaxy. However, in our increasingly immaterial / digital culture, it is common to treat things that are very close to us as ultra-faint galaxies, only experiencing them as images.

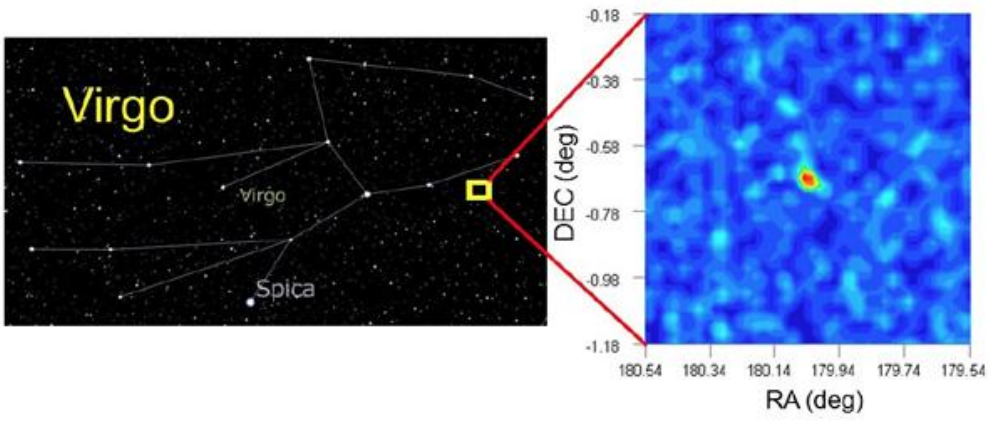

Figure 34 - The position of Virgo I in the constellation of Virgo (left).

“The right panel shows a density map of Virgo I's member stars in a 0.1 deg x 0.1 deg area, based on the stars located inside the green zone in the color-magnitude diagram of Virgo I shown in Figure 4. The color range from blue -> white -> yellow -> red indicates increasing density.”

Source: https://www.sci.tohoku.ac.jp/english/news/20161122-8790.html

In 2013, a composite image became popular throughout the Internet. It was a juxtaposition of two pictures taken at the same place, in similar events: the picture at the top showed Vatican square during the announcement of Pope Benedict XVI, in 2005; the picture at the bottom showed the same place during the announcement of Pope Francis, in 2013. In the first image, we can only see the back of dozens of heads as people are all turned to the same point, focusing on the historical event that is unfolding in front of them; in the second image, there is a sea of screens—smart phones, digital cameras, tablets—being held up in the air, trying to capture the event. Of course, many discussions unfolded on-line and offline, since the composition illustrated how so much had change in such a brief period of time, and especially how people now seemed to feel the need to create personal records of events—or just to insert a technical medium between themselves and the world.

Figure 35 - The collage that became viral—St. Peter’s square in 2005 and 2013 (TAYLOR, 2013).

Source: https://www.businessinsider.com/vatican-square-2005-and-2013-2013-3.

These examples have a twofold meaning: first, they exemplify our faith in digital apparatuses. We cannot see the ultra-faint galaxy with our eyes, but we believe that it does exist because the apparatus "tells us" that it does. Likewise, we believe the "story" told by the composition which illustrates, synthesises and confirms our feeling that the world is changing drastically at an increasingly disorienting pace. The fact that the picture at the top was actually taken during the funeral procession of Pope John Paul II has not gone viral, so the story lives on—both on-line and offline (KOLAWOLE, 2013). Second, in the case of Virgo I, the apparatus is a necessity; in the announcement of Pope Francis, it is a choice. The ultra-faint galaxy demands the mediation of an apparatus, so our experience of it does not really occur in space. Only the encounter with the apparatus—through which we see its image—happens in space. Thus, when people that are actually standing in Vatican square as Pope Francis is announced a few meters away feel the "need" to insert an apparatus between them and the event, they seem to be creating a different space inside the space of the square. This is a special kind of space, a relational space that the square, the historical stereotype of the urban public space, now seems to lack.

Heidegger used the term *Ereignis*—translated into English as appropriation or enowning—to describe the event of catching sight of something— "to see with the mind's eye, to see face-to-face" (Stambaug, in Heidegger, 1969, p. 14)—, and argues that enowning has a "technological 'veiling'". In the case of Virgo I, the technological veiling is a precondition for enowning, and since "positionality is the 'photographic negative' of enowning" (MITCHELL, RAFFOUL in HEIDEGGER, 2012, p. xii), it becomes clear that we are dealing with two positionalities that do not meet: the apparatus is positioned in order to catch a sight of the object, to appropriate—or apprehend—it; and we position ourselves not in relation to the apparatus, but to the images produced by the apparatus. Flusser uses the term "apparatus" to refer specifically to this kind of device that does not intend to transform the world, but to reveal it.

> From one side there is the emergence of machines that aim to discover, and not to change the world, the so-called 'apparatuses'. It can be said that the telescope is good for seeing the mountains of the moon, as much as the mill is good for making flour, but it cannot be said that the mountains of the moon

> must be something else, as wheat must become flour. Apparatuses are good, but not good for something (FLUSSER, 2012)[25].

Apparatuses are objects that allow us to discover and experience other objects. In the case of an ultra-faint galaxy, they are the only way through which we can experience the object, but the constant use of apparatuses may well lead us to treat every object and every event as an ultra-faint galaxy. People holding up apparatuses high above their heads, trying to see Pope Francis through them instead of through their own eyes, seem to be trying to move back from the event, turning both the Pope and his announcement into an ultra-faint event. However, these examples also illustrate two different approaches to the creation of technical images.

Referring to categories of photographers defined by Andreas Müller-Pohle, Flusser argues that a documentarist "sits behind a wall with a hole in it and tries to record the world as much and as painstakingly as possible through that one hole", while a visualist "also sits behind that wall but tries to create a new hole to gain a new perspective on the world" (FLUSSER, 1982 apud VAN GELDER AND WESTGEEST, 2011, p. 200). We are naturally prone to think of the scientists operating the Subaru telescope as documentarists, and the people recording Pope Francis as visualists—but it is hard not to see the revelation of never-before-seen confines of the universe as an attempt to "gain a new perspective on the world", and the recording of a historical event of worldwide appeal as an urge to capture the event as much as possible from one specific "hole". This shows us how it is difficult to pin out the difference between objectivity and subjectivity in what Flusser calls "the universe of technical images", especially because the spread of technical images and the centrality that they have gained in our culture has shaken the epistemological foundations that led us to conceive concepts such as object and subject.

7.4. An Archaeology of the Immaterial

> An aged man is but a paltry thing,
> A tattered coat upon a stick, unless

[25] Translation by the author. Original quote: "De um lado surgem máquinas que servem à descoberta, e não à modificação, do mundo, os ditos "aparelhos". Pode-se dizer que o telescópio é bom para ver as montanhas da Lua, tanto quanto o moinho é bom para fazer farinha, mas não se pode dizer que as montanhas da Lua devem ser outra coisa como o trigo deve ser farinha. Os aparelhos são bons, mas não são bons para algo" (Flusser, 2012).

Soul clap its hands and sing, and louder sing
For every tatter in its mortal dress,
Nor is there singing school but studying
Monuments of its own magnificence;
And therefore I have sailed the seas and come
To the holy city of Byzantium.
(YEATS, 1996, p. 193-194)

7.4.1. The icon as "window"

The immateriality of contemporary culture may seem unprecedented, but it is not as encompassing as common sense suggests. Victor Buchli argues that "the immaterial is by no means a unique quality of late capitalism or modernity but a thoroughly 'un-modern' aspect of human activity that has a long, if poorly understood, history" (BUCHLI, 2016, p. 1), and reminds us that "the immaterial is always produced materially" (BUCHLI, 2016, p. vii-viii). Of course, all the pictures, videos and words that pass by our screens are concretely stored in some distant mainframe, and are constantly bouncing between even more distant satellites, but this materiality does not seem to affect the way we experience these technical images. According to Buchli, the apparent paradox of the necessary materiality of the immaterial "is its generative power and what girds the productive dualisms of social life and sustains the metaphysics that secure our given ontologies" (BUCHLI, 2016, p. vii-viii).

In order to illustrate how the tension between the material and the immaterial is not a contemporary or even modern issue, Buchli discusses the role played by religious icons in Byzantine culture, focusing on the debates between iconoclasts—those who condemned the production of religious images, frequently identifying it with idolatry - and iconophiles—those who argued that these images were capable of communicating some transcendental meaning—that marked the eighth and ninth centuries. These controversies were "concerned with the question of how to presence the divine"—a fundamental ontological question at the time –, "producing the immaterial and the material means to do so" (BUCHLI, 2016, p. 52).

First of all, it is important to underline that, in Late Antiquity, paintings and works of art in general were conceived and perceived in ways that are quite different from modern and contemporary notions. In his 1919 essay "Reverse Perspective", Pavel Florensky confronts the centrality of representation—especially representations based on

linear perspective—in the historical accounts and interpretations of Western art with an analysis of the religious icons of the Russian orthodox tradition, which reverberates the byzantine tradition studied by Buchli. Florensky argues that, until the Renaissance, linear perspective was only used in the "applied arts" that aimed at the creation of "illusions", especially in the theatre. In such cases painting was undermined, since it was subordinated to another art—a painting used as scenery only existed to serve the theatre, having no life of its own. In fact, even a free-standing, "independent" figurative painting that tried to replicate nature as it appears to be would already be a minor work—it would not be "pure" painting. The task of painting, Florensky argues, "is not to duplicate reality, but to give the most profound penetration of its architectonics, of its material, of its meaning", while "theatre decoration wants as much as possible to replace reality with its outward appearance" (FLORENSKY, 2003, p. 209). For him, "pure painting is, or at least wants to be, above all true to life, not a substitute for life but merely the symbolic signifier of its deepest reality" (FLORENSKY, 2003, p. 209-210). Painting has its own ways of communicating through symbols, not by imitating what the eye sees.

Likewise, Buchli relies on Barber (2002) and Frank (2000) to state that the icon was an image made to be looked "through", and not "at":

> the 'icon' was a devotional image that served as an intermediary between the viewer and the person represented… the sacred portrait is best understood as a transparent window that the viewer looks through (to the 'prototype', the actual person represented) rather than at: the gaze does not stop at the surface of the panel, but goes to the prototype (BRUBAKER, in BARBER, 2002, p. 29).

