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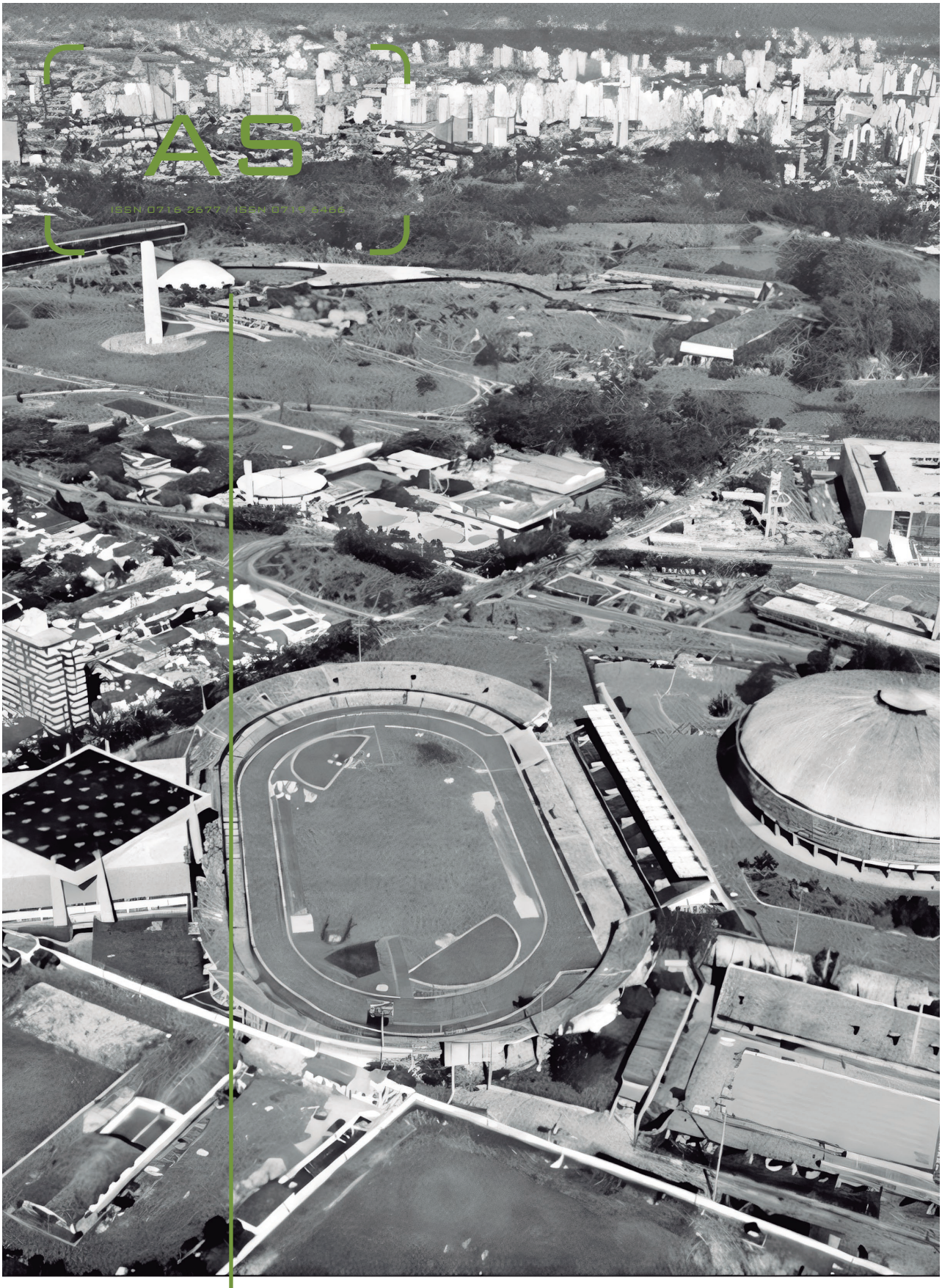

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ARQUITECTURAS DEL SUR

JULIO 2024 / vol. 42 CONCEPCIÓN , CHILE

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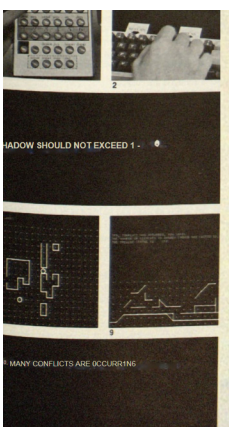

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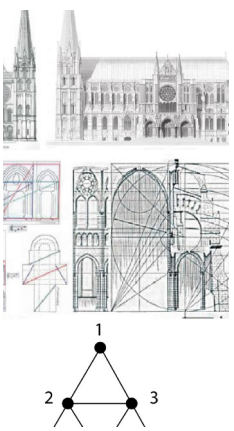

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CITIZEN PARTICIPATION AS A DRIVER OF HOUSING POLICIES: THE CASE OF THE OCCUPATION OF THE CAMBRIDGE HOTEL

LA PARTICIPACIÓN CIUDADANA COMO MOTOR DE LAS POLÍTICAS DE VIVIENDA: EL CASO DE LA OCUPACIÓN DEL HOTEL CAMBRIDGE

A PARTICIPAÇÃO CIDADÃ COMO INDUTORA DE POLÍTICAS HABITACIONAIS: O CASO DA OCUPAÇÃO HOTEL CAMBRIDGE

Figure 0. *State registration of the building during occupancy.* Source: Jardiel Carvalho/R.U.A Foto Coletivo, 28 Nov; 2016

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RESUMEN

Frente a la ineficiencia del Estado en la provisión de vivienda, se pretendió identificar posibilidades en la lucha por la vivienda social, teniendo como estudio de caso la Ocupación Hotelera de Cambridge, ubicada en el centro ampliado de la ciudad de São Paulo. El edificio, originalmente un hotel construido en la década de 1950 con incentivos fiscales limitados al Plan de Conmemoración del IV Centenario de la ciudad, terminó sus actividades en 2002. Fue expropiado en 2011 y ocupado por el Movimiento Sin Techo del Centro, en 2012. Luego de tensiones y participación en consejos participativos, el Movimiento obtuvo la donación del inmueble y una licencia en un programa federal de recalificación. A través de un análisis cualitativo del déficit habitacional del Brasil, concentrado en exceso de renta y precariedad de la propiedad, frente a políticas habitacionales centradas en la producción de unidades a través de programas de desarrollo en localidades periféricas, se entiende que el análisis de los determinantes de la factibilidad del estudio de caso puede contribuir a la discusión de las políticas y acciones gubernamentales. La metodología, basada en el campo procedimental, métodos observacionales y revisión de literatura, en el campo lógico se estructuró en los métodos dialéctico e inductivo de investigación, sistematización y análisis crítico de referencias bibliográficas y documentales y, en procesos empíricos, en el análisis cualitativo de entrevistas semiestructuradas y visitas de campo. Se concluyó que el poder de diálogo y formación de redes del Movimiento, y su estrategia basada en rodearse de actores que solidifican su lucha, contribuyeron a la viabilidad del Hotel Cambridge para su uso residencial. A partir de los datos analizados, también se defiende la innegable participación de los municipios para viabilizar la dotación de viviendas en zonas céntricas. Sin embargo, considerando el sesgo hegemónico identificado, la acción política de los movimientos sociales y la participación de la academia en su instrumentalización son de suma importancia para fortalecer la relación Capital-Estado y posibilitar la confrontación de políticas territoriales que contemplen el derecho a la ciudad.

Palabras clave: participación ciudadana, ocupación, movimientos sociales, actores sociales, financiación de la vivienda.

ABSTRACT

Faced with State inefficiency in housing provision, the occupation of the Cambridge Hotel, located on the outskirts of São Paulo's city center, was used as a case study to identify possibilities in the struggle for social housing. The building, initially a hotel built in the 1950s, closed in 2002, was expropriated in 2011, and occupied by the Downtown Homeless Movement (Movimento Sem Teto do Centro) in 2012. The movement, after social tensions and participation in participatory councils, obtained the donation of the property and its license in a federal requalification program. Through qualitative analysis of the housing deficit in Brazil, characterized by the excessive burden of rents and the precariousness of real estate, in contrast to housing policies focused on the production of units through development programs in peripheral locations, it is understood that the analysis of the determining factors for the case study's feasibility can contribute to the discussion of government policies and actions. The methodology, based on the procedural field, observational methods, and literature review in the logical field, was structured in dialectical and inductive methods for the research, systematization, and critical analysis of bibliographic and documentary references and, in empirical processes, in the qualitative analysis of semi-structured interviews and onsite visits. It was concluded that the power of dialogue and formation of the movement's networks and its strategy, based on surrounding itself with actors that solidify its struggle, contributed to the viability of the Cambridge Hotel as a residential property. Based on the data analyzed, it is also argued that the participation of municipalities is undeniable in enabling the provision of housing in central areas. However, considering the hegemonic bias identified, the political action of social movements and the participation of academia in its instrumentalization are essential to strengthen the Capital-State relationship and enable the collation of territorial policies that the right to the city contemplates.

Keywords: citizen participation, occupation, social movements, social actors, housing financing.

RESUMO

Diante da ineficiência do Estado na provisão de moradias, pretendeu-se identificar possibilidades na luta por habitação social, tendo como estudo de caso a Ocupação Cambridge, localizada no centro expandido da cidade de São Paulo. O edifício, originariamente um hotel construído na década de 1950, encerrou suas atividades em 2002, foi desapropriado em 2011 e ocupado pelo Movimento Sem Teto do Centro, em 2012. Após tensões sociais e atuação em conselhos participativos, o movimento obteve a doação do imóvel e habilitação em programa federal para requalificação. Mediante análise qualitativa do déficit habitacional do Brasil, caracterizado pelo (?) ônus excessivo dos aluguéis e na precariedade dos imóveis, em contraposição com políticas habitacionais centradas na produção de unidades por meio de programas de fomento em localização periférica, entende-se que a análise dos fatores determinantes para a viabilização do estudo de caso pode contribuir para a discussão de políticas e ações governamentais. A metodologia, baseada no campo procedimental, em métodos observacionais e revisão de literatura, no campo lógico se estruturou nos métodos dialético e indutivo para investigação, sistematização e análise crítica de referências bibliográficas e documentais e, em processos empíricos, na análise qualitativa de entrevistas semiestruturadas e visitas de campo. Concluiu-se que o poder de diálogo e formação de redes do movimento e sua estratégia baseada em cercar-se de atores que solidifiquem a sua luta, contribuíram para a viabilização do Hotel Cambridge como imóvel de uso residencial. Pelos dados analisados, defende-se, também, a indelegável participação dos municípios para viabilizar provisão de moradias em áreas centrais. No entanto, considerando o viés hegemônico identificado, a atuação política dos movimentos sociais e a participação da academia em sua instrumentalização são de extrema importância para tensionar a relação Capital-Estado e possibilitar o cotejamento de políticas territoriais que contemplem o direito à cidade.

Palavras-chave: participação cidadã, ocupação, movimentos sociais, atores sociais, financiamento habitacional.

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INTRODUCTION[1]

In 1948, the Universal Declaration of Human Rights, promulgated by the United Nations, declared housing as a universal human right:

> Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing, medical care, and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control. (United Nations, [1948] c2023, art. 25)

In 2020, the crisis generated by the COVID-19 pandemic exponentiated the relationship between health and urban planning (Borges & Marques, 2020). Social disparities and precarious housing conditions were preponderant in the face of deaths concentrated in peripheral neighborhoods, where informal construction, lack of basic sanitation, and densification heightened the spread of the virus. The distance of peripheral social housing projects aggravated the isolation difficulties due to the workers' need to stay on public transport for long periods. This framework greatly reinforces the essential character of the Right to Housing and how it is intrinsically linked to other social rights. Meanwhile, social movements that demand housing in infra-structured areas[2] struggle to guarantee these rights.

Regarding the Brazilian legal system, although it became a Republican State in 1889, the implementation of an urban policy was possible only in 1988—almost a century later—with the promulgation of the Constitution of the Federative Republic of Brazil (1988), in the resumption of democracy after the coup d'état and military government.

In this context, the right to housing was included, through a complementary amendment as a social clause, in the Federal Constitution of 1988. Engels (2015, p. 6) called it the" right of all rights " at the end of the 19th century and described, as a founding theoretical framework, the consequences of accelerated urbanization and the dualism of the countryside-city in 18th-century England. This situation would be reproduced over time in other countries, simultaneously with the march of urbanization under the molds of the industrial production process and the speculative extraction of land value:

> The expansion of large modern cities gives an artificial, enormously augmented value to land in certain areas, particularly central locations. Instead of increasing this value, the buildings built on them lower it since they no longer meet the changed conditions; hence, they are demolished and replaced by others. This happens first with centrally located working-class dwellings, whose rents never or only rarely slowly exceed a certain maximum, even if the houses are extremely overcrowded [...]. The result is that the workers are driven from the center of the cities to the outskirts, that workers 'dwellings and small dwellings, in general, are becoming rare, expensive, and often even impossible

1 This article includes research funded by the Coordination of Personal Improvement of Higher Education (CAPES, in Portuguese), modality 2.

2 The neologism "infra-structured", with a hyphen, is used here, appealing to the negative value of inferiority or lack connoted by the prefix infra-, as opposed to the term "infrastructures", which indicates the positive presence of infrastructures.

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> to find because, under these conditions, the construction industry, for whom the most expensive dwellings offer a much better field of speculation, will only exceptionally build workers' dwellings. (Engels, [1873] 2015, p. 18)

Brazil followed this movement: the urban population jumped from 31% in the 1940s to 84.72% in 2015 (Instituto Brasileiro de Geografia e Estatística [IBGE], c2023). Ermínia Maricato, in her article "Knowing to Solve the Illegal City," states that, although urbanization initially seemed an alternative to the independence from the *coronelista* command, modernity was accompanied by its archaic side: "[...] modernization is only for a few; citizenship and rights, idem" (Maricato, s. d., P.1).

Contemporaneously, it is confirmed that despite the inclusion of a chapter on Urban Policy in the Federal Constitution (1988), regulated by the City Statutes (Law n. 10.257, 2001), an instrument that represented a crucial legal advance in recognizing the social role of property, the fragility of the Federative pact (Caldas, 2015), the obstacles of the judicial system and the hegemonic character of the state-capital relationship, where the law "for the few" is applied, is influenced by the inheritance of socio-spatial stratification that permeated the urbanization process. Hence, as a rule, such laws are not sufficiently applied - given the inclusion of the right in a precarious way-which allowed the perpetuation of a process where the right to the city is restricted to access to housing through development programs, recurrently through financing and not provision, and comes to represent the means and not the end of the policies implemented.

Some references outlined by Marx (2011), especially the use value and the exchange value, and their reading by Harvey (2013), are articulable to the fundamental concepts of the right to the city of Lefebvre (2001) and analyzed under the right to housing, advocated by the foremost legal frameworks such as State duty and the unreached fundamental right, if the deficit of 5.87 million homes in Brazil is seen (João Pinheiro Foundation [FJP], 2021), in contrast to the existence of 7.9 million idle properties (fjp, 2018). This dichotomy is aggravated by the distortion caused by exchange value — which reinforces the consolidated model in the country where the policy is reduced to promotion programs despite the diverse needs identified through quantitative analysis of the housing deficit.

Such solutions imply that access to this fundamental right is reduced or conditioned on the beneficiary's possibility of access to credit (Royer, 2009; Rufino, 2015), and the requirement of cadastral regularity ultimately excludes most of those in need.

In this context of the inefficiency of the State's action in providing fundamental rights and the administration of the legacy of unbridled urbanization, it is seen that social movements are strengthening as

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Figure 1. *MSTC Material that distinguishes the terms "invasion" and" occupation."* Source: Downtown Homeless Movement, MSTC, Aug.13th, 2020. Retrieved from https://web.facebook.com/movimentosemtetodocentro/photos/pb.100069050783385.-2207520000./283174403710225 9/?type=3

essential agents of tension in the State Capital relationship. This is the context in which this article is inserted, which defends citizen participation as a fundamental instrument of opposition to the hegemonic bias by making tangible, for the other sectors of civil society, the limitation of the State, both in the provision of social housing and in ensuring the application of the social role of property, as can be exemplified by the material disclosure of the MSTC shown in Figure 1.

In the same sense, Caldas (2015) reflects on the gains assigned to social movements in fighting for urban reform, regarding "[...] the critical and organizational capacity, even if the disputes are not victorious, at first." The author also highlights the importance of the Movement's potential during this dispute to bring "society closer to reflection on the city, citizenship, law and democracy" (Caldas, 2015, p.91).

METHODOLOGY

To achieve the proposed objectives, methodological strategies in the procedural field, observational and literature review methods, and dialectical and inductive methods for investigating, systematizing, and critically analyzing bibliographic and documentary references were utilized in the logical field. We also made on-site visits to the case study and territory of direct influence.

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Figure 2. *Cambridge Hotel.* Source Photo: Werner Haberkorn, 1940-1960. Source: Paulista Museum Collection, University of São Paulo, iconography. Retrieved from http://acervo.mp.usp.br/IconografiaV2.aspx#

The qualitative analysis of semi-structured interviews with representatives involved in the project's feasibility and testimony collections during field research was used to investigate the actors' participation and vision.

Articulated research, which resulted in an article, with the quantitative and qualitative analysis of materials in sites selected related to the movement's leader, Carmen Silva, also contributed to the investigation into the formation of her public figure and to the systematization of facts related to the movement itself, since, considering the low academic production related to it, as well as the absence of formal systematization by the movement itself, such vehicles became an important source for this case study.

The case of the Cambridge Residence – Socioespacial Clipping

The Cambridge Hotel opened in 1953, during the expansion of the hotel network in São Paulo, to celebrate its IV Centenary. The Hotel — designed by Francisco Beck, an exponent of modern architecture — witnessed the center's rise and decline after the migration of its commercial activities to expansion areas, closing down in 2002, with labor and tax liabilities (Figure 2).

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The building is located on Avenida Nove de Julho, a vital corridor connecting the downtown area to the main neighborhoods of São Paulo's southwest. It is inserted in an area equipped with infrastructure and access to numerous public facilities. Considering the predominance of housing developments of social Interest in peripheral areas to guarantee the expected return by private capital, the location factor is the most recurrent theme of criticism of the Minha Casa Minha Vida (My house, my life) program, the main housing program in Brazil. In a document prepared by the Comptroller General of the Union, the legacy that the "[...] social segregation and mobility difficulties are direct effects of distancing, in addition to the lack of urban infrastructure nearby" is highlighted (Ministry of Finance, 2020, P. 47).

However, as with the Cambridge Hotel, there are numerous idle properties in the metropolises of Brazil and the world. In particular, for the case on the agenda, we mention the city of São Paulo, where the housing deficit is 358,000 units. Contradictorily, the city is estimated to have more than 2,800 idle, abandoned, underused, or sites without buildings, equivalent to two million square meters unused (São Paulo, 2016; 2020). The waiting list for the provision of social housing in the city of São Paulo has more than one million people. City Hall projections point to 20,000 citizens living on the city streets, 60% in the central area (Companhia de Habitação Popular do Estado de São Paulo [Cohab-SP], 2015).

Nevertheless, in the academic field and among public entities, there is a discussion of the need to requalify the central areas, which underwent a process of abandonment from the 1970s with the induction of new economic centralities. However, it is confirmed that sparse governmental actions directed to their requalification, such as legislative incentives for retrofits**,** as well as for the production of Housing of Social Interest by the Municipal Master Plan of 2014, at least in the municipality of São Paulo, they ended up being appropriated by private initiatives. Production of housing for higher income groups was stimulated, reversing public resources, directly or through granting exemption from fees and taxes, as instruments of private capital (Santo Amore, Sampaio, Higushi, & Pereira, 2015).

São Paulo is the largest city in Latin America, and the Metropolitan Region of São Paulo is the 4th most populous on the planet (World Population Review, c2023). The legacy of anti-cities, generated by the urbanization phenomenon induced by the capital-state relationship — fed back by targeted government actions — represents a socio-spatial situation that is replicated in metropolises of several countries, which makes this agenda relevant, as well as the systematization of social tensions caused and solutions built through this dialectical process. Through its critical analysis, the intention was to contribute to the discussion of alternatives for public policies and urban planning in large centers.

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The Downtown Homeless Movement (*Movimento Sem Teto do Centro*)

This case study starts with the Downtown Homeless Movement (MSTC, in Portuguese) — a social movement with relevant activity in the central region of São Paulo — which provided more than 3,000 homes (MSTC, c2014). The movement started from a group of women who met in a tenement association. 60% of Brazil's housing deficit is suffered by women (FJP, 2021). Their first joint act was occupying a building on Rua Álvaro de Carvalho in 1997, now known as *Ocupação Nove de Julho*. The MSTC is led by Carmen Silva, whose insurgent background stands out from forming networks and partnerships to fight for the right to housing.

In an analysis of occupations in the center of São Paulo, Buonfiglio (2008) mentions:

> The occupations of buildings in the centers, dating from the 1990s and intensifying after 2000 in several Brazilian capitals, cannot be explained as the product of isolated actions but inserted in a period of resumption of urban struggles as resistance against the deepening of poverty and social precariousness linked to the context of neoliberalism. The political and legal context of democratic consolidation brought the debate on the social role of property and the city with the Federal Constitution of 1988 and the City Statute of 2001. (Buonfiglio, 2008, p. 1)

The MSTC considers that housing is a fundamental right, a "mainstay" for other rights, for which the movement also fights:

> [...] the *Movimento Sem-Teto do Centro* is a movement of the struggle for housing in the central region of São Paulo. It comprises over two thousand people, including adults, children, and young people. We defend the fundamental right to housing, guaranteed in the Constitution, and universal human rights. Housing is not just about physical property. "Home" means much more and includes family life, safety, health, education, access to transportation, and community living. (MSTC, n.d., as cited in Moraes & Luz, 2023, p. 3)

Currently, MSTC coordinates five occupations and one development- the Cambridge Residence, completed through the Federal My Home My Life Entities program. Recently, the *Pode Entrar* program, linked to the municipality of São Paulo (Diário Oficial da Cidade de São Paulo (São Paulo, c2022, p.1)), selected it for the construction of 200 units.

The Movement's objective is "to improve the quality of life, housing, health, leisure and culture for all members and those who want to be part of the MSTC, defending, organizing and developing social work free of charge." Through the grassroots groups, in weekly and/or biweekly meetings, which take place in four locations in the city of São Paulo, rights and duties in access to citizenship are debated, based on the following lines: empowerment of

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low-income workers as subjects of rights; valorization of children's education and family health; community life and working together for self-management; right to housing; the importance of regularization of members' documentation; access to social investment funds for housing; the relationship of the City's Statutes with social movements; right to the city; incentive to participation in the agendas of public entities (Escola da Cidade, 2019, p.5). From the debates — through grassroots groups and with the participation of civil society — the movement seeks to value and encourage popular participation as an instrument for forming public policies.

Social tensions circumscribed to the residential

Through popular participation and provoked social tensions confronting the *status quo* identified in the housing provision, the MSTC could reverse the direction of the property it currently legally occupies. The former luxury hotel in São Paulo, expropriated by the municipality after several studies for requalification and negotiations with the owners — who had tax debts for more than ten years —would initially be directed to a private initiative through a public-private partnership. However, it was then destined for donation to the MSTC and subsequent selection in the federal financing program for reform (Moraes, 2023).

The film "*Era O Hotel Cambridge*" (Aurora Filmes, 2016), in which the occupation was the central theme, including the performance of real characters, received several awards, which made it possible to experience later an artistic residency**3**, a situation that, in addition to the reconfiguration of the form of appropriation of space -which guaranteed, to the Residence, the award in the Urban appropriation category by the Paulista Association of Art Critics (APCA) in 2016-, also enabled the projection of the movement and the occupation itself to segments that would not access their demands, enhancing their projection and struggle**4**:

From these perspectives, it is possible to infer that the building, in the course of its existence, as a Luxury Hotel, a decadent and inactive Hotel, an alternative bar, occupation, film set, artistic residence space, and, later, a residence, constituted, in itself, the representation of "city-making," as defined by Agier (2014).

> City-making must be understood as an endless, continuous, and purposeless process. It makes sense in the context of continuously expanding social and urban universes. This is why it seems possible to elaborate the theoretical hypothesis (and the political wager) according to which city-making is a pragmatic declination, here and now, of the "right to the city" and its establishment. Movement is essential in this conception of the city as a permanent construction. (Agier, 2014. Q. 491)

During the Movement's struggle, the Cambridge Hotel, despite having been identified in the Special Zone of Social Interest (ZEIS) by the Strategic Master Plan of the municipality of São Paulo (São Paulo, 2014), would be destined, for

3 The Cambridge Artistic Residency took place in the period from March 2016 to January 2017, with the presence of five residents in the Cambridge occupation. The work had as central objectives: the creation of collaborative work; the use of common areas as a place of work; the formation of the interlocution network with the community, focusing on the duration of the initiatives beyond the period of residence. The collaboration of psychotherapists was highlighted, for group sessions between residents and members of the occupation (Yzquierdo, 2016).

4 The projection of the Movement and the public figure of Carmen Silva to other social segments was identified through research of media outlets about the leader Carmen Silva (Moraes & Luz, 2022).

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Figure 3. *Registration of the state of the building during the occupation.*Source: Jardiel Carvalho / R. U. a collective Photo, Nov. 28th; 201

the most part, for families with income higher than six minimum wages, which circumscribes its dispute to the hegemonic character, imposed by the capital-state relationship, in the application and interpretation of laws. The inertia of the municipality, considering the time elapsed since the end of the hotel's activities and the study of its direction for higher income groups, conditioned that as a way of denouncing the inaction of the public power in guaranteeing the social function of property, the building of the old hotel was occupied, in 2012, by the Downtown Homeless Movement.

Between the occupation, which took place in 2012, and the delivery of the development — currently called *Residencial Cambridge* — more than ten years passed. Despite the numerous adversities, among them the struggle to donate the land; challenges expected in requalification works; delay in payments, due to fiscal restrictions; criminalization process, which involved the leaders of the movement; and serious restrictions caused by the pandemic, the project was finalized with the active participation of residents in assemblies, with the fulfillment of their demands such as, for example, changing the initial project, to install a tank in all bathrooms, dispensing with the collective laundry that had been proposed in the original project (Hodapp, as cited in Moraes, 2010).2023).

RESULTS

Case Study

In our research, we identified that the citizen participation of the Movement's members occurred in all phases of the process of guaranteeing ownership of the property, project, and reform works, including, initially, the act of occupation and encampment in front of the City Hall as a form of protest against the direction provided by the municipality — when the direction to entities was effectively negotiated. This was decisive for the reported reversal and the achievement, by the MSTC, of the transfer of the property with charges, which occurred in December 2015 (São Paulo, c2022).

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Thus, the history of the hotel, which was the object of "city-making" (Agier, 2015) through the MSTC's struggle, the upkeep of the collective strength of the Movement — even in the face of so many adversities—, the power of the networks created, and the experience of the actors chosen by the Movement, indicate possibilities that oppose the imposed reality related, at first, to the protagonism of the plaintiffs in accessing their right and opposition to the predominant peripheral locality.

As advocated by Maricato (1997), regarding the importance of transformation in the ideological plane and on the awareness of the excluded about their rights, it is possible to identify that, in an empirical and effectively practical way, the phenomenon object of this study intends, through its city-making movement, a possible " rupture" of the *status quo*. He highlights the MSTC:

> [...] We emphasize, therefore, the recognition of housing as a right (guaranteed in the Brazilian Federal Constitution of 1988), as well as the expansion of the concept of housing, not only as a roof but as a right to the city, including health, education, mobility, culture, security and all the infrastructure for a dignified life in a sizeable exclusionary metropolis such as São Paulo, where real estate speculation has caused serious consequences to the lives of homeless and low-income people, primarily black. (Escola da Cidade, 2019, P. 4)

The consonance of the Movement's strategy and actions with its conceptual scope and its respective contribution to the ideological plan, whose need was highlighted by Maricato (1997), could be evidenced through the bibliographic and field research carried out. The diversity of spectra of their actions demonstrates the complexity of their structuring and the sophistication of their instruments of struggle in the course of their maturation, as demonstrated by the historical milestones summarized in Figure 4.

Regarding the governmental action for the property's destination, it should be noted that this was circumscribed to the same context of overlapping private and public interests, overcome through the Movement's resistance and action in participatory councils. "Why not take advantage of public assets to make 100% of social housing viable?"(Santo Amore et al., 2015, P.1).

The organization of the space was carried out through the initial occupation -when the building was cleaned, an immense amount of garbage was removed. Electricity and hydraulic installations were carried out-, first, by the distribution of suitable environments for its occupants, according to family or personal organization, as well as collective environments, among which the following stand out: space with a library and computers for common use, community kitchen, environment for children's activities and games, entrance hall with spaces to sit, reception and access control, among others. All decisions, daily or special, are always taken collectively through assemblies, including recurrently with the external participation of

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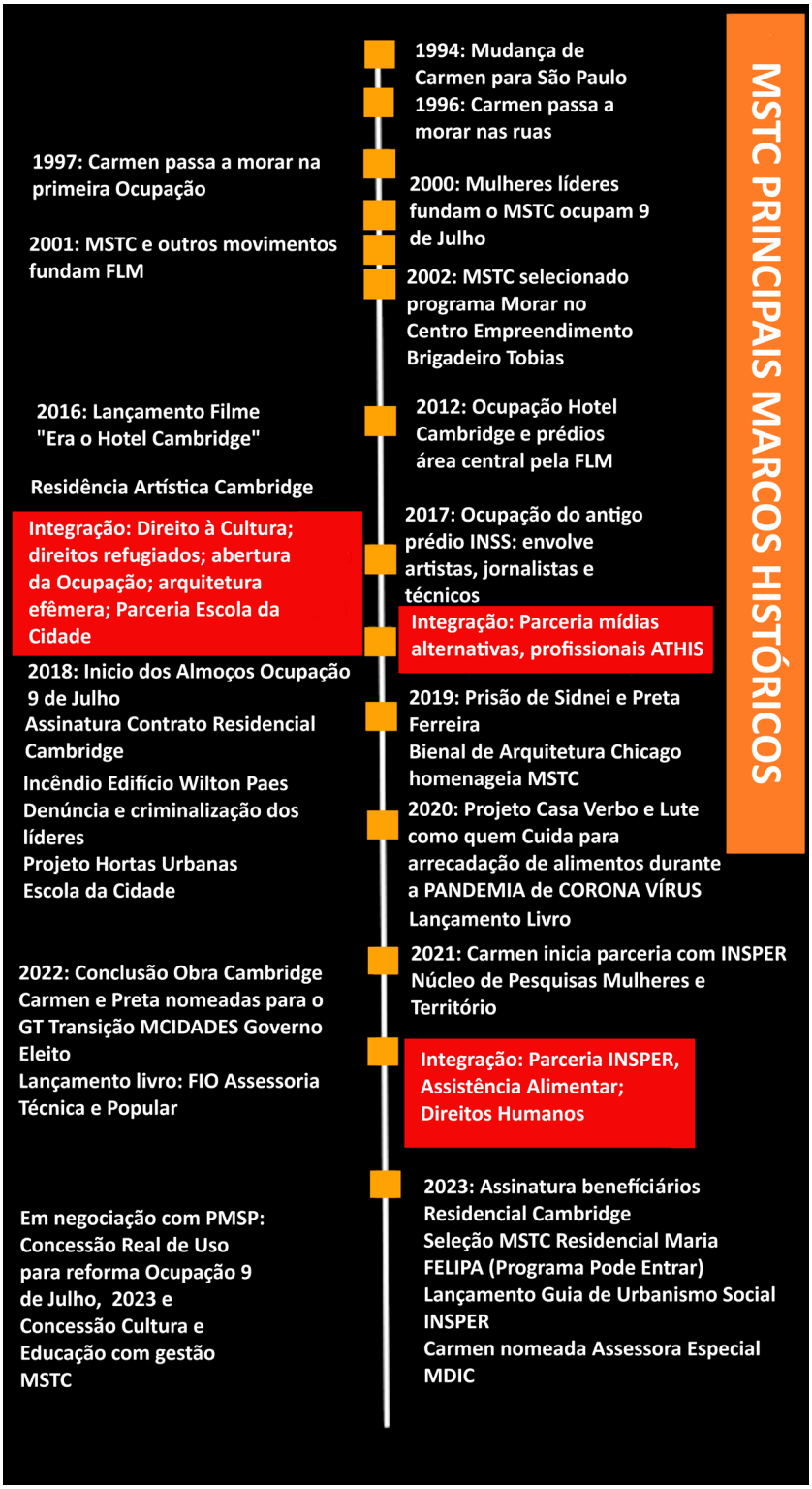

Figure 4. *Timeline with MSTC milestones.* Source: the authors, from MSTC data.

guests, among which, on some occasions, one or another of the authors of this study was present, and especially with the presence of professionals and technical collaborators, during the retrofit project and works. After completing the work, the rooms were ready for use, of high quality, and adapted to collective and individual demands, including detailed aesthetic aspects.

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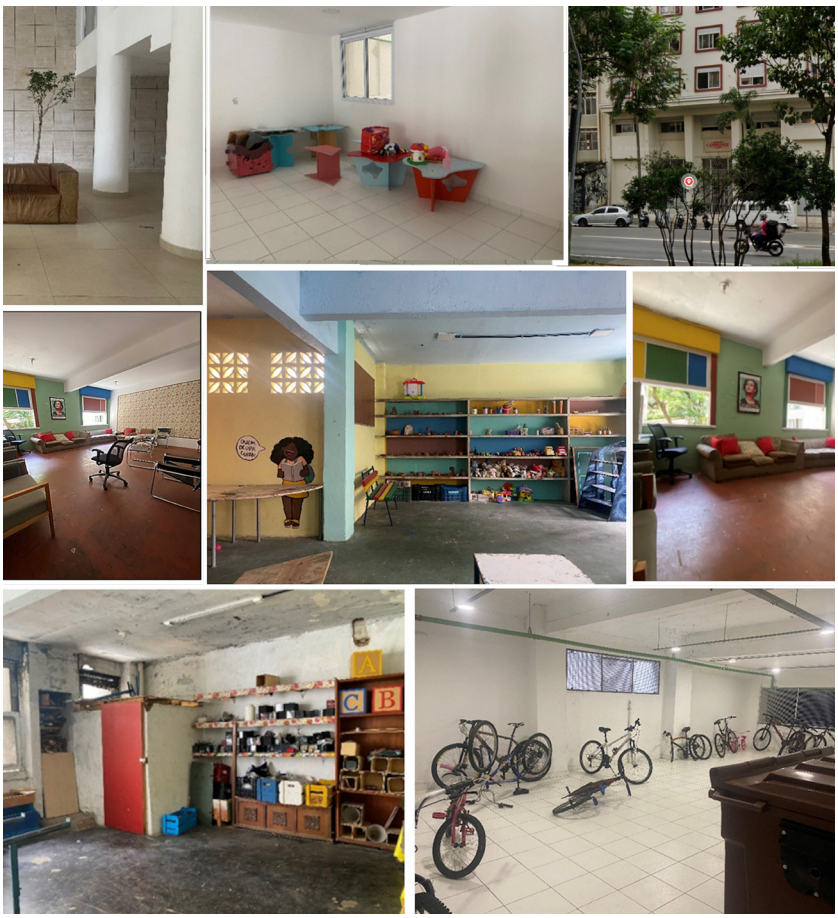

Figure 5. *Residencial Cambridge Residence and Ocupação 9 de Julho.* Source: From right to left, from top to bottom: Cambridge Residence: ground floor entrance hall; playroom; external view of the building from Avenida 9 de Julho; meeting and study room; Ocupação 9 de Julho: Library; Meeting Room; Joinery. Cambridge Residence: space for future collective use provisionally intended for bicycle storage. Source: Author. Images taken between February and March 2023. External Googlemaps image, captured January 24th, 2024.

DISCUSSION

Given the facts identified, the indelible municipal action for the viability of this case study can be seen surveying idle properties and with possibilities of expropriation, effective negotiation of the property, and direction to the entity through public appeal, situations that have legal provision and could be replicated as a fundamental process in the revitalization of central areas. Despite this decisive action for the viability of the project, the achievement of its direction for housing of social Interest had, as a preponderant factor, citizen participation, including architects, technical advisors, academics, and representatives of social movements, as members of the Municipal Housing Council. The questioning of the actions of this body allowed the withdrawal from the agenda, twice, of the proposal, which generated the time-lapse necessary for specific action of the MSTC, which, among other actions, organized the occupation itself and camp in front of the City Hall (Moraes, 2023) and, later, in the elaboration of the technical and social project and the monitoring of the construction and handover of the residence.

In an interview on the occasion of a work presented at the 11th Architecture Biennial of São Paulo, Carmen Silva highlighted the importance of the participation of social movements in municipal councils, which would configure a practical possibility of interference in public policy, in line with their demands:

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> That is why we are feared. Our organization causes the state to fear us because we are an organized group, not an alienated one. This fear is nonsense because we only want to be part of this state. How are we part of the state? Participating in the councils and their respective elections. The councils are a great decentralization of public power that guarantees popular participation in supervision and implementation. (Ferreira, 2017, as cited in Studio XRio & Columbia GSAPP, 2019, p. 8, bold section added)

In the universe of this case study, despite the difficulties imposed on the MSTC, it can be seen that the option taken by the Movement to associate with partners with experience in technical assistance for Social Housing (ATHIS), institutionalized by Law no.11,888 (2008) allowed the involvement of employees and the discussion based on information and technical proposals, given the need to overcome numerous challenges. These challenges were due both to the limits of the program, the overload of activities imposed on the Movement, and the absence of investment readjustment, as well as to external factors that had an important impact on the viability of the Enterprise: fiscal restriction by the federal government, pandemic restrictions, inflationary impact and criminalization of movement leaders. Through these data, one can infer the importance of ATHIS for realizing similar projects, which could also be stimulated by government programs in all its spheres.

According to this qualitative analysis, the organizational structure of the Movement is also worth highlighting, mainly its ability to rely on other social actors, foster the construction of their knowledge, expand the potential of their demands, and strengthen their capacity for struggle, a process that Carmen Silva, during the formation of her public figure, calls "exchange of knowledge [...] with which everyone learns a little" (Ferreira, 2017, as cited in Studio XRio & Columbia GSAPP, 2019, P.8).

CONCLUSIONS

This article seeks to demonstrate the importance of social movements and citizen participation as a way to compel the state, through its political action, in its duty to provide social housing and also to ensure that the properties under its management exercise their social role, obligations that, without the tensions caused, could not exceed the normative progress, given the hegemonic bias identified in government policies, programs, and actions.

Under the normative aspect, it should be noted that, in Brazil, the City Statute (2001) established general guidelines for urban policy, regulating articles 182 and 183 of the Federal Constitution with the definition of instruments that would allow municipal management, among which the following can be found: concession of real right of use; concession of special use for housing purposes; compulsory installment, construction, or use; special usucaption of urban property; surface right; right of preemption;

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onerous grant; right to build; transfer of construction and land regularization (Brazil, 2001). Nevertheless, the lapse between the Hotel's first tax debt enforcement action in 1999 and its effective expropriation, which occurred by agreement between the parties in 2012, demonstrates the challenges to be overcome for its effective use (Moraes, 2023, p. 46).

The MSTC's stance on opening the doors of the occupation to artistic residency and other cultural, academic, and income-generating activities, which take place at Cambridge Residence, and to cultural, education, leisure, and income-generating activities at Ocupação Nove de Julho, located next door, seemed to be the right strategy in the authors' opinion. The Movement considered the possibility of adding to its struggle social actors who would not be affected if this position were not adopted. This methodology can collaborate, if replicated, with the formal introduction of popular actors in a systemic way in the state and more plural social relations. The Movement's strategy, by allying with various segments of society and providing opportunities for such contacts to enhance their knowledge and symbolic power, may represent an important inducer of alternatives for the struggle for housing in Brazil, as identified in this research.

Due to its centrality and protagonism, this case study's cut is located in the field of exceptions. However, the systematization of its success can indicate the adequacy of existing public policies.

As Carmen Silva reflects (Ferreira, 2017, as cited in STUDIO XRio & GSAPP, 2019, P.8), "Every right without action is dead." Public management should be based on quantitative control methods, as they already exist, but also qualitative performance methods, which could support territorial and evidence-based public policies.

Considering the status quo identified in this case study, the articulation and struggle of social movements has proved to be an important instrument of opposition and inducement so that public policies can go beyond formal progress and urban reform into the realm of utopia.

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DOCUMENTARY COLLECTION OF JOSÉ VIAL: CONTRIBUTIONS TO THE STUDY OF THE SCHOOL OF ARCHITECTURE OF VALPARAÍSO

ACERVO DOCUMENTAL DE JOSÉ VIAL: APORTES PARA EL ESTUDIO DE LA ESCUELA DE ARQUITECTURA DE VALPARAÍSO

ACERVO DOCUMENTAL DE JOSÉ VIAL: CONTRIBUIÇÕES PARA O ESTUDO DA ESCOLA DE ARQUITETURA DE VALPARAÍSO

Figure 0. José Vial during the construction of the house in Jean Mermoz, 1960. Source: Archive Historical José Vial Armstrong.

