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THE RECONNECTION OF KNOWLEDGE AND THE PERENNIALITY OF BUILDINGS: GEOMETRY, MATERIALITY AND EMPTINESS IN DEBATE

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Raul Teixeira Penteado Neto[1]

ABSTRACT

From the deepening of the production of a group of contemporary architects, it was realized that the meditations of "complex thinking" maintain a direct and indirect link with the results of their projects. With approaches that are dispersed across borders, in a rich process that crosses and/or exceeds the limits of the discipline of architecture, in constant friction with the landscape and environment in special circumstances, Alejandro Aravena, Arquitetos Associados, Rafael Moneo and Álvaro Siza will produce indivisible and hyper-intertwined works with their contexts. From this understanding, it could be noted that the theoretical framework of "complex thinking" may have collaborated, organically and unconsciously, to the establishment of a modus operandi in the production of these contemporary architects. To validate or confirm this hypothesis, this text was based on a bibliographic review on the theme of "complex thinking", the "reconnection of knowledge" that it defends and on the "complex artifacts" produced in this critical intersection between disciplines. Technical visits and photographic essays were also carried out that allowed us to live in situ and confirm some of the intentions described by some of these architects in their descriptive memorials. This research tries to verify if buildings with flexible programs in peripheral landscapes with unfavorable topographies and inspirations in procedures that tension the intra/extra/supra disciplinary and the local/global, really favor, stimulate or legitimize the production of architectural works with a transdisciplinary character.

Keywords: contemporary architecture. complex thinking. transdisciplinarity;

[1] Architect and urban planner, Doctor IAU USP
E-mail: raultpenteado@gmail.com
ORCID: https://orcid.org/0000-0002-5614-2193/
LATTES: https://lattes.cnpq.br/8373663252074459

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INTRODUCTION

The practice of architecture in countries such as Brazil, Chile, Portugal and Spain, from the beginning of the twenty-first century, has been going through significant changes, based on the work of a select group of architects. From the analysis of a set of projects carried out between 2008 and 2016, it was possible to perceive a procedural approach, with a philosophical background. Supported by the reconnection of knowledge that complex thinking (MORIN and LEMOIGNE, 2000) defends, proposes and stimulates, these four projects elaborated by four Ibero-American studios seem to have the same objective: to plan works in which geometry, materiality and emptiness can provide more perennial, durable, flexible, adaptable artifacts, that is, more prepared for the rapid changes in society and the unpredictability of contemporary liquid life.

The studios selected for the case studies are: in Brazil, Arquitetos Associados; in Chile, Alejandro Aravena/Elemental; in Portugal, Álvaro Siza; and in Spain, Rafael Moneo. Supported by the approaches of their predecessors, they will carry out experimental transformations with the clear intention of overcoming limits and limitations, in specific and favorable circumstances, very particular, which is important to be observed. With a performance with constant coming and going between disciplines, the architectural work of these professionals results in works with other contours: a strongly experimental character, infected by procedures often foreign to the universe of architecture. The renewal of references, mixing strategies from other fields, combined with concern for the environment, the context and its circumstances, will produce works interested in slowing down their obsolescence.

About context and circumstance, procedural protagonism, which was previously concentrated in intradisciplinary and historical traditions, becomes less passive and specific, becoming more generic and universal, producing projects that will often resemble true prostheses of the landscape, transmitting to the works a complex, integrated and globalizing character (in a holistic sense). Thus, after a thorough literature review on the production of these four architecture studios, it was possible to identify which traits and characteristics of "complex thinking" (MORIN, 2000) and "transdisciplinarity" (NICOLESCU, 1999) can be directly or indirectly associated with their approaches, in certain circumstances that favor this approach.

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Based on this hypothesis, this article seeks to verify whether the projects selected and elaborated by these four Ibero-American architecture studios analyzed and assumed constitute a kind of testing laboratory for projects that can be contradictorily characterized as "complex artifacts" that intend to "reconnect knowledge" (MORIN, 2001) historically divided into independent disciplines. These 'complex artifacts' would depend on the theoretical framework of complex thinking and transdisciplinarity to differentiate themselves from conventional architecture: they would be interested in proposing experimental solutions linked to the tension between the built and the landscape, they would be open to fortuitous encounters, often depending on chance and circumstances to make the use of procedures from art viable, sculpture, or literature, in the exercise of architecture. Finally, it is believed and identified, therefore, that in these four countries, influenced by interdisciplinary approaches already used and consecrated by some key figures of local architecture from the 1960s onwards, the studios of some contemporary architects would transcend this legacy, exponentiating and exacerbating the dialogue with other fields of knowledge, in the creation of works interested in their durability, perenniality, adaptability.

To this end, the present study initially deepens the idea that humanity was built on a set of mental abstractions, perceptions, and points of view over the centuries (NICOLELIS, 2020) and that we would be close to another scientific and philosophical revolution at the beginning of the twenty-first century (OLIVEIRA, 2000). This other way of looking at the world would be based mainly on the principles of complex thinking and transdisciplinarity, organized by the sociologist, philosopher, anthropologist and historian Edgar Morin (1921), which establish a critical review of the organization of knowledge and the sciences as we know them, inherited from the scientific and philosophical revolution of the seventeenth century. presenting the transformations and crises of Western thought, to later address the emergence of the reconnection of knowledge.