Barber argues that an icon is, therefore, the depiction of a prototype, but that it also functions as a relic, "being both original and a copy—a copy in the sense that it is a copy of the original prototypical image, and a relic in the 'haptic' sense by which it has had 'contact' with the prototype" (BUCHLI, 2016, p. 57). The icon is, therefore, a special kind of painting, and its composition follows a prototype that is not only visual. According to Florensky, when a painting tries to replicate the outward appearance of reality, "The aesthetics of this outward appearance lie in the inner connectedness of its elements", while the icon is "the symbolic signifying of the prototype via the image, realised by means of artistic technique" (FLORENSKY, 2003, p. 209).

Although the icon is material, its surface provides a "site for exchange" in which the image mediates a contact with the divine. These conclusions presented by Brubaker and Barber were drawn from arguments made by iconophiles between the seventh and

eighth centuries, but at the time these arguments found resistance among iconoclasts. Apart from the theological and political issues that divided these groups, one of the key issues in the debates between those who condemned the production of icons and those who argued in their defence was rather practical, or even technical: to which extent could a material medium be capable of making present the divine? Some iconoclasts relied on the gospels to argue that bread and wine were the only material media that could act as both depiction (or sign) and relic. However, iconophiles such as Nikephoros argued that "Making the absent present by manifesting the similarity and memory of the shape [the icon] maintains [with its archetype] an uninterrupted relation throughout its existence' (NIKEPHOROS in BARBER, 2002, p. 119).

The focus on the "shape" of the icon—that, is, on the composition of the image depicted in its surface—reinforces the material dimension of the archetype: if the shape of the icon must follow specific compositional rules in order to make present the prototype, then it would be reasonable to assume that these rules have somehow emanated from the prototype itself, or at least from its "realm". Therefore, the material medium of the icon—wood, paint, etc.—may be, by itself, unable to "touch" the divine, but the act of covering the surface of this medium with an image composed according to divine rules would turn the composite object—medium + media—into a transparent window[26] that offers a view of the prototype. It becomes necessary, then, to assert the divine origin of the "shape", which necessarily means to recognize that the work of the artist is limited by these divine rules—otherwise, the result will be just a depiction, never a relic. A similar argument is made by Floriensky regarding the Russian tradition—the painter of icons does not create the painting, but *reveals* it (USPIENSKI, 1976, p. 16 in FLORIÊNSKI, 2012, p. 25). This revelation is achieved by following compositional rules that emanated from the prototype—the rules for the creation of an icon came from the realm inhabited by the prototype, whose presence in the material realm was made present by the icon. However, the artist must not try to copy the prototype, focusing "in the inner connectedness of its elements"—if he does that, he will be replacing the prototype with its outward appearance. Therefore, each icon is unique, even though its shape has to follow a set of compositional rules.

[26] For a broader discussion on the role of images and (literal) windows in the spatial experience of churches, see Abreu & Costa (2014).

Figure 36 - Icon of Christ *Pantocrator*, sixth century, Saint Catherine's Monastery, Mount Sinai, Egypt / Christ *Pantocrator*, 12th century, Hagia Sophia, Istanbul, Turkey.

Though six centuries apart, both icons depict the same prototype—the same elements are depicted in remarkably similar positions and with the same visual hierarchy—with slight variations, especially in the facial expression of Christ.

Sources : https://commons.wikimedia.org/wiki/File:Spas_vsederzhitel_sinay.jpg https://commons.wikimedia.org/wiki/File:Christ_Pantocrator_Deesis_mosaic_Hagia_Sophia.jpg.

This understanding of the nature and role of icons in byzantine culture leads to two conclusions that will be developed in the next section: first of all, the icon was essentially a "site for exchange", a window through which mortals could have a glimpse of a higher reality[27]; it was, therefore, a relational object that depended on "the phenomenon of the co-presence of viewer, icon and divine prototype" (BUCHLI, 2016, p. 4). Secondly, since the production of icons had to follow specific rules that were believed to have a divine—

[27] Martin Lings interprets Islamic art in a similar way, arguing that Islamic tradition considers that "(…) the universe and its contents were created in order to make known the Creator" and that "(…) the means of making it known is to reflect it or shadow it; and a symbol is the reflection or shadow of a higher reality" (Lings, 2006).

or at least immaterial—origin, and since the artist was seen more as a "developer"[28] than a creator, icons can also be understood as proto technical images—images produced "automatically" by "programmed apparatuses".

7.4.2. The icon as "relational device" and "proto technical image"

According to Flusser's model of cultural history, all images produced by human hands, without the use or mediation of apparatuses—from telescopes to smartphones –, are understood as traditional images[29]. Therefore, there would be no substantial difference between religious icons and the figurative/representational paintings derided by Florensky. However, the relationship between the icon and the prototype suggests that these kinds of images may be too different to share the same category.

At this point, we should remember that one of the main arguments made by iconoclasts was that icons were in fact idols—images that could be worshiped by themselves, replacing the prototypes they were supposed to make present. However, as Buchli argues, "when an idol is destroyed then the divinity that inheres within the idol is destroyed along with it", while "The icon distributes presence rather than being localized; it is distributed because it refers to an immaterial prototype" (BUCHLI, 2016, p. 154). Therefore, the destruction of an icon does not damage the prototype—it is only the destruction of one among many possible paths towards the prototype. Thus, "Within the nexus of propinquity which constitutes the icon, the material artefact as thing is relational—it is a conduit" (BUCHLI, 2016, p. 154). In a way, the production of different

[28] The term "developer" here relates to the process of developing photographic films.

[29] Many scholars criticize the fact that Flusser does not address the concept of traditional images very thoroughly. Hans Belting, for instance, underlines the imprecision with which Flusser uses the term *Begriff* (concept) when discussing images – "Flusser sees photography as 'a picture of concepts' [*Bild von Begriffen*], which can be said of most images, if one agrees on the essence of concepts [*Begriffe*]. In the case of photography, they signify 'concepts within a program' [*Begriffe in einem Programm*]. They are, furthermore, notions about the world [*Begriffe der Welt*] that the photographer 'encodes in images' [*in Bilder verschlüsselt*]'" (Belting, 2006, p. 215 apud Guldin, 2007, p. 9). Anyway, for the discussion proposed in this paper, the notion that traditional images are made by human hands seems to be enough, underlining the fact that "Traditional images have real situations as their source; technical images, on the other hand, start out from texts, which in turn have been written in order to break up images through translation" (Guldin, 2007, p. 8).

icons from the same prototype protects it from destruction—only the prototype is irreplaceable.

According to Buchli, "Our notions of heritage and conservation as concerns museum artefacts is characterized by a similar understanding of visual and physical co-presence that one might attribute to an idol" (BUCHLI, 2016, p. 155). Most of our conservation efforts (still) focus on "unique", "authentic" objects that are deemed irreplaceable. However, the increasing dematerialization of our experience of culture may point towards a shift that would bring us closer to the logics of icons. Conventional works of art "do not work within the material register of the icon, whereas the 3-D printed artefact does, since the immaterial prototype, the .stl file itself, is never harmed when the artefact is destroyed: it can be printed again indefinitely" (BUCHLI, 2016, p. 155-156).

It would be reasonable to argue that this approximation to the relationship between icon and prototype is already present in industrial design, and many mass-produced objects are displayed in museums all over the world. In this case there is no .stl file, but there are blueprints, construction drawings, specifications, etc. The main difference between a conventional industrial object and a 3-D printed artefact is the fact that the processes that produce the first are usually transparent and mechanical, whereas the latter seems to be produced "automatically"—almost magically—by a black box. Of course, the printing process of some 3-D printers may be as transparent as most conventional machines, and we should also consider that many—if not most—machines operating today already have embedded computers of some sort—in a way, they are all apparatuses with varying degrees of opacity. However, the 3-D printer is still understood as a special kind of machine because of its interface—there is a stark difference between managing a production line with a number of specialized apparatuses and just clicking on the "print" or "build" icon. Exactly because it presents a new way to produce materiality, the 3-D printer symbolizes the dematerialization of our culture— "Objects are produced from binary code like current digital music. (…) The object as a stable entity does not really exist; all that is stable is the binary code" (BUCHLI, 2016, p. 36). How is this different from an automated injection moulding machine working non-stop in a factory? The 3-D printer can be yours; you can keep it in your desk and click on the "build" button. The appeal of the 3-D printer is also relational—it relies on the co-presence of user, printer and code.

The experience of the icon presupposed that the viewer would see 'past' the icon to establish a relation with the prototype. Buchli argues that "such a form of seeing is penetrative" (BUCHLI, 2016, p. 156), and should be understood in the context of a "relation of sight to touch that derives from an Aristotelian understanding of haptic visuality" (BUCHLI, 2016, p. 4), something quite different from our current understanding of vision. Byzantine icons were therefore conceived and experienced in a different "sensorium", and aimed at transforming this sensorium, echoing Flusser's notion that a cultural medium may shape a whole new ontology— "The presencing technologies of the icon required a new way of cognizing presence and the theology of the era served to reconstitute this new form of perception and vision" (BUCHLI, 2016, p. 170). Since God made himself present in this world, a reappraisal of presence was not only necessary, but urgent— "The figure of Christ suggested a new understanding of the material in the face of the Old Testament, which permits the use of images as material manifestations of the divine without being idolatrous" (BUCHLI, 2016, p. 6-7).

The sensorium shaped by the new form of presence introduced by religious icons was fundamental for the establishment and dissemination of Christian culture in Late Antiquity. Our current sensorium, however, is much closer to the overall structure established after the Renaissance, a new conception of the senses that "privileged a disembodied form of vision over other senses with the result that other sensually based forms of knowledge derived from touch and hearing are diminished in significance" (BUCHLI, 2016, p. 5). A disembodied vision can no longer (literally) touch the divine, penetrating an image in order to look past it. A picture is seen as a two-dimensional composition that can only be looked at, and artists become increasingly interested in exploring ways in which to break the limits of the picture, trying to represent three-dimensional space. Painting becomes, then, closer to the sort of illusion or deception that Florensky believed to be "impure". It is the same disembodied vision, however, that will allow the emergence of the scientific method—the idea that one can observe a phenomenon "from outside", without interfering in it. The eyes were understood as windows to the natural world, windows that could eventually provide glimpses of the prototypes (laws) that lie behind Nature. The interest in the study of vision—from Berkeley to Goethe—seems like an urge to confirm the unbiased character of vision, a notion that will eventually lead towards materialistic worldviews—only that which can be seen really exists.