Research resulting from "The Valparaíso School of Architecture. Origins and foundations of his pedagogical proposal, 1952-1957", financed by Anid - Fondecyt Iniciación 11200064

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RESUMEN

Este artículo se dedica a presentar el trabajo en torno al acervo documental personal del arquitecto José Vial Armstrong (1926-1983), parte del grupo fundador de la Escuela de Arquitectura de Valparaíso. Éste se basó en identificar, revisar, ordenar y clasificar casi mil documentos teóricos inéditos, que entregan nuevas aristas al trabajo individual de Vial Armstrong como el rol que cumplió al interior del colectivo. Considerando la propuesta de volver a revisar las fuentes de la arquitectura moderna según Panayotis Tournikiotis (2014). Este artículo se desarrolla en identificar cómo el estudio del acervo documental de Vial, permitiría visibilizar al autor en la historiografía de la arquitectura moderna en Chile, a la vez de comprender el rol del arquitecto al interior de la Escuela a la que perteneció y por lo tanto, revisar nuevos antecedentes sobre esta institución académica.

Palabras clave: archivo, fuentes, documentación, arquitectura moderna, historiografía

ABSTRACT

This article presents the work on the personal documentary collection of the architect José Vial Armstrong (1926-1983), part of the founding group of the School of Architecture of Valparaíso. This was based on identifying, reviewing, organizing, and classifying almost a thousand unpublished theoretical documents, providing new insights into his individual work and role within the group. Considering the proposal to revisit the sources of modern architecture, according to Panayotis Tournikiotis (2014), this article aims to demonstrate how the study of Vial's documentary collection would make the author visible in the historiography of modern architecture in Chile, as well as to understand the role of the architect within the School to which he belonged, and, therefore, to review new information about this institution.

Keywords: archive, sources, documentation, modern architecture, historiography

RESUMO

Este artigo é dedicado a apresentar o trabalho sobre o acervo documental pessoal do arquiteto José Vial Armstrong (1926-1983), parte do grupo fundador da Escola de Arquitetura de Valparaíso. O trabalho baseou-se na identificação, revisão, ordenação e classificação de quase mil documentos teóricos inéditos, que fornecem novas percepções sobre o trabalho individual de Vial Armstrong e o papel que ele desempenhou no coletivo. Considerando a proposta de revisitar as fontes da arquitetura moderna de acordo com Panayotis Tournikiotis (2014). Este artigo é desenvolvido para identificar como o estudo do acervo documental de Vial tornaria o autor visível na historiografia da arquitetura moderna no Chile, bem como para compreender o papel do arquiteto dentro da Escola à qual pertencia e, portanto, revisar novas informações sobre essa instituição acadêmica.

Palavras-chave: arquivo, fontes, documentação, arquitetura moderna, historiografia

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INTRODUCTION

Jose Vial Armstrong (1926-1983), a key figure in founding the Valparaiso School of Architecture (EAV), brought a unique perspective to the collective. His multifaceted role as a professor, project leader, and pivotal figure in establishing the design degree program and Open City (Ciudad Abierta) underscored his influence.

Since his early death at the age of 57, his personal documentation has remained with his family and has not been addressed within the historiographical interest around the EAV in recent decades. This text focuses on a series of writings, most of which Vial authored. Therefore, visual, artistic, or architectural sources such as photos, maps, drawings, sketches, and plans are not included. Given that the main interest of the article is to present this documentary collection, an analysis of the sources is not considered. However, the idea of doing this at a later stage is left. This text aims to show theoretical documents that, in light of the current bibliographic balance, reveal the importance of incorporating them into studies covering the collective and the individual figure of the architect, which have hardly been reviewed.

The primary goal of this text is to present a comprehensive documentary collection consisting of nearly a thousand theoretical documents. These largely unpublished documents serve as primary sources, offering new background information and shedding light on lesser-known aspects of the collective. The text also outlines the process of reviewing the documents. It suggests potential avenues for further research to contribute to the historiographical discussion on the development of local modernity and its teaching in Valparaíso.

First, it is necessary to identify some central aspects that will better contextualize the documentation worked on. From a very young age and for about forty years, Vial was interested in recording writings from the different areas of his professional life. The oldest documents that its collection preserves are related to the reformist movement of the late 1940s, referred to by its protagonists as the "Revolution of '49", in his role as a member of the Student's Union (Vial, 1949), where notebooks with notes, leaflets, and reports were found.

Once he settled in Valparaíso in 1944, José Vial gave importance to preserving personal and collective documents related to architectural, teaching, and administrative topics, as well as his notes. This documentary drive was recognized and institutionalized in an archive at the School in the mid-1950s, later named the José Vial Armstrong Historical Archive (Archivo Histórico José Vial Armstrong, 2023), where all the documents relating to the School from the year 1952 to the present day are kept[1]. At the moment, there is not enough evidence to conclude whether Vial intended to create an archive since the document recording occurred spontaneously. It is believed that this exercise could indicate the collective's interest in registering their work,

1 This archive should not be confused with the Personal Archive of José Vial Armstrong, now in the hands of his son Daniel Vial, who refers to this work as the documentary collection of José Vial..

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probably to recognize the originality. In this sense, the knowledge and interest that Vial had about history, the history of art, and the teaching of architecture is relevant. Apparently, this would have allowed him to recognize the importance of documenting EAV's work from its earliest years.

It is appropriate to consider that, according to the current state of archival research, the material collected by José Vial, given the absence of systematization, could be considered architectural documentation and not an architectural archive (Carrascal, 2023, p. 18). Therefore, the terms architectural documentation and documentary collection will be used as equivalents to refer to the written sources produced and stored by José Vial. In this article, it is evident how the analyzed material has the potential to be understood as an archive, making this research a first step in that direction.

The documentary diversity presented by this set of theoretical sources would allow new approaches to fundamental topics of EAV's history, proposal, and way of working. In particular, three documents stand out: *Hace 30 años, en 1952, se funda en Valparaíso el Instituto de Arquitectura*, *Cómo se inició la Amereida* and *El fundamento de la Ciudad Abierta*. Later in the investigation, the importance of these three documents and the value of analyzing them in greater detail will be commented on. The main objective is not to look closely at a hermeneutical analysis of these sources, which have an essential value both to obtain new evidence and a deeper understanding of this group's path and its proposals, but to highlight the importance of publicizing the set of sources to work on them in depth.

CONTEXT FOR UNDERSTANDING THE DOCUMENTARY COLLECTION

José Vial Armstrong entered the Catholic University of Chile's (UC) School of Architecture in 1944. From his first years as a university student, he stood out for his leadership qualities among his classmates, participating in the Student's Union for several years. In 1948, he traveled to Europe with his professors Alberto Cruz, Francisco Méndez, and higher-year classmates to learn about modern architecture and their new pedagogical models.

Upon his return to Chile in 1949, Vial became involved in the opposition movement to the academic teaching of his alma mater. The movement was led mainly by young students and teachers, who understood it as a revolution that began in the mid-1940s and managed to crystallize modifications in the curriculum by 1950. In this context, Vial contacted the Argentine poet Godofredo Iommi, who supported the reformist group, leading to an interdisciplinary collective where

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Figure 1. José Vial and Teresa Cruz on the day of their marriage in 1955. Source: José Vial Armstrong Historical Archive

Figure 2. Miguel Eyquem, Alberto Cruz, and José Vial in Victoria Square, Valparaíso, c. 1952. Source: Personal Archive - José Vial A.

modernity and its teaching were discussed. Iommi had settled in Chile in 1940, approaching collectives linked to the artistic avant-garde. The group that was formed during the reformist process was initially composed of architects Alberto Cruz, Francisco Méndez, Miguel Eyquem, Jaime Bellalta, Pedro Burchard, Octavio Sotomayor, and architecture students Arturo Baeza and Fabio Cruz, in addition to José Vial. The poet Godofredo Iommi and the filmmaker Patricio Kaulen also participated.

In parallel with the UC reforms, the Catholic University of Valparaiso (UCV) was also undergoing internal changes. By then, the Society of Jesus had taken over the institution's administration, appointing the priest Jorge González Förster as Rector. Based on the oral sources of the period, the new Rector invited Alberto Cruz to join the University's academic staff in March 1952 to restructure the architecture degree program (Torrent, 2002). Cruz requested the incorporation of the participants of the so-called artistic avant-garde, drawing the attention of the students meeting with them. In March of that year, José Vial, along with Alberto Cruz, Godofredo Iommi, Francisco Méndez, Jaime Bellalta, Miguel Eyquem, and Arturo Baeza, moved to Valparaíso with the possibility of formalizing the group they had constituted years before. Fabio Cruz, Alberto's cousin, who had arrived in Valparaíso a year earlier to study architecture, joined them. They formed the Valparaiso Institute of Architecture, understood as the research wing that complemented their teaching work. Three years later, the Argentine sculptor Claudio Girola joined.

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Figure 3. Members of the Valparaiso Institute of Architecture and their families, 1957. Source: Personal Archive - José Vial A.

The Institute of Architecture was conceived as a separate entity from the School, but linked to it, to carry out studies and research that served as a basis for teaching and projects independent from pedagogical work. Historiography has recognized the autonomy of both instances, although it has called the group the Valparaíso School of Architecture (EAV), distinguishing the pedagogical dimension from the investigative (Dardel, 2022; De Nordenflycht, 2018; Pérez, 2014) (Figure 1, Figure 2 and Figure 3).

Since his arrival in the city of Valparaíso, Vial worked as an assistant and then as a teacher in the degree program. Over the years, he developed a deep interest in improving the School's curricula and internal regulations. During his academic career, Vial dedicated himself to the study of history and other humanist disciplines, which was accentuated by the close relationship that both he and the other members of the School had with the historian Mario Góngora (1915-1985), ultimately influencing one another (Rodríguez, 1988). Vial was also interested in theology and taught classes on the subject. Gerardo Mello Mourao, a Brazilian poet close to the EAV, said:

> Pepe's architecture and classes were no sweat for him but brought a smile to his serene face. However, one thing brought sweat to his brow: his focus on theology. That was his true profession. Pepe Vial was a theologian by trade and profession, although he was not a church minister (...) Pepe Vial, José Vial Armstrong, Catholic by faith, theologian by profession (Mello Mourao, 1979).

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Alongside teaching, Vial worked on architecture, urban planning, and design proposals. After the 1960 earthquake, he was part of an EAV-led project to rebuild a series of churches between Concepción and Aysén (Reyes, 2021). In 1969, alongside Fabio Cruz and other academics of the degree, he led the creation of the School of Design at UCV in alliance with the publishing house Zig-Zag (Vial, 1969). In 1970, he was part of the founding group of the Open City of Ritoque, a project where EAV crystallized its architectural, pedagogical, and research experiences. Over the following years, Vial continued as an academic at the School of Architecture, of which he was also director, resigning from that position in 1980 for health reasons. José Vial died in 1983 at 56 and is buried in the Open City cemetery next to part of the group with whom he worked for about four decades.

When addressing the documentation kept by Vial, the biographical background provided is of particular relevance since it allows contextualization of the written sources. At the same time, this identification admits dialogue with other known documentation, oral sources, and the historiography that the EAV has already addressed. Thanks to this, it becomes possible, as will be developed in the following sections, to recognize the value of unpublished documentation and how it could be inserted into the bibliographic discussion on the EAV, the teaching of modern architecture in Chile, and to recognize and disseminate Vial's contribution in both contexts.

METHODOLOGY

WORK ON THE DOCUMENTARY COLLECTION

To make a list of the material, 996 documents stored in 15 boxes under the custody of Daniel Vial Cruz, José Vial's son, were reviewed. These were registered during the first half of 2022 (Figure 4) and considered the following stages:

I. Opening. The content was reviewed, identifying all types of records: reflections, logs, notebooks, personal documents, letters, study notes, teaching material, and press clippings, among others.
II. Identification. Each box was assigned a number and each document, an identification. However, the order José Vial kept the documents was not altered.
III. Cataloging. A list was prepared that considered the document's location, identification number, title (in documents that had a title, it was kept. When it did not, one was determined based on its content), type of document, and, when relevant, some observations.
IV. Digitalization. Documents were selected based on two criteria: that they were unpublished, novel, and/or relevant to José Vial's trajectory and the group to which he belonged.

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Figure 4. Work in the Personal Archive of José Vial A. Source: Photo by Olimpia Rossetti.

PROPOSAL FOR THE DOCUMENTARY STUDY

Knowledge of José Vial's biographical and contextual background was essential for the digitization stage. This story, briefly explained in the previous section, was handled when making the first approach to the documents, which allowed recognizing fundamental material to propose less widespread aspects of the EAV, thus fulfilling the central objective of this stage of the work.

Given that the preserved documentation covered Vial's career, from when he was a student until a few months before his death, over more than forty years, it was necessary to contextualize the architect's professional career specifically. This exercise involved identifying the temporality of the different sources and, above all, reviewing how this documentary set would provide new lines about different events in which the architect had an impact.

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Although analyzing the sources is not part of this stage of the work, recognizing their importance and proposing criteria for their study was a central aspect to consider since the investigation regarding José Vial Armstrong's documentary material constituted a first approach to analysis. In light of the material review, the need arises to continue a closer examination through a hermeneutical analysis of the sources, contrasting them with the bibliography on the subject and putting them in dialogue with other primary and secondary sources.

DISCUSSION

In the last three decades, archives have become a referential aspect of working with visual arts. This move has revealed an area of development of contemporary artistic practices and a diversity of strategies for revisiting canonical artists and works. In the specific case of architecture, the interest aroused around archives has allowed focusing on various areas based on unpublished or poorly worked primary sources.

In 1975, the French art historian André Chastel started a debate by asking, "Where are the archives of modern architecture?" (Ávila Gómez, 2017). As Lourdes González (2004) has highlighted, foundations and other institutions associated with the most recognized figures of architectural modernity have already done a lot of work in this regard. In this way, determining characters were positioned within the canon from the review of their sources. This has not happened, however, with actors who had a more restricted impact or whose names have not entered, for now, the essential references of the historiography of architecture. In these cases, a revision is pending that allows considering the histories of local architectures in a more situational way, based on the preserved documentation and overcoming readings that tend to consider these figures as minor and subordinated to the roles of those who have occupied more recognized positions.

The architecture archives have been characterized fundamentally by having in their collection plans, documents, photographs, and other records essentially focused on projects and/or built work (González, 2004). In this sense, the situation of José Vial's documentary collection is doubly exceptional. He is a sparsely worked architect whose documentary collection focuses on the written word, which has not been considered study material so far. However, considering the historical circumstances of Vial Armstrong's professional life, it is necessary to theoretically define how the documentation will be observed and studied.

SOURCES OF MODERN ARCHITECTURE, ACCORDING TO PANAYOTIS TOURNIKIOTIS

The proposal of the researcher and architect Panayotis Tournikiotis (2014) was used as a base to theoretically articulate the challenge of

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investigating the documentary collection of José Vial. With his work, "*The Historiography of Modern Architecture,*" the foreword by Emilia Hernández Pezzi highlights that,

> (...) the facts from the outside were not written with the detachment that the historian seems to need to interpret or narrate the facts; on the contrary, this was done directly from the inside. Historians actively participated in constructing the theoretical framework of this new architecture. They promoted their analyses of historical events from contemporary keys that contributed to its programmatic and ideological equipment. They often did it at the expense of historical rigor, manipulating and deforming the material with which they worked to support their arguments (Hernández Pezzi, 2014, p. 8).

For Tournikiotis, the first historical studies on modern architecture had an ideological tone that is relevant to revisit nowadays, critically paying particular attention to the sources. For the author, this would allow:

1. Highlighting the constant changes in the discursive elaboration of history regarding architectural modernity.
2. Proposing an appreciation of the events and changes according to the interpretation of each historian.
3. Seeing the alterations produced in the discourses in conjunction with the transformations of architectural modernity (Tournikiotis, 2014).

It is considered that these proposals allow a better understanding of the figure of José Vial from his documentary collection since:

1. The preserved documents allow us to show nuances and specificities of the development of the modern movement and its teaching in Chile, particularly in Valparaíso.
2. The work based on his documentary collection would allow new interpretations regarding his figure, marginalized from the Chilean modern movement until now.
3. The documentary set, especially if reviewed chronologically, reveals changes in discourse alongside the transformations of modernity.

Although developed intuitively, Vial's documentary collection evidences the search for the strategies that EAV sought to instill in the context of mid-twentieth century Chile, where the group's work as a collective is formulated in its organization and an original pedagogical and avant-garde proposal in its artistic exercises. It is important to note that it is pertinent to review this set of sources in line with the current historiographical balance, finding lines that would allow rethinking aspects of the development of modern architecture and its teaching in the specific context of modern Valparaíso.

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RESULTS

The relevance of works with archives in recent decades is a relevant topic for investigating the central role they fulfill in research in arts and architecture (Colomina, 2010; Derrida, 1997; Foster, 2016).

In this sense, Panayotis Tournikiotis proposed three objectives for re-examining the sources of architectural modernity. This article considers that they are useful for studying the sources preserved by José Vial. This allows one to understand his work better and obtain new background information to understand the EAV. Regarding this point, it is appropriate to highlight the three sources mentioned above since they allow for rethinking key aspects of the collective:

1. *Hace 30 años, en 1952, se funda en Valparaíso el Instituto de Arquitectura (30 years ago, in 1952, the Institute of Architecture was founded in Valparaiso)* (Vial, 1982).

   This text accounts for different milestones in the history of EAV, such as the formation of the Institute, the Amereid crossing, and the Open City of Ritoque. Although it provides already-known information, distinctive features are incorporated by being a retrospective vision focused on Vial's experience.

   The source reaffirms the Institute as a research center, the first of its kind in the country. It also highlights that they introduced field trips and the observation process as a study mechanism in architecture teaching.

   On the other hand, it addresses the well-known exhibition that the School held in 1972 at the National Museum of Fine Arts (Cruz, 1972), where "the postulation of a direct relationship between architecture and poetry" was exhibited for the first time (Vial, 1982).

   A new key that the architect delivers in this source is that for him, the Open City emerged as a continuation of the Institute because it was there that the research and reflections carried out in the previous decades were substantially applied. The relationship between architecture and poetry is particularly relevant, formulated from a specific geographical terrain, synthesizing the group's searches from its origins (Berríos, 2010) (Figure 5).

2. *Cómo se inició la Amereida (How the Amereid started)* (Vial, 1965)

   This source is a letter Vial wrote to Francisco Méndez (a member of the Institute based in Europe since 1957) on August 8th, 1965. In the letter, Vial informed him of the preparations for what was understood as a poetic trip through the American continent (La Travesía de Amereida, n.d.).

   The document provides some background information regarding the trip's organization, particularly its management. It gives an account of obtaining permits, practical decisions, contacts used, purchases, and other details of that nature. Vial's narration of the teaching activities at the school during the trip and in the weeks before, when a large part of the academic staff was absent, is fascinating. During that period,

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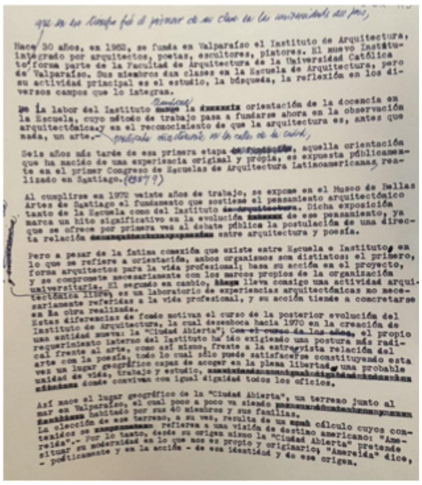

Hace 30 años, en 1952, se funda en Valparaíso el Instituto de Arquitectura,
integrado por arquitectos, poetas, escultores, pintores. El nuevo Institu-
to forma parte de la Facultad de Arquitectura de la Universidad Católica
de Valparaíso. Sus miembros dan clases en la Escuela de Arquitectura, pero
su actividad principal es el estudio, la búsqueda, la reflexión en los di-
versos campos que lo integran.

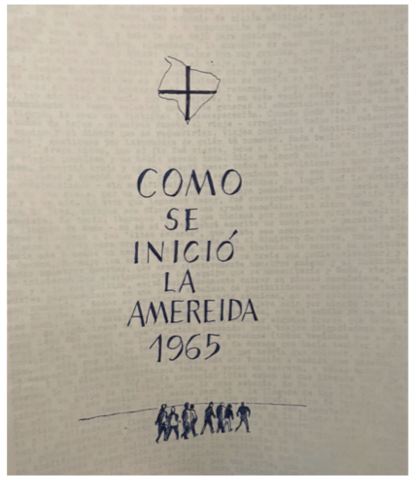
La labor del Instituto la orientación de la docencia en
la Escuela, cuyo método de trabajo pasa a fundarse ahora en la observación
arquitectónica y en el reconocimiento de que la arquitectura es, antes que
nada, un arte.-

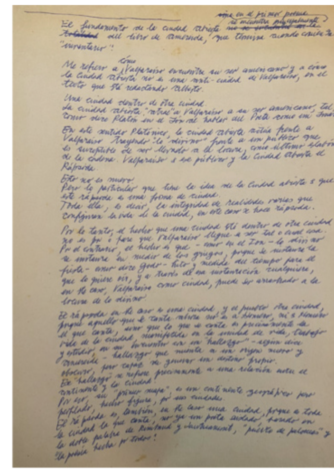
Seis años más tarde de esa primera etapa, aquella orientación
que ha nacido de una experiencia original y propia, es expuesta públicamen-
te en el primer Congreso de Escuelas de Arquitectura Latinoamericanas rea-
lizado en Santiago.

Al cumplirse en 1972 veinte años de trabajo, se expone en el Museo de Bellas
Artes de Santiago el fundamento que sostiene el pensamiento arquitectónico
tanto de la Escuela como del Instituto. Dicha exposición
marca un hito significativo en la evolución de ese pensamiento, ya
que se ofrece por primera vez al debate público la postulación de una direc-
ta relación entre arquitectura y poesía.

Pero a pesar de la íntima conexión que existe entre Escuela e Instituto, en
lo que se refiere a orientación, ambos organismos son distintos: el primero,
forma arquitectos para la vida profesional; basa su acción en el proyecto,
y se compromete necesariamente con los marcos propios de la organización
universitaria. El segundo en cambio, lleva consigo una actividad arqui-
tectónica libre, es un laboratorio de experiencias arquitectónicas no nece-
sariamente referidas a la vida profesional, y su acción tiende a concretarse
en la obra realizada.
Estas diferencias de fondo motivan el curso de la posterior evolución del
Instituto de Arquitectura, la cual desemboca hacia 1970 en la creación de
una entidad nueva: la "Ciudad Abierta". el propio
requerimiento interno del Instituto ha ido exigiendo una postura más radi-
cal frente al arte, como así mismo, frente a la entrevista relación del
arte con la poesía, todo lo cual sólo puede satisfacerse constituyendo esta
vez un lugar geográfico capaz de acoger en la plena libertad, una probable
unidad de vida, trabajo y estudio, donde convivan con igual dignidad todos los oficios.

Así nace el lugar geográfico de la "Ciudad Abierta", un terreno junto al
mar en Valparaíso, el cual poco a poco va siendo habitado por sus 40 miembros y sus familias.
La elección de ese terreno, a su vez, resulta de un cálculo cuyos con-
tenidos se refieren a una visión de destino americano: "Ame-
reida".- Por lo tanto, desde su origen mismo la "Ciudad Abierta" pretende
situar su modernidad en lo que nos es propio y originario, "Amereida" dice,
- poéticamente y en la acción - de esa identidad y de ese origen.





he and Arturo Baeza assumed the role of replacement teachers in the subjects and all the School's administrative work (Figure 6).

3. *El fundamento de la Ciudad Abierta (The Foundation of the Open City)* (Vial, n.d.)

   This source focuses on reflecting on the project's philosophical proposal. The architect begins with a series of questions related to the sense of identity of the American being and the relationship between Valparaíso and Amereida, focused on the poetic proposal of the Open City.

   For Vial, this is more than a "neighborhood or group of houses for some friends" (Vial, n.d.), but rather a collective and interdisciplinary place based on the relationship between poetry and architecture. Vial evidences that there are invariable laws that characterize the Open City, including "the denial of power as the domination of one over another" (Vial, n.d..) and the notion of hospitality, aspects that not only influence this proposal, but also run throughout the entire history of the EAV (Pérez & Pérez de Arce, 2003) (Figure 7).

Figure 5. 30 years ago, in 1952, the Institute of Architecture was founded in Valparaiso. Document No. 415, Box No. 9. Source: Personal Archive - José Vial A..

Figure 6. Cover of How the Amereida began 1965. Document No. 615, Box No. 13. Source: Personal Archive - José Vial

Figure 7. Document The foundation of the city Open. Document Nº702, Box No. 14. Source: Personal Archive - José Vial A.

Based on the cases presented and also the identification of the documentary collection of José Vial, it seems relevant to review how this documentation could influence new antecedents and interpretations of what historiography has already highlighted about the EAV (Berríos, 2014; Crispiani, 2011; Dardel, 2023; De Nordenflycht, 2018; Lagnado, 2010; Pérez, 1993, 2007)

In this sense, reviewing the contribution of some of the collective's most significant projects, such as the Amereida Crossing and the foundation of Open City, is vital. In the studies and interpretations made of them, Vial has been relegated to a somewhat secondary role. The historiography focused on the subject mainly addressed the Cruz-Iommi duo as a manifestation of the architecture-poetry link that synthesizes the group's work (Crispiani, 2011; Lagnado, 2010).

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Figure 8. José Vial during the construction of the house in Jean Mermoz, 1960. Source: José Vial Armstrong Historical Archive.

On the other hand, the review of Vial's documentation makes it clear that his work was decisive for the realization of these and other projects. So, the investigation should continue in the documentary collection and, with it, in his role within the group. This work is an approximation of the information that the sources made and preserved by Vial could reveal.

CONCLUSIONS

This article focused on bringing to light the existence of a documentary collection of unpublished theoretical sources preserved by José Vial Armstrong, the vast majority of his authorship. This set of sources provides new background information to understand the School of Architecture of Valparaíso and, in turn, makes visible his role within the collective.

To this end, the text explains how this revision was carried out and provides some lines on how the investigation of the texts could be continued to provide new background information to the historiographical discussion on the development of local modernity and its teaching in Valparaíso. The review and cataloging of the documentary collection

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strengthen the understanding of the EAV as a collective, making it clear that Vial Armstrong had a relevant, although little-known, role within the group (Figure 8).

The architect's documentary collection during his professional career provided knowledge about three essential aspects that update the historiographical discussion of this School: the figure of José Vial Armstrong, his role within the collective, and how the documentation he preserved sheds light on this group's work.

In line with the theorists above, the Spanish art historian Anna María Guasch has understood the archive as a place of communication, "with information constantly in a state of recycling" (2019, p. 303) linking, starting with Derrida, the archive with the future. In this regard, the Frenchman points out that the archive is "the question of the future in itself" (1997, p. 36).

The documentation collected by José Vial from the late 1940s to the early 1980s could be considered an archive. As already presented, it is not formally so, given the absence of systematization until the first attempt to organize this study. On the other hand, the documentary diversity, the theoretical references, the number of documents, and the new background that was investigated open the possibility of generating multiple investigations regarding his figure as an architect, his legacy, and the School to which he belonged.

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MODERN ARCHITECTURE FOR THE BRAZILIAN DICTATORSHIP: AMBIVALENCES IN THE SÃO PAULO MILITARY HEADQUARTERS, IBIRAPUERA PARK (1965)

ARQUITECTURA MODERNA PARA LA DICTADURA BRASILEÑA: AMBIVALENCIAS EN EL CUARTEL MILITAR DE SÃO PAULO, PARQUE DE IBIRAPUERA (1965)

ARQUITETURA MODERNA PARA A DITADURA BRASILEIRA: AMBIVALÊNCIA NO QUARTEL MILITAR DE SÃO PAULO, PARQUE DO IBIRAPUERA (1965)

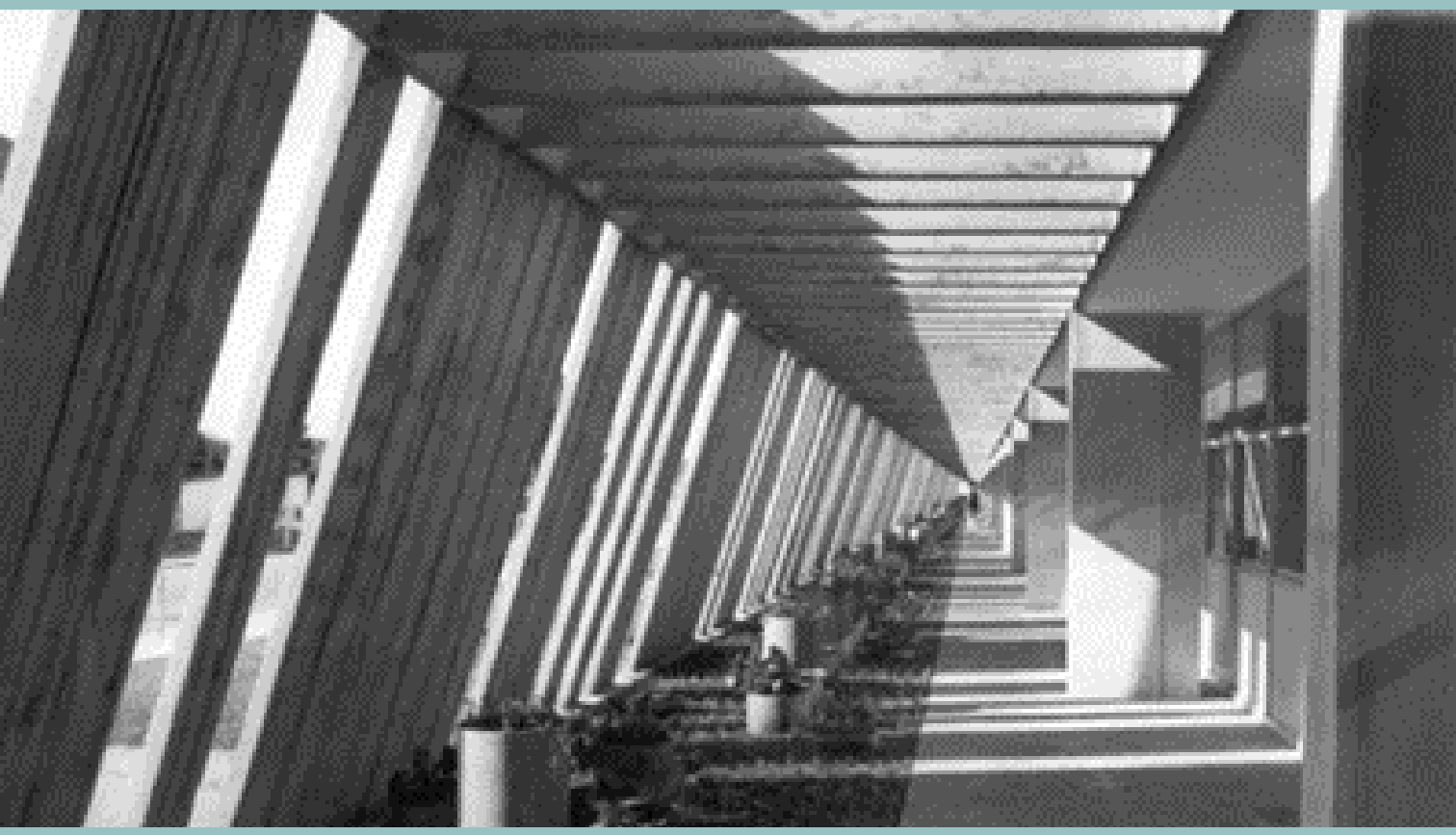

Figure 0. Second Army HQ internal facade photo (1969) Source: Paulo Bastos Archive.

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RESUMEN

Este artículo examina la relación entre arquitectura moderna y Dictadura Militar brasileña (1964-1985), en el caso de un cuartel militar diseñado por arquitectos comunistas para un régimen violentamente anticomunista: el Segundo Cuartel General del Ejército, en Ibirapuera, proyecto de un equipo dirigido por el arquitecto Paulo Bastos, un caso con fuertes enredos simbólicos, en el corazón de la ciudad de São Paulo. Aunque los arquitectos eran contrarios al régimen y estaban en el punto de mira de la represión, una mirada atenta a este caso revela matices en las reacciones de los actores ante ese contexto, así como una relación más compleja entre arquitectura y autoritarismo que va más allá de las lentes binarias de resistencia o colaboración. Este caso es un nodo importante para reflexionar sobre las complejas relaciones entre arquitectura y política, especialmente bajo regímenes autoritarios. También ayuda a reflexionar sobre la propia arquitectura moderna, las contradicciones inmanentes de sus objetos y las ambivalencias de las propias apuestas epistemológicas que la sustentaron.

Palabras clave: arquitectura moderna, arquitectura militar, brutalismo, cuarteles generales militares, dictadura

ABSTRACT

This article examines the relationship between modern architecture and the Brazilian Military Dictatorship (1964-1985) in the case of the military headquarters designed by communist architects for a violently anti-communist regime: the Second Army Headquarters in Ibirapuera, a project by a team led by the architect Paulo Bastos, a case with strong symbolic entanglements in the heart of São Paulo. Although the architects were against the regime and were the target of the dictatorship's repression, a close look at this case reveals nuances in the actors' reactions to that context, as well as a more complex relationship between architecture and authoritarianism, which goes beyond the binary lenses of resistance or collaboration. This case is an important node to reflect on the complex relationships between architecture and politics, especially under authoritarian regimes. It also helps to reflect on modern architecture itself, the immanent contradictions of its objects, and the ambivalences of the epistemological investments that underpin it.

Keywords: modern architecture, military architecture, brutalism, military headquarters, dictatorship

RESUMO

Este artigo examina a relação entre a arquitetura moderna e a Ditadura Militar Brasileira (1964-1985) no caso do quartel-general militar projetado por arquitetos comunistas para um regime violentamente anticomunista: o Quartel-General do Segundo Exército no Ibirapuera, um projeto de uma equipe liderada pelo arquiteto Paulo Bastos, um caso com fortes envolvimentos simbólicos no coração de São Paulo. Embora os arquitetos fossem contra o regime e alvo da repressão da ditadura, um olhar atento a esse caso revela nuances nas reações dos atores a esse contexto, bem como uma relação mais complexa entre arquitetura e autoritarismo, que vai além das lentes binárias de resistência ou colaboração. Esse caso é um nó importante para refletir sobre as relações complexas entre arquitetura e política, especialmente em regimes autoritários. Ele também ajuda a refletir sobre a própria arquitetura moderna, as contradições imanentes de seus objetos e as ambivalências dos investimentos epistemológicos que a sustentam.

Palavras-chave: arquitetura moderna, arquitetura militar, brutalismo, quartéis militares, ditadura

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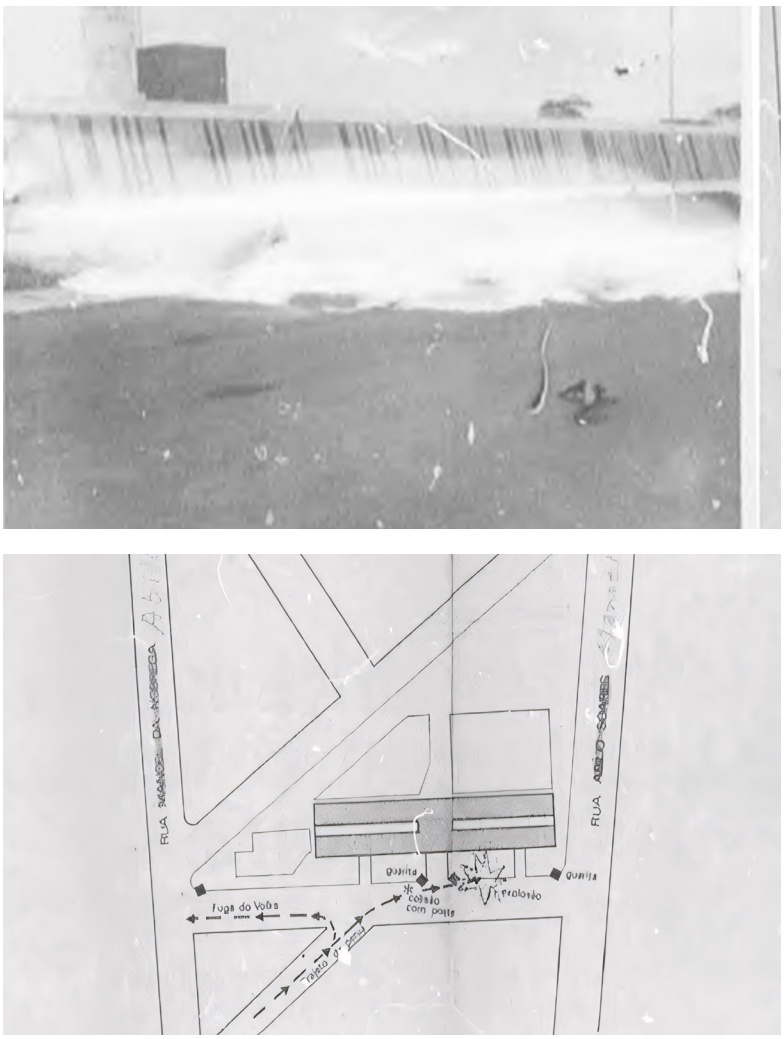

Figure 1. Images from the police inquiry opened to investigate the attack on the HQ in 1968. On the left is a photo of the moment of the explosion, and on the right is a map describing the attack. Source: National Archives, Ministry of Justice

INTRODUCTION

(COLD) WAR ARCHITECTURES OF THE BRAZILIAN DICTATORSHIP

In June 1968, a pickup truck, accompanied by a red car, entered the Second Army Headquarters' (HQ) access area in São Paulo while a second car waited outside. The truck sped towards the building as the driver jumped free. A soldier attempted to shoot at the advancing vehicle, but his weapon jammed. The vehicle, loaded with fifty kilograms of explosives, shot across the gap in the trench that protected the HQ's main building, collided with a wall, and exploded, killing an eighteen-year-old soldier.[1] (Figure 1)

The São Paulo Army HQ, located in Ibirapuera Park, in the southern part of the city, was targeted just a few months after it opened. Brazil was then living under a military dictatorship that lasted from 1964 to 1985, inserted within a global Cold War context. The Popular or People's Revolutionary Vanguard (VPR), an armed resistance movement against the regime, would claim responsibility for the attack.

1 The description of the attack was reported by the press in detail (See *Folha de S. Paulo*, June 26th, 1968), and the restricted investigations can be accessed at the National Archives of the Ministry of Justice through the inquest and documents made available by the National Truth Commission.

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The HQ had been moved from an "old mansion" to a brand-new modern building in a flat, military-controlled area, far from all of the city's highest points that could pose a danger to its personnel. Besides its strategic characteristics, it was clearly a symbolic move, with the new HQ serving as affirmation for the regime that would approve the Institutional Act number 5 that same year, thereby assuming itself as an even more well-polished dictatorship. **2**

During the following year, 1969, the military zone of Ibirapuera Park saw the creation of Operation Bandeirante (OBAN), a centralized political police body within the army focused on more direct techniques of repression (Napolitano, 2014).**3** However, the OBAN operation at the Second Army HQ generated certain issues, such as recruits witnessing detainees being tortured daily and the openness and exposure of the new building not appropriate to the kind of activity of the new operation. It was therefore considered essential to transfer the OBAN operation to a location that was safe and discreet while still being close (Gaspari, 2002). **4** However, the monumentality and openness of the HQ's new architecture imposed limits on such unsavory practices of the regime.

More than revealing this symbolic character of the new HQ, the incident involving the VPR attack demonstrated the core features of this modern project. The HQ had been built on a surrounding exposed and strategically defined plain, isolating itself and guaranteeing its security by making any approach visible. Here, architecture was intrinsically linked to strategic demand and didactically exposed the armed conflict event. A war project built under and occupied by conflicts.

This article examines the relationship between modern architecture and dictatorship in the case of a military headquarters designed by communist architects for a violently anti-communist regime. The case in question is the Second Army Headquarters in Ibirapuera, designed by a team led by the architect Paulo Bastos, a case with strong symbolic entanglements in the heart of São Paulo. Although the architects were against the regime and were targeted by the dictatorship's repression, a close look at this case reveals nuances in the actors' reactions to that context, as well as a more complex relationship between architecture and authoritarianism, which goes beyond the binary lenses of resistance against collaboration.

Brazilian modern architecture historiography has usually treated the military dictatorship as an "interruption" in the progressive project and, consequently, in the politically charged architecture emerging in the early 1960s. However, a close analysis of the period shows the contrary. Although the optimist hopes for social transformations were frustrated, the number of commissions and contracts to architects saw a boom, the result of progress in the construction industry and state-led initiatives and infrastructure enterprises. Therefore, the architectural field was deeply entangled in the very production and reproduction of that regime once its moments of economic success were produced by investments in the construction business sector (alongside repression and control of labor unions, guaranteeing a lowering of wages as inflation control). In this scenery, left-wing architects were primarily searching

2 Known as AI-5, this was the fifth of seventeen major decrees issued by the military dictatorship in the years following the 1964 coup d'état. Among other things, AI-5 abolished habeas corpus and closed the National Congress, resulting in greater repression and censorship, constituting the regime's darkest period. See (Patto Sá Motta, 2018)

3 The demands of the operation even had a support network which would help through occasional aid or a small collaborative "petty cashbox", such as donations by the São Paulo Mayor's Office, from the municipal area of the new HQ through to the State, or with contributions from representatives within the Brazilian economic power with "funds for equipment to confront subversion", not to mention the help of TV broadcasters and newspapers.

