PROJECT THINKING ON DESIGN

MORE THAN BUILDINGS

Learning form Portuguese Building Typology

EDITED BY
SÉRGIO PADRÃO FERNANDES,
JOÃO SILVA LEITE AND
CARLOS DIAS COELHO

ROUTLEDGE

More Than Buildings

More Than Buildings studies the buildings typology in Portuguese cities and their relationship with the programme (the way in which it responds to a function), the territory where it is integrated and with time and the way in which built forms evolve.

The book is structured around a set of key theoretical texts that highlight the potential of knowledge about typology (and its specific formal characteristics) in the production of new architectural objects. In this sense, the book has a didactic value based on the theoretical synthesis it produces, which allows it to expose certain spatial and formal attributes of the typologies and thus constitute a reference for the processes of urban and architectural production. The method of analysis and decomposition of the case studies presented in each chapter provide a useful reading and interpretation key for different readers. The typology should be understood as a reference in the act of designing, demonstrating how to understand the elementary formal and spatial principles. For the municipal authorities, or other political decision-makers, the book will enable them to interpret the value of typology and its relevance in the production of cities. This data could be useful, for example, in planning actions that aim at preserving or converting urban areas of architectural value.

The book will be relevant to readers within an academic framework and in the professional field engaged in work around architecture, cities, planning, and conservation.

Sérgio Padrão Fernandes is an architect with a PhD in Urbanism and Associate Professor at the Lisbon School of Architecture. He is integrated researcher at CIAUD and has coordinated the formaurbis LAB research group since 2022. In 2008, he was awarded the Portuguese Academy of Fine Arts prize.

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Introduction

Sérgio Padrão Fernandes, João Silva Leite, and Carlos Dias Coelho

> *To raise the question of typology in architecture is to raise a question of the nature of the architectural work itself. To answer it means, for each generation, a redefinition of the essence of architecture and an explanation of all its attendant problems. This in turn requires the establishment of a theory, whose first question must be, what kind of object is a work of architecture?*
>
> (Moneo, 1978:23)

The Portuguese City presents an urban fabric of great shape and type richness. Shaped over several centuries, the Portuguese urban fabric condenses in its form very diverse cultural influences that date back to the Roman, Arab or Medieval periods and that coexist with more recent formal principles and are influenced by lines of modern thought. This formal diversity sedimented over the centuries makes the Portuguese City a unique urban universe, still preserving its own spatial principles and, which find echoes in the built typology. Rules and exceptions make the Portuguese-built typology an interesting object of study to systematise, mainly due to the organisational resilience of certain functional programmes, the way in which the territorial and urban context shapes the typology or, even, the action of time on the buildings and the way how they had resisted or been transformed.

"More than Buildings. Learning from Portuguese Building Typology" is a book of theoretical essays that seek to reflect on the universe of built typology in Portugal. The book title is justified because it is a critical view of an inventory produced and wants to discuss the composition of the buildings in order to explain the shape of the Portuguese City and the territory configuration itself through the building's point of view. This publication is developed as an output and a critical synthesis of the survey of built forms made by the research project "BUILDINGS – Building Typology: Morphological Inventory of Portuguese City", funded by FCT – Fundação para a Ciência e a Tecnologia, I. P. – the Portuguese national research funding agency – with the project reference code PTDC/ARTDAQ/30110/2017 and hosted in Lisbon School of Architecture, Universidade de Lisboa and its research centre CIAUD – Research Centre for Architecture, Urbanism and Design. Bringing together different members of the research project's team of researchers, but also

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other scholars from complementary fields of study and linked to other national and international institutions, the reflection produced by the various theoretical essays make up a great retrospective, which is not chronological, but which aims to contain traces of all times in the particular context of Portugal.

The research project behind the book

The underlying project idea behind this book is to conclude the Morphological Atlas of the Portuguese City that has been ongoing in the last two decades made by *formaurbis* LAB, a research group in urban morphology.

The Morphological Atlas of the Portuguese City was organised into three parts: (1) the city – Urban Fabric and Urban Layout, (2) the public city – Square and Street and (3) the private city – Urban Block and Building. In the construction of the atlas' different parts, the *formaurbis* LAB developed the project "The Street in Portugal – Morphological Inventory" and the project "The Built Fabric of the Portuguese City – Morphological Inventory". The team was also integrated in two other works: "The Square in Portugal, Mainland – Public Space Inventory" and "The Square in Portugal, Azores – Public Space Inventory".

This research final chapter approaches the building typologies and translates the cultural diversity and wealth of man-made constructions within the scope of a small country, as portrayed simultaneously by the built structures singularity or repetition, thus constituting synchronic and diachronic categories and type series. Three different perspectives – **Programme**, **Context** and **Time** – organise territory mapping and the selection of 120 Buildings. These buildings are selected according to representative criteria that consider: the different architectural programmes; the country geographic characteristics; the typical compositions principles of some historical periods; as well as the evolutionary process phases, when buildings are the result of a metabolic process of transformations through time.

It is important to emphasise the complementary meaning of the different articles in relation to the previously prepared survey. The material produced by the atlas acquires a new dimension in the proposed book. We seek to develop critical and interpretive essays (using drawing or other graphic elements) that explore the potential of certain formal/typological characteristics. The neutral meaning of the atlas, as an inventory and cataloguing exercise, is thus enriched by a theoretical dimension that aims to emphasise the qualities or specificity of work reading.

About the book structure

Following the structuring concept of the research project, the publication proposes a theoretical reflection, elaborated from the material produced by the morphological atlas research project.

The book is organised into a series of articles that starts with a theoretical reflection on the organisation of an architectural atlas and its implementation in a concrete context and three major thematic blocks made up of the selected focus perspectives. Within each perspective on built typology, a set of different essays are

developed, which, starting from a specific case study or problematic, seek to discuss the value of built typology in the production of architectural and urban space. Each chapter will be developed by a member of the project team and external authors, from different international contexts, who participated in the research project and whose research areas intersect with the themes addressed in the book, were also invited.

Thus, the theoretical framework text sought to emphasise the ambition of atlases in Western culture, their antecedents, and the main questions that the production of a work of this kind raises. It also justifies the major options taken in relation to the subject, the universe represented, the way in which it was mirrored in a representative universe, the focus perspectives selected and the categories and types that resulted from them.

In the first thematic group – **programme** – the first chapter explores the relevance of Collective Housing in the definition of urban form and uses Lisbon and its typological diversity as a main case study. As opposed to the common urban fabric defined by housing typology, the Church as an example of a unique building and symbolic reference that, despite the various established canons, has a set of variations that question the purest functional and programmatic rules. The last chapter of this part focuses on the role of small rural buildings as structuring objects of the territory and their modes of appropriation.

In the second thematic group – **context** – the three essays address the close links between typology and the city. It reflects on the typological mutations that occurred in it met with the infrastructural elements or even in the way a building designs or reconfigures the urban space and, inversely, how the built typologies can be determined by the forms of the city.

In the third and last thematic group – **time** – the four chapters address issues related to the resilience or transformation of the built typology. The metabolism of buildings is explored and, as a representative example of the evolution of architectural form, the shape of convents is investigated and their potential to host different programmes that, while preserving a large part of their spatial qualities, allow the incorporation of diverse functional programmes throughout the period time. The value of ruins is also explored within the scope of the approach to the evolution of built typologies, as a category that allows reflection on the death of architectural organisms.

Purposes

In summary, the book "More than Buildings. Learning from Portuguese Building Typologies", enclosed in a larger context, directly linked to the "Morphological Atlas of the Portuguese City" project, but also to the other activities of the *formaurbis* LAB group, seeks to provide open readings, leaving the user with the possibility of relating the knowledge presented here to the basic elements of the atlas, the 120 detailed case studies and the comparative tables, most of which are available in the publications "Workbook 120" (2022), "Parallels. Building Typology: Portugal" (2022), "Building typology: Lisboa" (2019) or even online at www.instagram.com/buildings_mais/.

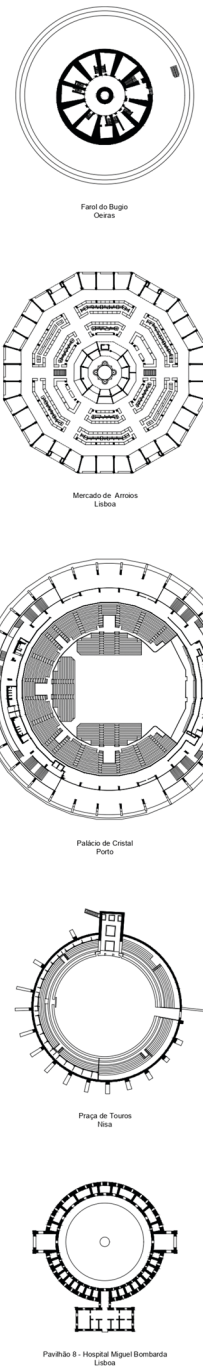

Figure 0.1 Typology vs Shape.

Source: Drawing by *formaurbis* LAB, 2022.

The research group has also used the extensive inventory produced for several academic activities related to architecture education, developing and supporting final master's degree work (in the field of architecture and urbanism) but also in intensive summer courses – Setubal Lab in 2021, Marvila Lab in 2024 and Inhabiting the Monument in 2024 – where understanding the building typology serves as a starting point for exploring innovative proposals that seek to think about different urban and architectural models in order to identify solutions that give a response to contemporary needs.

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1 The invention of an atlas of buildings

Carlos Dias Coelho

The creation of an atlas of buildings of the Portuguese city raises a number of questions that should be the subject of informed reflection. Only in this way will it be possible to develop a work that is grounded in the cultural tradition that uses this figure and also in supporting the choices necessary to define the representation of the universe to which it refers. In this sense, it was deemed essential to reflect on the usefulness of an atlas of buildings at the present time; also to understand how it is based in Western culture and architectural culture and, finally, to construct the premises for an organisation and a work aimed at a specific territory, establishing the prisms of reading and the categories in which the work should be organised.

The production of atlases responded to one of the greatest ambitions of Western civilisation after the Renaissance: the ambition for knowledge and its universal dissemination. It was in this context that the geographical atlas first appeared at the end of the 16th century, at a time when the entire Earth was unknown, and which supported campaigns and expeditions in undiscovered territories until the end of the 19th century.

In this way, comprehensive knowledge about a subject – the Earth – was brought together in a document with a descriptive component and a graphic component, which could be possessed by anyone, consulted and transported, and seized without any constraint. In short, an atlas brought together total knowledge of a subject that anyone could carry in their pocket.

By extension, from the terrestrial atlases to the celestial or maritime atlases, and also by further extension to others, such as Anatomic atlases.

The appearance of the atlas

The first work to which the name atlas is attributed was a collection of maps made by the German-Flemish geographer Gerardus Mercator from 1585 onwards, the 1595 publication of which had a frontispiece depicting the giant atlas, with a celestial globe in his hand and a terrestrial globe at his feet.

Although it wasn't the first collection of maps published, it was from this edition that the expression came to identify this type of work. Atlas, which etymologically means "carrier" in Greek, crosses two mythological legends about Atlante. The

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first refers to one of the titans who fought Zeus who, triumphant, condemned him to hold the heavens on his shoulders. The other refers to the king of Mauritania, who is credited with making the first terrestrial globe, which Mercator inscribed on the frontispiece.

Geographical or anatomical; celestial or maritime; synchronic or diachronic; general or thematic; pedagogical or official; printed or digital, the name atlas came to be given to any collection of maps, tables or integrated illustrations which, accompanied by keys to reading or descriptions, sought to address a subject as a whole.

Atlases in the context of architecture and the city

If the city and its components, particularly buildings, have always required graphic elements in most disciplinary texts, this does not mean that there was any objective of representing any universe, but only to better address fields of knowledge, art and technique, which have a physical and formal expression that constitutes the essence of the object and, as such, is better defined from its drawn representation.

While the articulation between written and graphic explanations takes place in the first texts on architecture, the desire to represent a universe as an objective is much later and the naming of these works atlas is only episodic. This is due to the impossibility, and also the pointlessness, of representing the entire universe addressed, but only to present it from cases that reflect a wide range of objects and, consequently, from those that reflect the whole.

It is in this procedure that the question of "type" comes into play, not so much in its meaning as "*a scheme for the production and creation of new objects*", a much-debated issue in the last quarter of the 20th century, but as "*deduction of the compositional structural characteristics of a set of objects*", which in the case of an atlas can be illustrated by a concrete example, selected and representative of a set.

In addition to this issue of representing the whole by the part, which clearly distinguishes architectural atlases, there is also another aspect that characterises them and differentiates them from geographical or anatomical atlases. If the latter graphically illustrate an entire universe, selecting only the reductive process of what is represented, their ultimate goal is knowledge of that universe, be it the Earth or the Human Body. However, the objective of architectural atlases has never conveniently resolved the ambiguity between establishing knowledge of the chosen universe, always based on cases considered representative, and using this tool for creation and design.

Treatises. Universe and graphic representation

The whole experience of setting down written and graphic knowledge about architecture dealt in one way or another with all the themes that came to be considered in the realisation of the atlas of this discipline and which still have to be taken into account today.

The oldest known treatise in the West is the work of *Marcus Vitruvius Pollio*, a Roman architect who lived during the time of Emperor Augustus, to whom he dedicated his work. As the only treatise on classical architecture to survive the Middle Ages, it had an enormous influence on the Renaissance and the production of modern treatises, which as a whole guided the production of erudite architecture until the mid-20th century.

However, *De Architectura* reached the Modern Age copied and recopied and without the drawings that were an integral part of the work. The treatise deals with design and construction, methods and techniques, and is organised into ten thematic books (Maciel, 2009). Buildings as the main architectural element are discussed in Books III and IV, which are dedicated to temples; in Book V, dedicated to public buildings, and also in Book VI, dedicated to private buildings.

Book VI deals with private buildings and their components through archetypes, such as the "Greek House" or the "Tricliniums, Pinacotheques and Rooms", organising some elements such as atriums by type. Book V, which deals with public buildings such as Forums, Basilicas or Theatres, also approaches them through archetypes, sometimes referring to existing examples.

The biggest exception is the way the temples are approached. Unlike the previous cases, they are organised by type, based on the arrangement of the outer columns on the one hand and the intercolumnium on the other. Sometimes the types are exemplified and referred to specific, well-known cases.

Modern treaties took on very different characteristics. O Leon Battista Alberti's *De Re Aedificatoria Libri Decem*, finalised in 1452 and published in 1485, had an inaugural character and is still today one of the most developed reflections on the discipline of architecture (Biermann, 2016). It did not, however, include any graphic elements, thus moving away from the purpose of this reflection (Alberti, 2011).

Similarly, the *Regola delli Cinque Ordini d'Architettura* (The Five Orders of Architecture) by Iacomo Barozzi da Vignola, published in 1562, is far from our purpose. This treatise, one of the most disseminated in architectural academies and schools, did not deal with the building, but rather with the canon given by the orders as a fundamental element in the organisation and composition of the art of building.

As an example of a modern treatise that poses the most questions for the construction of an atlas, we have selected the treatise by Sebastiano Serlio, entitled *I Sette libri dell'Architettura* (The Seven Books of Architecture). These books were published separately between 1537 and 1575, after the author's death, with the exception of Book VI, which remained in manuscript. Book IV stands out at the time, since for the first time it presented the five orders of architecture with the organisation and sequence taken up by all the later treatises. It was notable for its remarkable dissemination and already had four translations in 1550. The exploratory nature of each book meant that the collection was characterised by little uniformity, despite its great experimental richness, which is why the author also added an *Extraordinario Libro* (Extraordinary Book) to the set (Biermann, 2016).

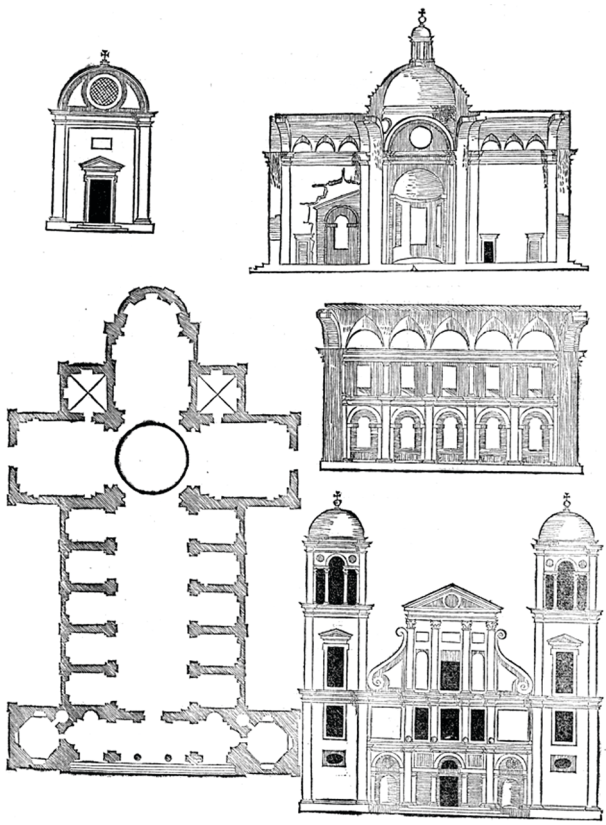

Figure 1.1 Temples table, Quinto Libro d'Architettura di: livre des temples, Sebastiano Serlio.

The work presents a significant innovation in the way it represents buildings, in many cases articulating a horizontal projection, a floor plan, with a vertical projection, section or elevation, and also with some details, a system that Andrea Palladio (2022) would later use systematically in all the buildings and projects whose drawings he included in his treatise *I Quattro Libri dell'Architettura* (The Four Books of Architecture), published in 1570.

Based on the main organisational themes of an atlas, we can analyse the different books of Serlio's work. Thus, Book VI, which remained in manuscript and deals with dwellings, as well as Book VII, the latter published, combines the reading of existing cases with projects proposed by the author and also with archetypes of each building chosen (Theatre, Thermal Baths, etc.). It includes, in a non-methodical way, the collection of a universe of examples with the aim of

serving as a basis for design, although this is restricted to the architect's experience. Book III – Antiquities of Rome – deals with a series of buildings that Serlio considers to be exemplary, organised by categories such as Obelisks; Bridges; Arches; Basilicas; etc., but where he also included, very curiously, works by Bramante and Raphael such as the Tempietto of St Peter in Montorio (Rome) and the designs for St Peter's Basilica in the Vatican. Despite the freedom and fluidity of his criteria, he organised a universe which, like most treatises, was represented graphically.

However, it is Book V – Various Forms of Sacred Temples – that presents the most innovative and methodologically successful character, when it is organised from the establishment of twelve types of buildings (circular; oval; square with circular additives; etc.) and then reverts to real examples. In this book, by starting from the abstract, Serlio anticipates many of the issues that will inform the formal categories of the 19th and 20th centuries. He also anticipates, although implicitly, the question of the usefulness of the type as a deduction and organisation of a universe of constructed forms, but also as a basic scheme for creation. This latter understanding of the value of the concept of type, a concept that would only be stabilised two centuries later by Antoine-Chrysostome Quatremère de Quincy (Quatremère de Quincy, 1825), is what gave rise to the *Extraordinario Libro*, in which the author conceived variants for the "Portal" as a prominent architectural element, proposing twenty different designs for "Delicate Order" portals and thirty variants for "Rustic Order" portals.

In Serlio's work we find the major issues that should be raised in the development of an Architectural atlas, although this was not the aim of the treatise, nor do these issues appear in an explicit and methodical way.

The first atlas of architecture

It wasn't until the beginning of the 19th century that the first work that could be categorised as an Architectural atlas was published. The publication, entitled *Recueil et Parallèle des édifices de tout genre, anciens et modernes. Remarquable par leur beauté, par leur grandeur ou par leur singularité, et desinés sur une même échelle,* (Collection and Parallel of buildings of all kinds, ancient and modern. Remarkable for their beauty, grandeur or singularity, and designed on the same scale) was realised around 1800 by Jean-Nicolas-Louis Durand, architect and professor at what later became the École Polytechnique.

Durand published his second work in 1802, and a new version in 1813, entitled *Précis des leçons d'architecture données à l'École royale Polytechnique* (Summary of architectural lessons given at the École royale Polytechnique.) which was a complement to the previous one, with the aim of developing a design method. This work, with an explicit critical and reflective sense, used lessons learnt from the previous work, using its examples to support and illustrate its principles and theories. Being autonomous works, only the first one is of interest to us in terms of reflecting on the production of an atlas, although its support for the "lessons" is a

clear reminder of the question of the ultimate usefulness of a work of the nature of an architectural atlas. J-N-L Durand clearly determines the purpose of each of the two works, defining the discipline itself in the *Précis de Leçon* editions when he writes *"...Architecture is the Art of composing and executing all public and private buildings..."* and when he emphasises the principles that govern its production, highlighting here the issue of composition which, he says, *"...amazingly had never been portrayed in a previous work..."*.

As for his initial work, which we previously classified as the first atlas of architecture, it was widely publicised and referred to, and was even commonly called the "Imaginary Museum of Architecture". Durand himself expressed his great ambition when he said that the publication *"...is of interest to those who have to construct or represent buildings and monuments, to study all the most interesting things that have been done in architecture in all countries and all centuries..."*. It is therefore important to understand how the author organised such a gigantic task, transforming this universe that crosses space and time into a feasible work.

Durand, in the written explanation of the work, mentions the need to select since *"...the buildings of interest would fill 300 volumes..."* recognising the usefulness of a volume that is inexpensive and easy to go through.

In addition to the written text, the work is structured around ninety engraved tablets with buildings and architectural elements represented on the same scale, to achieve the goal of allowing a 'parallel' comparison. Sixty-three of these boards correspond to buildings and monuments and another twenty-six to architectural and constructive details.

The author proposes classifying buildings and monuments by "genres" and presenting them by degree of analogy. Contrary to many interpretations of Durand's concept of "genre", it does not correspond to the concept of type as it has come to be stabilised in its different understandings, although it certainly includes it, being much wider and also imprecise.

Thus, the analogies established by Durand justify the tables organisation, mainly by programme (Aqueducts, Schools, Palaces, Theatres, etc.) but also by culture (Spanish Palaces, Indian Tombs, Egyptian Temples, etc.), by time, which includes existing temples and reconstructions (Gothic Churches, Modern Churches, Ancient Basilicas, etc), by materials (Wooden Bridges, Iron Bridges) and even by what comes closest to the concept of type, i.e. their formal structure (Round Temples, etc).

After Durand's publication, which was widely disseminated and always much referred to, considering both its inaugural character and the usefulness of the systematic collection made, the construction of atlases became recurrent, given the qualities that were attributed to them as tools of knowledge, both pedagogical and professional, and the possibilities of diversified and open critical readings that they make possible.

To illustrate the diversity of publications that can be considered as atlases, and with a view to understanding this wide spectrum, we can divide them into two large groups.

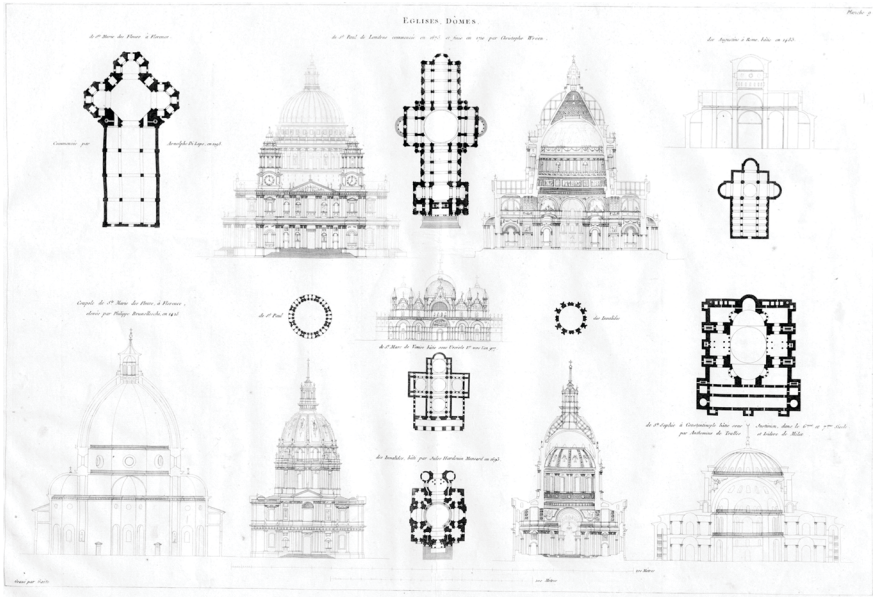

Figure 1.2 Parallèle: Eglises | Domes.

Source: Jean-Nicolas-Louis Durand, 1801.

In the first, we can include works that deal with urban elements in which buildings are always a component part of the urban fabric. This group includes the *Encyclopédie de l'Urbanisme*, coordinated by Robert Auzelle and Ivan Jankovic, published in fascicles in the 1950s. Never published in its entirety, this unique atlas, made up of loose sheets, was organised into five parts that would come to constitute what the authors defined as a *"universal encyclopaedia of the built fabric"*, aiming to represent "*achievements in all fields, all eras and all civilisations*", including the examples considered "greatest" of the different components of the urban fabric, such as the "square" or the "housing ensemble".

As a publication that focuses more on a single urban element and where the building, although present, clearly plays a secondary and fragmented role, we can mention Great Streets by Allans B. Jacobs, published in 1993. The author, in his selection of fifteen main cases and thirty complementary ones, tries to justify the representation of types, although he assumes that the selection is largely personal, even including categories such as "the *great street we once lived on"* (Jacobs, 1993).

In 2005, the *Atlas of the Dutch Urban Block* was published by Suzanne Komossa (2005), Han Mayer and others, who selected nineteen projects of Blocks in the cities of Amsterdam and Rotterdam. They used what they called "Typological and

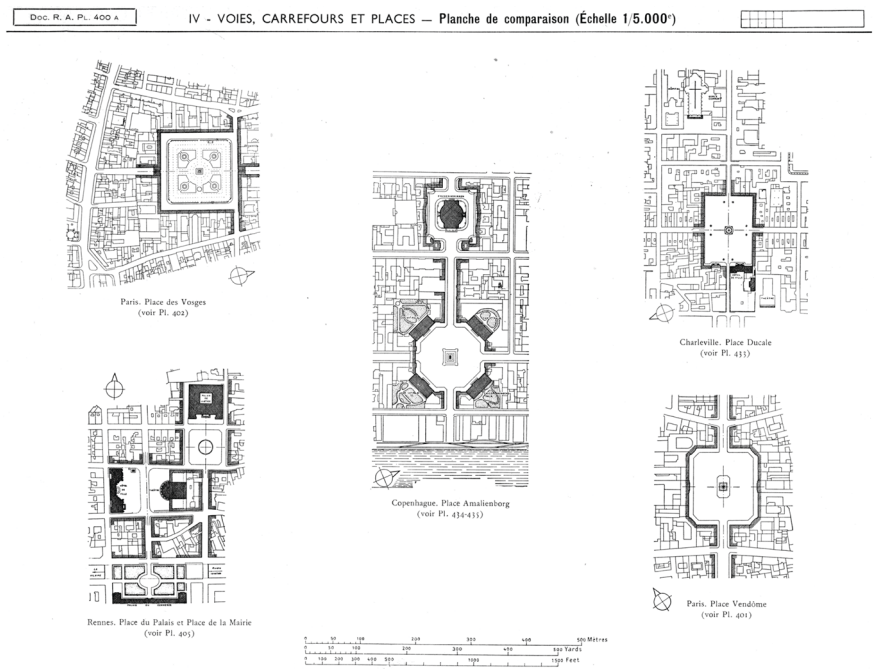

Figure 1.3 Comparative Table: *Places*.

Source: Robert Auzelle, 1947.

Morphological Research", defining the concept of type that justified the choice of each of the chosen cases. In the work, the building is an essential component in defining the block and its presentation is valued in the context of the repetition of the built units in the composition of the urban element to which the work was dedicated.

In the second group, we can include works that deal with buildings as an autonomous element. Even so, there is an initial split between the atlases that deal with individual buildings, often called public buildings, and the atlases that try to deal with common buildings, individual housing but above all collective housing. It should be noted that since the second half of the 20th century a huge number of works have been published on the subject of the building with the essential characteristics of an atlas, varying enormously in terms of the spatial or temporal universe selected, but with many of them having pedagogical objectives and disseminating experiences carried out in specific contexts.

As an example of an atlas of housing buildings, which focuses on the banal and repetitive building, representative of a category, we can refer to *Typology* (Christ, Gantenbein, 2012, 2015) published in three volumes, the first exploratory on Hong

Kong, and the other two on cities such as: Rome, Buenos Aires, New York (vol. II); and Paris, Delhi, São Paulo and Athens (vol. III). The edition, coordinated by Emanuel Christ and Christoph Gantenbein, provides a variety of representative cases of the main types of each city, organised systematically to facilitate comparison and transversal reading.

At the same time, an example of an atlas of singular buildings is the recent publication by Andreas Lechner, *Thinking Design Blueprint for an Architecture of Typology*, from 2021, which presents 144 buildings, which the author calls 'projects', taking into account that the universe includes existing buildings, demolished buildings and buildings that have never been built, all represented at the most perfect moment of their existence or idealisation. The projects are divided into twelve categories (Theatre, Museum, Library, etc.), which the author calls building types and which in practice are functional or programme categories. In the book, although the author classifies the buildings by the perspective mentioned, he organises a set of essays into three main themes: Tectonics; Type and Topos, aware that any story about any collection can be told from different points of view.

Finally, we can also mention the particularity of Atlas *Public Sydney: Drawing the City* (Thalis, Cantrill, 2013), which brings together the spaces and buildings of high value in that Australian city. In this work, a process of selecting cases is less evident, given the restricted universe to which the book refers, but rather a diachronic view of everything that is presented, not only when each case is dealt with individually, but above all by including them in evolutionary tables that stretch from 1790 to 2010, where all the examples are recorded in their most relevant moments of construction or evolution.

In the Portuguese context, it is worth highlighting a work that had an extraordinary impact because of its influence on the production of modern architecture and teaching the subject since its publication. The work, published for the first time in 1961 under the name 'Arquitectura Popular em Portugal' (Popular Architecture in Portugal), was the result of a public commission and involved carrying out an extensive survey of vernacular architecture throughout the country. Carried out by different teams working in six previously demarcated regions, the survey materialised in an atlas of buildings, focusing mainly on housing and detailing, through drawings, photographs and diagrams, representative cases of types, always approached from the perspective of their geographical context, building organisation and construction characteristics (Ordem dos Arquitectos, 2004).

Thus, by focusing more on urban elements or buildings approached individually, more broadly or thematically and reporting on limited universes, the questions of ambition, objectives and articulation between written reflection and representation soon stabilised. The always open question of selecting a restricted and paradigmatic universe from the total universe selected remained unresolved.

Organising representative categories

To address these questions, we will analyse the work by Nikolaus Pevsner (1976) entitled *A History of Buildings Types*, in which the author evaluates and discusses the subject, selecting a set of categories and expressly ignoring others. Due to the author's recognition and dissemination, the work ended up influencing mainly historical approaches to the production of architecture.

Although Pevsner's work cannot be considered an atlas, since it only deals with the classification of objects that represent the selected universe, without the essential component of a systematic graphic representation, he emphasises J-N-L Durand's *Recueil et Parallèle des édifices de tout genre, anciens et modernes* as a pioneering work.

Pevsner defines a universe that he restricts, on the one hand, and in an unspoken way, to Western architecture, and on the other to a period of around two centuries, justifying it as corresponding to the period of proliferation of new building programmes in the 19th and 20th centuries. Paradoxically, it includes a category of government buildings from the 16th to the 18th century. In addition to the above, he also excludes collective and individual housing, arguing that this would require another volume, as well as categories such as churches, which according to the author have already been dealt with extensively, and more surprisingly, Schools, Universities and Barracks, which would have "*increased the workload to unmanageable dimensions"*. Faced with these cut-outs, Pevsner can only assume that the selection is somewhat arbitrary and even personal.

He organises the universe into sixteen classes, which he calls "types", but which correspond to functional categories, considering that he does not bring into the discussion any theme linked to the structure and form of the composition of the buildings that would justify any arrangement of the objects identified. These only correspond to the major functions of urban buildings such as national monuments; government buildings, subdivided into four distinct sets: Theatres, Libraries, Museums, Hospitals, etc. Almost all of the cases are examples designed from scratch for the function to which the category corresponds, disregarding cases where other factors such as the evolution of the building over time, or site-specific circumstances that configure different results from an archetypal building are equations of this problem.

The awkwardness of the effect of time on the metamorphosis of buildings is evident in the way Pevsner refers to the Westminster Parliament in the "Government Buildings: Parliament" category. Although he historises the evolution of the building, the author focuses on the project by Charles Barry and Augustus Welby Pugin, developed after the fire of 1834, and attributes the irregularity of the whole to the existence of two elements of the project that unbalance the outline of the building – the Clock Tower and the Victoria Tower – and not to the much more structural issue of the fact that the new building incorporated important pre-existing buildings, particularly Westminister Hall and St Stephen Chapel.

The author, aware of the insufficiency of a single perspective leading to the choice of categories, states that the history of types effectively interweaves three histories: the history of function, which informed the organisation of work and which Pevsner refers to as a history of diversification; also a history of material, which he claims is in practice a history of innovation; and finally a history of styles, which he considers to be increasingly complex given the simultaneous overlapping of styles from the 19th century onwards. Pevsner's choice of this last point of view is paradoxical, given that the concept of style is largely opposed to the concept of type itself.

Considering this last issue, we thought it essential that, before constructing the organisational model for an atlas, the issue of type be addressed, distinguishing it from the more generic concept of category, with which, as we have seen, it is often confused. The concept of type is still not very stable when it comes to organising these works, and there are still obvious inaccuracies, ambiguities and even contradictions.

The type in architectural atlases

While it is not our purpose to go into the evolution of the concept of 'type' in depth, we believe it is important to understand its range, using some authors, and to conclude with a more stabilised understanding of this concept and its applicability in an atlas of buildings.

Type was defined by Quatremère de Quincy in his Dictionnaire d'Architecture (Leoni, 2023), which appeared in print in 1832 and later, in the 20th century, gave rise to the neologism meaning the science of type, i.e. typology.

The concept of Type, widely used outside the strict sphere to which its definition corresponds, designates "*any concrete being, real or imaginary, that represents a class of beings*" and "*a general scheme of structure*" as proposed by Lalande (2010 [1902–1923]). The whole range of the concepts in the disciplinary field of architecture varied between a more deductive and abstract character, referring to a set of experienced objects that can be categorised, and a germinal character, the basis for the creation of new objects. For Quatremère de Quincy, who is credited with formulating the first theory of the Type, it has a character of genesis, expressed in the examples of the primitive hut or Solomon's temple, defining itself as a "pre-existing germ" or "original reason". The 19th-century author, aware of the open and multiplying nature of the concept of type, went so far as to state that 'the type is an object from which realisations can be conceived that do not resemble each other'.

Although always present when trying to build any sublimated architectural object, the best-known example of which is Viollet-le-Duc's ideal cathedral, the concept of Type, in its double meaning of deduction or starting point, once again became an important topic of theoretical debate in the second half of the 20th century, recovered as a response to the iconoclastic obsession of the modern movement.

Re-launched in an article by Giulio Carlo Argan (1963) entitled *On the Typology of Architecture*, the idea of type appears there as a structure internal to the object, underlying and schematic, then shared by Colquhoun (1981) and Raymond (1984). This concept took on great importance and was the subject of various reflections, particularly in the Italian School of urban morphology, where it held the key to the relationship between buildings and the urban fabric in Saverio Muratori (1960, 1963), Carlo Aymonino (1970) and even Aldo Rossi (1966). In the latter, the concept of type was even reduced to the formal invariants of architectural objects, assuming an essential role as an operative mode in the act of design, an understanding that took precedence over any other.

As a conclusion to the importance of type and the stabilisation of the definition itself, we refer to the article *On Typology* that Rafael Moneo (1978) published in the journal Oppositions, which clearly outlined the concept of type from Quatremère de Quincy to its use in the theoretical debates of the 1960s and 1970s. The article helped to recognise the relevance of the concept as a response to the major questions of contemporary architecture. Moneo, on the importance of the notion of type, states that it is *"an obligatory step to be able to define the discipline [of architecture] and to be able to establish a theory that supports professional practice"*. Expressing the intrinsic nature of architectural work, on the one hand always unique and unclassifiable and, on the other, part of a class of reproducible objects, Moneo makes evident the dichotomy present in the concept of type as a deductive reading and as a foundation for the project. The author's concluding definition is characterised by its great synthesis, yet it encompasses the breadth that all the authors have attributed to it.

Thus, it considers that type is "*a concept that describes a group of objects characterised by having the same formal structure*". To this extent, it refers to type not in generic categories, but in categories that group together objects, existing or to be created, with common intrinsic organisational and formal characteristics, removing many of the accessions that were based solely on the programme or building systems, for example. In line with the theoretical debate initiated by Argan, this definition of type subjects more generic categories to a finer filter, corresponding to the formal structure underlying the object.

For the construction of an atlas of buildings, the sense of type as a starting point for creation is obviously secondary, leaving it up to the reader, but above all it's worthwhile as it allows for an operation of classification a posteriori, given the existence of a set of real, built or designed objects that can be ordered.

Premises to develop an atlas of buildings

Between 2018 and 2022, the formaurbis LAB research group, from the Research Centre of Architecture, Urbanism and Design, Lisbon School of Architecture, Universidade de Lisboa, as a result of a public competition, was given the task of producing an atlas of building typology in Portugal[1], which first involved the construction of a theoretical apparatus that would then support the options for selecting

a set of representative buildings from a universe, justifying the choices and translating them graphically. The work also consisted of constructing individual building registers, comparative tables and theoretical reflection essays justifying the principles used, with innovative interpretations of the universe represented, and also opening up the potential offered by this atlas.

Thus, seven major questions were established, which became the premises to develop an atlas and which will be addressed sequentially.

The first question was to define the very subject of the atlas: the building. With the experience of previous encyclopaedic works, particularly *A Praça em Portugal. Inventário de Espaço Público/Squares in Portugal, a public space inventory* (Dias Coelho, Lamas, 2007, 2005), which had different approaches and universes, we decided to consider the building as an urban element, that is, as an integral part of the urban fabric, although understood autonomously. This approach implied an articulation with other urban elements, such as the street or the plot, but independent of aggregations that required understanding the building in the context of composite units, such as the block. Thus, the theme should include the singular building (the Theatre, the Cathedral, the Station, etc.), often of a public nature and usually of an author, but always of obvious importance as a collective value, in which society has invested and is culturally reflected. It should also include the common building (above all individual and collective housing; the serialised industrial building; etc.), most often private and not always by designers, but which makes up most of the buildings in our cities and to a large extent gives them their character. The theme also included major urban infrastructures (aqueducts, wharves, walls, etc.), which form part of the built environment, have an autonomous nature and indelibly mould the urban fabric.

The second question consisted of defining the real universe of the atlas, made up of an unquantifiable number of buildings that the work aims to represent. From the outset, we ruled out defining a universe linked to an event or a sub-theme. It didn't make sense for us to approach a selection linked to a specific period of building production, or to an artistic or cultural movement, or even an event that had given rise to a wide range of productions.

So the question was whether to consider as a universe what we can summarise as 'Portuguese Architecture' or alternatively as 'Architecture in Portugal': the first cut has a cultural and temporal meaning, i.e. it restricts the universe to a production after the foundation of nationality, leaving out an important and vast earlier production linked to the occupation of the territory by other civilisations and whose built structures and spaces were incorporated and reinterpreted after the 12th century. We would exclude, for example, the Roman wall systems, successively used for centuries and which, even after their disintegration supported the configuration of buildings until the end of the 19th century. However, we should also consider here that understanding the cultural universe would imply bringing into its scope all the architectural production that took place after the 15th century in the area of overseas expansion, where cities were produced based on the continental Portuguese matrix. Many churches built in Brazil or Portuguese India can be typologically included in the continental series with very few variations.

We, therefore, opted for a territorial cut-off, corresponding to the current boundaries of the country, allowing us to consider buildings made by cultures that have disappeared, such as the Dolmens that are still part of our landscape today or that are incorporated into religious buildings many years later. This option also allowed us to include buildings designed and even partially realised outside the country, particularly some cases of industrial constructions erected in the late 19th and early 20th centuries.

The third question concerned the definition of the representative universe, i.e. the reflection of the real universe that results from the application of a set of selection criteria and which translates into the set of examples included in the atlas. This will probably be the primary procedure in the development of the work, given that it will result in a readable, comprehensible and operationally useful work for the reader.

In this sense, we decided to select and build two different sets that correspond to two universes of representation, with graphic restitutions also at two different levels. The question of the size of the representative universe is often mentioned in architectural atlases, in order to ensure that it is useful to the reader and that it can actually be produced. In our work, we believe that the universe represented should include a set of 120 buildings, restored in detail using the classic projections for representing architecture, plan, section and elevation, as well as an axonometric perspective and photographs. The selection of these cases sought to answer not only the questions already posed about the theme and the real universe, but also questions that we are yet to address, such as focus perspectives and categories. In addition, other criteria were also considered, apparently secondary, but of enormous relevance to the selection, such as ensuring a certain representativeness of the entire geographical territory of the country or avoiding excessive temporal concentrations in certain categories. The first criterion was important when choosing, for example, the medieval cathedral to represent, out of the four that exist, and the second when representing Entertainment Halls, for example, where cases were deliberately included outside the 19th and early 20th centuries, the period in which they were mostly built.

From the beginning, we realised the imperfection of representing 120 buildings in isolation, a number that removes the possibility of a critical reading of that selection and the very operability of the atlas. A second set of cases was therefore created, comprising 782 examples that, from the representation of just one plan, floor plan or section, could constitute the essence of the comparative tables, highlighting the perspectives of focus, the categories of buildings and even, in certain cases, constructing the series and typological variants.

The fourth issue has to do with the moment when the buildings selected for the atlas are fixed and represented, both in the restricted and detailed set and in the extended set of comparative tables. In most atlases of buildings, the decision was made to fix each building represented at the moment of its architectural maturity, resulting in a collection of apparently perfect and almost ideal buildings. Some cases, as we have seen, even took this option to a more extreme level and made up the universe represented not by the buildings themselves, but by their designs.

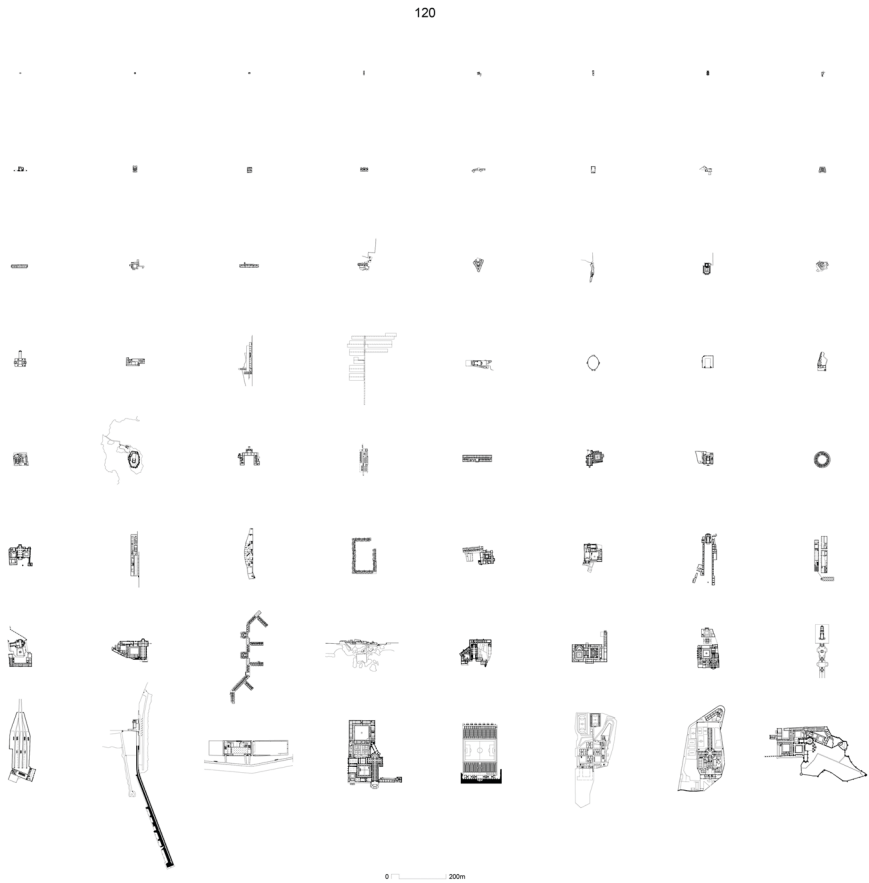

Figure 1.4 120 Buildings Table.