While covering the Apollo 11 mission for Time Magazine, Norman Mailer wrote that “if the great brain of NASA were attached to any particular sense, it was the eye. The eye was the collector of incontrovertible facts” (MAILER, 1970). This new sensorium is centred on what Pallasmaa (drawing from Heidegger) calls “the nihilistic eye”, a “hegemonic eye” that “seeks domination over all fields of cultural production” (PALLASMAA, 2005, p. 22). This nihilism emerged because sight is the most far-reaching of our senses—we can see stars many light years away—, and the most likely to become disembodied—“It is clear that only the distancing and detaching sense of vision is capable of a nihilistic attitude; it is impossible to think of a nil1ilistic sense of touch, for instance, because of the unavoidable nearness, intimacy, veracity and identification that the sense of touch carries” (PALLASMAA, 2005, p. 22). This detachment created the illusion of objectivity—or at least the possibility to deny subjectivity—, which was then transferred to apparatuses such as telescopes, microscopes, cameras, etc.—unsurprisingly, apparatuses that extended the already far-reaching sense of sight.

According to Flusser, “From the standpoint of so-called common sense, technical images are objective depictions of things out in the world” (FLUSSER, 2011, p. 49)—we trust photographs, videos and satellite images because these images seem to have been generated automatically though and automated, unbiased process. However, while Pallasmaa criticizes the illusory objectivity of most modern and contemporary theories and ways of producing of architecture—and the detachment from the sensual experience of space that derives from it—, Buchli mentions a “tyranny of the subject” in anthropology, especially in the field of material culture studies. This apparent contradiction is rooted in a more fundamental concept that permeates the social sciences, the idea that “the material was what was inscribed or projected upon by the social and cultural—things were literally mere illustrations of the social” (BUCHLI, 2016, p. 7). This notion is of course diametrically opposed to the main proposition introduced by Flusser—the medium informs (gives shape to) the ontology, and not the other way around—, but it explains both the objectivity of architecture and the subjectivity of anthropology: man-made material artifacts—from knick-knacks to buildings—are understood as formal/concrete expressions of intellectual concepts; thus, those who create artifacts focus on the pursuit of objective concepts to express, and those who study artifacts try to decipher and reveal the concepts behind them.

According to Buchli, a recent "sensual turn" may be adjusting the focus of the field towards "a new awareness of an expanded sensorium implicated in various forms of human knowledge in which the material is intimately and sensuously embedded" (BUCHLI, 2016, p. 9). This would be a major transformation, since this turn "refutes the significance of the more abstract and less dimensioned and less material aspects of materiality such as the visual and textual; representing of course a challenge to the prevailing post-Renaissance sensorium which privileged such visual forms of knowing" (BUCHLI, 2016, p. 9). It may seem strange to minimize the role of visual forms of knowing in the universe of technical images, but the term "image" may be misleading. Even though many technical images can be experienced as visual images—photographs, videos, animations, etc.—, and despite the fact that photography was the model chosen by Flusser to explain the concept of apparatus, the technical image is not an essentially visual medium.

Following Flusser's concepts, a photograph developed from film is as much a technical image as a digital photograph. An analogical 35 mm camera is as much an apparatus as a camera attached to the Deep Space Climate Observatory satellite. If we compare the processes that create analog (or film) photography and digital photography, we may be led to believe that these are completely different—one is chemical and therefore physical, material, whereas the other is digital, immaterial. However, it can be argued that the immateriality of the digital photograph is of course illusory, and that the optical and chemical processes that create the film photograph are as programmed as the software working inside the digital camera. "The technical image is an image produced by apparatuses. As apparatuses themselves are the products of applied scientific texts, in the case of technical images one is dealing with the indirect products of scientific texts" (FLUSSER, 2000, p. 14). There is no fundamental distinction, therefore, between the scientific (textual) knowledge behind film development and software programming. However, the apparent immateriality of software makes the digital process look even more automatic, reinforcing the apparent objectivity of its output. As digital apparatuses overcome and replace analogical apparatuses, this impression of automated objectivity spreads to almost all fields of human activity.

> Recent technological innovations in fact equate such things as houses and designs as text—as digitized code. Steel is cut directly within CAD (computer aided design), sign and signified are inseparable and effectively one, challenging what we understand as text and what we might understand as the materiality of the house—not to mention what the implications are for our

> sensorial terms of reference when it is hard to segregate ‘drawing’ from ‘cutting’” (…) “Or, as the examples from 3-D printing will suggest, word is literally ‘thing’ when it is code that is the only ‘stable’ entity, that is ‘printed’ to make an object in 3-D printing” (…) “The relation between the material and the immaterial and the hierarchies of our post-Renaissance sensoria privileging ‘vision’ (and I include text within the visual) need to be reconsidered, as has been so forcefully and eloquently asserted by figures such as Classen and Howes (2006) (BUCHLI, 2016, p. 9-10).

Coming back to the reflection on byzantine icons, it would be fair to say that the artist worked inside a framework that can be related to a program— “According to this model, the artificer is a tool working in the service of a higher inspiration. The artisan is necessary to the transformation of mere matter into a sacred object, but the validation for this act rests not with the artist but elsewhere” (BARBER, 2002, p. 114). This interpretation of the icon makes it similar to an apparatus—the image on its surface being a sort of proto technical image[30]. The same file—prototype—can be visualized simultaneously in thousands of screens. The file itself is never present, and the screens are conduits that distribute the presence of the prototype, a presence that can be experienced in the form of a picture. The artist acts like the internal process through which the apparatus generates the image—he is the developer, the software.

There is, however, a crucial difference. In the case of the apparatus/technical image composition, the prototype inhabits the same world or dimension as the conduits. The icon, on the other hand, distributes a presence that was understood as being beyond this world—the conduit is a channel to another realm of existence. If we try to dissect both composites and compare their elements, the prototype of an icon would be parallel to the code that makes up a technical image, while the shape of the icon relates to the visualization of the technical image on the screen of the apparatus. However, the prototype that guides the creation of icons is believed to have a divine origin, and its goal is not only to give instructions on how to make visible a specific image, but to create a window through which a divine presence can be experienced. Thus, the technical image is an end in itself, whereas the shape of the icon aims to create a connection with another existential dimension.

[30] In section 2.2., a similar claim was made regarding the emergence of descriptive geometry in the history of architectural drawing. The term “descriptive” emphasizes that these drawings were not “created” – they just described the objects as seen from a specific point of view. Given an object and the position of the observer in relation to the object, any draftsman would produce the same drawing, following the same predetermined procedures.

Another crucial difference between icons and technical images lies on the fact that, while millions of smartphones will necessarily interpret the same code in the same way, making visible the same technical image, the same cannot be said if we consider two artists painting from the same prototype. Even though both artists are bounded by the same compositional rules given by the divine code, they are still human beings creating traditional images, and this process can never be fully programmed. This last claim may sound obvious, but it is surely less obvious to us than it would be to a byzantine artist. In his account of the Apollo 11 mission, Mailer—who had an engineering degree—wrote extensively on what he called "the psychology of machines". Mailer used this term when describing episodes in which machines did not function according to plan, and argued that

> technology is founded on the implicit belief that machines are not possessed of psychology; the rifle jammed because of a speck of dirt in the breech, the car engine was flooded by the nervous foot of the driver, and the record-changer, far from having a mind of its own, rather had its record-changing procedure altered by careless handling. For every malfunction there is a clear cause technology must argue, a nonpsychological cause: psychology assumes free will (MAILER, 1970).

The machines that were going to put three American men on the moon had to be reliable, precise, infallible. Every malfunction needed a rational—and external—explanation. The men themselves had to be as reliable as the machines—which, at the time, was achieved through military training, technical education and physical preparation. Nowadays, however, the apparent immateriality of the software behind our sophisticated electronic apparatuses allows us to believe in the possibility of pursuing this infallibility not only as a metaphor or even a mimetic discipline, but as an actual symbiosis. Contemporary culture is filled with stories and images of uploaded and downloaded minds, reprogrammed memories, etc. Even though we may not yet have the technology required to turn fiction into reality, the intention to do so is already telling—we seem to be attracted to the (non)psychology of apparatuses.

7.5. Mind x Body / Software x Hardware

O sages standing in God's holy fire
As in the gold mosaic of a wall,
Come from the holy fire, perne in a gyre,
And be the singing-masters of my soul.
Consume my heart away; sick with desire

And fastened to a dying animal
It knows not what it is; and gather me
Into the artifice of eternity.
(YEATS, 1996, p. 193-194)

7.5.1. The mind-body problem and popular fiction

The so called "mind-body problem" is the focus of many current discussions on the fields of philosophy, neuroscience, psychology and neurophilosophy. Philosopher Tim Crane provides an overview of these discussions in his book "The Mechanical Mind", organizing the most influential theories in three groups: materialists or physicalists argue that "the mind is just the matter of the brain organised in a certain complex way"; dualists propose that "there are two main kinds of thing—the material and the mental"; and a considerably smaller group of idealists suggests that "everything is ultimately mental" (CRANE, 2016). Crane himself argues for a mechanical view of the mind— "the mind is a part of nature, something which has a regular, law-governed causal structure" (CRANE, 2016, p. 91)—which derives, of course, "from thinking of nature itself as a kind of mechanism" (CRANE, 2016, p. 2).

To say that nature is (like) a mechanism does not necessarily imply a materialistic / physicalist view. Anthony Dardis argues that "The world does proceed according to the laws of physical nature. But parts of it also proceed according to the laws of mental nature", clarifying that "The laws of physical nature don't rule out laws of mental nature, so long as the two are coordinated in a certain way" (DARDIS, 2008, p. x). It is possible to acknowledge that the physical and the mental are two distinct "dimensions", each one working in accordance with specific laws, while understanding that these two dimensions are inside the realm of the "mechanism of nature". While there are many competing currents in the academic debate regarding the mind-body problem, most of the proposed models seem to rely on this notion of an overarching "natural mechanism" that works through and with universal laws.