As a case study, this text launches and intends to delve into four projects elaborated by these four selected studios, whose approach exponentiates and exacerbates the interdisciplinary and transdisciplinary achievements already rehearsed by some referring masters, in search of works "without time", or works that have a decelerating power of their obsolescence.

As an investigative process, historiographical research was carried out about the four studios, projects and circumstances, accompanied by photographic essays that explain the

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issues raised in the works. It is believed, with this, to demonstrate and evidence that the transcendence and transgression of pre-established disciplinary paradigms and limits, in a broader way of understanding the world, the profession and life, can promote more perennial works, aligned with the problems of our time, in particularly favorable circumstances for this.

THE FRAGMENTATION OF KNOWLEDGE AND ITS REPERCUSSIONS

To analyze the possible relationships between traces of the theoretical framework of "complex thinking" (MORIN and LE MOIGNE, 2000) in some works of contemporary architecture, this chapter presents a brief bibliographic review that aims to summarize the path historically taken between the "fragmentation of knowledge" and the "reconnection of knowledge" in contemporary times.

It is increasingly becoming aware that Western thought has been built on a set of mental abstractions, perceptions and points of view over the last few centuries. The transformative processes of understanding the world and the phenomena that govern it are evident, especially from the end of the Middle Ages. It is in the Renaissance, according to Meier (2010) and Russell (2001), that the emancipation from the religious sphere and an alienated existence, that the human being assumes himself as the master of his destiny. Individuality is presented as the exercise of a free subjectivity in communion with the natural world, which is understood as "a living organism, a Being, a living Whole, internally organized and articulated between similar parts that constitute it" (MEIER, 2010, p.302).

Since the explanation of phenomena is no longer based on unshakable truths, or on medieval scholasticism, with a theological background, the human being ceases to be secondary, impure, establishing himself at the center of the universe, a universe that is no longer theocentric. Along with this conception, Aristotelian geocentrism makes room for heliocentrism, based on the experiments and observation of nature successively promoted by Nicolaus Copernicus (1473-1543), Giordano Bruno (1564-1600) and Galileo Galilei (1564-1642), for whom objects no longer moved by mysterious and unexplained causes, but based on mathematical principles (RUSSELL, 2001).

In parallel, in Renaissance Art, Sculpture and Architecture, according to Gombrich (2015), openly personal manifestations flourish, with unique characteristics, which will abandon the undefined and unsigned character of the vast majority of the production of the Middle Ages. Within this idea of authorship, or exacerbation of individuality, a process of mutual reference between the fields of architecture, sculpture and painting begins, in which

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the occurrence of a 'painting with a sculptural character' and a 'sculpture with a pictorial character' would be striking in the work of artists such as Masaccio (1401-28) and Donatello (1386?-1466) in the fifteenth century and, later, in the works of Domenico Ghirlandaio (1449-94), Leonardo da Vinci (1452-1519) and Michelangelo Buonarroti (1475-1564).

Paintings that would resemble sculptures, with emphasis on the contours of the figures, well defined volumetrically in contrast to backgrounds that contained true architectural projects in perspective; at the same time, sculptures that would keep a simplicity based on the simplification of nature, with "clear and solid contours" (GOMBRICH, 2015, p.230), which would look like true 'three-dimensional paintings'. A moment in history, when sculptors would paint walls and ceilings and painters would 'project' paintings with sculptures on architectural backgrounds. To oppose the new conceptions of the world based on astronomical and astrological experiments, on navigations that overcame the idea of limited and flat territory, without abysses or monsters on the borders of the world, the Church would react in the context of the Reform of the institution, in the practice of the recovery of believers or the indoctrination of new followers, based on investment in ostensive art and architecture, transforming "churches into grandiose exhibitions" (GOMBRICH, 2015, p.437).

In this period understood as Baroque, this intersection between art, sculpture and architecture would be accentuated in works in which the "contempt for simple balance; and the preference for more complicated compositions", also according to Gombrich (2015, p. 390). Architects such as Gian Lorenzo Bernini (1598-1680) and Francesco Borromini (1599-1667), each in their way, *would "unify*" architecture and sculpture, respectively, in works such as the Baldacchino of St. Peter's Basilica (1624-33), in the Vatican and the San Carlo alle Quattro Fontaine Church (1641), in Rome, making it clear that Architecture, Sculpture and Art could be the same. This profusion of splendor and dazzle in a scenic space of contradictory mixture between sensuality and sacredness would be taken to the limit, having its apogee in the 1700s (GOMBRICH, 2015, p. 457).

In this world of constant novelties, hybridizations, conflicts and uncertainties, of great leap in quality in Science supported by physical and mathematical experimentation, a true "project of *mathesis universalis*, that is, a general science of order and measure, which seeks in mathematics and a new standard of rationality" (MEIER, 2010, p. 307), Philosophy would also begin a process of important transformations. These important changes that would mark the modern world and that would be under review and discussion at this time

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would be undertaken mainly by Francis Bacon (1561-1626) and René Descartes (1596-1650). In the period historically understood as the cradle of modern Philosophy, according to Campbell (2008, p.303):

> Bacon and Descartes – prophets of a scientific civilization, rebels against an ignorant past (...) – announced the twin epistemological bases of modern culture. In their respective manifestos of empiricism and rationalism, the meaning of the natural world and of human Reason (...) has reached its definitive modern expression. (Campbell, 2008, p. 303)

Supported by the achievements of the scientific Revolution promoted by Copernicus, Kepler and Galileo, between the sixteenth and seventeenth centuries, Bacon (2007) believed that the discovery of truth should occur from an 'empirical method', with rigid rules that, through observation and experimentation, would lead reason to truth. At the same time, Descartes links error to the sensible, to subjective perceptions (MEIER, 2010). To avoid error and overcome misinterpretations provided by the senses or imagination, he creates the concept of methodical doubt: "(...) I am obliged to confess that there is nothing in everything that I once believed to be true that I cannot doubt" (DESCARTES, 2008, p.80).