4 This was a space provided at the police station on the corner of Rua Tutóia and Rua Tomás Carvalhal by the State Governor, Roberto de Abreu Sodré. The DOI CODI [The Department of Information Operations - Center for Internal Defense Operations] had its operations there. The building has been recently listed in memory of its torture and extermination center and as a landmark of the dictatorship (Process 66578/12; Resolution 25 12/05/14).

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for ways to work professionally within that regime, even while also seeking ways of resisting or conspiring against it.

Thus, the case helps to reveal the ambivalent roles of architecture during authoritarian regimes, done here through a combination of methodologies from political history, aesthetic theory, and archival research. On the one hand, the approach to left-wing architects and their expectations of a politically charged architecture is read in dialogue with notions such as Serge Berstein's "political culture" (2009) and also Raymond Williams's "structure of sentiment"(2011). Both help thinking about the circulation of ideas in the studied period, between political notions and architectural procedures. On the other hand, an approach from critical aesthetic theory underpins the analysis of architecture: the immanent critique of the object extracts from its reading aspects of the social realm's dialectics and contradictions (Adorno, 2012; Tafuri, 2011). However, it is important to consider the agency of architecture and how it intervenes rather than only representing a reflex or result of its social context (Avermaete, 2011). While documents of the design process help in this reading of the object, their content is crossed with different sources, such as written documents, competition edicts and reports, and press material, to complexify and historicize the architectural object within the period's political history. This article, therefore, addresses one single case, but seeks to open reflections that are urgent for a broad architectural production during the Global Cold War and the multiple authoritarian regimes installed worldwide at the time.

THE ARCHITECTS AND THE DICTATORSHIP

Modern architecture was at the heart of political events during the military dictatorship, from Brasília to Ibirapuera and from palaces to basements. An association between modernist aesthetics and the State with modernizing aspirations was nothing new in Brazil. This relationship had been cultivated since the *Estado Novo*, another authoritarian period led by President Getúlio Vargas from 1937 to 1945, setting the tone for the positive aims of the national architectural avant-garde: building a national identity, affirming a "tradition" based on the modern, and boosting development. From Vargas through to President Juscelino Kubitschek's government (1955-1960), the relationship between architects and government officials was fundamental in consolidating the architect's image as an artist who built state symbols. Technical and formal experimentation was fostered through a form of patronage, with cutting-edge professionals also legitimized by the cultural field's autonomous criteria (Gorelik, 2005). Nevertheless, this fundamental relationship between public commissions and the professional field of architecture would take different forms outside the country's capital over the following decades.

In the state of São Paulo, during the 1950s and 1960s, while witnessing the construction of the new federal capital, Brasília, the Brazilian Institute of Architects (IAB, in Portuguese) managed to negotiate a contract of over one hundred architecture offices with the State government to meet the demands of projects across the state, involving the construction of public schools, university campuses, courts, health centers, and infrastructure (Camargo, 2016).

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This productive context was fundamental for consolidating and affirming the profession, culminating in architects mobilizing to formally propose a solid political agenda for the country through the Seminar on Housing and Urban Reform in 1963. This agenda was associated with the Basic Reforms plan being proposed by President Goulart's government at the time (Koury, 2013). In addition to technical experimentation on the drawing board for the commissions of public equipment, in the Urban Reform debate, architects highlighted intervention in the legislation, forms of financing, and institutional design so that addressing housing and urban problems could become perennial. Part of the solutions designed in this debate were even incorporated by the military dictatorship established after 1964, with the creation of the National Housing Bank (BNH, in Portuguese) and the Federal Service for Housing and Urbanism (SERFHAU, in Portuguese), despite their partial and inefficient application in many aspects (Lucchese & Rossetto, 2018).

Besides responding to many technical demands, new generations of architects were also called to symbolically represent the regime's "conservative modernization." One relevant way this kind of commission occurred was through IAB-guaranteed competitions. This points to an essential element for an historiographical approach to the dictatorship period: the necessity to look at the accommodation processes (Patto Sá Motta, 2016), negotiations, and forms of insertion of architecture within the authoritarian regime, overcoming the binary lens of resistance versus collaboration.

Since the 1940s, the Institute of Architects had been working to defend the autonomy of architecture as a profession and making clear efforts to present to different kinds of institutions the role of architecture competitions. The army was one of those institutions. In 1964, right after the military coup, the Institute presented a guiding document to several institutions about how to organize a competition and a list with a national jury body selection to legitimize and inform future choices.**5**

It is often said that few competitions took place during the dictatorship, but research on the topic reveals this is not exactly true. Some relevant buildings were the result of public competitions, such as the National Oil Company (Petrobras) Headquarters in Rio de Janeiro (1969), the Santo André Civic Center (1967), the National Development Bank in Brasília (1970), Salvador City Library (1969), and the Brazilian Pavilion at the Osaka World Expo (1969), maybe the most famous case where some contradictions of that period appeared. Besides being part of a cultural arena, implying legitimation processes among peers, and changeable hegemonies, architecture competitions had an important role as a breach of democratic procedures during a time of political persecution and authoritarianism. In such a context, the design competition for the Second Army Headquarters was announced due to a partnership between the Ministry of War and IAB São Paulo in 1964.**6** The new HQ would be located next to the Legislative Assembly, the result of yet another competition held in 1961 (Dedecca, 2012).

5 Documents found at the IAB Archive in São Paulo.

6 The edict for the competition was published in December 1964, and the details were issued at the beginning of the following year. The edict, published by the Ministry of War in partnership with the IAB, was consulted in the collection owned by the architect Paulo Bastos.

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Here, mention should be made of the importance, at this particular time, of the IAB's São Paulo branch, which was under the leadership of a group of like-minded members who were — in part — military regime enthusiasts. Presided over by Alberto Botti, the group had won one of the very few tense elections for the institute's São Paulo branch, marked by a dispute between left and right, with the losing group under the leadership of Carlos Millan, an architect linked to the Catholic left and the Popular Action Movement (Matera, 2005). Always marked by the centrality of the agenda of professional affirmation and in defending the profession, the alignment of the IAB to the regime seems to have been necessary at that moment for two reasons: in addition to maintaining an intermediary role for public commissions, in competitions such as that for the Army HQ, the institute would also act as an important mediator in defending architects who had either been arrested or whose professional licenses had been revoked.**7**

The jury for the HQ competition, comprising military personnel and architects,**8** chose from twenty-eight proposals. The winning team included the young architects Paulo Bastos, Léo Bomfim Jr., Oscar Arine, Ubirajara Ribeiro, and Paulo Sergio Souza e Silva. It is noteworthy that part of the team had members of the Communist Party of Brazil, and this fact was cited in an appeal made by one of the contestants in the bid, as the architect Paulo Bastos recalled decades later:

> We won the contest and afterwards learned that one of the other bidders had gone to General Amaury Kruel, the commander of the then Second Army, and said that they could not give the project to a team of communists. Moreover, Kruel had asked: Are they architects? They are. Did they win the architecture competition? They did. Thus, they will carry out the project. (Rodrigues, 2008)

General Kruel, commander of the Second Army and, prior to that, Minister of War for President João Goulart, supported the 1964 coup by sending troops from São Paulo to Guanabara after—according to various interpretations—wavering and negotiating with his colleagues and the coup's leaders (Toledo, 1985). According to the testimonies of fellow soldiers, the commander was a friend and companion of the deposed President João Goulart (Gaspari, 2002). Such a fact is important to note given the apparent contradictions of a military regime hiring communist architects—one that had been established, among other reasons, to eliminate them. Kruel's involvement exposes the need to consider the armed forces as a heterogeneous, complex entity within itself (Martins Filho, 2019; Cunha, 2020).**9**

The competition program was written in December 1964 by IAB and the Ministry of War, but, according to the news, it took two months to get published, only after "an understanding of both parts." In April 1965, the results were announced, and 28 entries were exhibited at the headquarters of the Diários Associados newspaper.**10** In that event, the new Minister of War, General Costa e Silva—who would become the next president of that regime—gave a speech celebrating the (communist) awarded architects, calling

7 Testimony given by Botti at an event at IAB-SP in 2018; and also in a statement by Alberto Botti to Rodrigo Kamimura (2016).

8 Col. Augusto Osório, Major Hans Altenburg, Col. José Barreto, and Major Maurício Moreira from the military, and the architects Ary de Queiroz, Salvador Candia, Israel Sancovski, and Jon Maitrejean—the latter having been removed from the School of Architecture and Urbanism at the University of Sao Paulo (FAU/USP) in 1968 for being considered subversive, even without belonging to any political organization.

9 Documents, such as the edicts for the competition and the contract signed by General Amaury Kruel, were consulted at the architect's office, Paulo Bastos Archive

10 *Revista Acrópole*, n.316

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them the "new Niemeyers." General Kruel also highlighted the good work and partnership of IAB's good work and partnership in the ceremony. Besides the symbolism of Costa e Silva's speech, it is important to note that the projects for the new São Paulo Military Headquarters were exhibited for the first time in a newspaper's head office, which seems telling about the press' role both in supporting the new regime and in disseminating the architecture competition as a face of the country's modernity. **11**

What is striking, furthermore, is the type of nuances these relationships were subject to between the established power and those who rendered services to it. In 1970, shortly after the inauguration of the São Paulo Army Headquarters, the architect Paulo Bastos was reportedly kidnapped by paramilitary groups who were on the hunt for communists. His previous contact and good relationship with the Second Army—a relationship which had strengthened after he was invited to produce a series of other projects for the armed forces, including being awarded by them in 1978 for his services **12**—was essential for the family to locate him and get help to rescue him (Rodrigues, 2008). In 1975—a year when Bastos worked in many public and military commissions—his whereabouts were again unknown for several days after being taken from his office by men who had presented themselves as OBAN representatives. This led to his wife filing complaints, eventually reaching Minister General Figueiredo, then Head of the National Intelligence Service (SNI, in Portuguese) **13**. It was then clarified that, indeed, Bastos and his colleague Léo Bomfim Jr had both been arrested and charged and had appeared among 19 others charged from PCB, including the congressman and central committee member Marco Antônio Coelho, through the so-called *Operation Radar*. **14** Bastos had, in fact, been linked to the party since 1960 and had provided shelter at his home to João Vilanova Artigas during his clandestine moments, who, besides being his professor, was a prominent member of the party. Both individuals, moreover, also signed a manifesto in the early 1980s for the "refoundation" of PCB, by this point strongly demobilized and fragmented, with the prospect of reopening the regime and legalizing the parties. After his arrest, Bomfim Jr, like so many others, moved away from party militancy **15**.

During the dictatorship, the PCB had an official position of not making public its evident opposition—considering its members were the target of state repression since the 1964 coup—and the party established in its congresses also a stage-based reading of history that led them to a position for the support of the development of productive forces, which would lead the country to its capitalist revolution, and then, in the future, to a social one (Secco & Pricás, 2022). Considering all that—as a strong "political culture" within left circles at the period—the architects' positions should be read with the nuances they call for. Bastos believed their project for the HQ was improving a fundamental national institution, the Army, "regarding its validity and permanency." He condemned the 1968 VPR attack on the building, emphasizing that momentaneous conflicts moved it and would destroy the architectural efforts of "humanizing that institution" with a design of a military building with "no walls." **16**

11 The event was broadcast by TV Tupi, and its recordings are in Cinemateca Brasileira.

12 Award presented to Paulo Bastos by members of the military Fire Department, Paulo Bastos Archive.

13 General Figueiredo would become President from 1979 to 1985. These documents attest to his persecution and can be found at the National Archives, Ministry of Justice—Process DICOM n.53-424 - 04/03/1975, and records at the State Department for Social and Political Order (DEOPS) File.

14 *Folha de S. Paulo*, May 7th, 1975. This had been an offensive against the party, initiated during the General Geisel government with the aim of ultimately eliminating communists, considering the moment of inevitable growth of the congressional opposition and the early stages of constructing the opening process. The operation had discovered a clandestine party printing press operating in the basement of a country home, under a trapdoor at the bottom of a water tank, where the newspaper *Voz Operária* [The Worker's Voice] had been produced (Gaspari, 2005).

15 Interview with Léo Bomfim Jr conducted by the author in 2019.

16 *Revista Acrópole*, n.351 (1968).

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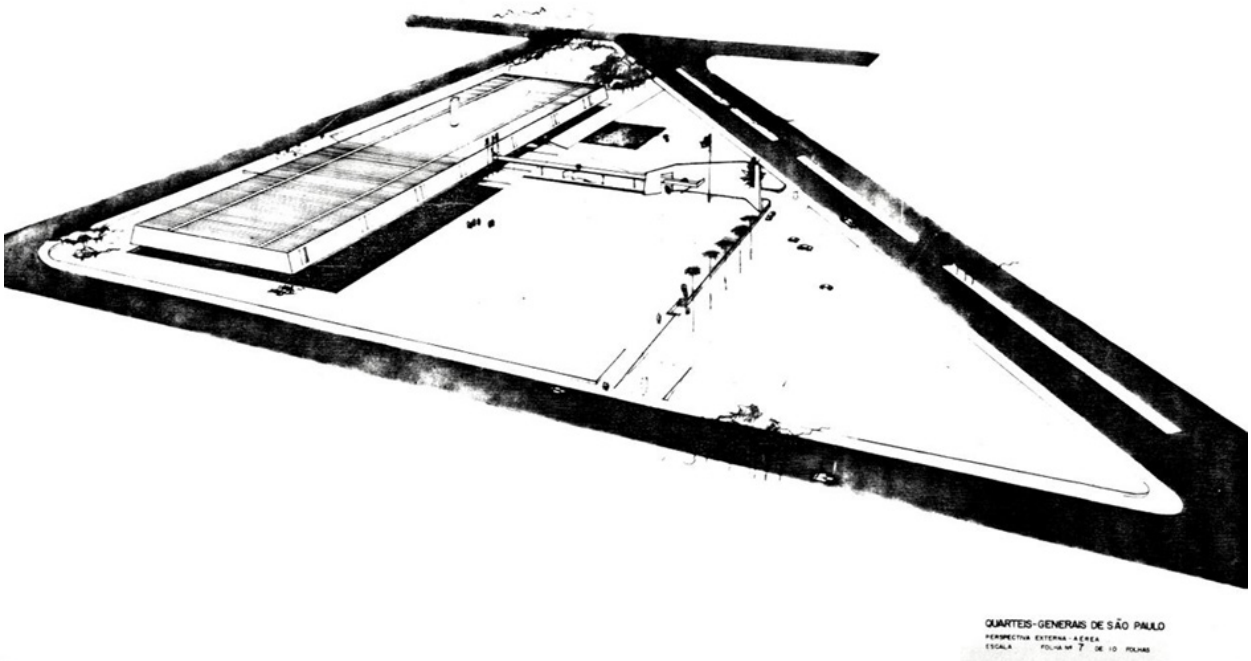

Figure 2. Second Army HQ First Prize Perspective Drawing (1965). Source: Paulo Bastos Archive.

Figure 3. Second Army HQ internal facade photo (1969) Source: Paulo Bastos Archive.

THE SECOND ARMY HQ DESIGN: BETWEEN STRATEGY AND MONUMENTALITY

In the Second Army Headquarters, architecture takes on a historical significance that journeys beyond the representation of national developmentalism in modern Brazilian production. In this case, several plots of the regime's inner conflicts cross the building's history, from General Kruel defending the competition result in 1965 to the birth of OBAN in 1969, shortly after its inauguration. In their nuances and contradictions, those moments are constitutive of the building and its presence in the city.

The jury minutes from the competition, published in the journal *Acrópole* No.321 in 1965, highlight the clarity of the spatial, volumetric rationale of the

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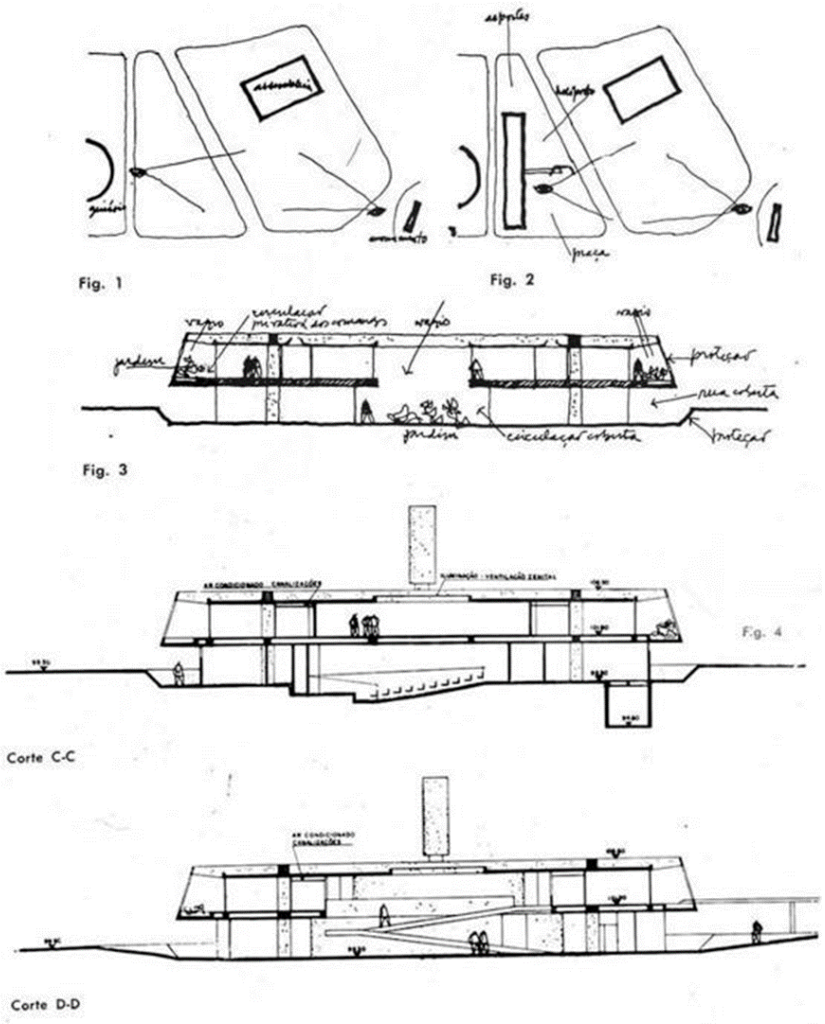

Figure 4. Implementation sketches considering the position of the Assembly room and the Gymnasium, and the HQ main building cross-sections. The top cross-section shows the location of the yards in the upper façade, protected by the brise-soleil, as well as the lower setback in relation to the slopes. Source: Paulo Bastos Archive.

project and extol "[how] the block is placed along the ground, with an elegant walkway and a monument-wall, the consequent definition of the external spaces and the value given to the visual effect of the *Bandeiras* Monument." The basic premises to be met by competition entries were: "adaptation to the landscape, a suitable structure for internal flexibility, monumentality, and artistic expression 'specific to a military command building,' public participation in military ceremonies, introverted functioning, safe from any external interference and vision, the means of defense built into the characteristics of the ensemble."

The winning project responded to these premises by reaffirming elements such as the immediate separation and control between the interior and the exterior, enabled by slopes and low embankments. The need for perimeter wall protection was thereby eliminated, which guaranteed the desired defense of the building through its intrinsic characteristics. A dual character affirmed then that of being discreetly monumental, fitting silently within the composition of the landscape with the existing built landmarks, and being at the same time emphasized in the general composition due to its horizontality and perspectives opening up towards other points. (Figure 2, Figure 3, Figure 4, and Figure 5)

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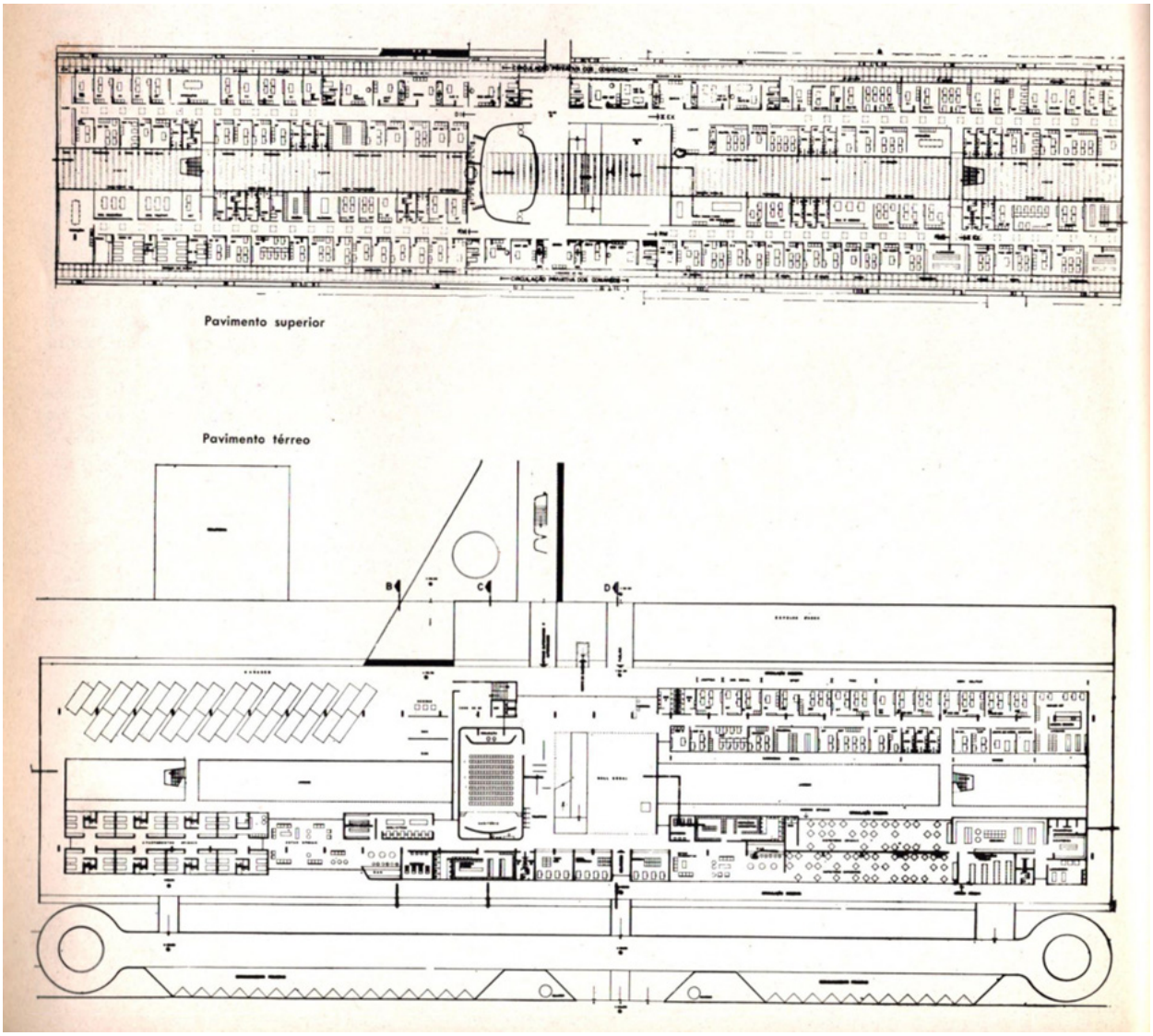

Figure 5. HQ main building floor plans: upper floor and lower level. Source: Revista Acrópole 321, 1965

Indeed, besides its strategic qualities, a vital design procedure of the HQ was its dialogue with the urban complex into which it was inserted: the Ibirapuera Park region. Inaugurated in 1954 as part of the 400th-anniversary celebrations of the city of São Paulo, the main appeal of the park was the ensemble of modern buildings designed by Oscar Niemeyer, set across the landscape. Built prior to the construction of Brasília, this was the largest group of buildings by the famous Brazilian architect at the time. Moreover, the region around the park harbored important public spaces such as the Legislative Assembly and the Gymnasium designed by the architect and sports expert Ícaro de Castro Mello, which—as mentioned above—was highlighted by the horizontality of the HQ. (Figure 6)

A look at the other prizes reinforces the jury's reasons for choosing the winning project, especially considering the relationship between the local landscape and the security approach. The second prize project proposed a traditional, modern building, highlighting the austerity of the army as an institution and dialoguing with the Legislative Assembly aesthetics. The building

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Figure 6. Ibirapuera Park and the complex public infrastructure surrounding it. In the bottom right-hand corner, the Gymnasium; above it, the Army Headquarters, and then the Assembly room. The Niemeyer museums may be observed outside the park. Source: Aerial image from the 1970s.

would be, nevertheless, too unprotected. The third prize, in contrast, presented a brutalist and prefabricated solution in which the external walls of the building itself established some protection, whereas the ground floor remained open. Besides not resolving the security issues, the dimensions of the building were in clear conflict with the monumental complex of the Ibirapuera buildings.

Returning to Paulo Bastos' project: Although he and his team were immersed within the esteemed context of the so-called "São Paulo School" of architecture, it is possible to note a consistent connection between the design of the Second Army Headquarters and the architecture of Oscar Niemeyer, combining certain aspects from different phases and projects of the Rio architect.

In the HQ, the setback made by slopes, which protect the building and serve as a central design operation, is overcome by one walkway access. This access constitutes the central axis defined by a canopy stretching from the main building to the public ceremonial square, marked by an exceptionally organic form. It is an open, raw concrete "monument-wall," as termed in the jury minutes and the architect's descriptions, that defines the ensemble's highest plane, marking the headquarters' entrance. This exceptional form, particularly the perspectives and elevations of the project, brings to mind Niemeyer's solution to the Chapel of the Alvorada Palace, the presidential residence in Brasilia. At the HQ, this monument-wall is a defining element of the building,

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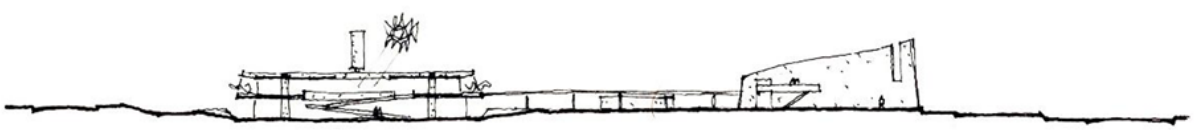

Figure 7. Photograph of the newly opened Second Army Headquarters (the Gymnasium appears immediately behind it). Source: Paulo Bastos Archive.

Figure 8. Sketch of the HQ with monument wall, marquise, and the main building. Source: Paulo Bastos Archive.

despite being in its external part. The discreet monumentality of this complex somehow provides the formal organicity that is lacking in the main building. It is not a curved wall that encases a closed environment, as in the Alvorada Chapel, but an open structure designed as a monument that defines the open spaces. The curvilinear ascendant movement delineated by such a wall is directly connected to a visual culture of Brazilian modernization being settled in that period. Nevertheless, what seems essential here is a flagrant symbolic connection between the main military building in the state of São Paulo and the Presidential residence in Brasília. A connection that is made directly through architecture. (Figure 7 and Figure 8)

Inside the building, the outward-to-inwardly sloping facade formally approaches the brise-soleil employed by Niemeyer and Affonso Eduardo Reidy. In Bastos' Headquarters, however, the cross-section shows a substantially different structure, since it mainly exploits the span of cantilever slabs, with a recessed structure, to make room for the slopes on the lower level, generating

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Figure 9. Photograph of a military celebration in 1973 at the Ibirapuera Army HQ. The monument-wall defines the open spaces for the parades and gives a monumental character to it. Source: Public Archives of São Paulo State.

a discrepancy of fundamental levels for the solution that differentiated the project from those of other competitors. Above the cantilever slab, the upper level is encased by alternating loco molded concrete panels, which provide shading and protection for the internal areas, with a landscaped strip in between. As indicated within the jury's guidelines, it protected the internal area and brought unity to the entire building, with its facade defined by gardens and the inclined concrete elements functioning as brise-soleil and defining the external plane of the facade. The architects also took advantage of the military vocabulary to describe these design procedures, not only by implanting it into a trench, but also through the control and protection provided by the open borders between the brise-soleil, thereby assuming the function of a casemate, a low fortification with strict control over communication with its exterior.

Beyond its flagrant symbolic connection to Brasília, representation of the brand-new position of the military with the central government, and even beyond its function as a strategic design to defend the dictatorship, some of the ambiguous characteristics of the project seem to be precisely what makes it so singular: a casemate on pilotis, a trench within a span of cantilever slabs, a discreet monumentality. An extremely exposed building implanted onto a vast open field, while at the same time semi-buried, protected, introverted, defined as a fortification without walls. This type of duality between spaces of war and freedom stands as an acute representation of the conservative modernization of that moment (Figure 9).

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CONCLUSION

The Second Army Headquarters case is an important node for reflecting on the complex relationships between architecture and politics, especially under authoritarian regimes. It also helps to reflect on modern architecture itself, the immanent contradictions of its objects, and the ambivalences of the epistemological investments underpinning it.

Concerning the architectural professional field, this case shows how the Brazilian Institute of Architects had a fundamental role as a nurturer of a cultural arena in the professional field and as a mediator between architects and institutions, especially by promoting architecture competitions. The competition was here—at once—a vital device of democratic access to a public commission and a way of giving the contractor a vast set of possible choices for its symbolic representation, in that case, the regime itself. On the one hand, this opened space for those "subversive" architects to present a building design that they considered representative of dignity and emancipation through its openness and constructive ethics. On the other hand, the regime chose this same aesthetic to represent its values of security and conservative modernization through its sobriety and austerity. Although competitions might have helped soften political tension in some cases, the immanent contradictions within the architectural object remain as testimonies of the period. As for the open spaces of the Ibirapuera headquarters esplanade—and the optimism of Bastos regarding the possibility of humanizing the army through architecture—it is worth remembering Michel Foucault (2000): "No matter how terrifying a given system may be, there always remain the possibilities of resistance, disobedience (...) On the other hand, there is nothing that is functionally—by its very nature—absolutely liberating. Liberty is a practice."

To conclude, it is worth remembering how the São Paulo Military Headquarters building has been appropriated during the past decade. Since 2015, far right-wing movements started publicly celebrating the army as a political agent, asking for "military intervention"; in other words, for another military coup d'etát. The HQ's building became one of the places for public demonstrations, especially with the public emergence of a former military officer who would later become Brazil's president. At the end of his mandate (2018-2022)—when realizing he would not be reelected—, the extremists' demands for a coup were intensified, and in January 2023, an attempt was made. While unprecedented destruction and invasion of Brasília's Palaces took place, two modern "palaces" were preserved and served as shelter to the conservative rebels: the Central Military HQ in Brasília (designed by Oscar Niemeyer in 1969) and the São Paulo HQ in Ibirapuera. Both buildings were materialized in rigid lines and strict rhythm, creating an image of solidity and austerity. Designed by communists, they ended up becoming symbols of another "political culture": the far-right anti-democratic will within the very core of the national state. (Figure 10)

The seeming contradiction between architecture and politics, revealed through Paulo Bastos' HQ case, is part of a broad context of the Global Cold War, where modernity identities and modernization investments were entangled with hopes for emancipation and sovereignty or authoritarian

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Figure 10. Far right-wing demonstrations against democracy in front of the São Paulo HQ (2022), asking military forces for a new coup d'etát; the image evidences the wall created to separate the HQ from the street, created after the VPR attack, against Bastos' project. Source: Photo by Miguel Schincariol and Alan Santos.

arrangements and regimes. The optimistic roles attributed to architecture—especially within a left-leaning "structure of sentiment" and in moments of national-development expectations such as the Brazilian early 1960s—were put through a stern test when faced with conservative modernization processes. The case of Ibirapuera Military Headquarters is illustrative of how architectural design responded and intervened in the very inside organization of military power in Brazil, whereas the dictatorship used the architect's power to assemble modernity imaginaries to seek symbolic legitimacy. Such an analysis—among several other cases of the period—helps one remember the limits of architecture's autonomy and its intrinsic and conflictive relationship to politics.

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THE PROJECT OF MAGDALENA GUTIÉRREZ: THE POETICS OF LIVING IN THE ATACAMA DESERT. THE FOUR MODES OF CLIMATE MANAGEMENT.

EL PROYECTO DE MAGDALENA GUTIÉRREZ: POÉTICA DEL HABITAR EN EL DESIERTO DE ATACAMA. LOS CUATRO MODOS DE GESTIÓN DEL CLIMA.

O PROJETO DE MAGDALENA GUTIÉRREZ: POÉTICA DO HABITAR NO DESERTO DE ATACAMA. OS QUATRO MODOS DE GESTÃO CLIMÁTICA.

Figure 0. North Facade of Workshop House. Source: Author's own elaboration.

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RESUMEN

El estudio aborda la problemática de las formas de habitar en entornos ecológicos frágiles, como los son los oasis en los desiertos. Es así como el oasis de San Pedro de Atacama presenta en la actualidad una disminución de su área agrícola debido a la urbanización y el turismo, afectando la sostenibilidad de las prácticas tradicionales de cultivo y poniendo en riesgo el equilibrio ecológico y cultural de este paraje atacameño. El artículo expone estrategias sostenibles de diseño para el habitar contemporáneamente en entornos frágiles, examinando cualidades térmicas y estrategias de control climático aplicado al caso de la Casa Taller de Magdalena Gutiérrez, utilizando los principios de Lisa Heschong y Eva Horn, se incluye en esta revisión los modos de gestión climática de Reyner Banham. La metodología empleada combina un análisis arquitectónico y etnográfico, estructurado en tres etapas: selección de obras, construcción del marco conceptual, análisis y sistematización de la obra. Se utilizaron modelos, fotografías, mapas y esquemas para contrastar teorías y cualidades térmicas y culturales con evidencias de la obra. Los criterios de clasificación incluyeron la evaluación de características como el grado de privacidad de las áreas y recintos, ventilación, iluminación, aislamiento térmico y métodos de calefacción, se empleó una calificación binaria para la evaluación sistemática. Los resultados destacaron que la Casa Taller es manifestación del habitar poético en la exterioridad del desierto de Atacama, sugiriendo una vocación para actividades comunitarias. Las cualidades lumínicas revelaron un diseño estratégico que maximiza la luz natural controlada, utilizando aberturas y claraboyas. Se concluyó que la casa Taller representa una expresión del "Regionalismo Crítico revisitado", en este enfoque, la relación "sitio-forma" es fundamental, equilibrando la técnica local con la cultural y el entorno natural. Esta obra ofrece un modelo sostenible para habitar en entornos frágiles, en el que se integra adecuadamente el diseño arquitectónico con las condiciones climáticas y culturales del lugar.

Palabras clave: diseño arquitectónico, construcción en tierra, arquitectura tradicional, arcilla, materiales de construcción.

ABSTRACT

This study addresses the issue of living in fragile ecological environments, such as oases in deserts. Currently, the oasis of San Pedro de Atacama is experiencing a decrease in its agricultural area due to urbanization and tourism, affecting the sustainability of traditional farming practices and putting at risk the ecological and cultural balance of this Atacamenian locale. The article presents sustainable design strategies for contemporary living in fragile environments, examining thermal qualities and climate control strategies applied to the "Workshop House" or Casa Taller of Magdalena Gutiérrez. Using the principles of Lisa Heschong and Eva Horn, the review also includes Reyner Banham's climate management modes. The methodology combines architectural and ethnographic analysis, structured in three stages: selection of works, construction of the conceptual framework, and analysis and systematization. Models, photographs, maps, and diagrams were used to contrast theories and thermal and cultural qualities with evidence from the work. Classification criteria included evaluating characteristics such as the degree of privacy of areas and rooms, ventilation, lighting, thermal insulation, and heating methods, with a binary rating employed for systematic evaluation. The results highlighted that Casa Taller manifests poetic living in the exteriority of the Atacama Desert, suggesting a vocation for community activities. The lighting qualities revealed a strategic design that maximizes controlled daylight, utilizing openings and skylights. It was concluded that the Casa Taller represents an expression of "Revisited Critical Regionalism." The "site-form" relationship is fundamental in this approach, balancing local techniques with cultural and natural surroundings. This work offers a sustainable model for living in fragile environments, where architectural design is appropriately integrated with the place's climatic and cultural conditions.

Keywords: architectural design, earth construction, traditional architecture, clay, building materials.

RESUMO

O estudo aborda o problema das formas de vida em ambientes ecológicos frágeis, como oásis em desertos. Assim, o oásis de San Pedro de Atacama está sofrendo atualmente uma redução em sua área agrícola devido à urbanização e ao turismo, afetando a sustentabilidade das práticas agrícolas tradicionais e colocando em risco o equilíbrio ecológico e cultural dessa paisagem do Atacama. O artigo apresenta estratégias de design sustentável para a vida contemporânea em ambientes frágeis, examinando as qualidades térmicas e as estratégias de controle climático aplicadas ao caso da Casa Taller de Magdalena Gutiérrez, usando os princípios de Lisa Heschong e Eva Horn, incluindo os modos de gestão climática de Reyner Banham. A metodologia empregada combina uma análise arquitetônica e etnográfica, estruturada em três etapas: seleção de obras, construção da estrutura conceitual, análise e sistematização da obra. Modelos, fotografias, mapas e diagramas foram usados para contrastar teorias e qualidades térmicas e culturais com evidências do trabalho. Os critérios de classificação incluíram a avaliação de características como o grau de privacidade de áreas e recintos, ventilação, iluminação, isolamento térmico e métodos de aquecimento, e uma classificação binária foi usada para a avaliação sistemática. Os resultados destacaram que a Casa Taller é uma manifestação de moradia poética na exterioridade do deserto do Atacama, sugerindo uma vocação para atividades comunitárias. As qualidades de iluminação revelaram um projeto estratégico que maximiza a luz natural controlada, usando aberturas e claraboias. Concluiu-se que a casa-ateliê representa uma expressão do "Regionalismo Crítico revisitado". Nessa abordagem, a relação "local-forma" é fundamental, equilibrando a técnica local com o ambiente cultural e natural. Esse trabalho oferece um modelo sustentável para viver em ambientes frágeis, no qual o projeto arquitetônico é devidamente integrado às condições climáticas e culturais do local.

Palavras-chave: projeto arquitetônico, construção em terra, arquitetura tradicional, argila, materiais de construção.

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INTRODUCTION

Magdalena Gutiérrez's relationship with San Pedro de Atacama is profoundly personal and professional. Born in Bolivia, her emotional bond with the region was strengthened by her decision to continue her architectural work in this desert territory after leaving teaching at the Catholic University of the North in 1998, settling with the "Solcor" ayllu in "Calamarca" (Giribas et al., 2023, p 24). Among her projects, the inhabited Workshop House (*Casa Taller*) and its nine-year construction process (1994-2003) stand out, reflecting a dynamic adaptation to the climate and local context.

The selection of the "Workshop House" as a case study came from the review of Magdalena Gutiérrez's projects between 1989 and 2012, based on the compilation of Giribas et al. (2023). 13 works were considered from the 1998-2012 period in San Pedro de Atacama, linked to the local ancestral family structure called Ayllu, which forms an oasis village. Unplanned works and hotels were excluded, as they were not linked to the territory, reducing the number of options to 7 cases. Finally, a list of 5 houses was left, as shown in Table 1 and on the map of Figure 1.

Table 1 shows the works of the period. With the criteria defined below, a few works are part of the architect's most productive stage.

Table 1. List of works by the architect in the 1989 -2012 period. Source: Giribas et al. (2023).

Year	no.	Name of work	Location	Planimetry	Materiality	Status
1989	1	Casa de la Cultura	Conde Duque Ayllu	No	no information	built
1994	2	Casa Dieter	Larache Ayllu	No	no information	built
	3	Kimal Hotel	Conde Duque Ayllu	Yes	adobe, stone, semi-cured mud roof	built
1994	4	Workshop House	Solcor Ayllu	Yes	adobe, stone, semi-cured mud roof	built
1996	5	Takha Takha Hotel	Conde Duque Ayllu	Yes	Adobe	Not built
	6	La Estaka Restaurant	Conde Duque Ayllu	No	no information	built
1997	7	Casa Toro	Solor Ayllu	Yes	adobe, stone, semi-cured mud roof	built
2001	8	Casa Carolina Agüero	Solor Ayllu	No	no information	built
2001	9	Casa Ana Espinoza	Coyo Ayllu	Yes	adobe, stone, semi-cured mud roof	built
	10	Casa Beeris	Conde Duque Ayllu	No	no information	built
2004	11	Casa Esmeralda Ramos	Solor Ayllu	Yes	adobe, stone, semi-cured mud roof	built
2007	12	Casa Nano	Yaye Ayllu	Yes	adobe, rammed earth, semi-cured mud roof	built
2012	13	Casa J.	Solor Ayllu	No	no information	no information

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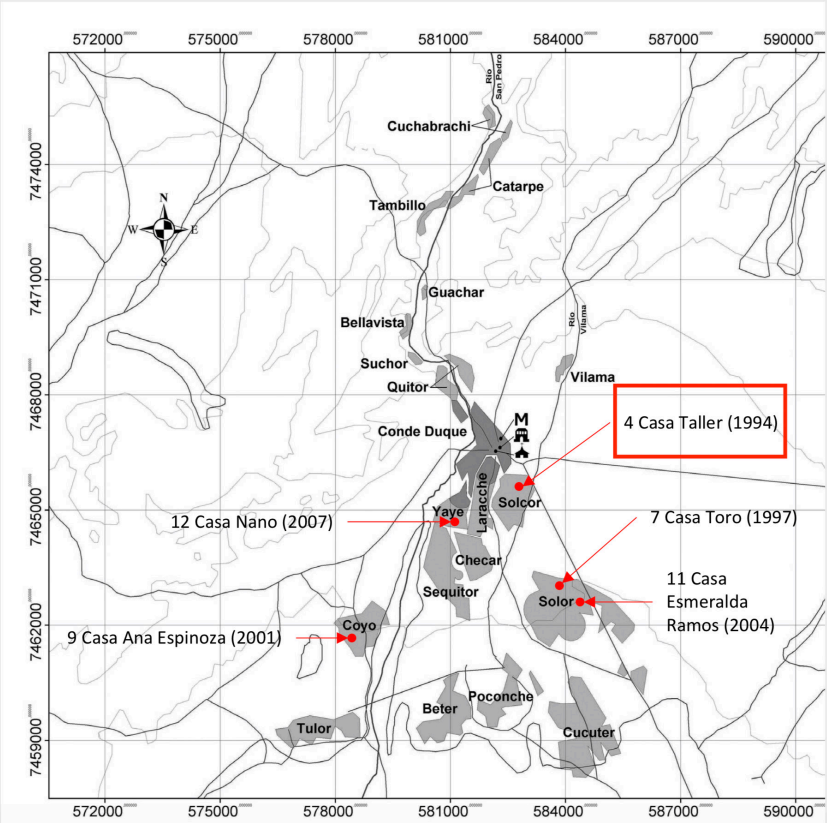

Figure 1. The case study is in the ayllu structure of the San Pedro de Atacama oasis. Source: Adaptation by Sepúlveda Rivera et al. (2015).