It would be fair to say, however, that this apparent consensus may not extend to the general public. Barbara Hannan opens her introduction to the subject of the mind-body problem with a critique of "a certain widespread and almost certainly mistaken view of the nature of the mind: substance dualism" (HANNAN, 2019, p. 2). Substance dualism is the idea that each human being is composed of two substances, a physical body and a mind or soul. According to Hannan, "We live in a time when two views of the nature of

persons, fundamentally incompatible with each other, are both widely accepted (often by the same individuals, who somehow remain blissfully unaware of the inconsistencies within their own thoughts). I mean the view of the nature of persons taken by physical science and a more ancient view of the nature of persons associated with many traditional religions" (HANNAN, 2019, p. 2).

Contemporary popular culture provides many examples that seem to indicate that we may be engaged in a new kind of substance dualism—the mind-body problem may be understood as akin to the software-hardware dichotomy. Fictional works such as many episodes in the *Black Mirror* series suggest that the mind is like a software that can be transferred between different hardware— "individuals' minds are extracted into vessels and settings constructed outside of the bodies in which they organically developed" (MULLER, 2019, p. 96). In the last few decades, dystopian narratives that built on the nearly-apocalyptical consequences of an apparently inevitable clash between human beings and machines—such as *The Terminator* film franchise—seem to have given way to stories in which the former belligerents become allies, or even indistinguishable entities. According to Muller, in the *Black Mirror* series "AI appears not in the guise of impersonal, Skynet-like circuitry with interests of its own and in opposition to those of humanity, but instead in the form of consciousness exported from an extant human being" (MULLER, 2019, p. 96). Human x machine is replaced by human + machine, and the focus is adjusted toward a reflection on the nature of human beings, the identity between mind and body and the possibility of denying death not through the enduring of an immortal soul, but by transferring the mind/consciousness to another piece of hardware.

These discussions were of course not absent in earlier works. In films such as *Blade Runner* and *A.I. Artificial Intelligence*, these questions were already central—what is the difference between a human being and a machine to which we can relate as if it was a human being? Muller underlies that "There are high stakes in answering the question of exactly what distinguishes person from thing, since we traditionally view interactions between person and person or person and thing as warranting different kinds of ethical postures", and that "the treatment in Black Mirror of the 'cookie', the reproduction of a particular person's consciousness, affords insight into just how precisely the ways we treat AI could mirror the ways we have already treated real human beings." (MULLER, 2019, p. 96).

The ethical dimensions of such discussions are of course highly relevant and were discussed in further detail in previous texts[31]. In this paper, however, I would like to underline the extent to which such stories seem to blend the traditional substance dualism condemned by Hannan with a computational view of the mind. According to Hannan,

> Once the basic claim of functionalism is accepted, that the essence of a given mental state is not its physical realization but its functional role, it becomes possible to draw an analogy between mental states and computational states, between minds and computer programs. Computers with different hardware can be in equivalent computational states, by virtue of running the same program and being at the same point in the program. Analogously, it can be conjectured that different systems (humans, silicon-based extraterrestrials, sophisticated robots) could all be in the same mental state, by virtue of being in the same functional state. The slogan 'the mind is to the brain as software is to hardware' is a pithy characterization of the computational theory of mind (HANNAN, 2019, p. 36).

However, this analogy may be a self-fulfilling prophecy. If we understand mental states—we may call them feelings, thoughts, ideas, etc.—as functions of an overarching cognitive system that works according to preestablished, unavoidable laws, then we are already saying that the mind is like a computer—probably influenced by our close daily relation to these apparatuses. Anyway, examples from popular fiction seem to take only a few aspects of this analogy, especially the mobility of software and its apparent indestructibility. In *Blade Runner*[32], for instance, not all replicants "work" according to programmed mental states. The plot builds on the fact that these machines were so akin to human beings that a group of them—led by Roy Batty—rebelled against their predetermined "expiry date" and engaged into a quest to meet their creator—Doctor Tyrell—and confront him, what does happen in what is now known as "the prodigal son scene":

> Tyrell: What seems to be the problem?
> Roy: Death.
> Tyrell: Well, I am afraid that is a little out of my jurisdiction, you –
> Roy: I want more life… father.
> (…)
> Tyrell: The code sequence cannot be revised once it has been established.
> (…)
> Tyrell: You were made as well as we could make you.
> Roy: But not to last (FANCHER & PEOPLES, 1982).

[31] See Loureiro, Bartholo, 2019.; Loureiro, F., Bartholo, R., Mattos, F., Barcelos, F.T, 2020; and Loureiro, F., Bartholo, R., Mattos, F., Sanchez, E., 2020.

[32] The following reflection on *Blade Runner* draws directly from Prof. Pedro Abreu's lectures at the University of Lisbon in 2006-2007.

In this dialogue, Roy discovers that his expiration date cannot be changed—it is programmed into him and cannot be altered, not even by his maker. Thus, Roy is ultimately a machine whose program includes its own unavoidable, unstoppable destruction. However, Tyrell's assistant Rachael, which was at first introduced as a human, is revealed—but not to herself—to belong to a new generation of replicants created with embedded memories and who are not aware of their condition or of their expiration date. Therefore, the main question that lingers at the end of the film is basically "is Rachael human, even though we know that she is a machine?" Of course, one can argue that Roy's revolt against death is a proof that the "human program" was replicated correctly—not accepting your inevitable death may just be a mental state, a function of the human system. Thus, instead of thinking "is Rachael like us?" we can also think "are we like Rachael?"—as programmed as a computer, just unaware of it?

7.5.2. A relational approach: The world-brain problem

At this point, it would be fair to ask how all of this can be related to byzantine icons and/or to Flusser's concepts. Going back to Buchli, it can be argued that both a byzantine *Pantocrator* icon and a Hollywood film such as *Blade Runner* express "the productive dualisms of social life" that sustained the "given ontologies" of each period. If we accept the model of the computational mind, we must then accept that both the revolt against death and the painting of an icon are mental states that could also be "experienced" by a machine—be it the replicant Roy Batty or some sort of icon-painting apparatus. In fact, any human creation must be somehow already inscribed into the program of the human mind, which may have been called, in earlier times, as the realm of *poiesis*.

This sounds very materialistic, but the notion may not be that secular. The Christian notion of the Divine Logos presupposes that, before the beginning of time, Creation already existed as a possibility in God's "mind"—we can say that it was already part of its program. Of course, considering that God is omniscient and all-powerful, one can infer that everything must necessarily be included in his mind's program, and that the Divine Logos would then be the supreme program, the meta-program. In Hans Urs von Balthasar's reading of the theology of Gregory of Nyssa (VON BALTHASAR, 1995), the act of Creation coincides with the creation of space, or of "a space" between God and something which is not Him—something we can call creation, spanning from the simplest mineral to the most complex of mammals. The act of creation is understood in relational

rather than objective terms, something similar to the acknowledgement of the otherness in non-human subjects in *Blade Runner* and *Black Mirror*—Rachael was created by a man, while "real" human beings were created by God or nature; but from the viewpoint of the creature, what is the difference?

Georg Northoff argues that "Neuroscientists investigate the brain in empirical terms and search for neuronal mechanisms underlying mental features including consciousness, self, free will, and others", while "Philosophers, in contrast, associate mental features with the mind"[33], and that, in both cases, "any relation to the world is left out" (NORTHOFF, 2018, p. xi). Most debates on the relation between the mind and the body seem to focus on the apparently internal interplay between these two entities—even for those who consider one to be the originator of the other—, mostly dismissing the relations between these entities and the "world". For Northoff, the mind-body problem is not the right problem to be tackled— "it would be better to raise the question of the existence and reality of mental features in terms of the brain's relation to the world, the world–brain relation, as I call it" (NORTHOFF, 2018, p. vii).

The question is not whether the mind guides the body, or if it is part of the body or something detached from it—the main issue is to understand the relation between the mind/brain and the space/context in which it exists. This shift in perspective is deeper than it may seem, since it replaces a metaphysical problem with an ontological problem (NORTHOFF, 2018, p. xiii)[34], focusing on how the brain's spontaneous activity and spatiotemporal structure are aligned with the world—and relying on empirical evidence which suggests "that such spatiotemporal alignment of brain to body and world is central for consciousness" (NORTHOFF, 2018, p. xvi).

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[33] "The brain is usually considered the subject of empirical observation in neuroscience. In contrast, the brain as such is not considered the subject of philosophy. For example, there is no well-established 'philosophy of brain' (Northoff, 2004) as distinguished from, for instance, 'philosophy of mind' (Searle, 2004). Unlike the mind, the brain has not yet been intensely scrutinized in epistemology and ontology" (Northoff, 2018, p. 239).

[34] "Ontology is the study of being, and it deals with the categories of existence and reality" (…) "I carefully distinguish ontology from metaphysics— existence and reality, as understood here, are not mere instances of the more general 'Being as such' as dealt with in metaphysics" (Northoff, 2018, p. 240).

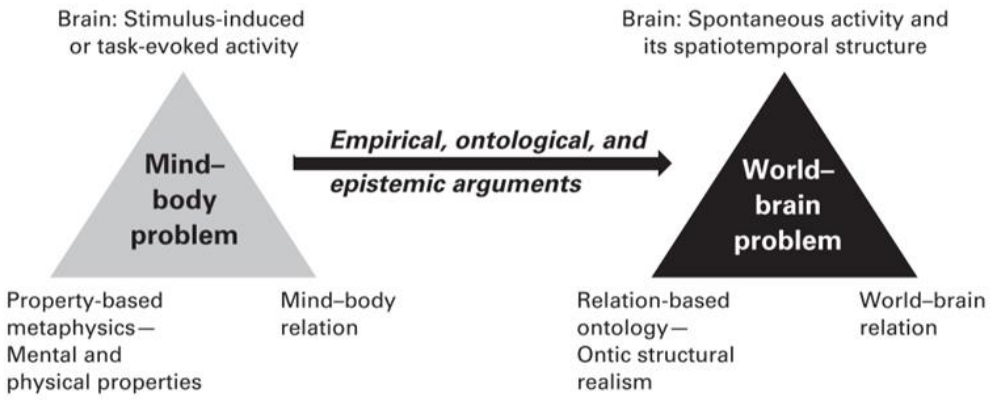

Figure 37 - "From the mind-body problem to the world-brain problem" (NORTHOFF, 2018, p. xxiv).