To this end, to avoid disturbances or contamination caused by previous ideas or the senses, it proposes the isolation of the body and mind, object and context. With these approximations, these two thinkers propose a fragmentation of the (unnatural) world, providing the *method* with a position of protagonism about the *object* analyzed, away from the *subject*. These two hypotheses for the study of world phenomena will become the basis of modern science, according to Paula (2008), reaching universities and their fragmented organizational model of teaching divided into disciplines in the nineteenth century, according to Sommerman (2008). The fundamental postulates of this new science, according to Basarab Nicolescu (1999, pp. 19-20) would be:

1. the existence of universal laws, of a mathematical nature.
2. the discovery of these laws by scientific experience.
3. the perfect reproducibility of experimental data. (Nicolescu, 1999, pp. 19-20)

In parallel, in Architecture, Art and Sculpture there would also be a fragmentation and autonomy, division and disciplinary specialization, from the eighteenth century onwards. There is a kind of moralistic response to the excesses and deviations of the Baroque and Rococo, resuming the cult of reason, nobility and purity, from the rediscovery of Greek

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History, seen as "supreme examples of civilization", according to Argan (1996, p.14). There is a systematic abandonment and condemnation of the models preceding the events of the French Revolution (1789-99), with recourse to the generic, and the neoclassical, as a kind of universal superhistorical style. In this period, sculptors will be sculptors, painters will be painters and architects will be architects, avoiding the invasion of fields that are alien and proper to another discipline, something that will remain until the first manifestations of the artistic avant-garde of the early twentieth century, in the form of the "synthesis of the arts as a form of dialogue between the different artistic spheres" according to Fernanda Fernandes (FARIAS and FERNANDES, 2010, p. 40).

THE RECONNECTION OF KNOWLEDGE AND ITS REPERCUSSIONS

"When Nietzsche [1844-1900], in the nineteenth century, said that there is no fact, but only interpretations" (CAMPBELL, 2008, p. 448), when Max Horkheimer (1895-1973) criticizes "human reason, trapped and hostage to infinite and linear progress, placing itself at the service of the destruction of life and the instrumentalization of the human being" (MEIER, 2010, p.451) and when Herbert Marcuse (1898-1979) admits that "in this world, man was restricted to a dimension, distant from himself, no longer belonging to himself (MEIER, 2010, p.452), space is opened for a critical review of the construction of Western knowledge and the theoretical and philosophical bases on which the majority of contemporary society is based. A real crisis and decadence of scientism is exposed.

Miguel Nicolelis (2020) in his thought-provoking book "The True Creator of Everything: How the Human Brain Sculpted the Universe as We Know It", reiterates this concern about the 'big story' produced from microscopic stories, which overlap, complement or oppose each other. Still, according to Oliveira (2000), we would be close at the beginning of the twenty-first century to another scientific and philosophical revolution. This other way of looking at the world would be supported, mainly, by the principles of complex thinking and transdisciplinarity, organized by a group of sociologists, philosophers, anthropologists and historians, with emphasis on the work of Edgar Morin (1921), who establish a critical review of the organization of knowledge and the sciences as we know them (inherited from the scientific and philosophical revolution of the seventeenth century).

According to Morin (2000), the construction of the modern world based on "the disjunction between science and consciousness" and the consequent and progressive hyperspecialization generated a "true mosaic, a puzzle of closed, closed, disciplinary

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objects" (MORIN and LE MOIGNE, p.28) that are incommunicable. At a time of clear crisis and transformation of thought (no longer Western, but planetary), the modern developmentalist idea that still prevails in some societies to this day - reductionist, isolationist, specialist, illusionist, artificialist, that is, alien to what is common and, consequently, to the future of the planet and life - may lead to the "disappearance of human existence on Earth (MANCINI, 2000, p.7). Expanding on this issue, Edgar Morin (2010, p. 17) believes that:

> [...] Fragmented knowledge is only good for technical uses. They cannot combine to nourish a thought capable of considering the human situation at the heart of life on earth, in the world, and of facing the great challenges of our time. (MORIN, 2010, p. 17)

According to Cláudio Lima Ferreira (2011, p.119) "Classical scientific thought was structured on three pillars: that of "order", that of "separability" and that of "reason". Roughly speaking, the pillar of 'order' or 'determinism', for example, rests on a deterministic conception of the world, which does not accept any disorder or change, therefore marked by an ideal and artificial character. The pillar of 'separability' takes into account the separation of the object from its observer and everything that arises from this isolation: the absence of subjectivity, marked, again, by the artificiality arising from the elimination of 'context'. The third pillar identified as that of absolute 'reason' arises to abolish contradictions. In this way, it is possible to perceive that classical scientific thinking is supported by a method that excels in artificiality and control, which can generate distorted results, depending on the complexity of the problem.