The "Workshop House" was prioritized because it is the oldest work of the analyzed period and is located in a peri-urban sector close to the typical area of the village, a sector that was traditionally an area of orchards and that, for the 1990s, exemplifies the transformation process of the oasis. Its setup differs from the traditional one that, until the 1980s, was associated with a traditional dwelling outside the central hub of San Pedro. The Workshop House exemplifies the layout in the center of the agricultural estate, combining the dwelling with crops, orchards, and fruit trees. However, the complex respected the pre-existence of the woodland and the existing double ditch irrigation system for crops (*melgas*) on the property.

Figure 1 shows the location of the Workshop House in the Solcor ayllu, southeast of the Conde Duque ayllu, which is the typical area and the historical hub of San Pedro de Atacama.

Problematic

Living in fragile environments, such as desert oases, has great challenges. San Pedro de Atacama is a pre-Hispanic oasis dating back to 1000 A.D. and is located in one of the most arid deserts on the planet. The expansion of tourism and urbanization has drastically reduced agricultural land in the last 30 years. According to González (2018), between 1990 and 2018, the agricultural area in San Pedro de Atacama decreased by more than 40%, transforming into urban and tourist infrastructure. This competition for land and water resources has

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impaired traditional agricultural practices and increased pressure on essential services. However, reviewing the vernacular housing offers solutions to face these challenges and preserve ecological cycles in an oasis.

THEORETICAL FRAMEWORK

The link between site, climate, and materials has been established in vernacular architecture using Vitruvius. Moholy (1957), Rudofsky (1965), and Olgyay (1998) related traditional construction to sustainability. Barada and Tomasi (2020) expanded upon this vision in Latin America, considering vernacular architecture not only in climatic terms but also as a material construction with social and symbolic roles in dialogue with the historical processes of the social groups Barada (2014). Rafael Serra (2001), in the Spanish edition of Architecture and Climate, highlights how Olgyay looked closely at the interaction between buildings and the natural environment, questioning the norms of the official architecture of the twentieth century Olgyay (1998). Rudofsky (1965) integrated anthropological aspects into the Loren-Méndez (2018) vernacular vision, while Rapoport (1969) highlighted climate as a determining factor. Mileto and Vegas (2014) introduced concepts such as "kilometer zero" and "bio-construction" related to sustainability. In Latin America, Gulá and Navarro (2015) and Toumi et al. (2017) addressed sustainability from a socio-economic perspective, given inequality and poverty. Santacana Juncosa and Mensa Biosca (2022) proposed categories to catalog architecture according to its climate management, redefining the relationship between architecture and climate. Heschong (1979) stressed the "Thermal qualities" essential for choosing activities in spaces and criticized the excessive use of mechanical systems in favor of passive solar houses. Horn (2017) and Santacana Juncosa & Mensa Biosca (2022) defined the "Climate control strategies" and categorizations for architecture. Alfaro, Yuste, and Palme (2023) address "Isolation" and "Cultural Techniques" influencing social behavior and transforming the landscape and climate. Reyner Banham (1984) classified the "Architectural modes of climate management" into "conservative," "selective," and "regenerative" (like Joseph Paxton's Conservative Wall). Finally, Santacana Juncosa and Mensa Biosca (2022) reviewed the conservative mode in depth, distinguishing between isolated, closed, and open systems according to their exchange of matter and energy with the environment.

The study of isolated oases reveals their growth limits and the fragility of their cultural heritage and landscapes. Without buffer spaces, the loss of vegetation and water deeply affects local traditions and culture. This raises questions about sustainability and resources for living. The objective is to extract design principles from a significant work by the architect Magdalena Gutiérrez that allows the formulation of sustainable strategies for contemporary living in fragile ecological environments, taking as context the oasis of San Pedro de Atacama.

Context

Urban expansion in rural areas highlights the need to review the ways of living and the impact they generate on cultural landscapes. It is crucial

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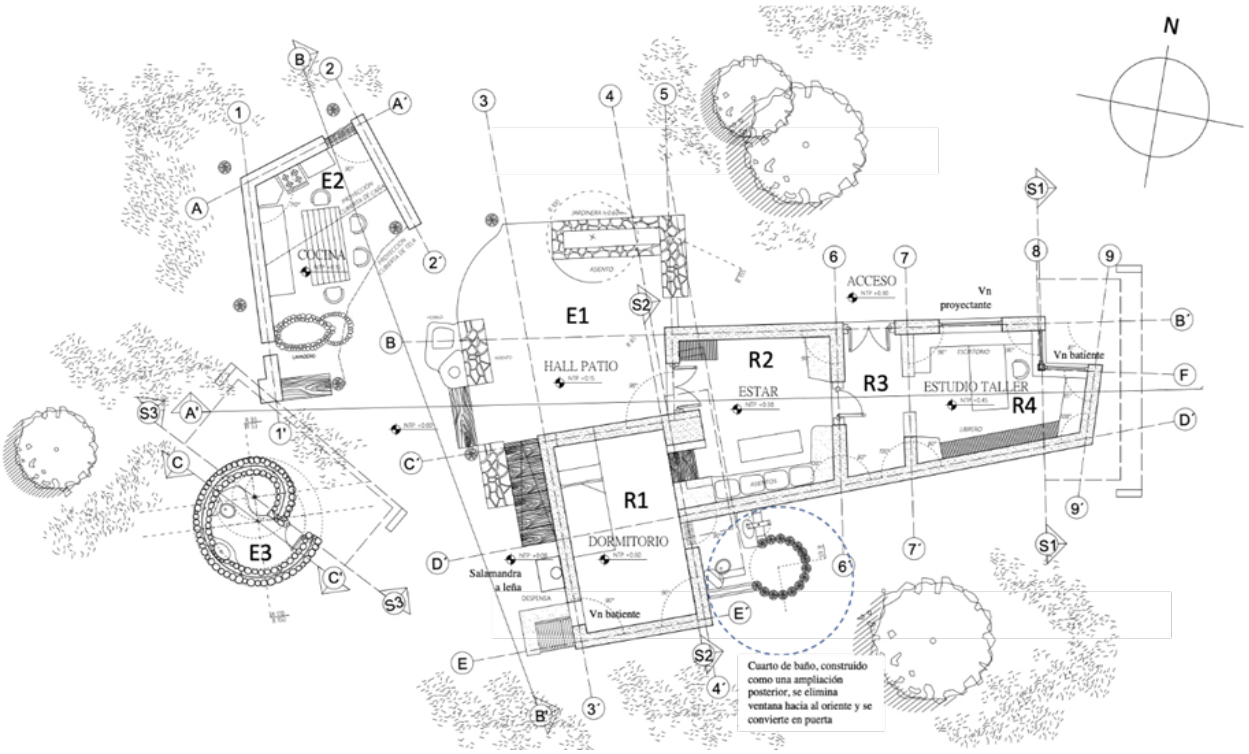

Figure 2. Architectural plan of the "Workshop House". Source: (Caro, Coo, & Roman, 2023)

to promote balanced growth in rural territorial units, which, although traditionally sustainable, are threatened by excessive consumption of resources and energy.

San Pedro de Atacama, in the foothills of Antofagasta (22°55' S, 68°12' W, 2,436 m), is an oasis of the Atacama Desert with a fertile salt flat, shrubby vegetation and endemic forests. Founded as an agricultural settlement, its name in Cunza means "I am going to the village." Archaic societies (4,000-2,000 BC) to sedentary agro-livestock communities (500 BC) took advantage of the ravines and the salt flat's hydrographic system. Located in Andean zone 9 (An) of Chile's climatic zoning, it has high altitude, low temperatures, and high daily thermal variation, with little precipitation and occasional snow.

In Figure 2, the enclosures with the letter (R) refer to indoor and intermediate spaces, while those designated with the letter (E) include outdoor and intermediate spaces.

METHODOLOGY

An approach was used to analyze Magdalena Gutiérrez's "Workshop House," combining architectural and ethnographic analysis based on personal experience. Three stages were used: works selection, conceptual framework construction, and evidence comparison. The Classification Criteria to evaluate the "Workshop House's" spaces are presented in Tables 2 and 3. Three types of spaces were identified: indoor, outdoor, and intermediate, following Glenda Kapstein's categories, which subdivide intermediate spaces into private, public, semi-public, and semi-private

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(Kapstein, 2015, p. 192). Access was categorized according to the degree of restriction, and ventilation, as natural or mechanical. Daylighting was analyzed considering its origin and quality. Thermal insulation was classified as high, medium, or low, and heating methods as active or passive radiation. Each attribute was evaluated with binary values (0 and 1), systematically evaluating the spaces.

DEVELOPMENT AND RESULTS

The results presented in Table 2 analyze the rooms of the Workshop House, subdividing the indoor and outdoor spaces. The surfaces in square meters, equipment, furniture, and access to services such as ventilation and daylight are specified. In addition, aspects such as outdoor and indoor space visibility are quantified. The percentages indicate the distribution of the different types of spaces.

Table 2 shows data from the analysis of the house's attributes, typologies of spaces, ventilation characteristics, sources of daylighting, size of openings, and their orientations.

Table 2. Spatial attributes and characteristics of the envelope. Source: Preparation by the Author.

		Space				Access				Ventilation			Daylighting Window size and orientation			58,8	Skylights and/or open screen m2	House windows, walls, and ceilings m2	% fenestration v/s indoor enclosure 10 % surface 10% m2
	Enclosures	Indoor	intermediate	Outdoor	surf. m2	Private	public	semi-public	semi-private	Natural	Artificial	North	Norte	South	East	West			
1	R1 Bedroom	1	0	0	18	1	0	0	0	1	0	0	0	0	0	0,5	1,5	2	11%
2	R4 estudio taller	1	0	0	11	1	0	0	0	1	0	0	1	0	0,75	0	0	1,75	16%
3	R2 Study workshop	0	1	0	36	0	0	1	0	0	0	1	0	0	0	1	0	1	3%
4	E2 Kitchen	0	0	1	9	0	0	1	0	1	0	0	3	9	2	0	9	0	0%
5	R3 Hallway	0	1	0	5	0	0	0	1	0	0	1	1	0	0	0	0	1	20%
6	E1 Hallway Yard	0	0	1	17,5	0	0	1	0	1	0	0	18	0	18	4	17,5	0	0%
7	E3 Open-air bathroom	0	0	1	6,28	0	0	0	1	1	0	0	0	0	0	0,5	6,28	0	0%
totals		2	2	3	102,78	2	0	3	2	5	0	2	23	9	20,75	6	34,28	5,75	
percentages		29%	29%	43%	100%	29%	0%	43%	29%	71%	0%	29%	39%	15%	35%	10%	33%	10%	

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Figure 3. Studio Workshop.
Source: Prepared by the author.

Regarding the size, location, role, and composition of the house's spaces, 43% are located outside, 28.6% are indoor, and the remaining 28.6% are intermediate. However, regarding the size of the enclosure surface areas and their degree of privacy or exposure, the private indoor spaces, namely the bedroom and study workshop, have a surface area of 29 m^2. The semi-public intermediate spaces, considered transitional spaces that include the yard's hallway, the kitchen, and the living room, the latter inside the housing, together total 62.5 m^2. In the category of semi-private spaces, the outdoor open-air bathroom and the hallway inside the house and between the study workshop and the living room are considered; both total 11.28 m^2.

a) Lighting of Indoor Spaces

In the 18m^2 Bedroom (R1), a fenestration of 2.25 m^2 is observed, with a window to the west and a skylight that represents 11% of the enclosure's total surface. The skylight provides direct light through a narrow north-facing opening, optimizing daylight on a south-facing wall and avoiding overheating, which reduces the need for artificial light during the day. In addition, a north-facing skylight illuminates the transition between the bedroom and the living room, improving the visibility of the three steps. The 11m^2 Study Workshop (R2) (Figure 3) has an east-facing 1.75 m^2 window (16% of the area) to take advantage of the morning light and avoid the extreme heat of the afternoon, offering optimal conditions for work. The low, horizontal north-facing window controls light rays and prevents overheating. In the 36m^2 living room (R3) with 1 m^2 of windows (2.7% of the area), the lack of north-facing openings allows an

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Figure 4. Outdoor kitchen, intermediate space. Source author.

Figure 5. Lowered yard. Source: Prepared by the author.

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exposed wall to capture and release heat during the day. Although it receives intense light from the west in the afternoon, the skylight connects with the bedroom and improves the lighting, creating a cozy atmosphere at the end of the day.

Figure 3 shows the lighting qualities. The central opening is oriented towards the sunrise and the Likancabur volcano, while the north-facing window runs at desk height.

b) Lighting of the Intermediate Spaces

The 9m^2 Kitchen (R4) (Figure 4), located in the outdoor space, has 1.5 m^2 of window cover, equivalent to 17% of its surface. This kitchen benefits from its south-facing position, providing indirect and constant light without the excess heat of the direct sun and ensuring good ventilation and clarity during food preparation, which makes it functional and safe. On the other hand, the 4m^2 Hallway (R5) has 0.4 m^2 of window cover (10% of its surface) and acts as a transition area.

In Figure 4, a north-facing "L" shaped adobe wall is shown at the back of the space, leaving the activities against the light and receiving indirect lighting through the south opening.

b) Outdoor Spaces

The Yard Hallway (R6), with an area of 17.5 m^2 and 1.75 m^2 of windows (10% of the area), acts as a connection and circulation area and has adequate daylighting. This north-facing space allows soft and constant light, facilitating the transition between indoor and outdoor spaces in a climate where sunlight is exceptionally intense. On the other hand, the Open-Air Bathroom (R7), with 6.28 m^2 and 0.75 m^2 of windows (12% of the area), faces North or East, optimizing ventilation and daylighting and improving hygienic and comfort conditions. The bathroom design, with a circular wall against the prevailing southwest wind, prioritizes the direct entry of the sunlight and protects the space from the wind.

In Figure 5, the light quality of this space is complemented by fabrics and nets that generate an even light outside. The photo shows the celebration of the open workshop "Building with Earth 2."

The ventilation, the wind direction, and the characteristics of the walls were evaluated, considering their insulation or energy capture capacity. Daylighting was classified according to its origin: windows, walls, or skylights, with or without filters. Additional heating was also examined, differentiating between active and natural passive radiation heating with semi-cured mud roofs. As for ventilation, 5 of the house's 7 spaces have direct natural ventilation with the outside. However, the living room and hallway do not have ventilation through windows; the air renewals are through glazed doors.

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Figure 6. Workshop House North Facade. Source: Preparation by the Author.

The material analysis (Figure 6) addressed the thermal capacity of the walls, ceilings, and enclosures, as shown in Table 3. The house, with an elongated east-west volume, has 30% of its walls facing north, 57.26 m^2, 30% south, 57.81 m^2, 16% to the East, and 24% to the West. 86% of the spaces have 45 cm thick adobe walls, and 29% have a 0.50 m wide "dry" stone wall around the outdoor bathroom. The window coverage is minimal: only 8.73% of the north-facing walls have windows, and the south walls are opaque. 50% of the rooms (bedroom, study, living room, and hallway) have high thermal insulation, thanks to approximately 15 cm thick adobe walls and semi-cured mud ceilings on wooden and cane structures.

The work can be seen in Figure 6, with the Likancabur volcano in the background and different materials: boulders on the furniture, split boulders on the floor, and liparite stone for the planters. The adobe north wall runs alongside the mud roof. The reed shading beside the materials connects with the oasis's vegetation context.

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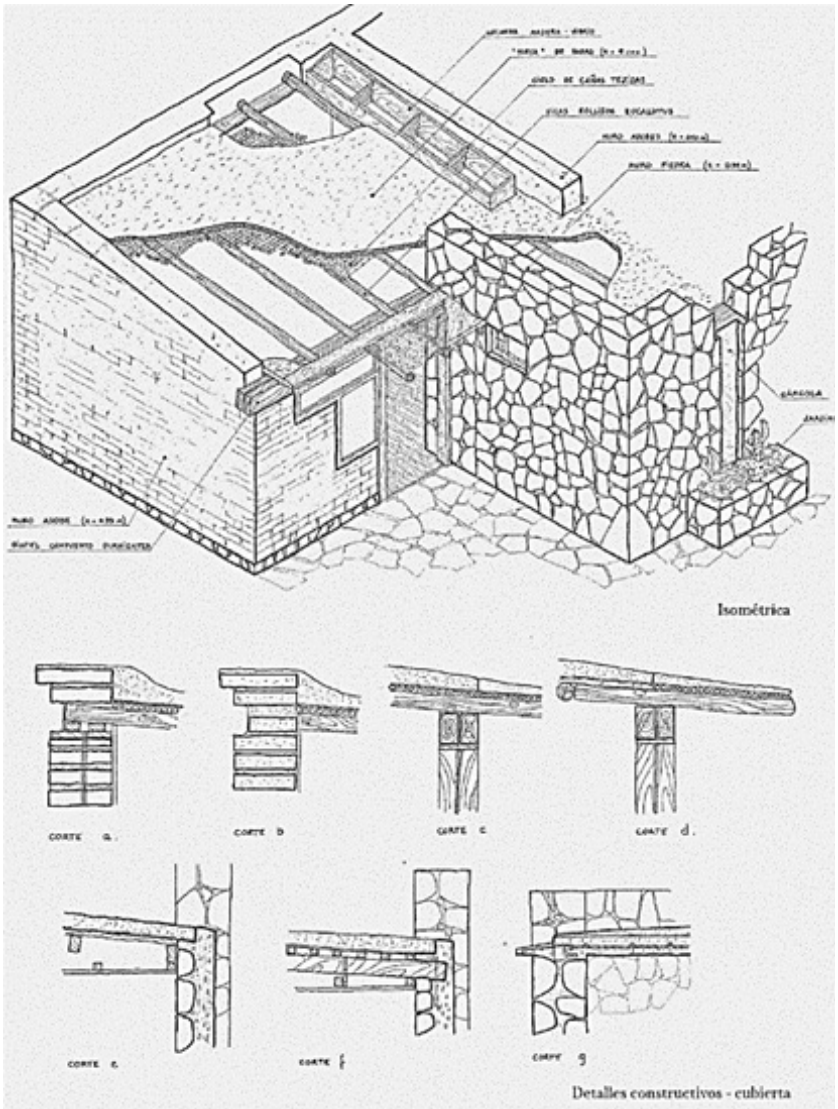

Figure 7. Hotel Kimal isometric construction. Source: Giribas et al. (2023).

Figure 7 shows the isometric construction of the Kimal Hotel. Work started the same year as the Workshop House and shows the earthen roof and the inclusion of skylights. Both works are different in the meeting between the wall and roof. These details demonstrate the concerns of the relationship between materials.

Table 3 shows the data for analyzing the house's attributes through its enclosures and indoor, outdoor, and intermediate spaces. It considers the analysis of the materiality of the walls, the orientation and surface of walls, the degree of thermal insulation, and heating for each enclosure or space.

The outdoor kitchen has medium thermal insulation, with walls that act as a barrier against the wind and a reed roof that is permeable to wind and rain. The yard's hallway, running alongside the house and with a fabric roof, has low thermal insulation. As for the heating, 50% of the rooms take advantage of passive radiation from the north, namely the bedroom, the

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		Materiality of Walls		Walls (m2 length and orientation)			190,3	High Thermal Insulation		Medium Thermal Insulation		Low Thermal Insulation		Heating	
	Recintos	Adobe 0,45 m	Stone 0,50 m	North	South	East	West	Barrier Wall	Barrier Roof	Barrier Wall	Barrier Roof	Barrier Wall	Barrier Roof	Passive Radiation	Active Radiation
1	R1 Bedroom	1	0	9	9	6	18	1	1	0	0	0	0	1	1
2	R4 estudio taller	1	0	17	18	6	0	1	1	0	0	0	0	1	0
3	R2 DEN	1	0	11,46	11,01	6,9	4,8	1	1	0	0	0	0	1	0
4	E2 Kitchen	1	0	9	0	5	15	0	0	1	0	0	1	0	0
5	R3 Hallway	1	0	4,8	4,8	0	0	0	1	0	0	1	0	0	0
6	E1 Hallway Yard	1	1	0	9	0,5	1	0	0	1	0	0	1	0	1
7	E3 Open-air bathroom	0	1	6	6	6	6	1	0	0	0	0	1	1	0
	totals	6	2	57,26	57,81	30,4	44,8	4	4	2	0	1	3	4	2
	percentages	86%	29%	30%	30%	16%	24%	50%	50%	33%	0%	16%	50%	50%	33%

Table 3. Physical attributes of the envelope, materiality, and thermal insulation. Source: Preparation by the Author.

living room, the hallway, and the study workshop. The bedroom also has an outdoor west-facing salamander heater, while the yard's hallway has a clay oven that uses coal or wood as a heat source.

DISCUSSION

The "Workshop House" design focuses on integrating with the environment through volumes and intermediate spaces that facilitate indoor and outdoor space use (Giribas et al., 2023). Adapted to the extreme conditions of the desert, it uses small volumes and sloping roofs for shelter (Benavides et al. 1977; Šolc, 2011; Jorquera, 2022). It uses local elements such as yards and hallways, applying climate design strategies. The orientation of the adobe walls, windows, and vegetation contributes to thermal management, providing warmth and coolness. The adobe walls have densities between 750 kg/m^3 and 2000 kg/m^3, while the industrialized materials vary between 1300 kg/m^3 and 2400 kg/m^3 (Cuitiño et al., 2020). To achieve high thermal resistance in the climatic zone 9 An, according to the National Institute of Standardization (2008), it uses traditional materials such as earth and straw with cane on the roof, reaching thermal resistance values of R100=386. Regarding the thermal properties, several studies have been established as a reference to know the properties of mixed construction systems that use soil and lightened straw as insulation, coatings,

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or filling mass in wall partitions or roofing. In this regard, it is necessary to highlight the previous research of Weiser et al. (2020), Volhard (2016), and Vinceslas et al. (2017).

The roof, with an 8 cm layer of "semi-cured mud," protects against intense radiation and desert rains (Serrano, 2019, p. 102). This thick layer of mud delays and transfers solar radiation, contributing to the energy efficiency of the day/night cycle (Palme et al., 2014). The thermal conductivity of the lightened mud is 0.30 W/mK, the adobe is 0.95 W/mK, and the solid mud is 1.60 W/mK, with thicknesses from 0.074 m for the clay/cane (*quincha*) to 0.35 m for the adobe, (Cuitiño et al., 2020).

The "Workshop House" illustrates Reyner Banham's "Architectural modes of climate management," encouraging a fluid interaction between indoor and outdoor spaces, adapting to day and night variations. It uses an active thermodynamic approach, incorporating the "intermediate space" concept by Glenda Kapstein (2015) with corridors, hallways, and vegetation in time-spatial sequences. Thermal analysis, based on Heschong (1979), manages warmth, dryness, radiation, and coolness: warmth is controlled with orientation and materials that capture solar heat, dryness by natural ventilation, radiation with skylights and design, and coolness with thermoregulatory and bioclimatic materials. The Conservative Mode uses massive structures, the Selective Mode uses natural filters, and the Regenerative Mode uses heat sources, such as a salamander heater and a clay oven. This study underlines the relevance of vernacular and sustainable architecture, fusing tradition and modernity in the relationship between climate, construction, and inhabitants.

CONCLUSIONS

In the "Workshop House" of Magdalena Gutiérrez, several significant conclusions can be drawn that integrate aspects related to the revaluation of earth architecture, energy efficiency, passive energies, and learning about the Atacamenian way of living and building. These aspects offer important guidelines for the study and architecture related to bioclimatic adaptation.

This work is a clear example of how earth architecture has been revalued in the contemporary context. Using traditional materials such as adobe, stone, recovered local woods, and natural fibers such as cane and straw, the work stands out for its ability to integrate harmoniously with the natural environment of the oasis when considering its mode of implantation concerning the pre-existing trees. This revaluation not only preserves ancestral construction techniques but also aligns with principles of sustainability and low environmental impact, which are crucial aspects of today's architecture.

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The "Workshop House" design incorporates innovative energy efficiency strategies and the use of passive energies. Firstly, passive climate control is achieved by arranging openings and skylights that allow maximum use of daylight, reducing the need for artificial lighting and preventing overheating, which is crucial in the Atacama desert climate. Secondly, the house is designed to take advantage of cross ventilation, which helps maintain a comfortable indoor temperature without needing mechanical air conditioning systems. Finally, the ground-based construction materials provide excellent thermal insulation, keeping the interior cool during the day and warm at night, a necessary adaptation in environments with high daily thermal variability.

Technologically, it is not limited to replicating traditional techniques; it adapts them to meet contemporary needs. This is reflected through the use of semi-cured mud on log structures and the incorporation of horizontal spans, without weakening the full and empty relationship so crucial for earthquake resistance, allowing us to understand light differently than the vernacular form. This shows how ancient ways of living and building are linked to nature and the landscape, which offer sustainable and adaptive solutions. The "Workshop House" reflects a balance between local techniques and the cultural and natural context, being an exemplary contribution of "Critical Regionalism revisited," as Foyo and González (2023) discuss.

In summary, poetic living in the San Pedro de Atacama oasis context is reflected in the revaluation of earth architecture, the implementation of energy efficiency strategies, and the learning of traditional ways of living, which provide significant guidelines for sustainable architecture. This work not only preserves cultural and ecological heritage but also offers a viable model for living sustainably in challenging contexts. This integrative and adaptive approach is crucial to facing the contemporary challenges of urbanization and climate change, underlining the need for bioclimatic adaptations in architecture.

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MICROGRAPHS OF INTANGIBLE SPACE. TRIPTYCHS, PAINTINGS AND GLASS-GRAPHS OF HABITABLE ARCHITECTURES

MICROGRAFÍAS DEL ESPACIO INTANGIBLE. TRÍPTICOS, PINTURAS Y VIDRIO-GRAFÍAS DE ARQUITECTURAS DEL HABITAR

MICROGRAFIAS DO ESPAÇO INTANGÍVEL. TRÍPTICOS, PINTURAS E VIDROGRAFIAS DE ARQUITETURAS DO HABITAR

Figure 0. Hans Hollein inhabiting his mobile office (Mobiles Büro), under the gaze of the ORF team, 1969. Source: Authors' composition, 2022.

The article is framed in the development of the Doctoral thesis: Tears of architecture. Graphic records of intangible space, from the Doctorate in Architecture program at the University of Seville.

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RESUMEN

El Jardín de las Delicias (1490-1500) es un tríptico formado por tres paneles frontales sobre el paraíso y el infierno que precisan del espectador para ser abatidos, cerrados y obtener una nueva visión: la Creación del mundo. En esta obra, El Bosco representa pequeños coágulos de aire que hablan de arquitecturas encapsuladas y lugares introspectivos, donde las leyes parecen haber desaparecido. Este ensayo pone de manifiesto la existencia de estos diminutos espacios insertos en el ámbito arquitectónico; trípticos que, en lugar de ser pintados, han adquirido una tercera dimensión para formar parte de obras como Casa Ugalde de Coderch (1953), Casa-museo Soane (1820) y Casa Vicens de Gaudí (1885). Una inmersión arquitectónica en tres proyectos de habitar que nos permite la creación de catálogos con micrografías de "lágrimas de arquitectura": burbujas atrapadas en la masa vitral que nos muestran cartografías de un espacio intangible y desconocido. Micrografías del espacio intangible nos sugiere cambiar la escala y sumergir al habitante en un micromundo en busca de nuevas expresiones que permitan concebir una arquitectura más gráfica y creativa.

Palabras clave: aire, vitrales, pintura al óleo, cartografías, escalas

ABSTRACT

The Garden of Earthly Delights (1490-1500) is a triptych with three panels depicting paradise and hell. These panels require the viewer to fold and close them to obtain a new perspective: the creation of the world. In this work, Bosch portrays small air pockets that suggest encapsulated architectures and introspective spaces, where conventional laws seem to have vanished. This essay highlights these tiny spaces inserted in the architectural environment. Triptychs, instead of being painted, have acquired a third dimension to form part of works such as Coderch's Casa Ugalde (1953), Soane's Casa-Museo (1820), and Gaudi's Casa Vicens (1885). It is an architectural immersion in three living projects that enables us to compile catalogs of micrographs showcasing "architectural droplets": bubbles trapped within the stained-glass mass, revealing cartographies of an intangible and undiscovered space. Micrographs of intangible space suggest a change in scale, immersing the inhabitant in a micro-world searching for new expressions that enable them to conceive a more vivid and creative form of architecture.

Keywords: air, stained-glass windows, oil painting, cartographies, scales

RESUMO

O Jardim das Delícias Terrenas (1490-1500) é um tríptico composto por três painéis frontais sobre o paraíso e o inferno que exigem que o espetador os feche para obter uma nova visão: a Criação do mundo. Nesta obra, Bosch retrata pequenos aglomerados de ar que falam de arquiteturas encapsuladas e de lugares introspectivos onde as leis parecem ter desaparecido. Este ensaio destaca a existência destes pequenos espaços inseridos no ambiente arquitetônico; trípticos que, em vez de serem pintados, adquiriram uma terceira dimensão para fazer parte de obras como a Casa Ugalde de Coderch (1953), a Casa-museu Soane (1820) e a Casa Vicens de Gaudí (1885). Uma imersão arquitetônica em três projetos de habitação que nos permite criar catálogos com micrografias de "lágrimas de arquitetura": bolhas presas na massa do vitral que nos mostram cartografias de um espaço intangível e desconhecido. Micrografias do espaço intangível sugere a mudança de escala e a imersão do habitante em um micromundo em busca de novas expressões que permitam conceber uma arquitetura mais gráfica e criativa.

Palavras-chave: ar, vitrais, pintura a óleo, cartografias, escalas

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INTRODUCTION

A new dimension in the Garden of Earthly Delights, Hieronymus Bosch, 1490-1500

It is surprising to see how someone with a stable, resolute life and without any fuss so far known can produce with his hands such enigmatic and exotic creations, representations of surreal scenarios so far removed from the everyday world. Jeroen Anthoniszoon van Aken, who signed under the name of his hometown Den Bosch (Hieronymus Bosch), lived through the Dutch Renaissance of the late 15th century, a time when some progress, cultural flourishing and social transformation were beginning to condense, despite the persistence of the mentality characteristic of the late Middle Ages, where people's daily lives were profoundly influenced by religion, superstition, and the persecution of heresy (Vivancos, 2017).

In an attempt to break with dogmas and express critical thinking in an almost encrypted form, Bosch created his own artistic language, characterized by hybridizations between human and animal nature, by the presence of water as a deity who decided between life and death, and by the incessant use of allegories and symbolism. Oil paintings gave a glimpse of that "boiling world of passions" (Devitini, 1998) that, for most mortals, is retained in the subconscious.

It was in this context of exuberant imagination that the Garden of Earthly Delights (1490-1500) was born, a triptych conserved in the Prado Museum (Madrid) that deals with themes of human morality, good and evil, sin and forgiveness, which is the object of countless studies due to its representative complexity. A single visit of detailed observations was enough to recognize in the piece an exhaustive mastery of composition and games of scale under the same perspective, with pale-colored buildings formed by a mixture between geometric profiles and vegetable plantations, which could well have been a source of inspiration for Gaudí centuries later. Superpositions and juxtapositions of elements and scenarios denote the author's prior knowledge of space, how he experiences it, and how he manifests it (Figure 1).

Within this amalgam of drawn forms and architectures, certain air capsules emerge that seem to have no gravity and that contain different information inside, an unusual contribution that distinguishes it from the rest of his artistic production. They represent a type of space that has not been addressed until now: a place suspended, inserted, and, in turn, separated from the outside by a membrane that prevents its tactile manipulation. It took a work as essential and primary as humanity's destiny and life to experiment with this kind of dimension with these architectures of intangible spaces.

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Figure 1. Macrography: Triptych of the Garden of Earthly Delights, Bosch, 1490-1500. Front panel. Source: Composition prepared by the Authors, 2022.

This study proposes to make, from a complete vision of the work, an approach to its translucent structures to analyze the graphic records that have taken place in them and their possible transfer to the architectural field. A journey to the minuscule within the global that generates new keys in understanding the space it encloses, providing new approaches and perspectives.

THEORETICAL FRAMEWORK

The study of the vitreous spheres

*Happiness is like a crystal; it breaks right away. (*Flemish proverb, 1401).

Throughout these centuries, experts in the field have established numerous conjectures about the meaning and symbology of these transparent spheres. Rarely had spaces of this type been represented in the artistic field or described in the literary field of the time; they were unique, and this increased uncertainty and imagination. Many researchers interpreted that the translucent material was glass and that it was cracked as a metaphor for fragile and ephemeral happiness. Others relate it to alchemy or with certain sexual connotations, given the scenes that took place inside.

Leaving aside symbolic interpretations and focusing on a visual and objective analysis of the space they contain, these air capsules or "transparent amniotic bags" (Belting, 2009) are still an undulating volume with an apparently venous structure that supports the element and gives it shape and skin; an architecture with membranes that establish a border and divide areas, leaving alongside the external world while harboring life inside. They are watery tears that emerge in

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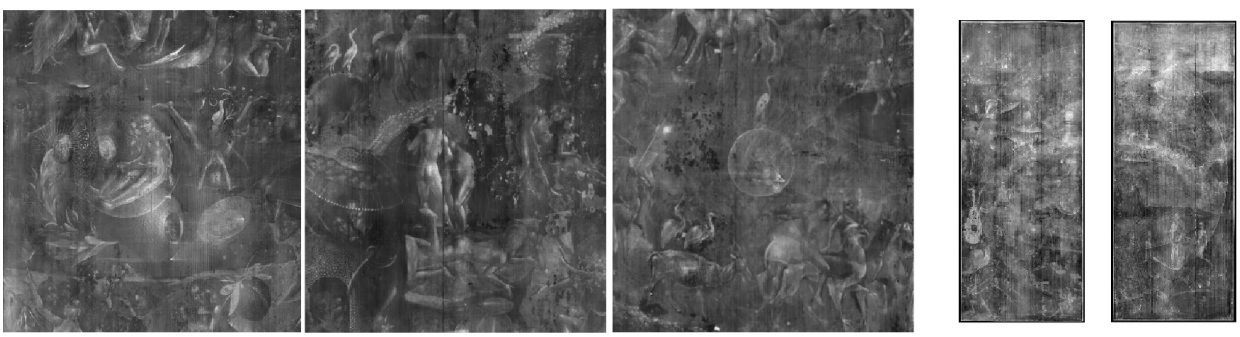

Figure 2. left: Approximations. Right: Back panel. Source: Composition prepared by the Authors, 2022.

Figure 3. Technical study conducted by Van Schoute and Garrido, 2001. X-rays on the triptych of the Garden of Earthly Delights. Left: Approximations. Right: Back panel. Source: Composition prepared by the Authors, 2022.

an environment on which they depend but do not establish a connection beyond the gaze.

Each teardrop presents a different context: a naked couple, sitting on this skin that surrounds them, intimately looking at one another; a group of three people standing, talking about any private topic with only half a capsule over their heads, suspended, without touching the bodies; a blue hedgehog or similar animal, with a crest of spikes that does not graze the membrane that encapsulates them, without apparent movement, protected. As for their position, these three tears are scattered in the central panel, dedicated to the earthly paradise. The other two side panels, hell, and heavenly paradise are empty of tears as if they acquired value only in a central position. The surprising thing happens on closing the triptych, when all the information is exposed in an image, a single transparent capsule that holds the entire world, with an inscription that heads it: "***For he spoke, and it came to be; he commanded, and it stood firm."*** (Psalm 33, 9. The Holy Bible, Old Testament).

At that moment of closing, the observer faces the large transparent sphere. All the inner tears are summarized and condensed into a single capsule, wanting to show the existential principle: the cosmic image. The universe is represented in miniature, a microcosm that gives a glimpse of how small the world is compared to the magnificence of the divine order (Figure 2).

Between 1980 and 1990, Professor Roger Van Schoute and Dr. Carmen Garrido conducted a technical study of the work published in

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2001 (Garrido, 2016). In it, mechanical eyes, X-rays, and infrared rays were arranged to clarify some of the uncertainties accumulated over the years and capture the imperceptible details or any information of the strokes contained in the underlying surface of the piece. This same resource has been used in the architectural field; architect Beatriz Colomina shows this in her book "X-ray Architecture" (Colomina, 2021), where radiography reveals the internal part of the object of study. Both are examples of the restlessness of going beyond the surface to immerse oneself in the deepest layers of a work. In this case, the study of Van Schoute and Garrido (2016) showed the first sketches made schematically before painting, the first composition that placed the elements on stage, with certain hesitations and some subsequent alterations (Figure 3).

METHODOLOGY

Transparencies and graphic records: Tears of architecture

The technical study's results were enlightening regarding the spaces in this essay: the bubbles were preconceived from the beginning without subsequent modifications. The methodology to provide them with transparency was innovative since, instead of painting them on the panel, a layer of quick-drying varnish was applied over the existing paint and, even when fresh, it was scraped to reveal what was in its background so that the bubble was wholly inserted into the medium where it was. A new methodology committed to obtaining a specific result in its transparency. They were captured as an absorption, a silence, a pause within the chaotic world where they find themselves.

Every detail had a motive, a cause. The musical notes of the pentagram create a particular currently readable melody. Every animal, fruit, building, person, and space is part of his knowledge, starting from worldly knowledge. The question then arises as to how he came to handle this type of encapsulated space, how he could have seen or lived them to get into each of these bubbles and leave them embodied in the work. These questions made neuroscientist Sophie Schwartz (2016) carry out a cerebral study to see if the information came from the dream world, remaining in mere illusion or reality, to which she concluded:

The world of dreams is an authentic simulation of the real world. The objects that populate our dreams are those of our everyday experience. Maybe they are not the same size, but the basic elements arise from our experience. (Schwartz, 2016)

It is unknown how El Bosco came to possess these architectures. However, thanks to his methodology of scraping and inserting the void into the painting, he left us the oldest known graphic record of intangible space.

This is a work that works on various scales. According to the assessment provided by the observers, the available approximation layer adds new information. The air capsules are revealed in the central panel, a hedonistic

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Figure 4. Hans Hollein inhabiting his mobile office (Mobiles Büro), under the gaze of the ORF team, 1969. Source: Composition prepared by the Authors, 2022.

scene where each bit player is shown openly and unrestrained. The motivation for finding them in architectural contexts makes us think of intimate and safe spaces where the inhabitant could explore their individuality and desires without restrictions in the form of a home. Therefore, three examples of domestic architecture were chosen where the mechanism of fixation on the small, of the magnifying glass and of the zoom allows one to discover these spaces of new natures. To search, to travel to the microworld to tell, using graphical symbols, what is found in it. Discovering the graphic microcosm that encloses the architecture becomes this essay's methodology.

RESULTS

Three triptychs and three architectural approaches

Attention changes the size of things. It gives importance to selected parts of the world (Seguí, 2012).

Hans Hollein's mobile offices are the human-scale representation of these architectural tears. Four centuries after the Garden of Earthly Delights, the Austrian architect wanted to design a mobile space that could accommodate people's movement. A small box with wheels was unfolded and turned into air wrapped in transparent plastic (Hernández, 2014). He intended to respond with architecture to society's growing mobility and changing needs, to create something constantly adapting to its environment (Elvira, 2022). Somehow, this architect made a perceptive game of scale, giving life to the tears of El Bosco. He entered them, creating an ephemeral, transparent, and encapsulated architecture, inhabiting a space where he could not be touched (Figure 4).

The methodology of the approximation and the detail enacted in the Garden of Delights continued the search for microcosms in the purely architectural field, with the idea of contributing new values to

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Figure 5. Macrography - Diptych of Casa Ugalde. Source: Preparation by the authors, 2020.

the projects. The methodology was applied for four years (2021-2024) to several doors and windows of recognized architectures, presented as diptychs, triptychs, or polyptychs, ready to be analyzed. Immersed in an abstract world by its microscale, inaccessible, contained, uninhabitable capsules of a single cold and transparent material appeared, but at the same time, tears with enigmatic, sudden, and unusual spaces that could well be related to the architectural work where they are located, or function as a springboard for a new understanding of the space they inhabit.

In this way, the following study assembled catalogs of different works formed by micrographs of approximations, from which the graphic results of three will be presented: urban protrusions, floating cosmos, and architectural microflora. The microphotographic capture was carried out using a telescopic lens with extension, a glass meter, and a crack meter. Subsequently, these *catalogs of tears* were analyzed using a computer program that recognizes characteristics of a microimage to analyze all the physical data of said characteristics scientifically.