Source: Drawings from *formaurbis* LAB, 2022.

Naturally, while recognising the validity of the parties described, we took a very different and theoretically opposite option, since we felt it would be richer, more complex and even more useful for the current disciplinary debate if the buildings incorporated their own evolution, even if it was considered 'deforming'. To achieve this, all the examples were represented at the present time, incorporating the effects of the process of evolution to which the buildings have been subjected. In this sense, a Roman building that is now in ruins was not represented by its hypothetical reconstruction, as has become very common, but by its state of ruin. This criterion ruled out any judgement as to the value of the transformation that had taken place, but valued the representation of the result of this evolutionary process.

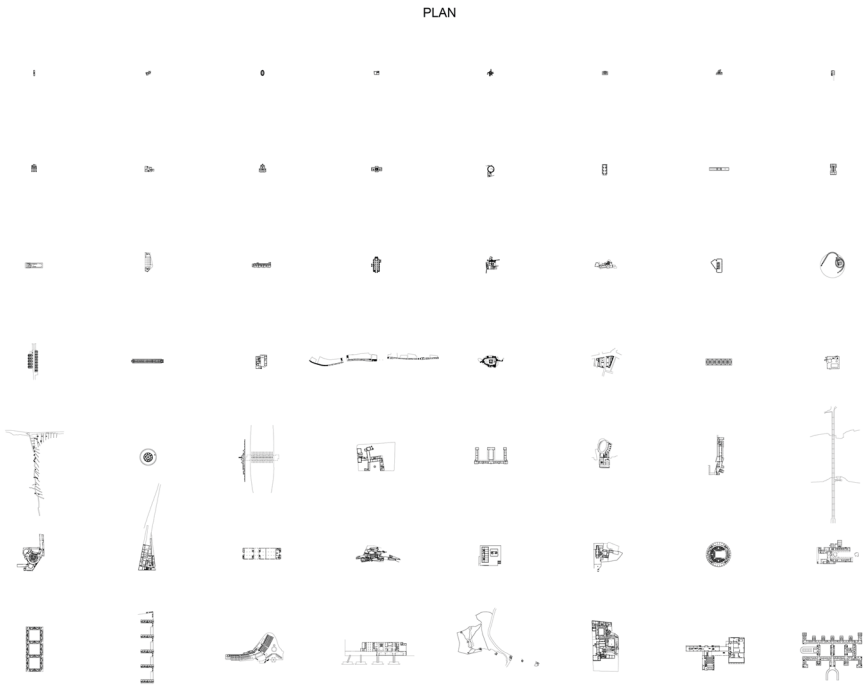

Figure 1.5 120 Buildings Table (continued).

Source: Drawings from *formaurbis* LAB, 2022.

The fifth question we tried to stabilise was the perspective from which the buildings should be grouped in the synthesis tables. Most of the aforementioned works opted to organise the categories by programme, also calling it function, or in Durand's case by what he called 'genre', a diffuse perspective that made it possible to design boards based on very different criteria, aggregating examples both by cultural origins and by time periods, among many others. Despite this, some authors have relativised the focus perspective that they themselves favoured, even saying that the story could be told in various ways (Pevsner: function; materials; and styles, Lechner: type, topos and tectonics).

The fact that only one perspective is favoured allows a large collection of buildings to be carefully arranged. However, this reduction to a single point of view limits the possibility of critical cross-referencing on the part of the reader and leads to the error of, for example, attributing the exclusivity of the building's configuration to the programme, ignoring other important perspectives that start from different circumstances that inform architectural creation, among which we have selected context and time in this work. A corner collective housing building incorporates the principles of the type, but is always a formal variant and an

exception to the rule. Equally, a building that spans several centuries and is reused successively will never be able to respond to the characteristics dictated by the programme, which will be much more characteristic of a building designed from scratch to respond to a specific function.

Naturally, these three perspectives of focus, among any other possible, are not mutually exclusive and any case selected for the collection can illustrate one, two or even all three perspectives of focus from which the work is organised. On the other hand, a building can be the direct result of a programme, if the circumstances of the project, site and time of execution allow it, but that same programme can be the object of very different solutions if they integrate the constraints or potential of a specific urban or natural context and, equally, if they consist of a successive reuse of a heritage building that requires an adaptive interpretation. Far from constituting a confusing picture, the simultaneity of these three approaches better reflects the disciplinary richness of architecture, as well as responding more effectively to two of the themes of contemporary reflection on the discipline, such as the importance of contexts, urban or natural, loaded with pre-existing information and also the importance of utilising and reinterpreting existing building structures, both of which enhance the creative process at the heart of the project.

The sixth question that the organisation of an atlas must answer is that of the series of categories into which the three focus perspectives are subdivided. For the programme perspective, 40 categories were established, each translated into a table, which considered the following themes: Aqueduct, Bank, Barrack, Bridge, Bull Arena, Cathedral, Cemetery, Chapel, Church, City Hall, Convent, Courthouse, Cultural Centre, Entertainment Hall, Factory, Farm, Fortification, Garage, Granary, Greenhouse, Housing (individual), Housing (collective), Hospital, Hotel, Library, Lighthouse, Market Hall, Mill, Museum, Office Building, Palace, Pool, Prison, Retail Building, School, Stadium, Transport Station, Warehouse, Water Tank, Wine Cellar.

Similarly, tables were set up to include examples of buildings whose compositional structure stems from the very nature of the surrounding context. This perspective was divided into two large groups: the urban, with the categories: Square, Street, Intersection, Passage, Urban Block, Plot and Infrastructure, and the natural with the following categories: Ridge, Slope, Rock, On Water, Waterfront and Greenery.

Finally, a third set of tables was built to focus on time, organised along chronological lines and graphically referencing the buildings at the main moments of their construction and transformation. From this perspective, four categories were considered that best characterise the action of time on each building, namely: Addition, Subtraction, Metamorphosis and Ruin.

The non-exclusive nature of the categories would allow for duplicate representations of the same building on different tables, but we chose to represent each case only once, leaving the reader free to make these theoretical simultaneities.

The seventh and final question that the atlas should answer is the controversial issue of type, naturally taken here in the strict context of the definition transcribed above. The arrangement by type was only carried out when the number of cases

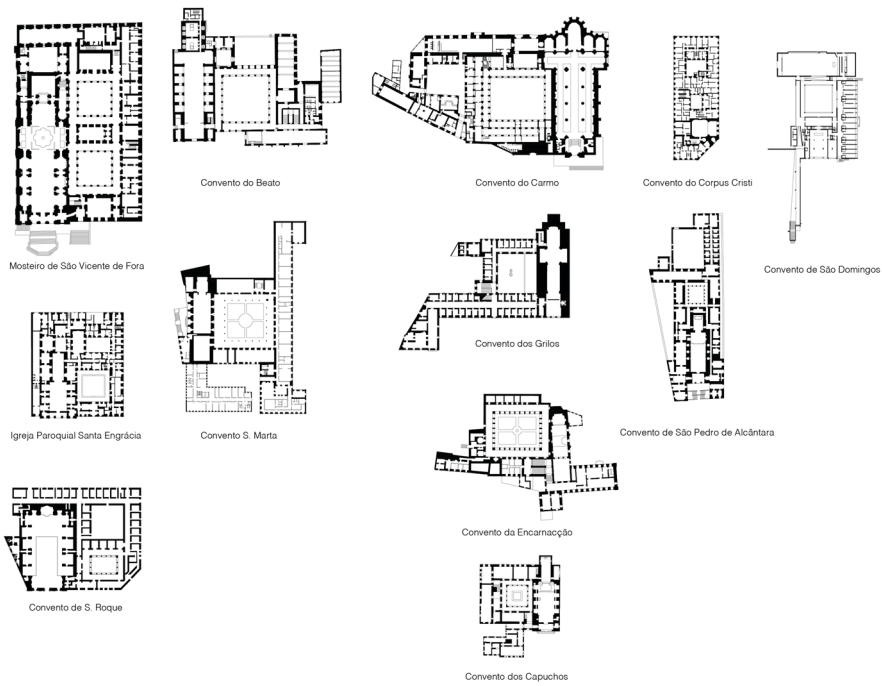

Figure 1.6 Comparative Table: Convents.

Source: Drawings from *formaurbis* LAB, 2022.

was sufficient for the organisation of boards structured in typological variants, such as the category of individual and collective dwellings, organised by active fronts and location on the plot, or the board of the chapels category, arranged by generative forms. The fact that some boards are not organised by type is due to the fact that it is not possible to find an internal structure common to the various examples, or simply due to their lack of numbers. For example, the fact that there is only one parliamentary building with hemicycle rooms in the universe represented – the Assembly of the Republic – does not allow for the creation of a typological series in the atlas universe, but it does exist if we consider similar buildings with the same characteristics, such as the Palais Bourbon, seat of the French national assembly, or the Palazzo Montecitorio, seat of the Italian Chamber of Deputies.

An open reading

This Buildings Atlas is part of a larger atlas project, both as a whole and in each of its constituent parts, aims to satisfy three main objectives. The first is to provide a didactic and pedagogical tool for the study and teaching of architecture and

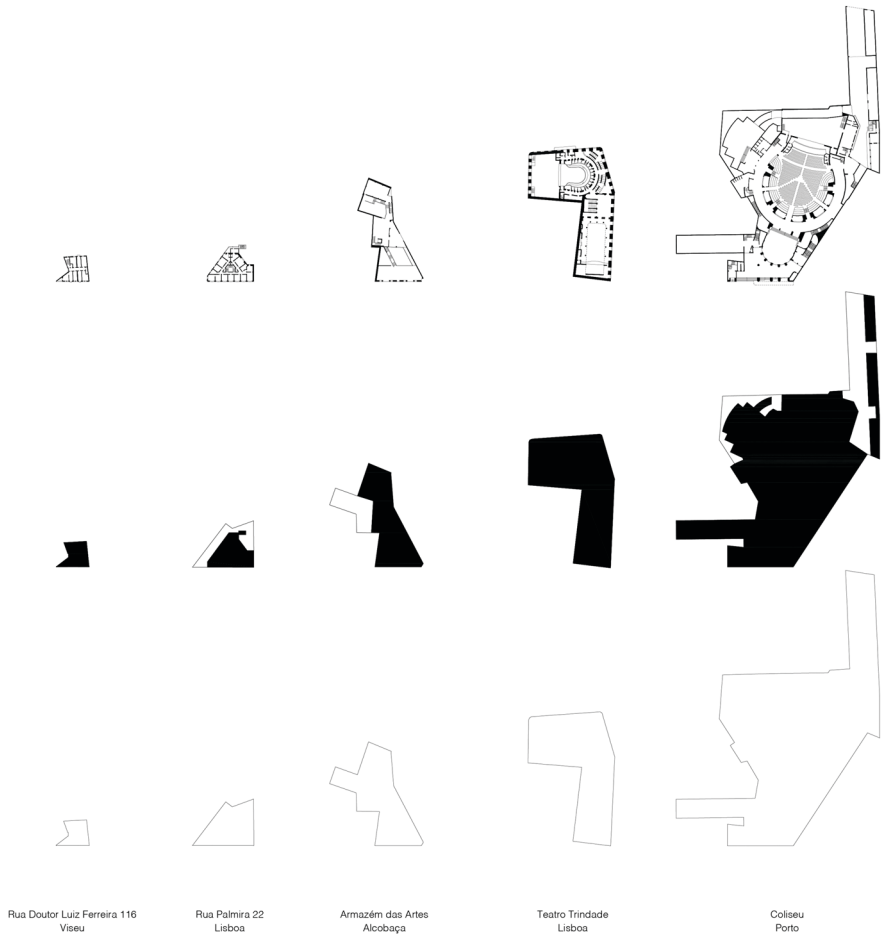

Figure 1.7 Comparative Table: Plots.

Source: Drawings from *formaurbis* LAB, 2022.

urbanism that will prove as fundamental as cartography itself. The second is to provide a tool that can be used for reflection and practicing architecture and urbanism. This avoids proffering models that are immediately operational, and instead, provides types that consist of tangible, well-known examples that are dealt with in such a way that they can be taken as reference points for the conceptual stage itself. The third and most ambitious objective is to set up a thorough database of readily available, high-quality information, which will enable, to all specialists in this subject area, and to a generic public, to have access to a unique source of material for the understanding and conducting research on urban morphology topics, standing as a resource bank of material on Portuguese cities.

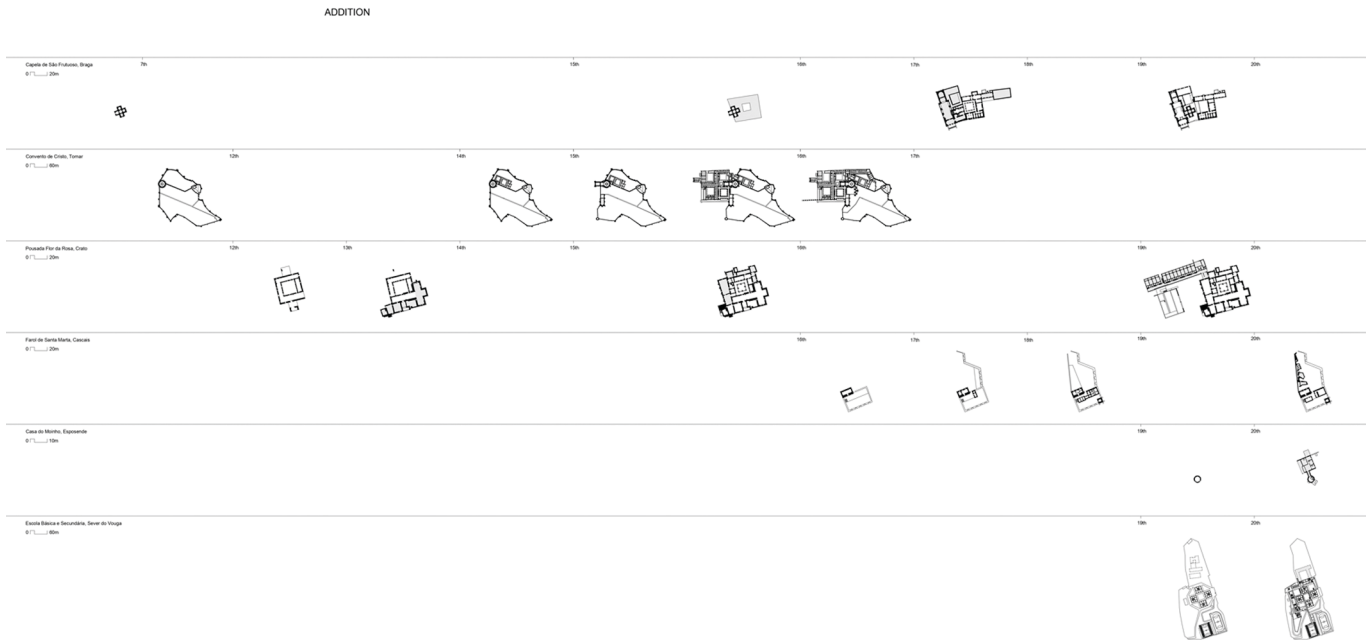

Figure 1.8 Comparative Table: Addition.

Source: Drawings from *formaUrbis* LAB, 2022.

An Architectural Atlas is a collection of objects, and every collection tells a story, and this morphological atlas intends to explain the city shape in Portugal and the territory construction itself through the buildings point of view, in a reading that is not necessarily sequential.

The importance of an atlas today is to tackle the great themes of architecture with the weapons that knowledge of the entire production of our civilisation, the basis of our built heritage that we experience daily, gives us.

Since there are no perfect histories, nor perfect collections, an atlas of buildings is intended to be subject to infinite critical readings, not only of what is inscribed in it, but also of the tools it provides us with for the creative process and the ongoing production of the built city.

Note

1 *"Building Typology - Morphological Inventory of Portuguese City"*, ref. PTDC/ART-DAQ/30110/2017 funding by FCT – Fundação para a Ciência e a Tecnologia, IP.

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Part I

Programme

2 Urban blocks made up by collective housing

Rui Justo

Avenidas: the urban block as a typological lab

The Avenidas urban block, a type that draws the city of Lisbon from Avenida da Liberdade to Campo Grande, represents a large segment of models with exclusively private use and perimetral occupation, the most common units of an orthogonal composition plan originating in the 19th century[1]. We could question the relevance of these models, which typologically resemble so many others in the city, however, they have an unusual ability to reveal a complex and diverse set of forms, especially when we look inside of each urban block (Fig. 2.1). It is here, between protrusions and recesses, that we realise the existence of a perimeter cut out by a different set of built forms, arranged side by side, isolated and in aggregation. We are dealing with an elementary occupation of the urban block and a formal manipulation of the building, a phenomenon with full expression in collective housing units, widely spread and repeated in the Avenidas urban fabric by typological series (Henriques da Silva, 1997; Madeira Rodrigues, 1979).

These collective housing forms lead us, in a first approach, to an isolated, comparative and ordered reading of the models built in the Avenidas catalogue. However, the most interesting issue lies in the house design process, which, in most of these models, is triggered by a recognition of the urban block courtyard as a city space and not just as a strictly hygienic resource (Fig. 2.2). This statement stems from an idea of a bourgeois city, with equipped and tree-lined avenues, where the generous dimensions of the urban blocks, as well as the plots, wide and deep, combined with a system of perimetral occupation, contribute to the definition of broad, airy, and illuminated interior spaces, although formally asymmetrical.

This is not a strange condition because these models are inscribed within a permissive normative framework regarding both the built typological definition and the plot's occupation structure[2]. The choice for a more open built process, without predefined types or models, led Acciaiuoli (2015:230) to initially think that the palace would build the architectural identity of the main avenues. However, the incursion into the operation of private promoters stimulated by a strong demographic pressure, triggered a progressive and broad diffusion of multi-family buildings for rental housing, commonly called tenement buildings.

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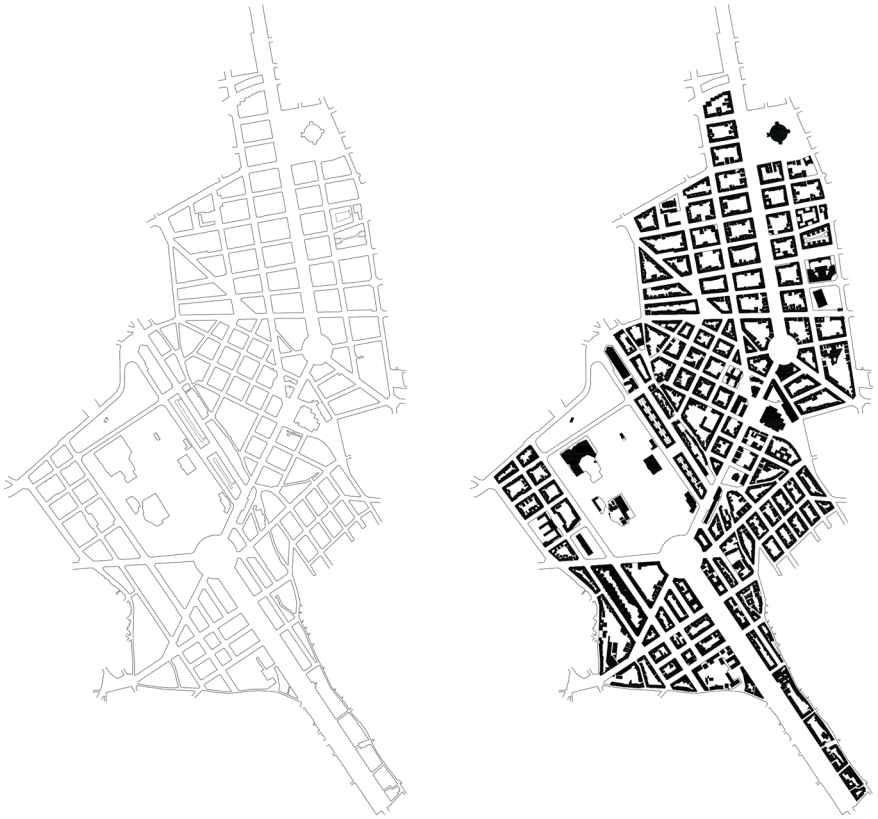

Figure 2.1 The Avenidas urban structure: urban blocks and built fabric.

Source: Drawings by author, 2023.

On the other hand, it is known that the normative framework has successive changes over time concerning the hygienic requirements in housing, influencing the plot built process and encouraging the implementation of proposals that call for a creativity and complexity exercise in the articulation of the dwelling spaces and functions, enhanced by a qualified relationship with the inner courtyard.

The Avenidas urban block shows a paradigm change in the city collective housing practices, i.e. the dwelling no longer orbits exclusively around the street, an usual tradition until the mid-19th century, but extends to the interior of the urban block (Monteys, 2013). With the recognition of the courtyard, the experience of domestic life took on a new dimension, with deep implications for the dwelling organisation. The more conventional model – a social area on the street, an intimate area in the centre and a service area at the back – evolved in

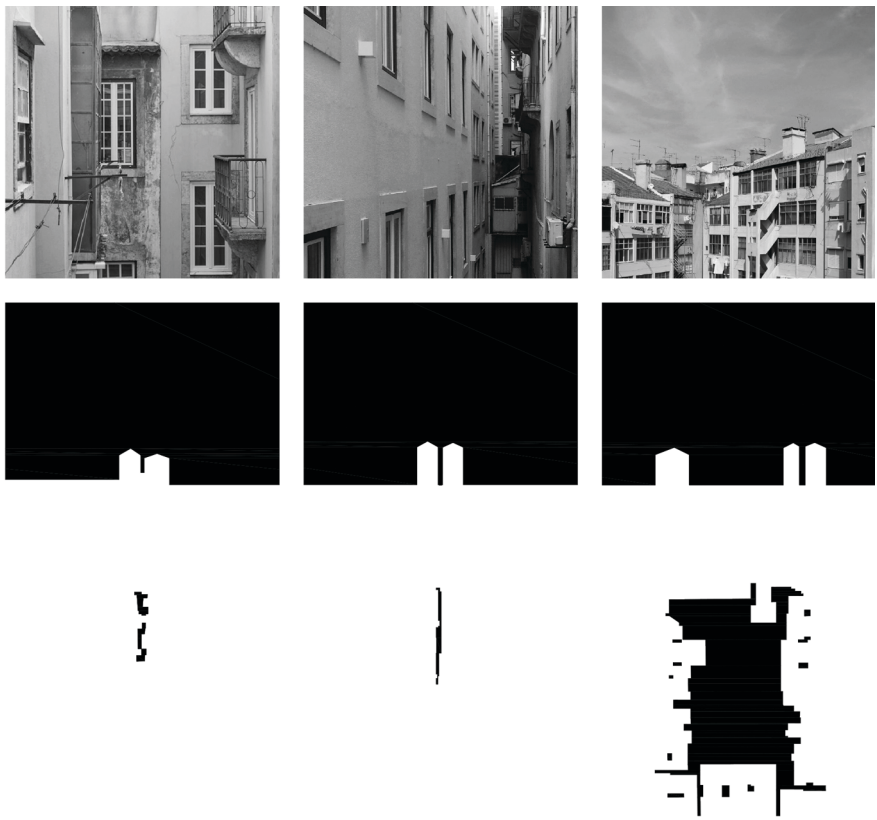

Figure 2.2 The urban block courtyard evolution in Lisbon. Bairro Alto, Baixa and Avenidas.

Source: Photographs by author, 2023. Drawings by author, 2023.

the Avenidas into a system ordered by the proximity to the façades, main and back, remaining with unequal hierarchies. In the organisation of the dwelling, the division into areas is no longer a structural condition as well as the way they are traditionally distributed, with fluctuations in the relationship of the different areas and rooms with the façades, especially at the back, when the plan unfolds towards the interior of the urban block, increasing the area of contact with the courtyard. As will be noted, this fact is inseparable from the influence of two different spaces, the corridor and the dining room, due to the structural importance they achieved in the housing organisation between the end of the 19th century and the middle of the 20th century, and then their proscription due to the adaptation of the modern house principles, centred in the optimisation of domestic life, that is, the activities and the dimensions of the space in which they take place (Fig. 2.3, 2.4).

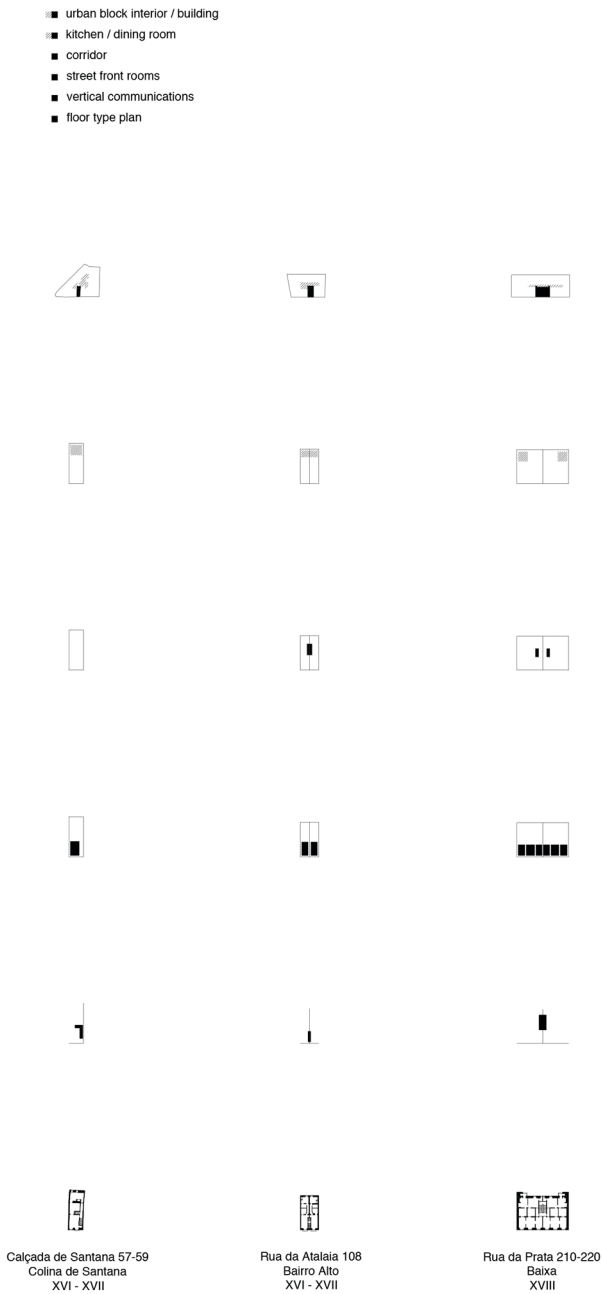

Figure 2.3 Parallels: collective housing types until the 18th century.

Source: Drawings by author, 2023.

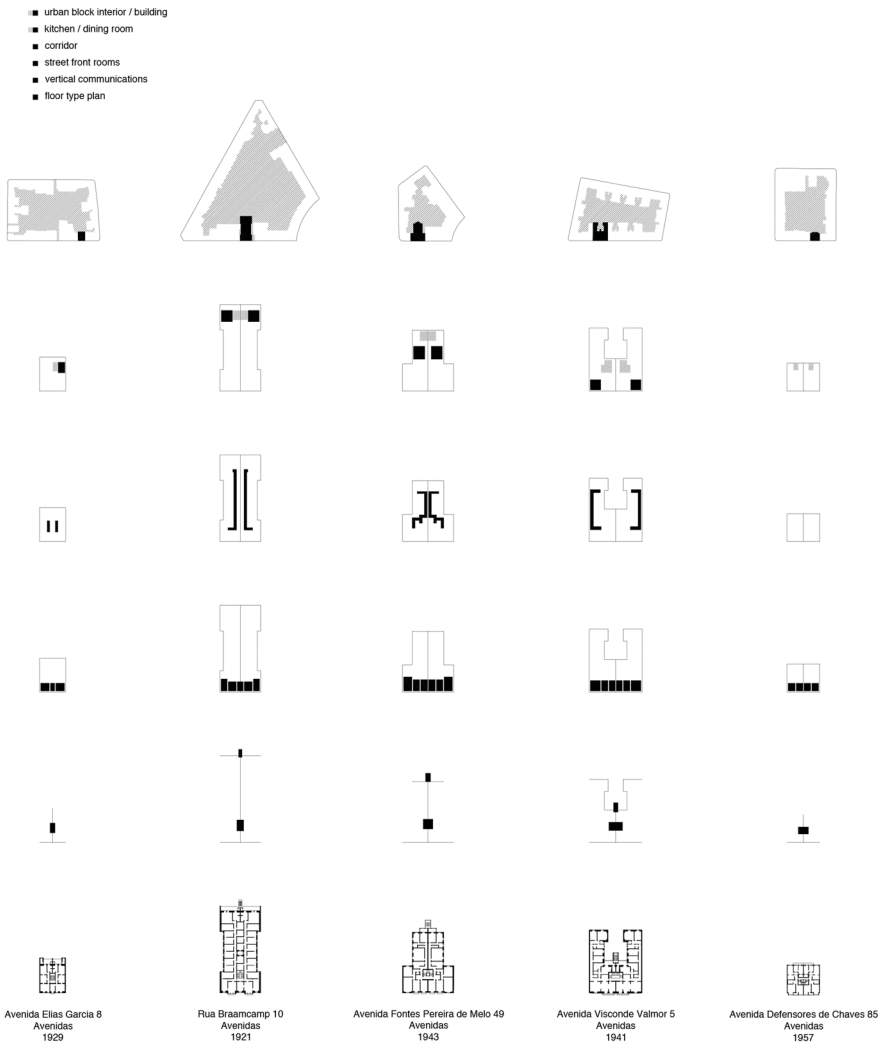

Figure 2.4 Parallels: collective housing types in Avenidas.

Source: Drawings by author, 2023.

It is based on the idea that the urban block courtyard participates, with greater or lesser complexity, in the dwelling reformulating process, that we move on to systematise, from concrete models, the typologies that crystallise the Avenidas collective housing evolution. Five fundamental types were identified: the compact and deep building; the airshaft building; the "rabo-de-bacalhau" building; the U-shaped building; and the compact and narrow building.

Compact and deep building

The compact and narrow building corresponds in the Avenidas to a segment of collective housing models built between the end of the 19th century and the 1930s, a formal successor of the urban production before the 1755 earthquake, if we consider the built occupation of urban blocks structured by deep and narrow plots. This system, used in the Bairro Alto or Colina de Santana construction, regulated the deep implantation of collective housing units. Habitually, these units followed a dwelling tripartite functional organisation, with rooms either directly connected by interior doors – no. 57–59 of Santana Street (Fig. 2.3) – or indirectly by small circulation spaces – no. 106 of Atalaia Street (Fig. 2.3). This scheme is interpreted both by buildings that are the result of a typological transformation process, initially allocated to one family and then converted into a multi-family building[3], and by buildings originally built to receive several families, which is at the origin of the tenement building appearance in the 17th century.

The compact and deep type of collective housing found in the Avenidas plan the space and opportunity to renew itself. The size of the urban blocks and plots will have motivated the continued use of this built type, which saw its scale adjusted to this new urban reality.

It is in the dwelling organisation that we see the biggest changes in this type of building, with functional segregation being replaced by a system of spaces distributed according to the façade planes. We should note, at first, the influence of the dining room appearance as an autonomous space and an essential part of the domestic social apparatus and, otherwise, the establishment of this room on the rear façade, above the interior courtyard, alongside the kitchen room. The family's "exhibition" spaces are thus no longer confined to the rooms on the street front. With the addition of the dining room, it takes place at the two ends of the dwelling, structurally linked by a linear corridor that follows its depth, ordering at the same time the sequence of interior rooms linked to the intimacy part of domestic life. The dwelling identity is therefore revealed by the façade rooms and the corridor that connects them (Dias Coelho, 2018:68–69).

This structure is repeated both in narrower-fronted buildings, with one dwelling per floor, and in wider-fronted buildings, with two symmetrical dwellings per floor. In both cases, the access to the dwelling is ensured by a column of stairs that occupies the space immediately after the first row of rooms on the street front. Regarding the access to the dwelling, two references should be made, the first to the independent, a room that occupies the gap between the main façade and the staircase column, from which it can be accessed autonomously, that is, without having to communicate with the dwelling, although this connection is maintained and mediated by one of the main façade rooms. The function of this space is determined by the needs of those who live in it, interfering directly or indirectly in the activities of domestic life. The other reference concerns the integration and consolidation of a second entrance to the dwelling, motivated by service functions, which justifies its placement next to the kitchen room, but also by preventive fire events, which will justify its exposure to the outside.

It is relevant to mention a few notes regarding the interior rooms, which are fundamentally intended for the intimacy of family life. While the models described, with blind side walls, show the presence of one or, at most, two interior rooms, ventilated and lit indirectly by the exterior façades, there are other models, equally compact, but deeper, in which the increase in the number of interior rooms is made possible by the opening of windows in the side walls, generating a form disconnected from the adjoining buildings – no. 4 of Berna Avenue (Fig. 2.5). The reference to this model, emblematic in the Avenidas, serves as a prologue to an incursion into the deep building manipulation, based on typological variants that explore the potential relationship with the interior of the urban block.

Airshaft building

The airshaft building is one of the ways in which depth construction evolved and is certainly the most reproduced and representative of the Avenidas, with models produced between the end of the 19th century and the 1940s. The apparent presence of these models, centred on the airshaft device, is mainly noticed by those who live in them and only an aerial perspective or a simple observation of the city plan can reveal how significant is the number of units built in the Avenidas. It is revealed by the endless number of uncovered interior spaces that punctuate the urban blocks roof planes, inscribed either between adjoining buildings, in a logic of symmetrical and asymmetrical association, or isolated on the blind side wall and/or in the centre of each building. These vertically proportioned spaces strategically pierce the building's volumetry with the specific purpose of ensuring lighting and ventilation for spaces that do not benefit from a direct or indirect relationship with the exterior façades, which includes rooms belonging to the dwellings as well as circulation and access areas to them (Arenga, 2009:75–76) .

The airshaft device is thus the result of an opportunity to make possible depth dwelling solutions, while guaranteeing regulated hygienic conditions. It allows to increase the number of interior rooms in the dwelling, depending on the airshaft proportion. Although we can see the presence of airshaft devices in narrower buildings, with blind side walls of around 20 metres, there is a tendency to be found in deeper buildings, with blind side walls dimensions of up to 45 metres – no. 97 of República Avenue (Fig. 2.5).

The built models comparative reading reveals five variants: with one side airshaft – no. 63 of Castilho Street (Fig. 2.5); with two asymmetrical side airshafts – no. 97 of República Avenue; with two symmetrical side airshafts – no. 202 of Liberdade Avenue (Fig. 2.5); with two symmetrical side airshafts and a central one – no. 10 of Braamcamp Street (Fig. 2.5); and with only one central airshaft – no. 72 of Rodrigo da Fonseca Street (Fig. 2.5). From the universe analysed, we can see that in asymmetrical configurations, with only one side airshaft or with two distinct side airshafts, the building organisation presupposes the aggregation of one dwelling per floor. When the composition of the building is based on a symmetrical formal matrix, interpreted by the side and central airshafts, simultaneously or separately, the aggregation follows a scheme of two dwellings per floor, in a left-right system[4].

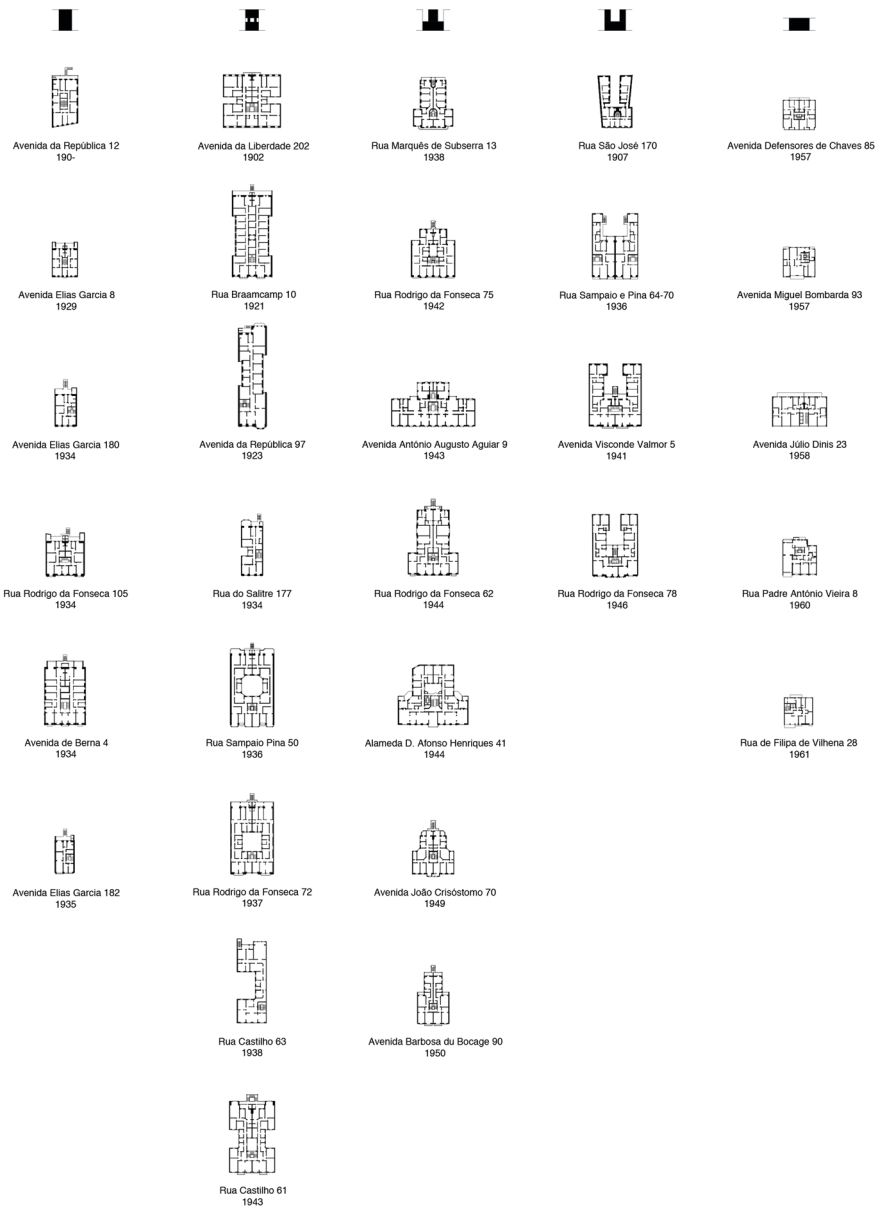

Figure 2.5 Parallels: collective housing types and models in Avenidas.

Source: Drawings by author, 2023.

The disparity between airshafts, especially in size, reveals its importance and nature in the dwelling organisation process, i.e. in the spatial and functional determination of the interior rooms that they aggregate. When the size is smaller, the airshaft essentially serves small domestic service rooms such as the storeroom, the "maid's room" and hygienic rooms. When the size is larger, the airshaft brings together interior rooms linked to the family intimacy sphere. In any case, the airshaft devices are often connected both to the dwellings' common access column or circulation corridor.

If we look at the dwelling's internal organisation, we find structural and functional affinities with the previous type, which had a compact and deep configuration. The two types combine deep dwellings in a front-to-back system composed of a bipolar structure divided by the main and back façade rooms and linked by an extensive interior corridor. The functional organisation of the front and back rooms is maintained, where the dwelling reception areas, the living room and dining room, respectively, diverge. What distinguishes this type from its predecessor is precisely the inclusion of the airshaft device, which assumes a central position in the definition and distribution of the interior rooms and, at the same time, defines the dwelling identity.

"Rabo-de-Bacalhau" building

The "Rabo-de-Bacalhau" building, a name generalised due to its T-shaped footprint, corresponds to a new stage in the depth construction evolution, with clear hygienist concerns. It is presented as a critical alternative to the airshaft building, which is supposedly unhealthy. Even so it seems to find inspiration and meaning for its shape in this device, equivalent to a theoretical scheme of opening the side airshaft onto the urban block inner courtyard.

These models, organised in a left-right system, are recognisable in the city's form by their characteristic cut-outs inside the urban blocks, especially when they are aggregated, adopting design principles that are inversely analogous to the French *boulevard à redans*, with the built front cut out over the street (Cohen, 2013:81, 90–91). The theoretical validation of the "Rabo-de-Bacalhau" is not known, but the built reality reveals clear approximations to the layout of this model. Appleton (2018:73) identifies, among others, the now-defunct "Stuyvesant" building project, also known as "French Flats", built in New York at the end of the 19th century. Designed by the architect Richard Hunt, the building is the result of a double T-shaped footprint, each one combines two separate dwellings in a left-right system with independent accesses, communicating only on the first floor. The dwellings organisation reveals significant structural and functional similarities with the Portuguese model.

In Lisbon, the production of T-shaped buildings began to be noticed in the second half of the 1930s and continued until the 1950s. The recurrence of this model in the Avenidas is more scattered and therefore not as expressive as in contexts such as Actores and Areeiro neighbourhoods, where this form is widespread. In fact, it was

in the scope of the plans and projects for the "area between D. Afonso Henriques boulevard and the railway line", led by the city council's technical offices, that the "Rabo-de-Bacalhau" type was introduced, applied to the composition of the urban blocks located to the south of this operation (Appleton, 2018). This solution was later transferred to the Avenidas urban blocks, where it was reproduced from individual and overall projects, in a logic of modular repetition – the urban block between António Augusto Aguiar and Sidónio Pais Avenues; and the urban block delimited in one of the corners by the Marquês de Subserra Boulevard and Artilharia 1 Avenue.

The choice of the "T" configuration thus seems to be the result of two essential desires: to maintain deep built practices, in line with the wishes of private promoters, and to optimise the entry of natural light and air into the building. The volumetric translation of these wishes is summed up in the definition of two perpendicular parts: one at the front, arranged to reinforce the exterior alignment of the urban block; and one at the back, developed in depth for the inner courtyard and detached from the adjoining buildings. This composition creates two lateral courtyards open onto the interior of the urban block, a particularity that is structural in the organisation of this housing model.

Regarding the functional vocation of the building parts, we can detect the existence of principles that are transversal to all models, regardless of their form; however, there are also notable differences in the allocation of these volumes, resulting from an inconstant relationship between the size of the street front and the building depth. Normally, the front part is made up of two sections of rooms, one overlooking the street and the other inside the urban block. These sections accommodate both social and intimate functions, with the specificity of the bedrooms also being positioned on the main façade rooms. In any of the models, the building part over the courtyard accommodates the domestic service rooms, including the kitchen, positioned at the far end of the dwelling and linked to a second access staircase, the "maid's room" and a set of rooms to support family activities. The accumulation in this building part of rooms linked to other spheres, such as the social and even the intimacy, is directly associated with the possibility of increasing its depth.

The functional oscillation between volumes seems to make sense in the positioning of the dining room, the room that resolves the link between the domestic service, to which it is added, and the other functions of the dwelling. This condition is particularly relevant if we see that these models are transversely ordered by a corridor, which, at moments of formal articulation of the building and functional articulation of the dwelling, shows breaks in its direction.

In the shorter-tail models, the dining room is usually integrated into the front part of the building, in the innermost section and in a position of articulation with the rear part. In these cases, there is a volumetric correspondence in the dwelling functional segregation, with the services allocated to the back part and the social and intimacy areas to the front – no. 9 of António Augusto Aguiar Avenue (Fig. 2.5). On the other hand, when the tail tends to gain depth, the dining room moves to the back and can take one of two positions: in articulation with the front – no. 7 of Guerra

Junqueiro Avenue (Fig. 2.5); or away from the front, accompanied by rooms linked to the intimacy sphere of the dwelling – no. 62 of Rodrigo da Fonseca Street (Fig. 2.5)[5].