Based on the awareness that classical science has many limitations, and that it would be necessary to reconnect fragmented knowledge, according to Weil, D'Ambrosio and Crema (2017, p. 15), Morin writes about the achievements and transformations that have occurred in the field of quantum physics, especially from the "reintroduction of the subject into the process of scientific observation". Nicolescu (1999) will complement and make the case more didactic by exposing that the discoveries in the field of quantum physics at the beginning of the twentieth century would collapse some of the pillars mentioned above, especially those of separability and order or determinism: "Quantum entities continue to interact regardless of their distance", which leads to the understanding that it would be impossible to locate a quantum particle "at a precise point in space, at a precise point in time" Nicolescu (1999, p. 29). These new ingredients, inseparability and

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indeterminism, will therefore open space for chance, for randomness, for fortuitous events, for the influence of context on science that, until then, obtained results in controlled, delimited and artificially isolated experiments. These transformations will spread to all sciences, introducing context, environment, instability and uncertainty as important factors for obtaining more real results. About this, Edgar Morin adds that:

> [...] It is a matter of promoting the natural capacity of the human spirit to contextualize and to globalize, that is, to inscribe all information or knowledge within the respective context and whole. (MORIN, 2010, p.15)

In this way, the resolution of problems begins to accept and depend on their contexts to obtain solutions closer to reality. And what seems to be most interesting is that Morin does not discard specialized knowledge to help in the search for answers. Complex thinking, therefore, is built on contradictions and accepts, at the same time, the particular and the global. When it comes to global, Morin presents a concept that is key to understanding all his thinking, which originates in the civic challenges that are increasingly imposed on humanity, in the acceptance that everything is connected and that

> The weakening of a global perception leads to the weakening of the sense of responsibility – each one tends to be responsible only for his or her specialized task – as well as to the weakening of solidarity – [since] no one preserves his organic link with the city and its citizens anymore. (MORIN, 2010, p.18)

From this arises the awareness that the development of the ability to contextualize tends to produce the emergence of an "'ecologizing' thought, in the sense that it situates every event, information or knowledge in a relationship of inseparability with its environment – cultural, social, economic, political and (...) natural" (MORIN, 2010, p. 25). And this will not exclude the perception that this new event will also change the context, having repercussions on the whole. In this way, the protagonism of the method is overcome, giving due importance and prominence to the context of the phenomena. And it will be this contextualization and globalization of divided knowledge that will favor the articulation of disciplines, whose integration will be preponderant in the renewal of the entire process of organization of our society.

As a discipline, one of its definitions elaborated by the Organization for the Corporation and Economic Development (OECD) in 1970 will be admitted, which considers it a "specific set of knowledge that has its characteristics in terms of teaching, training,

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mechanisms, methods and subjects" (OECD apud PINEAU, 1980, p.8). Based on this and within the globalizing context placed by Morin, the interrelationship between the disciplines and the specific characteristics of these relationships were addressed by several authors, such as Sommerman (2008), Paula (2008), Zabala (2008) and Weil, D'Ambrosio and Crema (2017) and Pombo (2021), which can be understood as: pluri or multidisciplinarity, interdisciplinarity and transdisciplinarity.

Pluri or multidisciplinarity is the overlapping of disciplines without any interaction or attempt at synthesis. When a subject is addressed by more than one discipline, without the same objective, or at the same time, in a disconnected way, without dialogue, we have a pluri or multidisciplinary relationship (SOMMERMAN, 2008).

Interdisciplinarity already involves the dialogue between the disciplines, generating a synthesis between the related fields, which, however, still present particular signs and characteristics of each discipline involved. There is no structural change, nor contagion or deformation in each discipline in isolation (POMBO, 2021).

Transdisciplinarity is an interaction and openness of disciplines in dialogue to reciprocal contagion, to the undisciplined and the marginal and peripheral in each of them; it is a global system, without stable boundaries between disciplines, between order and disorder, between known and unknown, between rationality and imagination, between conscious and unconscious (PAUL, 2000); "has a dual nationality: the motherland, which refers to the nation, and the transnational, which has the Earth as its other territory of origin and destination" (PAULA, 2008, p. 28).

Regarding transdisciplinarity, also according to Paula (2008), it is not a new attitude, as it can already be identified in the Renaissance, in the work of Leonardo Da Vinci or Gian Lorenzo Bernini, as we have been able to mention earlier in this work. However, the use of the term is relatively recent, having been coined by Jean Piaget in 1970. According to Damásio (2004, p.280-281), transdisciplinarity and its complexity can be seen as a way to reverse the "Descartes' Error":

> This is Descartes's error: the abyssal separation between body and mind, between bodily substance . . . and mental substance; the suggestion that reasoning, moral judgment, and suffering arising from physical pain or emotional turmoil could exist independently of the body. Specifically: the separation of the finer operations of the mind, on the one hand, and the structure and functioning of the biological organism, on the other. The Cartesian separation may also underlie the thinking of neuroscientists who insist that the mind can be perfectly explained in terms of brain phenomena, **leaving aside the rest of the organism and the physical and social environment**. (DAMÁSIO, 2004, p.280-281, emphasis added)

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In the Architecture, art and sculpture of the second half of the twentieth century, transdisciplinarity seems to be resumed at some important moments, especially after the Second World War, especially when a work of architecture used procedures from another discipline, such as sculpture or painting, and allows itself to be transformed, presenting structural changes, becoming a "complex artifact" that lies between sculpture and architecture. This will occur, for example and vigorously, in Le Corbusier's work, in the Church of Ronchamp, in which the architect uses the strategies he had been exploring in paintings and sculptures a few years earlier, as pioneered by Jencks (2000) and expanded by Penteado Neto (2019), compared to the work of the architect Álvaro Siza.