The first diptych is of Casa Ugalde, 1951-53, built by Coderch in Caldes d'Estrac as an urban extension of the Mediterranean. This diptych is located in the main room on the first floor, an intermediate element between the interior room and the private terrace (Montaner, 1998). This place frames the horizon line between sky and sea (Figure 5).

In this first experience, the spaces detected are shown as dynamic and floating tears, drops printed with the feeling of wanting to transport messages from one place to another. Sometimes, they seem to come out of the thickness of the glass itself and merge with outer space to

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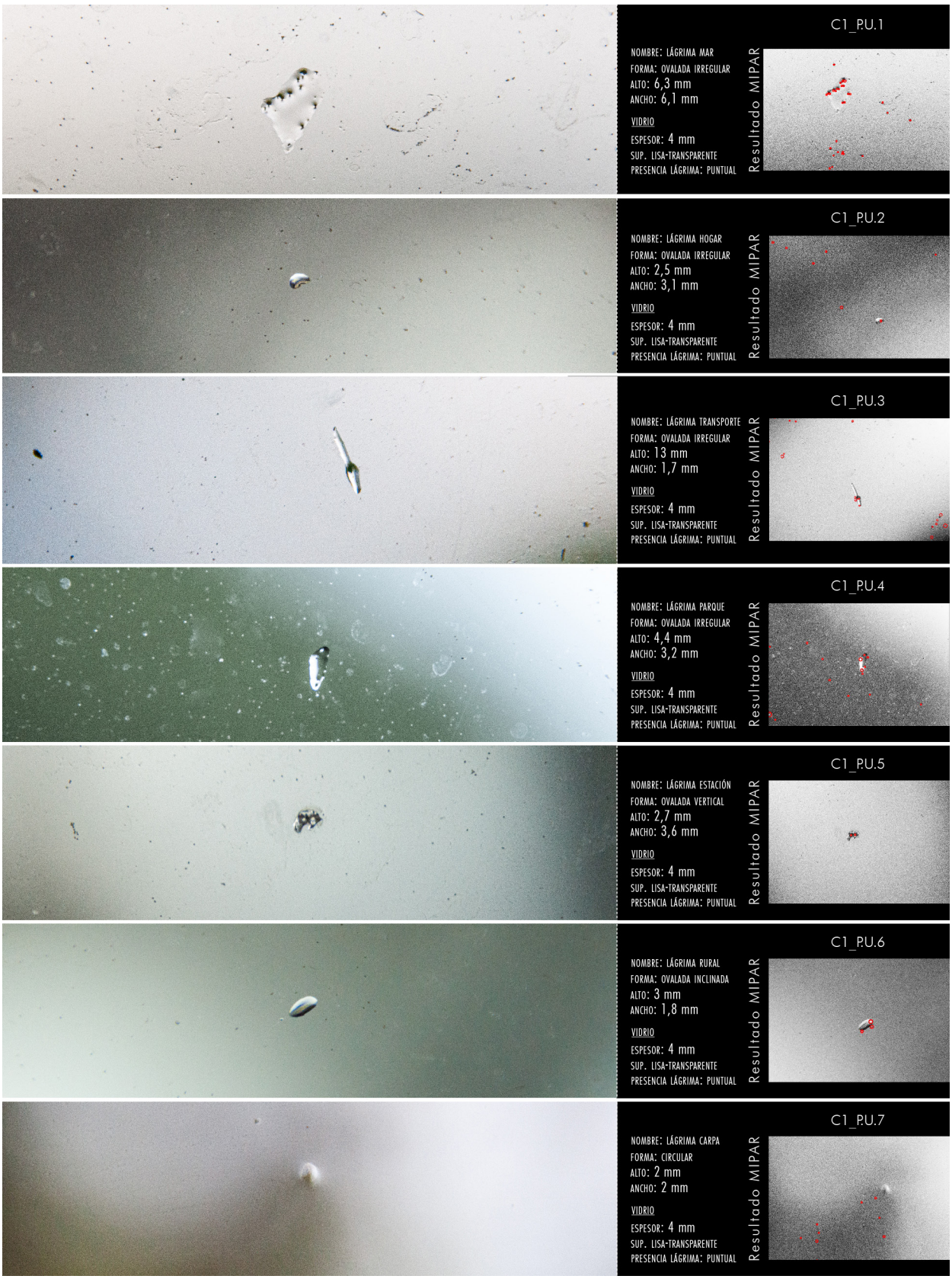

Figure 6. Aproximation: Catalog 1 - Urban protuberances. Source: Preparation by the authors, 2020.

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Figure 7. Macrography - Monoptic of The Monk's Palace. Source: Preparation by the authors, 2023.

penetrate the crust of the material world. Sometimes, the skin wrapping is transparent and lets you see through; others are opaque, as if defending itself from itself (Figure 6).

By setting fixed parameters (bright polarity, sensitivity of 0.93, and a threshold of 0.2), the program recognizes bubbles in the glass with sizes from 0.1 to 3 mm. However, the main spaces are not detected. Something about these unintelligible elements prevents the algorithm from identifying them.

The second monoptic is part of the last extension made at the John Soane Museum House in London, known as The Monk's Palace, in 1820 (Well, 2001). In that basement (Figure 7), the architect projects the space as a satire of the Gothic style that society required him to build, where the monoptic glasses come from a church in the city of Cologne in 17th-century Germany (Knox, 2009).

This time, eyes inserted in lunar textures were discovered, elements of a microscale cosmos with the character of ubiquity for observing those places where they are found. Of the three, it is the gloomiest and most challenging to capture in a catalog of glass. The point of view can make the tear directly disappear; to perceive it altogether, one must have a kind of squint that allows multifocal vision (Figure 8).

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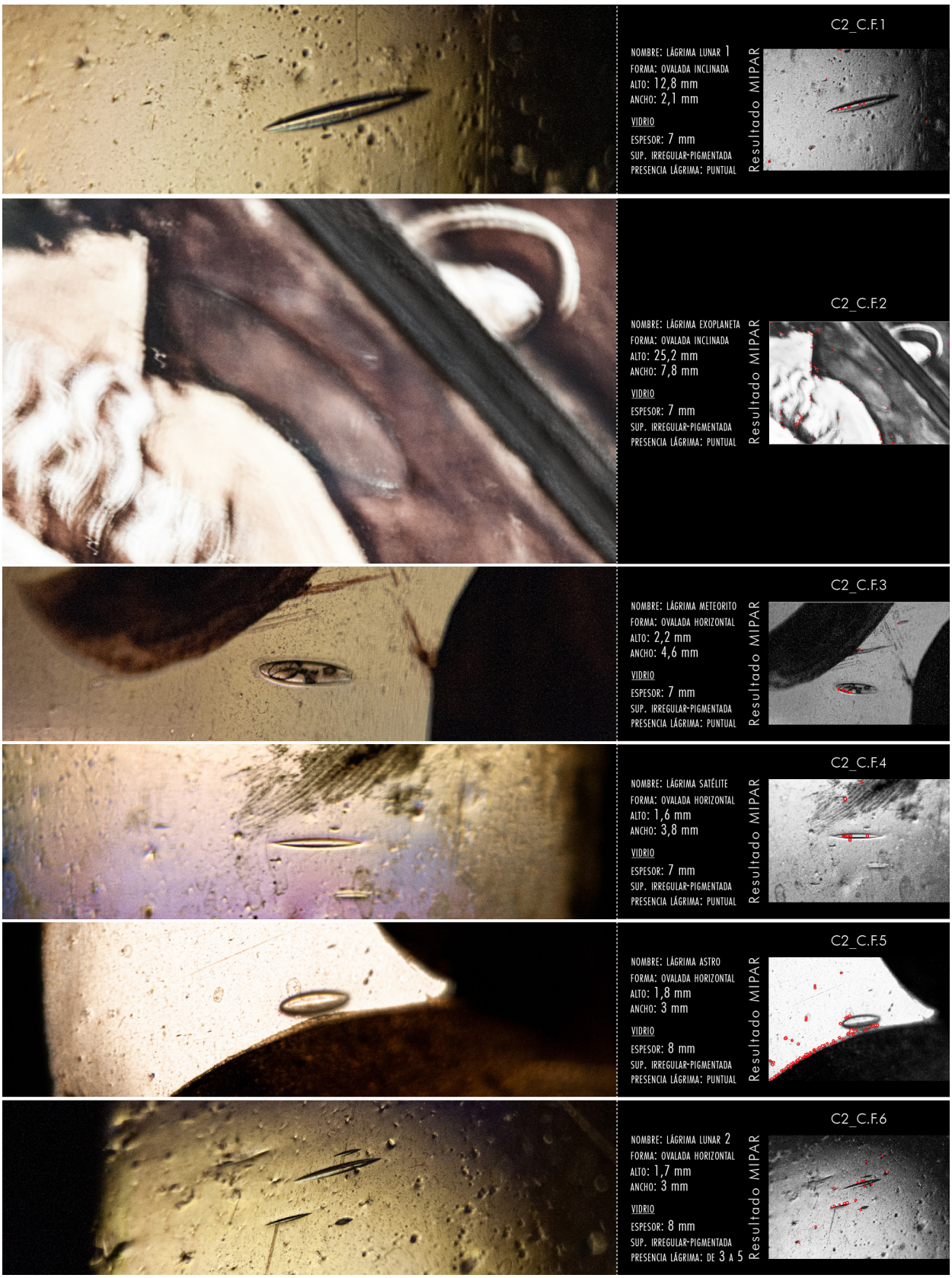

Figure 8. Approximation: Catalog 2 - Floating Cosmos. Source: Prepared by the authors, 2023.

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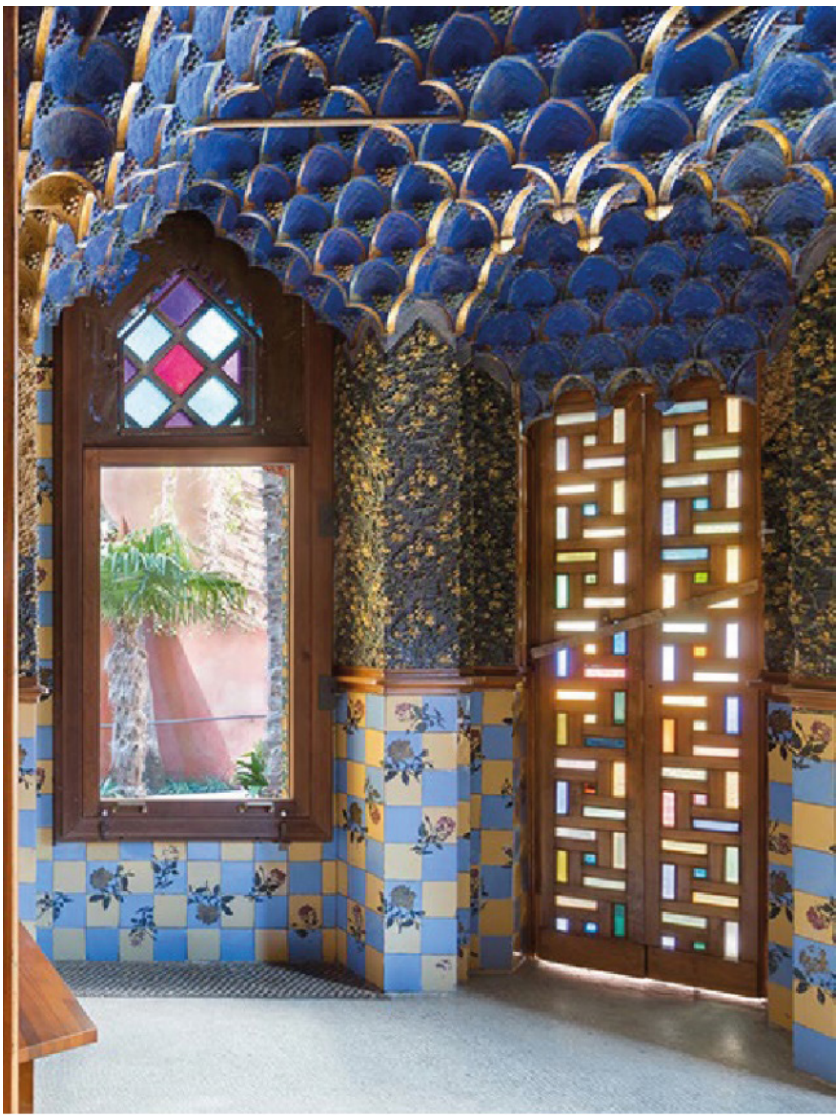

Figure 9. Macrography - Diptych of Casa Vicens. Source: Composition prepared by the Authors, 2022.

Under identical starting parameters, the same pattern emerges again: standard bubbles and malformations of glass of similar sizes are recognized. The algorithm perceives some element of another nature, but it does not finish witnessing what it is. It points in or near the tear but not the tear itself; it escapes its understanding.

Finally, the diptych belonging to Casa Vicens, 1883-85, a work that was originally a single-family residence designed by Gaudí but that saw several architects change its use until it was adapted into today's museum by Elías Torres and Martínez Lapeña (Roe, 2012). There is a room that has remained intact over the years and keeps all its essence, the smoking room (Solà-Morales, 1983), where the diptych that gives rise to the third catalog is located (Figure 9).

It detects hyaline cells, corpuscles, vacuoles, mitochondria, and bubble membranes unwrapped in a viscous environment. Some seem to be suspended in any coordinate of a liquid, sometimes unfolding in plasma, and others in apparent motion. They have their position marked with the horizon line and

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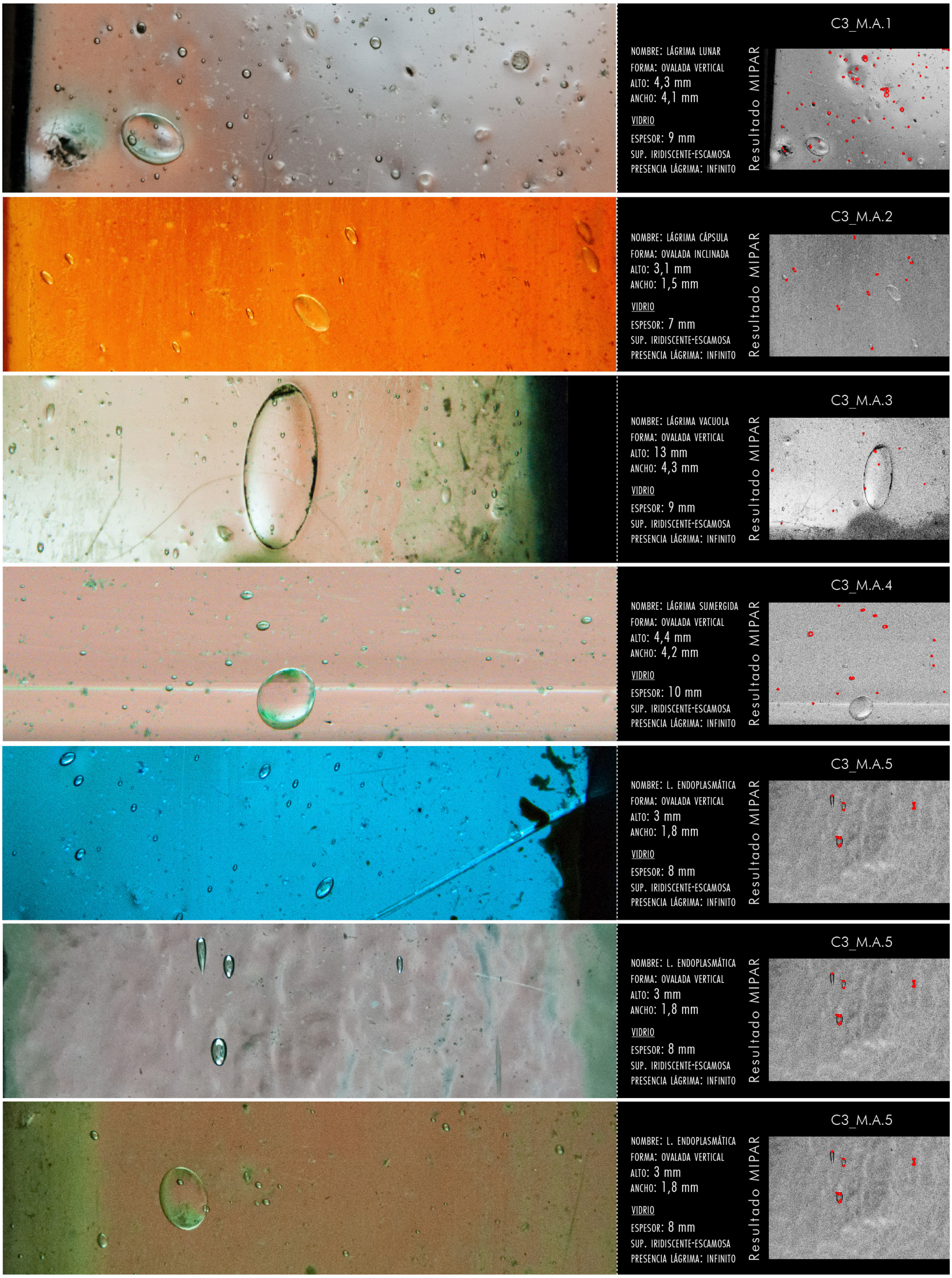

Figure 10. Approximation: Catalog 3 - Architectural microflora. Source: Preparation by the authors, 2021.

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seem to submerge, or they appear in a lunar environment. They transmit a biological language that carries the condition of not being touched. However, if, at some point, access was allowed, it would be easy to perceive the roughness and undulations of their surface. Its presence tending to infinity indicates that the importance is not in the quality of the glass but in its formal representation and in how it could sift the visions using color and thickness while allowing light to filter (Figure 10).

The inserted parameters should allow their recognition. However, again, the computer application tries to locate something, but the algorithm does not know what it is. By their nature, these architectural tears seem to be in a parallel reality, going almost entirely unnoticed. The tool could have provided diverse physical data such as the area, major axis, minor axis, eccentricity, angle to the horizontal, distances, etc. Instead, it has revealed the biggest clue of all: these spaces do not belong to the glass. The starting hypothesis seemed clear; the condition of transparency provided some confusion. They have found themselves there by chance, but continuing their search could lead to new discoveries, perhaps camouflaged or barely visible. It is so easy that they have not even been perceived yet. However, one thing is clear: intangible spaces belong to another nature.

A graphic microworld

You have to love space to describe it so thoroughly as to enclose a whole show in a drawn molecule (Seguí, 2012).

We are in an era where tiny gestures are valued, where great effervescent actions are not sought but rather small ones of great intensity. Moreover, architects often tend to dwarf the drawings in search of abstraction. They move with admirable ease on scales ranging from the enormous to the insignificant; the small contains values that the large cannot encompass.

In this sense, exploring architecture and space through a microscopic camera encourages the researcher to transform into small creatures of unrecognizable size, traveling to worlds that are yet to be discovered. Converting the graphs into micrographs provides additional information about the space from the moment events that are not accessible to the human eye are revealed. This was what Bosch was doing, miniaturizing. He prepared a microcosm that he placed next to the seed to continue investigating the details of the minuscule.

The control over the size of the world makes it possible to discover its telescopic condition. The possibility of making real encounters on different scales and, with this, increasing or reducing the mental spaces leads to the confrontation between the visible world, which we sometimes call real, and the magical or spirit world, which we have agreed to call intangible. The first is subjected to a single scale, and the second is free of it because it lacks a body. As in those multi-scale maps drawn by Belén Gopegui (2009), where a room

CONCLUSION

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can arise from the encounter between two knees, a hand flies over, protecting a floor, or the arm of an angel unfolds to offer us shelter. (Gopegui, 2009).

The microworld is objective; it provides data, condensed matter, and information. It is a small and empirical world; its micrographs so far speak of spaces that cannot be touched, of inaccessible membranes and bubbles, but at the same time, they show tears with enigmatic, sudden, and unusual spaces, places that Hans Hollein (1969) experiences as susceptible to being inhabited.

Each tear is shown as a cartography, a representation of coagulated air, a slight essence of the project to which it belongs. Each micrograph relates data and looks from three different dimensions: an exterior one—the place to which it responds, its creation process, and its author—another of the creative elements of the teardrop—glass, painting, or any other element that gives rise to intangible space—and finally, the space itself—drawings, footprints, records, textures.

This is a kind of fiction and scale game that shows architecture within architecture (De Luelmo, 1999). The world is full of incredible places, hidden in the margins of visible space, inside the objects that surround us, ready to deliver spaces with unimaginable potential for our architectural projects. All one has to do is prepare one's senses, open one's imagination, and be patient.

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ARTICULATION OF DESIGN PROCESSES, COMPUTING, CYBERNETICS, AND BIM: A RETROSPECTIVE

ARTICULACIÓN DE PROCESOS DE DISEÑO, COMPUTACIÓN, CIBERNÉTICA Y BIM: UNA RETROSPECTIVA

ARTICULAÇÃO DE PROCESSOS DE PROJETO, COMPUTAÇÃO, CIBERNÉTICA E BIM: UMA RETROSPECTIVA

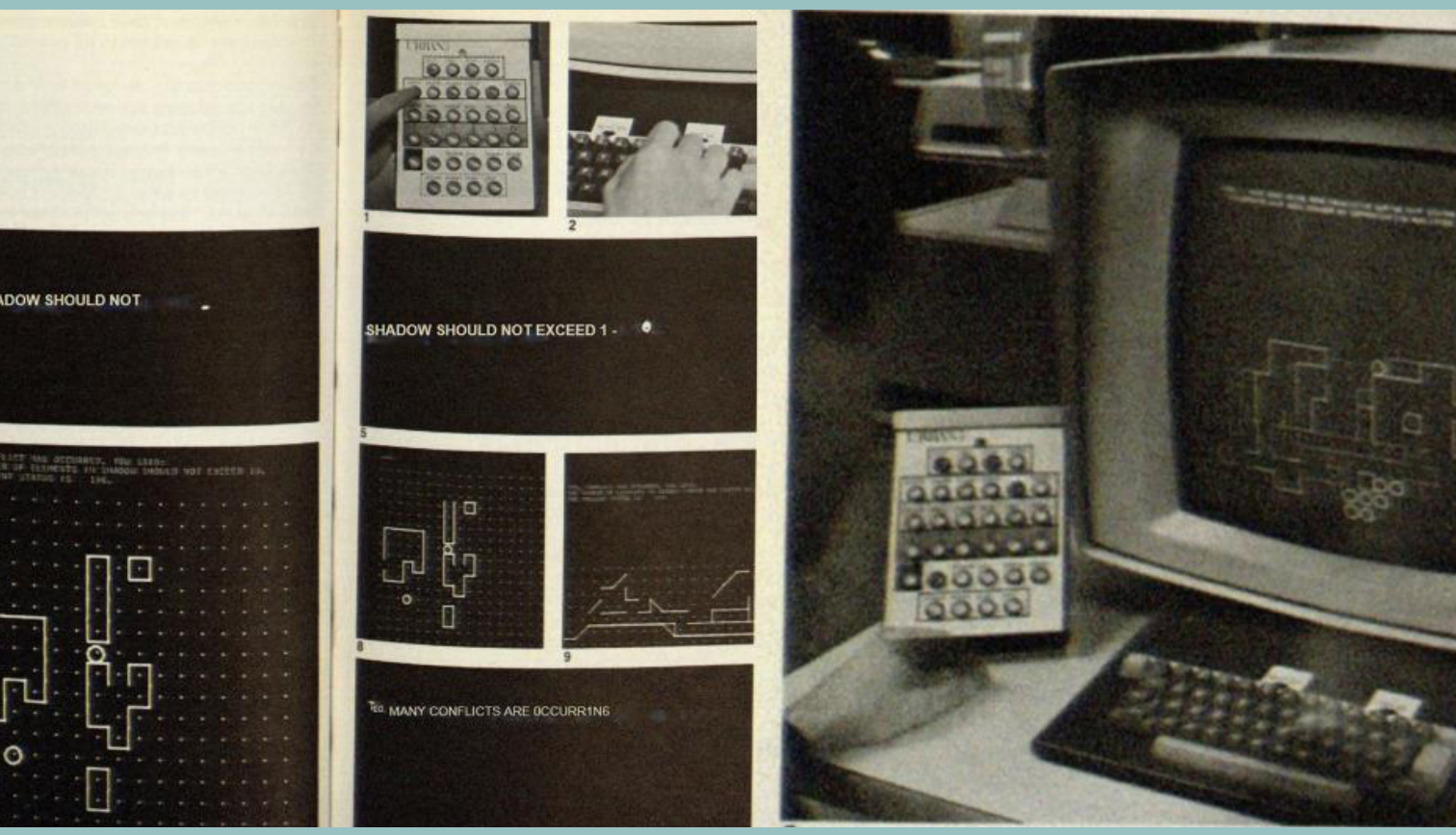

Figure 0. URBAN5 software. Source: Adapted from Negroponte, 1970.

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RESUMEN

El artículo explora el desarrollo histórico y teórico del *Building Information Modeling* (BIM) y de los procesos de diseño que este conlleva. El estudio deriva de una investigación de doctorado y tiene como objetivo construir una comprensión ampliada del proceso de informatización del pensamiento arquitectónico que condujo al BIM, considerando aportes del campo de la Cibernética y de las Ciencias de la Computación. Se profundiza en el contexto histórico del siglo XX y se destacan los avances paralelos e interdependientes en la Arquitectura, la Cibernética y la Computación. Basado en una revisión bibliográfica, análisis retrospectivo y teórico, el artículo hace hincapié en las contribuciones de trabajos que sistematizaron procesos de diseño e introdujeron abordajes metodológicos sistémicos que valoran la declaración y estructuración de las informaciones de diseño y que también contribuyeron tanto para la incorporación de la computación en los procesos de diseño, como para su desarrollo. El texto presenta las contribuciones de instituciones de investigación del Reino Unido y Estados Unidos en el desarrollo de bases computacionales para la arquitectura, recalcando que la diversidad geográfica de los avances en el campo va más allá de estos dos ejes. Tales programas computacionales, influenciados por las teorías cibernéticas, se centraron en crear modelos y sistemas para la descripción de la información, siendo cruciales para el avance del BIM. Por fin, se señala la importancia de la traducción del pensamiento arquitectónico en información estructurada para ser procesado por bases computacionales, incluyendo aquellas de base BIM. Se concluye reforzando que, aunque el BIM y los actuales procesos de diseño informatizados provengan de un amplio contexto histórico y geopolítico del siglo XX, involucrando investigaciones teóricas, militares y profesionales, su desarrollo fue guiado para asistir la producción de modelos de arquitectura norte-atlánticos.

Palabras clave: cibernética, diseño arquitectónico, diseño digital, historia, informatización

ABSTRACT

This article explores the historical and theoretical developments of Building Information Modeling (BIM) and the associated design processes. The study stems from ongoing doctoral research and aims to build an expanded understanding of the informatization process of architectural thought that led to BIM, considering contributions from the Cybernetics and Computing fields. The paper looks into the historical context of the 20th century and highlights the parallel and interdependent developments in Architecture, Cybernetics, and Computer Science. Based on a bibliographic review, retrospective, and theoretical analysis, this article emphasizes the contributions of works that systematized design processes and introduced systemic methodological approaches. Those works acknowledge the value of declaration and structuring of design information and contribute to incorporating computing into design processes and their development. The work presents the contributions of research institutions from the United Kingdom and the United States in developing computer programs for architecture, emphasizing that the geographical diversity of advancements in the field goes beyond these two lines. These computer programs were influenced by cybernetic theories, which were crucial for BIM development, and were created to produce models and systems to describe information. Finally, the importance of translating architectural thought into structured data that might be processable through computer programs, including BIM software, is highlighted, concluding that although BIM and developments of the current digital design processes followed the goal of assisting the production of North Atlantic architectural models, they originated from a broad and diverse historical and geopolitical context of the 20th century, involving theoretical, military, and professional research

Keywords: cybernetics, architecture design, digital design, history, informatization

RESUMO

O artigo explora o desenvolvimento histórico e teórico do *Building Information Modelling (BIM)* e dos processos de projeto envolvidos. O estudo deriva de uma pesquisa de doutorado e tem como objetivo construir uma compreensão ampliada do processo de informatização do pensamento arquitetônico que levou ao BIM, considerando as contribuições do campo da cibernética e da ciência da computação. Ele se aprofunda no contexto histórico do século XX e destaca os desenvolvimentos paralelos e interdependentes da arquitetura, da cibernética e da ciência da computação. Com base em uma revisão da literatura, análise retrospectiva e teórica, o artigo enfatiza as contribuições de trabalhos que sistematizaram os processos de projeto e introduziram abordagens metodológicas sistêmicas que valorizam a declaração e a estruturação das informações de projeto e que também contribuíram para a incorporação da computação nos processos de projeto e seu desenvolvimento. O texto apresenta as contribuições das instituições de pesquisa do Reino Unido e dos EUA para o desenvolvimento de fundamentos computacionais para a arquitetura, enfatizando que a diversidade geográfica dos avanços no campo vai além desses dois eixos. Esses softwares, influenciados por teorias cibernéticas, concentraram-se na criação de modelos e sistemas para a descrição de informações, sendo cruciais para o avanço do BIM. Por fim, aponta-se a importância de traduzir o pensamento arquitetônico em informações estruturadas a serem processadas por bases computacionais, inclusive as baseadas em BIM. Conclui-se reforçando que, embora o BIM e os atuais processos de projeto baseados em computador tenham origem em um amplo contexto histórico e geopolítico do século XX, envolvendo pesquisas teóricas, militares e profissionais, seu desenvolvimento foi orientado para auxiliar a produção de modelos arquitetônicos norte-atlânticos.

Palavras-chave: cibernética, projeto arquitetônico, projeto digital, história, informatização

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INTRODUCTION

To understand the computerization of architectural thinking that led to the formulation and development of *Building Information Modeling* (BIM) and the design processes that this entails, the scenario of parallels and interdependencies of the 20th century's theoretical, computational, and architectural design process advances must be understood. The architectural thought referred to is structured under design methodologies that involve specific routines and dynamics of declaration and use of design information affiliated with the visions of architects such as Christopher Alexander (1965; 1977), Lucian Kroll (1994), Nicolaas John Habraken (1961; 1996), Yona Friedman (1971; 1973), Charles Eastman (1972) or groups and movements such as Archigram (Sadler, 2005) and Metabolists (Frampton, 2003; Rocha, [n.d.]), who systematized design processes, through research and experiments. In addition, they introduced systemic approaches that value the organization and structuring of design information, exploring the idea of open and flexible systems that allow the adaptation and continuous evolution of architectural designs.

Dubberly and Pangaro (2015) carefully crossed the paths of cybernetics, computing, counterculture, and design, identifying and illustrating a broad fabric of articulations and interdependencies. Although the reflection proposed here is developed similarly to that of Dubberly and Pangaro (2015), this work examined the articulated paths of Cybernetics with the advances in architectural design and Computing Processes. This aims at building a complex understanding—in terms of Morin (2011)—of the computerization of architectural thinking that led to the formulation and development of BIM and the design processes that it presupposes. For this, adopting a retrospective approach, a bibliographic review, historical rescue, and theoretical analysis were carried out, mainly through the dialog with postulates of First Order Cybernetics (Wiener, 1948) **1**; Second Order Cybernetics (Von Foerster, 1974)**2**; Conversation Theory (Pask, 1976)**3**; the General Systems Theory (Von Bertalanffy, 1976) **4**; the Mathematical Theory of Communication (Shannon, 1948) **5**; and Morin's Complex Thinking (1977; 2011) **6**. The retrospective approach involves analyzing past events, documents, and figures to address contemporary challenges and gain a more profound and expanded understanding of historical contexts. This approach is complex and incorporates several fields of study and research techniques (Bourke & Skinner, 2022), and coincides with the vision of Morin (1977), who advocates a dialogical and dialectical method that recognizes the complexity and interconnection of historical phenomena.

The understanding of design processes in BIM, to which reference is made and which guides the reflection, simultaneously refers to a technological structure of informatics, a set of specific design and production processes, and a methodology and procedures of management and access to information (Pita, 2021; Pita & Tramontano, 2023; Dounas et al., 2020). It is an understanding that allows one to interpret BIM's capacity to complexify the design processes, dealing with

1 First-order Cybernetics deals with studying a system's principles of organization, control, and communication without focusing on the system's constitution or functioning (Wiener, 1948).

2 Second-order Cybernetics consists of the study of systems under observation. It considers the observer part of the observed system and admits their interference in the organization of the parts (Foerster, 1974).

3 Conversation Theory explores the dynamics of interaction and learning through conversations, emphasizing the causal circular processes based on the feedback inherent in these interactions (Pask, 1976).

4 The General Theory of Systems studies the relationships between the parts and between the whole and the parts that compose it (Bertalanffy, 1976). The Austrian biologist Ludwig von Bertalanffy developed his ideas starting in the 1930s, publishing the first article on the subject in 1948 and the first edition of the General Systems Theory in 1968.

5 The Mathematical Theory of Communication focuses on transmitting messages with the least information loss, considering the noise in the transmission channel (Shannon, 1948).

6 Complexity Theory is a multidimensional and integrative non-reductionist approach that recognizes planetary complexity, uncertainty, and the condition of social reality's interdependence (Morin, 1977; 2011). The French anthropologist, sociologist, and philosopher Edgar Morin published the first book on the subject in 1977. It is based, among other postulates and fields of study, on cybernetic and systemic principles.

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sets of layers of interdependent information of diverse natures and enabling responsiveness and feedback between metadata and design parameters, between designer and design, in a constantly produced flow of information. It is argued that to achieve these dynamics of informational flows in the production of architecture, it was necessary to construct an extensive fabric of articulations that computerized architectural thinking, mainly with cybernetics (Quin, 2019), in a process that remains in force and that, without it, architecture could not be processed through BIM. It is pertinent to emphasize that, although it is important, the objective of this article does not lie in the discussion of current practices of design processes or the use of BIM, but rather in examining the historical and theoretical background that contributed to its formulation and development over the last century.

In addition to the introductory and concluding sections, this article is structured around two main sections. Starting with "The emergence of Architecture-oriented computer bases", the genesis of the development of computer bases in Architecture is discussed, considering socio-political contexts and theoretical contributions from Cybernetics. Then, in the section "Cybernetics and Design processes", the relationship between both fields of study is explored, examining how cybernetic and computational principles were applied and incorporated into the design process and how that node of connections contributed to the computerization of architectural thinking.

The emergence of architecture-oriented computer bases

Douglas Engelbart (1962), aligned with the premises of Ashby's work (1956), presented the concept of augmented intelligence in a network, proposing a design process assisted by a computational system, the *Clerk*. In the opening pages of his report, prepared for the Air Force Office of Scientific Research, Engelbart points out:

> Ignoring the representation on the screen, the architect begins to insert a series of specifications and data about a six-inch slab, twelve-inch concrete walls, [...] the revised scene will appear on the screen, the structure is taking shape. They examine, adjust, take information from the clerk's catalog, and readjust. [...] they use the lists of specifications of the "clerk" to modify them or add others. They grow in an increasingly detailed and interconnected structure, representing the mature thinking that led to the design. (Engelbart, 1962, p. 5)

In addition to his cybernetic understanding applied to the design process, Engelbart (1962) described with significant precision those that, years later, would be design-oriented experimental systems. This was a vision of an architect of the future who, according to Ashby (1956), would expand his intelligence with the assistance of computing. It was also the vision of a design process based on interdependent data banks that directly relate to a symbol system supporting human-machine interaction. In 1959, the *Computer Applications Group* and the Design Division of the MIT Department of

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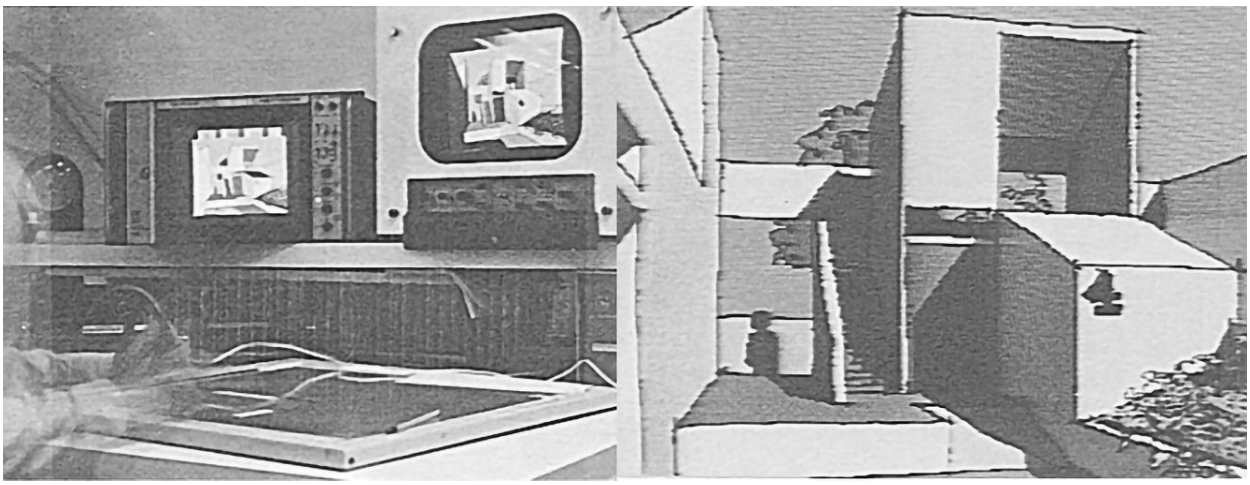

Figure 1. Architecture-by-Yourself: An experiment with computer graphics for House Design. Source: Adapted from Weinzapfel and Negroponte, 1976.

Mechanical Engineering discussed visions similar to Engelbart's (Coons, 1963). They addressed the possibility of using computing more explicitly in the design processes, from the building's conception to construction. Coons (1963) described that they outlined a system that would "use the creative and imaginative powers of man and the analytical and computational powers of the machine" (Coons, 1963, p. 300). Based on this premise, Coons and Ross incorporated the postulates of Engelbart (1962) into the proposals of their research project Computer-Aided Design, coordinated by Ross. This project aimed to apply data processing concepts and techniques for the design of mechanical parts and the development of automatic programming systems for numerically controlled machines and tools (Ross, 1961; Ross & Rodríguez, 1963), consolidating itself as a reference for important research in the area, such as the doctoral research of Ivan Sutherland (1963) and Charles Eastman (1968).

Eastman (1970) published an analysis of intuitive design processes based on computer bases and, a year later, published a computational basis (Eastman, 1971) that, in terms of Ashby (1956) and Engelbart (1962), would expand designers' ability to develop design process activities. Also in the 1970s, the research group Architecture Machine Group (AMG), founded by Nicholas Negroponte and Leon Groisser, initiated the research project Architecture-by-Yourself: An Experiment with Computer Graphics for House Design, which, researching computational graphics, sought to develop systems that assisted non-technical actors in designing their own rooms (Figure 1) (Weinzapfel & Negroponte, 1976).

At the same time, in the United Kingdom, applying systemic and information control principles, four research groups were consolidated as a reference in the research of information description models and systems (Figure 2). As can be corroborated in Ingram (2020), part of the source codes of BIM-based computer programs, such as Revit and Archicad, come from the fruits of the research of these research groups.

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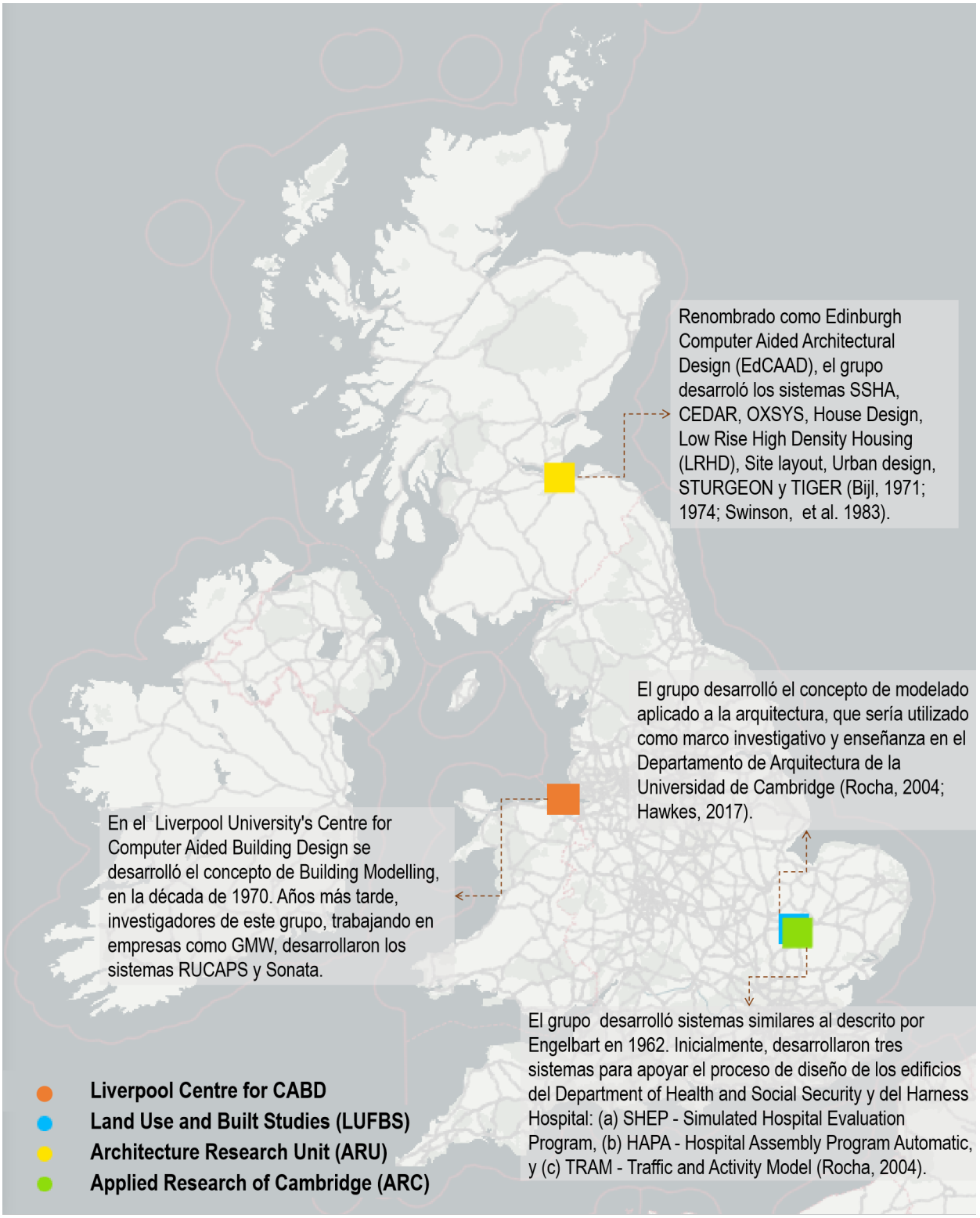

Figure 2. Research groups in the UK. Source: Preparation by the authors.