It is important to mention, outside the radius of the Avenidas and the most representative variants of the "Rabo-de-Bacalhau", a model with unusual characteristics in Lisbon, rarely repeated and opportunely revealed by João Caldas (1997) – no. 41 of D. Afonso Henriques boulevard. It reproduces the usual T-shaped footprint, but internally it shows the unique presence of a central airshaft that brings together the dwelling circulation and hygiene functions. Even so, the great interest of this example lies in the functional vocation of the two parts that organise this building, with a radical inversion of the conventional system: the back part is entirely reserved for the dwelling intimacy; and the front is divided between the service functions, in the innermost section, and the social functions, concentrated in the section above the street, with the inclusion of the dining room. With this, the tripartite functional system is recovered, albeit in a different layout to that presented by the compact and deep type prior to the Avenidas experience. In the context of in-depth building forms, this unique example takes us back to an intermediate stage between the traditional "Rabo-de-Bacalhau" and the U-shaped building, if we consider that it follows the "T" configuration and incorporates the tripartite organisation system of the second one, as will be seen below.

U-shaped building

In this sequence of depth variants, it remains to reveal the U-shaped building, a collective dwelling type organised in a left-right system and with a notable presence during the 1940s, although there was an atypical model built in the first decade of the 20th century – no. 170 of Rua de São José (Fig. 2.5). Even though the occurrence of U-shaped buildings also manifests itself through individual projects, it is in the overall projects that they achieve some notoriety. We can include two unique examples in the city, one in the Avenidas area – the urban block between Defensores Chaves Avenue, António José de Almeida Avenue, D. Filipa de Vilhena Street and Visconde Valmor Avenue – and the other in Campo de Ourique – the urban block between Sampaio Bruno Street, Almeida e Sousa Street, Azedo Gneco and Coelho da Rocha Streets. When you look at any of these urban blocks, the *à redans* shape of their inner perimeter stands out, drawn by the lateral aggregation of U-shaped models (Cohen, 2013:81, 90–91). The succession of spaces created by cutting out the interior shape of each urban block is in this case closer to that imagined by Eugène Hénard for the *Grand Boulevard du Paris*, if we consider that these courtyards are crossed by interior streets that give access to them, mediating a second entrance to the dwellings.

The U-shaped building is, like the "Rabo-de-Bacalhau", generated from a principle of optimising the building's hygienic conditions. In practice, it is yet another model that seeks to impose itself as an alternative to airshaft buildings, depreciated by hygienist critics. Its "U" shape alludes in theory to an evolution process of the precedent model, if we conjecturally consider the design of the central airshaft

opening onto the interior courtyard, as has been speculated for the "T" shape, in this case from the side airshafts.

Despite the obvious conceptual affinities, there is a real division in the way these two models are laid out, marked by an inversion in the logic of occupying the interior space of the plot. In the "T" shape, the interior cut-out for natural lighting and ventilation is made by the building side wall, opening two side courtyards. In the "U" shape, the cut-out is made from the back to the centre of the building, opening a central courtyard, formed on the sides by two built parts that are connected to the front street part. Regarding this, it is important to emphasise a widespread idea: its re-entrant shape is similar in plan to the *cour* of an 18th century *Parisian hôtel particulier*, an interior courtyard defined laterally by one or two wings of rooms connected to a main part, in this case facing a garden (Monteys, 2013). It is on the *cour* that the dwelling service functions are developed, a particularity that is also echoed in the Portuguese model.

Recovering an idea that has already been announced, the U-shaped building variant adopts a new tripartite organisation scheme in any of the known models, thereby introducing major transformations in the functional dynamics of depth dwellings, with effective volumetric correspondence. The social functions and, of particular interest, the dwelling service functions are allocated to the front part, while the rooms linked to intimacy are reserved for the two back parts. The position adopted by the kitchen, service staircase and other rooms to support domestic activities is of great curiosity here, since in this model they no longer occupy the back end of the dwelling, an invariable feature in previous models, but occupy a position in the front part of the building, further inland and on the re-entrant courtyard. This position marks a structural division in the dwelling organisation, between the place of intimacy at the back, organised by a linear sequence of rooms that are accompanied in their depth by an extensive corridor, and the place to receive, organised by a sequence of rooms on the main façade. In this new layout, the dining room takes on a position it had not previously reached, next to the social areas and facing the street.

In terms of the U-shaped building variants, a reference should be made to numbers 64–70 in Sampaio e Pina Street (Fig. 2.5), as it exceptionally breaks away from the traditional left-right system and adopts a layout of two separate dwellings per floor, served by independent staircases, in a symmetrical composition. Despite this structural difference in the dwelling's aggregation, the internal organisation still follows the same tripartite functional model as the most common ones. The number 170 of São José Street (Fig. 2.5), from the beginning of the 20th century, has the particularity of the dining room being located in the inner section of the front part, in line with the kitchen and away from the main façade, which can be justified by the small size of the street front.

Once the U-shaped building variant is known, this concludes the tour of the forms of collective housing developed in depth, in other words, the types that dominated the building process in the Avenidas during the first half of the 20th century. The existence of extensive areas of urban blocks, organised by a structure of wide and deep plots (Fig. 2.6), together with the lack of limits on the building

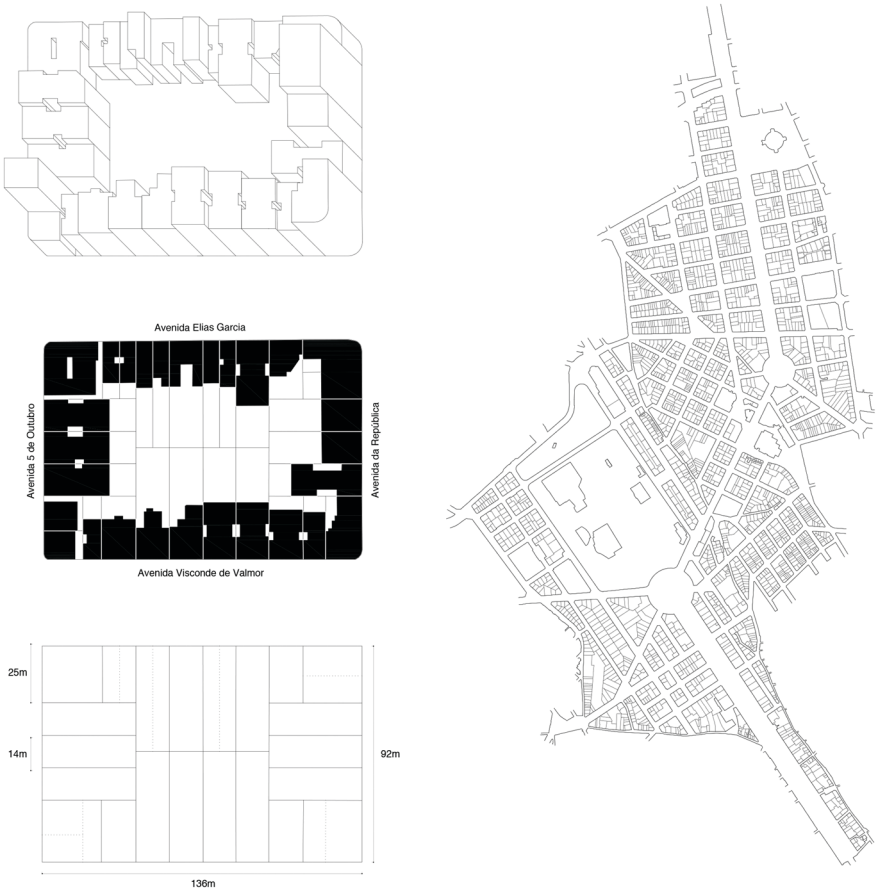

Figure 2.6 The plots structure as increment of order in Avenidas.

Source: Drawings by author, 2023.

depth, which was established by rules that were not very strict when it came to the size of the interior courtyard, favouring the exploration and proliferation during this period of models that aggregated deep dwellings.

Compact and narrow building

With the publication of the general building regulations "Regulamento Geral das Edificações Urbanas" (RGEU) in 1951, in-depth construction was severely restricted. The update introduced by this regulation imposes significant changes to the hygienic conditions applicable to combined buildings, which are now more demanding in terms of the dimensions imposed on interior courtyards. The

Figure 2.7 The regulation of the built structure depth.

Source: Drawings by author, 2023.

building form will necessarily have a narrower side wall, which naturally restricts the airshaft use, although it is not explicitly forbidden, unlike what happened in the city of Porto through regulations published in 1956 (Lameira, 2017). In Lisbon, we can infer that the airshaft extinction is implicit in the imposition of specific limits on the depth of the building, set by complementary orders to the RGEU: in 1955, which established the maximum limit of 12 metres of depth for certain areas of the Avenidas; and in 1960, which updates the maximum limit to 15 metres, applicable to the entire area of the city of Lisbon. These provisions establish the compact and narrow building type (Fig. 2.7).

The production of these new collective housing models came at a time when attempts were being made to implement the prescriptions of the modern movement,

which had already been consolidated and disseminated both in international architectural and urban forums and in the practice of rebuilding European cities after the Second World War. In Lisbon, the RGEU will probably be one of the most symbolic manifestations of this attempt, making possible the application of the modern building programme, especially the denial of the corridor street and the private urban block. The evidence of its effective application is negligible in the city's form, with the existing urban tradition prevailing. It is in domestic organisation that the greatest influences of this movement can be seen, with certain attributes of the modern dwelling being introduced with varying degrees of tangibility: the search for greater spatial and functional efficiency in the dwelling; the differentiation between intimacy and social spaces; and the denial of rooms considered dispensable, such as the corridor or the dining room, which were now integrated into the emerging and nuclear space of the living room, where the functions of eating, living and circulating converged.

These housing models with narrow side walls thus appear as the product of a built and domestic environment updating in the city of Lisbon, especially during the 50s and 60s of the 20th century. This trend finds great expression in the Avenidas. Within the models analysed we can recognise the existence of two variants, also defined by Agarez (2009): the models with one to two dwellings per floor, aimed for middle and upper classes families; and the models with two to three dwellings per floor, for lower class families. It's interesting to see that these variants reveal different approaches and adaptations to the principles that define the modern dwelling. It is in the models designed for lower-class families, with more needs for spatial optimisation, that we can best see the interpretation of modern prescriptions.

If we look at the first variant, it is the one where we see the greatest ideological clash. This is reflected on the one hand in the weight given to the service functions of the house, which include the same nature of rooms as bourgeois dwellings – kitchen, "maid's room" and other spaces to support domestic activities. On the other hand, there is still some resistance to the autonomy of the dining area, and its position next to the kitchen is still recognisable, in certain models more prominent – no. 93 of Miguel Bombarda Avenue (Fig. 2.5) – and in others more diluted and reduced, in the continuity of the living room – no. 8 of Padre António Vieira Street (Fig. 2.5). These differences contrast with a transversal tendency for the service areas to be located next to the access columns, on the inside of the urban block, usually with their own entrance. The dwellings intimacy functions tend to occupy the rooms on the main façade, although there is also at least one bedroom on the back façade in some models.

In the second variant, where the living areas are more limited due to the aggregation of two or more dwellings per floor, there is a noticeable reduction in the dwelling spaces and with it the affirmation of the living room as the only space where the collective activities converge, eliminating the dining room and the corridor – no.14 of Conde Redondo Street (Fig. 2.5). On the other hand, the dwelling's service functions tend to be centralised in a single room – the kitchen. The dwelling's places of intimacy oscillate between the rooms facing the street front and those facing the interior of the urban block. This variant is perhaps the closest to the pretensions of the modern house.

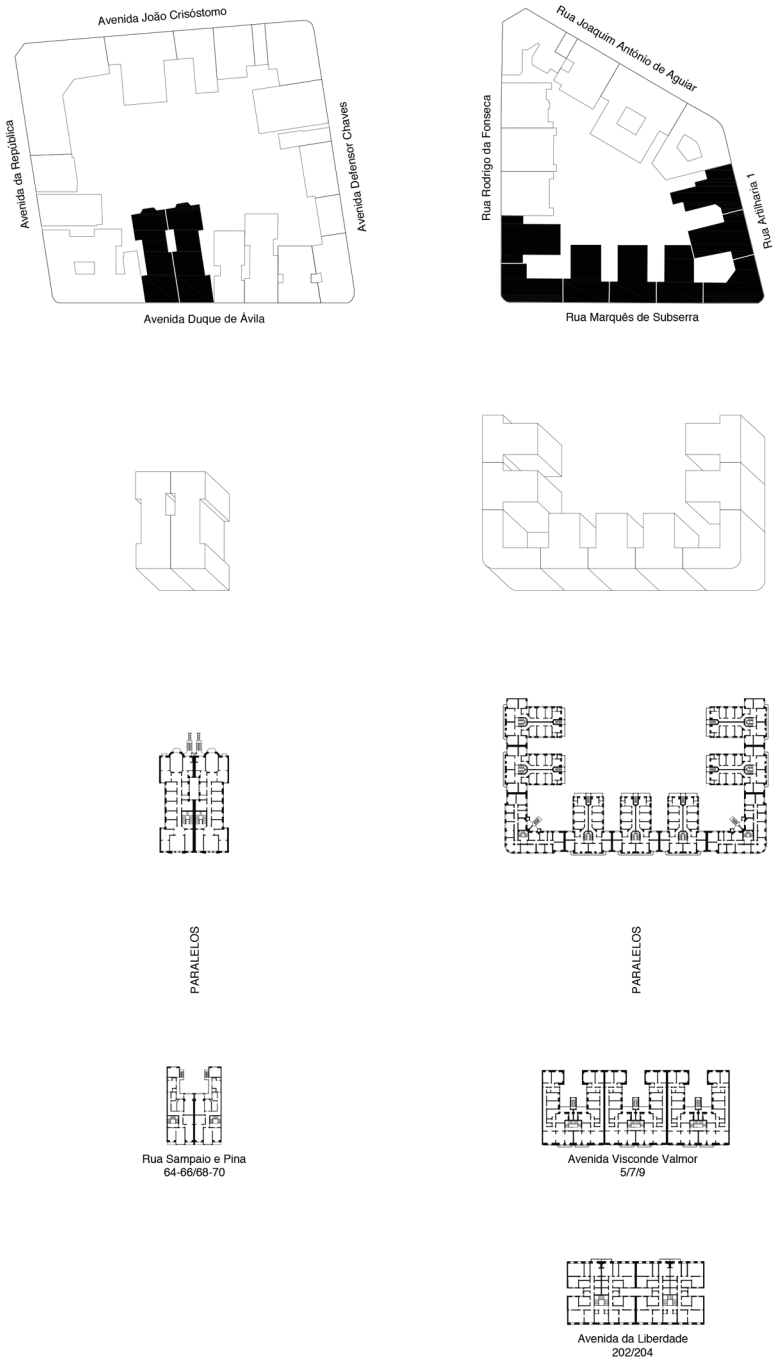

Figure 2.8 The building as an element of composition.

Source: Drawings by author, 2023.

It is important in this sequence to mention the number 23 of Júlio Diniz Avenue (Fig. 2.5), as it reveals a series of particularities within the models analysed. The first concerns the generous size of the street front, which is 23 metres wide, a circumstance that tends to gain expression in the city with the limitations introduced to the depth of the side walls. The second refers to the compatibility on the same floor of the two variants of this type of housing. The last is related to the position of the vertical access column, which in this case occupies the front of the main façade, a phenomenon that also resonates with other contemporary models.

These collective housing models are a sign of a trend towards the transformation of domestic space, which, despite the known limitations of application and ideological interpretation, still serve today as a reference and a lesson for the new forms of the contemporary home, now oriented to solutions that point for spatial and functional versatility.

This passage through the forms of collective housing thus reveals how the Avenidas urban block allowed and still allows for the exploration of new forms of dwelling organisation, making it one of the most paradigmatic examples of formal diversity in the city, but also the most elementary. This means that the interest or particularity of this more conventional type, of private use and perimetral occupation, does not lie so much in the way it allows the city to be designed, but rather in the way it internally allows the exploration of different plot occupation models, based on the aggregation of typological series or through the repetition of a type or even the same model (Fig. 2.8).

As we have seen, the diversity of forms that this urban block summons up is stimulated by an idea of the city that assumes the courtyard as an urban space, with qualities that place it on a level of relationship with the built fabric that is very close to that of the street. In Avenidas, this condition is decisive in the forms of spatial and functional organisation of the dwelling. However, it should be understood as the first stage of an evolution that will prove to be more complex and richer between the courtyard, the collective housing forms and the city, as has already been announced in this context through the opening of the interior of certain urban blocks to the city.

Avenidas: the ground zero of Lisbon diversity

When we move further away from the Avenidas, we immediately perceive the complexity of the courtyard evolution in the city, with a set of examples that explores new forms of use and occupation of the urban block interior. The urban block thus evolves from the formula that made it one of the main generators of urban fabric to configurations that use it, manipulating it in the search for alternative solutions for organising the city. The results are simultaneously different and analogous, considering that the urban block admit with some autonomy multiple experiments, conceptual and operational, without losing the link with the form of the city, contrary to what is explored in some operations linked to the Modern Movement and other contemporary's projects in which the concept of an urban block is diluted or simply absent.

Despite the collapse of modern urbanism, as it was clearly disconnected from the form of the city, the idea remains that this current, oriented towards

the efficiency of collective housing units, is not at all indifferent to the experimentalism of the urban block. In fact, it may have awakened the potential for relationships that can be established between the urban block, the public city and private dwelling. The Lisbon urban fabric reveals concrete examples where the theme of the modern collective housing unit is designed from the dialogue between building typology, interior spaces and the shape of the city, using the urban block as a link and structuring element in the exploration of different relationships between full and empty, open and closed, public and private spaces. The urban blocks of Avenida Infante Santo, in Estrela, and Estacas, in Alvalade are paradigmatic examples of the phenomenon.

On the other hand, the city reveals models where collective housing typologies move away from modernist conceptions, linked to a declared functional predetermination and the application of the concepts of family-type, dwelling-type and building-type. Thus, the design solutions created suggest greater spatial, formal and compositional diversity and flexibility, already aimed at pressing issues of an unstable society that demands alternatives to stabilised ways of inhabiting the city. The urban block in the urban structure of Telheiras fits into this typology – between Professor Henrique Vilhena Street, Professor João Barreira Street, Professor Dias Amado and Professor Francisco Gentil Streets. This unit maintains the traditional perimetral occupation, however, it reveals several particularities: the interior of the urban block is private but for collective use of the plots, being occupied by a tennis court, playground and tree-lined parking lot. It is partially permeable to view from the street through the private passages next to the stairwells and more clearly from the northeast corner of the urban block due to the absence of buildings there; the perimetral occupation is formalised by a linear block, broken by vertical columns of stairs that divide it into a sequence of parts with different types of collective housing. These parts include gallery system, left-right system and even dwellings with direct access from the street, but also dwellings aggregated by floor and in duplexes within the same formal structure.

That said, Lisbon thus presents itself as an exemplary space for practicing and manipulating the design of the urban block, displaying an infinity of models that formally denounce the creative capacity that this element achieves in the urban fabric production process. It is in the models made by collective housing buildings, the main construction unit of the city, that we truly appreciate the relationships that can be generated in the urban block, whether internally, between the elements that constitute it, or between them and the form of the public city.

Notes

1 The Avenidas plan was drawn up by Federico Ressano Garcia, an engineer for the Lisbon City Hall between 1874 and 1909. According to Henriques da Silva (1889:26), in 1879 he made the vision for this part of the city known with the presentation of the "First part of Avenidas". However, It was only in 1889 that the conditions were found for its implementation, which came about with the approval of the 1988 law regulating the expropriation process and the phased implementation of two projects - the "Project for the streets adjacent to the future Parque da Liberdade" and the "Picoas avenue to Campo Grande" (Madeira Rodrigues, 1979:72).

2 In the 19th century expansions, some european cities included normative principles for building, in contrast to Avenidas, which were regulated only by dimensions imposed on the street section and the courtyard. For example, the Cerdá Plan for Barcelona set a limit on the depth of buildings, creating blocks with regular inner perimeters.
3 Carita (1994) details the process of typological transformation that led to the proliferation of collective housing units in Bairro Alto.
4 Lameira (2017:447) refers to the left-right models, with two side airshafts, as the most recurrent until the mid-20th century due to their ability to adapt to different formal and functional orders.
5 Sara Eloy (2012:150-151) establishes four variants for the "Rabo-de-Bacalhau" type, determined from a more complex combination of parameters: the size of the building front and back volumes; the functional organisation of the rear volume; the location of the building's vertical communications; and the shape of the dwelling interior circulation.

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3 Churches

Uncanny buildings, rules and exceptions

Paulo Pereira

Introduction

Some of the Portuguese buildings built between the late 16th and 18th centuries are unusual. They constitute exceptions in a panorama marked by obedience to the dictates of the books by Serlio, Cataneo and Vignola and, in particular, to the dominant current of architectural culture in Portugal, which for ease of classification has been called "plain architecture" (or "plain style") in Portugal, sequel to George Kubler's seminal work (Kubler, 1972). In effect, a sober language prevailed that derived from ideological impositions, but also pragmatic and economic ones, a "stripped classicism" (or in our own expression) a simplified classicism), resulting, in part, from the teaching practiced in the fortification schools in a long-lasting process.

But there were disobediences. These are the ones that interest us for now: combinations and assemblies of ornamental themes or apparent structural nonconformities in the face of a simplified classicism. Later on, the advent of baroque and rocaille also brought with it literally "oblique" proposals (if we use the expression by André Corboz) as we witness an interplay of volumes on completely new plans. The paroxysm is reached in the interior of baroque temples with an original device: the step throne, located on the high altar, a fundamental element of the Catholic worship practices.

"Plain architecture"

The translation of the title of the Portuguese edition of Kubler's work dedicated to Portugal's 16th/17th-century architecture was actually contained in the very concept of "plain architecture": *Arquitetura Portuguesa Chã*, wisely subtitled "*Entre Especiarias e Diamantes*" (1st Portuguese edition: 1988) (Kubler, 1988); (last Portuguese edition: 2005)[1]. Here, Kubler shifted the centre of gravity of his research to areas that were little studied by Portuguese historiography, leaving aside the traditional periods of great artistic development, such as those of D. Manuel, the "Manueline a Portuguese variation of a late gothic, or D. João V, the "Joanin baroque" or "international baroque" (Kubler, 1988:5): he situated it "between spices

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and diamonds", that is, in the period when wealth was not abundant (less spices and no diamonds…) and when an austere pragmatism prevailed, to which were not strange, however, practical, formative but also ideological and religious constraints. It thus proceeds to an in depth analysis of "plain"[2] architecture, an architecture without apparent rhetorical effects, which neglected iconography and "representative"/"narrative" ornament, based only on "forms", almost always flat and pure. The term would expand and today one can speak – for better or for worse, it doesn't matter for now –e of Portuguese "plain style" architecture, situated between 1560 and around 1680. Early on, Kubler warns us:

> *The various histories of Portuguese architecture, like numerous histories of art. they are always written under the conviction that period, place and style are united (...) According to this venerable system, (...) each place in a period can only know one «style». /"Opposed to this notion, which links each territory to a single style, there is a more recent criterion according to which no style or category excludes the possible simultaneous convergence of many other previous categories. In any place and at any time, the artist strives to gather his materials from the past, combining and adjusting them according to his own needs and preferences./"These, in turn, are continually transformed by the fact that the artist to expose himself to the different possibilities of the past. During the period in question, architects in Portugal were not led to select and decide only between Italian examples, as possibilities from Northern Europe, Spanish, local and overseas were also presented. The resulting architecture does not easily allow a classification by mere «influence» or just through the biography of the monument.*
>
> (Kubler, 1988:4–5)

Actually, what Kubler presents to us is the existence of the architectural object within that category that he expounded so well in his other important book, *The Shape of Time*, (Kubler, 1962) where he tried to replace the notion of "style" for that of the "*class of objects*". It is clear that Kubler puts into practice the methodology that he had already exposed in that essay.

The critical fortune that accompanied this revolution sparked by Kubler's work would amplify; and this even happened in the context of contemporary Portuguese architecture (Sousa Santos, 2014). As for the study of architecture from the 16th to the 17th centuries in Portugal, the impact was lasting and there are countless studies that reflect, even if critically, the impulse conferred by Kubler's work (Horta Correira, 1991; Moreira, 1982, 1983, 1985, 1994; Pereira, 1995; Ruão, 2006, Varela Gomes, 2007a, 2007b; Lobo, 2009; Soromenho, 2009).

A treatise for "plain architecture"

From 1550 onwards, a process that closely followed the Counter Reformation began. That is what led to architecture adopting the so-called "plain style"

in Portuguese territory characterised by the solidity of its apparatus, smooth walls and sober volumes, simultaneously economic and austere in treatment, contrasting with the interior of the temples, in which an effort to produce images comforted a religion in crisis and reinvention. Departing from renaissance models it fits alongside simple typologies such as the Hall-Churches (an extension of gothic, "mechanically" understood) and the "box-church", with a single nave and pulpits located in the central sections, face to face, to offer conditions for the practice of the sermonary, which was, among all, a Jesuit practice: a "stripped classicism" so that the Espírito Santo Church in the city of Évora (1566–1574) does not have a single column but only very elementary Tuscan pilasters. It should be noted that Raul Lino (1879–1974) was one of the first to note certain constants in Portuguese architecture when assessing the sobriety of the Renaissance and seventeenth-century Portuguese classicism (Lino, 1970), concluding that:

> *This refinement manifested itself mainly in a close attention to proportions, in a distinct sobriety that sometimes borders on severity, in an exemption from the superfluous and in the general finesse of all the details. After the period in question, these qualities disappeared one after another, but it is fair to say that serious sobriety remained in the works of the Jesuits until later. Many seventeenth-century palaces reflect this incontrovertible.*
>
> (Lino, 1970:26)

What Raul Lino had just discovered was what George Kubler, two years later, would designate, with the critical fortune that is recognised, *Arquitectura Chã* (or "Plain Architecture").

At the beginning of the 17th century, this last format persisted and was even exported in colonial terms to India and Brazil. There were, of course, other Italian lines or currents for buildings that called for greater apparatus. But the "long duration" of these systems and especially of the "box churches" was a fact that did

Figure 3.1 Church of Espírito Santo, Évora (1566–1574). Façade and Side view. Plan and Elevation (adapted drawing).

Source: Photographs by the author.

not escape Kubler. The standardisation of acquired processes result, many of them, from the choices (and "schools") of military architecture. Military architecture was, moreover, a motive (and focus) for the training of architects, and at the same time an imperative given the extent of the Portuguese Empire and the pressing needs of defences in the metropolis and overseas. Despite knowing that this was not a homogeneous trend, depending rather on the creative context and commissioners, it denotes a conscious vernacularism.

In the words of Paulo Varela Gomes in a brilliant essay on "plain architecture":

> *The concept of "plain style" presented itself, in this way, as a true denial of the periphery: seeking to make certain architectures made in Portugal independent in relation to the domain of Italo-centric concepts and demonstrating the precariousness of these concepts, finally created another concept that, as such, could rub shoulders with renaissance, mannerism and baroque. Denying the centrality of Portuguese architecture, its belonging to the center, he made it the center of itself. This operation was evidently useful. It allowed for a more peaceful discussion of architectural pieces that, in the light of concepts such as mannerism or baroque, were negligible or incomprehensible.*
>
> (Varela Gomes, 2007a:281)

To stick to this tectonic tendency of Portuguese 17th-century architecture, we simultaneously perceive an attachment to the treatises of Vitruvius's Cesare Cesariano early on, and Sebastiano Serlio since 1540 and onwards.

There is, moreover, an architecture treatise for this acquired knowledge to be presented in class for training: the *Tractado de Architectura, Que Leo o Mestre, and Archit.o Mattheus do Couto o Velho, No Anno de 1631*, probably a "*sebenta*"[3] (owned by the Tinoco family, a "dynasty" of architects) (Coelho, 2018; Gomes, 2007b:124–125). The requirements found in the Treaty express well the "plain architecture" principles. The relationship with the materials, the pragmatism of the compositions of plans and elevations, walls and spans, all contribute as a written illustration of the precepts of an architecture of great austerity that is completed with the interior ornamentation. but which maintains the eurythmic sobriety in the facades and in the organisation of the volumes, not to mention issues of functional spatial distribution, whether in churches, monasteries and above all, in fortresses. The results stand out.

This is the case of the Monastery of Santa Clara-a-Nova in the city of Coimbra (João Turriano, Mateus do Couto, 1644–1696), which can well be considered the ex-libris of the "plain style", a built mass of absolutely flat expression, a sober but regulated architecture with a modicum of compositional balance. The rhythm of the pilasters, in a sequence different from that of the crevices with deeply torn windows, clearly marks a dominance that seems to reduce the theory of classical orders to its simplest expression, in a game of permeability and inventive malleability, naturally anti-classical.

Later on, this stream of compositional simplification is significantly surprising in a period of promotion of the Italian Baroque under the reign of D. João V – an

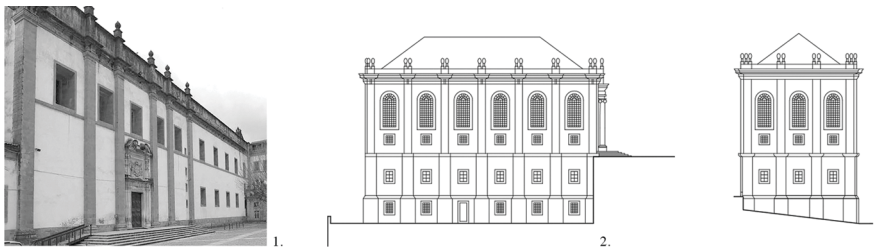


Figure 3.2 (1) Monastery of Santa Clara-a-Nova in Coimbra (João Turriano, Mateus do Couto, 1644–1696). (2) University Library, Coimbra (1717–1728, Gaspar Ferreira [attributed]). Side elevation and Back elevation (adapted drawing).

Source: Photograph by the author.

architecture enthusiast – at the University Library, Coimbra (1717–1728, Gaspar Ferreira [attributed]). It obeys to a typology of its own, being, perhaps, the first construction of its kind in Portugal, when most of the time, libraries and bookshops were accommodated in pre-existing spaces, whether in palaces or in convents. Therefore, it does not have parallels in Portugal. It is a large parallelepiped box that, moreover, looks more like a building out of the 17th-century architecture school, sober and resistant to ornament – an authentic "vault" -, more than a Baroque building in its disarming simplicity[4].

The Guarini "affair"

In view of these examples, we witness in Portugal a startling and enduring resilience to the most innovative Italian Baroque discourse. In this regard, Portuguese architecture registers a curious episode. In the album *Architettura civile* by Guarino Guarini, from 1668, is included the plan and elevation of the Church of "S. MARIA DELLA DIVINA PROVIDENZIA DE LISBONA" drawn up in 1653 and commissioned by the Teatine priests through the Marquis of Sande, with a dominant circular chancel as well as with a transept and central and side aisles marked by the regulating outline of ellipses (Varela Gomes, 2007c).

The exterior, especially the choir in its relation to the nave, would result in an unprecedented game of smooth and convex volumes, which could have eventually inspired architect João Antunes (1642–1712), all the more so since, it is said, the construction of the Divina Providenza temple actually began in *Bairro Alto* (Varela Gomes, 2007c:155). However, as it was incomplete, it ended up being razed in 1683 and replaced ten years later by a work with a discreet and completely "plain" language – practically anonymous – (São Caetano Church, 1693, Pascoal Pacheco de Lima) (Varela Gomes, 2007c:155), although it may have influenced the design of Santa Engrácia Church in Lisbon.

Against the canon

Also anti-classical was the façade of the Church of S. João Baptista, Angra do Heroísmo Fortress, Terceira Island, Azores (1642–1657/1698). It has a squat shape, with two low towers and only two floors on the façade. Two bulbous domes cover the towers. The central composition of the façade is uneven and does not follow any classical scheme. In fact, this composition has a "flat" character, as if it had been generated only in drawing and *for* drawing. But when it was turned to stone, it gained a strong, unusual anti-academic expression – as if it were upside down, as in the case of the central door, on the ground floor, with overlapping pilasters. Immediately above, on the central axis of the façade, a theory of frames develops, the first framing a cartouche with the coat of arms of Portugal with a dedication to Nossa Senhora da Conceição (our Lasy of the Conception) with two "hook" windings; the second framing a (modern) clock and a niche, flanked by extremely slender and far from canonical pilasters.

The side slices of this façade are made up of two windows, one immediately above the other, blocked by cornices that connect to the corners of the towers, crossing the decorative and architectural fields without obedience to any classical rule. On top it is crowned by a pediment with windings. It is an architectural unicum, an outstanding temple, in the literal sense of the term. From a compositional point of view, this façade is completely dysphoric. It seems to result from the assembly of architectural "leftovers", arranged at will; or a recomposition based on disparate elements, recalling ornamental examples of furniture represented in Book VII by Serlio (ed. Frankfurt, 1575).

Figure 3.3 (1) Church of St. John, Angra do Heroísmo, Azores. Façade. (2) Church of Atouguia da Baleia, Peniche. Façade.

Source: Photograph by the author.

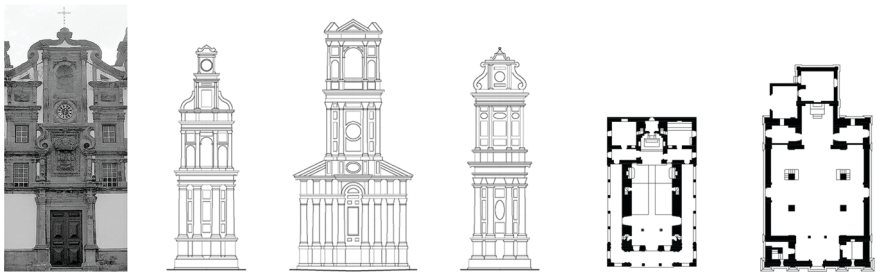


Figure 3.4 (1) Church of St. John, Angra do Heroísmo, Azores. Detail (2) Sebastiano Serlio, Ornamental examples of furniture represented. Book VII (ed. Frankfurt, 1575) (open source). (3) Church of St. John, Angra do Heroísmo, Azores. Plan (adapted drawing) (4) Church of Atouguia da Baleia, Peniche. Plan (adapted drawing).

Source: Photograph by the author.

There is a curious parallel in the Church of Nossa Senhora da Conceição in the village of Atouguia da Baleia (unknown master, 1694–1698), a pilgrimage church with a galilee and a long arcade. The façade is a true anti-canonical nonsense: a work of "amateur" invention, with unusual disproportions (the towers and their bulbous crowns) and unexpected effects (the wave of the gable). It is absolutely original and determined by an (apparent) ignorance of treatises. Even inside, it favours a regionalised authorship of scenographic effect: the beautiful-ugly, in a total instability of tectonic values: a "whale", in Atouguia… However, it has a plan calculated to the millimetre and proportioned. It is a probable creation of Manuel do Couto (adoptive son (?) of Mateus do Couto-nephew), who at that time worked on the fortification of Peniche.

Some fifty years later this penchant for whimsical invention is taking hold with impressive vigour in the Azores. It should be noted that one of the most celebrated effects of baroque architecture is the "proliferation of ornament". There is a torsion and hyper-theatricalisation of all elements, which establishes a kind of indiscipline of forms and motifs. This "organic" precept is the Church of Misericórdia of Ribeira Grande (Island of São Miguel, c. 1750) also known as the Espírito Santo Church or Senhor dos Passos Churc, on the Island of São Miguel (18th century; unknown date).

It is perhaps the "most" baroque of all Portuguese churches, with its convex façade and two doors giving access to an interior with two asymmetrical naves in an unusual but necessary functional solution, justified by the distribution of spaces between two competing confraternities. The entire façade is organised as if it were a wooden altarpiece. It is, however, made of grey vulcanic stone, in a staggering contrast to the white of the "whitewash" applied to the masonry. It is marked by an already distorted theory of a classical order, which only what is absolutely indispensable for it to be a metaphor of "classicism". Even the "knots" or "laces" of a

drapery are represented there, alongside an immense sprinkler and the holy water shell... These references, although "external" to architecture, overlap with it, creating another architecture, one of apparatus, festive and monumental endeavour in its potent rhetoric. There is a reinvention of the classical orders, as the pilasters and capitals constitute an unprecedented form, which is also found in some Azorean altarpieces.

"Voluminous walls"

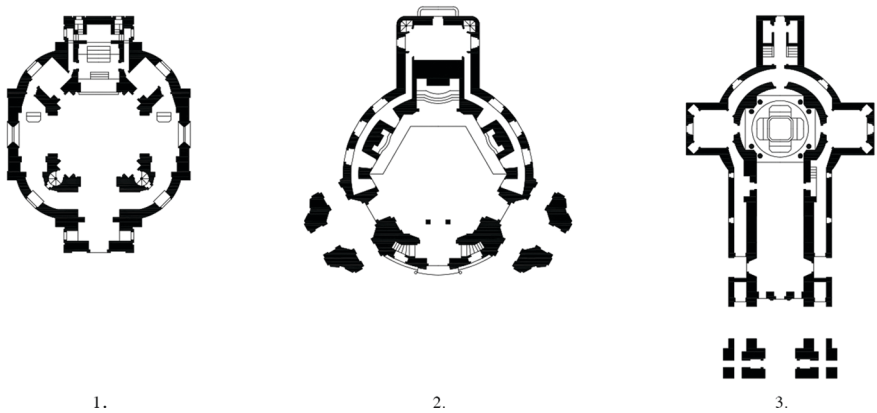
The Bom Jesus da Cruz Church in the city of Barcelos (1704 [?]–1725), attributed to João Antunes, was completed late, around 1725, when it received the shiny interior coverings, in carvings and gazed tiles ("azulejos"), rescuing any remaining linearity. Like the other temples, pilgrimage or processional, the church has a central plan defined by a one circle – the *nave* – and a corridor that runs all around it. It is topped by a small rectangular body: the chancel. The architect's choice can be seen from the outside.

The wall panels are convex, although with an evident curvilinear regularity. The church offers a plan defined by an oblong central nucleus and that barrel-vaulted corridor that runs all the way around. It is topped by a small rectangular body, the chancel. In fact, from the outside, it's as if a church with a Greek cross plan were filled with curved volumes in the extra space between its arms. The whole is crowned by a voluminous belfry, complemented by a lantern tower. The Portuguese tradition is evident in these elements as well as in the upper balustrade, punctuated by pyramidal pinnacles.

A votive work of great iconological significance, but which remained incomplete, is the Sanctuary of Senhor da Pedra, Óbidos (Capt. Rodrigo Franco, c. 1740). The temple that we see today had its inauguration in 1740 with the dedication to S. Tomé (Saint Thomas), and the church received relics of St. Sebastian and St. Honoratus by transfer. The unusual layout of the temple, with a centred plan, and perhaps determined by the pious and votive vocation as had happened in Bom Jesus de Barcelos, was the work of Captain Rodrigo Franco (Gorjão, 1998).

It has a "round" exterior, with a circular plan, with a church with a hexagonal plan inscribed in the circumference and a protruding rectangular chancel. The hollow arches under which free passage is allowed indicate that it is a pilgrimage church, with practices of circumambulation, or planned to be so. The inverted or "mirrored" windows are one of the most curious decorative devices in the building, revealing the inventiveness that baroque architecture allows, although with treatise support at a time when the huge Convent of Mafra (1717–1741 and onwards) shipyard was also in full operation and where Franco collaborated[5]. The two towers, planned on the side of the curved frontage, were never built.

Suddenly, as if displaced from its natural habitat, a large baroque church appears on the Alentejo plain in the Sanctuary of Nossa Senhora de Aires, in Portel (João Baptista, priest, 1743–1760) (Seixas, 2021), with its monumental aspects and its fat volumes, enriched by the ornamental load. In its current formulation, the sanctuary is the initiative of Father João Baptista, who was the author of the design,



1. 2. 3.

Figure 3.5 (1) Church of Bom Jesus da Cruz in Barcelos (1704 [?]–1725), attributed to João Antunes. Plan (2) Church of the Sanctuary of Senhor da Pedra, Óbidos (Capt. Rodrigo Franco, c. 1740). Plan (3) Church of Nossa Senhora de Aires (Viana do Alentejo). Plan.

Sources: (1) Kubler, 1988, (2) adapted drawing; from Gorjão, 1998, (3) adapted drawing from Seixas.

and Manuel Gomes who executed it as master builder. It was inaugurated in 1760. It is the result of the permit granted by the Marquês of Pombal to hold the *Feira* (commercial gathering) of Nossa Senhora de Aires on the grounds of the large influx of pilgrims on a pre-existing Christianised place. It has a Latin cross, basilica plan, following erudite models, a pronounced transept, illuminated by oculi, and a main façade with two bell towers, central panel with a "palatial" type façade and a triangular pediment, reproducing prestige models "in the manner" of Mafra. It is crowned by a large cylindrical dome with stucco ornamentation, topped by a lantern. Grey and white Alentejo marbles were used in the portals, already using a late-baroque style. The interior simulates marble through painting. A huge canopy is located on the transept. The most original aspect is the plan, with a corridor that surrounds the cross and replicates the logic of other temples such as Bom Jesus da Cruz, and Senhor da Pedra. The scheme of internal ambulation by the use of cell walls or membrane-walls persists.

It is irresistible to relate this to Louis Kahn and to digressions around the "thick walls", "voluminous walls" or "inhabited walls" (Kass, 1988). George Kubler had already intuited it in 1972 when referring to Portuguese architects and their training: "*At this time, Portuguese architects working in Portugal felt fascinated by the geometric and volumetric relationships of the interiors with the exteriors and, therefore, with the spatial possibilities of the wall itself, as a membrane, channel or passage, barrier, fence and, in general, as an obstacle or limit to be transformed. Many of these transformations treat the wall as a cellular structure and as a zone of circulation. The first coherent experiences in this sense belong to the decade that began in 1530./ "The Portuguese tendency to treat the wall as a thick and cellular*

substance may have come from architects and military engineers. For them, the inhabited wall has always been a profession and a necessity." (Kubler, 1988:7).

Another paradigm of an alternative route to the Portuguese baroque – in this case a "third way"- is the most emblematic work of the "Archytecto Dom Nicolao" as Nicolau Nasoni (1691-1773) was called, a master of Tuscan origin who settled in the Porto in 1717: the Church and Tower of Clérigos, Oporto (1731–1763).

If we have to choose a monumental ex-libris for the city of Oporto, the church and the Clérigos tower are the buildings that stand out the most, both for their originality and for their location in the urban landscape of an old and dense city. The building assumes even greater prominence due to the way in which the stone which supports it was carved with a sophisticated care, almost a sculptural work with pictorial values, actually familiar to Nicolau Nasoni, a man trained in interior painting (and ceilings). Nasoni came to Portugal after visiting Rome and Malta. It was certainly due to his contacts with Portuguese dignitaries and diplomats that he came to Oporto, where he began working for the Dean of the Cathedral, D. Jerónimo Távora e Noronha, whose brother he had met on the Mediterranean island. He started his work by painting ceilings, but quickly began to respond to important architectural commissions, crediting himself with a vast and remarkable work.

Work began in 1731[6]. In 1745 the façade of the temple was built, and a little later the staircase (around 1753), but in 1748 the church was already almost completed. The "Casa dos Clérigos", as the bureaucratic and assistance part of the building is called, was completed in 1759, including the secretariat and an infirmary. The tower was built more slowly, between 1757 and 1763. Putting in scene superimposed plans and some baroque oddities that gave an innovative expression such as a mild compositional asymmetry introducing a "rocaille" as a new aesthetic attitude, breaking with the modular classicism of the traditional Roman baroque.