If we shift the focus from the mind-body problem towards the world-brain relation, while also accepting the computational view of the mind, it becomes possible to include computers in the discussion. If *Blade Runner*'s Rachael and *A.I.*'s David live in the same world as humans and can process the same mental states experienced by them, from the viewpoint of the world-brain relation there would be no difference between replicants, *Mecha* and human beings.

Discussing the ontological status of fictional characters may seem to be just an amusing exercise, but this exercise may prepare us to deal with similar questions that may soon challenge us. In 2004, Neil Harbisson, a visual artist and musician, attached an antenna to his skull in order to expand his senses. Harbisson was born colour-blind and developed an apparatus that would enable him to "hear colours"—the antenna is equipped with a webcam and attached to a small portable computer that translates colours into sound waves that can be heard through headphones (STIX, 2016). After months of adaptation, Harbisson was able to identify even infrareds and ultraviolets, which cannot be captured by human vision (STIX, 2016).

By combining his body with an apparatus, Harbisson changed his brain's relation to the world, adding unforeseen dimensions. His natural sensory apparatus was upgraded by a man-made apparatus that is seen—at least by Harbisson himself—as an extension rather than an accessory. It can surely be argued that, even though Harbisson is commonly referred to as "the first cyborg artist" (JEFFRIES, 2014), anyone carrying an artificial pacemaker—an apparatus available since the early 60's—would be as much of a cyborg as him. However, in the context of a culture shaped by technical images, the fact that Harbisson's antenna looks like part of his body and seems to expand the reach of both his body and his mind does help to blur the boundaries between the natural and the artificial.

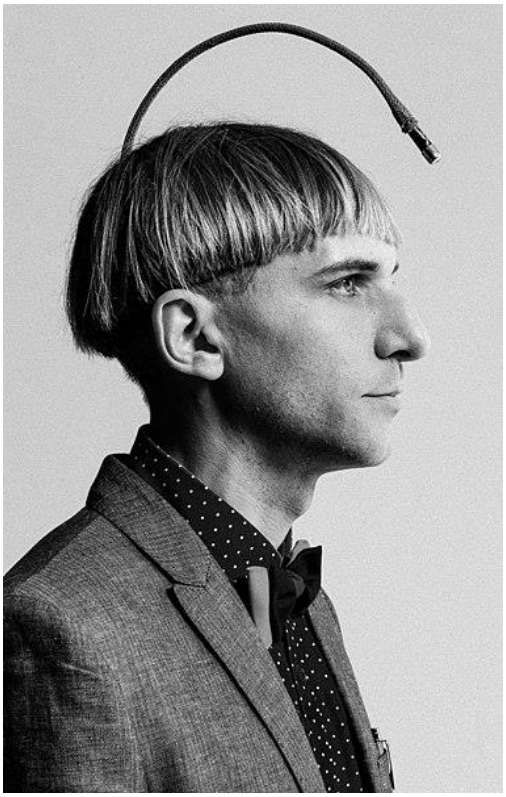

Figure 38 - “Biohacker artist Neil Harbisson with his cyborg antenna implanted in his skull to extend his sense of color beyond human perception”.

Photograph by Hector Adalid, available at
https://commons.wikimedia.org/wiki/File:Biohacker_Neil_Harbisson.jpg

7.6. Conclusion(s)

Once out of nature I shall never take
My bodily form from any natural thing,
But such a form as Grecian goldsmiths make
Of hammered gold and gold enamelling
To keep a drowsy Emperor awake;
Or set upon a golden bough to sing
To lords and ladies of Byzantium
Of what is past, or passing, or to come.
(YEATS, 1996, p. 193-194)

In March 2021, Christie’s promoted an online auction to sell its first all-digital artwork. “Everydays: The first 5.000 days” is a collage by digital artist Mike Winkelmann

(a.k.a. Beeple), but the object of the auction was not a high-resolution print of the work, nor the "original" jpg file created by the artist. Bidders were interested in acquiring a NFT (non-fungible token) file, which is a certificate of authenticity for the jpg file. The link between the jpg file and the NFT certificate is protected by a blockchain, so it cannot be copied or replaced. The token is "non-fungible" because it is unique, unlike a cryptocurrency that emulates conventional currency—all one-dollar bills have the same value. A NFT is a unique certificate related to only one specific object—in this case, Beeple's collage, which only exists as a jpg image file. "The NFT file doesn't contain the digital piece of art (…). It's just a kind of contract, saying 'the owner of this NFT owns this other digital file,' often with a link to the art file itself" (DEAN, 2021). Thus, the winning bid of over sixty-nine million dollars did not purchase a print nor a jpg file, but "one-of-a-kind bits of code with a verifiable chain of title attached" (DEAN, 2021).

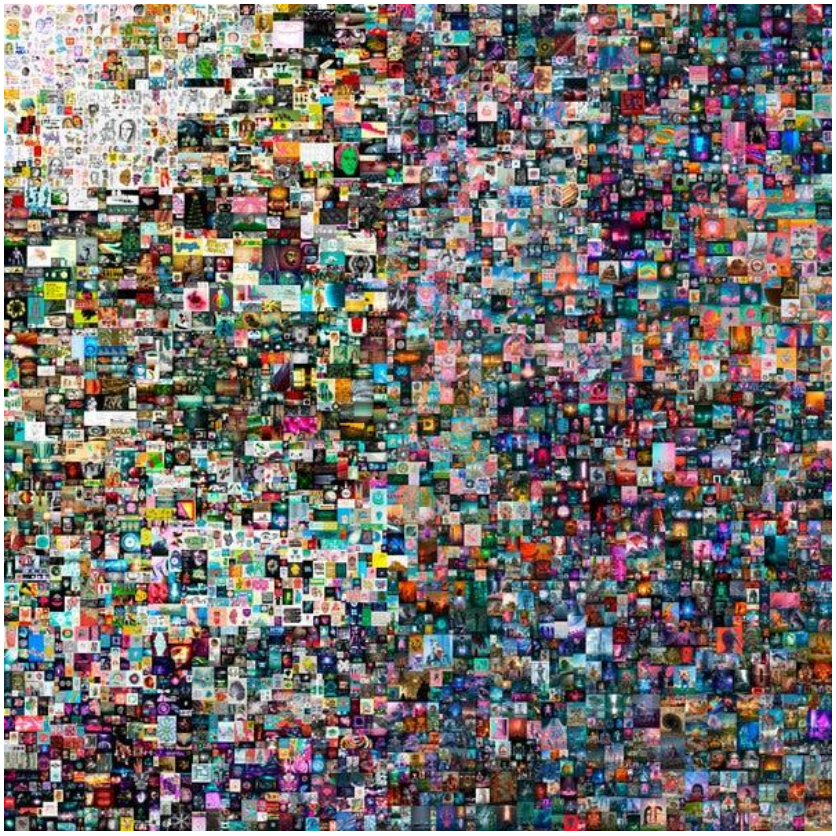

Figure 39 - Beeple (b. 1981), EVERYDAYS: THE FIRST 5000 DAYS, 2021.

Non-fungible token (jpg). 21,069 x 21,069 pixels (319,168,313 bytes). Minted on 16 February 2021. Sold for $69,346,250 in a single lot sale concurrently with First Open". Available at https://www.christies.com/features/Monumental-collage-by-Beeple-is-first-purely-digital-artwork-NFT-to-come-to-auction-11510-7.aspx?sc_lang=en&lid=1

In a way, since "All an NFT does is authenticate and record the provenance of the NFT itself" (DEAN, 2021), it can be somehow related to "official" reproductions of photographs or engravings—signed or at least "permitted" by the artists—, something that can be traced back to the Renaissance[35]. However, in this case, the "original" jpg file is a collage of all the images the artist produced and posted on his Instagram account—https://www.instagram.com/beeple_crap/—between 2007 and 2021. Thus, the work itself is freely available on the internet, and all images can be copied, edited, shared, etc. From the standpoint of the relation with the work of art, the owner of this particular NFT does not seem to have any "advantages"—the collage is not hung or stored somewhere for exclusive personal enjoyment. Anyone who can access Instagram can have a very similar experience. Thus, the NFT seems to be an attempt to attach a sort of artificial uniqueness to a technical image, reacting against its reproducibility.

However, the driving force behind this reaction may not be as philosophical as it may seem. The artificial scarcity created by NFTs is more relevant to the art market than to the experience of art. Beeple's NFT file made him "the third most-expensive living artist after Jeff Koons and David Hockney" (CROW, OSTROFF, 2021). Curiously, while the market value of digital art approaches that of conventional, physical art, its materiality is already surprisingly bulkier. "Processing cryptocurrency transactions takes a massive amount of computing power, which has raised environmental concerns about the boom" (…) "On a larger scale, the computer networks that collectively make up the bitcoin and Ethereum blockchains are estimated to use as much electricity as Argentina and Ecuador, respectively, each year" (DEAN, 2021).

Through this example, we are once again reminded of the inescapable materiality of artifacts that we usually believe to be immaterial. What we see as dematerialization is just the replacement of one material form by another material form that is more distant from us. Our belief in the dematerialization of our culture comes from the perpetuation of a dualism that is a long-lasting "vestige of the Cartesian mind/body split" (BUCHLI, 2016, p. 146). This does not mean, of course, that we should ignore the radical changes

[35] In the early sixteenth century, Albrecht Dürer moved lawsuits against engravers that were copying some of his works, creating similar matrices from his widely available engravings. Emperor Maximillian eventually granted Dürer exclusive control over the reproduction of his engravings, deciding which printers would receive the matrices and how many copies they would be allowed to make. This and other similar cases led to the developed of the "right to copy", or copyright (see Pila, Torremans, 2019, p. 11).

brought by this new form of materiality. Technical images are so fundamentally different from the media that preceded them that we are still learning how to relate to them—but this has not stopped us from building a whole new world based on these mysterious artifacts.