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The American computational systems of the 1960s and 1970s were developed in close connection with Cybernetic Theory (Wiener, 1948), the Mathematical Theory of Communication (Shannon, 1948), and Conversation Theory (Pask, 1976). This connection can be attributed, to some extent, to the funding from institutions related to military research and that used premises of cybernetics, such as the Advanced Research Projects Agency (ARPA), the Air Force Office of Scientific Research, and the Army Engineer Division, Construction Engineering Research Laboratory (CERL). The research report of the Computer Aided Engineering and Architectural Design System (CEAEADS), prepared by the Daniel, Mann, Johnson & Mendenhall architecture office (DMJM) for the CERL, financed by the Army Engineer Division, evidences the contribution of a wide network of researchers, including architects such as Charles Eastman, William Mitchell, Robert Stults and Nicholas Negroponte (DMJM, 1979). These professionals, affiliated with diverse research groups and universities, conducted studies commissioned by military institutions, demonstrating the interconnection between academic research and military interests. The particularity of the contributions of Eastman (1968; 1970; 1971; 1972) and Negroponte (1970; 1975) is noteworthy.

The works of Eastman (1968; 1970; 1971; 1972), especially those published in the 1960s and 1970s, reflect a constant dialog with communications from researchers interested in human behavior, brain functioning, and cybernetics. Eastman (1970) noted that his approach was grounded "[...] in the work of Newell, Shaw, Simon, Hunt and others who use information processing concepts to study concept formation and problem-solving" (p. 23). We highlight the work Adaptive Conditional Architecture (Eastman, 1972), which derives from cybernetics, "focusing on the dynamic and constantly changing aspects of the physical environment, rather than the static and monumental aspects" (p. 52). This shows that the works, both theoretical and computational, emerged from experiments driven by the theories that permeated the intellectual and social context of the United States, especially cybernetics. On the other hand, Negroponte's work was strongly influenced by Conversation Theory (Pask, 1976) and by the participatory design processes of the Franco-Hungarian architect Yona Friedman (1971). In the middle of a series of posts about Conversation, the English cyberneticist Gordon Pask came up with the text Artificial Intelligence in 1972, published as an introduction to a chapter of Soft Architecture Machines (Negroponte, 1975). This demonstrates a clear articulation between the fields of Cybernetics and Architecture.

In Europe, design processes and computer programs oriented to the design process benefited, particularly -but not exclusively - from the systemic and cybernetic contributions of Pask (1969; 1976) as well as from the participatory proposals of the Archigram group and the architect Lucien Kroll (1994). We highlight the vast academic production on the subject, especially, but not limited to, the book Advanced

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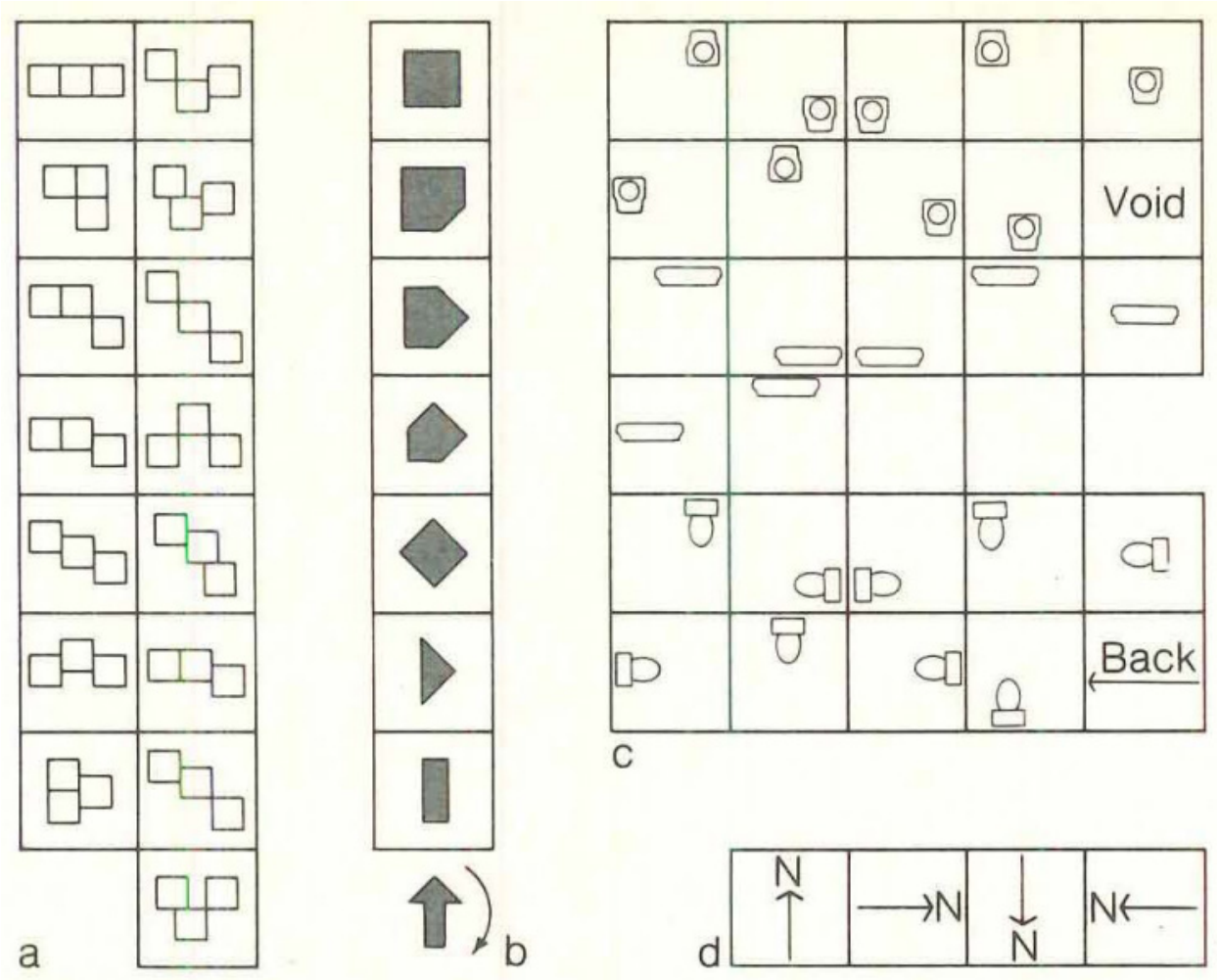

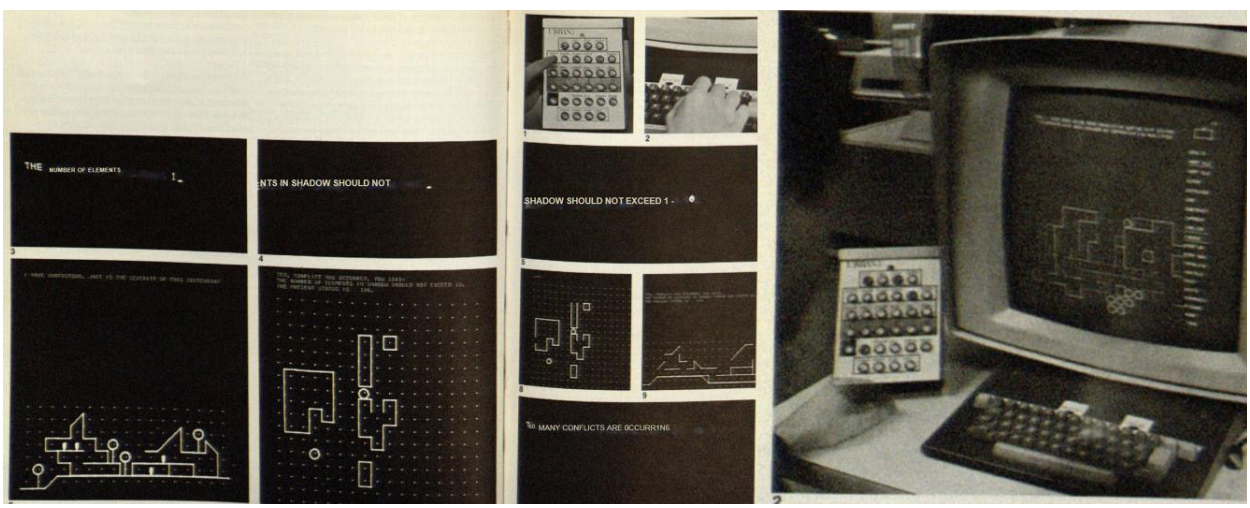

Figure 3. Diagram of the options of Flatwriter. Source: Friedman, 1971.

Figure 4. URBAN5 Software. Source: Adapted from Negroponte, 1970.

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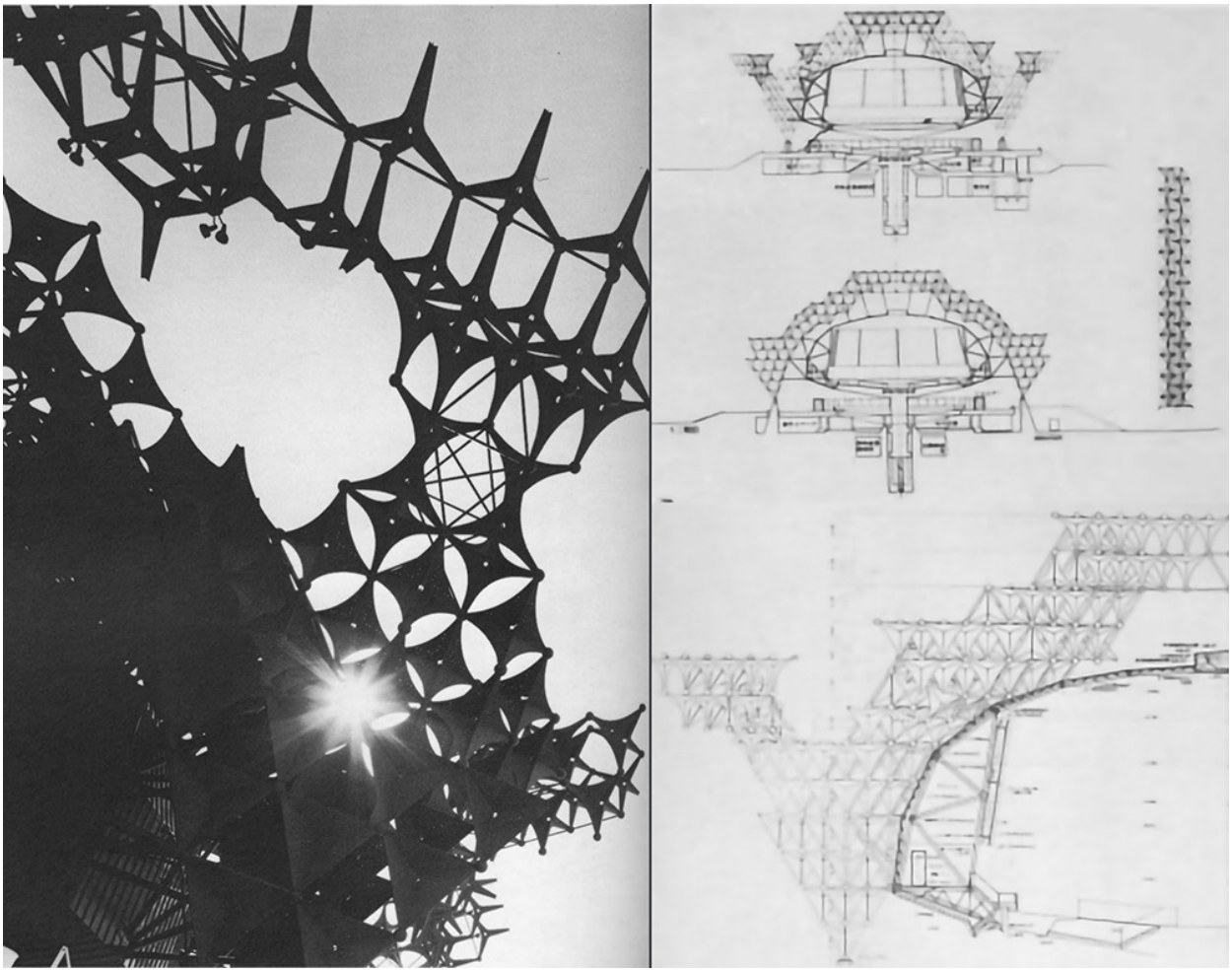

Figure 5. Toshiba Ihi Pavilion, Expo 70, 1970. Source: Adapted from Kurokawa, 1977.

Computer Graphics: Economics Techniques and Applications (Parslow & Green, 1971) and the Annals of the Congress, Design Participation – Proceedings of the Design Research Society Conference (Cross, 1972). At the same time, in France, notions of citizen participation in design decision-making, derived from structuralism (Rocha, 2004), also contributed to the formulation of software that assisted participatory design processes and described the construction information. In this context, Friedman (1971) conceived the Flatwriter software (Figure 3), designed to offer non-technical tools for selecting and printing the preferences of their future room. His proposal was presented at the Osaka World Exhibition in Japan in 1970 and influenced a significant number of formulations of computational systems, such as URBAN5 (Figure 4) (Negroponte, 1970). It is noteworthy that, at the same exhibition, the metabolist architect Kisho Kurokawa presented the Toshiba Ihi Pavilion project (Figure 5), whose structural calculations were made with the assistance of a computer (Kurokawa, 1977).

Architecture journals also played an essential role in disseminating technological advances, which influenced the formulations and developments of BIM. The American journal Progressive Architecture (1920-1995) built a

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valuable collection of pioneering works on systems oriented to architecture and, specifically, to the design process. The issues of 1971 stand out, where influential works on participatory design processes were published, such as Flatwriter (Friedman, 1971), and systems with interconnected databases developed by architecture offices (Interior design, 1971, p. 84). Also, in London, the Computer-Aided Design Journal inaugurated the International Conference and Exhibition on Computers in Engineering and Building Design (1974). This event served as a discussion platform for the growing group of professionals involved with Computer-Aided Building Design (CABD).

This item gathered a set of connections between cybernetics and the panorama of the genesis of the development of architecture-oriented computational bases, aiming to verify the theoretical foundations of the BIM formulations, as in the cases of Eastman, Negroponte, Sutherland, and Friedman. The 1960s and 1970s marked the birth of software, once a broad set of computer programs was unfolded from the first formulations of these architects and from the British groups CCABD, LUBFS, ARC, and EdCAAD (Hawkes, 2017). Despite the geographical diversity of the contributions, they are all located in North Atlantic countries.

DEVELOPMENT

Cybernetics and design processes

The central decades of the 20th century constituted a scenario of intellectual ferment strongly related to the post-war and Cold War situations. During those decades, using cybernetic postulates, the influences of the knowledge produced in the period of the space race and by the Advanced Research Projects Agency (ARPA), on computing and architecture. This scenario contributed to the weaving of connections between cybernetics, computing, and design processes, which led to the computerization of architectural thinking and design processes in BIM. It encompassed influences, impositions, and concordance of visions on the production of architecture in an era of computational advances and the need for urban reconstruction.

In the American context of the imminent threat of nuclear war, Wiener, Deutsch, and Santillana (1950) applied the organizational principles discussed in their recently published book, The Human Use of Human Beings, to the field of urbanism. They conceived the city as a network of communications and flows analogous to the human body. Martin (2005) considers that, for Wiener, the city should be understood as a great communicative organism (Martin, 2005), a vision that coincides with those mentioned by Alexander (1965) and by the English cyberneticist Gordon Pask (1969; 1976), who stood out for his extensive contribution to the articulation between cybernetics and architecture. Cedric Price (2001) recalls that Pask's first contact with architects occurred in 1960 when he was a guest in the Fun Palace project. Price (2001) noted that Pask's contribution to the design of the Fun Palace was invaluable, providing executive and, mainly, cybernetic solutions, which determined the program and dimensions of the project (Figure 6). For the English cyberneticist, architects

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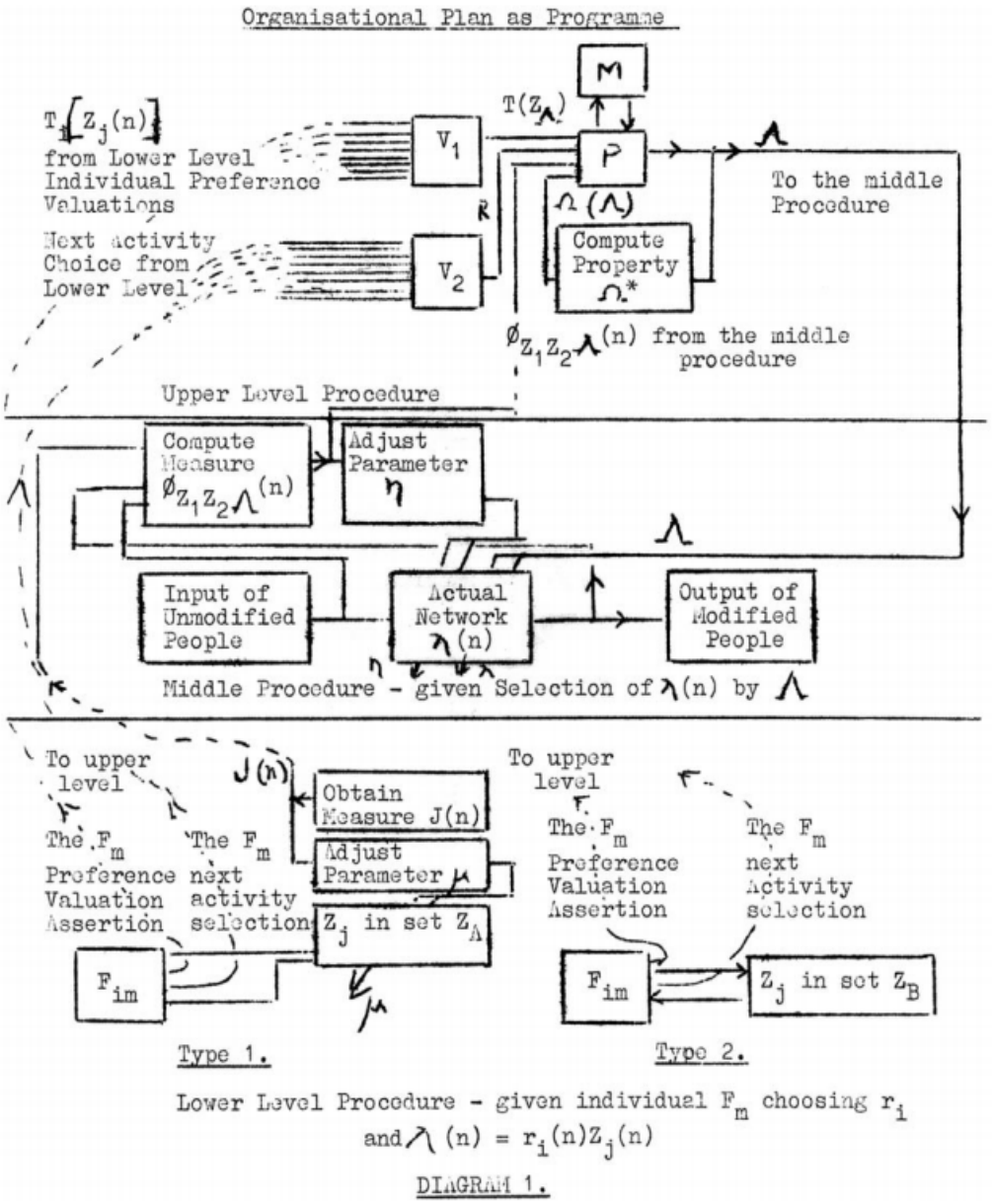

Figure 6. Cybernetic diagram of the Fun Palace, by Gordon Pask. Source: Mathews, 2006.

were the first designers of dynamic systems, driven to an interest in the organizational properties of designed systems, communication, and control (Pask, 1969). Such an argumentation on the relationship between cybernetics and architecture is based on the premises of Conversation Theory (Pask, 1976) which, in line with Second-order Cybernetics, considers the influence of the observer on the observed systems.

Pask's conception (1969; 1976) coincides with the Archigram group's understanding of architecture as a system that includes its observer. Sadler (2005) indicates that Archigram "promoted architecture as a complex, dispersed service situation, completed only by the active participation of the observer, in a fully functioning cybernetic environment [...]" (p. 113). Both Pask (1969; 1976) and Archigram identified potentialities in digital

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technologies for observing complex systems, be they design processes, architectural units, or cities. It is important to note the architecture-oriented computational pioneering of both. The works of the English cyberneticist promoted the theoretical transfer and application of cybernetics to architecture. They discussed cybernetics itself, which occurs, according to the Theory of Communication (Shannon, 1948), without noises in the transmission channel. It was the cybernetic himself who, applying cybernetic theory to the field of architecture, developed computational bases to assist design processes. At the same time, he reflected on the processes and theorized them. According to Mathews (2006), Pask translated interaction processes and dynamics between users and control systems of the Fun Palace into structured information, stating this in diagrams to establish spatial reconfiguration strategies and providing an "operational spatiotemporal matrix of a virtual architecture" (Mathews, 2006, p. 45). Archigram made direct analogies to the computer and its operation, alluding to an architecture of plug-ins and connections allied to a systemic approach (Sadler, 2005): In Plug-in City, the software is the movable and interchangeable architectural units; the hardware is the fixed structure of the city, the support where the architectural units are connected (Rouillard, 1994; Silva, 2004).

The residential building proposal of Plug-in City refers to portable reinforced concrete unit capsules that could be connected in cities. These were also proposed as machines designed for easy connection and disconnection of capsules (Silva, 2004). Similarly, in 1959, based on biological and systemic notions (Von Bertalanffy, 1976), the metabolicists proposed developing and adapting mega-interconnected structures in which "living cells, as in the work of Kisho Kurokawa, would be reduced to prefabricated cocoons, connected to huge helical skyscrapers" (Frampton, 2003, p. 344). This scenario of proposing and developing mega structures arranged to connect capsules occurred in parallel to Friedman's proposals on organizing urban space by means of spatial mega structures (Miyasaka, 2011).

In this work, it has been proposed to bring together the Archigram group, the Metabolist movement, and Friedman based, firstly, on the fact that they shared the historical situation of the years following the Second World War when city planning was under reconstruction, and, secondly, on the similarities in their participatory approaches to design and the use of digital technologies. These similarities derived from the significant influences of General Systems Theory and the field of Cybernetics for the "emergence of an improvisational reasoning in architecture and projects of spaces, objects, infrastructure, and even cities" (Rocha, 2015, p. 108). Silva (2004) argues that the capsule houses also had flexible characteristics, comprising smaller and articulated elements, allowing the inhabitants to reconfigure them dynamically. Regarding the Metabolist movement, there are "traces of a participatory

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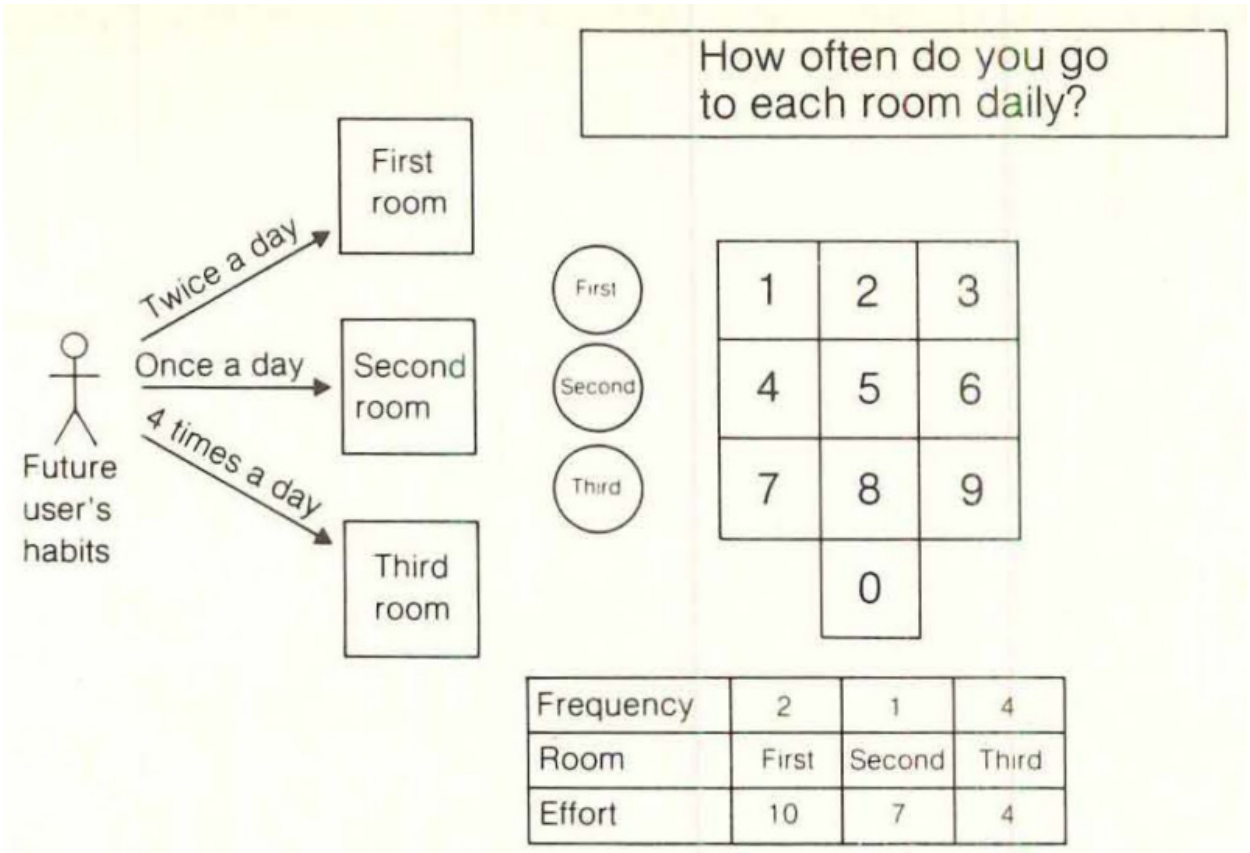

Figure 7. Diagram of translation of ways of life and use of environments. Source: Friedman, 1971.

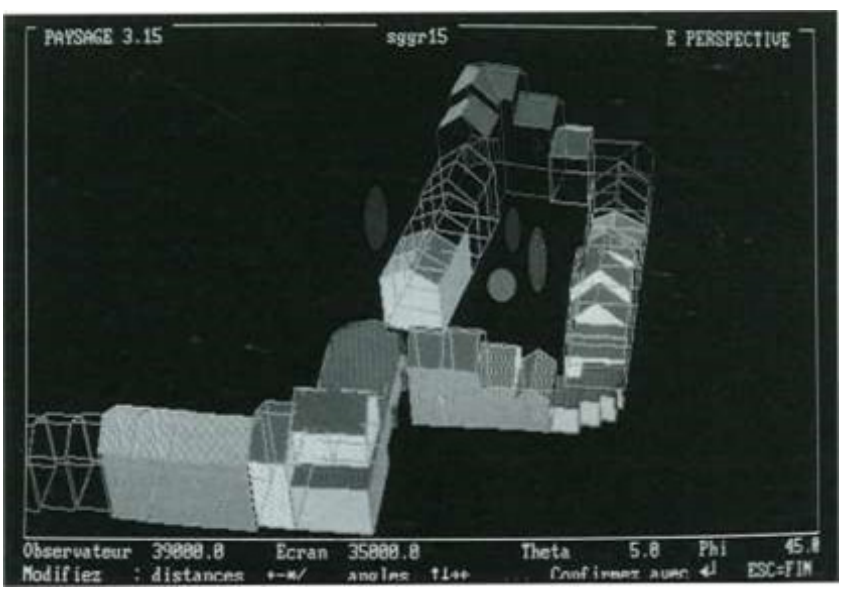

Figure 8. Software developed by the Lucien Kroll office in 1981. Source: Kroll, 1994.

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opening and individual valorization manifested in the desire to offer, through these systematic methods, the possibility that each individual could create their own room, according to their tastes and pocketbook" (Rocha, 2015).

Friedman (1971; 1973) notes the need to open spaces of expression for individuals and inform them about their decisions' risks and possible implications (Figure 7). He designed processes that avoided noise in the transmission of information, so as not to compromise the reception of the message sent (Friedman, 1971; 1973). In fact, as Miyasaka's study (2011) shows, Friedman looked more deeply into participatory dynamics. Veloso and Pratschke (2014) also indicate that Friedman investigated design in architecture as an informational process that stimulated "the diversity of human behavior and new types of social organization" (p. 354).

The Belgian architect Lucien Kroll and the Dutch architect John Habraken make up a second group of architects who marked the studies on design processes that stimulate and are open to emergencies, to paraphrase Morin (2011). The approach of Kroll (1994) regarding participatory processes starts from the search for design guidelines where, through the observation of the daily life of the communities, the concerns were contemplated as they are identified, instead of designating priorities to the problems, making it necessary to involve all urban inhabitants. Kroll (1994) stated that starting from disorder, his search was based on encouraging the development of self-organized social autonomies while inviting escape from what he called architectural clumsiness, which lacks basic questioning (Kroll, 1994). Apart from being an assiduous critic of the modernist movement, Kroll (1994) was noted for using software to develop techniques for people to design their own spaces (Figure 8).

In the Netherlands, the architect John Habraken (1961), a pioneer of the participatory architecture movement, published the book *De Dragers in de Mensen*, where he presented a radical alternative to the mass construction of rooms. Like Kroll, Habraken lays the foundation for the production of identical living spaces and responds to this situation—in a post-war moment—with the concept of supports, which attribute the general design to the architect and the design of the domestic space to the inhabitant (Habraken, 1961). Although Habraken did not contemplate the use of digital technologies much at the time of his book's publication, he presented to MIT in 1996 a report reflecting on the professional practice of architecture and addressing the influence of digital technologies (Habraken, 1996). While he notes a departure from the architect's traditional role, he clearly indicates a computerized practice.

"It is, however, Alexander's most incisive contribution to the computerization of design processes, objectifying the inclusion of inhabitants" (Tramontano & Trujillo, 2019, p. 3). In The Architecture Relevance of Cybernetics (1969), Pask (1969) indicated that abstract cybernetics can also be interpreted as a global architectural theory,

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referring to the potential of architectural design to create responsive open systems. He also highlighted the cybernetic advances of the architects Christopher Alexander and Nicholas Negroponte: "Alexander, concerned with the logic of form, traces essentially cybernetic concepts [...], I am eager to follow the pragmatic development of cybernetic ideas and see them emerge in the history of architecture" (p. 76). In Community and Privacy: Toward a New Architecture of Humanism, Chermayeff and Alexander (1963) worked on describing the structure of an urban organism using computer programs. Moreover, in the classic essay, A City is Not a Tree (1965), they emphasize two fundamental issues.

> The first is that the city is a complex system and that any attempt to understand it requires a systemic approach [...]. The second is the risk that, because it is based on technical-scientific knowledge as a guarantee of its rationality, modern urban planning concentrates excessive decision-making power in the hands of designers, planners, urban administrators, and real estate developers, ignoring, in the process, the real city, the lifestyles, and the, in general, conflicting aspirations of its inhabitants" (Tramontano et al., 2020, p. 55).

Seeking a quantitative approach to design, Alexander defended that any element that could be designed was a problem to be solved methodically as a system: "Using the computer, the designer defines a mathematical model of the behavior of the problem, creating a hierarchy of various subsystems with strong interaction" (Veloso, 2012, p. 497). For his part, Habraken (1961) considers that, by presenting each pattern as a solution to a problem, Alexander's argumentation acquires an unnecessary deterministic meaning for participatory design processes. Even so, Alexander played a crucial role in the computerization of architectural thinking, in particular, introducing the notion of Pattern Languages (Alexander et al., 1977). In addition, as Richard P. Gabriel (1999) emphasizes in his book Patterns of Software: Tales from the Software Community, software developers, especially object-oriented software, widely welcomed Alexander's propositions. As with Pask for the Fun Palace (Mathews, 2006), Alexander stated and systematized the dynamics of human behavior, producing a catalog of structured and interconnected information so that it could be thought through digital technologies (Alexander et al., 1977).

CONCLUSIONS

In this work, the design processes in BIM were observed as the configuration of a fabric of metatheoric, computational, and design process advances, derived from a process of more than fifty years of computerization of architectural thinking. Based on a retrospective approach, interdependent articulations between these fields were presented, considering the historical and socio-political contexts that inspired questions about participatory and collaborative design processes influenced and assisted by digital technologies and cybernetics. This scenario of parallels cemented the foundations, first, of a process of change in the design processes and, secondly, of a process of computerization of architectural thinking that extends to the present.

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Consequently, it can be inferred that the formulation and advancement of BIM is a continuation of the efforts to incorporate computational thinking into the design processes once it is intrinsically linked to the objective of managing and declaring a more significant amount of information from the design process, based on cybernetic and computational principles, with the support of technological advances.

The cybernetic premises, propositions, and developments of Pask, Friedman, Alexander, Kroll, Habraken, Eastman, Negroponte, Sutherland, Archigram, and the Metabolists were brought together in the same cognitive-investigative sequence according to their contributions to the processes of design and computerization of architectural thinking. The observation, organization, and active control of dynamic systems were identified as a common denominator, as were design processes open to the interaction of the parts. They also share the characteristic of contemplating using digital and information technologies, although at different levels and scales.

Archigram reflected on an interconnected society that would use information and communication technologies. Although he did not examine the implications of his futuristic proposals closely, he provoked questions about using data to produce and manage such organisms. The Metabolists, in turn, had a more mature view of Western technologies. It was found that the Metabolists used software**,** both in the design processes and in the buildings themselves. Friedman (1971; 1973) contemplated using software through organized design processes focused on participation, encouragement, and acceptance of emergencies. Alexander (Alexander et al., 1977), for his part, developed the concept of Pattern Languages in the field of architecture. He contributed profoundly, although not exclusively, to software development, especially in object-oriented software. The search for non-hierarchical organizational structures supported by conversation processes was also identified to stimulate emergencies and system reorganization. Tramontano et al. (2020) highlight that the works carried out by Kroll and Alexander "were precursors of the introduction of algorithmic thinking in architecture and helped to construct procedures that, later, would be useful for the conception of current parametric programs, especially those based on BIM" (p. 55). It is considered pertinent to place the works of Friedman and Negroponte within this group of precursors.

In Europe, especially in the United Kingdom and France, cybernetics gained more followers, contributing to the emergence of other ways of approaching design processes and the incorporation of cybernetic and computational thinking into the design process. Even though a movement of incorporation and study of cybernetics within the field of Art and Architecture also occurred in Latin America, with exponents such as Jorge Glusberg (Glusberg, 1972) and The Group of the Thirteen (Mariategui, 2024; Marchesi, 2017), in Argentina, and Jaime Garretón Risopatrón (Garretón, 1975; Araneda, 2022) in Chile, no records were found that directly relate this movement to the development of BIM.

It was understood that the computerization of architectural thinking, despite its strict dependence on the use of digital technologies, initially needs

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to structure the information since computerization is the process through which dynamics, knowledge, and behaviors are translated into information that can be processed by digital technologies (Zuboff, 1988), such as those of BIM programs. Therefore, efforts to translate processes into declared and arranged information to feed data banks are as necessary as efforts to introduce algorithmic-computational thinking into design processes. Thanks to cybernetic visions of observation, control, and organization, Pask, Negroponte, Kroll, Alexander, Friedman, and Eastman acted in both spheres simultaneously. Then, clear articulations between cybernetics and design processes were identified, which instigated and theoretically based computational bases that, among other things, contributed to the production of the current computerized design processes in BIM. This statement is also verified by the discovery of the cybernetic foundations of research that directly drove the advancement and development of BIM, such as those carried out by Charles M. Eastman (1971; 1972; Eastman et al., 2011) or those made by the UK groups. The importance of the programs developed in the United Kingdom, mainly in the Liverpool Centre for Computer-Aided Building Design, is highlighted since they are the direct predecessors of the most widely used BIM-based programs in the contemporary production of architecture.

Finally, we cannot help but notice that computer programs oriented to design processes, mainly those based on BIM, have been developed to assist North Atlantic architecture models, contributing to perpetuating their imposition on other global lines. This means that design processes are not exempt from the non-neutrality of technology, mainly Software and Information and Communication Technology Services, revealing the need to discuss the issue critically.

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NUMERICAL HARMONIES IN ARCHITECTURAL EDUCATION: VILLARD DE HONNECOURT'S GRID

ARMONÍAS NUMÉRICAS EN LA EDUCACIÓN ARQUITECTÓNICA: RETÍCULA VILLARD DE HONNECOURT

HARMONIAS NUMÉRICAS NA EDUCAÇÃO ARQUITETÔNICA: A RETÍCULA DE VILLARD DE HONNECOURT

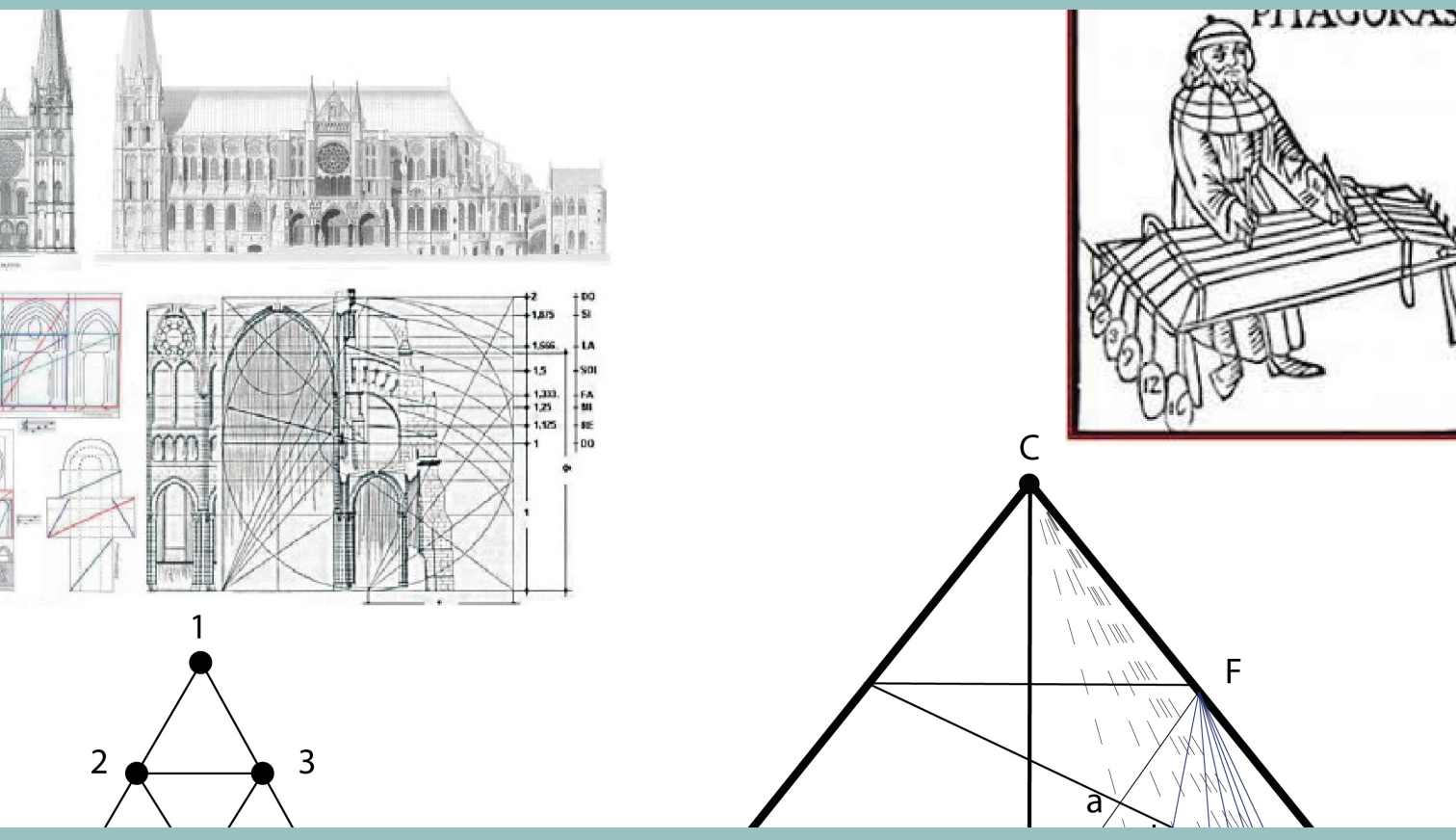

Figure 0. Graphs of the Pythagorean scale and practical examples during the Middle Ages in the construction of Gothic cathedrals such as the Cathedral of Chartres. Source: Based on a collection of several academic texts.