If the building offers a unique monumentality, it also owes it to the fact of looking like a superb and sumptuous "piece of furniture", like a large casket enunciating am enclosed treasure. The verticality of the façade, accentuated by the large base that serves as its foundation, and the impressive bell tower – a veritable, almost cathedral-like spire -, combine with the temple's invocation to Nossa Senhora da Assunção, as if translating into stone the words that refer to the ascending movement of the Virgin, towards heaven. Nasoni's genius also lends the church completely unprecedented traits in Portuguese architecture. The building's difficult implementation and foundation had to be solved, for it had to overcome quite large level differences in a longitudinal terrain. For this, Nasoni designed a relatively narrow façade growing in height. This grand entrance, a veritable screen placed at the midpoint of the hillside and offering itself as a virtuous spectacle of architecture, is followed by the body of the church, oval in plan and with double walls, with passageways surrounding the nave and giving access to the back of the building. Then, the utilitarian dependencies were erected, authentic offices of the congregations and confraternities, with greater sobriety and following, unlike the temple, a traditional architectural scheme, with straight walls. Finally, Nasoni, who did away with the towers flanking the façade, placed the single, large bell on the back of the building.

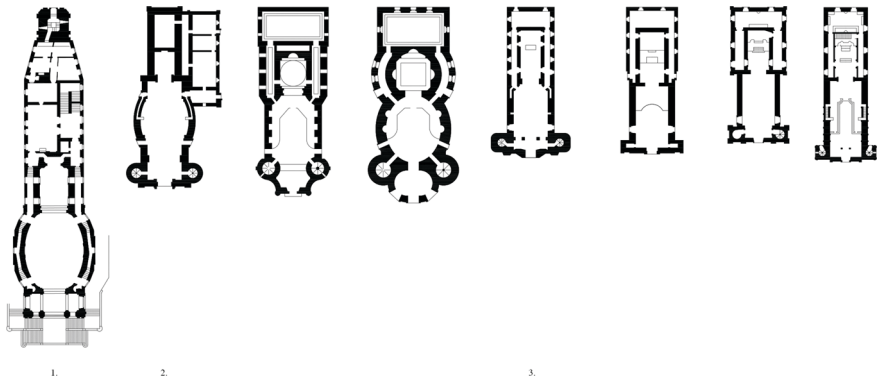


Figure 3.6 (1) Nicolau Nasoni, Church and Tower of Clérigos, Porto (1731–1763). Plan. (2) Brazilian late baroque churches with nave oval plans (mid and late 18th century). (3) Brazilian late baroque churches with one nave and side corridors (mid and late 18th century).

Source: (1) Adapted from SIPA/monumentos.pt.

In a colonial context, it is worth mentioning the "series" -to adopt a Kublerian expression -, which seem to result from an architectural culture that has since been consolidated. In Brazil (and in "Portuguese" India) there is, on the one hand, a triumph of the "box church" (what we call "Portuguese-type church"). However, at the end of the 1700s, an original transcontinental trend coincides with the golden period of Brazilian architecture and sculpture, especially witnessed in the "Mineiro" triangle (S. João d'el Rei, Mariana and Ouro Preto) with the radiating point in Vila Rica (Ouro Preto) due to the advent of the so-called "'Gold' Cycle".

The architectural types that emerge there seem to be Latin American derivations of the Porto-Braga architecture in the northwest of the metropolis. However, he prevalence of oval plans and convex and concave surfaces on the facades, as well as the insistence with which this model is followed, suggests not only the contribution of a metropolitan tradition, but also of Central European and Italian erudite elements in late-key deeply regionalised baroque. This fact is especially evident from a planimetric point of view, as with the use of triple ellipses and secants, covered by a rocaille decoration and resuming the interstitial corridors and the "voluminous" walls. Architects such as António Calheiros, Jerônimo Teixeira (Rosário dos Pretos Church [1785]), Francisco Cerqueira and António Francisco Lisboa, the famous "Aleijadinho", stand out, contributing to the casing and ornamentation of the Church of S. Francisco [began 1766]; Church of Nossa Senhora do Carmo [beg. 1766–1772]). The metropolitan roots cannot be ruled out, especially when we compare a model like the monumental stairs system of Bom Jesus de Braga with its overseas counterpart, the Sanctuary of Bom Jesus in Congonhas do Campo, equipped with a staircase and a Via Crucis, decorated in successive campaigns initiated by "Aleijadinho" (beg. 1773; and onwards: 1780 and 1793).

It is also worth taking into account the contributions of continental Portuguese experiences, such as the one that derives from the Clérigos Church, referring to the circular plan and oval chapels, the latter with a very curious kinship with Santo Ovídio Chapel (Amares), not by chance, sponsored by a Portuguese traveller returning from Brazil where he made his fortune, and therefore denouncing a path of interpenetration of the Brazilian formulation (Ribeiro de Oliveira, 1984, 2003, 2006, 2008, 2011; Tavares, 2003; Bury, 2006). Even the case referred to above, that of Misericórdia da Ribeira Grande, betrays a taste that is vividly rococo in the way it combines animated and curved pediments, with shellwork, even with the simulation in stone, in what seems to be a testimony to the contamination of the arts in this period of creative strength that would have its epicentre in Brazil, as one would expect from a building located in the middle of the Atlantic, right on the traffic route to South America.

"Oblique" plans

Rather, this "third way", as we called it, appears timidly associated with the precocious work of Manuel Pinto de Vilalobos (?1667–1734), a military engineer who was also responsible for ecclesiastical and civil orders (Soromenho, 1992).

The Church of S. Sebastião das Carvalheiras (1717, later enlarged) and the unexpected, unprecedented configuration of the votive Nossa Senhora de Guadalupe Chapel (1718; 1725–1747), both with designs from Vilalobos, and with the help of Manuel Fernandes da Silva (1693–1751) – possibly as decisive "as Vilalobos himself in the propaedeutics of an unadorned "pre-baroque" (Rocha, 1996) – reveal a trend which also made its way towards the interior of Minas Gerais. Incidentally, the round polygonal plan seems to become a "theme" that tends towards the centred plan, and which will later evolve from churches with cut corners to the curved frames of the internal walls and even to elliptical or oval plans that we will see emerge in the region of Douro and Minho. Meanwhile, an adventurous late baroque, from a noble North and in an ecclesiastical context of powerful commissioners, would end up introducing what would come to be called rococo. Domingos Tavares (Tavares, 2021) places the churches of Vilalobos at the genesis of the genealogy of other temples, the most famous of which was due to André Soares.

André Soares (1720–1769), "*the great granite poet and golden brown virtuoso*", in the words of Robert Smith (Smith, 1973; Oliveira, 1993), finds himself at the centre of a of the other creative poles of granite architecture in Braga. Soares would leave a very extensive body of work and, more than that, a true "regional school" that assumes gigantic proportions both when we are able to verify the originality of his work, which operates a very delicate transition from late-baroque to rocaille, as attested by the exhaustive studies by Eduardo Oliveira (Oliveira, 2011, 2019).

In gilded wood, his sense of monumentality stands out. The altarpieces have an immense crowning that combines their virtual weight with the base and pilasters carved with the usual fleshy sinuosity of this master. It should be noted that André Soares owes much to his familiarity with the wood carving design.

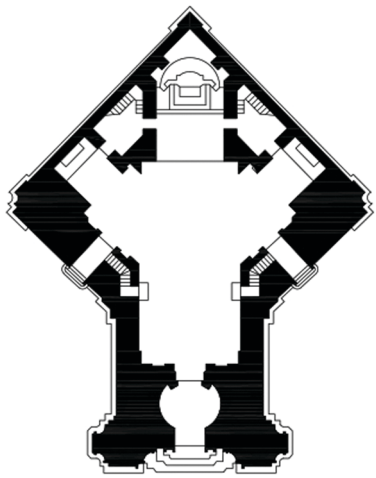


Figure 3.7 André Soares, Church of Santa Maria Madalena da Falperra (1753–1755). Plan.

Source: Tavares (2021).

His compositional leanings explain the type of combination of architectural types, that is, the seemingly endless possibility of overlapping planes and treatment of overhangs, accentuated later by the verticality conferred on these compositions of hard granite stonework, at first sight of a smooth moulding but that were not – in a characteristic dialectic of the "Rococo" of Alto Minho – through large pediments and jagged lintels that lift the "weight" of the architecture. In short: André Soares transposed to granite stone, with apparent ease, the precepts with which he operated in wood and gilded carving.

The most impressive example of this type is the oblique square plan church of Santa Maria Madalena da Falperra (1753–1755), The adventurous façade is preceded by a winding staircase. This façade has a stone border on a background of whitewashed masonry, as an evident transposition into stone of the rocaille gildedwood decorative drawings, certainly inspired by German and Austrian engravings (Tavares, 2021:50), using a design scheme that causes the instability of all the usual purely architectural bearing elements, giving them an organic connotation, removing their mineral inertia and offering them, as it were, a new plant-based (architectural) "order", as if reproducing in hard matter the volutes of a cabbage garden.

God's "throne"

Finally, it is worth mentioning another Portuguese originality. The Eucharistic throne. It should be noted that during the 17th and 18th centuries, gilded carving

subverted the interiors of temples, so often simple in their dominant linear plan – and therefore static in their configuration. It gives them spatial animation and luminosity. This formal transformation was mainly due to lavish carved gilded wood altarpiece devices that were multiplied in Portuguese churches from the 17th century onwards[7]. The brilliance of the gold plating, the greater or lesser depth of the carving (with religious or profane ornamental motifs, in different combinations), constitute the background for the architectural elements: the arches and the jambs – thick, repeated, staggered in depth; the "tribune" – rising to a great height in a curious scale monumentalised interplay; the "throne" – where the image of the patron saint is installed; and the Solomonic (or pseudo-Solomonic) columns - covered by vines and little angels, eloquently present in examples such as that of S. Pedro de Miragaia, whose main altarpiece was executed around 1724 by one of the greatest specialists in the field. gender, António Gomes, supported by Caetano da Silva Pinto.

It should be borne in mind that the ornaments are based on universal themes. The Solomonic columns, the vines, the little angels or putti are variations of one and the same topic: nostalgia for paradise. Because they are made of wood, the altarpieces are also a replacement for tried-and-tested stone structures – colder, more solemn, less persuasive and more erudite as well. The embossed decoration is, in turn, an adaptation and an enrichment of the themes of the classic brutesques: wooden cladding of usually "stable" architectural devices, is decidedly transformed and destabilised by the sum of aggregated props. Altarpieces of this type are, after all, new-style triumphal arches, serving Catholic ideals. But one of the exclusive traits of carved altarpieces is the "throne", apparently invented around 1609/1610 and widespread since 1650 (Martins, 1991:26–27). In it is placed the image of the patron saint or on days of dedicated worship – and that was its primary destination – the eucharist and the monstrance that contained it.

Fausto Martins (Martins, 1991:26–27) studied in depth the genealogy of the "Eucharistic throne". He points out, among other precepts of a symbolic nature, the importance of the so-called "forty hours' devotion" or "forty hours' prayer", as well as the "lausperene", which constitute ritual indications derived from the Counter-Reformation Martins, (1991:26–27). Any of these initiatives has as its objective the exaltation of the Blessed Sacrament and its adoration. Now this is precisely the function of the "throne", which aims to place the Blessed Sacrament in an imminent place so that it can be seen (and venerated) from any place within the temple. The iconology of the "throne" evolves, therefore, to a staggered form as an evocation of the stages of spiritual perfection, in the manner of a "stairway to heaven" or "*scala coeli*". Likewise, from an architectural point of view, the staggered design finds consecrated models, also arranged in imminent places inside the temples, such as the scaffolds of the 17th and 18th centuries, some of which have steps. The typologies of the scaffold, the altar and the ladder (Martins, 1991:26–27), in turn, match the symbolism of the mountain and the throne of Solomon, also comforting access to divine goods as a pilgrimage, a path that offers itself as an ascension.

Between the "throne" of the altarpiece and the baroque staircases such as Bom Jesus do Monte in Braga, there is not really any difference. They have the same

Figure 3.8 António Gomes, Caetano da Silva Pinto, Altar piece with "throne". S. Pedro de Miragaia, (c. 1724).

Source: Wikipedia commons.

iconological root; easily grasped, downright intuitive, and universal. With five or more steps, they can form true pyramidal structures of great height. Placing the Blessed Sacrament (or the image of the patron saint) higher allows a better perception of the central focus of the temple; but they also induce a spiritual intangibility and, as it were, increase the aura of the image, which itself becomes a relic to be venerated. Of course, the models for the invention of the throne are, from an ideological point of view, complex. But they have Christian and Catholic tradition. As a "stairway to heaven", they star in a crescendo that is reflected in the number of steps (or degrees) that are evident in them. They could also have mnemonic functions, and help, by inspiration in treatises on the art of memory and "pure"

intellectual research, much followed in convents, for the construction of sermons. The "throne" thus constitutes one or more "places of memory".

In this series of a peculiar and unusual "class of objects", we return to George Kubler, recalling what he wrote (and which we quoted at the beginning of this essay):

> Astronomers only look at old lights. They cannot look at others. These old lights from dead or distant stars were emitted a long time ago and we are only aware of them in the present.
>
> The same thing happens in the history of architecture.

Notes

1 Kubler, G. (2005 [1988]). *A Arquitectura Portuguesa Chã Entre as Especiarias e os Diamantes (1521–1706)*. Lisbon: Vega. (1988, 1st. português edtion)
2 The term "plain" is the possible translation of the portuguese term "chão", coined by Julio de Castilho (1879), *Lisboa Antiga. O Bairro Alto.* Lisboa: Livraria de A. M. Pereira, 1: 144
3 "Sebenta" for an upper grade teaching: classes copied and disseminated in a written manuscript
4 Its main façade faces the *Pátio das Escolas*, with a single floor, while the volume grows to the side of the slope, towards which its lateral and posterior façade turns, with six and three large windows. If on the outside, despite the classic expression of the monumental entrance portal, the architecture of the building does not present exactly baroque syntagms, on the inside, the decorative program accentuates the baroque character of the work: it formally explodes with its wood carving coating and the paintings that ornament and give it a rhetorical meaning. The interior is entirely covered with carving and painting, according to the principles of a "total work of art", typically baroque; see Pimentel, A. F. (1998). "O Gosto Oriental na Obra das Estantes. A Casa da Livraria da Universidade de Coimbra". *Actas do IV Simpósio Luso-Espanhol de História de Arte*. Coimbra; Pimentel A. F. (2016) *A Morada da Sabedoria: O Paço Real de Coimbra, Das Origens ao Estabelecimento da Universidade*,.Coimbra: Almedina.
5 Franco also collaborated with Canevari in Santo Antão do Tojal church and Archebishop's summer palace (c. 1732–1741) as designated architect for the works of Lisbon Patriarchat; ere similar syntagms are found, which presupposes a more robust intervention by the Franco in the sequence of these works
6 By order of the Brotherhood of Clerics, which was formed in 1707 through the merger of three similar entities: the Confraternities of S. Pedro, Nossa Senhora da Misericórdia and S. Pedro Nery. Formed by priests or secular clerics, it assumed the name of Confraria dos Clérigos. See Smith, R. S. (1967). *Nicolau Nasoni. Arquitecto do Porto,* Lisboa: Livros Horizonte.
7 In fact, the so-called "Portuguese style" altarpiece has an infinity of examples. It applies to the entire national and colonial territory. It corresponds, without a shadow of a doubt, to a first movement of "upgrade" of the temples in the sense of their baroque style. It seems that this "Portuguese style" is influenced by the structure of Romanesque portals

and the decoration of Manueline buildings. We shall note, however, that the structure of the Romanesque portals constitutes an architectural generality. Likewise, the ornamental theme of the vine and putti is not exclusively Manueline, as it is a common theme in Catholic iconography of all ages. It is much more likely that the "invention" of the "Portuguese style" altarpiece, with thick archivolts, has more to do with old devices of ephemeral architecture such as funeral scaffolds, festive pageantry arches and canopies in a swift combination.

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4 Agricultural support units

Buildings to structure the rural territory

Gilberto Duarte Carlos

Introduction

Agricultural support units, also known as adjective constructions, represent a significant part of the vernacular architecture that also characterises the cultural landscape of Portugal, particularly in the geographical areas within the rural territory (Oliveira and Galhano, 1998).

If, on the one hand, the dilution of the dialectic between Urban and Rural space is a widely assumed phenomenon, the observation of a territorial matrix that derives from the main regional agrarian systems continues to characterise the national space (Domingues, 2010). Portugal presents a territory with an asymmetrical occupation, predominantly developed on the coast and polarised by administrative nucleus, from which the metropolitan areas of Lisbon and Porto stand out. Its peripheral condition and internal administrative circumstances determined late industrialisation and irregular implementation, with a reduced complement of infrastructures at national level, which would be reflected in the development of the territory.

In this context, buildings of vernacular nature, generally associated with logics of pre-industrial agricultural production, should constitute a determining typological component in architectural heritage inventories (Ordem dos Arquitectos, 2004).

This prerogative is particularly evident in the critical reformulation carried out in the historical and theoretical perspective of national architecture in the 50s and 60s of the 20th century. Aware of the profound social and technological changes of the time, the national professional association and academic community combined efforts to carry out a survey that would allow for a general characterisation of traditional regional construction. The Survey of Popular Architecture in Portugal thus constitutes an unavoidable landmark for the reading of the national built environment, from the conceptual definition of heritage, mainly restricted to its monumental dimension, to the identification of the logic of occupation and management of the territory (Leal and Prista, 2021). Its impact, combined with the reactive currents that, internationally, proposed the revision of the modernist movement is, according to most contemporary Portuguese architecture theorists, a key element in understanding the singularity of the subsequent architectural production that was developed, above all, in the North of Portugal (Toussaint, 2009).

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This national mobilisation initiative, marked between 1955 and 1961, divergent in the political purposes that subsidised it and the scientific objectives that implemented it, thus constitutes a synthesis of an experimental survey and classification process. Constituting an unparalleled in the Portuguese reality, in scale, extension, diversity and representativeness of the architectural object, its ensemble and its geographical relationships.

This was also a time of adjustment in the architecture teaching, through the revision of the regulation of Superior teaching (Moniz, 2011). Aiming to reduce the gap between the technologic fields, architecture schools made an effort to ensure disciplinary autonomy from the Fine Arts teaching as well as to promote scientific research, thus pursuing the necessary objectivity. Subsequently, Architecture will enthusiastically follow the development of Social Sciences, namely in urban application studies, with a clear French influence (Duarte Carlos, 2014).

Conditioned by the size and youth of the human resources used in the process, especially in its field phase, those responsible for the Inquiry, in order to ensure the coherence of the results, resorted to Ethnography as a methodology for collecting information and Geography as a disciplinary area for systematising information. The documentary research carried out to prepare the Inquiry, confirmed by the participants themselves (Menéres, 2023), reveals a reduced but seminal bibliography. Among these, the publication Portugal, the Mediterranean and the Atlantic, by Orlando Ribeiro, constitutes the most operative reference. It was through the previous and pioneering work of this Geographer that the areas of study were structured and the logic of the contextual relationship between the building and its physical support was established (Leal and Prista, 2021).

It was also from his interpretation of rural and urban agglomerations, in their national diversity, that the basis for his general typological classification was established, characterising the essentials in terms of configuration, population, density, communications and their dynamic relationships (Menéres, 2023).

The survey process divided the continental national territory into six zones, numbered progressively from North to South. Each zone was handled by a different team, made up of three elements, a more experienced coordinator, and two young architects, recently graduated (Ordem dos Arquitectos, 2004).

This text will use as a reference the region that was designated as Zone 1, the coastal fringe of the North of the country, which encompassed the administrative areas of Minho, Douro Litoral and Beira Litoral. The Zone 1 team was made up of the architect and professor Fernando Távora, the recent graduate Rui Pimentel and the final year student António Menéres, who made the commitment to complete his studies during the process. Architect António Menéres, the only survivor of the team at the time, was interviewed as part of the preparation of this text.

The selected territorial division intended to establish a compromise between the operational viability of the size of the area to survey and the geographical coherence designated by Orlando Ribeiro. An abstract definition that became difficult in an era in which the means and infrastructure of circulation were quite rudimentary, especially in the more interior and mountainous areas. This circumstance,

regardless of the quality of the results, would decisively condition the sample collected and its consequent systematisation. The team was perfectly aware of the existence of relevant territorial gaps that could not be filled for obvious logistical reasons (Menéres, 2023).

As Orlando Ribeiro, the authors of the Inquiry collect and characterise cases according to their location and the viability of the planned itinerary, confirming on the field the existence of identity logics, testing representative hypotheses that could be graphically substantiated. Despite the dichotomous concept of the time, and the awareness of the enormous gap in knowledge in relation to rural territory, the study portrays an architectural production of a seminal vernacular character, both in the countryside and in the city (Ordem dos Arquitectos, 2004).

In this period, far from the awareness of contemporary hybridising processes, it was the city that invaded and overlapped rural territories. The logic of expansion and growth was a model considered inevitable. Evidently, from the point of view of social dynamics, the process was practically antagonistic, with the accelerated growth of the urban population through the emptying of more rural territories, increasingly accentuated until the end of the 20th century (Wilson, 2021). In this conflict, with lesser or greater adjustment, the urban fabrics of the mid-20th century often brought together, with very specific exceptions, pre-existing principles, logics and vernacular elements. From the compatibility of the cadastral structure to the perpetuation of agrarian-based subsistence complements in family life, here it seemed, instead, the countryside entering the city (Menéres, 2023).

Even in the most expressive urban centres today, it will not be uncommon to see the presence of some of these examples, which, despite their eventual decontextualisation, corroborate their importance in the memory of Portuguese architectural heritage. Areas of great population growth in recent years, such as Guimarães, Braga, Barcelos or even greater Oporto, are no strangers to this circumstance. If these manifestations, in the most developed centres, can be interpreted as remnants of an outdated technological legacy, the analysis of the cadastral correlation with the morphological evolution of urban fabrics, particularly in the North Coast of the territory, will allow us to recognise the importance of the aforementioned rural matrix that hosts the agricultural support units.

Agricultural Support Units, also known as rural equipment, are, as can be seen from their self-explanatory name, constructions exclusively intended to assist the agricultural exploration activities of a given community. In most cases, particularly in places where they became regional archetypes, they represented essential solutions for the implementation of a subsistence economy, often secular. It is above all in these contexts, where the most adverse conditions prevailed, that these constructions assumed a preponderant ethnographic character (Oliveira and Galhano, 1998).

Rural Equipment arises naturally from the need that implies the relationship between man and nature. If housing serves, logically, to shelter or spend the night for humans, rural equipment serves exclusively to solve the problems of the main subsistence activity, traditional agriculture. Thus, completing the cycle of rural

subsistence in the Minho economy, where the peasant's house functions as a unit of both production and family consumption. This interdependent relationship is vividly reflected in various cultural expressions. In Galicia, the most common term used to describe this architectural typology is "adjunct buildings" (Llano Cabado, 1996).

Typologically, they should be understood, not as the antithesis, but as the complement, or the productive extension, of the residential architectural group, regardless of the social condition of the household. In the Minho region, whether in the modest detach dwelling or the farm's built complex, the agricultural support units play a fundamental role in the occupation and exploration of the territory, regardless of the proximity to the residential centre they serve (National Institute of Scientific Investigation, 1985).

Agricultural support elements can be subdivided between Building Units and Resource Management Infrastructures. Within the Building Units we can distinguish generic typologies related to the logic of supporting subsistence activities. Thus, at a first level, we can classify these logics according to their basic purpose, regardless of the area or product, in Units of: 1- Shelter, 2- Storage, 3- Transformation, 4- Maturation.

The *Espigueiro* (corn maze granary) objectively fits the purpose of storage. Its particularity is to serve the function of differentiated storage, intended solely for the temporary (relatively short) storage of a single agricultural product: corn (Dias et al. 1994). The *Espigueiro*, in relation to other built elements, presents different location possibilities, generally consisting of two typified solutions. It may appear associated with a specific dwelling, forming a delimited complex together with other agricultural buildings, such as Wineries or Animal Shelters; or it can integrate a group with other granaries, resulting in a homogeneous nucleus with greater formal expression, constituting what is called a community threshing floor.

Despite its lesser recognition, often because it is limited to a minimally regular rocky soil, it is precisely this element, the *Eira* (threshing floor), which constitutes the common denominator for the establishment of *Espigueiro*. Considering the aforementioned storage stage, the *Espigueiro* is intended precisely to accommodate the cereal between harvesting the fields and the threshing process, which takes place precisely on the floor formed by the threshing floor. The proximity between these two elements is decisive for the efficiency of the corn processing cycle, in preparation for its consumption. This relationship optimises transport needs between the cultivation fields and its subsequent distribution, still in the form of cob, and reduces possible degradation and waste when it is already in the form of grain. The importance it has acquired in the diet of this region, indirectly in the feed of farmed animals and directly in the making of cornbread, thus gives it the status of greater importance in local agricultural production, with its abundance, or scarcity, determining the annual quality of life of communities.

Some authors (Ordem dos Arquitectos, 2004) state that it is this deep-rooted correlation that gives it greater technical development, in comparison with other rural equipment, of more basic and sober construction, progressively assuming a greater role in the composition of building complexes, proportionally evident in

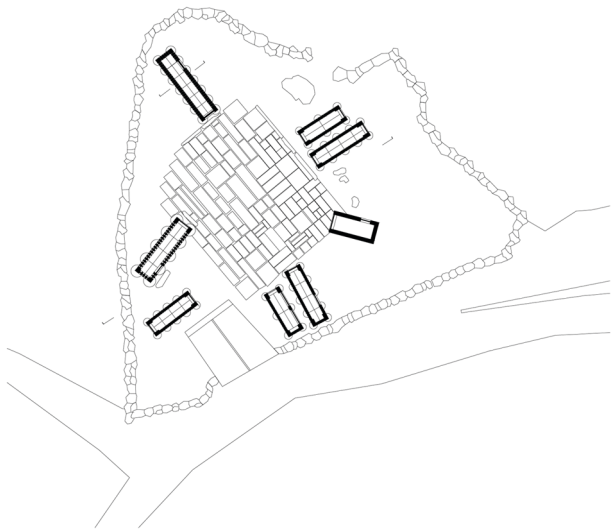

Figure 4.1 Community threshing floor, Parada da Eira, Lindoso.

Source: Drawing by *formaurbis* LAB.

villages with fewer resources and more isolated. It is precisely in the most remote places that the most iconic complexes appear, of which the towns of Lindoso and Soajo are perhaps the best-known examples in the national territory. More isolated and at a higher altitude, these granaries stand out for their quantity, regularity and technological systematisation, demonstrating the collective impetus of communities in mountainous regions and the importance of their combined efforts in the face of adversities in the context.

In the particular case of granaries, in addition to the intrinsic anthropological aspects, it is the specificity of their exclusive function, which gives them evident prominence in the landscape, regardless of the number of surrounding buildings, since it is inherently related to the predicate of their performance.

Programme

Briefly, we can describe this equipment as installations intended simultaneously for the storage and drying of corncobs of American corn, between harvesting and the threshing process. This premise determines a very particular implementation strategy, favouring slopes, or hills, with greater solar incidence and more favourable exposure to mild winds. The granary thus justifies a dominant position in the landscape, towering over the surrounding obstacles, natural or built, ensuring adequate exposure to the weather elements. Their location is generally formalised on ridges or promontories, oriented to the southwest, surmounting the houses of the

communities they serve. Along with mountain communities, they generally take advantage of the rocky outcrops of bare cliffs, allowing a comfortable proximity to the village and minimising the need to sacrifice potential areas for cultivation or forest.

This condition obviously takes advantage of the geological condition of the region, using the granite composition of the soils to configure the *Eiras* without having to resort to the arduous work that their formalisation from scratch would require. In contexts of denser built environments, inserted in villages or within agricultural complexes with greater resources, the search for adequate exposure makes the visual dominance of the granary a very characteristic aspect in the relationship it establishes within the building complex (Oliveira and Galhano, 1998). Extremely conditioned by the properties and dynamics of neighbouring buildings, the inhabitants, when they do not have public spaces large enough to safeguard an unobstructed layout, resort to confronting streets oriented preferably to the south, or with approximate alignments, to attach their granaries to the highest structures. Of its properties. It is therefore not uncommon, in higher density agglomerations, to identify these structures on the lintels of the gates, crowning the fence walls or completing the roofs of other agricultural annexes, at the limit of confrontation with the public domain, or collective domain, of the respective agglomeration. It is above all this condition, even if unconscious, that leads us to a perception of the preponderance of these vernacular elements over others, such as water mills, antagonistically embedded in the thalwegs and partially buried, at the beginning of their own foundations, surrounded by aggressive vegetation riparian (Dias et al. 1969).

Individually, granaries are structures designed as narrow ventilated chambers, elevated from the ground, developed to specifically protect the cereal against humidity in the air and soil and against the attacks of rodents and birds. They are formalised in small buildings, originally made of stone and/or wood, with an

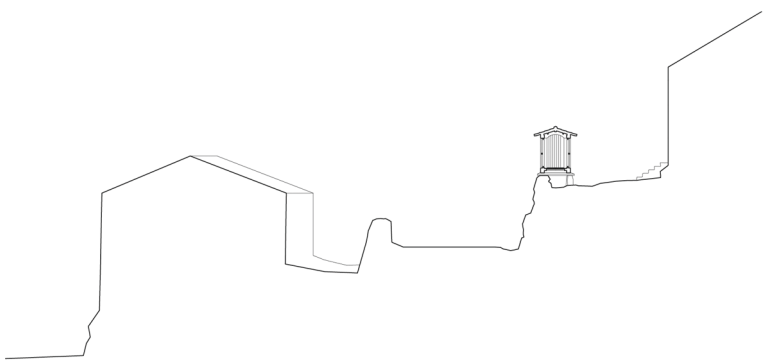

Figure 4.2 Prominent granary in dense cluster, Merufe, Monção.

Source: Drawing by the author.

elongated rectangular plan, with walls torn by gaps for the permanent ventilation of the interior, displayed on a system of robust stone supports.

Its vertical composition is generally divided into two components, the seat (*assento*) and body (*corpo*), below is a very synthetic description of its main characteristics:

- The seat is the system for lifting the pavement, which provides the necessary distance from its humidity, made up of feet, vertical prismatic blocks or rough stone cylinders, which are arranged in pairs at critical points supporting the base of the body, invariably at its ends and possibly at the intermediate points of greatest load, also ensuring its levelling. Superiorly, they are topped by rudimentary discs with a diameter greater than the thickness of the feet, the millstones or rat-turners, in order to configure a protruding flap, which establishes the transition between these elements and the base of the body, its function being to prevent the rise of rodents. Occasionally, the feet can be replaced by transverse blocks or a continuous mass, capped on top by protruding slabs along the entire laying structure, called tables, to ensure the aforementioned protection.
- The body corresponds to the drying tank and in most cases is composed of a structural skeleton in an indented system and a set of closing planes, configured as a systematisation of vertical or horizontal gaps, to ventilate the interior. Its interior is narrow and its height is reduced, so as not to promote the deposit of cobs too far from the periphery, allowing man to move inside within the limit necessary to carry out the respective tasks of accommodating and extracting the cobs to from the access and discharge openings.

The body's construction system presents a wide variety of solutions, traditionally ranging between elements of stone, wood or a combination of both. This diversity of solutions presents a generic geographic affinity, which allows local flexibility, leaving room for the implementation of some singularities even in the most systematised sets.

The skeleton is made up of a base (made up of stone ballast or railing and floor), stone columns and lintels or wooden posts and beams. The upper transversal bracing elements of the walls, which support the roof can be in in stone (*cangas*) or wood (*cambotas*) presenting a triangular shape.

The ventilation planes or walls are the surfaces that fill the vertical spaces between the skeleton elements. They are made up of baluster or slatted panels and, depending on the materials and systems, they have very different configurations. Stone balusters are composed of torn columns, with narrow vertical (more rarely horizontal) slits or simply separated with more generous joints. Vertical wooden slats are composed of oak or chestnut beams, arranged regularly and spaced apart, generally reinforced with an intermediate strap. Like stone granaries with horizontal slits, horizontal wooden slats are less common, possibly due to their greater need for maintenance. They feature an internal skeleton, with a greater number of props to ensure structural locking, covered with small-width horizontal slats. In

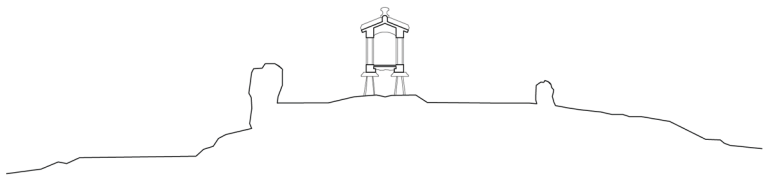

Figure 4.3 Cross section of a narrow Granary, Lindoso.

Source: Drawing by author.

most cases, the angles are reinforced with diagonal struts, fixed between the lower transverse beams, protruding for this purpose, and the corner props.

The roof in narrow granaries with upright walls is generally gabled, transverse to the body, the most common solution is made of tiles placed on lath, which was progressively replacing thatch, the most robust examples can be composed of inclined granite slabs and In shale areas, use slate systems. The tops of the waters are generally topped with stone elements, constituting a prominent cap to protect from the winds, forming a formal transition with the upper lintels (Dias et al. 1994).

Despite the sobriety and pragmatism of their systems and execution processes, granaries reveal some propensity for incorporating decorative elements, particularly the crowning of the roof's capes. Of these ornamental elements, sundials stand out (whose activity would determine adequate sun exposure), crucifixes, figures and various inscriptions, the most common being the date of construction or reconstruction. Naturally standing out from the aesthetic simplicity of other models of popular architecture and revealing the importance attributed by local communities (Llano Cabado, 1996). Of all the types of rural equipment, they are the most symbolic, intrinsically linked to the cult of fertility and the prosperity of rural life, reflecting the importance of corn as the main subsistence crop in the northwest of the peninsula, between the 17th and 20th centuries.

Context

The territory of the Iberian Northwest, when corn was introduced, was mainly structured according to the Roman *ager-saltus-sylva* matrix, deeply dependent on summer cycles and the complementarity of production activities. Despite its modest size, Portugal had few connections, making it particularly difficult to move people and goods, affecting the development of any commercial networks, in quantity and size.

According to Orlando Ribeiro (1945), Portugal's mainland corresponds to three large geographical areas, which, until the middle of the 20th century, would be dominated by the intensive cultivation of three main types of cereals. In the so-called Humid Portugal, geographically coinciding with the area of the Northwest Atlantic, in which the present essay is inserted, maíz corn or large maize,

constituted the dominant cereal; consequently, wheat would be equivalent to the South Mediterranean and rye to the Northeast *Trás-os-Montes*. In this region, with greater or lesser variation, the necessary conditions for the prosperity of this cereal are met. A temperate climate with well-marked seasons and a high level of precipitation (the highest in the Iberian Peninsula) combined with an extensive and intense water network, influenced by the relative permeability of the soils, predominantly granite, allowed a very favourable framework for the introduction and development of this cereal.

With a low mountainous relief, minimising the impact of frost and thermal fluctuations, the extensive network of river basins offered the floodplain as one of the most productive resources in the region. It was in these elements that its primary appropriation was established (similar to its context of origin). Afterwards, toked place the progressive appropriation of the foothills of the mountains, with their systematic modelling of land steps and artificial terraces, intensifying the occupation of areas susceptible to agricultural production. This orographic change, resulting from the current cadastral regime, dominated by smallholdings and crossed by countless water lines, determined the definitive consecration of corn as the main agricultural product in Minho, to the point where its agrarian cycle dominated the entire rural landscape (Dias et al. 1969).

Considering the rurality of the territory and its articulation with towns, independently of their sizes, the impact of this activity on the built environment is clear, determining the configuration of the region's landscape. The abundance of networks of water channels that allowed the adequate and permanent routing of water to the cultivation fields was an important complement. A circumstance that is deeply related with a tradition of shared management, constituting a specific sociocultural component of these communities, inseparable from their architectural and urban expression.

On a larger scale, granaries present a generic identity, easily recognisable among the other typologies, regardless of the variability of construction solutions. Its geometry, constructive systematisation, size and logic of implementation present a constancy of characteristics, to form, together with the threshing floor, one of the most rooted archetypes of rural architecture in the Northwest Peninsular.

> *Cultural ties between northern Portugal and the rest of the country have never been as strong as with the neighboring Spanish province of Galicia. Not surprisingly, horreos (...) have their perfect counterpart in the Portuguese espigueiros,*
> (Rudofsky, 1990:75)

In a more localised interpretation, their differentiation is evident, but it is far from being circumscribed, with many examples of exceptions punctuating the more homogeneous trends. This differentiation demonstrates a subordinate adaptation to available resources. The main distinction between granaries is based on the materials used, forming stabilised sub-typologies or trends associated with a specific intervention carried out in the same period of time. This first contextual

correlation is the most evident and is mainly responsible for the classification of the best-known variants. The full execution variant in stone is associated with mountainous territories, with less accessibility and sparser forest mass (using more resistant and lasting solutions), with the best carving techniques being exemplified in the Lindoso and Soajo granaries (Ordem dos Arquitectos, 2004). The stone variant, but with more rudimentary development, without technical development of the components, is associated with the Serra d'Arga highlands, in Caminha municipality.

The all-wooden variant is associated with floodplain areas, close to settlements with more modest resources and fewer inhabitants, generally in milder climates with greater forest wealth, providing privileged access to oak and chestnut wood. Its dissemination is more dispersed and diluted, usually coexisting with groups of stone or mixed typology, even within very homogeneous groups. However, in some circumstances they can also refer to a technological trend, as in certain villages in Marco de Canaveses municipality in the case of narrow granaries; or the examples of wide configuration located in the areas surrounding the city of Porto, whether those with an upright appearance, located to the North of the Douro, or with sloping walls, to the South of the Douro, namely in the very characteristic case of the city of Vila Nova de Gaia (Dias et al. 1994).

The mixed sub-type, exemplified in the variant that dominates the coastal strip from the city of Viana do Castelo to the town of Vila Nova de Cerveira, with the clear distinction between the stone skeleton and the wooden slatted panels, appears mainly in the most dynamic and greater territorial connectivity. Generally associated with centres with the highest population concentration, administrative headquarters or places with more financial resources. It constitutes an evolutionary synthesis, perfectly defined, of the combination of more accessible material resources and the development of perfectly differentiated construction techniques. This last fact refers to the second distinction in the classification of variants and is related to the technical capacity of local communities. Places with a more developed construction culture, such as Barbeita, in the Municipality of Monção, show technical differentiation in the execution of the stone elements of the skeleton, due to the quantity and quality of local construction sites. As well as the number of cases identified around the towns of Ponte da Barca and Vila Verde, incorporating elaborate carvings and engravings made on the wooden parts of the doors and friezes, demonstrating the transversal relationship between the granaries building techniques and the local community's aptitude for woodcraft (Oliveira and Galhano, 1998).

In a more critical assessment, we can associate types with less material diversity with areas with more extreme conditions, referring to less developed construction cultures and above all associated with self-construction. In contrast, the types that present greater material diversity, developing more elaborate technological solutions, are associated with towns with more resources and more qualified craftsmen with activities that cut across the construction sector.

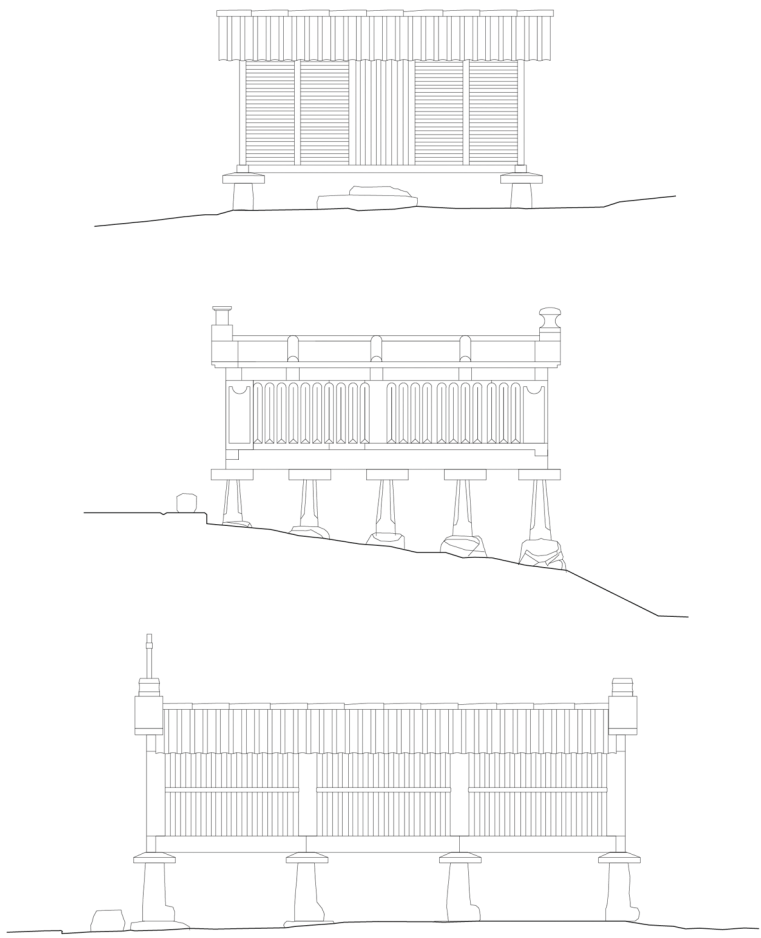

Figure 4.4 Main variants, comparative table.

Source: Drawing by author.

Time

The referential studies argue that granaries variants are primarily conditioned by sub-geographical resources, dependent of the development of construction cultures. With the necessary exceptions, generally associated with the isolation of higher altitude mountain communities, the materials used are uniformly distributed. Its traditional form, as previously seen, oscillates between all the elements made in granite or alternatively in chestnut wood and/or oak (preferably). With

the exception of the ancient replacement of thatched roofs with ceramic tile roofs, the inventories conducted reveal a remarkable morphological crystallization. This change is mentioned significantly although with rare graphic characterisations, so it can be inferred that, except for the variant of integral stone granaries, the tile-covered roof represents a completely assimilated traditional solution. The specific date of the surveys is not objectively identified in the publications, but the time interval can be deduced from the creation of the Centre for Ethnology Studies and the respective editions of published works.

Therefore, it can be safely stated that between the 1940s and the 1980s of the 20th century, considering a conservative interval, the record of the incorporation of industrial production materials is scarce (Dias et al., 1994: 135) and constitutes a gap in the inventory process carried out. However, any field survey carried out at the turn of the millennium, close to the busiest centres of activity, particularly in administrative centres or along the busiest roads, provides objective evidence that the vast majority of existing granaries resort to the use of hollow brick and, to a lesser extent, concrete as essential construction materials, without distorting their morphological configuration and compositional constitution. In some cases, the application of these materials presents a significant consistency, implying two situations that are decisive for their incorporation into the collective memory. The first is related to the production of these elements on a regular basis for this specific purpose, determining the recognition of their purpose and their economic justification, the second is related to the development of technical solutions stimulated by the intrinsic properties of the new material, also expressed in the systematic exploration of their aesthetic potential (Asquith; Vellinga, 2006).

The analysis of examples constructed with industrial materials, as illustrated in the comparative table, reveals a technical evolution that contrasts with the logic of traditional buildings. In these cases, the more recent the construction, the more rudimentary the building solutions employed to self-construction. This inversion of logic is also linked to the programmatic decline of the function associated with agricultural support units.

The examples of brick, present an enormous evolution within their own derivation, constituting areas and nuclei of great general homogeneity and particular feature, as in the case of the vicinity of the National Road N13 that connects the towns of Caminha to Valença with perfectly defined concentrations, or present in the small villages in the interior of the Municipalities of Paredes de Coura and Vila Nova de Cerveira.

Another of the most interesting examples are entirely metallic solutions, composed of profile skeletons and mesh or net walls, covered by profiled sheets, very present, for example, along the road axes between the towns of Ponte de Lima and Barcelos. The configuration of these solutions remains very faithful to the compositional matrix, both in size and proportion. However, in the second case, the components naturally have a much smaller section, which, without detriment to the internal volume, produces an apparently slimmer variant, suggesting an even more elongated configuration.