It seems, therefore, that we are currently in need of a deeper ontological understanding of what does it mean to live in the universe of technical images, and this situation is similar to the crisis faced by those involved in the iconoclastic controversy of the byzantine period. Early Christian thinkers and artists were puzzled not only by the problem of how to communicate the Christian message, but also by the event of incarnation itself, and they understood that it was necessary to develop a new sensorium in order to both understand and express this phenomenon (FRANK, 2000; BARBER, 2002, apud BUCHLI, 2019, p. 170). According to Buchli, "The presencing technologies of the icon required a new way of cognizing presence and the theology of the era served to reconstitute this new form of perception and vision" (BUCHLI, 2016, p. 170). Likewise, Flusser argues that "A true understanding of techno-images—and implicitly of all images—implies a criticism of their mimetic, representational side, a move from objectivity towards intersubjectivity, a focusing on the relationship between subject and object and a constant phenomenological effort at deciphering techno-images both within scientific and everyday contexts" (GULDIN, 2009, p. 17).

Flusser coined the term "techno-imagination" to refer to this new attitude towards technical images and the world shaped by them, "suggesting that the way we look at the world is ultimately a question of inter-subjective, that is, dialogic convention" (GULDIN, 2009, p. 18). This relational approach echoes both the core of the iconoclastic controversy—the possibility of a direct encounter with the divine through/in the icon—and Northoff's answer to the mind-body problem—reframed as the brain-world relation. Therefore, the apparently distant world of traditional images can surely provide valuable insights to those who dwell in the universe of technical images. The objects being discussed may have changed, but the subject of the discussion is basically the same—and it will always remain the same. The illusions created by technical images may lead us to believe that our world is opaquer and more mysterious than ever, or, in contrast, that it will eventually be completely revealed—and controlled—by apparatuses. Anyway, in order to really understand our condition, we may need to overcome a worldview based on the material/immaterial duality, abandon any faith in the objectivity of technical

images and articulate a new sensorium that may explore and expand the imaginative possibilities provided by apparatuses.

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8. Conclusion

8.1. Post-Historical Architecture - Mythologies, rituals and archetypes

History is a nightmare from which I am trying to awake.
James Joyce, "Ulysses".

The apologists of modern architecture, including the historians of the historic-modernist mode, used historical discourse to elevate architecture to the level of modern science, which they understood to be a definitive way of understanding the world that could finally liberate architects from the canons of tradition. However, modern architecture created new canons, and these were not exactly scientific. The impracticality of many supposedly rational designs does not mean, however, that modern architects were incompetent, but that they were aiming at an unattainable goal. Art and science work in different ways and deal with different things. Northrop Frye seems to agree with Heidegger when he argues that art deals not with nature, but with mythology:

> Mythology is the embryo of literature and the arts, not of science, and no form of art has anything to do with making direct statements about nature, mistaken or correct. Similarly, as science does not grow out of mythology, so it can never replace mythology. Mythology is recreated by the poets in each generation, while science goes its own way. (FRYE, 1980, p.7)[36]

The analogy between poetry and architecture is surely not new. The main point here is that modern architecture tried to turn architecture into a science, but all it could do was to develop an apparently scientific discourse that tried to justify this aspiration beyond any rational opposition. The new tradition created by modern architecture is a new mythology—as new as any mythology can be—and the writings of Giedion, Pevsner and

[36] It is relevant to mention exactly what Frye means by the term "mythology". "The cultural aura, or whatever it is, that insulates us from nature consists among other things of words, and the verbal part of it is what I call a mythology, or the total structure of human creation conveyed by words, with literature at its centre. (…) It is designed to draw a circumference around human society and reflect its concerns, not to look directly at the nature outside. When man finally gets around to doing that, he has to develop the special language of science, a language which becomes increasingly mathematical in idiom. Many things have to come together in a culture before science can begin, and when it does begin it does not descend from or grow out of mythology directly. Mythological statements about nature are merely grotesque or silly if they are thought of as pre-scientific explanations of it" (Frye, 1980, p. 6-7).

Zevi are its Vedas. Although modern architecture has been widely criticized since at least the 1950s, the persistence of its centrality cannot be denied—its main arguments are just adapted to current technology. It is no longer in fashion to understand a house as a "machine for living", and the decayed and desolate suburbs produced by functionalism are not exactly celebrated. However, there is a growing interest in applying the principles that govern digital apparatuses to the functioning and planning of our cities.

In response to the technological prometheism that is latent in many recent writings on the interplay between architecture and digital technologies, in this thesis the focus was shifted towards *presence*. The justification for this shift can be summarized in one simple argument, presented in Chapter 6: what we value in material objects is not the objects themselves, but the relationship we build with them. This sounds obvious, and even akin to the ethos of a meaning culture—as identified by Gumbrecht. However, this does not mean that the discourses built from the experience of the object are more important than the object—it just means that what turns an object into a valued piece of matter is what Heidegger called a "open relational context". Heidegger illustrates this argument through the example of the classical Greek temple— "The temple, in its standing there, first gives to things their look and to men their outlook on themselves. This view remains open as long as the work is a work, as long as the god has not fled from it" (HEIDEGGER, apud HARRIES, 2009, p. 103). If there is not a "open relational context", there is no temple—even if the building we call "temple" remains intact.

However, how can we address the built environment, especially the works of architecture produced by our ancestors, as if the god is still present? Is it possible for us to engage into an I-Thou relationship with an artifact of a long-lost civilization? Do we need to establish some common ground, or is the presence of the object itself a common ground? And does this apparently archaic notion apply to the objects we are building today? The only way to address these questions without falling into "historicism" is to focus on the presence of each object. This may point towards a post-historical understanding of architecture, but are we really able to create connections between objects without categorizing them according to historical concepts?

One way to do that would be to understand each object as the re-creation or re-enactment of an archetype—something similar to the conventional/natural symbols proposed by Harries. According to Eliade, rituals that re-enacted myths are central to the cultures of "archaic" civilizations, in which objects can only be valued "because they

participate, after one fashion or another, in a reality that transcends them" (ELIADE, 1954, p. 3-4). Thus, for these civilizations, a new creation that draws from a previous model is not actualizing this model, but the model of all models—to put it in the terms proposed by Harries, a new conventional symbol may be created with reference to a previous conventional symbol, but in doing so it is actually re-creating the natural symbol that lies behind both. "The object appears as the receptacle of an exterior force that differentiates it from its milieu and gives it meaning and value" (Ibid).

This description fits well with the idea that the object itself is not important—only the relationship with the object can be valuable or not. Eliade argues that "This force may reside in the substance of the object or in its form", and then also turns to the same example used by Heidegger and Flusser:

> a rock reveals itself to be sacred because its very existence is a hierophany: incompressible, invulnerable, it is that which man is not. It resists time; its reality is coupled with perenniality. (…) Other stones will be sacred because they are the dwelling place of the souls of ancestors (India, Indonesia), or because they were once the scene of a theophany (as the bethel that served Jacob for a bed), or because a sacrifice or an oath has consecrated them (Ibid).

However, the process of re-creating the archetype also plays a role in this relationship. In a ritual, a series of movements, gestures and words must be repeated in order to fulfil the re-enactment— "In the particulars of his conscious behavior, the 'primitive', the archaic man, acknowledges no act which has not been previously posited and lived by someone else, some other being who was not a man. What he does has been done before. His life is the ceaseless repetition of gestures initiated by others" (ELIADE, 1954, p. 5). The repetition of gestures is the basis of a craft culture, and it is possible to relate the break with tradition proposed by the modern movement with the emergence of new gestures brought by the industrial revolution. Both the machine analogy proposed by the modernists and the current apparatus analogy proposed by the proponents of smart cities draw from the notion that our gestures have no precedent.

Machines demanded new gestures because they worked on an inhuman logic. The machine demands that a button is pressed, or a lever is pulled—but anyone can do that, even another machine. However, when a smartphone demands that two fingers touch the screen and spread in order to enlarge an image, this demand is directed towards a human being—or at least something with an opposing thumb. A robot can assemble a car, but it cannot use a smartphone. My grandparents pulled many levers and pressed quite a few

buttons, but they never swiped. Swiping is more human—only humans can do it—and thus more artificial—before smartphone screens, there was nothing to swipe. However, swiping leaves no imprints, maybe just the shadow of greasy fingers on the screen. It is anti-archaeological, anti-historical. It is also anti-mythical—no hero, or God, or ancestor, swiped. Thus, how can we re-enact archetypes if the gestures through which we shape our culture seem to have no archetypal or even historical reference?

According to Flusser, "a gesture is a movement of the body or of a tool connected to the body for which there is no satisfactory causal explanation. And I define satisfactory as that point in a discourse after which any further discussion is superfluous" (FLUSSER, 2014, p. 2). Reactive or reflex movements are not considered gestures—a gesture is an intentional, imaginative movement. However, when we work through programmed apparatuses, our gestures also become programmed—any gesture that is not predicted in the program will not be understood. Thus, if we only produce and consume culture through apparatuses, our imagination can also become programmed. Programs are our myths, and the "mythification" of these apparently unprecedented gestures may be one of the main tasks of contemporary architecture.

Of course, not all our gestures and actions are directly shaped by apparatuses. But, as Flusser argues and as current trends like smart cities suggest, we may easily transfer the programmatic logic of apparatuses to realms of life which they apparently have not yet entered. For instance, although variations of the computational theory of mind have been discussed for a few decades without achieving clearly reliable conclusions, the analogy between mind-body/software-hardware seems to be increasingly popular among the general public—as seen in Chapter 7. How we can, thus, prevent our imaginations from being programmed?

As mentioned above, the idea that a work of art is or has a "discourse" with a somewhat hidden meaning can make us overlook its presence, trying either to discover its meaning or to create a meaning for it on our own. According to Norman Crowe,

> The modern notion that the urban and architectural world must be reinvented, 'free of the inhibiting constraints of the past,' presumes that we can, by scientific means, account for all the subtle human factors that traditional processes have accommodated in a long evolutionary descendence of the man-made world—through trial and error, patient refinement, and subtle adjustments in response to the unaccountable human characteristics that are so important to the satisfactory lives of communities and individuals (CROWE, 1997, p. xiii).