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RESUMEN

El análisis de la retícula de Villard de Honnecourt y su rol en la arquitectura medieval ofrece una perspectiva enriquecedora para la educación arquitectónica contemporánea. Durante la pandemia de COVID-19, en el año xx, en la Universidad Autónoma de Ciudad Juárez, México, se implementó con éxito esta herramienta histórica. La elección estratégica de la retícula como punto de partida permitió explorar las técnicas constructivas medievales integradas con herramientas digitales. Este enfoque no sólo resalta la conexión entre arquitectura y música, evidenciando la influencia de la escuela Pitagórica y Platónica en la Edad Media sino que también, demuestra la versatilidad de la retícula en la formación académica. A través de análisis prácticos y estudios de caso, se promovieron habilidades analíticas y creativas entre quienes se dedican a estudiar arquitectura. La transformación de la enseñanza de la arquitectura en entornos universitarios actuales, alejándose del modelo tradicional, plantea desafíos. La disyuntiva entre herramientas digitales y acceso a la información permite reinterpretar métodos compositivos. El análisis del uso académico de la retícula de Villard de Honnecourt, y su predecesor la retícula Van Der Graaf, destaca su relevancia histórica y características geométricas distintivas. Desde sus orígenes medievales hasta su aplicación contemporánea, la retícula se consolida como una herramienta pedagógica esencial. Este estudio realizado en la Universidad Autónoma de Ciudad Juárez, reflexiona sobre el modelo propuesto por la retícula. Analiza sus implicaciones en los procesos de enseñanza-aprendizaje académico, revelando su impacto en dimensiones físicas, documentales y tecnológicas. En síntesis, destaca la adaptabilidad y relevancia continua de la retícula como herramienta pedagógica esencial en la formación de arquitectos.

Palabras clave: retícula de Villard de Honnecourt, arquitectura medieval, educación arquitectónica contemporánea, herramientas digitales, proceso de enseñanza-aprendizaje.

ABSTRACT

The analysis of the grid designed by Villard de Honnecourt and its role in medieval architecture offers an enriching perspective for contemporary architectural education. This historic tool was successfully implemented during the COVID-19 pandemic at the Universidad Autónoma de Ciudad Juárez, Mexico. The strategic choice of the grid as a starting point allowed exploring medieval construction techniques integrated with digital tools. This approach not only highlights the connection between architecture and music, evidencing the influence of the Pythagorean and Platonic schools in the Middle Ages, but also demonstrates the versatility of the grid in academic training. Through practical analyses and case studies, analytical and creative skills were promoted among those who dedicate themselves to studying architecture. The transformation of architecture teaching in current university environments, moving away from the traditional model, poses challenges. The dilemma between digital tools and access to information allows for reinterpreting compositional methods. Analysis of the academic use of the Villard de Honnecourt grid and its predecessor, the Van Der Graaf grid system, highlights their historical relevance and distinctive geometric characteristics. The grid has become an essential pedagogical tool from its medieval origins to its contemporary application. This study, which was carried out at the Universidad Autónoma de Ciudad Juárez, reflects upon the model proposed by the grid. It analyzes its implications in academic teaching-learning processes, revealing its impact in physical, documentary, and technological dimensions. In summary, it highlights the adaptability and continued relevance of the grid as an essential pedagogical tool in the training of architects.

Keywords: Villard de Honnecourt grid, medieval architecture, contemporary architectural education, digital tools, teaching-learning process.

RESUMO

A análise da retícula de Villard de Honnecourt e seu papel na arquitetura medieval oferece uma perspectiva enriquecedora para a educação arquitetônica contemporânea. Durante a pandemia da COVID-19, no ano XX, na Universidad Autónoma de Ciudad Juárez, México, essa ferramenta histórica foi implementada com sucesso. A escolha estratégica da retícula como ponto de partida permitiu a exploração de técnicas de construção medievais integradas a ferramentas digitais. Essa abordagem não apenas destaca a conexão entre arquitetura e música, evidenciando a influência da escola pitagórica e platônica na Idade Média, mas também demonstra a versatilidade da retícula na formação acadêmica. Por meio de análises práticas e estudos de caso, as habilidades analíticas e criativas foram promovidas entre aqueles que se dedicavam ao estudo da arquitetura. A transformação do ensino de arquitetura nos ambientes universitários atuais, afastando-se do modelo tradicional, apresenta desafios. O equilíbrio entre as ferramentas digitais e o acesso às informações permite a reinterpretação dos métodos de composição. A análise do uso acadêmico da retícula Villard de Honnecourt e de sua antecessora, a retícula Van Der Graaf, destaca sua relevância histórica e suas características geométricas distintas. Desde suas origens medievais até sua aplicação contemporânea, a retícula se estabeleceu como uma ferramenta pedagógica essencial. Este estudo, realizado na Universidad Autónoma de Ciudad Juárez, reflete sobre o modelo proposto pela retícula. Ele analisa suas implicações nos processos acadêmicos de ensino-aprendizagem, revelando seu impacto nas dimensões física, documental e tecnológica. Em resumo, destaca a adaptabilidade e a relevância contínua da retícula como uma ferramenta pedagógica essencial na formação de arquitetos.

Palavras-chave: retícula de Villard de Honnecourt, arquitetura medieval, educação arquitetônica contemporânea, ferramentas digitais, processo de ensino-aprendizagem.

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INTRODUCTION

The Villard de Honnecourt grid, attributed to the namesake French architect, is a graphic construction with exact delimitations and proportions rooted in medieval architecture (12th - 15th centuries). This intricate geometric framework reveals essential numerical harmonies behind the architecture of that period (Kruft, 1994). This article explores the grid's historical importance and contemporary relevance in architectural education.

The grid is a visual map of geometric principles and proportions that have endured over time. Its design is deeply connected to the period's philosophical and mathematical influences, particularly the Pythagorean and Platonic schools. This link between architecture and philosophy reflects a cosmic harmony that transcends the aesthetic, highlighting the symbolic richness incorporated by Villard in his work (between 1225 and 1250).

The grid, attributed to Villard de Honnecourt, a medieval French architect, is a geometric diagram reflecting his period's essential architectural principles. This framework served not only as a practical construction tool, but also as an educational guide on geometric proportions and harmonies, fundamental in medieval architecture (12th – 15th centuries). Villard's manuscript (Hommecourt et al., 1968) was not initially conceived as a literary treatise, but as a sketchbook to which explanatory text was later added (Bowie, 1959). In particular, the section on loggia geometry shows a clear correspondence between the illustrations and the texts, probably influenced by Roman traditions, as seen in the "Gromatici veteres" (Kruft, 1994). The geometric figures used in his work, such as the square, the circle, the triangle, and the pentagon, were applied to both organic and architectural forms, highlighting a synthesis between the artistic and the constructive. Although projected on organic bodies, these geometric figures retained autonomy in proportions, revealing a more geometric than naturalistic approach. The grid was also used in architectural contexts, such as the Cistercian church's plans and building roofs' design. This use of geometric shapes underlines the importance of mathematics and geometry in Gothic architecture, evidencing a connection between ancient and medieval architectural traditions.

Exploring the grid in the context of medieval architecture and its applicability in contemporary education responds to the need to understand the discipline's historical roots. Returning to historical fundamentals offers a unique perspective in a digitized world where design tools are evolving rapidly. The grid is a tangible testimony of the principles that guided medieval architects, providing a solid foundation for the contemporary teaching of future architects of the 21st century.

During the COVID-19 pandemic, from 2020 to 2022, the Autonomous University of Ciudad Juárez (UACJ) in Mexico implemented

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Villard's grid from remote teaching in April 2020 as part of its architectural educational program. This practical approach not only demonstrated the grid's adaptability to virtual environments but also fostered a deep understanding of medieval constructive methods. Through projects and analysis, the students internalized both the technique and the philosophy behind the grid, enriching their academic training.

This article underlines the connection between architecture and music, adding dimension to the understanding of the grid. The grid's harmonic arrangement manifests the influence of the Pythagorean school (from the middle of the 6th century), which sought numerical relationships in music and geometry. This link between two forms of artistic expression suggests the omnipresence of mathematical principles in several creative disciplines.

The case studies and analyses demonstrate the grid's versatility in architectural education. This geometric framework's ability to adapt to different contexts and challenges underscores its continuing relevance. It is not only a pedagogical tool but also a bridge between the past and the present, allowing students to explore and understand architecture from a holistic perspective.

Despite the challenges associated with implementing the grid in educational settings, it recognizes the importance of balancing the appreciation of history with practical application in contemporary design. The adaptability and effective integration of this tool into academic curricula raise questions about pedagogical tools and strategies that allow learning to be built beyond the physical spaces of the classroom.

The UACJ started a new academic program in 2019 to subsequently face the arrival of the COVID-19 pandemic in 2020, which forced a rapid transition to remote teaching. This adaptation generated challenges, especially in Architectural Theories, but it also became a unique opportunity to explore theoretical research by reusing Villard's grid (1225-1250). The main objective was to understand medieval construction techniques and explore the influence of medieval architecture on contemporary architecture, integrating digital tools to generate new design products.

The success of using the grid in classrooms, both remote and face-to-face, underlines its relevance as a significant architectural element, both historical and contemporary. This article invites reflection on the importance of preserving and adapting historical tools in training 21st-century architects, highlighting how a grid of the past can remain a valuable tool in modern education.

THEORETICAL FRAMEWORK

The Notion of Numerical Harmonies for the creation of grids

The research focuses on the digital development of the Villard de Honnecourt (VH) grid, supported by theoretical-historical resources. It seeks

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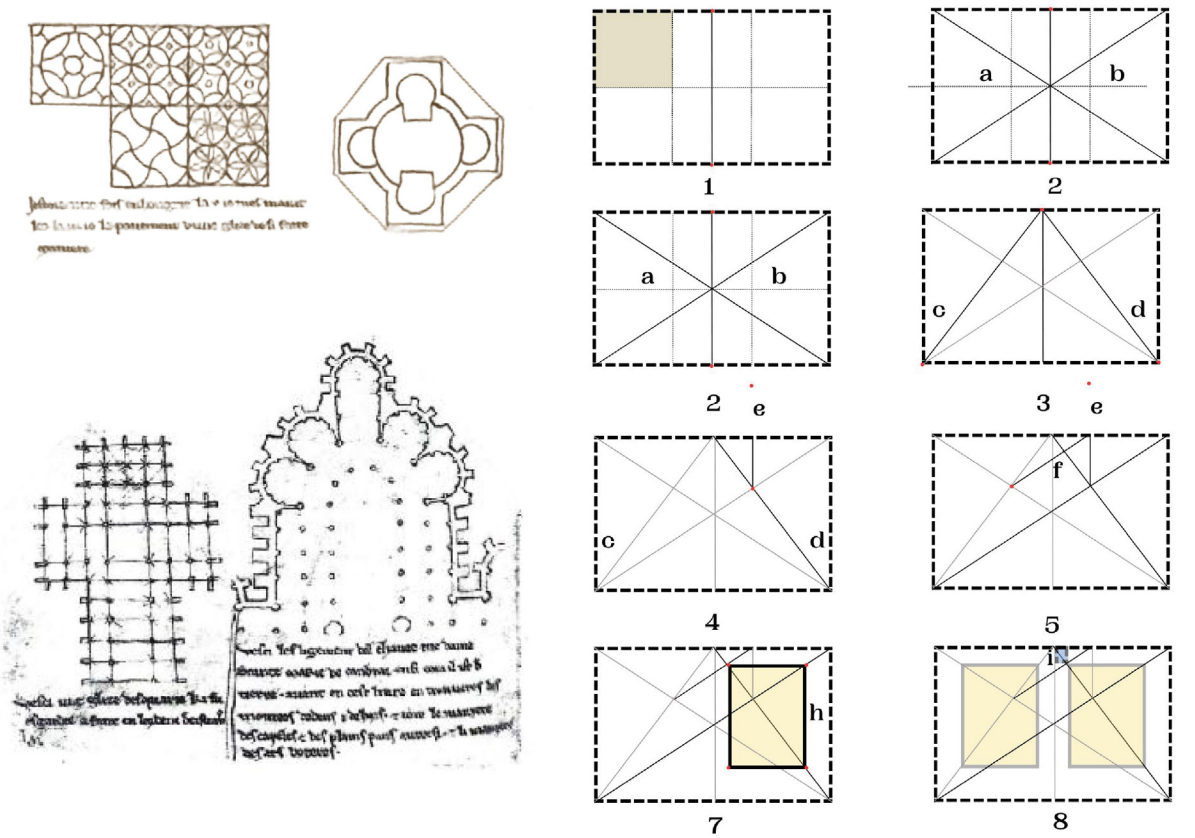

Figure 1. Reticular lines can be found in history, such as those developed by Villard de Honnecourt and reinterpreted today. Source: Interpretation by the author.

to generate guidelines for infographic works and analyze architectural elements from antiquity to illustration. The connection between music and architecture, from ancient Greece to the Late Middle Ages, is explored (CANVA, 2022), highlighting Pythagoras and Plato.

The grid structure and the search for proportion and number captured architects' attention, leading to a combination of theories on such a valuable tool that formed ensembles, cathedrals, palaces, and villas for centuries in the ancient world. Despite man's impossibility of generating an ontological change in the natural order or the essence of objects, design processes based on this modernist standardization propose attractive localized possibilities. The grid (weaving, interlacing) and rhetoric (discourse, the art of speaking well) make up an ordered discourse in architecture that tries to unite the analytical order and the world of practice in the work (Figure 1). Meanwhile, the aesthetic, practical, functional, and normative assessment of change attributed to the project process is jeopardized by proposing that all the works of their natural regions are parties to the unequivocal development of a unique system (Bertola, 2015).

In mathematics, Pythagoras of Samos, in the 6th century BC, developed the theory of the Music of the Spheres, relating music and arithmetic to "perfect harmony." This theory proposed that the universe was organized according to whole numbers and musical consonances produced by the celestial bodies in their orbital revolution, albeit imperceptible to humans.

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Pythagoras discovered that musical notes could be interpreted spatially by vibrating two strings under the same conditions and with proportional dimensions. For example, if the strings were in a 1:2 ratio (fingerboard), the shorter string produced a note one octave higher than the longer one. When the ratio was 2:3 (diapent), the height difference corresponded to a fifth; if the ratio was 3:4 (diatessaron), there was a quarter interval between them. Thus, the consonances of the Greek musical system were expressed by the progression 1:2-2:3-3:4, built from the first four whole numbers, searching for the secret of the ideal harmony of the universe. Its intervals, like the octave and the fifth, are fundamental for the music-architecture relationship. Plato contributes the golden ratio in "Timaeus," represented by Phi (φ ≈ 1.618), connecting music and architecture through this geometric ratio (O'Connor C. et al., 2005).

Plato, following Pythagoras, explained in his work "Timaeus" (around 360 BC) that the order and harmony of the cosmos obeyed certain numbers derived from the squares and cubes of double and triple unity. These geometric progressions (1, 2, 4, 8 and 1, 3, 9, 27) represented the planetary distances, taking the distance from the Earth to the Moon as a unit. This set of numbers contained the secret eurythmy of the macrocosm and the microcosm, implying both the inaudible musical order of the universe and the structure of the human soul (Eggers, 2005).

The Pythagorean and Platonic theory integrated the four elements of universal harmony into the Tetraktys, where Mathematics, Geometry, Astronomy, and Music were combined in a triangular structure. Boethius, a philosopher of ancient Rome, compiled these ideas establishing three simple proportions: eighth (1:2), fifth (2:3), and fourth (3:4), which would become the basis of beauty and harmony in the Middle Ages (Sánchez, 2011).

In ancient Rome, Vitruvius (80-15 BC), an architect and military engineer under the command of Emperor Julius Caesar, embodied in his treatise *On Architecture*, the ideas about harmonic proportions, based on the symmetry and proportion of the human body, which he transferred to architecture, influencing the design of buildings of his time and subsequent centuries. Boethius (480-524 A.D.), a Roman philosopher of the Early Middle Ages, unified music and geometry in his work *De Institutione Musica*. In it, he defined the arithmetic, geometric, and harmonic proportions that founded medieval music theory. During the Gothic period, between the 12th and 15th centuries, European cathedrals reflected cosmic harmony, integrating mathematical proportions, such as musical intervals and the golden ratio, into their architecture. This elevated the concept of beauty through a symbiosis between art and science (Egido, 2018).

Saint Augustine (354-430 A.D.), one of the most influential figures of Christian thought in Late Antiquity, adopted Platonic ideas by affirming that the number was the basis of beauty, positing that art should imitate this divine principle. In his work *On Music*, he classifies Music and Architecture

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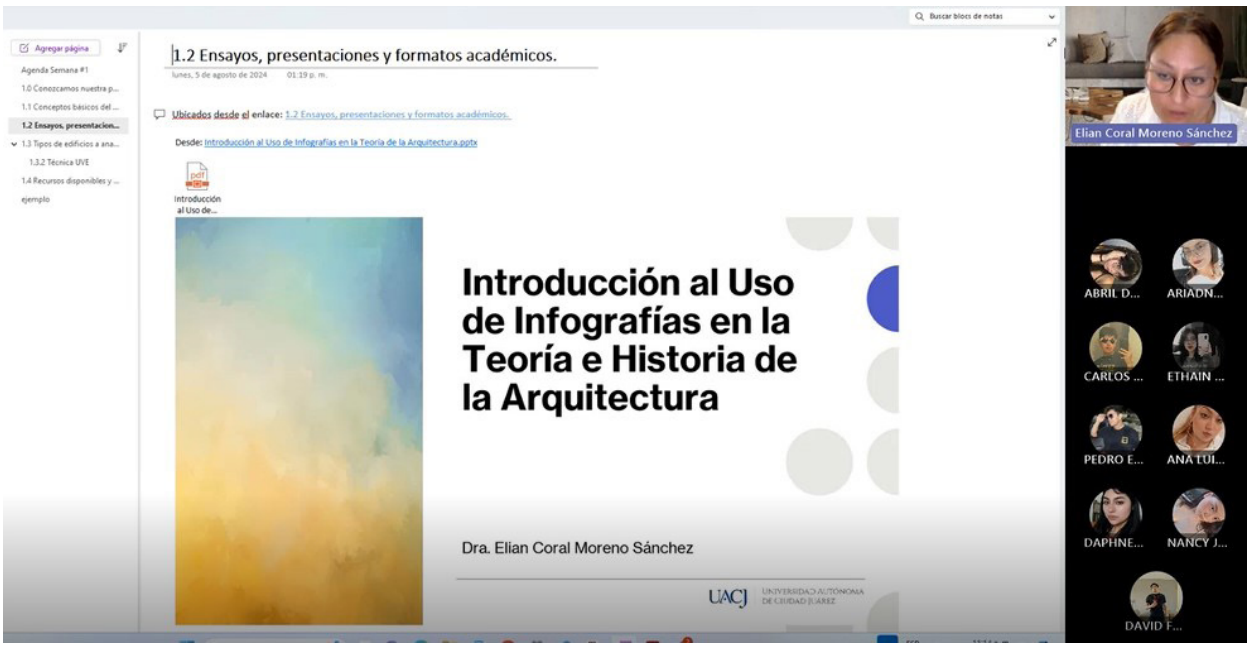

Figure 2. Screenshot of remote class on the use of the grid in the theory of architecture. Source: The author's private files.

as sister disciplines due to their rhythmic and mathematical properties, highlighting the importance of proportion in artistic creation. Saint Thomas Aquinas (1225-1274 A.D.), a key figure of medieval thought, reinterpreted these insights in his *Summa Theologica* (1265-1274 A.D.), where he argues that harmony between the parts provided the sense of beauty, a concept applicable to all artistic forms, including Music and Architecture. In this way, both thinkers contributed to integrating classical philosophy into Christian aesthetics, founding the relationship between proportion, beauty, and art in the Middle Ages.

In summary, the relationship between mathematics and architecture is established through principles of rhythm and proportion. The numerical harmonies discovered by Pythagoras and developed by Plato and other thinkers have influenced architectural theory and are essential for creating grids, which are used to organize architectural design and construction harmoniously and proportionately (Figure 2).

For his part, Villard de Honnecourt, considered the "Gothic Vitruvian" (Kruft, 1994), is a valuable resource in contemporary architectural teaching and practice. His grid, rediscovered in the 19th century, persists in its versatility and relevance, serving as a bridge between the past and the training of 21st-century architects. Ultimately, the grid of V.H. is a living source of inspiration and knowledge in contemporary architectural design.

His grid offers theoretical and architectural solutions, influencing contemporary design. Its rediscovery connects with medieval architectural evolution. Researchers such as Hahnloser (1972) and Willis (1859) systematized his drawings, highlighting architectural elements and his focus on geometries.

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Most of what is known about Villard de Honnecourt comes from his portfolio (Barnes, 2009), which shows a deep interest in geometry applied to architecture and the representation of the human and animal body. Although Villard does not systematize his work methodologically, his visual approach can be interpreted as reflecting training in both the trivium and the quadrivium, which suggests a broad education in the liberal arts of his time. His drawings' use of geometric figures such as the triangle and the square reveals an intention to apply mathematical principles to organic forms, a characteristic of medieval thought in which geometric proportions and symmetries reflected the cosmic order. Despite the limitations of its compilation, his portfolio offers an insight into how architectural and geometric knowledge was transmitted in his time (Murray, 2014). They are subjective expressions about canons that made up his visual mind (the portfolio), coming from an education: it was the author's own personal education and an author's referentiality of the canons that had elaborated a conscious and reflective search of his contents (Binski, 2012).

For example, some calculations are proposed between the design of two arches. That is to say, when designing a circle of 6, the semicircle is divided into 12 units: above, the major semicircle is divided into 8, which, added to the three that arrive directly in the middle of the first marked circle, gives 11 over the 12 of the first arc. Obviously, the perfection of one and the other causes the harmonic relationship between them. 7 over the diameter comes to be 1 plus 1/6, while the length of the rectangle measures 4 plus 1 and 5/10; an interesting contribution to compose a rectangle which is approximately the 1.5 x 8 that we call the Villard rectangle.

Since the 20th century, in contemporary editorial design, Villard's grid has stood out against the golden section (Haslam, 2006). Its application in digital design contributes to geometric understanding and the creation of standards for primarily infographic documents.

The grid of V.H. is also a two-dimensional geometric tool that facilitates the harmonious arrangement of architectural elements. It is most prevalent in architectural floor plans due to its ability to delineate precise proportions and alignments, creating a solid foundation for 3D design. The grid introduces 2D geometry using guidelines that structure the space into repetitive and proportionate modules, allowing a coherent and aesthetically pleasing composition (Kruft, 1994).

This geometric tool is applied in both 2D and 3D designs. In the architectural floor plans, the grid of V.H. helps organize spaces and structures in an arrangement that reflects mathematical principles of harmony and proportion. In 3D architecture, these proportions are translated into volumes and shapes that maintain the coherence and symmetry established in the 2D plane.

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Figure 3. Instructions on how to make the Villard de Honnecourt grid. Source: Preparation by the author.

It can then be stated that there are categories of modules, such as those that unfold from a grid universe on a numerical basis. Since all their links are hierarchical, they distribute their intersections on the supported surface through the vertices of regular polygons or intersections of these.

The grid has constantly evolved over several historical periods, adapting to each era's needs and architectural styles. During the Renaissance, in the 15th and 16th centuries, additional principles, such as the golden ratio, were incorporated, allowing for greater sophistication and harmony in architectural compositions. This mathematical approach enriched the design of emblematic buildings, reflecting an ideal of beauty based on symmetry and balance. In the modern era, between the 20th and 21st centuries, the grid has been reinterpreted thanks to digital tools, facilitating the creation of more complex and adaptive designs that, despite their innovation, maintain traditional geometric principles as a structural basis (Figure 3).

Working with Villard's grid in modern architecture is relevant because it can harmonize historical concepts with modern applications. This geometric tool not only facilitates the design process but also enriches the theoretical understanding of architecture, allowing students and professionals to explore and apply mathematical and aesthetic principles in innovative ways.

However, although this idea of reticular structure has been present in architecture (and everyday life) since ancient times, a theoretical framework that would consolidate the "image of structural thinking" was developed during the 20th century. This is because, during that period, structuralism

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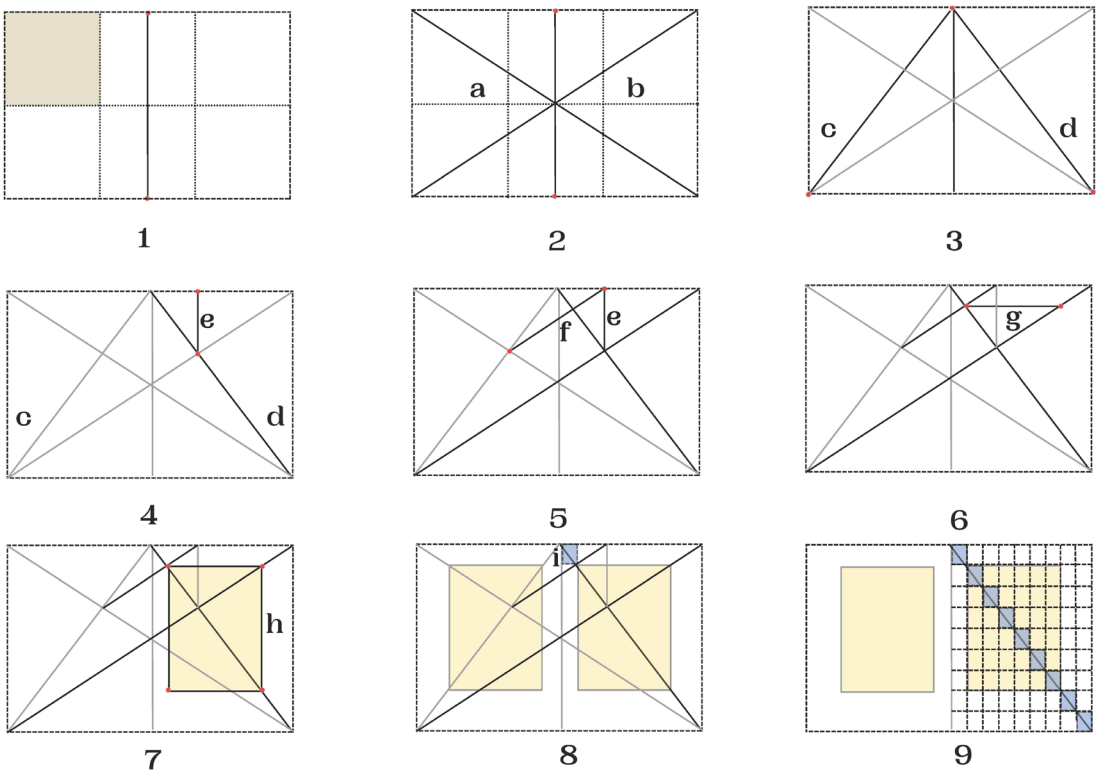

Figure 4. Key Elements when applying the Villard de Honnecourt grid in the Academic Digital Teaching of Architecture. Source: Preparation by the author based on what was proposed by Villard de Honnecourt in 1225-1250 AD.

emerged as one of the main driving forces of scientific, philosophical, and artistic discussions. With this thought, a conception of "structure" was formed that would guide research in linguistics, cultural activities, social habits, the mind, cinema, anthropology, and architecture, among other fields (Foucault, 1966).

Thus, the Honnecourt grid, rediscovered in the 19th century, is a valuable resource in contemporary architectural teaching and practice. Its versatility and relevance persist, serving as a bridge between the past and the training of 21st-century architects. Ultimately, it is a living source of inspiration and knowledge in contemporary architectural design (Figure 4).

METHODOLOGY

Educational Transformation in Architectural Theories in the face of the COVID-19 pandemic

Between 2020 and 2021, in response to the COVID-19 pandemic, teaching was reconfigured at UACJ, including the subject of Theories of Architecture, beginner level, incorporating a new approach to the Villard de Honnecourt grid through documentary and correlational research. The key variables included adaptation to virtual teaching, integration of digital tools, and connection between architectural theory and practice.

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Figure 5. Applications of the Villard de Honnecourt - Haslam Grid in Student Designs (2021-2024). Source: The author's private files.

Based on the proposal of Sifuentes-Solís and Torres-Landa (2014), the implementation explored the "e-topía" as an integrating digital educational space. Different approaches were identified in the historiography of architecture, from the classification of objects to the hermeneutic interpretation of space experiences. The subject was reformulated to describe, identify, and classify theoretical-architectural objects using digital tools (Figure 5).

The strategic choice of the V.H. grid was based on understanding medieval techniques and their contemporary relevance. This tool not only introduced 2D and 3D geometry, but also implemented digital tools, developing essential digital skills. The students acquired knowledge about medieval architecture and crucial digital skills in current practice, among other things.

In addition to incorporating the grid, the approach redesigned the course structure, assessments, and student-teacher interactions, encouraging creativity and exploration. This change contributed to a dynamic and participatory learning environment, evidencing a comprehensive transformation in architectural education during times of crisis.

DISCUSSION AND RESULTS

Innovative decoding of the Villard de Honnecourt grid

The transition to remote teaching during the COVID-19 pandemic led to an evolution in the digital presentations of Architectural Theories that combined face-to-face and remote classes in a defined hybrid system once the health emergency was over. Despite the new modalities, the implementation of the Villard de Honnecourt grid was consistent in both contexts, evidencing its post-pandemic relevance. The urgency of overcoming social distancing drove the rapid adoption of digital tools in educational institutions, facilitating

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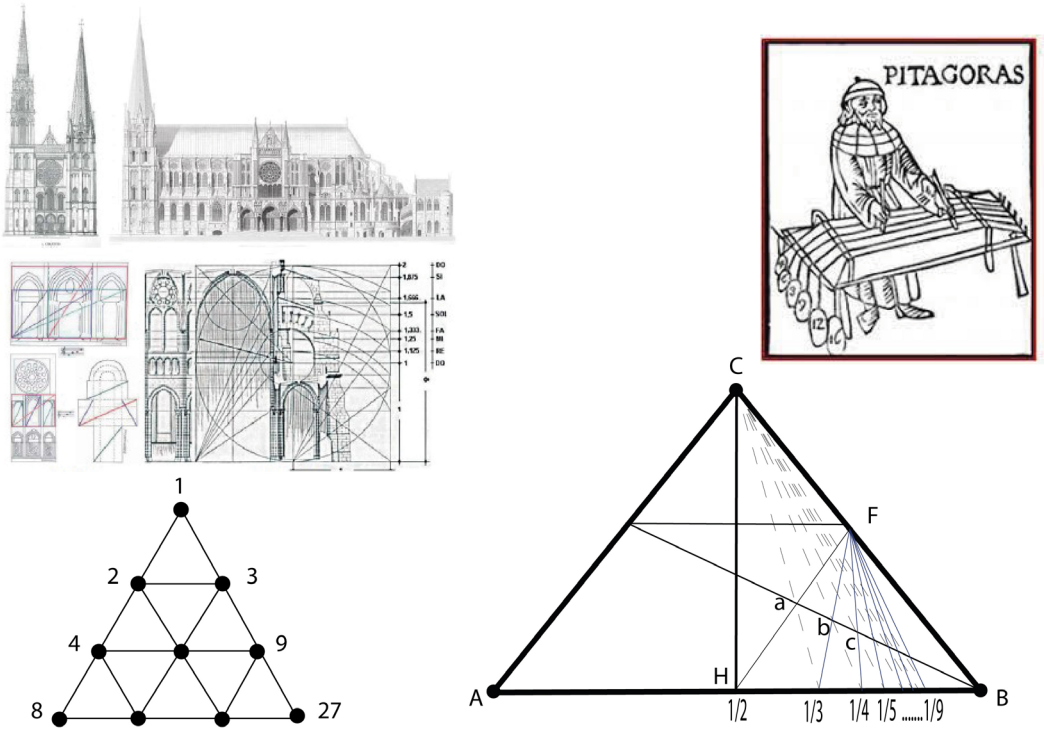

Figure 6. Graphs of the Pythagorean scale and practical examples during the Middle Ages in the construction of Gothic cathedrals such as the Cathedral of Chartres. Source: Based on a collection of several academic texts.

the creation of infographic summaries focused on architectural theory.

COVID-19 forced a reconfiguration in teaching, including the subject of Theories of Architecture at the Autonomous University of Ciudad Juárez (UACJ). This transformation involved adapting to virtual teaching, integrating digital tools, and taking a more practical approach to architectural theory using the Villard de Honnecourt grid. This methodology was supported by documentary and correlational research, where different approaches were explored in the historiography of architecture and its connection with digital tools. The sampling yielded the following: The studied population was 2021, 2022, and 2023, with two semesters per year (Semester 1 and Semester 2). Each semester, the Villard de Honnecourt grid technique was applied to 1 to 3 groups on Architectural Theories, each comprising 20 to 30 students (Figure 6).

The total number of students per year was estimated at 40 to 90, considering the total of both semesters and the different groups. This gave a range between 120 and 270 students in the three years.

The sample calculation revealed that 87% of the students reported having learned and enjoyed using the Villard de Honnecourt grid to develop infographics. In groups of 20 students, 17 expressed this appreciation, and in groups of 30, 26 students stated the same.

Based on the Villard de Honnecourt grid, between 17 and 26 students per group confirmed positive learning in each semester.

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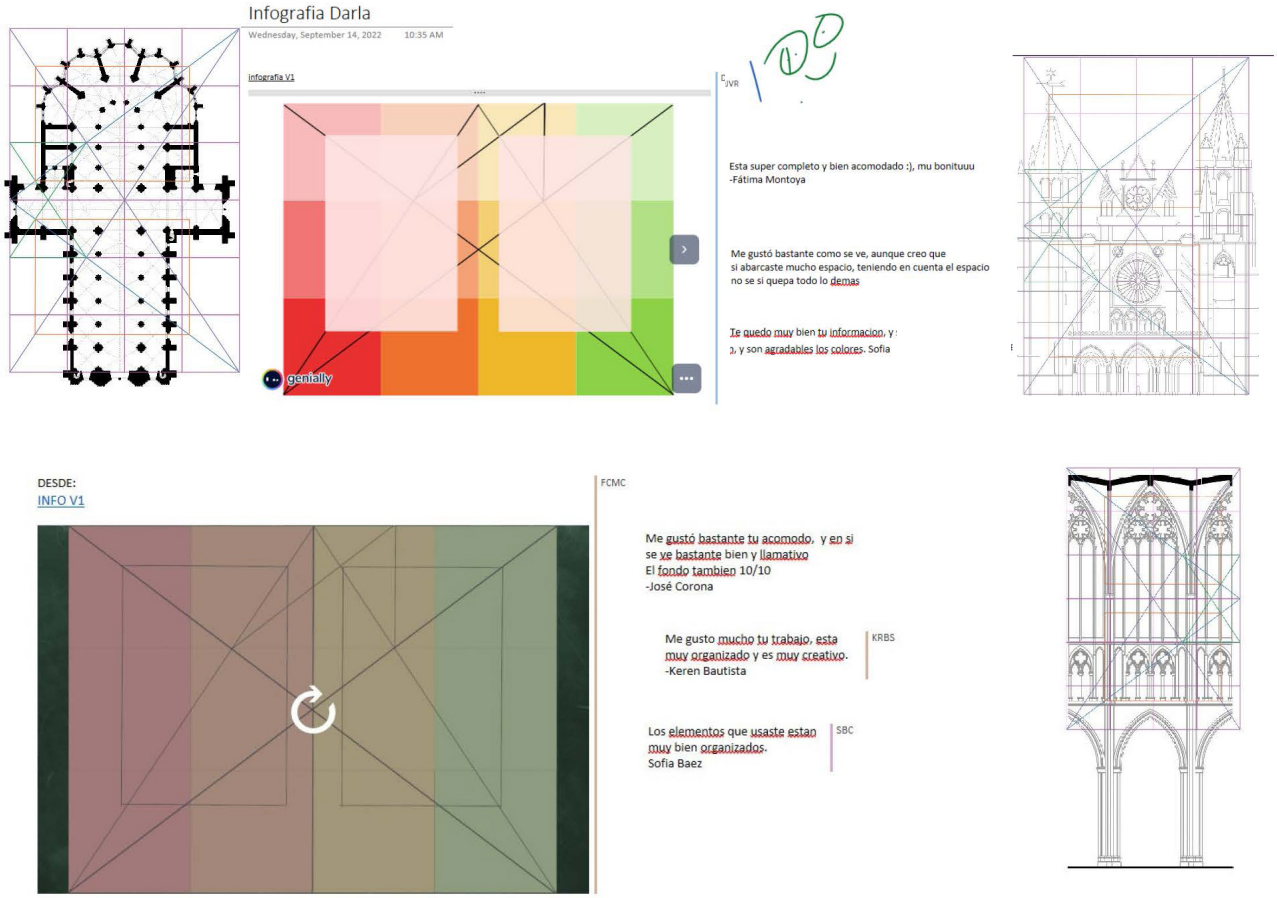

Figure 7. Graphs that exemplify the Pythagorean or Tuning scale. Source: Preparation by the author.

Total Sample:

- **2021:** 34 and 156 students were consulted, of which 29 and 136 stated that they liked the grid.
- **2022:** 34 and 156 students were consulted, obtaining the same affirmative range from 29 to 136.
- **2023:** Again, 34 and 156 students were asked, who in ranges of 29 and 136 confirmed their appreciation for the grid.

Adaptation to Virtual Teaching

The transition to remote teaching was based on the proposal of Sifuentes-Solís and Torres-Landa (2014), which promotes "e-topía" as an integrating digital educational space. This approach made it possible to identify different approaches in the historiography of architecture, from the classification of objects to the hermeneutic interpretation of space experiences. The subject was reformulated to describe, identify, and classify theoretical-architectural objects using digital tools, facilitating understanding complex concepts in a virtual environment (Figure 7).

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Integration of Digital Tools

The implementation of the Villard de Honnecourt grid as a central pedagogical tool was based on its ability to harmonize historical concepts with modern applications. Medieval construction techniques and their contemporary relevance were explored, integrating digital tools that allowed students to develop new competencies. This approach not only promoted a deeper theoretical understanding, but also the mastery of digital skills essential for current architectural practice.

The Use of Infographics in Teaching

The infographics designed based on the Honnecourt grid emerged as a key tool for facilitating the communication and understanding of complex information in architecture theory. Infographics combine images, data visualizations, graphics, and minimalist text to summarize topics clearly and attractively. In this context, infographics were used to:

- Provide quick summaries on architectural theories.
- Explain complex design and construction processes.
- Present research results or case study data.
- Compare and contrast different architectural styles and methodologies.

So, the infographics were adapted to visually represent complex architectural concepts, facilitating the retention of information and improving understanding. Some specific applications included:

- **Statistics:** Presentation of quantitative data on projects and materials.
- **Informative:** Detailed explanation of architectural theories and concepts.
- **Timeline:** Visualization of the evolution of architectural styles.
- **Process:** Description of design and construction stages.
- **Comparative:** Contrast of different architectural approaches and solutions.

To design effective infographics, these steps were followed:

- **Organization of information:** Creation of a draft structuring the main ideas.
- **Template Selection:** Choosing a template appropriate to the specific content.
- **Personalization:** Adaptation of the template with colors, fonts, icons, and graphics related to architecture.
- Tools such as Canva, Piktochart, and Adobe Illustrator were used to design custom infographics, using their features to create visually attractive and easy-to-understand content (Figure 8).