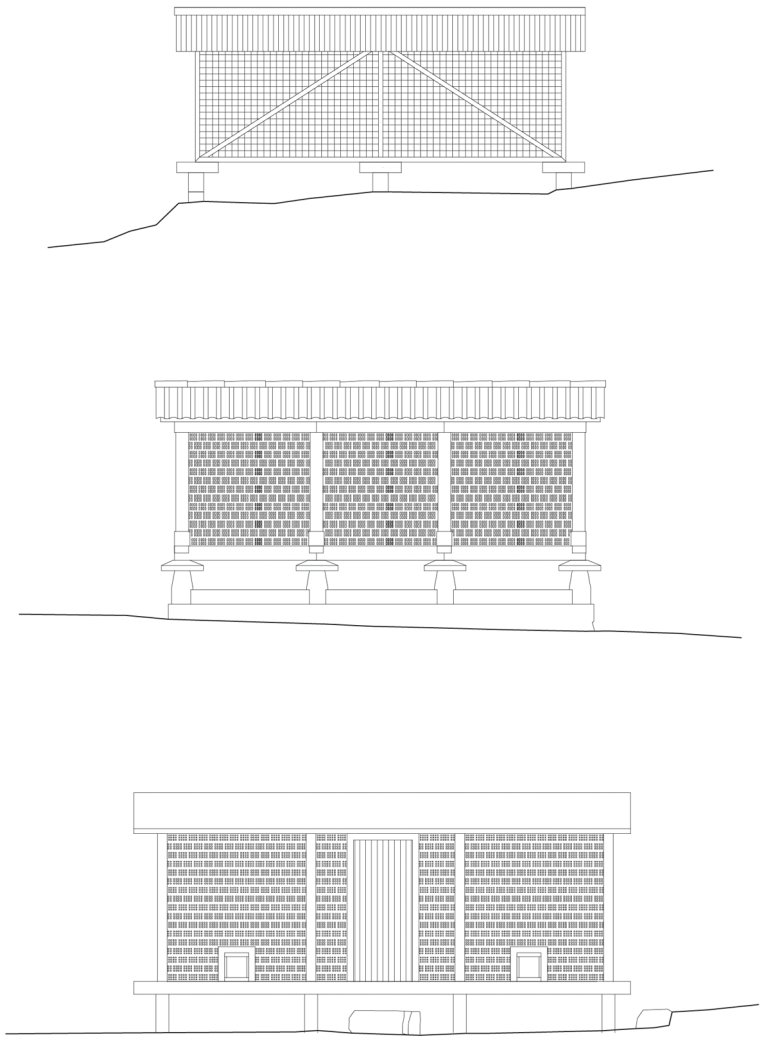

Figure 4.5 Incorporations of industrial elements, comparative table.

Source: Drawing by author.

This acculturation, as a symbolic incorporation, becomes more evident when we witness the objective standardisation of certain solutions, and above all, in the less common integration of iconographic or decorative complements in the execution of these popular variants. Therefore, concluding the importance of the culture of the bread cycle in communities, regardless of the authenticity/antiquity of the buildings associated with it.

The speculative granary: Between territorial reference and technological obsolescence

Whether on the coastal fringe or on the mountain headlands, within the urban core or in cultivation areas, the granary constitutes a differentiated element, which contributes to the formation of a specific cultural landscape. In its physical dimension it coincides with a specific geographic region, in abstract terms it represents the dynamics of a lasting rural matrix that extended beyond industrial transformation, perpetuating a technological anachronism very characteristic of Portuguese architectural reality (Ordem dos Arquitectos, 2004).

Granaries both punctuate the streets of the most traditional villages and coexist under the busiest highways, constituting a transversal element in the most recent territorial transformations. This generic identity is determined by programmatic specificity and results from the secular consolidation of the associated subsistence activity. Critically, this finding inevitably refers to a territory where the modernisation of agriculture was late or non-existent (Domingues, 2012).

There is a clear tendency, in the most isolated places and in less populated and dispersed villages, for the construction of granaries to be concentrated in larger community groups with great morpho-typological systematisation. This contrast, considering the residuality and irregularity of the nearest residential areas, gives them greater landscape dominance.

Even though they are technologically more archaic, they tend to have greater heritage value, with administrative recognition at local and national level.

Espigueiros, in this context, is understood as a particular autonomous nucleus, with independent structure. Located around the perimeter of a threshing floor, or several, they have clear alignments, generally transversal to the exposure of the prevailing winds, as in the case of Castelo do Lindoso, arranged in parallel rows. In other cases, as in the ones we could observe in the villages of Parada do Lindoso or even in Soajo, they are assumed to be perpendicular to the threshing floor, more regularised, and have a cruciform arrangement, involving it on all its sides. Finally, as in the case of the Eira Comunitária de Porreiras, in Paredes de Coura municipality, they are dispersed and isolated, always oriented in the same direction, West-East, flanking the smaller side of more irregular threshing floors, formalised in roughly levelled granite outcrops, forming groups with small gabled porches, called tulhas, which would alternately serve as shelters for livestock, covered for implements and covered in transition for the already threshed grain.

Circumscribed around the most populous and dense centres, granaries appear associated with residential complexes, generally one for each street, and due to the lack of space and better exposure to climatic elements, they are located along the perimeter of the property, precisely on the public domain.

In places where fence walls acquire great urban expression, consubstantiating narrow streets with broken geometry, embedded in the building fabric, granaries constitute occasional appearances of great constancy in the urban environment. They generally indicate the primary agricultural production properties, which stratified the clusters before the more recent cadastral fragmentations, encouraged

Figure 4.6 Date inscription on brick granary; Menstrestido, Vila Nova de Cerveira.

Source: Photograph by author.

by the appreciation of buildable soil and the devaluation of cultivated areas, inevitably consecrated by current territorial planning instruments.

Its overlap with the plot's enclosure elements suppresses one of its most characteristic typological elements: the feet. In this way, they are elevated over the lintels of the gates, or over the walls facing the street. Within this logic, they differ greatly from the opaque and irregular wall technologies of Alto Minho region, which constitutes a unique characteristic in the serial vision itineraries of rural settlements.

Regional variations arise from the ability of local communities to adapt to the means of execution. Despite the definition of a common compositional matrix of great territorial transversality, granaries demonstrate compatibility with a systematisation of components adapted to the available resources, material and human.

Figure 4.7 Granary placed over the property wall; Mentrestido, Vila Nova de Cerveira.

Source: Photograph by author.

The construction tradition of a given place, in a more limited territorial circumscription, produces consistent variations, which reciprocally also characterise its locations. Its relationship with the context in a micro-scale interpretation thus refers to a technological sub-specification, which, admitting many exceptions, manifests very coherent trends, with localised exponents of great cultural correlation.

The perpetuation of this typology is irremediably dependent on the regular production of corn on a small scale. Like other vernacular typologies, the economic changes that took place in the second half of the 20th century promoted its

Figure 4.8 Granary in an urban context, Vila Nova de Cerveira.

Source: Photograph by author.

progressive disappearance, given the suppression of its original programmatic need (Duarte Carlos et al. 2015).

However, more recent years have suggested the possibility of programmatic preservation, which, although residual, demonstrates a territorial dilution that could enhance the granary's typological survival. As expressed in the technological characterisation carried out, it can be deduced that the technical evolution of the granary is associated with the process of acculturation of the materials used, disruptive in its introduction and systematic in its repetition. A living constructive culture presupposes a permanent response to the needs that give it its purpose, in light of the technical conditions stabilised in a given context (Frey and Bouchain, 2013).

Much more interesting than the replicas, devoid of their original use, that decorate the public spaces of suburban homes in the region (in large quantities), will certainly be the examples of altered technology, with the indiscriminate incorporation of non-traditional resources, which seem to give this typology a consistent path for its formal evolution and its persistence as a characterising element of the built landscape of northern Portugal.

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Part II

Context

5 Urban buildings!

Sérgio Padrão Fernandes

In the Nolli footsteps

The research we propose is the expression of the investigation on the form of public space and its relationship with the built environment, focused on the potential of the city's ground floor, when understood as a system of spaces of articulation, interrelationship and coexistence – exterior and interior –, which welcome formal and informal, permanent and transitory appropriations.

The notion of "urban buildings" calls for a new point of view on the public space in the city, but this idea of public space above all calls for a definition of architecture in which the individual form of the building must always be in a direct relationship with the form of the city as defended in the conference presented at ETH Zurich in 2011, by Emanuel Christ and Christoph Gantenbein. (Christ & Gantenbein, 2012)

Inspired by Giambattista Nolli's graphic method, we intend to investigate the public form of the city to develop a new point of view on the design of contemporary urban places that respond to the new demands of public life and that explore an organic relationship between the parts of the urban fabric, which means stimulating reciprocity between the building typologies and the public space.

Intervention in public space is today one of the great challenges of cities that seek answers through urban rehabilitation to adapt pre-existing urban fabrics to current and contemporary demands. As a working hypothesis we want to formulate a new cartography of the city's urban ground that explores the representation of the public system as a representation of the structural form of the urban fabric.

We propose to address here the less explored fringes between urbanism and architecture, starting from non-stabilised concepts and deepening the study of the urban fabric in its relationship with a specific territorial context, as well as the correlation between the components of the Morphological Atlas of the Portuguese City, which has been developed by the *formaurbis* LAB research group, at Lisbon School of Architecture (Fernandes, 2014; Dias Coelho et al. 2022; Silva Leite et al., 2024).

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Methodologically, the drawing is explored as a way of knowledge. The analysis of urban form as research by design and the drawing analysis as a process of investigation. The proposed approach is also based in the analogue relations in architecture and urbanism. Understanding that the analogy can be defined as the similarity between things, or in its Greek origin, the similarity related with a sense of proportion. The transposition of the analogy to the field of urban analysis means a powerful operation of comparison that emerges as a form of dialectics attempting to bridge a conceptual relation between different urban fragments that share similar formal principles, as well, between the reading exercise and the process of design.

The city is approached as a manufactured object represented through its architectural consistency and built with walls, openings, steps, columns and other elements that together with a sidewalk produce an urban topography.

The research we are proposing is positioned at the intersection between urban layouts and buildings, where the urban public space is articulated with the component of public use, inside or outside the buildings. The form of the city is questioned based on the recognition of the living spaces on the ground level, as the preferred plane of access and relationship between the parts of the urban fabric (Stiftung, 2014) .

We therefore propose to study complex and ambiguous built structures as well as the form that public space is taking as result of the transformations of urban society, understanding public space as a common, free space that unites all of us within city (Gehl, 2017; Hertzberger, 1991).

The emergence of digital technologies such as online platforms has made previously private spaces and areas easily accessible. Coach-surfing has made private rooms and dwellings accessible online, as well as "secret" restaurants, which are nothing more than the dining rooms of private homes that people open up for public use. There have also been changes in the use of urban public space as result of the pandemic, the explosion of outdoor terraces, urban abandonment, and the need for housing (for residents) that has increased in the urban centres of metropolitan areas. All these phenomena have been catalysts for the transformation of the city and our living spaces, particularly on the ground floor of the city (Soja, 1996).

That's why we're interested in looking at what we might consider to be "urban buildings" or, more precisely, the built system that supports urban coexistence on the first floor of the city and which can play a special role in changing the shape of public space and reactivating the activity of urban spaces (Solà-Morales, 1992).

Urban buildings, what it means?

Access to public transport hubs in Tokyo through public buildings, access to shopping malls in Los Angeles by car or the three-dimensional circulation networks in Hong Kong that dematerialise the concept of urban ground are urban situations that go far beyond the classic definition of public space (Framptom, Solomon and

Wong, 2012). New York's Central Station and Istanbul's Grand Bazaar are also examples that call into question what is conventionally understood as a building.

In de *Architectura Libri Decem*, Vitruvius discusses the forum – the most important square in the city – as a public building. The notion of urban building calls for another point of view on public space in the city, but this idea of public space calls also for a definition of urban space or urban topography in which the individual shape of the building is always in direct relation to the shape of the city. (Vitrúvio, 1914 [20–30 BCE]).

The concept of urban buildings questions the urban role of built typologies and refers to the historical reference of the Plan of Rome elaborated by Giambattista Nolli and to the famous notion of Aldo Van Eyck who states that public space is more than the space between buildings and in this sense can be understood as part of the buildings themselves.

The Nolli Effect

The plan of Nolli

The invention of La Nuova Topografia di Roma (1748) by Giambattista Nolli became an original point of view for representing the complexity of the city's form beyond the conventional dichotomy of public-private or building-street (Smithson and Smithson, 2023).

To highlight the ambiguous and structural relationship between public space and buildings, Nolli represents the ground floor plan of public buildings in the city plan, particularly interior spaces for public use, which are thus understood as civic spaces, open in the extension or continuity of urban public space. Piazza Santo Ignazio (St. Ignatius square) is a paradigm that can only be truly understood in the relationship it establishes with the church that gave it its name.

The influence of Nolli

The innovation of Nolli's plan was translated into cartography as a need to represent urban space based on the articulated relationship between the shape of the city and the interior shape of buildings with a public component. There are several examples such as the plan of Padua (1784), by Giovanni Valle, and the plan of Munich (1806) or Milan (1914), which are drawn with the plans of the main churches, or the plan of Paris (1827) by Theodore Jacoubet and the plan of Barcelona (1862) by Miguel Garriga, which represent the city with the plans of public buildings.

The rediscovery of Nolli

In the mid-20th century, with the revaluation of the historic city, Saverio Muratori developed a series of ground-breaking studies on urban form. This work begins with the reading of the city of Venice. The integral representation of the city ground level supports the theory that the city must be understood as an organism and

where public and private are inseparable components of the same evolving entity. (Muratori, 1960) In this same line of research, it is also important to highlight the pedagogical experiments of Aldo Rossi at the ETH in 1973 and the famous "Rossi plan" of the centre of Zurich.

In 1972, Robert Venturi used the diagram "Nolli's Las Vegas" in his graphic decomposition of the Las Vegas Upper Strip to represent the sensitive and complex relationship between public and private space or the "private buildings – [Hotel Casino] – that are sculpted by the exterior and interior spaces for public use". (Venturi et al., 1972)

The rediscovery of the operability of Nolli's plan in 1978 at the "Roma Interrota" exhibition was intended to criticise the paralysis of the historic city and the inability to reuse the urban forms of the past. (Sartogo, 2014)

In the same year, Collage City by Collin Rowe and Fred Koetter was published. Using the famous "figure ground plan" diagrams and examples of urban megastructures – referred to by the author as "Ambiguous and Composite Buildings" – it demonstrates how, at the urban ground level, the form of the building and the form of the public space are inseparable, as are their relations of continuity (Rowe & Koetter, 1978; Frampton, 2021).

More recently, heirs to Nolli's invention insist on the idea that in the future, the transformation of urban form will involve reusing the built city and reinventing the relationship between buildings and public space, particularly by reinterpreting the ground level of buildings in line with an urban topography.

In 2010, Xavier Monteys and the Habitar research group at ETSAB-UPC investigated the "plantas bajas" (ground floor plans) of cities in Spain as a strategy for revitalising their streets. This is an inspiring vision of the potential of abandoned ground floors and the study of the reuse of buildings in their relationship with the city and the reactivation of urban spaces. (Monteys, 2010)

The exhibition "rez-de-ville, rez-de-vie" (ground floor, floor of life) organised in 2013 by the collective GRAU architectes urbanistes at the Pavillion de l'Arsenal, questions the urban landscape of Paris from street level. They defend the idea that in Paris the ground floor is the core component of an active part of the urban space and that, in this city, the building fabric is separated between the upper levels, which belong to individuals, and the street level, which belongs to the city (GRAU, 2013).

This exhibition inspired a group of researchers from EAVT Paris-Est, who under the direction of David Mangin developed the Rez-de-Ville project – Atlas comparative de rez-de-ville – with a group of international partners. The research questions the potential of the ground level of cities as a public/private interface and calls for a city project that focuses on the emergence of a common, active, flexible, productive and shared urban floor (Mangin, 2020). Still on the study of the form of urban public space, two works stand out that reveal the current concern of architects with the design of the city's ground level.

The work "Atlas Zum Stadtebau, Platze + Strassen" is a research project carried out by Vittorio Magnago Lampugnani at the ETH in Zurich, which was published in 2019 in two volumes and presents a collection of 68 unique urban situations – streets, squares, courtyards and promenades in Europe – characterised using various

drawings and different scales, from the general urban situation to the constructive detail. In this work, the representation of the public space is always articulated with the ground floor plan of buildings and the use of constant scales of representation allows for comparability between the various case studies.

The work is based on the idea that the historic city is an accumulation of knowledge and that research into the built city finds its purpose in the framework of the design process. (Lampugnani et al., 2019)

The work "The Architecture of Public Space" is exclusively dedicated to the theme of the architecture of public space and the urban elements that characterise Italy's historic towns and cities – galleries, loggias, porticoes, steps and courtyards. The observation of 30 admirable case studies allows the Labics Architecture Studio to convey the message that the city is structured on the basis of the relationship between buildings and public space and that the ground floor plan of the city is the privileged tool for studying and understanding this dichotomy in urban space. (Labics et al., 2023)

The urban building as an ambiguous building

We propose investigate urban buildings based on typological categories. Within the framework of "ambiguous building", we have broken down some of the formulas that make it possible to relate a building to public space, particularly urban squares. In addition, we also looked at buildings whose shape is the result of the creative action of the urban context, which could lead us to say that they are buildings shaped by the form of the city (Vidler, 1977; Aureli, 2011).

Building or square

The Praça do Comércio (Comércio square) is like an immense, continuous horizontal construction, where the pier, the square and the buildings tend to form a single entity that resembles a single construction, a single building, one and continuous. It is the condition of unity of this spatial entity that brings us back to a certain ambiguity and prevents us from separating the public space from the built ensemble or the shape of the buildings themselves from the shape of this square.

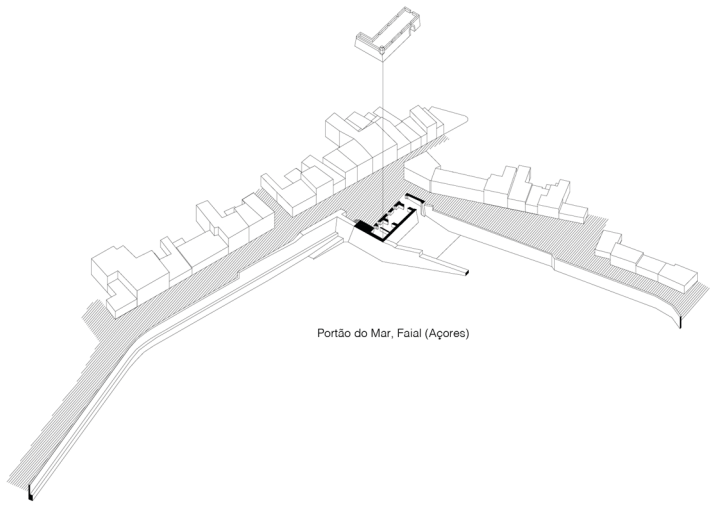
The square was designed during the reconstruction of the city of Lisbon in the 18th century and is one of the most unique examples of European royal squares, with a regular floor plan and one of the boundaries completely open onto the immense Tagus estuary known as Mar da Palha (straw sea).

However, this square is more than just a place to celebrate the power of king D. José; it is the point of maximum concentration of monumentalisation on the riverbank, where the city meets the water. On the ground floor, arcades open up into the large public buildings that delimit the square. These articulate the programmes of the ministries, the naval arsenal and the customs office with the public space. Some of these functions of the State have gradually been transferred to other parts of the city.

The Terreiro do Paço and the Praça do Comércio are squares that succeeded each other over time in the same location. Despite having very different shapes,

they hold the same symbolic importance in characterising Lisbon before and after the earthquake. By replicating the idea of a gateway, the design changes according to the context, but the same significance of the place persists.

Squares that define "Portas de Mar" (sea gates) tend to represent a certain ambiguity. They are simultaneously public spaces – square, public building, and



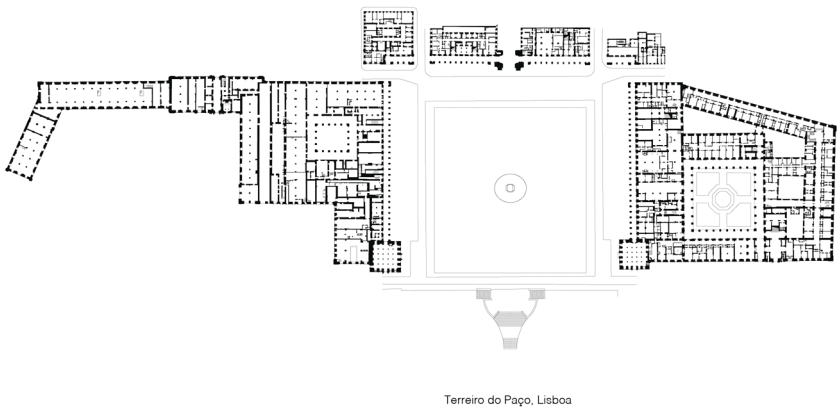


Figure 5.1 Urban building as an ambiguous building – Building or Square. Comércio square, Lisbon, plan. Portão do Mar, Horta, Azores, axonometric view.

Source: Drawings from *formaurbis* LAB, 2022.

monument. They are reference and permanent spaces that promote the relationship between the place and the landscape, and transitional spaces, in that they celebrate entry and approach.

A particular example of this ambiguity is the Portão do Mar do Porto Pim (Porto Pim sea gate, from 17th century). It is a fort that is part of a defensive system of the territory where the city of Horta was founded. Here, the sea gate is effectively a public building, whose symbolic urban role goes far beyond the programme it houses. It actually belongs to the public space structure of this city, between a ramp for ferrying boats and the small urban space that gives access to the fort and the terrace of the guardhouse, which is a *belvedere*.

When the Cruise Terminal was built in Lisbon (2018), the opportunity was taken to build a topography of public spaces that reinterpreted the concept of the sea gate. The project rescues the lost relationship between the old Navy dock and the dock that the Cruise Terminal has once again revealed. And by defining a new entrance to the city through a building, a new *belvedere* has been created on the roof that houses the programme, offering itself to Lisbon's public space.

In a way, both the Porto Pim sea gate and the Lisbon Cruise Terminal reinvent the typology of entering the city at very different times, from the sea and through a building erected with public conviction. Each project stands out more for the way it responds to the construction of a place, which reinterprets the typology of the city gate, than for the resolution of the programme for which it was conceived. The primitive fort or Cruise Terminal will always be extraordinary urban places, regardless of the functions they will serve.

Building and square

"Buildings and square" means a category of urban buildings that is revealed when the building and the square are a single, integral entity that, at the level of the city's ground, explores the complementarity between built and empty space, between interior and exterior.

The complex defined by the church and the wings of the Casas dos Círios or simply the inns, which are part of the sanctuary of Nossa Senhora do Cabo Espichel (Our Lady of Cabo Espichel) in Sesimbra, has a special complementarity between the square – terreiro – and the buildings complex that define it. This situation is the result of the unity of the sanctuary as a place and a very particular relationship with a site and a *finisterre* landscape where the typology of an urban space was transferred. But, despite the square possessing an apparent urban condition, there is no relationship here with an urban context or even a built fabric.

The sanctuary forms a rectangular square elongated according to the geography of the territory. The eastern front is open and marked by a cross. To the west, the church of Nossa Senhora do Cabo constitutes its boundary, which is permeable through two arches that formally connect the church to the wings of the lodging houses. These linear and continuous bodies extending on both sides of the church are volumetrically lower and practically symmetrical, with arcades on the ground floor. They define the longer sides of the square and contain a series of small individual cells that initially served to accommodate pilgrims.

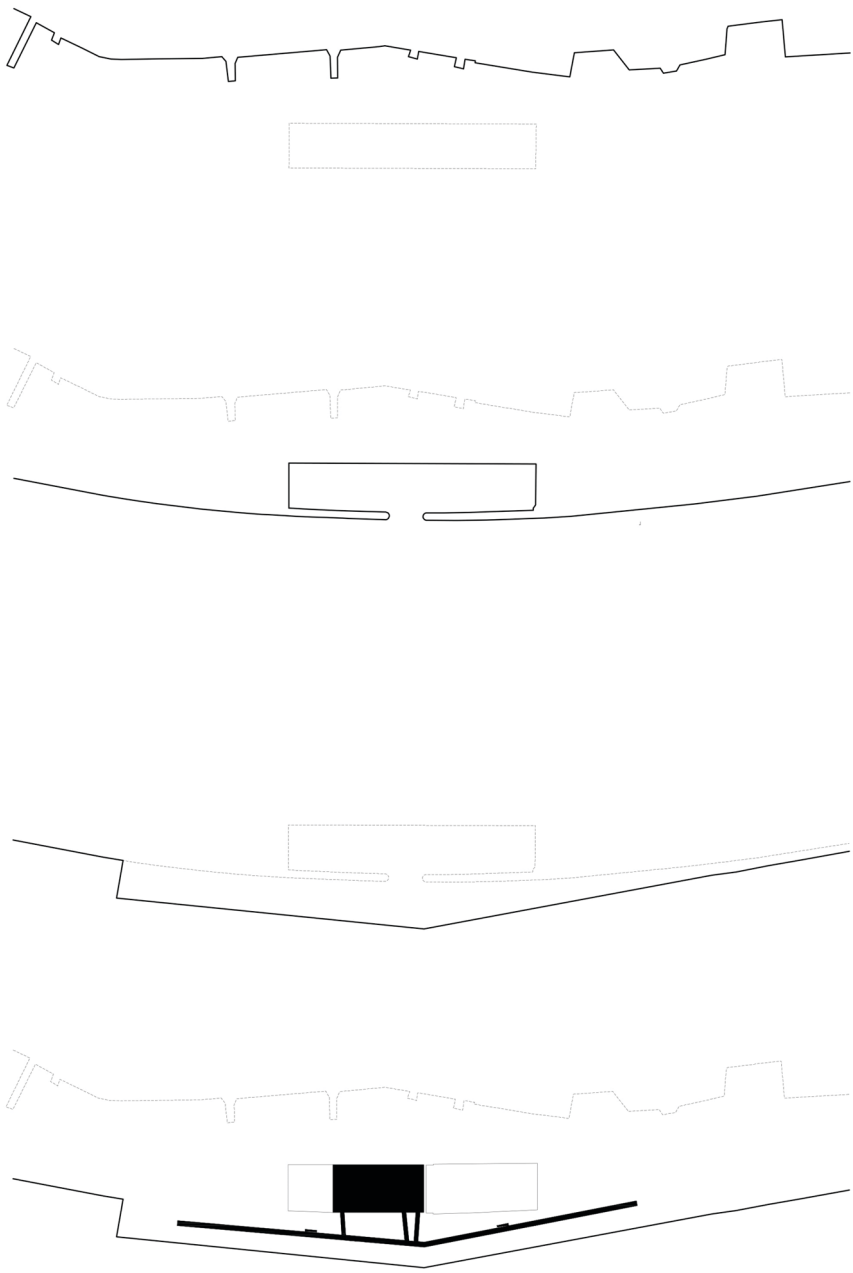


Figure 5.2 Urban buildings and ambiguity: Building or Square. Lisbon Cruise Terminal and waterfront evolution: 1856, 1911, 2008, 2018.

Source: Drawings from *formaurbis* LAB, 2022.

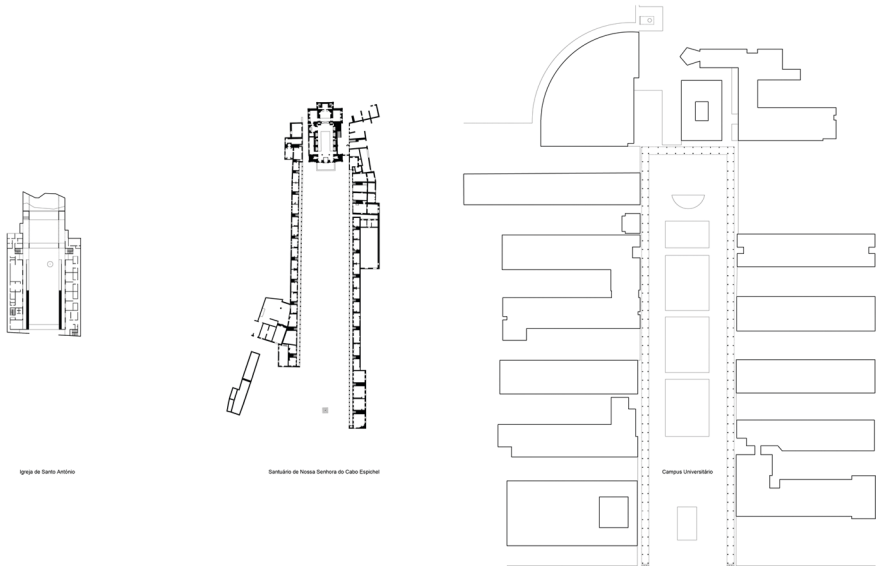


Figure 5.3 Urban building as an ambiguous building – Building and Square. Santo António church, Portalegre. Cabo Espichel sanctuary, Sesimbra. Aveiro university campus.

Source: Drawings from *formaurbis* LAB, 2022.

The use of the site as a place of pilgrimage probably predates the cult of Our Lady, which dates back to 1410. It was during the 15th and 16th centuries that a small temple and a camp surrounded by houses were built, whose construction and composition acquired the form it currently presents in the construction campaign undertaken at the beginning of the 18th century, due to the large influx of pilgrims.

On the university campus of Aveiro (1980s), the master plan is organised around matrix elements of public space, where the urban layout defines the public ground and supports the urban composition. The courtyard and the portico are the elements that define the structural form of the composition. They establish the shape of the urban space in the territory and its own evolution over time, if the renovation of the built complex maintains the reference to the shape of the square and the portico, which is the fundamental infrastructure of this public space.

The campus is structured and polarised around a large and monumental public square, which, in fact, corresponds to a reinterpretation of the monastic cloister. The idea of a collective courtyard is adopted in Aveiro with a more public aspect, as a central square articulated with the city's public space system. This plays a central role in the context of university life, in its use, and as a privileged place for meeting and socialising for the campus students.

This huge rectangular square with 232m. long is open on one of its shorter sides and is bordered by a portico that aggregates identical plots, defining a continuous

perimeter path that articulates the public platform of the urban square with the entrance to each of the buildings. Each lot is occupied by a different school and built according to the same formal matrix of urban design. The series of plots is symmetrically arranged along the longer sides of the urban square, on either side of the length, and they are articulated by the teaching science and technology facilities building for the university of Aveiro.

A similar condition of complementarity between the building and the square can be found in the Church of Santo António (2008) in the Assentos neighbourhood, in Portalegre.

The church and the churchyard are not only a place of worship but also and mainly a community centre.

The churchyard, although of restricted access, functions as a space for public use. It is a place where various social, educational, and charitable activities take place, reinforcing the sense of community and mutual support in the city's peripheral neighbourhood where it is located.

The church is set on a rocky mass, and its square plan is, in a way, the generating element of the churchyard, an elongated rectangle that precedes the entrance to the temple and is bordered by two lateral wings where the parish centre offices are located.

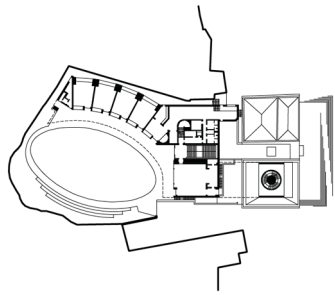
Despite the evident differences that distinguish the small church in Portalegre from the monumental square of the University of Aveiro campus, there are similarities between them and with the sanctuary in Sesimbra, both in the logic of space organisation and in the plan, which not only reveal formal analogies but also seem to be the result of a creative reinterpretation of the ancient sanctuary throughout the time.

Building with square

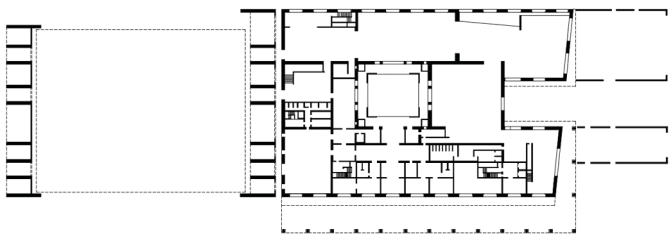
The "building with square" is a category of urban buildings that emerges when the square is a space that is completely open to public use and is also one of the rooms in the building. It is invariably an extension of the entrance that acts as a mediation interface between the building and the city's public space system.

On Lisbon's eastern waterfront along the river, the former dock of Olivais has become the nerve centre of the 1998 World's Fair and a key element of the urban composition of this urban area. The dock was surrounded by some of the most emblematic permanent pavilions of the exhibition, such as the Portugal Pavilion (1998). In contrast to the dock – water urban square – the covered square of the Portugal Pavilion was conceived as the land urban square of the Expo. It is designed as a solemn and protected entrance to the exhibition grounds, more than to the pavilion to which it is genetically associated. The square is actually the protected entrance to the Portugal Pavilion. It is defined by a cover, a thin concrete slab that ties to two parallelepiped volumes, whose perforations define transitions reminiscent of propylaeum.

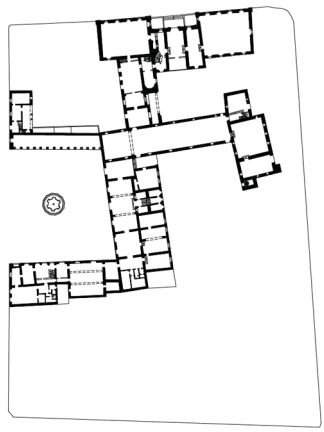
The urban square of the Arts and Creativity Centre of Torres Vedras was conceived as a collective place, for socialising and mainly as an outdoor events hall for this new public building in the city. The terraces and public steps that contour



CAC Torres Vedras



Pavilhão de Portugal



Paço Arquiepiscopal de Braga

Figure 5.4 Urban building as an ambiguous building – Building with Square. Arts and Creativity Centre of Torres Vedras. Portugal Pavilion, Lisbon. Archbishop's Palace, Braga.

Source: Drawings from *formaurbis* LAB, 2022.

the slope of an old quarry crater are seen here as bleachers where the stage backdrop is the building itself.

This arts centre was adapted in 2021 from the ruins of an old slaughterhouse, located between pedestrian paths and the remains of a deactivated quarry. The elliptical shape of the square is suggested by the concavity of the rocky outcrop that defines one of its fronts. On the opposite front, a new structure added to the pre-existing building creates a covered gallery that precedes the café, workshops, and street shops.

Just like the Portugal Pavilion or the art centre of Torres Vedras, similar characteristics can also be recognised in the former Archbishop's Palace of Braga, where the building's entrance is an urban square and simultaneously a compartment of the building itself that relates the interior space with the public system of rooms.

The Archbishop's Palace has its history sedimented between the 14th century and the present. It is, therefore, a complex spatial structure that has evolved and transformed over time, whose metabolism has produced an unusual urban-architectural ensemble. It is currently occupied by the rectory of the university of Minho, the Braga public library, and the Santa Bárbara garden. The abandonment of the military function of the Archbishop's Palace resulted in the construction of new structures and the expansion of the complex, which also increased its urban significance. The construction campaign that began in the 16th century sought the image of the palace as one and integral object. It focused on the relationship between the building and the main street of the city, resulting in the opening of a new square – the Largo do Paço – that allowed the articulation of the Archbishop's Palace with the cathedral complex.

Urban building as sequence of atomised rooms

The urban building is a sequence of atomised compartments when the ground floor is made up of a system of dispersed indoor and outdoor compartments, intended for public use and articulated with their own nexus.

The Maritime Museum in Lisbon, including other services of the institution such as the archive and library, occupies a building complex that is divided into three architecturally distinct areas connected by an urban square, and was built at different times: the wings of the Jerónimos monastery, a 16th-century building that has been divided for various purposes. It was also partially adapted in the mid-20th century to house part of the Maritime Museum's collection.

The Galeotas pavilion is a hangar or exhibition hall of the Museum. It was the first addition to be built at the end of the 1950s, adjacent to the monastery, with the purpose of museum use and to house a set of full-size boats. The plan distinguishes an exhibition hall and a smaller lateral body that houses the bar and shop services. This volume creates a counterpoint with the main entrance of the museum, located in the tower of the old monastery, and is an important element in the balance of the public urban square.

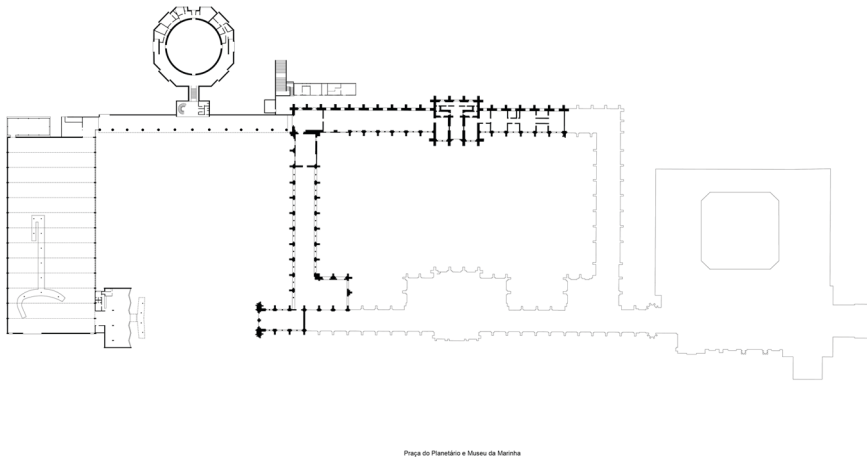


Figure 5.5 Urban building as a sequence of atomized rooms. Maritime Museum.

Source: Drawings from *formaurbis* LAB, 2022.

The building of the Study Centre and the Planetarium is part of a set of buildings constructed later, in 1963, which also includes the astronomical observatory and the rooms of museum's workshops.

The building of study centre is characterised by a horizontal volume that contrasts with the semi-spherical form of the Planetarium, positioned at the axis of the composition.

The plan articulates the octagonal body of the Planetarium, in a recessed position, with the two-story longitudinal body of the buildings. This opens at ground level, creating an exhibition gallery open to the public space.

The urban square, along with the gallery, unifies, articulates, and gives coherence to the set of the museum's three different bodies, becoming part of the museum's exhibition programme, associated with a recreational use of the public space.

When the city shapes the buildings

Buildings at the corner

Among the cases of corner buildings that we were able to observe in the Atlas of Built Typology in Portugal, the FPM 41 tower (2019) in Lisbon is an exemplary case of a building whose form is shaped by the city's alignments. The composition is the result of a crossroads of different streets intersecting at the point where this office tower was built.

The FPM 41 builds on the ambiguity between the public and the private and the building was born with the desire to make city. The building has an axial

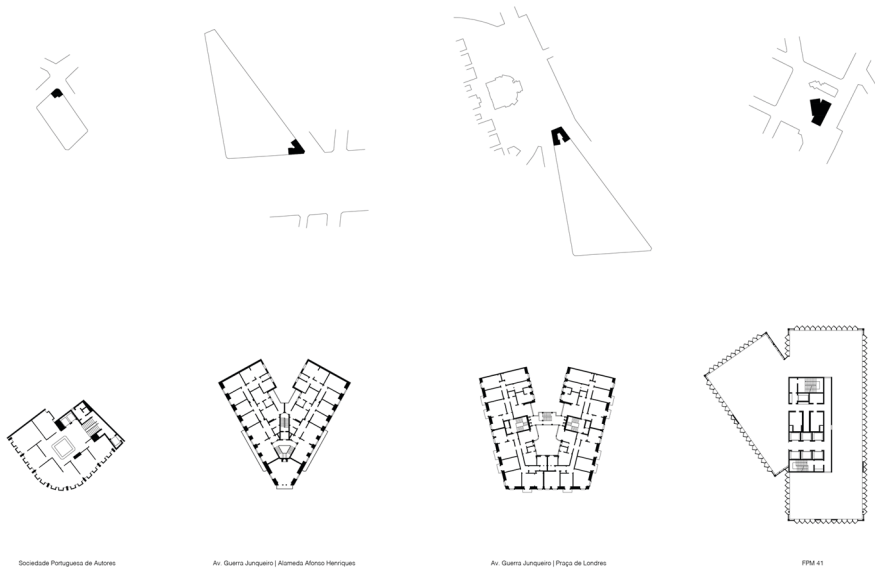


Figure 5.6 Buildings at the corner: comparative table.

Source: Drawings from *formaurbis* LAB, 2022.

composition without being symmetrical and is based on a composition principle: alignments with streets and dematerialisation of ground-floor limits between inside and outside.

In FPM 41 the boundaries of the lot are assumed, the building is advanced to define the corner, but in a large console supported by the central structure of the tower, which allows the release of the floor and the creation of a tension with the entrance, also it more retreated. The entrance to the cantilever is a private space, but for public use and is related to the widening of one of Lisbon's main arteries where, at the intersection of FPM 41, there are some unique buildings that are set back to favour the size of the avenue. The building thus has a strong urban vocation. It articulates the widening of the avenue with a new public space of considerable size that has been transformed into a space of great public enjoyment. The tower stands as a landmark building, between two urban spaces that are strategically articulated through the tower's base, thus taking advantage of the corner situation to exploit a significant urban presence. While the main body of the tower is more associated with the widening of the avenue, the new garden square articulates directly with the secondary body of the tower, in continuity with the public programmes of its ground floor.

This square of triangular contours is defined by the combination of the alignments of the streets in this place and by the overlapping of one of these axes in relation to all the others, that, when prolonging to the south, it hierarchises the juxtaposition of different urban layouts that are arranged with different orientations.

The difficult plot

In Oporto city the Coliseu do Porto (Coliseum) is a famous performance hall built between 1939 and 1941.The hall is multipurpose, allowing for various types of performances. It has a circular plan, designed in the shape of a horseshoe, with an interior organised into a tiered seating area with a capacity for about 3,000 people.

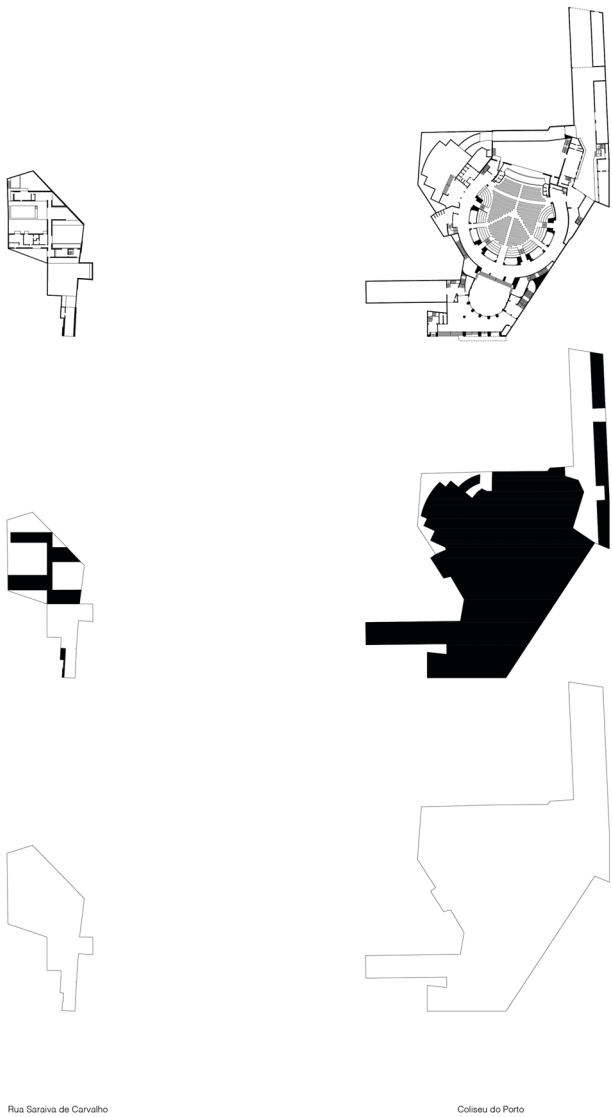


Figure 5.7 The difficult plot. Coliseu do Porto, Oporto and Santa Isabel houses, Lisbon.