COMPLEX REFLECTIONS ON CONTEMPORARY ARCHITECTURE

After the events that culminated in the fall of the Berlin Wall in 1989, a group of European countries entered the 1990s on an agenda of progressive abolition of fiscal and monetary borders, in an attempt to create a continental bloc. This agenda promotes a period of optimism and some economic euphoria in the global northern hemisphere, based on the unification of currencies around the "euro". The simplification of customs barriers and the integration of economies would provide an unprecedented movement of capital in the world. In this context of relatively generalized economic growth in the last decade of the twentieth century, with echoes extended to the first decades of the twenty-first century, a surprising technological advance would simultaneously occur. Previously unattainable limits are quickly overcome, from the use of three-dimensional simulation software, in all fields of knowledge, having a special impact on the construction industry and architecture.

In this last discipline, at the end of the 1980s, a process of detachment from revisionism, historicism and preservationism inherited from the theoretical discussions of the 1960s and 1970s, posed by Robert Venturi (1966, 1995), Aldo Rossi (1966, 1995), Colin Rowe and Fred Koetter (1978), was accelerated, pushing architecture towards a production freer of paradigms, more based on independent production, of "author" (PENTEADO NETO, 2019).

In Portugal, the work of Fernando Távora (1923-2005) and the careful observation of the production of foreign architects such as Alvar Aalto (1898-1976), Oscar Niemeyer (1907-2012) and Robert Venturi (1925-2018), among others (PENTEADO NETO, 2023), stimulated Álvaro Siza (1933) to trace a path full of experimental inflections, guided most of the time by context, environment, chance, by the fortuitous encounter, testing procedures

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from other fields, always in tension with the landscape. Siza will work with the idea of "transformed continuity", perpetuating all that he learned with these aforementioned architects. Considered the most important European architect still active, with long experience and multiple awards, he will be a kind of light that will guide a series of contemporary architects, from different generations, all over the world, as will be possible to see in the following case studies.

In Brazil, the remarkable work of the architect Gustavo Penna (1950), who had an initially interdisciplinary production, progressing to transdisciplinary episodic works, transgressing and transcending, in many cases, some modern national canons, was and continues to be inspiring. His awareness of the importance of chance will produce unique works: "You don't control everything you draw. I really like this vision, to learn from what will happen (PENNA, 2013, p.196-197)." His dialogue with the work of the artist Amilcar de Castro (1920-2002) served as an example for the new generations, on how to import procedures from another discipline, in this case, sculpture, in a sensible and balanced way. It is also important to note that Penna had the Portuguese Álvaro Siza (1930) as a guide and, at times, produced very 'Sizianas' works: "I met Siza when I went to Portugal in 1984" (PENNA, 2012, p.19). Naturally, all this experience has grown to contaminate the production of the professionals of the new generations who worked or learned from Penna's work. The Arquitetos Associados studio, a collective of architects with relevant performance in competitions and institutional projects, will be one of them. Initially, they dialogued more directly with Penna and Castro, later expanding their horizons, without escaping from an approach that takes into account the context as an informant of volumetry, materiality in continuity with the environment and emptiness as a vector of freedom of use.

In Chile, the work of Alberto Cruz Covarrubias (1917-2013) and José Cruz Ovalle (1948), introduced a kind of 'primitive poetics', redesigning what Chilean architecture would be, linking this production to the literature and landscape of the Andes, navigating the border between architecture and poetry (MEURER, 2020). The first revolutionized the teaching of architecture in Chile, under the direction of the School and Institute of Architecture of the Pontifical Catholic University of Valparaíso, in which a series of "poetic prototypes" were produced in the "Ciudad Abierta" in Ritoque, reflecting "el espiritu de Chile" (EYQUEM apud CRUZ, 2021, p.102). They innovated by fusing architecture and poetry, action and space, rehearsing pieces based on vernacular constructions, built with light, fragile or discarded materials. Ovalle studied in Spain, where he had contact with the

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sculptor Jorge Oteiza (OVALLE, 2019), who inspired him to produce a free and organic architecture in line with the sculptures he would also produce: "In 1972, I met the renowned Basque sculptor Jorge Oteiza, who generously allowed me to share his spatial conception in sculpture" (OVALLE, 2019). 2008, p.10, author's translation). The continuous exchange between the procedures of sculpture and those of architecture would lead his work to surprising paths in Chile. These two characters are remarkable and were an important influence on the "Golden Generation" (ADRIÁ, 2013), to which Alejandro Aravena belongs. Even without explicitly assuming the influence of Covarrubias or Ovalle, Aravena ends up bringing these interdisciplinary and poetic layers in his production.

In Spain, finally, José Coderch (1913-84) and Álvaro Siza (1933) himself may have had an important influence on the production of Rafael Moneo (1936), stimulating the creation of unique works integrated with landscape, topography, and culture. Moneo will have an important academic activity in parallel to that of architecture, teaching at ETSA in Barcelona in 1970 and at the IAUS in New York and at ETSA in Madrid in 1976 (MONEO et al, 2011). He would still be professor emeritus of architecture at the Harvard Graduate School of Design since the mid-1980s. He is the author of the famous book "Theoretical Restlessness and Design Strategy in the Work of Eight Contemporary Architects", released in Brazil in 2008. With his eyes open to international production, he will have moments in which his work will touch on the production of his closest colleagues and studied in depth, with spatial attention to the integration of the architectural artifact with culture, landscape and territory.