In the universe of technical images, this notion becomes even more radical—our scientific means seem to be able to capture, decode and recreate our whole experience of the world. However, buildings and natural structures share, occupy and configure the same space; technical images exist in their own space, only temporarily occupying screens on which they can be visualized. As Cicero argued that human intervention created “a second world within the world of nature” (CICERO, apud CROWE, 1997, p. 3)—a world of crops, diverted rivers, irrigated soil, etc.—we might as well understand the digital world as a “third world” which is also, in some way, within the world of nature. We tend to think of this third world as something that exists in another dimension, an ethereal substance that can be glimpsed but not grasped.

However, despite the popularization of the “cloud” metaphor, all the data that we see flowing through our screens is very concretely stored in computers and mainframes—thus, the third world is within the second world, and both are within the world of nature. This may seem obvious, but the fact that most of us have no contact with the hardware that stores all this data makes us believe that it really is all abstract or immaterial. The only hardware we (still) need is some sort of screen—all other parts have been miniaturized and engulfed by the screen—, in which we see the presentification of data. The apparatus itself tries to be as immaterial as possible—ideally, just a screen—, a neutral frame that apparently has no influence on what becomes present between its boundaries.

It is not far-fetched to see an architectural metaphor here—the apparatus is a minimalistic, “clean”, silent building in which anything can happen. In some areas like retail design, we can already see that screens are becoming more important than architecture—the content information showed on the screens seems to be more important than any architectural (material, spatial, haptic) “information”. While some authors believe that a synthesis between brick-and-mortar stores and numerous new technologies can promote a new “golden age of retail”, one can also believe that architecture may become a minimalistic, “clean”, silent frame for screens—a frame for frames—, with all the interest of organizations, storeowners and customers focused on the fleeting information shown on the screens. In "Fifteen Million Merits", the second episode of the first series of Black Mirror, we can see a hyperbolized version of this tendency—the main character’s bedroom is just a cube with four wall-sized screens around the bed.

Figure 40 - A "bedroom" in "Fifteen Million Merits", Black Mirror, 2011.

Source: https://www.hollywoodreporter.com/news/general-news/black-mirror-mr-robot-more-940572/

This may seem as a rather dramatic or even apocalyptical view of the future of architecture in the post-digital era. After all, celebrated architects like Peter Zumthor have defined architecture as “an envelope and background for life which goes on in and around it” (ZUMTHOR, 1999, p. 13)—and, if our lives are focusing more and more on technical images experienced through screens, it seems natural for architecture to become a background for this new way of life. However, the rest of that quote by Zumthor affirms that “Architecture has its own realm. It has a special physical relationship with life. I do not think of it primarily as either a message or a symbol”, and that this “envelope” is not mute, but “a sensitive container for the rhythm of footsteps on the floor, for the concentration of work, for the silence of sleep” (Ibid, p. 13). Even though this kind of architectural information may seem to compete with the information presented by technical images, they are in fact completely different—we can say that the first is composed mainly of presence effects, while the second is essentially made up of meaning effects.

A mentioned before, the Portuguese word *presente* has a threefold meaning: it may refer to the fact of being (present) in a place; it may refer to the present time (the time in which all presences are present); and it may refer also to a gift, something that you offer to someone else. Architecture communicates (non-verbally) through its presence, which creates “more world” to be experienced, more space for things to become present, for events to “take place”. Whenever a new building is erected, chunks of undifferentiated “space” become rooms—bedrooms, living rooms, classrooms, etc.—which will then

become envelopes or stages for human lives. The main purpose of architecture is the production of presence.

In our meaning culture, many architects and authors tried to turn architecture into a formal/spatial translation of discourses, usually philosophical or ideological concepts—as exemplified by what Nikos Salingaros called "the Derrida virus" (SALINGAROS, 2004). Other authors seem to agree with Zumthor and place architecture as its own realm: for Harries, architecture is a representational art that represents itself—buildings represent buildings (HARRIES, 1997)—, and Pedro Abreu sees architecture as a "pre-condition to all other human activities" (ABREU, 2008). Both these notions—architecture as representation and as something necessary for all other human activities—point to the fact that the realm of architecture is the realm of presence. By being present—in the triple sense of the Portuguese word *presente*—, architecture "gives" us, as a gift, a place in which we can be present and have encounters (in the present time).

The previous chapters express some of the partial conclusions that were developed during the research process. However, all the ideas, concepts, analysis, and conclusions lead to open questions: what would be, concretely, a post-historical understanding of architecture? Is it possible not only to create, but to imagine such an understanding while working through programmed apparatuses like the notebook I am using right now? The attempt to develop an architectural theory that does not rely on historical consciousness is not unprecedented—we can say that the representational theory proposed by Harries goes in this direction, and the same goes for the ideas proposed by Christopher Alexander in "The Timeless Way of Building" and "A Pattern Language". However, these theories did not address the ontological shift identified by Flusser[37].

Two apparently different fields seem to provide interesting developments for this endeavour: the "maps of meaning" developed by psychologist Jordan Peterson and one of his main sources—the literary theory proposed by Northrop Frye, especially in "The Anatomy of Criticism". An incursion into psychology and literary criticism may be risky,

[37] Likewise, many studies focused on images and their role in contemporary culture—from Walter Benjamin's classic essay "The Work of Art in the Age of Mechanical Reproduction" (1935) to more recent writings by Jonathan Crary and Georges Didi-Huberman—surely provide many valuable insights, but do not address the more fundamental ontological transformation identified by Flusser as the transition from History to post-History.

but it is just this kind of spatial metaphor used by Peterson that seems to present interesting possibilities:

> The world can be validly construed as a forum for action, as well as a place of things. We describe the world as a place of things, using the formal methods of science. The techniques of narrative, however—myth, literature and drama—portray the world as a forum for action. (…) The world as forum for action is composed, essentially, of three constituent elements, which tend to manifest themselves in typical patterns of metaphoric representation. First is unexplored territory—the Great Mother, nature, creative and destructive, source and final resting place of all determinate things. Second is explored territory—the Great Father, culture, protective and tyrannical, cumulative ancestral wisdom. Third is the process that mediates between unexplored and explored territory—the Divine Son, the archetypal individual, creative exploratory Word and vengeful adversary. We are adapted to this world of divine characters, much as to the objective world. The fact of this adaptation implies that the environment is in 'reality' a forum for action, as well as a place of things (PETERSON, 1999).

Peterson joins the conceptions of "second nature" proposed by Cicero and Flusser, and points to distinction between art and science that is central to Frye's thought. The idea that our being-in-the-world can be understood through three main spatial/personal archetypes seems coherent with the relational approach that was sketched in the previous sections, and Frye's literary theory is very akin to the architectural theory proposed by Harries:

> All art is equally conventionalized, but we do not ordinarily notice this fact unless we are unaccustomed to the convention. (…) Poetry can only be made out of other poems; novels out of other novels. Literature shapes itself, and is not shaped externally: the forms of literature can no more exist outside literature than the forms of sonata and fugue and rondo can exist outside music. (…) But the poet, who writes creatively rather than deliberately, is not the father of his poem; he is at best a midwife, or, more accurately still, the womb of Mother Nature herself: her privates he, so to speak. The true father or shaping spirit of the poem is the form of the poem itself, and this form is a manifestation of the universal spirit of poetry (FRYE, 2000, p. 96).

Peterson's use of the term "architecture" in his subtitle is not accidental—architecture is the symbolic representation of the structure of our being-in-the-world. Architecture can be seen as the action of placing things, and, from a flusserian viewpoint, actions create things, which inform actions. However, Nature also informs actions—and even things—, and Peterson's evolutionary approach acknowledges that. His theory of existential/psychological archetypes also seems to resonate with one of the central concepts in Alexander's more recent writings: "that human feeling is mostly the same, mostly the same from person to person, mostly the same in every person"

(ALEXANDER, 2004, p.). This idea may seem controversial for a culture that is focused on celebrating diversity, but it may be more fruitful than the exacerbation of differences.

Of course Alexander is also talking about archetypes, but, while his first writings—"The Timeless Way of Building" (1977) and "A Pattern Language" (1979)—focused on identifying spatial, aesthetic and constructive patterns that seemed to be repeated by different cultures in different times, in "The Nature of Order" (2003) he turned his pattern-seeking eyes to Nature as a whole.

> Our idea of matter is essentially governed by our idea of order. What matter is, is governed by our idea of how space can be arranged; and that in turn is governed by our idea of how orderly arrangement in space creates matter. So it is the nature of order which lies at the root of the problem of architecture (ALEXANDER, 2003).

Interestingly enough, Alexander's influence was first felt—in the 1960s—in the field of computer sciences, and only later in architecture. Conversely, Frye's literary theory seems to propose a sort of combinatorial model of literature—and even of imagination as a whole—that can be related to a program, just as some of Peterson's arguments regarding the biological/evolutionary roots of our being-in-the world seem to suggest that we are already hard wired/programmed to a certain extent. Does this mean, therefore, that all these references are drawing us to the very thing we were trying to avoid—the programming of imagination? Or is it already the influence of our post-historical age that makes us see programs everywhere?

Back in 1999, Bernard Cache posed similar questions while investigating the relationship between his avant-garde work with design software and Gottfried Semper's *Der Stil*, Published in 1863:

> What does it mean today to refer to Gottfried Semper? Why, in 1999, should we look back to the nineteenth century just as everybody claims the twenty-first will be digital? And why focus on Semper, whose architecture seems to reveal nothing but the Renaissance historicism rejected by the Moderns? Are we not in a very different period? We live in an age not of iron but silicon. Why would we need to reconnect the end of our iron, concrete, and glass century to the history of wood, stone, clay, and textiles? Do we not run the risk of a new technological determinism, by which the information age, the so-called "third wave," would create a second break with the past, definitively negating any historical experience, leaving us with no alternative other than a choice between the dinosaurs and the space shuttle? Or should we not instead be reminded that information technologies themselves are deeply rooted in the past? The computer is not an Unidentified Flying Object that landed one day in a California garage. (CACHE, 2007, p. 379)

One of the goals of this thesis was to clarify not exactly the "past", but some of the logic of apparatuses, these supposed UFOs. Since the focus was not on a detailed understanding of the functioning of these apparatuses, but on the ontological shift caused by the seemingly inescapable centrality they have conquered in the production and reproduction of culture, I have pursued this not as a programmer or "computer expert", but as a practicing architect with an interest in theory and philosophy. The interest in the flusserian concepts of apparatus and technical images—among others—came from a need to better understand apparently banal, everyday situations—many, but not all, in the context of the profession—in which these concepts seemed to emerge, sometimes as answers, many times as questions.