Source: Drawings from *formaurbis* LAB, 2022.

The stage has a rectangular proscenium, positioned at the axis of an apparent symmetry that organises the sequence of spaces between the foyer, the seating area, and the stage, which has a irregular layout, although it is equipped with complex machinery and a hydraulic lift. In this building, the regularity of the main rooms and the interior space organisation contrasts with the irregularity of the plot on which it was built.

The plot parcel is located between streets that, through narrow facades, provide access to a large plot that expands within a large block from the 18th-century expansion of Oporto.

The apparent difficulty of the plot allowed for a creative arrangement of the architectural programme. It pushed the performance hall and the adjacent technical areas towards the interior of the plot. It also allowed for distinct entrances, one on each street: a technical entrance with direct access to the backstage, and another, more formal entrance marked on the street by a protruding tower combined with a canopy that shelters a recessed entrance.

The same phenomenon that characterises the relationship between the Coliseum of Oporto and its plot is also observed in the Houses in Santa Isabel (2010), in Lisbon. Although this involves a very different programme – a residence – in this building located at the rear of an ordinary collective housing building, the interior of a huge urban block with capillary access from the street was also utilised to organise a new house.

As with the Coliseum, the irregularity of the plot contrasts with the regularity of the compartments. In this case, three large square courtyards structure the organisation of the interior of the house with very regular and hierarchised spaces.

The Nolli manifesto

By understanding the public space system as a structure and the city as a context, the survey of buildings in Portugal made it possible to recognise that urban buildings define urban form when they are born out of the impetus to take on a generous counterpart to support the city's public life. These are buildings that create or reinterpret traditional streets and routes, squares or blocks and build a direct, structural and indestructible relationship with the shape of the city.

The composition of urban buildings is sometimes determined by the city's forms, thus revealing the tension between pre-existence and programme, between context and composition. Particularly expressive of this are the corners at the intersections of streets or the plots with irregular outlines, which are the result of the concordance of layouts or an opportunity to take advantage of the territory's resources.

But the atlas of building typology has also made it possible to compare different fragments of the urban fabric and discover other systems which, being complementary to the public space, structure the shape of the city and explain the urban space organisation or even the composition of the buildings within their context.

From our reading of Lisbon's built fabric, we have highlighted three lines that help us explain this idea and, which, in fact, are three systems or three infrastructures of this city. The first, without any relation to order or hierarchy, refers to the Cerca Fernandina (city wall built in the 14th century) which lost its military significance from the 16th century onwards and which, from then on, was progressively dismantled, sometimes appropriated or even reinterpreted in some of its elements, such as the towers or gates.

On some occasions in the city's history, the city wall served as a support for buildings. Today, this infrastructure it is almost entirely absorbed by the urban fabric and is practically imperceptible. However, it is this line that gives meaning to a very distinct set of buildings that have their shape profoundly determined by this decommissioned system and which, if observed without awareness of the substrate of the old city wall, look like strange built forms, randomly arranged in the territory. These buildings were built at different times to respond to different programmes and needs. Examples include the housing complex in Chiado (2006), the Belmonte palace (15th–16th century) or the Casa dos Bicos (16th century), the Rossio train station (1887), the Trindade theatre (19th century) or even the Graça Convent (12th–18th century).

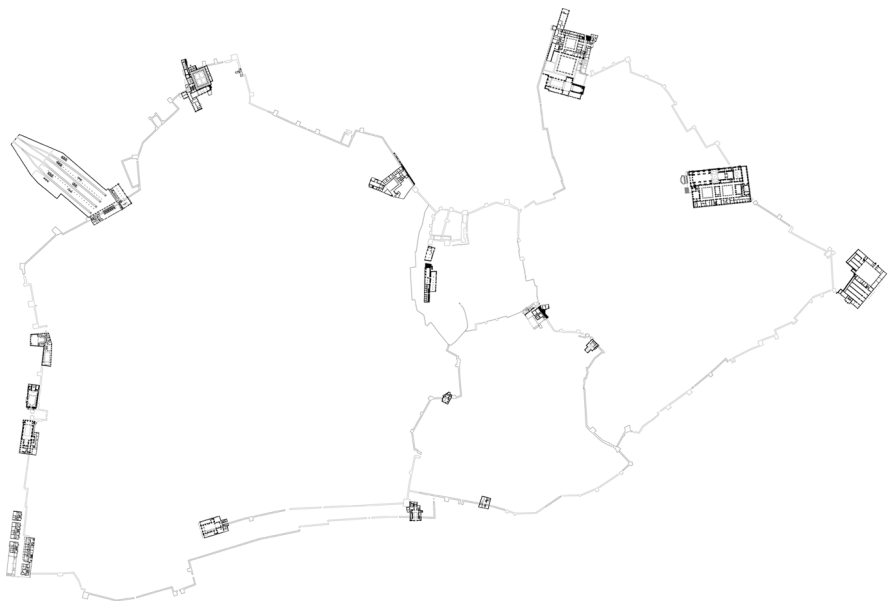


Figure 5.8 City wall system and buildings.

Source: Drawing from *formaurbis* LAB, 2022.

Another line refers to the Águas Livres aqueduct and more specifically to the 58 km-long water collection and transportation network, which was built in Lisbon during the 18th century and was in operation until 1960. Also, to the consequent impact of this infrastructure on the shape of the city and the creation of a system made up of pipes, buildings and urban spaces.

Of all the elements that make up this system, we can highlight the Alcântara Valley aqueduct, which is both a conduit and a pedestrian route. It is 941m. long and has the largest ogival arch ever built in stone. In addition to the pipes that carry the water, there is another set of buildings that store it and which, like the fountains that used to distribute it, have a strong presence in the urban space. They assume a referential existence in the streets or squares where they are located, such as the Mãe de Água (water tank) das Amoreiras, the patriarchal reservoir or the Esperança fountain.

The last example is Lisbon's waterfront (1940) or, more specifically, the 17 km long waterfront line that was built with a limestone wall between two towers, one in Belém and the other in Expo. This white line of stone is more than just a new riverfront. It is actually the formal expression of the port infrastructure that was built in Lisbon between the end of the 19th century and the middle of the 20th century.

In addition to the ship repair docks, it includes other docks such as Belém, which supports pleasure boating, the Olivais dock where the Lisbon Oceanarium is located and the Jardim do Tabaco dock, which was transformed into the Lisbon Cruise Terminal.

It also includes several other port facilities and a series of emblematic buildings that over time have symbolically marked the monumentalisation of the city's waterfront, such as the Torre de Belém (Belém tower from 16th century), the Padrão dos Descobrimentos (the monument to the discoveries from 1940) and the Vasco da Gama tower (1998). Integrated into the waterfront, these buildings reveal the current maritime and port tradition of the Portuguese capital.

This infrastructure is a system that, like the ancient wall or the aqueduct, unifies a set of elements – buildings and urban spaces – which, on the one hand, can be compared to an urban building. On the other hand, these systems also reveal the capacity of the city's form to transform, to be reused, reinterpreted or even re-signified. This proposed methodology advises analogies between analytical and designing procedures. Thus, it is possible to admit that the knowledge extracted from the urban buildings may be transferred to the development of new concepts. While the urban design must be a possibility of reinterpreting the forms of the inherited city by overlapping new meanings to the layers of the past.

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6 Passage Building

An interface to intimacy

João Silva Leite

Limit, ambiguity and porosity in the city

> *Porosity is the inexhaustible law of the life of this city, reappearing everywhere.*
> (Benjamin and Lacis, 1978 [1925]:168)

In the Western European city, public space is the main place for the collective and for democratic freedom. In the urban form, public space is seen as the structure and support of urbanisation (Sòla-Morales, 1997) and has become the primary space where people interact; it is the place where people live together (Gehl, 1971). Its importance is particularly relevant today, when the various processes of fragmentation of the urban fabric have broken down spatial continuities. This makes it difficult to read and recognise places, making the spaces for meeting and sharing in the city's collective fabric imprecise.

New spaces and ways of inhabiting the city have transformed private spaces into places for collective use, reconfiguring boundaries and redefining the way we live in the city. The undefined line between private and public constitutes a more complex and variable dynamic in the urban space, causing difficulties for urban understanding and interpretation on the one hand, but on the other, unleashing a "series of high-potential modes of urban habitation". The ambiguity of appropriation produces greater spatial versatility, which enriches the city and its daily experience (Silva Leite and Proença, 2020). In this sense, there is a contemporary trend in urban and architectural production that questions the classic limits between public and private, between interior and exterior spaces, presenting ambivalent spatial solutions that centre their concern on creating space that serves the collective, the people. Xavier Monteys (2010) points out precisely one set of hypotheses or architectural devices that, working with this ambivalence in the urban space appropriation, explore a greater porosity of private space, allowing public space to expand into the built fabric and thus contribute to a greater activation of the street and its urbanity. To a certain extent, it recovers the idea of the threshold expressed by Aldo Van Eyck (1962), where the limit is understood not as a surface that is simply crossed, but as a space that has thickness and that can be crossed or remained. The threshold becomes a place to inhabit (Boettger, 2014)

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The building then plays an important role in concrete definition of the boundary. The transition threshold between the built and the empty space of the city will constitute edges or spaces of greater permeability. In singular building typologies (Dias Coelho, 2013), there are tensions or spatial narratives where the limit and border spaces are conceived as integration strategies between the building and the public space. These dialogues take on special typological relevance when the building itself assumes responsibility for shaping or transforming the form of the public space. Using various compositional and formal solutions, the building designs squares, streets, *patios* and passages, or simply through small architectural devices such as transparency, thickness or dilution of the limit, it ends up directly influencing the urban layout of the city. In this way, the built object emerges as a transformer of the city's public place, linking typology to the morphology of the polis (Silva Leite et al., 2024).

In this respect, the Passage Building has particular interest because, on the one hand, it typologically realises an overlap between two urban elements (Panerai, 1999) – Street and Building – and, on the other hand, it develops urban porosity that can be used for various purposes, public, private or both. The Passage Building is not just understood as an object that makes it possible to cross the urban space from one part of the city to another, but as an architectural system that is designed and structured according to the passage space it creates. A symbiosis is established between the built fabric and the empty spaces. Just as Giambattista Nolli expressed conceptually in his plan of Rome in 1748, where he represents the ambiguous

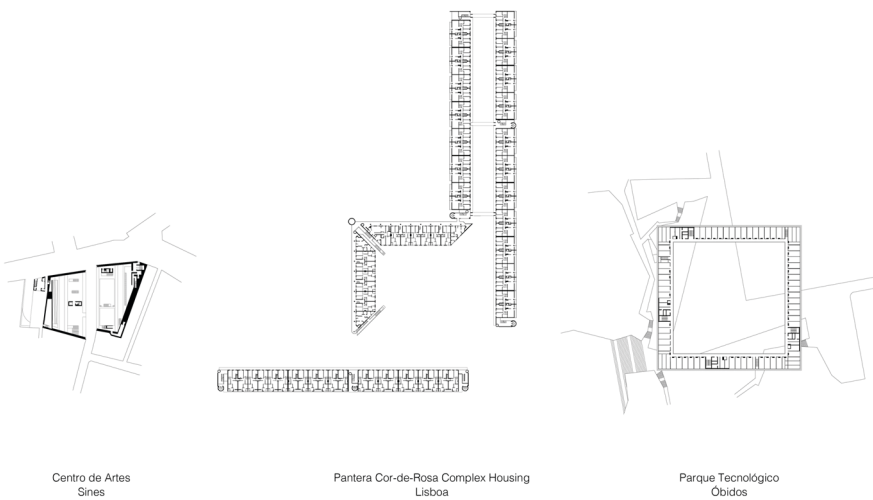

Figure 6.1 Comparative Table: Building that designs public space.

Source: Drawings from *formaurbis* LAB, 2022.

nature of the private spaces of some singular buildings as transformers of the city's public structure. The continuity between exterior and interior, in addition to the spatial value, reinforces the constitution of formal links between the built typology, the architectural element and the public space.

From the passage to the passage building

The passage as an architectural type emerged in European cities in the 19th century with the Palais Royal in Paris. As a typological variation of the colonnade and gallery (Geist, 1985), the passage is an opportunity that creates a dense rupture in the urban fabric of pre-modern European cities. Between the street and the building, the passage incorporates a hybridity that reminds us of the oriental bazaar and quickly established itself throughout Europe as a complementary element to the public layout of cities.

The passage became the main commercial space in European cities, representing a place of comfort and quality. In addition to its function as a link between different parts of the city, connecting two opposing streets, the passage is also a space for socialising and permanence, mainly linked to cafés or tea rooms. Its importance in the collective dimension of the city is such that Walter Benjamin[1] considers the passages of Paris to be objects that characterise the capitalist society that was emerging in the 19th century.

> *The arcade (...) become the driving force behind a reorganization of public space. It became the unmistakable index of urban life.*
>
> (Johann Friedrich Geist, 1985:VII)

Despite their loss of relevance over the course of the 20th century, passageways continue to play an important role in the urban structure. Cities such as Paris, Milan, London or Buenos Aires still have some inherited examples that still represent shortcuts and alternative commercial spaces to the traditional public space. Its meaning as a central place of consumption and meeting is practically reduced to the primary condition of a connecting element. It is consolidated as a transition device that connects different buildings or urban spaces (Apel-Muller, 2017). Take the complex systems developed by cities such as Tokyo (Silva Leite, 2016), Hong Kong, Montreal (Mangin and Girodo, 2016) or São Paulo (Lima, 2020). The passage has become a fundamentally articulating element that is sometimes accompanied by commercial activities that seek to capitalise on the flow of people. In these cases, the walkway is associated with the construction of connection networks between major mobility interfaces and the city, linking different built structures such as stations, platforms, buildings or remarkable surrounding public spaces.

In some cities, including Lisbon, the passage also finds an echo in commercial systems that develop along the ground floor or underground (Allegri, 2016). Small shopping centres are set up close to street level and colonise the lower floors of

common buildings in the urban fabric. These spaces make it possible to cross the block, but without constituting a typological autonomy. They are part of a building and not a specific building.

In this sense, it is important to keep in mind some examples where the relationship between building and passageway has remained more intrinsically linked. Situations such as the Manzoni Theatre in Milan, designed by architect Alziro Bergonzo (1950), show a formal interdependence between the pathway and the building. The spatial structure functions as a whole, and in this case the passage emerges as the theatre's first (public) foyer. It is through the passage that the user accesses the interior of the building. The boundary between the passage and the theatre is also blurred. The transparency of the threshold plane and its total permeability (when open) produces a spatial extension of the passage into the interior. The main foyer merges with the passage.

The Manzoni Theatre in a sense reproduces examples such as the Royal Opera Arcade (1818) in London or, at the beginning of the 20th century, the Lindengalerie (1909), which was directly attached to the Linden Theatre and the Linden Hotel. Both cases have not survived to the present day, and only the gallery of the Royal Opera Arcade can be seen. In these cases, but also in others such as Reading Terminal in London or the Herzog & De Meuron Funt Hofe in Munich (2003), the spatial structure of the architectural building is dictated by the presence of the passage. The building's type-morphological characteristics are shaped by the passage, by its needs as a connecting element, but also by the urban value it incorporates. The passage is an essential part of the transition system between the building and the city. This symbiosis establishes the understanding of a specific typology – the *Passage Building*.

The links that are built, rooting the passage in the spatial and functional structure of the building, give this built artefact a distinctive urban feel. The building, regardless of its public or private use, interacts with urban life, offering new circulation paths to the public space. This feature favours the development of a set of ambiguous spaces that will reconfigure the public form of the city. The limit between public and private is challenged, with the passage functioning as part of the city's layout, but at the same time it is part of the building's private structure. The Passage Building is an interface, an urban mediator where public and private spaces merge and become a single collective space, expanding the urban habitat and the way we appropriate places.

Between the collective and the intimacy: Sagrado Coração de Jesus Church

> *... the city is a big house inhabited by all of us; and that, therefore, it is not a question of making a building, but of creating places from a building.*
>
> (Portas, 2011:161)

Throughout its history, the city of Lisbon has also embodied a few examples of urban artefacts in which the passage appears as an element of articulation between

Figure 6.2 Funf Hofe Galleries (1) and Manzoni Theatre photographs (2).

Source: Funf Hofe photographs by Gonçalo Valente, 2013 and Manzoni Theatre Photographs by author, 2019.

different parts of the urban fabric. Galleries, ground floor pathways, lifts or simple elevations of the building through pilotis emerge as spatial solutions that make up passages that enrich the diversity of the urban space, introducing alternative routes and in some situations new places to stay.

In the 20th century, from the 1960s decades, Lisbon saw the growth of a series of commercial galleries in its central urban fabric that redefined the ground floor of some buildings, promoting porosity in the basement and thus extending the public space into the interior of the built fabric. This phenomenon has developed in various areas of the city, but it is in the central area of the Avenidas Novas neighbourhood that it is most significant. In certain situations, these commercial

spaces end up promoting crossings that break up the block and thus establish links between different streets. The gallery's interior space combines with the city's public layout to form a symbiotic relationship between the commercial space and the city. On the one hand, commerce feeds off the consumption of the population but, at the same time, it promotes an improvement of the surrounding urban space (Allegri, 2016:62). However, the idea of passage appears in these situations consequently and not as a profoundly transforming agent of the building or even as a structuring element of the very idea of the formal composition of the architectural or urban object. In the opposite direction, there is a notable example in Lisbon, the Sagrado Coração de Jesus Church, where the concept of passage is interpreted as an integral component of the architectural object.

In the work of architects Nuno Teotónio Pereira and Nuno Portas[2], the passage is not just another urban device that allows people to pass through but is constituted through formal interrelations that are inseparable from the church itself and the rest of the religious complex. The work is composed through the passage and the idea of the Passage Building emerges with great eloquence.

The Sagrado Coração de Jesus Church, completed in 1970, is a significant landmark in Lisbon's architectural panorama, not only because of its architectural language, but also because of the relationship it builds with the city. The result of a public competition launched in 1961 for the construction of a new religious complex on a plot located in a block between Rua Camilo de Castelo Branco and Rua Santa Marta, next to Avenida da Liberdade, the church was supposed to serve the population of this central area of Lisbon on the one hand, but also to constitute a new centre on the other. In this sense, the project developed by the two architects, both progressive Catholics and members of MRAR[3], will be influenced by two significant historical events – the Second Vatican Council (1962–1965) and the 25 April Revolution. The first redefined a new relationship between the Eucharist and the community, while the second was linked to a certain democratic spirit that was beginning to emerge in Portuguese intellectual society at the time. The interior space of the church is seen as a large hall, a grand amphitheatre, while the system between the church and the rest of the parish complex forms a "micro-city" (Grande, 2021). In addition, the proposal incorporates a set of conceptual and typological principles observed in various Italian, Spanish, French and Nordic works, which Nuno Portas had learnt from various trips he had made in the years before. In these various reference examples, the idea of an amphitheatre space is recurrent, and Teotónio Pereira's project for the Church of Penamacor is the first test of spatial reform, in a clear *"intersection between tradition and modernity"* (Grande, 2021:9). However, it is in its relationship with the city that the work becomes truly unique. The Sagrado Coração de Jesus Church has a very particular urban sense, not only in the way it seeks a certain anonymity, integrating itself into the built fabric of the urban block, but also in the way it forms a relationship of continuity with the urban layout. Having in mind, at the time of the competition (1962), the need to create an open space within the plot, the architects developed a project whose form is based on the creation of a passage. Conceptually, the project is based on a massive block, with the church and the rest of the religious complex being

born from the subtraction of material that will create the passage and respond to the lack of connection between the church and the two parallel streets.

> *... there is the idea of filling the plot completely and then excavating the spaces and fragmenting the volumes.*
>
> (Nuno Portas in Providencia and Baia, 2019:106)

So, the emptiness that constitutes the passage directly influences the architectural form of the entire religious complex, while at the same time giving it a centrality

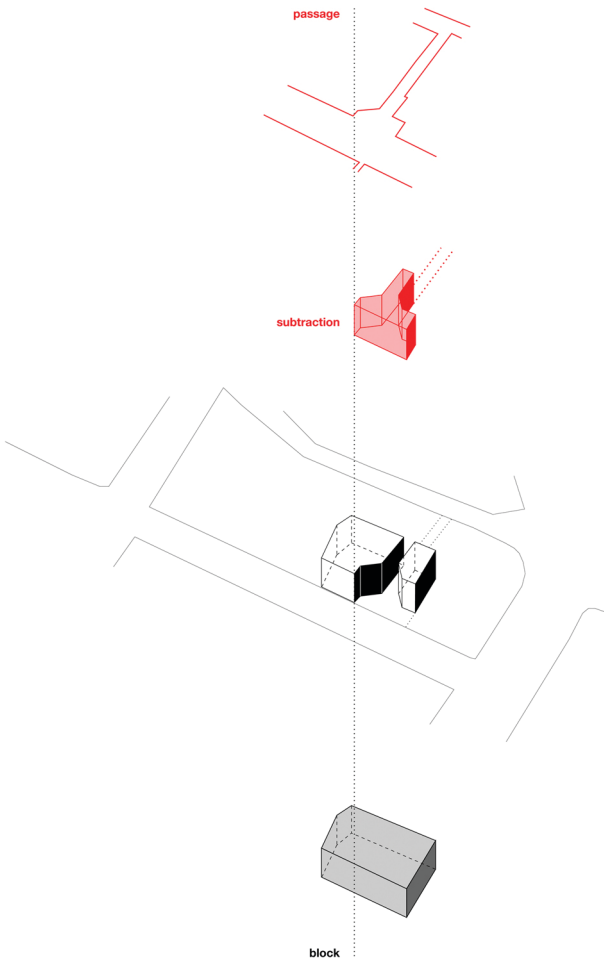

Figure 6.3 Conceptual diagram of the formal composition progress of the passage from Sagrado Coração de Jesus Church.

Source: Drawing by author, 2022.

and symbolic meaning. It is in the passage that everything is concentrated and hangs. The passage is a gravitational line where the community and the collective spirit meet. This space is the structuring and supporting element of the building and its programme activities, but also the element that ties the project to the city. The passage becomes part of the urban layout, dissolving limits and accommodating the daily dynamics of the polis. It is a stairway that connects the approximately 7-metre gap between Camilo Castelo Branco Street and Santa Marta Street and brings the public space into the plot. Curiously, in the opposite direction, the passage builds a relationship of extension with the next block to the west, using a second, private crossing system to create a visual continuity that spatially extends the passage.

The urbanity of the passage comes from an intelligent combination of this idea of a building-street, which is gradually discovered, and an efficient articulation with the various functions of the religious complex, which are organised into different levels along the passage[4]. The very shape of the passage creates a succession of spaces that are not entirely obvious at the beginning (Santana and Cunha, 2020). As you walk along the passage, you realise the site is in a sequence of darker spaces, others that are wider and more open, some that invite you to stay and others that only allow you to link up or access them.

The very formal attributes of the passage create the conditions for greater diversity and spatial richness. The combination of form, space and architectural elements favours the establishment of different places and atmospheres. Spaces where the roof of the entrance squeezes us and takes us back to a more human scale are contrasted with wider places like the central courtyard, which allows us to extend our view and observe the sky and the built structure as a whole. The

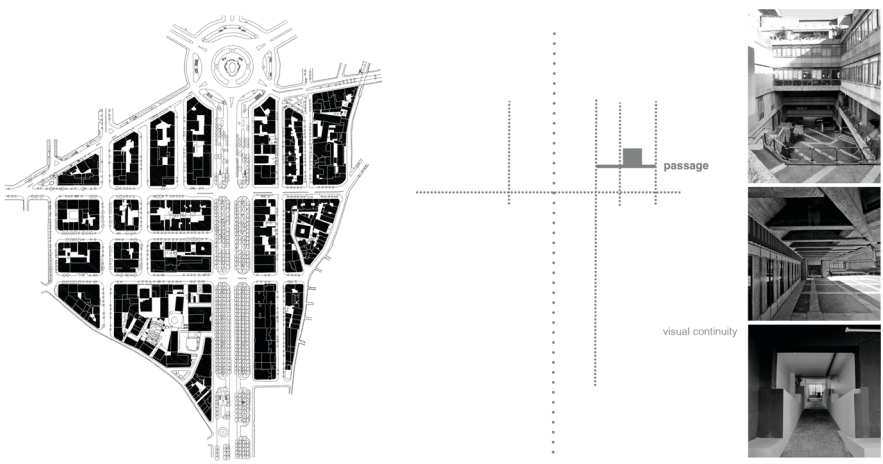

Figure 6.4 Passage system in the urban fabric of the Avenidas neighbourhood.

Source: Drawings and photographs by author, 2022.

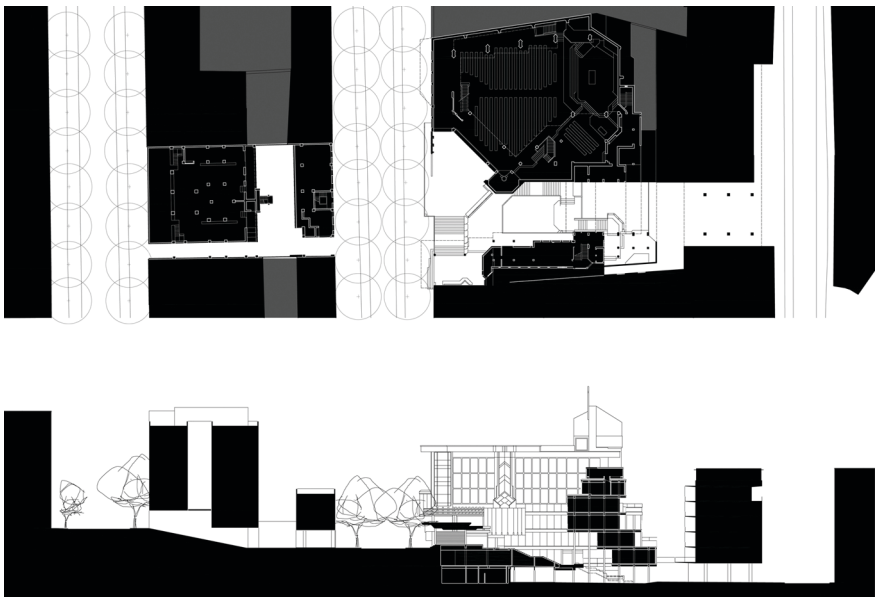

Figure 6.5 Sagrado Coração de Jesus Church, plan and section.

Source: Drawings by author, 2022.

very volumetry of the front of the block (towards Camilo Castelo Branco Street) presupposes a slight break in the alignments, as if inviting the citizens to enter the empty space (Santana and Cunha, 2020). On the other hand, this twist pulls the composition of the churchyard into the system of open spaces of the passage, encouraging people to linger while at the same time creating a small square on top of the street. This architectural detail is particularly interesting because it causes the main façade to rotate over this space of the passage, taking away its sense of back and, at the same time, expanding its public and structuring sense. The church thus has no main façade facing the street, just a play of volumes, advances and retreats that announce its presence in the urban space and generate mechanisms for spatial referencing and routing to the empty central space of the plot.

Another decisive aspect of the passage is its domestic spirit. Despite the public sense, the passage perverts intimacy, a certain idea of privacy, where the community finds a place to meet and share. This atmosphere is reinforced by the volumetric dialogue between the empty and the built, in a sharp contrast created by the proximity between the various bodies of the architectural object. In addition, the accentuated verticality of the space contributes to a reading of a more contained, restricted and private place. It is in this ambiguity that the collective

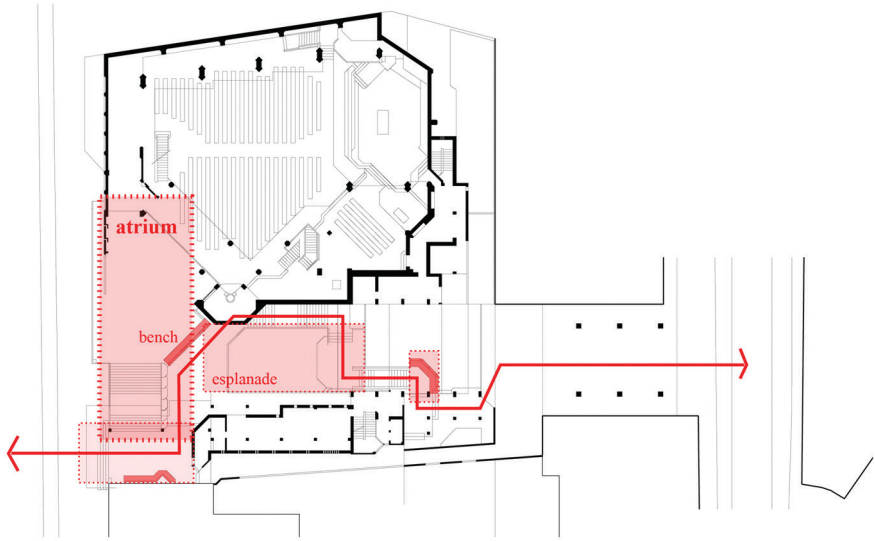

Figure 6.6 Passage spatial structure decomposition.

Source: Drawings by author, 2022.

sense flourishes, making the passage a very important moment of transition. On the one hand, it builds mechanisms for progressive proximity to the church and its support areas and, on the other, it sets up spaces for permanence and socialising among the neighbourhood's population. This symbiosis between the passage, the church and the city was particularly valued by Nuno Portas in an interview with *Arquitecturas* magazine in 1971, when he mentioned his desire to stimulate activities where the sacred became profane and the profane became the new sacred (Portas and Teotónio Pereira, 1971).

In the passage, the private becomes public and the public welcomes the intimate. The open space of the passage emerges as an extension of the interior space of the religious complex, establishing itself as a collective place.

> *... we gave this centre a civic sense: you enter from one street and go to the next. There are always people passing here, on the stairs, something that Lisbon residents are used to... and then someone said to us – perhaps Gregotti, or even Bohigas – 'you make access to the religious space more difficult, and the passage easier, because it's on the way between one street and another'. This was a good point, but I think we did it out of instinct...*
>
> (Nuno Portas, 2014)[5]

Variations and coincidences

> *When I designed the market 20 years ago, the idea was to make a covered street, a fragment of the city capable of proposing an urban layout.*
> (Eduardo Souto de Moura in Del Co and Graça Moura, 2019:359)

The urban sense of Sagrado Coração de Jesus Church is similar to other examples identified in the atlas Building Typology: Morphological Inventory of the Portuguese City. Between variations and common features, the different cases always present this condition of Passage Building. The spatial and compositional structure of the architectural object is based on the passage's construction and the urban value it adds to the city.

The case of the former Carandá Market in Braga, the work of architect Eduardo Souto de Moura (1984), is one of the most interesting and changing examples of the surrounding urban fabric. Located on the south fringe of the city centre, the market project was an opportunity to build a path that would restructure the area and contribute to the consolidation of the urban layout (Del Co and Graça Moura, 2019). It is particularly curious to note that even after the market closed and the object declined somewhat, it preserved its essence. As a ruin, it served the city; the passage remained active and people passed through it. The passage street survives and remains in the urban layout. Years later, the architect himself confided that when he was invited in 2001 to design the conversion of the building into the city's new cultural centre, this public sense had been maintained and would be protected in the object's new life[6]. The Carandá Market and the Sagrado Coração de Jesus Church assert themselves as objects that produce urbanity and bring together a collective sense; the church as a place to meet and support the neighbourhood, the former market, now the School of Music and Dance, a place to share and promote various cultural activities.

On the other hand, situations such as the Abrantes Municipal Market, designed in 2010 by the ARX studio, seek to establish a better integration of the object with the city through its status as a Passage Building. Located on the hinge between the city's upper level and the lower level where the courthouse is located, the market is an opportunity to build a quick articulation between levels. Thus, the building designed by the architects Nuno Mateus and José Mateus will not only incorporate a system of stairs that connects the two points in the territory but will also develop an interior space that functions as an extension of the city's public space. The interior circulation system is an *architectural promenade* constituting a rich spatial system that builds intense visual relationships between floors but also moments of interaction with the city.

On the other hand, cases such as the Belém Cultural Centre or the EDP Headquarters itself, both in Lisbon, are situations where the Passage Building seeks to produce spaces of permanence. The crossing path of the EDP Headquarters, Manuel Aires Mateus (2015) through the central widening of the passage and the transversal shading elements of the base introduces a place of pause and protection into the urban fabric of the city. In this sense, the Belém Cultural Centre, the work

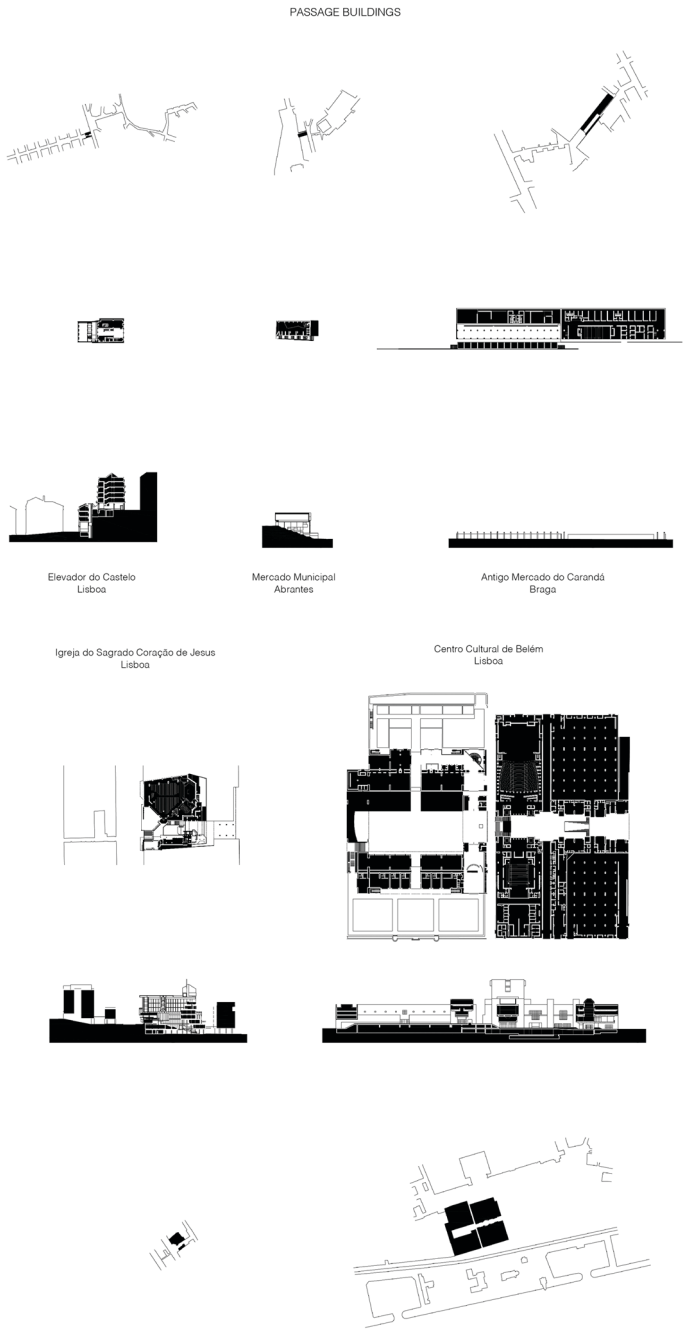

Figure 6.7 Comparative Table: Passage Buildings.

Source: Drawings from *formaurbis* LAB, 2022.

of Vittorio Gregotti (1992), reaches a greater dimension. The porosity presented by the cultural complex offers several connections and ways of moving through that area of the city, while at the same time providing a culmination to the system of squares developed along Belém's seafront from Afonso de Albuquerque Square.

In contrast, we also have examples such as the Castelo Lift in Lisbon. This is the result of a colective housing building rehabilitation project in Baixa Pombalina, designed by the architect João Falcão de Campos (2013), and is simply intended to serve as a link between two parallel streets in the city, but which are about 20 metres apart in height. The building is simply an access device, with a spatial and functional structure practically designed to configure the passage. It becomes particularly interesting if we understand the urban role it plays. The Castelo Lift is another part of a wider system that, starting at Largo do Chiado located in the opposite hill, aims to build a transversal route through the city linking Lisbon's two main hills.

Figure 6.8 Chiado passages system.

Source: Drawing from author, 2022.

From element to system

The whole is greater than the sum of its parts.
(Aristotle, Metaphysics, 4th century BC)

The city as an organism is made up of an urban fabric composed by different elements and systems. To work more effectively, the articulation between the several components, urban devices or urban fragments should not be based on the simple arithmetic sum of the parts. The whole must transcend this rationality to form a cohesive and systemic identity.

In this sense, it is understood that the Passage Building itself represents a value in its own. As a typologically differentiated element, it has the characteristic of constituting spatial transition systems that redefine limits and introduce alternative rhythms and routes to the urban space, while at the same time configuring collective places of greater intimacy. The form and composition of the architectural object functionally serve the city's flows and transform the building (or part of it) into an interface that leads the individual to a more domestic or private space. The building generates spatial filters that prepare the user for a more controlled interior space or simply to cross the urban fabric in a more direct way. However, in urban situations such as the Chiado neighbourhood in Lisbon, it can be seen that the Passage Building can acquire a superlative dimension because, through the regular use of this typology, it has been possible to create a wider system.

After the great fire in 1988 in Chiado, architect Álvaro Siza was invited to develop a project to rebuild and requalify this historic area of the Portuguese city. With the main principle of apparently preserving the image of the pre-existing built fabric, the architect introduced a new spatial structure to complement the pre-existing one. By taking advantage of a series of empty spaces in the interior of the blocks, several public *patios* are designed that are interconnected through various passages[7]. The structural axes of the neighbourhood, consisting of Garrett Street, Carmo Street and Nova do Almada Street, are overlapped by a series of alternative paths that cross the main axes and blocks. The Passage Building has a different dimension in Chiado. The typology is not understood as an individual object, but as a piece that works in combination with a set of other parts. This creates an urban system that diversifies the way people use and live Chiado. Circulation spaces, passages, the articulation of different topographic levels and places to stay are combined into a single identity that has radically transformed the rhythms and daily life of this part of Lisbon, as well as the surrounding urban areas.

In Chiado it is possible to identify the presence of different typological variations of the Passage Building, with situations where the building only offers a way through, but also cases where the architectural form generates places for people to stay and creates conditions for an extension of the city's public space into the interior of the built structure.

Perhaps it is important to recall the thinking of Manuel Solà-Morales, who emphasises the strategic value of producing public space through the use of private urban elements that know how to interpret collective space as a factor of urbanity[8].

· Spatial ambiguity and the dilution of rigid boundaries make urban space more versatile and changeable to different circumstances, rhythms and times. The typology built with a public sense thus incorporates an additional responsibility. The building assumes an urban condition, serving the city in its collective dimension, but also offering space for intimacy.

> *Physical urban quality is in the measure, the proper understanding of the limits of a space. As soon as we define it, we segregate it. Good public space has no limits, or the ones it has are undefined, multiple, oscillating. As a relative place, its references to the urban whole are more important than its own identity and yet this is enhanced thanks to them. Watch those perimeters! They are both main theme and baptism of fire of urban quality.*
>
> (Manuel Solà-Morales, 2010:31)

On the other hand, being aware of the urban value that a particular building typology can have, as in the case of the Passage Building, makes it possible when designing the building to develop compositional mechanisms that are sensitive to the qualities of the place. In this way, the architectural object starts from the context, interprets it and designs a place (Vidler, 1977). The creation of a Passage Building signifies this ability to understand the urban context in which it is located and, through its typology, to provide a spatial solution that best serves the city. The Passage Building embodies what Manuel Sòla-Morales called *material urbanity* (Sòla-Morales, 2008), that is, the relationship that is established between the built, the matter, and the urbanity of places. Through its formal features, this typology transforms urban space, its limits and its different scales of inhabitation – from the collective to the intimate.

Notes

1 Between 1927 and 1940, Walter Benjamin produced a series of essays and reflective texts on Parisian society and the way in which the type of covered commercial gallery - the Arcade - asserted itself as a place for meeting and consuming. This philosophical essay, which has yet to be completed, is nevertheless an opportunity to understand the relationships that are established between certain building typologies or other urban structures and certain societal behaviours. in Benjamin, Walter (2019). As Passagens de Paris, Porto: Porto Editora.

2 In addition to Nuno Teotónio Pereira and Nuno Portas, the project also had the collaboration of Victor Figueiredo, Vasco Lobo and Avelino Rodrigues (liturgist) in the tender phase and, later, Pedro Vieira de Almeida, Luís Vassalo Rosa, António Reis Cabrita and Luís de Almeida Moreira in the architectural design phase

3 Movimento de Renovação da Arte Religiosa - Religious Art Renewal Movement

4 The Sagrado Coração de Jesus Church is a very diverse religious complex that aims to be a large community centre. Throughout the different levels and floors of the built structure you can find uses such as: a church, a crypt, a mortuary chapel, a multipurpose hall (a place for conferences, public debates, theatre, cinema), a reception room or administrative spaces, catechism rooms, a restaurant, a gym, and spaces for medical, social and charitable services and support.

5 Statement by the authors in the documentary "Sagrado" produced by architect Nuno Grande in (2014).

6 "Throughout this time, in the many visits I made to the ruin, I realised that the market was used as a bridge, as a street, a necessary crossing between two axes of the city." Eduardo Souto de Moura, in Del Co and Graça Moura, (2019:90).

7 *"What it will be. The same as it was? There is an inevitable touch of falseness."*. in Frampton, (2000:356)

For Álvaro Siza, the simple exercise of recovering Chiado as it was would be a huge lie. So he developed a new system of routes and permanence spaces that, without competing with the original structure, would create a new layer of use. The project was developed in several stages, and was complemented by the requalification of the Império block, by Gonçalo Byrne, in 2002, and more recently with the conclusion of the Carmo Terraces, in 2015, co-authored by Álvaro Siza and Carlos Castanheira.

8 *"Projects that collectivize. These projects, the most incisive, accept the strategic goal of creating public space with private ingredients, on the basis of an understanding of collective space (public+private) as a defining substance of what is urban. Explicitly or otherwise, such projects take the view that urbanizing means collectivizing, and they may have a lot or a little in terms of form, but they do not shape. Rather, they are actions of mental strategy."*.in (Solà-Morales, 2010:29).

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7 Infrastructure steps in the city

Pablo Villalonga Munar

Introduction

Originating, structuring and supporting new cities, enabling existing cities, improving, destroying or controlling the living conditions of their citizens, positioning themselves far, near, tangentially, embedded in the city, crossing, connecting or flying over inhabited and uninhabited areas infrastructures are everywhere: their encounters with the city are simultaneously multiple and variable.

Among all possible situations, encounters between elevated linear infrastructures, such as aqueducts and viaducts, and enclaves of the sedimented city, yield interesting meetings between infrastructure and the city as a variable background. On the one hand, this type of infrastructure generates an impact in vertical section that contrasts in scale with the intersected environment. On the other hand, the sedimented city receives this intersection as a variable and affected background of stratified historical layers.

Lisbon presents itself as a rich field of study for examining the encounter between this kind of infrastructure and areas of the European sedimented city. The conditioning produced by its topography produces a complex built environment, nurtured by urban and architectural challenges in tension with accumulated overlapping historical layers.

Through a journey along the Aqueduto das Águas Livres, the viaducts on Rua São Sebastião da Pedreira and Rua Alecrim, and around the north viaduct over Alcântara neighbourhood in Lisbon, this chapter delves into the complexity of conflicts arising from elements of diverse origins, disparate times, and scales. It explores encounters between infrastructure and the city, revealing the intricate interplay between them.

Aqueduto das Águas Livres meets the city

Elevated, buried, skimming, treading, appearing, disappearing, lengthening, looming briefly, breaking, narrowing, widening, gliding, transforming, are some of the ways in which the Aqueduto das Águas Livres moves through Lisbon. This extensive and intricate case study spans centuries of history and encompasses various forms of interaction between the infrastructure and the city.