INSTRUMENTS TO DELAY THE OBSOLESCENCE OF BUILDINGS: GEOMETRY, MATTER AND VOID

The production of the architect Álvaro Siza (1933), considered the most important architect still active in Portugal and winner of the Pritzker Prize in 1992, gains other contours from the early years of the 1990s (PENTEADO NETO, 2019). The "Museum for two Picassos" (1992), an unbuilt "rehearsal building", would be a different project from all the previous context of his work, detaching itself from citations to styles, templates, materials from the immediate context, in search of an "architecture without time", in search of a perennial, durable artifact in dialogue with art, culture and nature. According to Siza (2012, p. 37):

> I believe that in the project for the two Picassos it is not possible to clearly define what the references are. It could be a step towards architecture

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> **without time**. The influences are many, of that I am absolutely sure, and of some I am not even aware. But what remains, in the end, is a very subtle and complex mesh, not a single limiting obsession. (SIZA, 2012, p. 37, emphasis added)

The end of the 1990s and the first two decades of the 2000s seem to have been a time when many architects were aligned with this search for an "artifact without time", a "multidisciplinary artifact" and in some cases a "transdisciplinary or undisciplined artifact", the result of hyper-referential research, based on a desire to "reconnect knowledge" (MORIN, 2001), unexpectedly miscegenate different procedures. Siza makes no distinction between the arts and science (SIZA, 2018 and 2019a) and makes this clear in several provocative and poetic texts: "Everything is discovered by observing nature. Science or Art. What's the difference?" (SIZA, 2019b, p.84)

As a speculative cut, some works from four contemporary studios are selected that will explore other procedures from other disciplines with the aim of transcending already tested and recurrent solutions, in order to try to reduce the effects of the passage of time in the projected buildings. It will be through interdisciplinarity and, in some more radical cases, transdisciplinarity that, in Portugal, Álvaro Siza himself (1933), in Spain, the architect Rafael Moneo (1937), in Chile, Alejandro Aravena (1967) and in Brazil, the collective Arquitetos Associados (2000) will experiment with flirting with other aesthetic strategies in some special projects, in particularly favorable contexts.

CASE STUDIES

In the south of Portugal, on an orange farm, Siza will experiment with a dialogical approach, in the project for the Chapel in Lagos (2016-17). A block with cubic geometry, carefully cut on the faces oriented in order to favor the entry of cold air through the lower slit and the exit of hot air through the upper slit and the high window with permanent opening. This passive strategy of cooling the interior of the building, by chimney effect, is observed in the neighboring houses, with their small and playful towers on their roofs. It is also possible to note strategies for organizing the openings arising from the observation of the sculpture, with emphasis on Eduardo Chillida, as already assumed by Siza in some texts (LLANO; CASTANHEIRA, 1996) and (SIZA, 2018 and 2019a). The color of the chapel also reproduces the color of the land and buildings in the region. A work that tries to resist time through its simple geometry, the flexibility of its empty spaces and its material mimesis.

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Title: Capela do Monte (2016-17), Álvaro Siza, Lagos, Portugal.

Image Source: by the author, 2023.

At the Museum of Navarra, in Spain, the architect Rafael Moneo, winner of the 1992 Pritzker Prize in 1992, full professor and author of a book that analyzed in depth the procedures of eight important contemporary architects (MONEO, 2008), Siza being one of those studied, also establishes a rich dialogue with the regional landscape, with a volumetry that spreads throughout the topography. In this museum, the openings, very dosed, in specially selected areas, are covered internally by a structure with Spanish marble that has translucent property and allows the filtered entry of light into the exhibition spaces. The interior and exterior coloring dialogues with the regional stones and with works contained within the museum, such as "Homage to Bach" (1956), by Jorge Oteiza, sculpted in a large block of beige stone. Oteiza also seems to be present in the excavations of the cuboids that make up the volume of the set and that are joined by wide covered circulations. Again, the apparently simple geometry and accommodated to the place, the discreet coloring imported from the stones and sculptures of local artists and the emptiness of the internal spaces that make the uses more flexible, convey to the building a transcendent character of its time.

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Title: Museum of the University of Navarra (2008-14), Rafael Moneo, Pamplona, Spain.

Image Source: by the author, 2023.

In Chile, the young and award-winning architect Alejandro Aravena (1967), 2016 Pritzker Prize, belonging to the acclaimed "golden generation" (ADRIÁ, 2013), designed in 2014 the Anacleto Angelini Innovation Center on the Campus of the Catholic University of Chile, a building that should have been innovative since its birth and origin. To avoid the common sense of proposing a vulgar and obvious all-glass building, unsuitable for the hot climate of the site of implantation, Aravena elaborates a project that intends to be perennial based on the intelligent and appropriate use of the materiality and geometry of the set (ARAVENA, 2018). With an idea equivalent to that proposed in the book "Ancestral Future" by Ailton Krenak (2019), Aravena proposes a rescue of ancestral knowledge, creating a work that resembles a pile of megalithic structures, geometrically cut and stacked stones, with the rudimentary and long-lived aspect of concrete in an apparent state: "regular forms and monolithic buildings made of raw materials, not processed with an almost brutalist primitivism" (ARAVENA, 2015, p. 12). With a design process full of duality and dialogy, it often seems to evoke founding traits of Edgar Morin's "complex thinking", described by the Chilean architect:

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> Part of this process includes as many different factors or 'parameters' in the development of the drawing as possible. And it's perfectly reasonable if these different parameters push the project in different directions. Opposing forces create the tension or synthesis necessary to let form emerge. The parameters are what the architects say "inform the shape of the project. (Aravena, 2015, p. 13)

Title: Anacleto Angelini Innovation Center, UC (2014), Alejandro Aravena + Elemental, Santiago, Chile.