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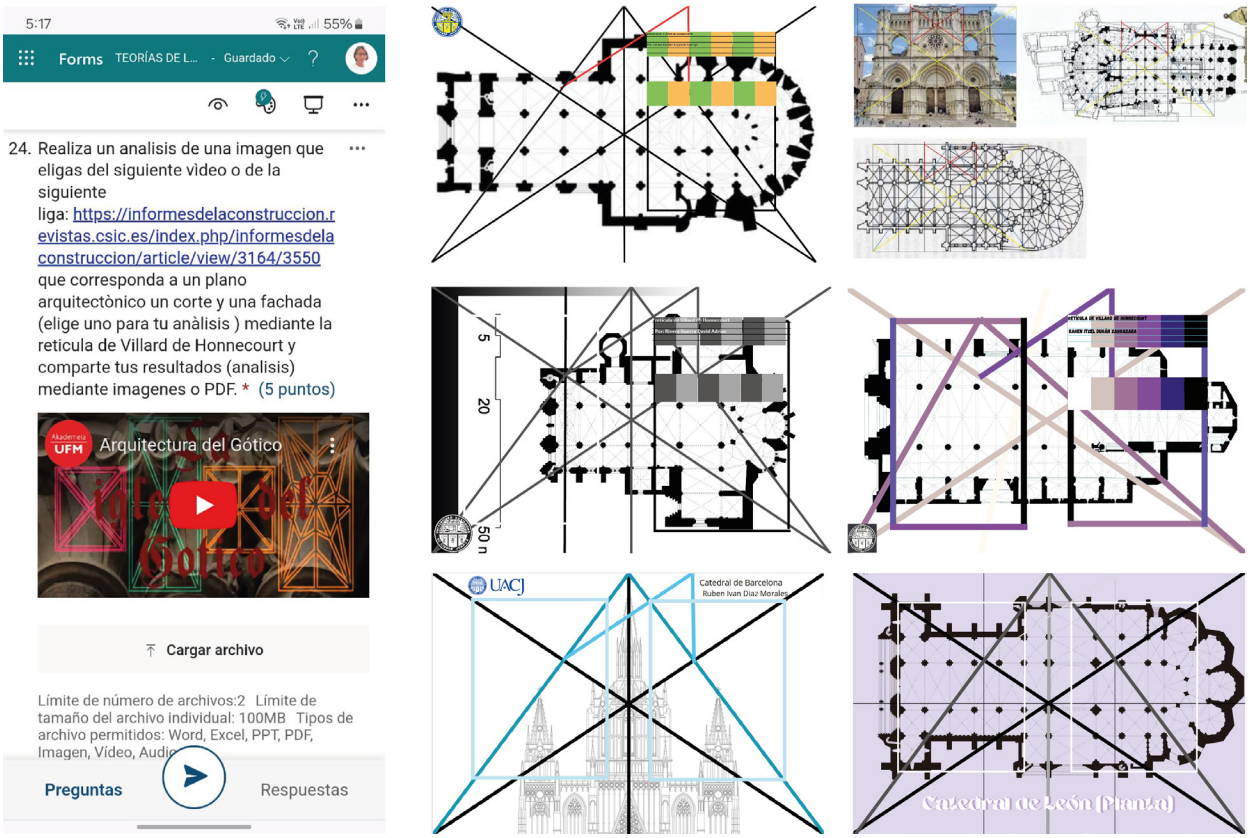

Figure 8. Plans, cross-sections, or facades analyzed using the Villard de Honnecourt grid, student results (2021-2024). Source: The author's private files.

CONCLUSIONS

Thus, infographics in the teaching of architecture proved to be an effective strategy to transmit complex information clearly and efficiently.

The implementation of the Villard de Honnecourt grid, combined with the use of infographics (Genially, 2022), transformed the structure of the Theories of Architecture course, promoting creativity, individual exploration, and collaborative work. Students developed digital skills and a deep understanding of architectural elements, effectively linking medieval techniques with contemporary tools (Gamma, 2024).

The key inferences stand out:

- **Theoretical-Practical Link:** Strong connection between theory and practice through the use of the grid.
- **Practical and Conceptual Skills:** Development of digital skills and in-depth understanding of theoretical concepts.
- **Significant Impact:** Adaptability of the grid as an essential pedagogical tool in the training of architects.

Despite the continuous implementation of the Villard de Honnecourt grid in the field of Architectural Theories, his meritorious contributions have not been able to be extended to other teachers of the same subject. The post-pandemic adjustments and the imminent reaccreditation

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of the architecture program by the ANUIES in 2024 justify the theoretical-historical academy's reluctance to coordinate these subjects. However, the lack of dissemination of its benefits limits the educational potential in architecture, which sometimes deviates toward sociological aspects without fully understanding the discipline's purpose and role.

In the current context, it is concluded that questions about copyright, values, and creativity arise as digital algorithms advance in creating works of art and in analytical prediction. The growing presence of artificial intelligence raises the question of whether architects and other professionals will eventually be replaced in their activities. From Daniel Innerarity's perspective (2023), digital tools, including artificial intelligence, have both a banal and a singular character. They serve as auxiliaries while revealing the creative core of art.

In this sense, adopting software as an assistant in architecture parallels history, especially with the medieval era. The harmonic compatibility between mathematics, architecture, and music is materialized through these digital tools with algorithms focused on generative artificial intelligence, reaffirming the ability to choose between various possibilities, but without the monotony of transpositions of harmonies, enabling instrumentation and orchestration (conducting) so that one can choose between various possibilities that, through his grid, Villard de Honnecourt solved approximately 774 years ago (in 1250 A.D.).

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ART DÉCO ARCHITECTURE IN EDUCATIONAL INSTITUTIONS: THE DICHOTOMY BETWEEN A RELIGIOUS PRIVATE SCHOOL AND A SECULAR PUBLIC SCHOOL

ARQUITECTURA ART DÉCO EN INSTITUCIONES DE ENSEÑANZA: LA DICOTOMÍA ENTRE UNA ESCUELA PRIVADA RELIGIOSA Y UNA ESCUELA PÚBLICA SECULAR

A ARQUITETURA ART DÉCO EM INSTITUIÇÕES DE ENSINO: A DICOTOMIA ENTRE UMA ESCOLA PRIVADA E RELIGIOSA E UMA ESCOLA PÚBLICA E LAICA

Figure 0. Escola Normal Assis Brasil, 1960. Source: Almanac do bicentenário de Pelotas, v. 3, 2014. Accessed in 2024.

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RESUMEN

En la década de 1930, en Brasil, se introdujeron nuevas pautas de diseño en las instituciones educativas, dando relevancia a los temas sanitarios y nacionalistas, lo que representó un progreso. En este contexto social, educativo y político, fue necesario construir edificios escolares que incluyeran un nuevo programa con un nuevo lenguaje arquitectónico, tanto en edificios educativos públicos como privados. Sabiendo que las características constructivas del edificio escolar ejercen influencias en los individuos, este trabajo tiene como objetivo comparar e identificar las variaciones y proximidades que existen entre los proyectos de una escuela privada y una escuela pública, a través de análisis bibliográficos, documentales y arquitectónicos, en un estudio de caso comparativo entre el Ginásio Santa Margaria (1935) y el Instituto Estatal de Educación Assis Brasil (1942), ubicados en el sur de Brasil, en la ciudad de Pelotas/RS. Se puede observar, a través de este estudio, que si bien el uso del lenguaje está relacionado con la materialización de la construcción, su interpretación depende del contexto sociocultural en el que se inserta la obra.

Palabras clave: *art déco*, arquitectura escolar, arquitectura moderna, política cultural, edificios culturales.

ABSTRACT

In 1930s Brazil, new design guidelines were introduced to educational institutions, highlighting health and nationalist issues, which represented progress. Within this social, educational, and political context, it was necessary to build new schools that included a new program with a new architectural language, both in public and private educational buildings. Knowing that the constructive characteristics of a school building exert influences on individuals, this work aims to compare and identify the variations and proximities there are between the designs of a private and a public school through a bibliographic, documentary, and architectural analysis, in a comparative case study between the Ginásio Santa Margaria (1935) and the Instituto Estadual de Educação Assis Brasil (1942), located in the South of Brazil, in the city of Pelotas/RS. Through this paper, it can be observed that although the use of language is related to the materialization of the construction, its interpretation depends on the sociocultural context where the work is located.

Keywords: *art déco,* school architecture, modern architecture, cultural policy, cultural buildings.

RESUMO

Na década de 1930, no Brasil, foram introduzidas novas diretrizes projetuais às instituições de ensino, trazendo relevância às questões sanitárias e nacionalistas, que representavam o progresso. Dentro desse contexto social, educacional e político, foi necessária a construção de prédios escolares que contemplaram um novo programa com uma nova linguagem arquitetônica, tanto em edificações de ensino públicas quanto em particulares. Sabendo que as características construtivas do prédio escolar exercem influências sobre os indivíduos, este trabalho tem o objetivo de comparar e identificar quais são as variações e proximidades existentes entre os projetos de uma escola privada e uma pública, por meio de análise bibliográfica, documental e arquitetônica, em estudo de caso comparativo entre o Ginásio Santa Margaria (1935) e o Instituto Estadual de Educação Assis Brasil (1942), localizados no Sul do Brasil, na cidade de Pelotas/RS. Pôde-se observar por meio deste estudo que, apesar do uso da linguagem estar relacionado com a materialização da construção, sua interpretação depende do contexto sociocultural no qual a obra está inserida.

Palavras-chave: *art déco*, arquitetura escolar, arquitetura moderna, política cultural, edifícios culturais.

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INTRODUCTION

In Brazil, at the beginning of the 20th century, with the transition from the imperial regime to the Republican government, the relevance of school buildings grew. Built as new imposing buildings that stood out from their surroundings, these schools, called School Groups, labeled education and health under the concepts of progress and fundamental elements of society. They became a model and reference in the urban environment. The educational institutions idealized in the First Republic had two floors and eclectic architecture, with U or H-shaped typologies configuring spaces around internal courtyards. The School Groups consolidated the idea of an exclusive building for school use (Faria Filho, 1998).

Despite investment in the educational sector, which came to be understood as a tool for progress, public education had only been for the wealthiest part of the population, causing an increase in illiteracy (Faria Filho, 1998). However, between 1920 and 1930, in an attempt to provide widespread democratized access to education for the entire population, the Escola Nova or New School movement arose in southeastern Brazil. New school buildings were conceived with architectural and constructive characteristics that promoted rationalization and speed in their construction (Buffa & Pinto, 2002; Oliveira, 2007).

In the 1930s, Getúlio Vargas, the newly elected President of the Republic, would appropriate part of the New School discourse, adding nationalist and patriotic thoughts. Meanwhile, with the creation of the Ministry of Education and Health in the same presidential period, a reformulation in the education system was seen that would emphasize health and nationalist issues through progress and modernity using Art Deco architecture. This generated approximations with an architectural building style dedicated to religious education (Azevedo, Bastos & Blower, 2007; Faria Filho, 1998; Oliveira, 2007; Schwartzman, 1982), ultimately forming new model schools as a result of this set of social, political, and educational factors.

To meet the new demands, under Getulism, a new school program was proposed that would be consolidated through new educational buildings to add spaces for an auditorium, library, gym, and medical and dental rooms (Oliveira, 2007). The latter health aspects transformed the typologies of school buildings, and L, U, E, or Z shapes were used, improving the rooms' lighting and ventilation (Goldfarb & Tinem, 2017). Initially applied in the southeast region of Brazil, in São Paulo and Rio de Janeiro, these typologies would later be applied in other states.

Art Deco constructions in Brazil were characterized by the use of reinforced concrete, positioning on corner lots with markings, articulation, and play between pure volumes, little ornamentation,

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geometric lines, vertical and horizontal friezes that outline the shapes of the building, and emphasis on porticoes and staircases (Segawa, 2018; Silveira Junior, 2012). Its language found references in machines and means of transport, such as airplanes and transatlantic ships, represented by shapes, friezes, frames, and guardrails (Viana, 2011).

The rationalization of *Art Deco* was fundamental for disseminating the construction of school buildings in Brazil in this period, whether for public or private education. Examples of this are the Marina Cintra State School, in the state of São Paulo, from 1939; the Vilhena Alves school group in Pará built between 1937 and 1943; and in Paraná, from 1940 to 1950, where rationalist school projects multiplied, such as the case of the State College of Paraná.

In Rio Grande do Sul, during the 1930s, standardized projects were followed[1] for educational institutions where the same set of floor plans and facades were replicated in different cities, complying with the new health, sanitary, moral, and civic guidelines (Cabral, 2020). The teaching environment had a complex network of pedagogical methods, educational agents, and school buildings, and the political ideals could be transmitted to society through the curriculum, pedagogical practice, and its built spaces (Escolano, 2017).

> "[...] the school's location, its insertion in urban architecture, the building's layout, its symbolic elements, and the indoor/outdoor decorative aspects outline explicit cultural/pedagogical values that determine norms that interfere with what the student internalizes and learns. It is, therefore, as a school space, a historical-cultural construction " (Lombardi & Nascimento, 2004, p.221).

In the period of the Estado Novo or New State (1937-1945), led by Vargas and characterized by an approach to authoritarian regimes in force in Europe at the time, public buildings were an instrument of political propaganda, representing power and progress through the monumentality of buildings (Ribeiro, 1991; Chaves, 2008). The *Art Deco* language was used in institutional buildings in several Brazilian states, such as São Paulo, Rio de Janeiro, Minas Gerais, and Rio Grande do Sul (Oliveira, 2007; Manzo, 2012).

The ties between school architecture and social and political relations began to be studied in the 19th and 20th centuries. According to Ramírez (2017), ideological issues and pedagogical methods influenced the typology of public school buildings built in Colombia. In Argentina, according to Espinoza (2017), public educational buildings associated with public policies were part of a design tradition consolidated between 1884 and 1910. In Brazil, Manzo (2012), in his thesis, points out that during the Vargas government in 1930, the *Art Deco* language was applied to state buildings to represent the political moment, becoming a symbol and example for other buildings. However, it is observed that even though these references do not include all of Latin America, the ideological discourse reflects the architectural discourse of the built school object.

1 Standardized designs were used in the country's public institutions to optimize the design and construction process. The standardized project was then replicated identically or similarly in different regions.

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METHODOLOGY

This article aims to identify the variations and proximities between the designs of these educational buildings through bibliographic, documentary, and architectural analysis within exploratory research, with a case study in two school buildings with Art Deco architecture. Between 1930 and 1960, in the city of Pelotas**2**, education was provided by public secular institutions and religious private schools (Amaral, 2003). In this context, a private religious school, Ginásio Santa Margarida (Santa Margarida Gymnasium, 1935), and a public and secular institution, Instituto de Educação Assis Brasil (State Institute of Education Assis Brasil, 1942), were chosen as objects of study.

The bibliographic research sought sources that addressed school architecture, the municipality's history, and the two institutions studied in this article. The consultation took place using the collections of the Secretariat of Public Works of Rio Grande do Sul. Based on Martínez (2000) and Ching (2013), the buildings' architectural analysis was conducted by comparing the layout, entrances, and the organization of the rooms, corridors, and standout elements. Redesigns were made using the AutoCAD and SketchUp programs, along with tools such as Google *Street View* and Google *Maps*, complemented by material provided by the 5th Regional Coordination of Public Works of Pelotas and the Faculty of Architecture and Urbanism of the Catholic University of Pelotas.

Thus, two school buildings in Pelotas, in Rio Grande do Sul, built in 1935 and 1942 (Jornal Diário Popular, 1935), were studied. One was run as a private educational institution with a boarding school system, and the other as a public school. Their choice was because both used *Art Deco* and were built quickly. This work builds on previous studies on standard *Art Deco* schools in Rio Grande do Sul (Cabral, 2020; Cabral, Cordeiro & Oliveira, 2020; Cabral & Oliveira, 2018), but with a different focus.

Ginásio Santa Margarida (1935)

In 1934, in a rented residence at 172 Rua Santa Cruz, Ginásio Santa Margarida, an Anglican and private educational institution, started classes with 44 students. The school intended to transmit Christian teachings related to public and domestic life affairs, following moral values and investing in pedagogical innovations. The school served as a boarding and day-student school for early childhood and elementary education, teaching culinary arts, embroidery, modern languages, singing, and gymnastics in addition to conventional subjects (Bica, 2006).

During the Vargas government (1930-1945), Ginásio Santa Margarida sought to promote a nationalist education, reinforced by practices such as singing the national anthem, displaying the national

2 The municipality of Pelotas is located in the extreme south of the state of Rio Grande do Sul, Brazil, and is the fourth most populous city in the state.

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Figure 1. Ginásio Santa Margarida, 1936. Source: https://wp.ufpel.edu.br/asphe25anos/home/print-8/. Accessed in 2024.

flag, and participating in Independence week, in addition to geography and history classes focused on building a patriotic feeling. The school also underwent nationalization inspections, which verified compliance with the nationalist requirements established by Decree 72/2 of April 8th, 1938.

The institution's new building, which began construction in 1935 and was inaugurated in 1936, was built by engineer Affonso Goetze Jr. and designed by the architect Arthur Beach Ward Jr. Ward also idealized the Young Men's Christian Association in Porto Alegre (Moura & Schlee, 2002). Its construction was intended to represent religious ideals through innovations and elements that represented progress (Bica, 2006).

The relationship between the policies of the Vargas government and the religious education proposed by the school is evidenced in the speech of a Reverend in June 1936, quoted by Bica (2006, p. 58): "Glorious flag! Go and tell the city of Pelotas, to this land of honor and civility, that Colégio Santa Margarida is open and that it is a temple where Christ is loved [...]". This relationship is also manifested in adopting the New School method since, during the new building's inauguration, the methods of the progressive, active, and socializing school were mentioned.

The school's structure was based on foreign schooling, including the French, Dutch, and German, and had the capacity for 45 female boarders and 100 day pupils (J. D. P, 1935). The building, located on a corner plot in the center of Pelotas, facing 1274 Anchieta Street, had its rooms spread over four floors (Figure 1).

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Figure 2. Escola Normal Assis Brasil, 1960. Source: Almanac do bicentenário de Pelotas, v. 3, 2014. Accessed in 2024.

The first floor had spaces for the library, teachers' room, kitchen, pantry, dining hall, cloakroom, bathrooms, and two large halls. The second floor had five classrooms, rooms for science, music, languages, the secretary, a waiting room, and restrooms. On the third floor were the dormitories of the students and teachers, bathrooms, and two classrooms. The infirmary was in the central space on the fourth floor (J. D. P, 1935). In 2005, the building ceased to be used as a school and currently belongs to the Catholic University of Pelotas.

Instituto de Educação Assis Brasil (1942)

In 1929, the Escola Complementar de Pelotas, a public educational institution, began its activities in the municipality. In 1942, the new building was inaugurated, designed to serve 750 students, in an event attended by the Secretary of the Interior, Osvaldo Aranha, and the President of the State Government, Getúlio Vargas, with 90 students initially enrolled. At that time, the building was considered innovative and grandiose, a source of pride for the population. Student demand grew over the years; after twelve years, the school already had 105 teachers to serve 1,523 students.

I. E. E. Assis Brasil's building is part of a set of standard projects devised during the Vargas government in the 1930s. In addition to meeting the needs of the new pedagogical program, these Art Deco schools served, through subjective elements, as tools for transmitting social-political ideals. In addition to the subjects and civic moments, the terraces and banners,

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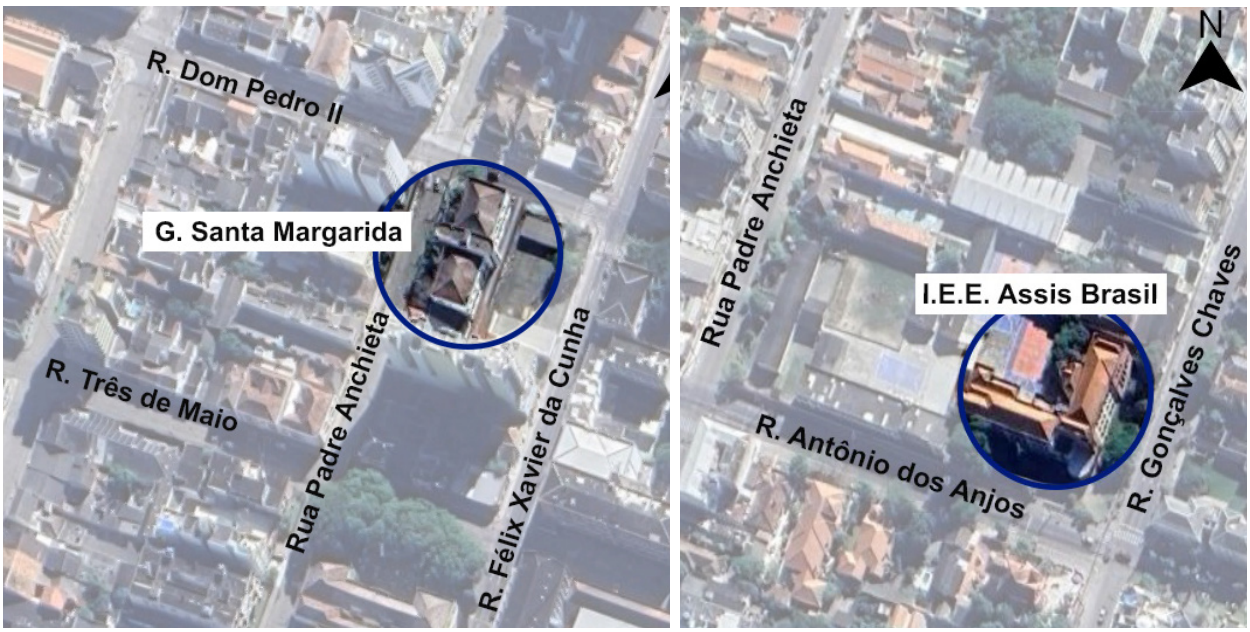

Figure 3. Location of Ginásio Santa Margarida and the I. E. E. Assis Brasil, Pelotas/RS. Source: Google Maps, adapted by the authors. Accessed in 2023.

as well as the size and architecture of the school building, represented progress and legitimized the intentions of sanitation, nationalization, and modernity (Cabral, 2020). According to a student who attended the school between 1938 and 1940:

> "At that time, the symbols of the motherland were very respected, and we were encouraged to do this at school. Every Saturday, we read the Prayer to the Flag by Olavo Bilac. A student would read, and then we would sing the National Anthem. Standing, and with great respect" (Amaral y Amaral, 2007, p.34).

This standard project, developed by the engineer João Baptista Pianca, an employee of the Secretariat of Works of Rio Grande do Sul, was adapted to serve between 200 and 750 students and was replicated in several cities in the state. The three-floor building, executed by Haessler and Woebcke, is located on a corner plot in the city center, with its main entrance at 296 Antônio dos Anjos Street (Figure 2).

On the first floor were the kindergarten, some primary school classrooms, the director's administrative rooms, the concierge's office, the auditorium, the reading room, the changing room, and bathrooms. The spaces for the science rooms, primary school, changing rooms, and bathrooms were on the second floor. On the third floor were areas intended for teacher training, classrooms, the museum, locker rooms, and bathrooms.

DISCUSSION

The two buildings were set on corner lots, with a setback from the building alignment. At Ginásio Santa Margaria this setback is frontal, while

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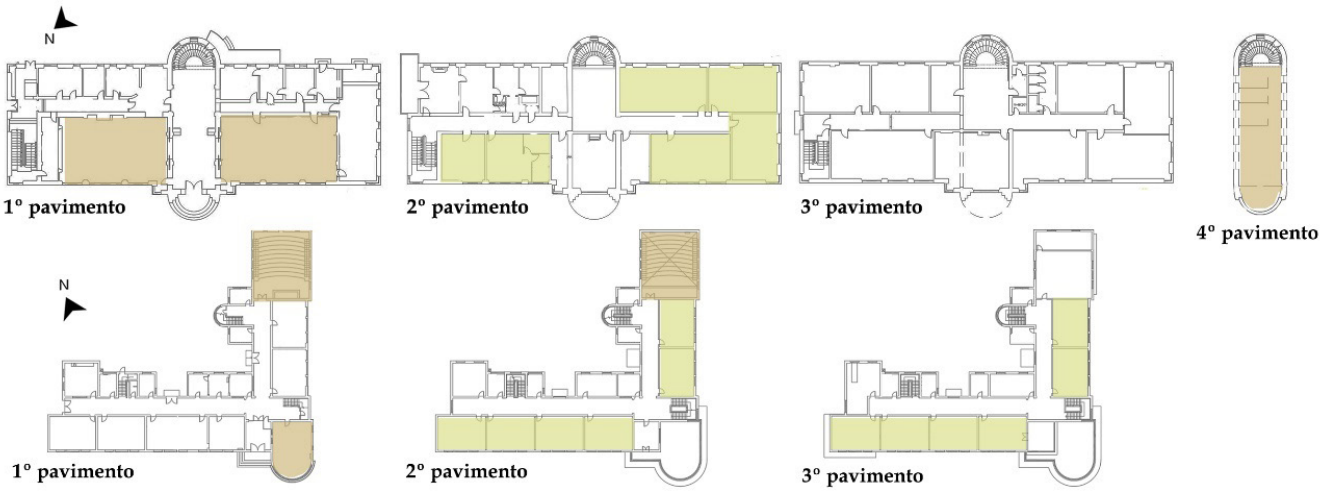

Figure 4. Halls, classrooms, and infirmary of Ginásio Santa Margarida and the library, auditorium, and classrooms of I. E. E. Assis Brasil. Source: UCPEL, 5th CROP, adapted by the authors. Accessed in 2023.

in I.E.E. Assis Brasil, the distance from the sidewalk is greater and is on the front and side of the building (Figure 3). The remoteness of the lot's boundaries made arranging frames facing external areas on these facades possible, improving the rooms' lighting and ventilation. In addition, the distance from the front of the building and its alignment creates a transition space between inside and outside, generating a pathway of contemplation for users.

It is seen that both schools used front and side setbacks to emphasize the building's facade. In the case of Ginásio Santa Margarida, the frontal setback, combined with other elements, highlights the main entrance. In I.E.E. Assis Brasil, the same setback was applied on two sides of the built volume. This orientation may be related to the layout adopted in each building, one in I and one in L, so that in the first, the only main facade is highlighted and, in the second, the corner.

In the analysis of the two institutions' floor plans, it can be seen that the most important spaces face the front of the building. In Ginásio Santa Margarida, the halls, some classrooms, and the infirmary were raised while I. E. E. Assis Brasil prioritized areas of the library, auditorium, and classrooms. It should also be noted that the curved volumes, which protrude from the rest of the building, are used in Ginásio Santa Margarida by the infirmary and in I.E.E. Assis Brasil by the library (Figure 4). Their positioning in the floor plan may be related to the circulation routes or the emphasis given to each room.

The horizontal circulation in Ginásio Santa Margarida, especially on the first floor, is in the form of a cross consisting of two intersecting lines. On the remaining floors, these lines disappear, turning into a T. Vertical circulation is provided by two staircases: one curved, located in the center of the volume, and the other U-shaped, positioned on the side of the block. In I. E. E. Assis Brasil, the horizontal circulation is L-shaped, configuring an internal courtyard. The vertical circulation is

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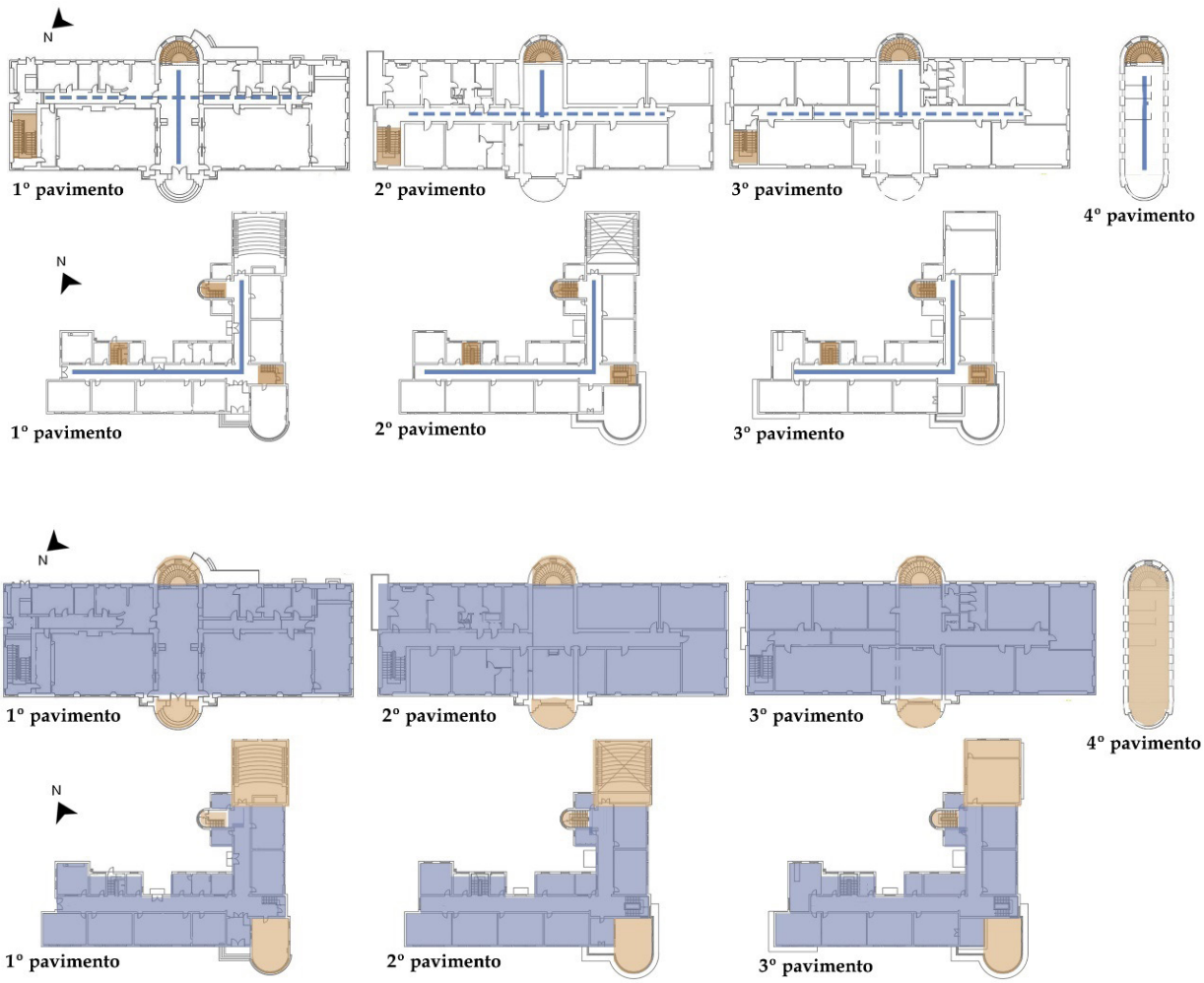

Figure 5. Horizontal and vertical circulations of Ginásio Santa Margarida and I. E. E. Assis Brasil. Source: UCPEL, 5th CROP, adapted by the authors. Accessed in 2023.

Figure 6. Floor plans and emphasized elements of Ginásio Santa Margarida and I.E. E. Assis Brasil. Source: UCPEL, 5th CROP, adapted by the authors, 2023. Accessed in 2023.

Figure 7. Volume of the infirmary and staircase of Ginásio Santa Margarida, and the volume of the library and staircase of I. E. E. Assis Brasil. Source: Prepared by the authors, 2023.

through three staircases arranged at the ends and a corner of the L, one of which is curved (Figure 5).

The organization of the rooms in Ginásio Santa Margarida considered the limits of the building's rectangular shape, as the block is rigid,

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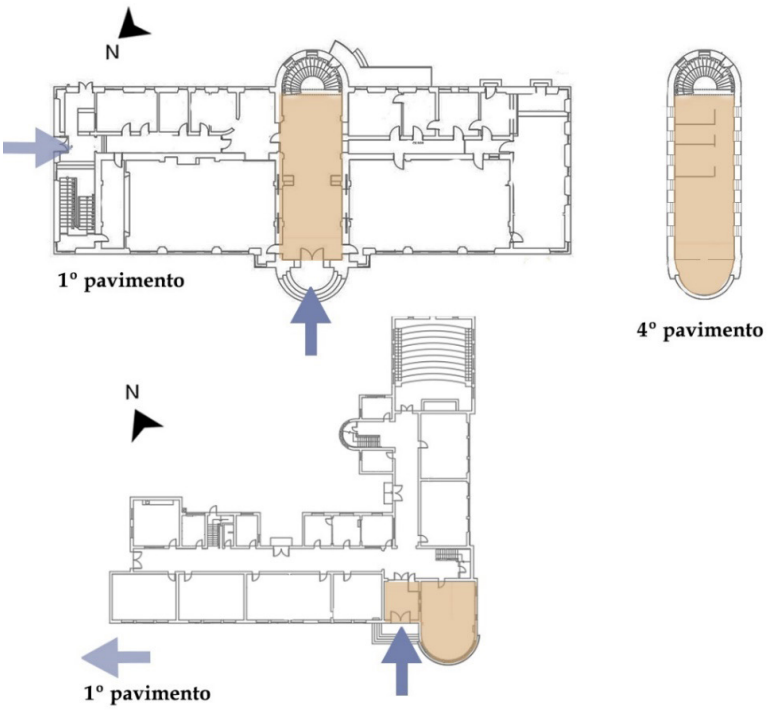

Figure 8. The entrance, entrance hall, and infirmary of Ginásio Santa Margarida and the entrance, entrance hall, and library of I.E.E. Assis Brasil. Source: UCPEL, 5th CROP, adapted by the authors. Accessed in 2023.

symmetrical, and contained. It is noted that the areas fit the rectangle, except for a single protruding element, where the infirmary and the staircase are located. In I. E. E. Assis Brasil, on the other hand, the layout has different characteristics. It is marked by a set of small blocks that differentiate and show themselves as independent from one another. In this way, several elements were incorporated along the L-shape without forming a continuous and single block and with some extrapolated points to emphasize, such as the library, the auditorium, and the staircase (Figure 6 and Figure 7). The architecture, through positioning and differentiation of form and volume, reflects the innovations of the educational programs of the time.

The main entrance to Ginásio Santa Margarida is on Padre Anchieta Street, where a large hall leads to a staircase, allowing circulation between the four floors. On the side of the school, on Dom Pedro II Street, is a smaller side passage for employees. In I.E.E. Assis Brasil, the main access is on Antônio dos Anjos Street. The entrance hall, located in the corner of the building, provides two alternatives: horizontal circulation or access to a staircase. On the same street, on the side of the plot, there is a secondary access to the institution's internal courtyard.

The entrance hall, library, and infirmary have innovations from the teaching program devised in the 1930s, with these spaces focused on social, intellectual, and health aspects. Both schools emphasized these rooms. In Ginásio Santa Margarida, the infirmary is located on the top floor, in the center of the building, standing out for its shape and advancement to the built volume. In I. E. E. Assis Brasil, the library, located on the first floor next

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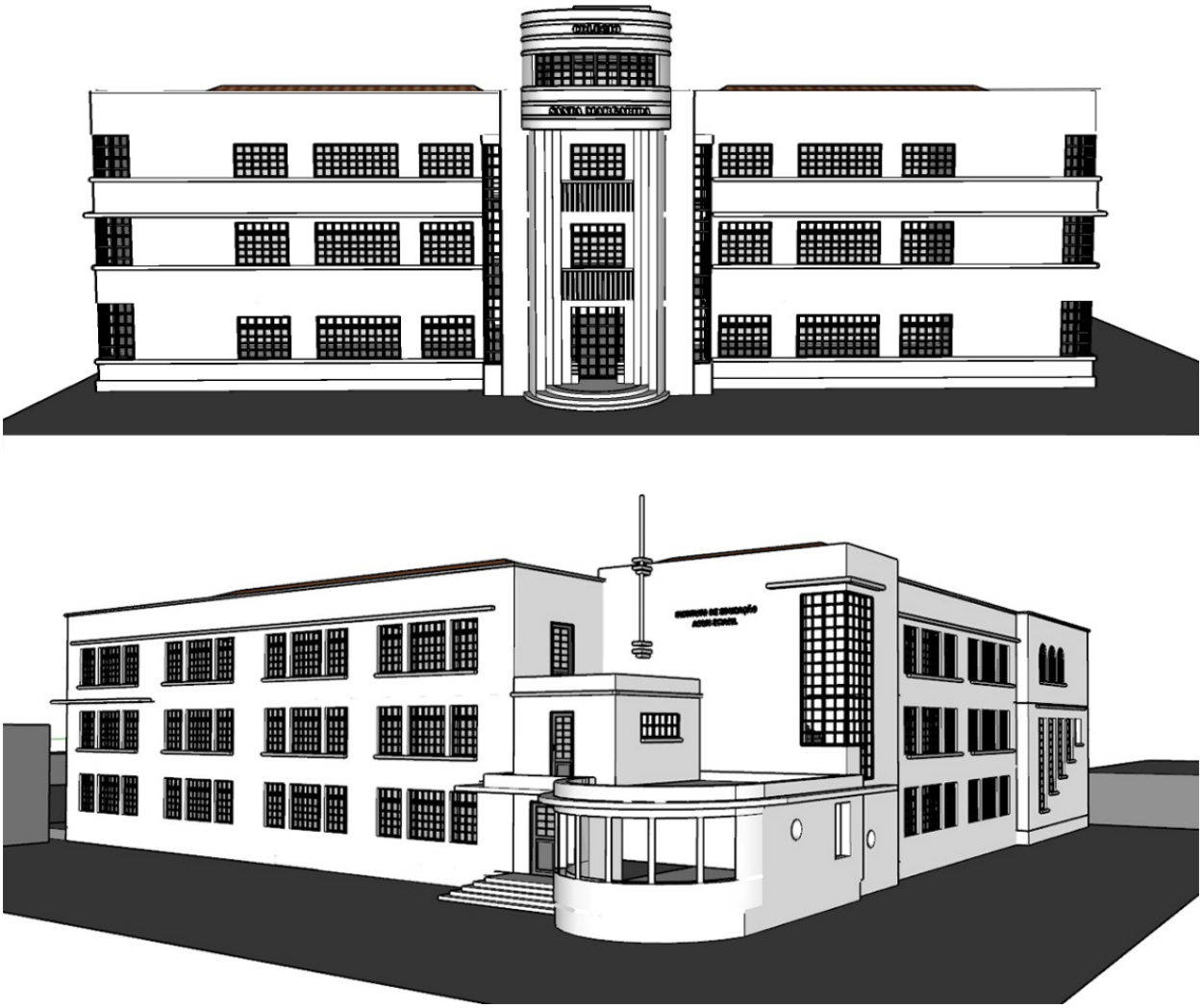

Figure 9. Facade of Ginásio Santa Margarida and I. E. E. Assis Brasil. Source: Prepared by the authors, 2023.

to the main access, has a curved shape, which extrapolates the body of the building (Figure 8).

The rigidity and symmetry in the floor plan of Ginásio Santa Margarida are also reflected in its facade, which comprises a mirrored central axis. Regarding *Art Deco*, the facade features elements such as platbands, horizontal and vertical friezes, vertical windows, balconies, curved forms, boxed lettering, and finishes with metal pipes. On the facade of I. E. E. Assis Brasil, a play of volumes and heights, is observed, emphasizing the corner of the lot and the construction. *Art Deco* elements include friezes, balconies with tubular metal guardrails, marquees, curved shapes, vertical windows, and circular frames (Figure 9).

The two schools have their rooms distributed on three floors, except for the small central volume of Ginásio Santa Margarida. Here, the social and service spaces were organized on the first floor, the teaching areas on the second floor, and the boarding dormitories on the third floor. This

organization seems to follow a hierarchy of uses, where the internal ones would remain more sheltered on the top two floors. In I.E.E. Assis Brasil, a day pupil institution, the service, administrative and public use areas were arranged on the first floor, while the classrooms and laboratories were distributed on the upper floors.

It can be said that the buildings have several similarities, such as the layout on corner lots, the presence of frontal setbacks, the use of curved volumes in prominent rooms near the main access, and a staircase with a curved volume that rises above the rest of the construction. Both organize the service spaces at the back of the building, have prominent elements on the main facades, enhance the entrance hall, have elevated access, and mark the base of the building. However, they also have notable differences, such as the emphasis in the center (Ginásio Santa Margarida) or the corner of the building (I. E. E. Assis Brasil), the organization of service spaces, and the distinction between symmetry and order in a contained volume, in contrast to asymmetry and the play of irregular blocks, with varying shapes and sizes.

CONCLUSIONS

Despite the gap of seven years between the buildings and the fundamental differences between the institutions-one a religious private school with boarding and the other a secular public school with a day pupil system-, both sought to follow the sanitary, nationalist, and modernist guidelines proposed for the new school buildings in the 1930s. Although these guidelines have not been consolidated exclusively by architecture, it is evident that the same architectural language has been applied to fulfill different purposes.

The sanitary issues were addressed through the I or L typologies, including medical and dental rooms and gyms, and the enhancement of lighting and ventilation materialized in the strategic positioning and expansion of the number of frames. The nationalist demands were applied in the pedagogical program, including subjects and civic moments, creating spaces for raising the national flag, and adopting *Art Deco* architecture. Modernity and progress, in turn, can be observed in the ensemble formed by implementing the new pedagogical program, in the imposing size of the buildings, and in using Art Deco-style architecture.

It is seen that the projects of the two school institutions present a clear opposition. The building of Ginásio Santa Margarida has an I-shaped symmetrical and contained typology, while that of I. E. E. Assis Brasil has an L-shaped typology with asymmetric characteristics and a play of volumes. These differences seem to be associated with the particularities of each school: Ginásio Santa Margarida, which has a conservative, Christian, and domestic education, adopts a more rigid and formal architecture. I. E. E. Assis Brasil, although it seeks a conservative education, disregards religious and economic aspects, using dynamic elements in the building's volumetry, reflecting a more modern and flexible approach.

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The rooms highlighted by the application of curved shapes – the infirmary at Ginásio Santa Margarida and the library at I. E. E. Assis Brasil- are located on the main facade of the buildings, projecting from the body of the building. The infirmary, located on the fourth floor and in the center of Ginásio Santa Margarida, rises, increasing the height of the building and symbolically approaching the divine. In contrast, the library of I. E. E. Assis Brasil, located on the first floor and at the corner of the building, stands out when signaling access to this space.

In both cases analyzed, the form praises progress and modernity, whether with the state or religion. It is concluded that although architectural language is linked to the building's materialization, its interpretation depends on the sociocultural context where the work is inserted. It appears that *Art Deco* architecture, regardless of the educational institution's character, was applied in school buildings to represent the progress promoted by the new policies of the time. In this way, the complex formed between architectural language, pedagogical methodology, and policies of patriotism and nationalization consolidates and materializes this discourse.

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