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Figure 7.1 Intersection of some lineal elevated infrastructures in the city of Lisbon. Blue color: Aqueduto das Águas Livres. Yellow colour: Rua São Sebastião da Pedreira and Rua Alecrim. Red color: North Viaduct of Alcântara.

Source: Drawing by author.

The appearance and characteristics of the aqueduct vary depending on factors such as the entity or agents responsible for its construction, the surrounding context, and numerous other conditions. These differences serve as compelling examples of moments where architectural design intersects with infrastructural design, reflecting the dynamic relationship between the two disciplines.

In the landscape of Alcântara's valley

With 35 arches at a height of up to 60 metres and a distance of 1 km, the aqueduct "flies" through the sky of Alcântara Valley. In this place, the aqueduct has witnessed drastic changes in the landscape. Fields and shepherds have been replaced by neighbourhoods and infrastructures. A historical reading shows how different infrastructures have been crossing the valley as the city changed around it.

The presence of the aqueduct in the landscape of the valley is remarkable as a single structure, designed as one unified project, even though it was executed by different authors (Ataíde, 1990). Emerging aboveground on one side of the valley and disappearing underground on the other, its towering height, construction with

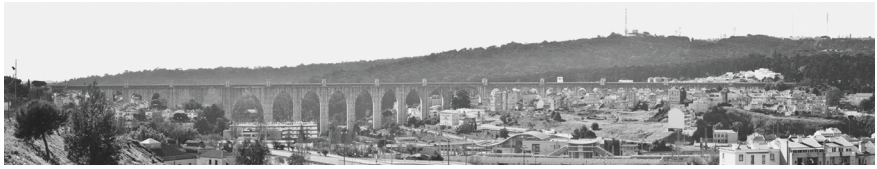

Figure 7.2 Aqueduto das Águas Livres over the Alcântara Valley.

Source: Photograph by the author, 2018.

stone material, pointed arches, intricate lanterns, and consistent dimensions of the water gallery and pathway are among the features that characterise this segment of the aqueduct as a monumental entity. This portion of the overall infrastructure can be envisioned as a single "building", despite being just one component of a broader network spanning the territory. The aqueduct across the Alcântara Valley is the result of a blend of the designers' intentions and the conditions of the site. It is important to highlight its impact with the other architectures in this place to understand its potential features.

On the northern slope of the valley lie the neighbourhoods of Liberdade (at lower topographic elevations) and Serafina (at higher elevations). The distinction between these two areas is evident both in their urban layout and in the types of buildings found within them. The Liberdade neighbourhood is a denser urban fabric and a container of informal growth (Martins 2010). In contrast, the area of the Serafina neighbourhood presents a more homogeneous aspect, the result of the unitary project developed by the Ministério das Obras Públicas in the 1930s.

Between the 1960s and 1990s, at the base of the aqueduct, existing inhabited areas (established since the early 20th century) were demolished as part of a landscape transformation driven by the construction of the Eixo Norte-Sul motorway leading to the 25 de Abril bridge. The imprint of this infrastructure on the landscape is enduring, unlike the homes that were affected and demolished during that period. Today, the valley is intersected by infrastructures in two directions: the aqueduct in the air, and the roads and rail tracks on the ground.

The lower sections of the valley hold a recurring paradox often found in the history of infrastructure's interaction with urban areas. The necessary expansion of the city through infrastructural development often clashes with the interests of communities affected by the construction of such infrastructures.

While the central area is marked by this infrastructural divide, on the southern slope of the valley lies the Bairro da Calçada dos Mestres, conceived as a cohesive project by the Ministério de Obras Públicas in 1939 (Antunes, 2018). These residences, designed with a unified volumetric style, surrounded by gardens and perimeter fences, create a streetscape with a consistent rhythm. Cascading sinuously down the slope, the juxtaposition of urbanisation with the aqueduct is resolved by integrating garden areas into the void spaces.

Figure 7.3 Bairro dos Mestres from the Aqueduto das Águas Livres (left). Bairro da Liberdade and Serafina from the Aqueduto das Águas Livres (right).

Source: Photograph by the author, 2022.

At the point where the aqueduct meets the top of Campolide Hill, we encounter a deliberate integration of the infrastructure with the city. This is the Meia Laranja garden, serving as an access point to the aqueduct's gallery and elevated walkways over the valley. Enclosed by a wall and open to the public during specified hours, this garden represents a carefully crafted arrival point for the aqueduct at the hill's summit.

In contrast, on the opposite side of the valley, at Monsanto Hill, the connection between the aqueduct and the park is less structured. Here, an iron gate and stone steps provide direct access onto the grass, with less formal design intervention.

As well as transporting water, until 1852 the aqueduct served as a border, linking the two sides of the valley. For this reason, it was also known as the Ponte dos Arcos (UNESCO, 2017), a fact that explains the polyvalence of the infrastructure, going beyond the mere fact of transferring water between two points. Today, the access to Monsanto from Campolide is closed by a simple fence with barbed wire and a closed gate. If this gate could be opened, the monument would become a real public space, capable of fundamentally improving the pedestrian connection between the two neighbourhoods and the accessibility to Monsanto.

Over streets and public spaces

After reaching the top of Campolide Hill, the aqueduct traces its course along the crest of a cliff. Around it, the built fabric clung to the aqueduct, being squeezed between the rear facades and the topographical edge. It creates a passage with the courtyards of the buildings on Rua Francisco Rodrigues Lobo, Calçada de Quintinha and Vila Maria. Along this path, the aqueduct is also acting there as a retaining wall, absorbing the topographical conflict between the cliff and the valley.

This cliff, with the aqueduct as aqueduct-wall-cliff, arrives to another valley situation. The aqueduct follows its route independent of the orography, tracing a bridge in the air to cross the little valley and continue towards the centre of Lisbon.

The aqueduct's appearance of a wall becomes an elevated gallery supported by arches, the so-called Arco de Carvalhão (Fig. 7.4).

Under its arches, at the bottom of the little valley, two streets cross at different levels, creating an area in contact with the aqueduct, where there is a fountain and a former building of the water company EPAL. On the axis between the two streets, at the top of the aqueduct, there is a lantern, carefully detailed. Its position, not only responds to a strict rule of ventilation or lighting distances for the internal water conduit, it is also part of the monumental composition of the whole in the site. The aqueduct is transformed by the conflict with this little valley, taking advantage of the position and presence in the city's landscape as a landmark.

This intersection of Arco's de Carvalhão's with the little valley and the streets is totally different of what happens just some metres near there, when the aqueduct meets a huge avenue; Avenida Eng. Duarte Pacheco. In this place, the aqueduct seems to have been cut by a sharp knife. As in other places in Lisbon, the aqueduct is demolished to make way for other infrastructures, leaving a visible "scar". These are the cases of the Arco de São Bento or in Avenida Infante Santo, where in both places large arches crossing the street were demolished to make way for the renovation of the street. In these cases, the "new" fights against the old aqueduct, a battle of infrastructures for the city. The conflict with these streets erases the aqueduct's design.

Following the path of the aqueduct beyond Eng. Duarte Pacheco Avenue, it reappears near the Bloco das Águas Livres. The aqueduct crosses Rua das Amoreiras and transforms into an impressive triumphal arch. It frames an access to Rato and articulates the turn of the water to align itself and create one of the facades of Praça das Amoreiras. This work of the architect Carlos Mardel, was built for the arrival of water to Lisbon in 1748, being the support of the inscriptions on the event.

The architect Walter Rossa (Rossa, 1998:27) has already pointed to Mardel's use of collage as a method or compositional resource, both in his work on the triumphal arch for the arrival of water at Amoreiras and in the rest of the aqueduct. However, this use of collage becomes a fact that goes beyond questions of style when one considers the relationship of the aqueduct to its surrounding context along the territory. The difference and contrast between the aqueduct as an infrastructural body and the city as the backdrop against which it unfolds materialises a collage effect in their encounters, from the structural detail to the scale of the landscape. The aqueduct can be a monument hundreds of metres high, as in the Alcântara Valley, a triumphal arch or a street façade.

In this area, the arrival of the infrastructure plays a fundamental role in the definition of the public space. From its form as a triumphal arch, the aqueduct is transformed into a lineal and deep façade of arches. It forms the boundary between the slope of Rua das Amoreiras and the Praça das Amoreiras, as a flat public space on the side. Infrastructure gives not only a double façade, but also helps to solve the topographical levels between both the street and the public space. With the sequence of arches, the gallery is maintained at a high level for the conveyance of water, which reaches the main and old water tank building, the Mãe d'Água reservoir finished at the beginning of the 19th century. Inside, the aqueduct threw

Figure 7.4 Back of the aqueduct intersection at Arco do Carvalhão with attached building (left). Ruins of the intersected aqueduct by Avenida Infante Santo (middle). Triumphal arch in Rua das Amoreiras (right).

Sources: Left, photograph by the author, 2018; middle, photograph by the author, 2018; right, photograph by the author.

the water through a cascade into a large internal tank that can be surrounded and seen by visitors. Outside, the leafy mulberry trees (Amoreiras in Portuguese) fill the public space, they seem to be contained by the aqueduct and the buildings that surround it. On the side of Rua das Amoreiras, the aqueduct has a clear façade of arches, whereas on Praça das Amoreiras it almost disappears, covered by the tops of the trees.

Attachments to infrastructure

In one of the arches of the aqueduct at Praça das Amoreiras, there is a great exception. Wedged between two of the pillars there is the Church of Nossa Senhora de Monserrate, its volume protrudes towards Rua das Amoreiras aligning its access façade with the inner face of the aqueduct towards the square (Fig.7.5). This fact reinforces the role of the infrastructure in the definition of the interior façade of the square. The presence of this small jewel embedded in the infrastructure is an extraordinary phenomenon due to its condition as a temple and its architectural characteristics. Here, architecture and infrastructure merge to house a sacred space of the city, in an unusual combination of tangible and intangible conditions.

At other times and places, there are also buildings such as houses and other buildings that have been attached to the aqueduct and other similar infrastructures,

Figure 7.5 Capela Nossa Senhora De Monserrate in between the aqueduct at Praça das Amoreiras.

Source: Photograph by the author, 2017.

in an act that we could call infrastructural parasitism. For example, in Rua das Amoreiras there were buildings in the corner, now converted into a public space with tile murals on its walls, or in between the arches of Rua dos Arcos in Bairro de Liberdade in the Alcântara Valley[1]. This is a sign of the capacity of the elevated linear infrastructure as a support, by generating a section that contains subjugated architectures underneath.

Although many of these architectures that are attached to the aqueduct are clearly distinguishable or conceptually removable from the infrastructure that dominates over them, there are other situations in which the balance of power in the domination, between infrastructure and architecture, is not so clear.

An example of this variable relationship between domination and appropriation is the encounter between the aqueduct and the old Por Timor library located on Rua São Bento (Fig. 7.6). In this case, when seen from the main façade, the aqueduct could go unnoticed, camouflaged by the uniform surface where the library sign is located. On the side, however, the geometry of the arches can be seen, constituting one of the facades of the building and interrupted by the scar left by the removal of the old Arco de São Bento (now decontextualised in Praça de Espanha). This thick side of arches can only be clearly seen from the backyard of the building, where they are filled in by the spaces of some rooms.

Figure 7.6 Former "Por Timor" public library and aqueduct.

Source: Photograph by the author, 2018.

Infrastructural camouflage and exhibition

The presence of the aqueduct in the city fluctuates, sometimes hidden from view and other times prominently displayed, ranging from surface-level structures to subterranean passages. When concealed, it may be hinted at or partially revealed behind other architectural elements that serve as intermediaries with the urban landscape. An example of this camouflage is evident in the design of the Casas do Registro (Fig.7.7). These buildings, typically nestled between adjacent structures within the city's fabric, feature compact volumes and facades adorned with tightly closed doors and windows. These dwellings, along with the lanterns, establish a connection with the underground path of the aqueduct, subtly guiding observers along its concealed route.

While log houses or certain lanterns are disguised or camouflaged, fountains serve as a celebratory façade, showcasing the existence of the infrastructure. Designed with varying degrees of prominence within public spaces, they function

Figure 7.7 "Casa do Registro" of the aqueduct inbetween buildings in Trav. São Sebastião da Pedreira.

Source: Photograph by the author, 2022.

as artefacts with architectural features, serving as an intermediary object between the infrastructure and the city.

For instance, beneath the Principe Real fountain lies an old reservoir, now repurposed as an event space. The fountain serves as an interchange point between the aqueduct and the city, surpassing its original function. Instances like this, including those of the Arco de São Bento or the Chafariz do Vinho, illustrate the multifaceted utility that infrastructure can exhibit in its interaction with the city.

This extends not only to spatial considerations but also encompasses its evolution over time and its adaptation to unplanned uses. The infrastructural body of the aqueduct is utilised in diverse ways, highlighting its versatility beyond mere monumentality or functionality.

These fountains, strategically placed to assert urban prominence, are adorned with sculptures, symbols, and meanings, both mythical and strategic, serving as a celebration of water in the city and reflecting Lisbon's urban policy of the 18th century. The deliberate positioning of these fountains, taking advantage of specific corners of the city traversed by the aqueduct, characterises public spaces, transforming them into potential hubs of activity. Some instances of these types can be found at Arco São Mamede or the Chafariz das Terras.

Fountains, Casas do Registro, log houses, or isolated lanterns are elements of the aqueduct infrastructure that could be compared to components of a building such as doors or windows. They are more or less concealed elements facilitating the exchange between the infrastructural content (water), the container of the content (aqueduct), and the environment surrounding the container (the city). They represent built thresholds materialised through various forms.

Filipe Folque's viaduct and Rua do Alecrim

The São Sebastião da Pedreira fountain is not only part of the intersection between the aqueduct and the city, but also of another intersection between the city's infrastructures themselves. Here, Rua Filipe Folque forms a viaduct over Rua São Sebastião da Pedreira. On one hand, this elevated street is an extension of the Avenidas Novas, a part of Ressano García's plan to expand the city northward, combined with Avenida Liberdade at the beginning of the 20th century. On the other hand, Rua São Sebastião da Pedreira is a street that follows the path along the bottom topographical valley line.

In this case, the old street path remains while new streets fly over it. One path adheres to the ground while others follow the layout of the new extension direction in the air. One infrastructure layout adheres to the context while another follows the plan. The intersection between both creates encounters between infrastructures at different levels and directions, giving rise to a complex ensemble of buildings[2].

In Filipe Folque's viaduct project, the fountain is designed in conjunction with various spaces that take advantage of the new urban space conditions. Below the viaduct's spaces, there are the headquarters of the cleaning services of the Avenidas Novas Parish. These spaces include lockers, a kitchen, a dining room, stores, and office spaces divided on both sides of São Sebastião da Pedreira Street. The vault under the viaduct and above the street serve as a meeting space for the workers, acting as a threshold that connects both sides. The design of the viaduct facades is meticulously planned, incorporating its integration with a public space, which results from a wider section of the street in front of the fountain, along with a tree and the facades of housing buildings. On the edges of Rua Filipe Folque's viaduct, the veranda is designed as a bench that turns into a corner with access

to the buildings on the sides. Public staircases are attached to the northwest side, connecting both levels of the streets.

Another case study in Lisbon similar to the intersection between a new street in the air and other streets on the ground is the intersection between Rua Alecrim over Rua São Paulo and Rua Nova do Carvalho. In this location, Rua Alecrim is built as a viaduct connecting Praça Duque da Terceira. The space below it has been utilised for restaurant or bar programmes, with entrances situated just under the intersection of the viaduct with both streets. The configuration of housing buildings follows its own rules. The order of their facades remains unaltered by the inclination of the viaduct. This conflict is resolved with terraces and staircases that connect the different entrances to the building floors with the street. The intermediate space is filled with terraces in the upper sector of the street, while the lower one remains empty, creating two small passages connecting Rua São Paulo with Praça Duque da Terceira. In this case, the viaduct is designed as an autonomous urban element that utilises those staircases and terraces as elements to solve the intersection with the nearby built environment.

The relationship between Lisbon's street layout and its topography plays a key role in generating this casuistry, where infrastructure and city intersect. The interconnection between levels and the confluence of different urban elements are indicative of the complexity of design in this type of place. It results from a consideration of scales ranging from the urban to the architectural. Together, these elements blur the design boundaries of what is traditionally understood as infrastructure, street or building. It forms an ecosystem of hybrid configurations between different urban elements that converge in an urban space.

Figure 7.8 Filipe Folque's viaduct and São Sebastião da Pedreira fountain (left). Rua Alecrim over Rua São Paulo (right).

Sources: Left, photograph by the author, 2018; right, photograph by the author, 2018.

Alcântara's north viaduct

The reasons why and how some infrastructures steps and meet the city are wide and sometimes the result of chance. Nevertheless, there are some places that have a high probability of receiving this kind of encounter. In the case of the Alcântara neighbourhood, whose name means "the bridge", it is one of these places.

The northern viaduct of the Ponte 25 de Abril crosses this neighbourhood, linking it to the infrastructural corridor of the Alcântara Valley. In 1966, its construction left images of the contrast between an ordinary urban fabric and the grandeur of huge pylons facing the sky (Públicas, 1966). They also support a railway line, a red beam that was launched through the pillars in 1999 (Rede Ferroviária Nacional - REFER, E.P., 1999). While the bridge over the Tagus was mainly made of steel and red, the northern viaduct was white and made of concrete. Its piers, numbered from 7 to 18, were designed as footprints with a direct impact area. Some of them, invisibly infilled by maintenance stairs and other elements, stand out for their relationship with specific buildings.

The first pillar after the Ponte 25 de Abril, number 7, houses a museum about the bridge, with an interior visit to the foundations and a lift to a box to see and feel the bridge at deck level. Between piers 11 and 13 is the Palácio Sabugosa. This building and its gardens, owned by the Conde Sabugosa family, were the reason for slightly altering the route of the viaduct in order to save the building (Gomes, 2016). At Pillar 14 is the Mercado Municipal Rosa Agulhas. In this case,

Figure 7.9 Ponte 25 de Abril and North Viaduct over Alcântara neighbourhood.

Source: Photograph by the author, 2022.

the building creates a patio around the pillar, using the void as the main strategy for the encounter with the infrastructure. The contrast between the presence of the white columns, inserted between a children's playground, the chairs and tables of a bar and people shopping, shows a great contrast. Pillar 15 is the building of the Freguesia de Alcântara. It uses the infrastructure to increase the monumentality of the entrance to the building, taking advantage of the position and dimension of the pillar. The pavement with the shell of the neighbourhood is aligned under the path of the viaduct, facing the corner from which you can see the bridge crossing to the other side of the river.

In the cases of the Mercado Rosa Agulhas or the building of the Freguesia de Alcântara, the northern viaduct is now inseparable from the understanding of the context; it plays an unavoidable role of extreme contrast of scale (Fig. 7.10). It is an example of the use of infrastructure as part of a project argument, but also a reminder of the problems that infrastructure encounters create. In addition to its outstanding monumental presence, this viaduct detects the movements and sounds of the cars and trains that cross it, while casting shadows on the facades of the surrounding blocks of flats. The crossing of infrastructures like this through the city is the construction of an open concert of multiple vibrations, sounds and lights over the city.

Figure 7.10 North Viaduct and Mercado de Alcântara (left). North Viaduct into Mercado de Alcântara (right).

Sources: Left, photograph by the author, 2018; right, photograph by the author, 2022.

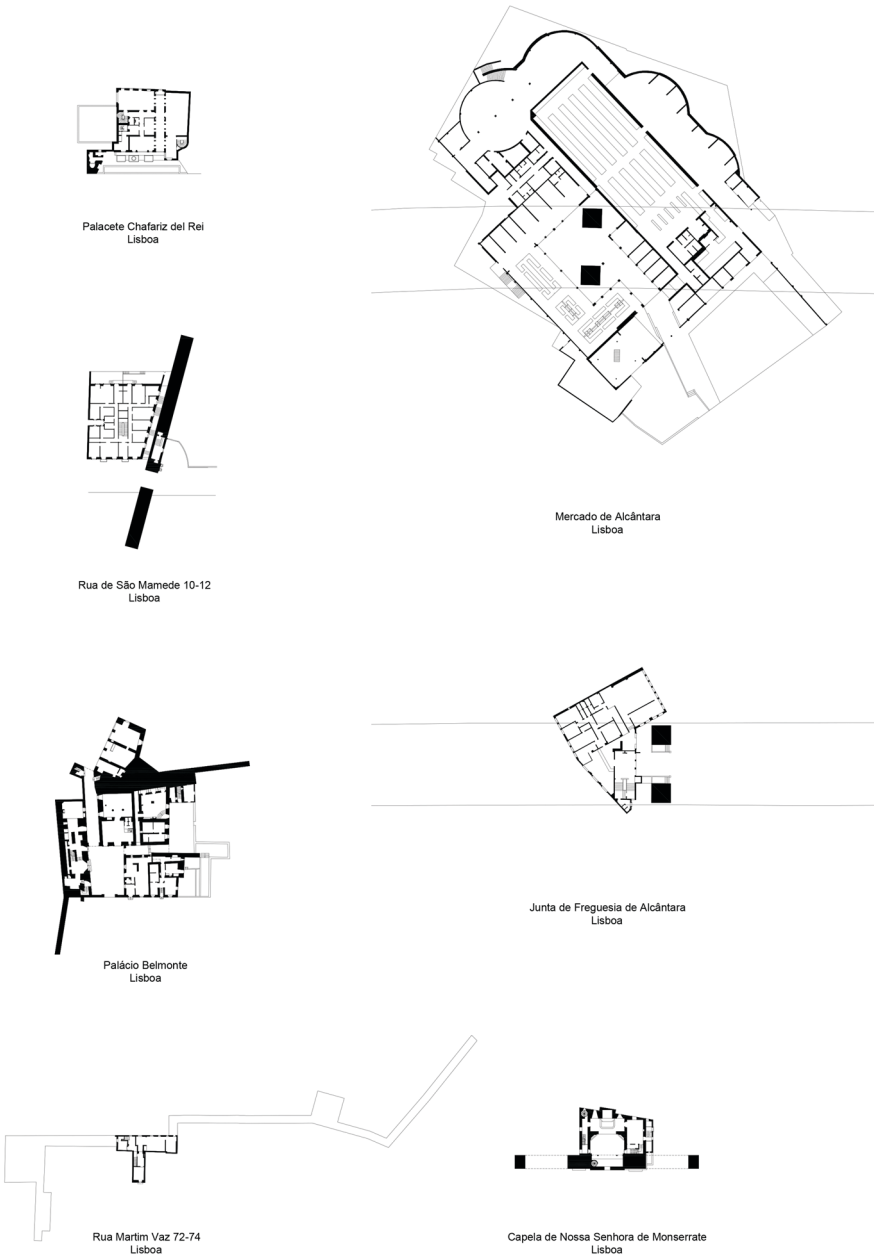

Figure 7.11 Comparative Table. Encounters between infrastructure and the city. Drawings from formaurbis LAB.

Conclusions

When infrastructure meets the city in Lisbon, the topographical layout and the city's own complexity make the encounters extraordinary. The conditioning created by its geography produces a complex built environment, nourished by urban and architectural challenges. The case studies approached in this chapter are only some of the exceptions to be found in this city. The confluence of infrastructure and sedimented urban areas is an extreme situation that guarantees contrast and reflects a conflictive state where it occurs. Deformations, imperfections, mistakes and coincidences are a resource of design strategies and critical thinking about how we look at the city.

Different patterns of encounter emerge from the specific aspects considered in this chapter. Reflections on the relationship between infrastructure and the city are observed from an architectural point of view and beyond, useful for critical, analytical or propositional insight. These case studies related to Lisbon are included in the European Atlas of Case Studies developed in the thesis "Encounters with Infrastructure" (Villalonga Munar, 2020). His collection contains a wide range of examples that are currently being studied to varying degrees.

The infrastructure unfolds with a high degree of autonomy on variable backgrounds. Its movement through the city creates a variety of visual relationships. The elevated condition of the cases treated here creates a different ground and spatial frame for viewing the city. At the same time, the large infrastructural bodies provoke a constant play of light on the city above. Their changing shadows, cast by a rigid infrastructural body, mark the rhythm of time as a constant phenomenon that transcends and remains above the contingencies of the city. The transitions and relationships with the surroundings are multiple, affecting the urban landscape near and far. The structural expression and constructive design of the infrastructures play a determining role in their presence. Their qualities and tectonic unity contrast with the heterogeneous and varied context.

As the infrastructures are built, deconstructed or repaired, moments and images of ephemeral structures appear. Demolitions and constructive processes colonise the city as extraordinary events; spectacles that reflect the epic dimensions of infrastructural intervention. They also leave traces in the infrastructural body as an expression of its constructive process. Examples of this are the photographs taken during the construction of the North Viaduct in Alcântara, the stone ledges used as scaffolding in the aqueduct over the Alcântara Valley, or the 'scars' of its demolition in Av. Infante Santo

Depending on the frame of observation, the position of the pedestrian, the element or fragment analysed, the dominance between the infrastructure and its surroundings varies. As seen through the case studies, the variety of designs produced ranges from integration to protagonist or normalised acceptance of contrast. The relationship of the infrastructure to the city depends to a large extent on the order of its construction in relation to that of the city itself; infrastructure arriving in the existing city, city and infrastructure building at the same time, or infrastructure supporting the future development of the city. Thus, different case

studies are determined by the relative position in time between the infrastructure and the city.

With regard to the position of the infrastructural body and the city in space, there are a variety of possibilities depending on the proposed condition. For example, depending on their contact situation, there are situations of intersection, tangency or emptiness (treading, rubbing, distancing); depending on the modification of the shape of the infrastructural body, there are widenings or narrowings in the three dimensions. Considering the movement or placement of the infrastructure in the landscape, there are alignments, curvatures, breaks, rhythmic appearances or zigzags, among others. The ways in which they appear and disappear are varied and difficult to simplify, possibly conditioned by the balance of power and imposition between infrastructure and city, project and context, imposition or adaptation.

Given the intermittent appearance of some infrastructures in the urban landscape – such as the aqueduct – or the autonomous coherence of some of the elements that compose the infrastructures – such as the piers of the North Viaduct in Alcântara – their infrastructural body could also be understood as a sequence of segments or fragments, alone or in a collage ensemble. Even if we know that each segment is part of a larger system, we could understand each of the parts as an independent intervention or with an autonomous sense. Sometimes these parts are seen as "buildings", buildings made of infrastructure as a material, as a generator of their form. At the same time, any infrastructure as a whole could be seen as a kind of hybrid building. (Fenton, 1985), a discontinuous megastructure or system of buildings; buildings that share a common infrastructural objective.

In the Alcântara Valley, the coherence of the design of the aqueduct stands out, and it would be easy to imagine it as an exceptional aqueduct connecting the two hills. However, the common features that we can read in the configuration of the different fragments lead us to understand them as part of the same infrastructural species. The arches, the gallery section or the material are signs that link the aqueduct recognition throughout the territory. The variations of the design seem to be influenced by the relationship with the context or the intentions of their authors.

When infrastructure intersects with context, there are different levels of relationship with it. From the point of view of tangible contact, the city comes into contact with it in different ways. In the case of the market and the building of the Freguesia in Alcântara, emptiness and public space are the tools to deal with the position of the infrastructure. In the case of the Rua Filipe Folque viaduct, the design of the infrastructure is integrated into its surroundings. In the case of Rua Alecrim, the autonomy of both elements is maintained, using the staircases, terraces and voids to mediate between the infrastructure and the built environment. In the case of Aqueduto das Águas Livres, the Church of Nossa Senhora de Monserrate is inserted between the arches, taking advantage of the structural condition of the infrastructure. In the case of the Principe Real Fountain, the aqueduct takes advantage of the old foundations of the unfinished Erário Real. From the point of view of immaterial relations, the aqueduct is used by the city as an icon or a container of memory. This could be found in objects such as the city's stamps, or in the stories that can be told and remembered by following the path of the infrastructure.

The capacity of infrastructure to be a support or generator of spaces to be used by the city is one of its collateral effects that goes beyond its specific functional impact. This ties in with M. Vanore's idea of the transfiguration of the technical form of infrastructure (Vanore, 2002). At any scale or dimension, whether architectural or urban, from the millimetre to the kilometre, when infrastructure meets the city, it can be used and designed as a promise or a weapon, as a function to be achieved or as something else to become.

In the relationship of encounters with time and space, infrastructure resembles a living being that moves and acts in multiple ways, that need the city beyond the specific function for which it was conceived. The possibilities of its use and its effects, both tangible and intangible (in memory, culture or social activities), go beyond what was originally planned or its formal conditions.

The dualisms that emerge when considering the relationship between infrastructure and the city (or any other dualism, such as the relationship between architecture and infrastructure) are momentary mirages, tools for understanding particular situations. It is necessary to be aware of this, because it is necessary to have an overall vision of infrastructure and the city as parts of the same phenomenon, and to understand the complexity of their interrelated relationships.

From looking at small details to broader urban and territorial frameworks, this chapter is a glimpse of some transfigurations that point to conflicts, agreements and potential project strategies. The confluence of tensions in the encounters raises questions about the boundaries between the different disciplines approached during the research and the boundaries of what is defined as architecture, urbanism or infrastructure.

Infrastructure has great potential as a useful artefact for the future development of the city, not only because it is always new, but also because of its relationship with the past. Its ability to vertebrate, dynamise, contain memory, produce monumentality, generate support, build or destroy societies and their environments are some of the promises that arise when infrastructure meets the city (Anand *et al.,* 2018).

> *Obsolescene is not the end of anything, it is the beginning of aesthetics, the cradle of taste, of eloquence and of slang.*
>
> (in McLuhan and McLuhan, 1992:100)

Notes

1 The infrastructural parasitism of this kind could be also found in other examples around the world, like in the Água da Prata Aqueduct in Evora.

2 The main intersections through this path are the intersections between: Rua São Sebastião da Pedreira and Rua Filipe Folque, Av. Fontes Pereira de Melo and Largo do Andaluz, and, Rua Santa Marta and Av.Duque de Loulé.

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Part III

Time

8 The convents reUsed

Three transformation processes

Miguel Freitas Silva

Introduction

One of the most complex and ever-present issues in the debate on the city is the reuse of the built form, a cyclical phenomenon with full expression in contemporary times. The idea of reuse appears as one of the most elementary manifestations of the sustainability of urban fabrics, but also as an intrinsic condition of the architecture and urbanism production.

The idea of reuse, as we acknowledge today, arises from the need to preserve resources by adapting existing buildings and public spaces to the most diverse forms of occupation; practices resulting either from project or urban planning that (re)assemble the built fabric (Wong, 2023). Some authors seek a broader meaning, studying the phenomenon through the decomposition of the building (Boesch, et al, 2022), others aspire to formulate a "theory of reuse" (Plevoets and Van Cleempoel, 2019) or their inclusion in current trends such as the circular economy in which materials are kept or (re)used for as long as possible (Ter Steege, 2023).

However, the theme of reusing buildings is not a recent phenomenon. Reuse as a process of rethinking the city has always been applied, in which buildings or parts of built structures tend to persist in time as physical memories of a singular past. In Rome, the transformation of Diocletian's Baths into the Basilica of St. Mary of the Angels and Martyrs in the 17th century is a case in point. The fragments of a pre-existing structural and spatial matrix are embedded in the design of a new occupation, but also of a new urban fabric with the redesign of the surrounding public space.

In this sense, we will try to demonstrate that this relationship between reuse and the metamorphosis of buildings is not an emerging idea, but a continuous action of adaptation and transformation of the city. This synthesis is based on a morphological reading of religious buildings, particularly centred on convent architecture, with the aim of building a synthesis on reuse based on three processes of building transformation: (1) **overlapping** based on the transformation of a convent into a lighthouse; (2) **juxtaposition** with the addition of a military fortress to a convent; and (3) **insertion** based on the adaptation of a convent into a factory. In order to understand the theme in the Portuguese interventional context, it was decided to

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study former convents because of their uniqueness in the territory and the fact that this phenomenon is not repeated as much in other types of buildings. We use examples of buildings that have been clearly transformed in form and are representative of the diversity of solutions and ways of (re)adapting existing convents, documenting the processes through interpretative drawings of the different stages of transformation in each case study.

The study is also a part of the research project *"Rehabit Conventos in Lisbon. Built heritage, adaptive reuse and urban form transformation"*[1] results, carried out between 2021 and 2023. In the first phase, the research sought to recognise the composition of the old convents form over a long time, carrying out a morphological exercise to deduce the matrix structure that supports their adaptation to collective living, in order, in the second phase, to analyse their systemic organisation, the private – cell – and common spaces – cloister. The interest and diversity of existing examples made it possible to extend the sample from Lisbon to the national territory and to different types of occupations (Silva, 2024).

The sample is made up of several examples, variations of the typology in relation to religious orders and from different geographical contexts in Portugal. The database created contains a survey of the information needed to understand and represent each case study, including technical drawings, texts and photographs. Thus, based on a list of 360 convents it was possible to identify 45 different forms of occupation resulting from continuous transformation processes from the 19th century to the present day, such as: military barracks, town hall, courthouse, cultural centre, industry, fortress, fire station, garage, hospital, hotel, library, lighthouse, museum, office, palace, entertainment centre, prison, shopping centre, school, funeral parlour, café, railway station, assembly of the republic and housing.

While the process of transformation was diversified at an early stage, today the practice of reusing convent architecture is shrouded in a process heavily influenced by conservationist ideas or trends, tending towards standard projects intended for museum, cultural, hotel and hub uses. Their continued (re)use seems to be based on occupation processes that resolve the desire of the cultural moment and do not represent long-term strategies for their social integration into the urban fabric. The idea of reading physical form over a long period of time makes its systematisation a necessary and interesting action. Accepting these structures as "living organisms" allows us to intervene in the dynamics of city building, in the elaboration of hypotheses or practices in projects to adapt them to new forms and functions.

The convent in time and territory

Since the beginning of the Christian (re)conquest of the territory, convents have been decisive elements in its appropriation and transformation. Over the course of ten centuries, churches and convents played a foundational role in the occupation, settlement and social development of urban areas in Portugal. Convents had the ability to build cities from canonical or prosaic programmes, open or enclosed, often through their spirituality and subsistence agriculture.

Generally located on the outskirts of cities, they occupy spaces adjacent to urban axes, valley lines, isolated or integrated into the urban fabric, adjoined to walls, placed in central areas of the city or isolated in the landscape, like the particular cases in this study. Be religious places, military defences or signposts for maritime navigation, convent buildings play(ed) an important role in characterising natural and urban landscapes.

Depending on the historical and geographical context and the metabolism of each territory, the convent tended to act as an aggregating centre or an obstacle to urban growth. In a way they had the capacity to generate new urban layouts, in the other they limited the growth of the city with the rigidity of their programmes and fences. Yet, they proved to be flexible in their appropriation, allowing for different uses over time or simultaneously, through their segmentation and/or (re)parcelling. Authors such as Walter Rossa and Miguel Freitas Silva (Rossa, 2014; Silva, 2024) approach the theme from the idea of a mutable urban building, strongly influenced by the layout and topography of a particular urban context and capable of generating new centralities on its own. The convents are decomposed in different moments of transformation over a long period of time in order to understand their ability to be part of the city construction and to be transformed to new uses other than the initial one.

Although the importance of convents in the composition of urban fabrics is well-established, the opposite is also true: convents that were not built from scratch but resulted from a process of appropriation of existing buildings. Cases such as the Nossa Senhora da Conceição Seminary in the city of Santarém and the São Evangelista Convent in the city of Évora, which resulted from military structures; or the convents of Nossa Senhora das Mercês and São Salvador in Évora or Nossa Senhora da Saudação in Montemor-o-Velho, which resulted from the occupation of existing houses, can be highlighted.

Convents have different forms and spatial organisation, differing according to rules inherent to the specificity of each Religious Order[2], geography and transformation processes over a long period of time. They all respond to a model idea that organises the different dependencies around a cloister, and they vary according to their religious identity. For example, between open and cloistered communities, the organisation of the typology differs, the cells and circulations are organised in opposite directions. In other words, if the community lives in close proximity, the cells or part of them face the street and the distribution corridor divides the whole or coincides with the cloister. If the religious habit is cloistered, the cells face in the direction of the cloister or on themselves and have no openings to the street. They may also differ in the size of the cell, the cloister or the number of cloisters each building has. The comparative table is intended to demonstrate some of these variations, the convent and its relationship to a specific order.

Evidently, the reuse of convents and monasteries is motivated by their architectural and structural quality and typological "flexibility". Their adaptation is approached by Jorge Gaspar or Miguel Tomé (Gaspar, 2002; Tomé, 2002) as a strategy for conserving their historical and artistic values, as well as for preserving their physical condition over a long period of time. However, the transformation of

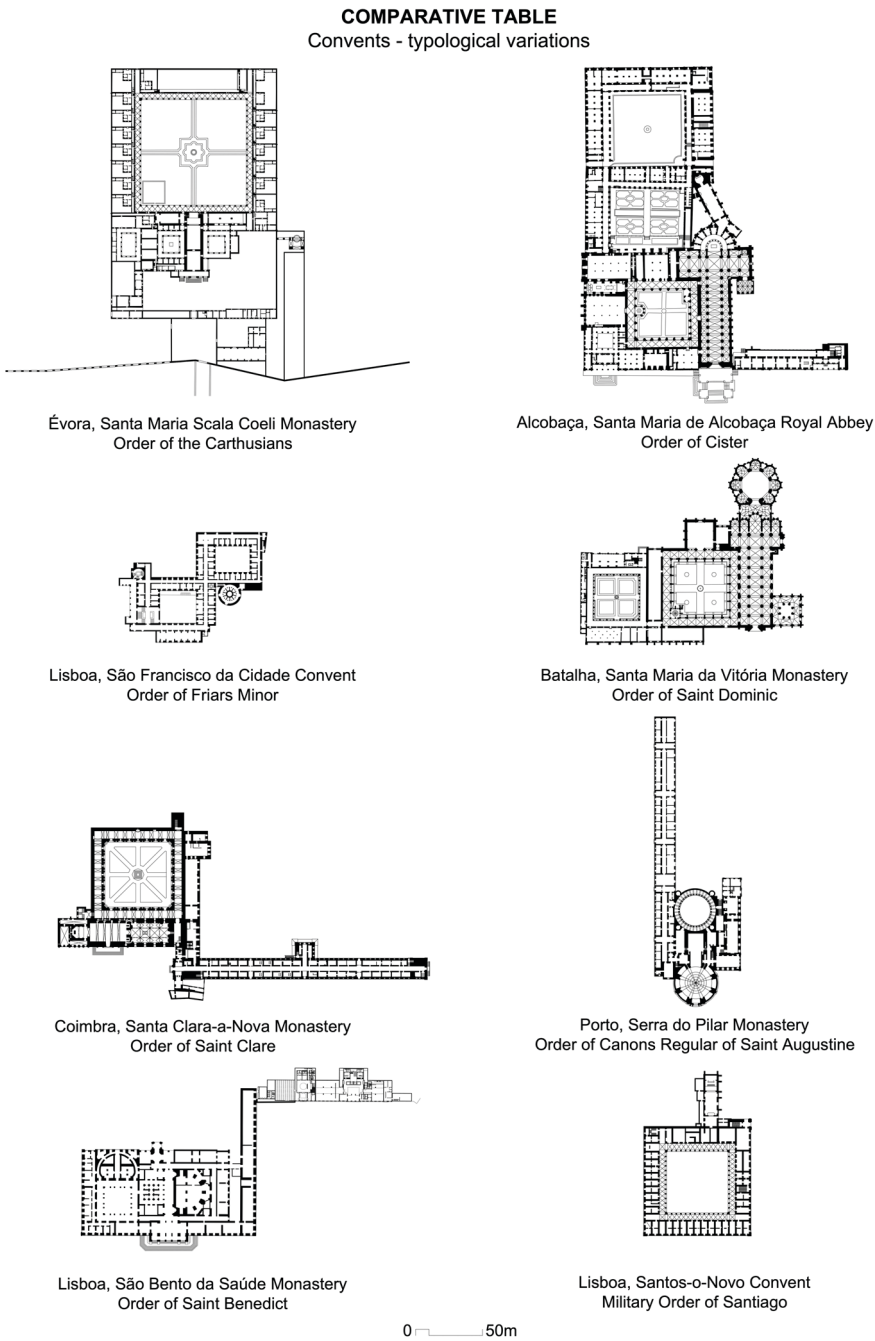

Figure 8.1 Comparative Table: Convents – Typological variations.

Source: Drawings from *formaurbis* LAB, 2022.

buildings is a timeless process that predates the definition of value or the invention of the notions of monument and historical monument. In many cases, singular or common buildings, what is recognisable today in their composition no longer corresponds to their original state and use. Their importance to a community's cultural understanding and identity prevails, but it has been consolidated over time.

Despite the importance of collective affirmation, the problem of authenticity should not be placed in its physical dimension, but in its meaning or symbolism (Silva, 2024:41). The continuity of built heritage is achieved through its reuse, regardless of the function it may have in today's circular and sustainable system.

Different programmes and new functions

Until the end of the 18th century, the process of transforming convents was based on adding and subtracting parts, almost according to their initial use and supported by new construction. The São Francisco Convent in the city of Évora, transformed into the Royal Residence, or the Santo Antão-o-Novo College in Lisbon, transformed into a hospital, are examples of an apparent exception. Another exceptional moment is the effect of the 1755 earthquake on Lisbon's built fabric. As is well known, the event determined the opportunity to remake the city centre with a new urban layout and built fabric in both its private and public dimensions. In the process, some of the convents, which had been structurally damaged, were divided up into allotted (fences and building complexes), with convent wings transformed into streets and others used for a wide variety of functions. Others, completely demolished, saw their parts integrated into different building compositions and typologies, such as the portal of the Royal Chapel of the Paço da Ribeira rebuilt on the main facade of the church of the São Domingos de Lisboa Convent or the columns of the demolished church of the São Francisco Convent transferred to the portal of the Dona Maria Theatre.

The potential for adaptation that these types of buildings have come to the fore when the church's property was taken over in favour of the State in 1834 and until 1910. This process of appropriation was, in a way, the first large-scale "reform" to transform spaces conceived as enclosed organisms into centres of urban polarity – they were given public and private uses linked to social and economic dynamics, respectively.

With the growing need to affirm public space and facilities in the 1830s, the convents were repeatedly occupied by programmes such as military barracks, schools, hospitals and/or residences, in interventions more or less adjusted to the structural context of the buildings.

Others, privatised, were later abandoned and reused by local communities as informal (collective) housing. The lack of space, the absence of resources and the poor materials used to adapt them into dwellings led to the degradation and consequent collapse of some former convents throughout the 20th century, as exemplified by the Bernardas Convent in Lisbon.

In fact, the process of adaptation has not always been simple. However, some examples of incisive transformations are now recognised for their uniqueness

and importance in the national context. The São Francisco Convent (Commerce Association, 1834; Stock Exchange, 1842) and the São Bento de Avé Maria Monastery (Train Station, 1875) in Porto are paradigmatic examples, as is the particular case of the São Bento Convent located in the Santa Isabel valley in Lisbon. This former Benedictine convent, built in the 16th century, was adapted to different uses throughout its life: into a historical national archive (1757, 1905), the Court Palace (1896) and the current Portuguese parliament (1910).[3]

Between the 1930s and the 1960s, the issues surrounding Portuguese-built heritage changed and were framed, on the one hand, around symbolic, artistic and value qualities, influencing reconstruction according to an identity imaginary, and, on the other, dynamics of reuse or refunctionalisation, with a view to its recovery and preservation. The capacity for symbolisation and intrinsic meaning in the structures of these buildings has served as a backdrop for the proliferation of architectural units that oscillate between spaces for cultural and tourist enjoyment. The creation of the tourist inn concept allowed for the definition of a new type of occupation, such as the well-documented Paço de Barcelos, the castles of Chaves, Bragança, Óbidos and Leiria or the palaces of Queluz, Sintra, Ajuda and Belém.

From the 1970s onwards, the intervention paradigm changed again, the rigidity of the programme was broken and the former convents were (re)designed from a critical approach in the project, through the reintegration and preservation of the value, meaning or nature of the architectural object. In other words, the architectural project is recognised as an intervention tool, informed by the historical, technical and artistic values of the buildings being adapted.