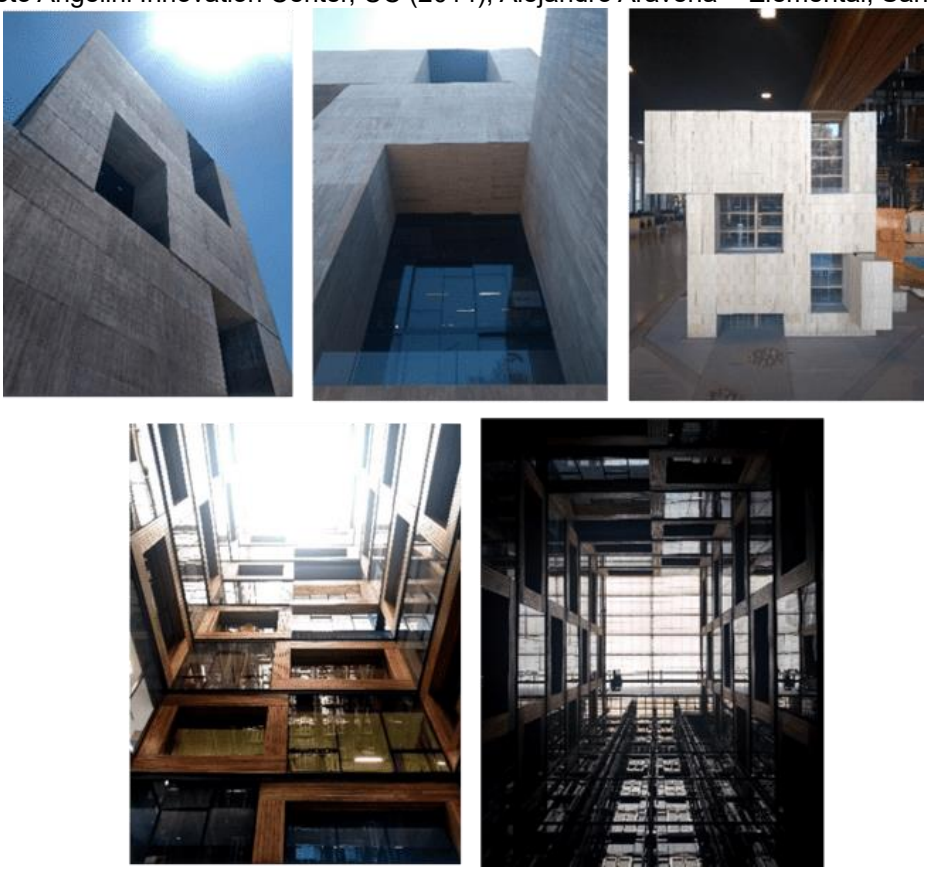

Image Source: by the author, 2018.

Following this process of "systematic chaos" (ARAVENA, 2015, p. 14), exterior and interior are diametrically opposed. Internally, the building has its core completely open, forming an atrium that has a transparent roof that allows the chimney effect and cross ventilation of the spaces that are located on the perimeter of the complex. Panoramic glass elevators and apparent structures in the internal spaces contrast with the rawness and (apparent) simplicity of the configuration of the exterior volumetry, which is reminiscent of a sculpture by Eduardo Chillida or Jorge Oteiza.

Finally, in Brazil, the Minas Gerais collective Arquitetos Associados founded in 2000, recognized winner of competitions and responsible for the most important exhibition pavilions of the Inhotim Cultural Institute, in Brumadinho, in the interior of the State of Minas Gerais, proposes a work full of ambiguity to safeguard a large collection of photos by the

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artist and activist Claudia Andujar (1931). The volume and the cut-out perimeter of the set reveal correspondences with the topography, stream and deviations of the native forest, while maintaining relations with procedures observed in the work of some Spanish artists already observed. In this project there is yet another dimension of relationship with the place and nature, which involves the reading of part of the artist's own work, whose photos are exhibited there. Between 1970 and 1972, Andujar (2015) made a series of photographs of nature in which the emphasis was on the beauty of the contrast between light and dark provided by the incidence of the sun through the cracks of the trees over the vegetation covers, inside the forests. This chiaroscuro seems to be represented in the materiality of the building, according to the verbal testimony of Bruno Santa Cecília, one of the partners of Arquitetos Associados, in an online Aula Magna for the architecture and urbanism course at USF Campinas, in August 2020, organized by the author of this article: "the texture adopted on the external surface of the pavilion intends to reproduce the richness of continuous movement of light that falls on that portion of virgin forest in which the building is implanted". Contradictorily, Bruno Santa Cecilia, in the poetic text "On the Construction of Voids", leaves aside materiality and praises the freedom provided by emptiness, evoking the work of sculptor Jorge Oteiza:

> Proposing the construction of voids is based on the principle that the excess of materiality of architecture is one of the greatest obstacles, if not the greatest, to the free spatialization of human events. The idea of projecting absences of construction can be understood as a reaction to the excess of determination imposed by the solidity of the built matter, because it is in it, in the void, where all possibility of indeterminacy resides. This principle is, in a way, announced in the now abstract of the Spanish sculptor Jorge Oteiza. His works investigate the systematic liberation or de-occupation of sculptural space, as in the series "Cajas vacías". If for Oteiza, sculpture is not a visible external form, but the invisible void that this form builds inside, the same can be said of architecture: even if what is most immediately perceived is only its materiality – its walls, floors and ceilings – architecture is essentially made of voids (...) the use value of architecture is not in its image or materiality, but in the emptiness that it shapes and articulates relationships. (SANTA CECÍLIA apud PRADO et al, 2003, p.235)

Internally, the supports for the works, loose in the middle of the large halls, are not structural, allowing an infinity of possibilities for exhibition configurations. The internal void allows the building to adapt to whatever is needed.