Although this thesis has focused on the impacts of the overwhelming and apparently inescapable presence of apparatuses and technical images in the production and perception of architecture, many—if not most—of the questions that emerged during the research process seemed to be too dense to be contained inside the boundaries of a particular discipline. As mentioned before, the emergence of the universe of technical images is akin to the emergence of writing, and it seems almost impossible to grasp the dimension of such a cultural and ontological revolution. In this context, this thesis aims to provide a few insights regarding the impacts of this process in a particular human activity—one that is especially relevant since it deals with the symbolic representation of the structure of our being-in-the-world. Consciously or not, contemporary architects and builders are shaping our understanding of this new world, and especially of our place in it. This has always been the main task of architecture, from the pyramids to the most avant-garde digitally fabricated structures—what may have changed with time is the extent to which those involved in these world-shaping activities have acknowledged the scope and breadth of their work.

While some contemporary discourses seem to overestimate the impacts of recent design and construction technologies, hallowing them as the panacea that will lead us to a utopian sustainable future, the research presented in this thesis suggests not only a more cautious approach, but a different focus. The work of contemporary architects and builders will not be relevant to the extent in which it incorporates—or stimulates the development of—new technologies. This is a twentieth-century paradigm that has produced many interesting results, but that cannot, by itself, provide an epistemic foundation for complex disciplines of intervention such as architecture and engineering.

This does not mean, however, that these disciplines should not embrace technology and take part in its development; on the contrary, in order to take an active role in the symbolic representation of our universe of technical images, architects may be obliged to take interest in activities such as programming, digital fabrication and materials research. In fact, the technological basis of our culture seems to demand that the separation between art and science—and between architecture and engineering—must be finally overcome.

This is what I mean when I call for the "mythification" of unprecedented gestures. Texting, swiping and video conferencing are fairly recent gestures/activities that have come to form a central part of the daily lives of millions of people around the world, and one must understand the programmatic logic behind these gestures in order to acknowledge their position in our individual and collective ontologies. Historically, architecture was always attuned to the emergence and consolidation of new gestures, interpreting them and also producing new gestures of its own; post-historically, it must not only provide links between our era and the preceding text-based culture to which many of us still cling to, but it should also produce new spatial, tectonic and aesthetic forms that may not only express the emerging culture built through apparatuses, but take a decisive role in its development—which is very different from placing screens on walls and delegating most meaning effects to the technical images that will slide through them.

As argued before—especially in Chapter 5—, contemporary myths such as technological solutionism and smart cities are not very distant from the foundational myths of modern architecture, and of modernity in a broader sense. These new concepts do not really replace worn out modern dogmas, but update them according to recent technological advances. However, the technological prometheism of the Modern era was built in and by a culture based on texts, while our current reinterpretation of this profession of faith in technology is built on technical images. As Frye argued, the language of science has indeed become "increasingly mathematical in idiom", and thus mythology—as defined by Frye as "the total structure of human creation conveyed by words"—may seem to have been overcome, with the languages both of literature and of science being built on words and images that actually consist of lines of code.

However, mythology is in fact unavoidable. Mythology was not destroyed, it was only engulfed by apparatuses and technical images, which became the prevalent medium for the production and consumption of words. We obviously still perceive words and texts such as this one—written in a word processor and destined to be read, if it is read at all,

mostly as a PDF file—not as the codified and programmed technical images that they essentially are, but as the "conventional" texts that they appear to be. The same goes for the architectural drawings that I produce with the same apparatus, performing very similar gestures—these are usually printed, and perceived by clients and builders not as lines of code, but as conventional drawings. The mythification of these gestures means to interpret them both as conveyors of long-established traditions—such as literature, architecture or science—and as founders of new traditions.

The mythification of apparently unprecedented gestures is of course not a new or exclusively contemporary issue, but a necessity that becomes evident whenever a profound cultural revolution takes place. According to Dias (2009), the work of Italian poet Cesare Pavese (1908-1950) was structured by "the attempt to conciliate and give a finished, stable form to such disparate traditions—classical culture, on one side, and the demands of the modern world, on the other[38]" (PAVESE, 2009, p. 11). In his first writings, and especially in the first sections of *Lavorare Stanca* (Work Is Tiring), published in 1936, Pavese tried to develop a sort of programmatic language which was based on a strict poetic form—the classical anapaest, built by two short syllables followed by a long one—and aimed at neutralizing "subjectivity, idealism and irrationalism". Pavese's use of analogy, for instance, consists not of connecting a "artistic form" to a specific emotion, but of creating relations between forms (images) inside the text, "without resorting to a subjectivity that it is external to it"[39] (Ibid, p. 35)—something similar to the notion, defended in this thesis, that architecture has its own lexicon of meaningful forms, which do not rely on "external" references. However, this rational approach, that should produce a *de facto* modern poetry freed from the formal and sentimental vices of the previous generations, proved, to Pavese himself, to be in fact a personal mythology that he only believed to be collective (Ibid, p. 58)—and the same could be said of some orthodox modernist architects, who believed that their conception of the Modern Man was a universal, objective and inescapable reality. Pavese grew

[38] Translation by the author. Original quote: "E não seria exagerado dizer que a tentativa de conciliar e de dar forma acabada, estável, a tradições tão díspares—a cultura clássica, de um lado, e as solicitações do mundo moderno, de outro—constitui o eixo estruturante de toda a obra pavesiana."

[39] Translation by the author. Original quote: "Em vez de ser a ponte que conecta a 'forma artística' a uma 'emoção específica', a analogia pavesiana associa uma forma (imagem) a outra, permanecendo um procedimento interno ao poema, sem remeter a uma subjetividade que lhe é exterior."

increasingly aware that the social function of poetry was to clarify and communicate the myths of its time (Ibid, p. 37), and this led him to pursue the origins of these myths (Ibid, p. 57), receding from his supposedly rational approach and acknowledging the mythical aspects of modernist discourses. In an essay written in 1949, Pavese argues that

> Without myth - we have already repeated - there is no poetry: it would lack the immersion in the vortex of the indistinct, which is an indispensable condition for inspired poetry. We do not intend, now, to sketch a typology of inspiration, of the narrative symbols of our time, which would result in a story, albeit a concise one, of all contemporary fiction - we simply want to remember that in each culture and in each individual the myth is, by its nature, monotone, recurring, obsessive. (PAVESE, 1951, p. 338)[40]

Our culture seems to be obsessed with apparatuses and technical images—from big data to social media—, and we are clearly—although maybe unconsciously—raising notions such as the mind-body/software-hardware analogy and the faith in technological solutionism towards the level of foundational myths—they have come to express and symbolize, for many of us, what we are and what we can aim to become. Contemporary architects must deal with this mythology, creating architectural forms that clarify and communicate this emerging collective ontology. Apparatuses and technical images must be included both in the lexicon of architectural theory and in the tradition of architectural practice, and this demands a deeper knowledge of the form and of the workings of their innards—to which this thesis hopes to contribute by highlighting some fundamental aspects of the logics that lay somewhat "hidden" behind them. As Cache argues, "Architecture emerges in the move from one technology to another. (…) Technical art is a contracting memory as opposed to an *engramme*." (CACHE, 2007, p. 387)

According to Picon, many designers and architects see apparatuses just as advanced tools "that enable them to produce sophisticated forms and to control better their realization", while fewer theorists and practitioners "think that it has become unavoidable to enter into the black box of programming" (PICON in TERZIDIS, 2009, p. vii-viii).

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[40] Translation by the author. Original quote: "Senza mito–l'abbiamo già ripetuto–non si dà poesia: mancherebbe l'immersione nel gorgo dell'indistinto, che della poesia ispirata è condizione indispensabile. Noi ora non vogliamo tentare una tipologia dell'ispirazione, dei simboli narrativi del nostro tempo, che si risolverebbe in una storia, sia pure sommaria, di tutta la narrativa contemporanea–vogliamo semplicemente ricordare che in ciascuna cultura e in ciascun individuo il mito è di sua natura monocorde, ricorrente, ossessivo."

Kostas Terzidis belongs to the second group, and his approach to the human-computer interaction, based on the notion that "The computer is the Other of the human mind, not its mirror" (Ibid), brings us back to the dialogical nature of Being, as proposed by Buber. By engaging into an active dialogue with apparatuses—and their "radical otherness" (Ibid, p. ix)—, we may be able to reinterpret the conventional symbols that we have inherited, revealing the natural symbolisms that lie behind them and creating new conventional symbols that communicate the myths that make up the emerging ontology of the universe of technical images.

> One of Terzidis' fundamental tenets is that design is not properly an invention, the creation of something absolutely new. It should rather be considered as the result of an unveiling or a rediscovery process. There is something almost pre-Socratic, or, to take a reference closer to our time, neoclassical, in this conception of design as a kind of return to an existing state of things that has fallen into oblivion. The pre-Socratic perspective would be to consider after Empedocles or Parmenides that nothing comes out of nothing and that the new is just the extant seen from a different vantage point. Neoclassical aesthetics and design theory starts as for it from the assumption that the quest for beauty is about recapturing the fresh inspiration that prevailed at some point towards the origin of art, an inspiration that accounts for the enduring value of archetypes. Part of Terzidis' ambition lies precisely in rethinking some of architecture's most fundamental archetypes in the light provided by computation. (Ibid, p. viii)

To put in very concise terms, two very simple ideas can summarize the arguments presented in the previous chapters and the tentative conclusions explored in this final section. First, the notion that I can only really be an I in relation to a Thou, and that architecture must provide places in which the two can meet; and secondly, the need to overcome a worldview based on the material/immaterial duality, abandon any faith in the objectivity of technical images and articulate a new sensorium that may explore and expand the imaginative possibilities provided by apparatuses. We must find a way through the door of the black-box, inhabit it and turn it into a home.

8.2. References

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