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Title: Claúdia Andujar Gallery (2012-15), Associated Architects, Inhotim, Brumadinho, Brazil.

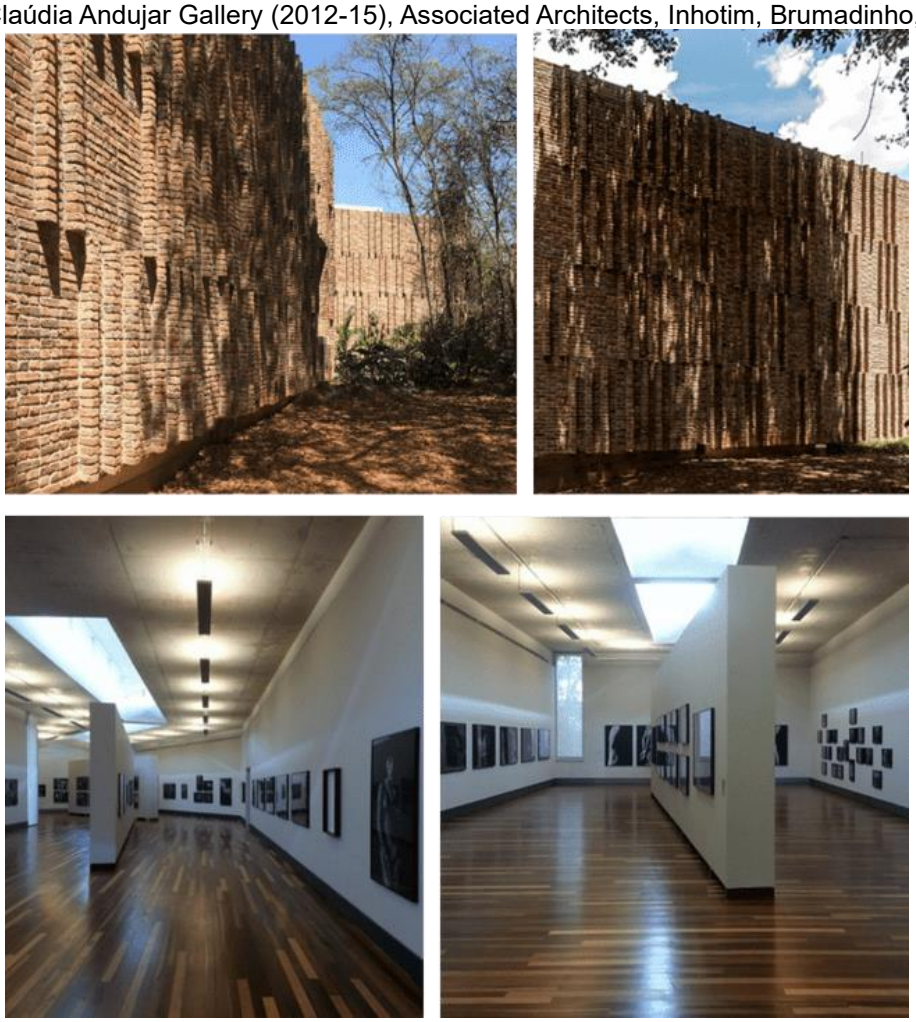

Image Source: author, 2016.

FINAL CONSIDERATIONS

From the above, it is possible to see that there are equivalent strategies in these works analyzed and taken as an example. The geometric rigor, materiality and protagonism of the void adopted, even with very different dimensions and uses, present an important concern in relation to the perenniality of the constructed artifacts.

Thinking about works that age well or that have properties that delay their obsolescence are essential nowadays when there is no more room for demolitions or major reconstructions. The frenetic change in ways of living and the growing awareness of the unpredictability of life forces architects to seek increasingly adaptable, flexible and intelligent solutions.

In addition, producing works that have an adherence to the local culture and landscape encourages their occupation and maintenance, resulting in a greater welcome of the designed spaces. It is interesting to observe how the production of the architect Álvaro

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Siza and his welcoming look at chance, contingencies and circumstances as informants of the projects, may have been a design instrument for these different generations of professionals, from the most diverse corners of the world, critically adapted.

The reconnection of knowledge, a movement of no return, emergency, in our society, seems to have been the driving force behind works with such complex procedures and that resulted in apparently simple pieces. These "complex artifacts" no longer have that naivety of the works produced at the turn of the 1980s-90s, which wanted to have a complex appearance. Its complexity lies in its rich production process, which mixes and critically arbitrates all pertinent knowledge in favor of the best solution for the project.

The apparently simple geometry of the volumetries of the projects, the materiality that has a relationship with the environment, culture and place and the void that allows the imponderable, the indeterminate and the unpredictable seem to be valid instruments to delay the obsolescence of buildings.

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