The interventions on the old convents in this period can be organised into three paradigms: mimetic, restitutive and abstract.

The first concerns processes of mimetic analogy to articulate the figurative and formal qualities of the pre-existence (aesthetic character and symbolic dimension) with a new functional and territorial occupation[4]. References include Fernando Távora's projects for the Santa Marinha da Costa Monastery in Guimarães (1977) or Alcino Soutinho's for the São Gonçalo Convent in the city of Amarante (1977). Both buildings are complex in their composition in time and space, the result of various methodological processes of reading and interpreting form as a plastic value and structure as the matrix of an inclusive system for adapting the proposal to different spaces.

The second is based on the building history as a memory of a formal and constructive process. The design approach involves the application of ancient techniques in the restoration and reconstruction of pre-existing walls and structures. The projects developed by the Portuguese Institute for Architectural Heritage (IPPAR, 1991–2007) and by Paulo Freitas and Maria João Marques Architects for the Monastery of São Martinho de Tibães (2008) can be highlighted. The monastery has undergone several restoration interventions of the monastic complex (buildings and fence) with the restitution of architectural elements, as well as being adapted into a museum and parish residence, and currently an inn.

Finally, the idea that a project activity can be in the "abstract domain", imposing a minimalist intervention with an antagonistic character on a pre-existing building

or ruin. The restoration project developed by IPPAR for the church of the former São Domingos de Lisboa Convent (1995) is an example in the national intervention context. The image of the church is composed of the relationship of the walls destroyed by a fire (1959) and the recent metal structure roof that supports the domes of the nave, with geometry identical to the original and sponged with shades of red.

The practice of reusing fragments has also been a recurring theme in the history of architecture, as mentioned above in the context of the São Domingos portal. However, in the last 20 years the issue has become more pronounced with the increase in archaeological surveys and architectural projects. The fragments remain incognito and embedded in the built fabric, often only evident in excavations that dismantle the form or in dynamic processes of transformation of the urban fabric that, through project action or informal gestures, reuse them as a memory of a past state and time. Their reuse gives them a new value, that of a "sign" (Spera, 2018:9).

They are, therefore, continuous incisions on the city that transform the built fabric – sometimes by an architectural project, sometimes as a result of natural effects –, conceal what persists in the stratum of time and make them reappear again, albeit with a different value to the one for which they were conceived. Paradigmatic cases in the city of Lisbon are the projects by Álvaro Siza Vieira in the former Nossa Senhora da Pedreira Convent, by GRCA Arquitetos in the cloister of the São Domingos de Lisboa Convent or the various interventions in the remains of the former Trindade Convent, also in Lisbon. Through their fragments, the memory and significance of a built fabric that was once important in the process of affirmation and expansion of the city persists. Over time it fell into disuse, was deformed, expropriated by the state, gave way to a new urban layout or was simply reused in various programmes. São Domingos and Trindade are examples of this: wings demolished to open up Nova de São Domingos and Nova da Trindade streets, their cloisters used as factories, housing, retail and catering. Today, their remains are scenographic elements in the context of a hotel and two restaurants. The persistence of the Nossa Senhora da Pedreira Convent is not so obvious. Transformed during the 20th century to accommodate the sales spaces of the Armazéns do Chiado and finally destroyed by fire in 1988, it is still recognisable in the repeated windows of the front elevation and in the correlation of the convent courtyards with the voids in the mechanical staircases of the new shopping centre.

Three processes, three case studies

The processes of transforming buildings have been addressed by several authors with the aim of systematising and classifying the different possible forms of action, based on specific cases in different cultural and geographical realities. The studies vary from a more conservative position in defence of restoration as a solution, to the sense of affirmation of the new as a preponderant element in the reuse of the building.

The processes are closely linked to the ability of buildings and places to be moulded to new social and cultural uses over time. The architect Sherban

Cantacuzino (1975) in "New uses for old buildings" reviews the processes, not just in physical form, but in their social relationship, in which the reuse of buildings is a way of preserving historical ensembles over time.

For his part, Chris van Uffelen (2010), in his book "Breathing new life into old bones", argues that whenever the choice of project falls on the reuse or recovery of the artefact, what is juxtaposed to the local tradition is its new function. Updating it over time involves a substantial change in its history. Therefore, preserving tradition is only possible if it is fully consolidated by a "symbolic act".

Françoise Bollack and Kenneth Frampton (2013) in "Old buildings, New Forms", give a typified reading of the reuse of existing buildings, organised according to Juxtaposition, Insertion, Weaving, Wrapping and Parasites. In the reuse of buildings, the processes can contain a variety of contrasting forms, which interfere with the pre-existing elements, modifying the classical, ancient or traditional character that is intricately linked to the culture of societies at a given time.

In the national context, Jorge Gaspar systematises the reuse – "reutilisation and reconversion" – of convents between the 19th and 20th centuries into four groups: (1) "living spaces" which include private residences, barracks, asylums, colleges, hotel establishments; (2) "industrial production or support spaces" in which he groups wineries, mills, factories (textiles, cork, beer,...) and warehouses; (3) "public service spaces" refer to schools, hospitals, offices, ministries, parliament; (4) and "public, free spaces" result in gardens, squares, streets and markets (Gaspar, 2002:93).

Finally, in order to understand "contemporary practice" in the second half of the 20th century, Miguel Tomé organises interventions to adapt or restore built heritage, specifically religious buildings, convents and churches, into three paradigms: "form and structure", "form and construction" and "form and matter". It is a reading methodology that groups interventions taking into account structure and functional organisation, the relationship between the new intervention and the "traditional" construction process of these buildings and the ability to preserve the pre-existence based on a concept (Tomé, 2002:219).

Assuming that the metamorphosis of buildings is always the result of a process of adding or subtracting new forms or strategies for constructing spaces. What differs is the process that defines or particularises the reuse action, which can vary between overlay, juxtaposition and insertion.

Overlay is a phenomenon that describes a change of form by substitution. In other words, it results from the succession of forms and spaces between two different cultures and times, in which one replaces the other. Juxtaposition is a process of adding elements, a "mosaic of diverse fabrics", simple or complex, more or less interconnected, representing a diversity of forms that together give rise to a heterogeneous organism. Insertion means interventions that define a new space by combining the characteristics of two different sets – old and new. In other words, the process insertion is the act of introducing a new set within another combining two different times, where the new tends to overlap with the old.

To exemplify the three processes, we present three distinct case studies related to the transformation of obsolete convents integrated into the context of the

Portuguese urban and natural landscape. Each case can be representative of various processes of metamorphosis of buildings over a long period of time, but here they are casuistically organised into three processes of appropriation that in some way defend the idea of reusing convents into new functions. The representation of each case study follows a uniform methodology of evolution and comparison, using the same scale and representation symbolism. Red and black signify the new and the persistence of time, actions embedded in the physical form of each building analysed.

Convent > Overlapping > Lighthouse

Overlapping is the act or action of superimposing a new system or a new element onto a pre-existing reality, merging to create a new building. The action transforms the relationship between two or more distinct entities, always based on the physical alteration of their context, uses and meanings. The process of superimposition has the potential to create new logics that become predominant in the organisation of the object and its urban or rural context.

The process of adapting the São Vicente Convent into a fort and lighthouse is an example of a process of superimposing a new programme that somehow alters the physical form of the building. The typology changes, transforming its spaces according to the needs of its inhabitants: friars, soldiers and lighthouse keepers.

It is not, therefore, an adaptive reuse action. However, the geographic location and typology of the convent are determining factors for a specific reuse of the lighthouse type. On the one hand, the position overlooking the water that "elevates" the light from the chancel to a lighthouse, and on the other, the functional structure of the convent that transforms its dependencies into rooms – functions related to the dwelling of the lighthouse keepers.

The maritime promontory of Cabo de São Vicente is characterised by a unique natural landscape that contrasts the hardness of its limestone cliffs with the water of the Atlantic Ocean. This sacred place is also the result of a sedimentary process that has transformed its architecture into different forms and functions, based on an interpretative and imaginative reading of historical events, sometimes mythical, related to São Vicente, Prince Henry the Navigator and the Portuguese maritime epic.

Since the 12th century AD, the Cape of St Vincent has been a place of perigrinatory influx for Islamists, Mozarabs and Christians. The relationship with the landscape and the mysticism of the sea led to the construction of the first hermitages, including one dedicated to the Christian saint Vicente – along with a hospital for the faithful.

In the following century, the hermitage and the hostel were expanded into a convent. This monastic building was initially intended for the Jerónimos friars and later for the Franciscans. It had a varied programme including a residence for the religious, a bishop's residence, a fort and a lighthouse.[5]

The monastery was rebuilt in 1608, following the attack by the pirate Sir Francis Drake in 1587. The reconstruction involved strengthening the convent and

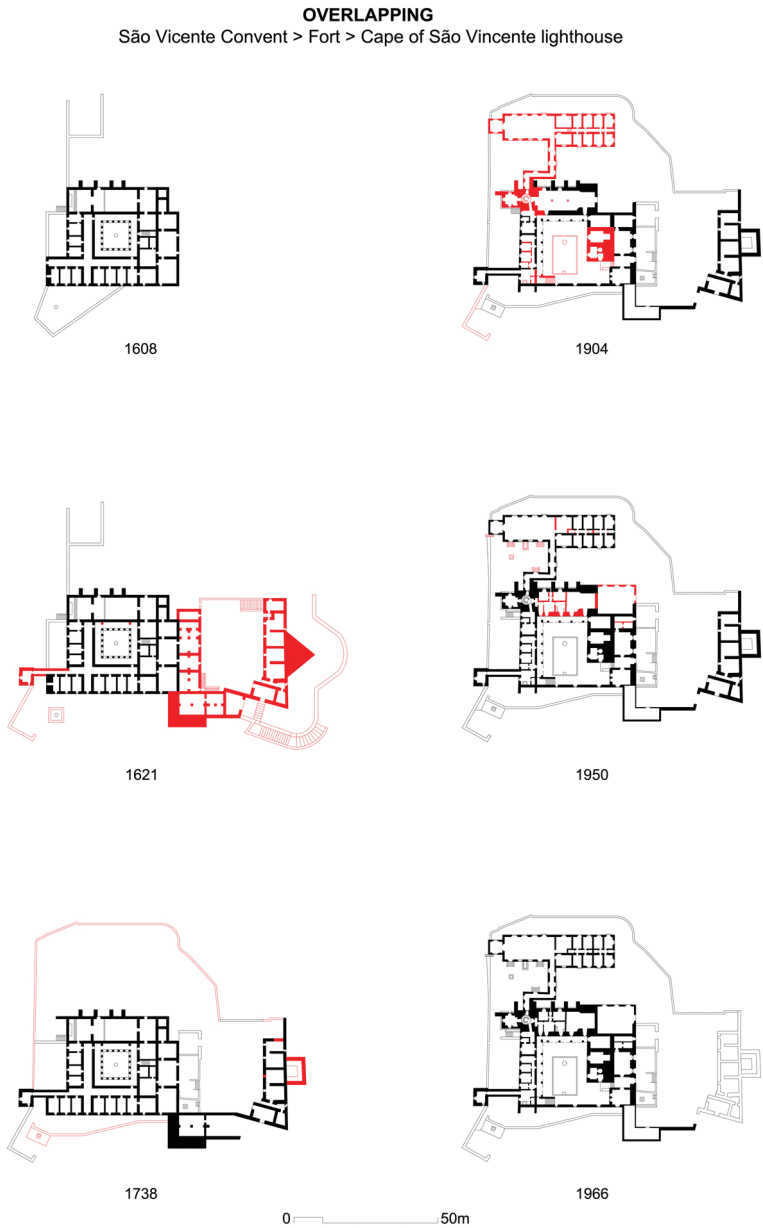

Figure 8.2 Overlapping: São Vicente Convent and Cabo de São Vicente Lighthouse (plans).

Source: Drawings by author, 2023

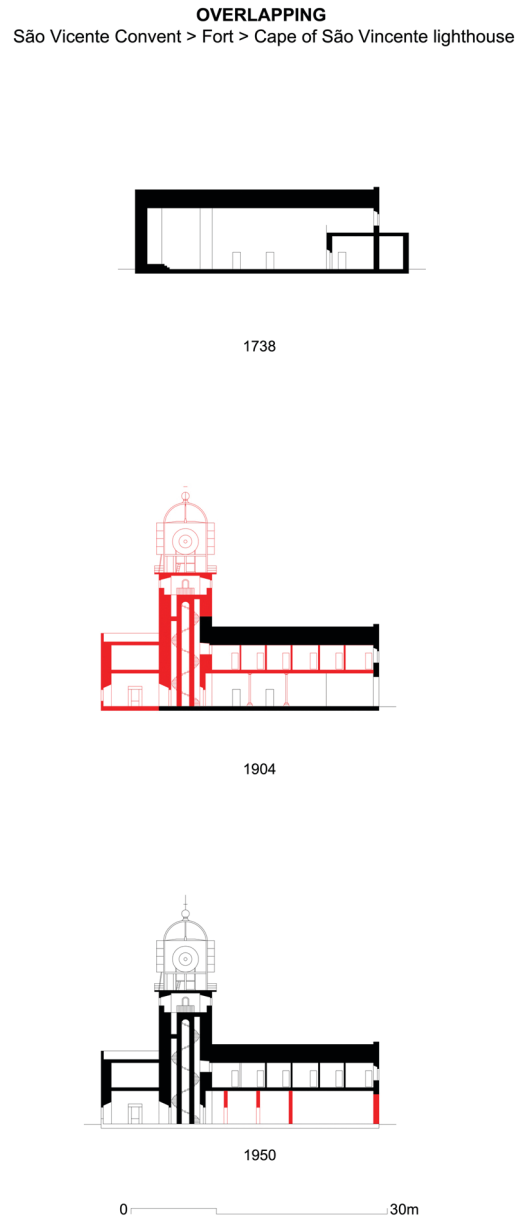

Figure 8.3 Overlapping: São Vicente Convent and Cabo de São Vicente Lighthouse (sections).

Source: Drawings by author, 2023.

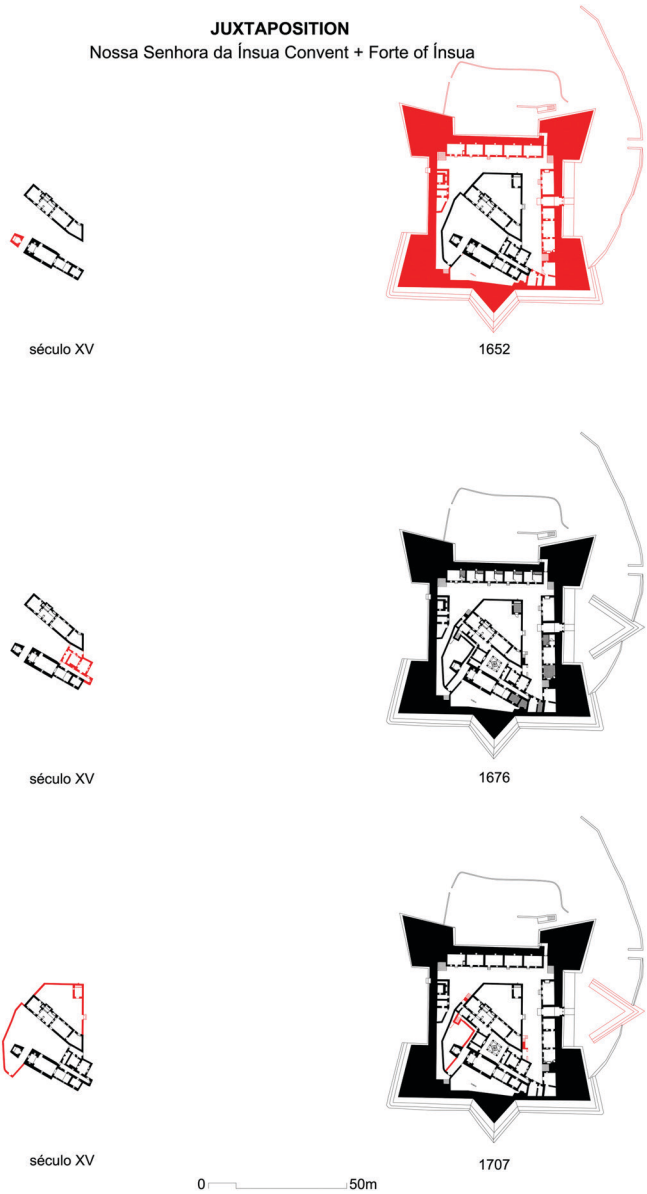

Figure 8.4 Juxtaposition: Nossa Senhora da Ínsua Convent and Ínsua Fort (plans).

Source: Drawings by author, 2023.

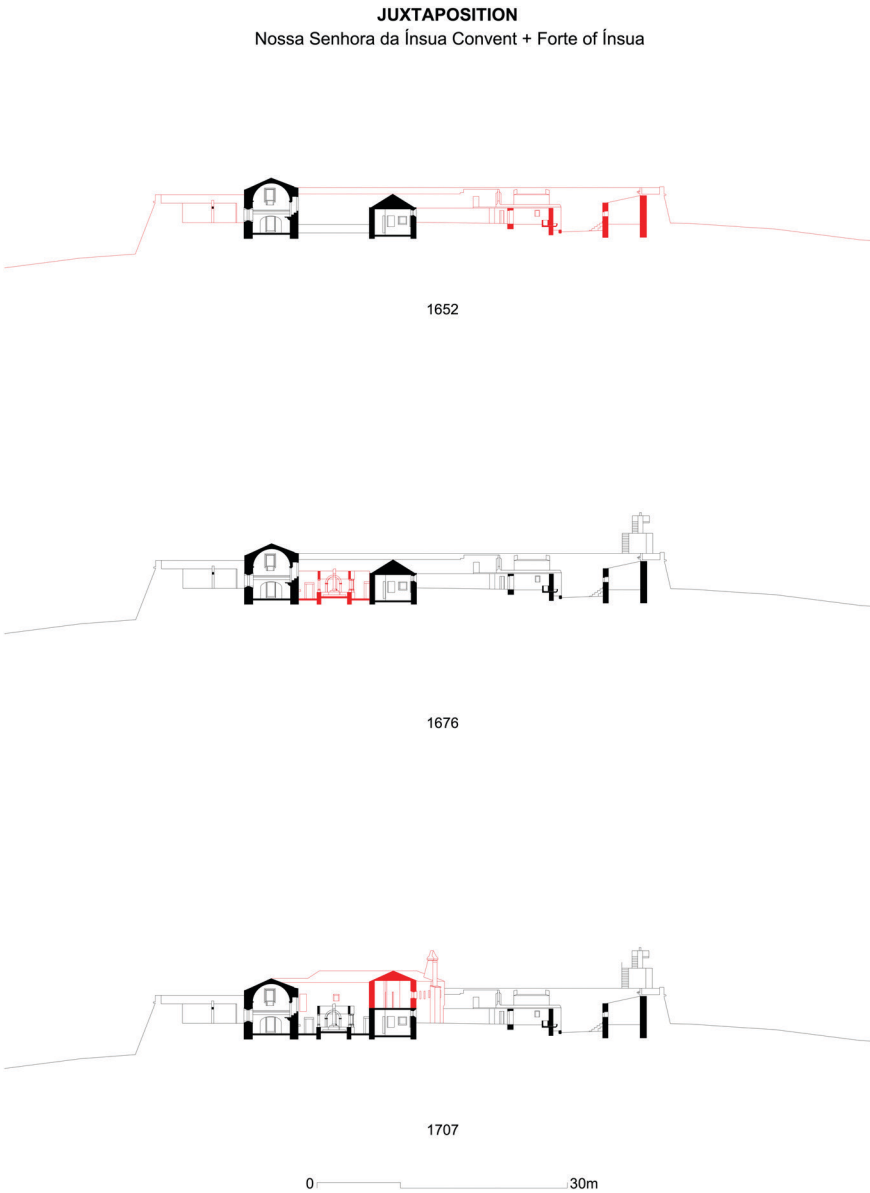

Figure 8.5 Juxtaposition: Nossa Senhora da Ínsua Convent and Ínsua Fort (sections).

Source: Drawings by author, 2023.

rebuilding the bastion, which was described as "dismantled and poorly secured". The buttresses, slabs and bombardments were rebuilt "and with this the said fort and monastery will be finished and in defence"[6].

Throughout the 17th and 18th centuries, the complex was damaged by several earthquakes and reached its decline with the end of the religious orders, when the remains of the convent and the church disappeared for good. The process of transforming the former convent into a lighthouse marked the beginning of the building's transformation to a new use. The lighthouse was built in 1846 over the chancel of the São Vicente Church. During the construction work, a "temporary lighthouse" was built on the west side of the promontory.

The lighthouse, in its current configuration, is the result of an extension process carried out by the Ministry of the Navy between 1904 and 1908, adding 1.60 cm to the 10.60 metres of the existing tower. The "project for the new Cape of São Vincente lighthouse. Modification of the tower and addition of a further 5.0 metres" of 1904 defined the basis for the extension of the original lighthouse tower. The new building was functionally organised to house bedrooms, workshops, lounges, kitchens and the sound signalling system. This system was built on top of the temporary lighthouse. Throughout the 20th century, the building was adapted to the needs and accommodation of the lighthouse keepers.

Convent > Juxtaposition > Fortress

Juxtaposition is the act of adding new parts to the constructed. In other words, it's a process of adding two or more elements from different times, joined or articulated by a measurement space. Although they are part of the composition of the same object, each one has its own identity and refers to its own time.

The Nossa Senhora da Ínsua Convent is an example of a simple process of addition by juxtaposing a new element – a fortress – to an existing building – a convent – which they cohabit simultaneously through a space of interstitial relationship – the square of arms. Today, it is a ruin that functions as a lighthouse. This process of reuse by juxtaposing two typologies defines the uniqueness of this example. Unlike the case of the São Vicente Lighthouse, the conventual structure has been preserved – much as a result of its continued use, monks and soldiers cohabited at the same time. The process of humanising the island of Ínsua began in the 4th century with the construction of a temple associated with Roman mythology. In Christian times, the eremitical cult changed and was dedicated to Nossa Senhora da Ínsua, Santa Maria de Carmes or Santa Maria da Salva, evocations in the Portuguese, Galician and seafarer contexts respectively.

At the end of the 14th century, the hermitage was appropriated by Franciscan friars, beginning the process of transforming the landscape of Ínsua and building a community dedicated to Our Lady.

The convent was built over a long period, stretching back to the mid-18th century when the church was rebuilt. It is a small convent structure with an irregular floor plan and two floors, organised around a cloister. The particular interest of this

example is the juxtaposed relationship between the religious and military activities inherent in the fortified structure surrounding the Franciscan community.

The fort is an example of 16th century military architecture, a bastioned fortification commonly referred to as a star fortification and circumscribed in a square. Its configuration is determined by the geography of the site, isolated in the centre of a small outcrop, easily defended from all angles around the walled enclosure. The difference to its typical design is the substitution of a square of arms, tower and barracks for the convent fence and outbuildings.

These different realities lived side by side until the extinction of the religious orders, which allowed it to be used as a lighthouse. In 1979, following the methodology of intervention in the Portuguese-built heritage at the time, the project to adapt it into an inn was realised, co-authored by the architects Alberto Bessa and Cassiano Barbosa, but it never came to fruition. It is currently part of the REVIVE programme, which promotes and speeds up the rehabilitation and valorisation of obsolescent public assets.

Convent > Insertion > Factory

Insertion means examples of buildings whose reuse involves the inclusion of a new volume or space within an existing one. The result is the characterisation of an object that combines the two different parts simultaneously. Insertion always implies the prevalence of the new identity over the old. The memory of the past amplifies the character of the new.

Cases as São Evangelista Convent in Lisbon is an example of the reuse of a convent building in an industrial complex – the Companhia Industrial de Portugal e Colónias factory. The former convent is defined by a set of spaces built at different times, the old church (formally restored to its limits), persistent conventual elements and various ancillary buildings constructed during its factory use in the late 19th and early 20th centuries.

The cloister, chapter room, refectory, monumental staircase and library remain from the old convent. With the paradigm shift in the context of heritage intervention in the 21st century, all these spaces have been reused for functions related to the activities of a cultural centre. However, we are trying to particularise the adaptation of the convent into a factory, as part of the concept of insertion that we are trying to explain here.

Dedicated to the Canons Regular of St John the Evangelist (Lóios), the convent was built in the 15th century on top of a small Benedictine hermitage. The memory of the hermitage is present in the name that is popularly given to the old convent and the street that adjoins it, Beato.

The process of adapting it to a factory after 1843 marked the old convent incisively, largely distorting the persistent elements of its original configuration, particularly the body of the church. According to the "project of transformations that the industrial company of Portugal and the Colonies intends to have done in its building located in Alameda do Beato, 1st neighbourhood"[7], the church was

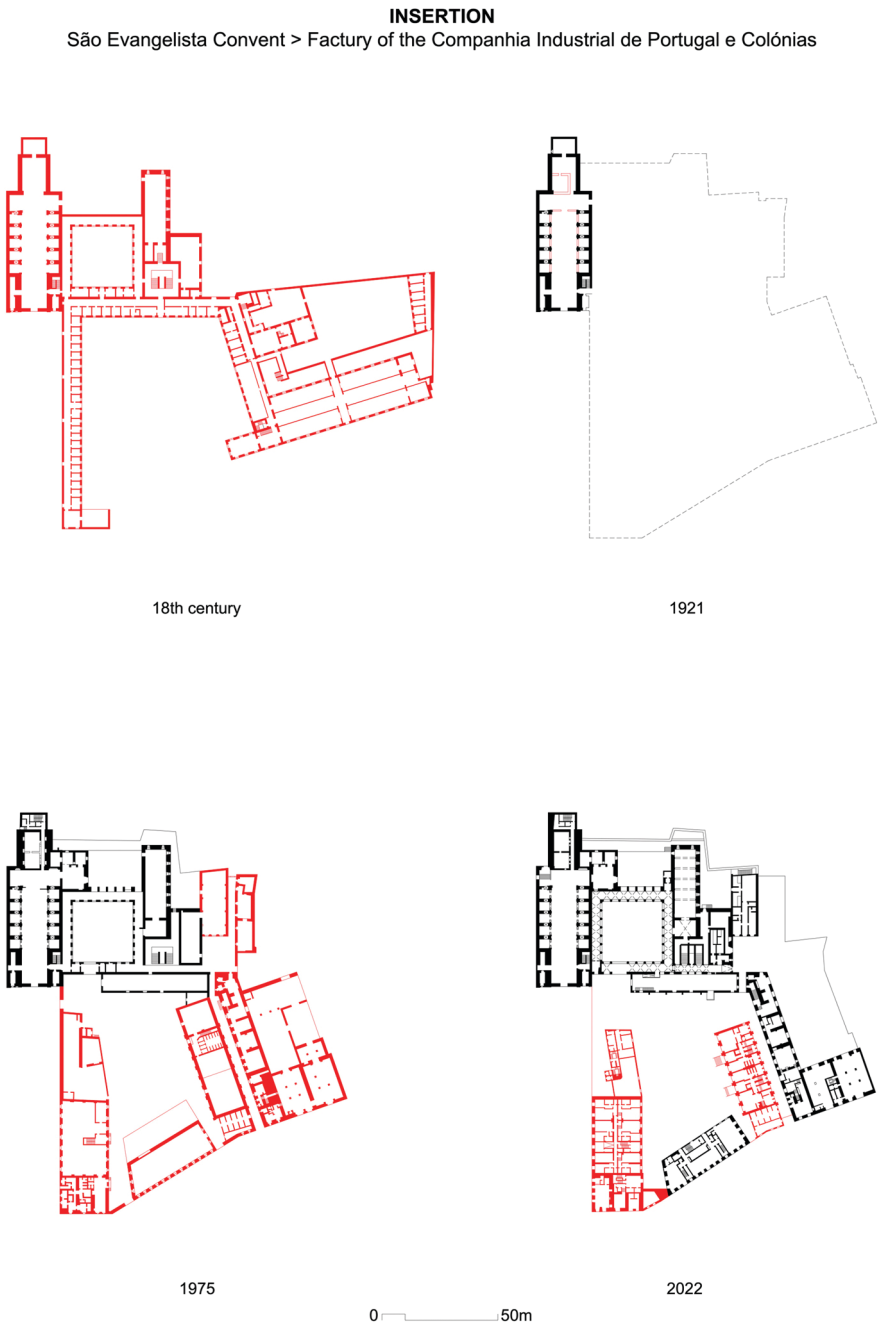

Figure 8.6 Insertion: São Evangelista (Lóios) Convent and Factory of the Industrial Company of Portugal and the Colonies (plans).

Source: Drawings by author, 2023.

divided into four floors, with reinforced concrete and iron slabs, cement and brick finishes respectively, topped by a vaulted oven with a 20-metre-high chimney.

In the work process for the construction of an administrative building in 1976, authored by architect António Santos Mattos Gomes, it is possible to understand how the factory complex was organised, in its different dependencies, removing the stratification of the body of the church and the cloister transformed into a garage.[8]

In 2010, Adquadratum Arquitectos coordinated an intervention to restore and rehabilitate the convent, following the fire that partially destroyed the building – the front wing of the courtyard, formerly an inn.[9] The proposal was to adapt the existing building into a multifunctional space – cloister: events room; church: exhibition

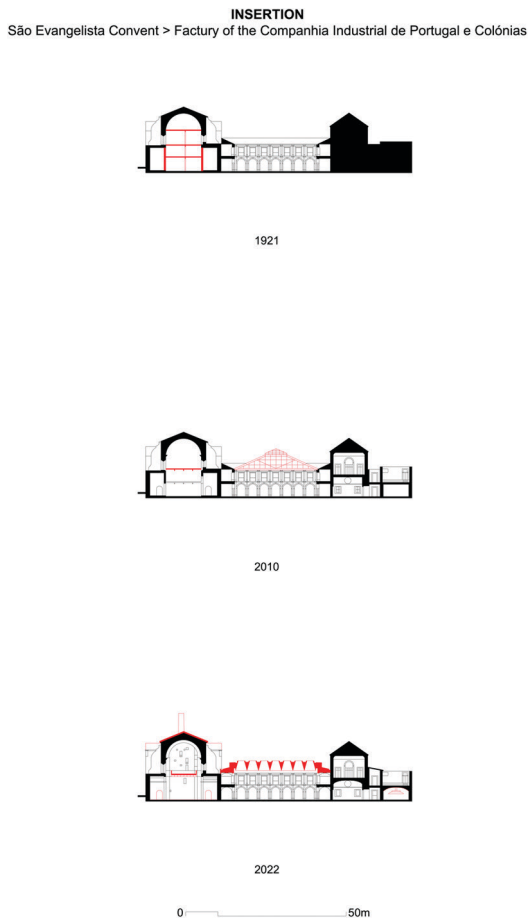

Figure 8.7 Insertion: São Evangelista (Lóios) Convent and Factory of the Industrial Company of Portugal and the Colonies (sections).

Source: Drawings by author, 2023.

room; refectory and library: meeting rooms – as a sustainable solution to the preservation and valorisation of the building's heritage. An important element in the image of the complex is the roof of the cloister, a pyramid-shaped roof covered with acrylic panels.

Currently in the construction phase, the former convent is being rehabilitated according to a project by the Risco office, 2018–2024. This "new" cultural centre aims to build a luxurious space – Beato Lux – that requalifies the events centre (already finished), reuses the space of the old church for services and the remaining industrial buildings for housing. The intervention aims to valorise the built heritage based on technical innovation, energy sustainability and the safety of its spaces, marking the contrast and affirming the visual contemporaneity of the new elements over the existing building.

For the cloister, for example, the roof was redesigned with the aim of modernising the room and improving thermal and acoustic comfort. The roof is a system of orthogonal trusses, which form a continuous honeycomb from which artificial and natural light comes through skylights.

A continuous [re]use

All these examples demonstrate that the process of reusing convents is not a recent phenomenon. Using three possible actions as example, were synthesised possible methodological approaches to new interventions in the continuous process of transforming convents in Portugal. The built heritage is successively generated and regenerated, restored and copied, added and subtracted, with new and old traditional values.

However, the 21st-century obsession with making everything have a productive meaning leads us to the problem of the (in)usefulness of vacant, unused, abandoned buildings: what uses can they have beyond those considered conventional? Despite their importance in the past, their use can lead them to vulgarity through the systematic repetition of one type of use. What if convents were reused to build social spaces for local communities? Perhaps this could be an opportunity to respond to proximity, inclusion and sustainability programmes.

The answer points to a dynamic process of action that evolves from the sense of building something new, sometimes demolishing and replacing it with another building, to the idea of integrating the object's value into the design of a new occupation – adjusting the programme to the "essence" of the pre-existing building.

The unique life of each building contains the original idea and the others that have added character, texture and meaning. It is a coherent system that allows generations to relate to others. The continuity of the artefact does not necessarily have to do with preserving its memory, but with the capacity for use that a given space has.

Through the study of these many cases, different possible solutions are documented, with the introduction of different programmes in conventual, obsolete and expiring typologies, as well as the effect of the transformation action. These are not strict preservation processes; they understand the historical-artistic potential of

each typology but seek to demonstrate the variability of possible solutions for its occupation and continuity. It is in this sense that the inventory of solutions applied in the reprogramming of existing buildings can be an opportunity to learn more about this type of process, particularly in the case of convent typologies.

The suitability of the convent typology for hosting different functions is based on the matrix defined by the structure and organisational systems of the spaces. However, it is believed that the adaptation of conventual spaces to new purposes cannot be restricted to the exclusive use of programmes considered "convenient": culture, tourism, sharing and assistance. Their formal and symbolic dimension allows them to offer a variety of possible solutions, particularly those aimed at issues such as sustainability, inclusion and, it should be emphasised, housing. An increase in the need for housing, for example, can provide a new practical opportunity to introduce new programmes in "empty and underused" convents. A continuous [re]use through communities that potentiates the building's continuity over a long period of time.

Notes

1 The research project was carried out at FA.ULisboa, coordinated by the author and funded by the Centre for Research in Architecture, Urbanism and Design, under reference (CIAUD/UDIB/04008/2020).

2 From the 11th century onwards, the Order of St Benedict, the Canons Regular of St Augustine, the Cistercian Order, the Order of St Francis, the Order of St Dominic, the Order of Carmel, the Carmelites and the Order of St Jerome, the Society of Jesus, the Congregation of the Oratory and the Carthusian Order, among other congregations and orders, settled in Portugal.

3 To be more specific: Tombo do Reino (1757), Mercês Registry Office (1791), Palace of the Courts (1896), Historical National Archive of Torre do Tombo (North wing, 1905) and Assembly of the Republic (Parlement of Portugal, 1910).

4 This confrontation between the plasticity of the buildings and the incision of new grammatical compositions, constantly visible in their spaces and walls, demonstrates the influence of Cesare Brandi's Restoration Theory (1963) and the Venice Charter (1964) in the methodological definition of interventions in the built heritage of this period, particularly in the differentiation between the pre-existing and the new intervention.

5 While there is no record of the exact location, shape and composition of this lighthouse, it is speculated that it was a rudimentary and ephemeral structure, certainly signalling the coast by fire.

6 "Description and plans of the coast, the castles and fortresses, from the kingdom of algarve to cascais, the third island, the square of mazagão, the island of santa helena, the fortress of ponta do palmar at the entrance to the river of goa, the city of argel and larache" [online] Arquivo Nacional Torre do Tombo, Digitarq, reference code pt/tt/ccdv/29_m0091 [visited on 16 January 2023] Available at https://digitarq.arquivos.pt/viewer?id=3908671

7 Arquivo Municipal de Lisboa, Obra n.º 40453, Processo n.º 11887-SEC-PG-1921, folha 4

8 Arquivo Municipal de Lisboa, Obra n.º 40453, Processo n.º 340-DMPGU-OB-1976, folha 16

9 Arquivo Municipal de Lisboa, Obra n.º 40453, Processo 91-DMAE-POL-2010, folhas 30, 31

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9 An imPerfect building

The Espírito Santo Hospital in Évora

Pedro Vasco Martins

Geometry and perfection in architecture

Before looking at the Espírito Santo Hospital in the city of Évora in Portugal, it is important to highlight the structuring role of geometric compositions in the design and organisation of built forms, especially when we analyse past buildings, in which precisely due to the frequent use of geometrically perfect models for the architectural composition, this dichotomy between the rule and the exception, perfection and imperfection is more evident.

The maturation of architecture is inseparable from the respective evolution and in the fields of geometry, mathematics and arithmetic, with the buildings of antiquity progressively presenting greater refinement and sophistication from a set of earlier archaic models. These would be carried out not only in construction techniques and materials, but also in architectural forms, drawn essentially from progressively more complex arithmetic and geometric compositions, usually identified as *Proportional Schemes*, and that are also frequently associated with notions of *Sacred Geometry*. We have, admittedly, little information from ancient authors about the design principles used during this initial phase of the discipline; however, fundamental evidence of ancient architecture, its methods, design processes and construction, particularly in the use of geometric compositions, survives in the treatise "*De architectura libri decem*" by Vitruvius. Vitruvius addresses several topics from the most technical aspects, such as the types of masonry (in book II), to the general principles of architecture; however one of the most interesting aspects addressed is precisely the way in which ancient architects approached the issue of designing buildings:

> *1. This is how to make the configuration of the theater itself. Whatever the size of the lower perimeter, locate a center and draw a circle around it, and in this circle drawn four triangles with equal sides and equal intervals. These should touch the circumference of the circle. (By these same triangles, astrologers calculate the harmonies of the stars of the twelve signs in musical terms.) Of these triangles, take the one whose side will be closest to the performing platform. There, in that area that cuts the curvature of the circle; lay out the scaenae frons*

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> *and draw a parallel line from that place through the center of the circle; this will divide off the platform of the proscenium and the area of the orchestra.*
>
> (De Architectura, 5.6.1 in (Vitruvius, 1999):69)

Vitruvius clearly describes in his work how a geometric scheme, that is, a proportional scheme is applied as a geometric skeleton to support the design, not only of a particular building, but rather of an entire building typology, in this case the theatre. It seems clear (and it certainly is) that for the author, this type of geometric scheme should be used for the main building typologies, explaining the considerable formal similarity between the various forums, theatres, temples and amphitheatres, as a result of the systematic and conscious use of a set of Proportional Schemes shared between several works.

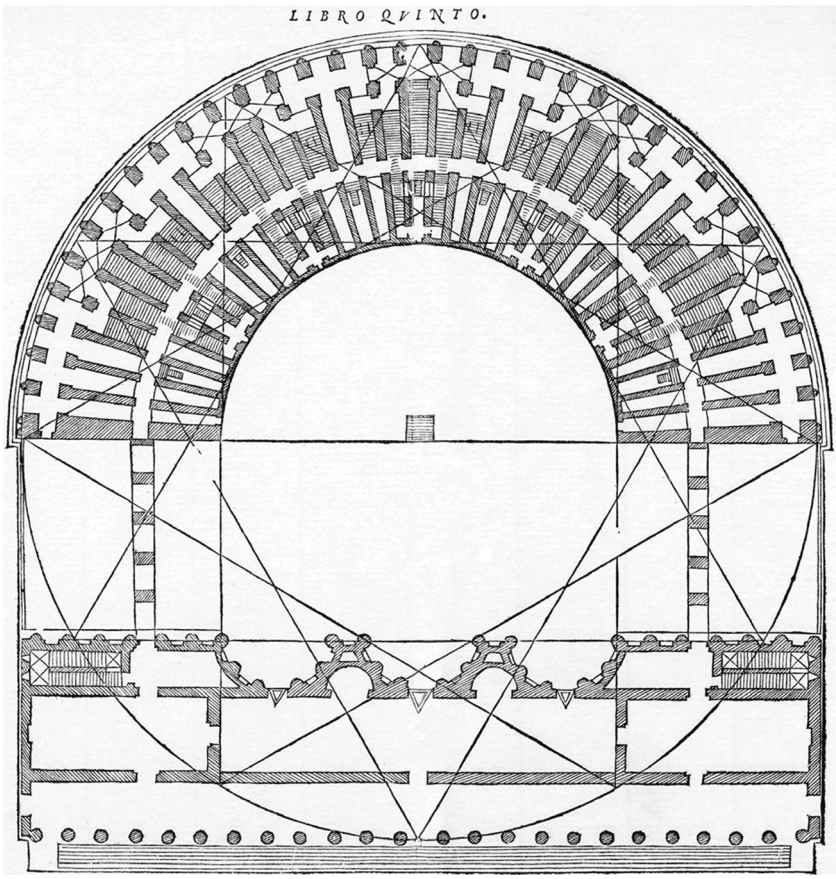

Figure 9.1 Geometry of the Roman Theatre according to Andrea Palladio.

Source: Drawing from Barbaro, 1556.

Vitruvius's treatise will remain a reference, even remaining in continuous circulation during Late Antiquity and the Middle Ages, with dozens of copies documented from the 9th century to the 15th century. It should be noted, in fact, that treatises such as "De Architectura" by Vitruvius or the "Elements" by Euclid will continue to be disseminated throughout Europe, even though incomplete or sometimes distorted versions, especially in restricted circles generally associated with the *scriptoria* of the great monastic complexes, losing in the process the images that eventually accompanied their texts. The continued transmission of the treatises of Vitruvius and Euclid in the post-classical world will ensure the partial preservation of the main theoretical and conceptual elements of classical architecture and geometry in a line of continuity, eventually allowing their "rediscovery" and reinterpretation in the late Middle Ages. The partial survival of these treatises, known through *fragmenta*, helped maintain a culture of practical geometry applied on large construction sites throughout Late Antiquity and the Middle Ages. The design of medieval churches and cathedrals thus maintains direct continuity with the practices of Euclidean geometry and surveying used since Classical Antiquity. This practical knowledge would also be aided by several medieval treatises and compilations on geometry, as well as several construction drawings, which would be shared between masters from different construction sites, and of which little has survived to this day (among the surviving texts the work carried out by Villard de Honnecourt in the 13th century stands out). The surviving works and texts of medieval builders convey a notion of continuity, albeit imperfect, between Classical Antiquity and the Middle Ages in the use of geometric schemes to control the design of buildings.

The study of classical and medieval treatises on geometry and architecture thus highlights a continued practical culture of designing and constructing buildings through complex geometric schemes, that is, *Proportional Schemes*. These lines were drawn from the frequent use of a set of base shapes to which various practical geometry operations such as reductions and divisions were then applied to generate progressively more complex shapes. These *Proportional Schemes* or layouts would be present not only in the plans of individual buildings, but also in their elevations, the main elements of which would be provisionally "assembled" in plan on the ground before being placed on the correct place on building under construction. This process is well documented for example in the design of the Pantheon's pediment reproduced in on a 1:1 scale, on the cobblestone surrounding the Mausoleum of Augustus, where it would have initially been assembled flat. Like this, there are numerous similar examples in various Romanesque and Gothic cathedrals.

The function of *Proportional Schemes* is traditionally associated with issues of harmony and beauty and even with more intricate themes of cosmic or divine ordering and symbolism (the excessively valued *Sacred Geometry*). However, if these issues could be present in the architect's mind at the time of the design, the main reason for their existence rather seems to be of a practical nature. This assertion, pragmatically valuing the practical component over the symbolic, is supported by the apparent continuity of this design methodology throughout Late Antiquity and the Middle Ages, remaining relatively unchanged despite

the significant cultural transformations between paganism and Christianity that resulted in a radical change in religious and symbolic paradigms. Another reason (of a practical nature) for the application of these geometries thus emerges. One in which their importance for the development of the work lies mainly in the fact that through them it is possible to copy the design of a given project in an extremely efficient way, from the *paper* to the site. In other words, the design of a building using these schemes allowed master masons to reproduce on the ground, with simple tools, such as ropes and stakes, the main geometric operations of spatial translation, division and measurement (literally, *geo-metria*). This assertion seems to be confirmed by the following statement by Vitruvius about the role of geometry for the architect:

> Geometry, in turn, offers many aids to architecture, and first among them, it hands down technique of compass and rule, which enables the on- site layout of the plan as well as the placement of set-squares, levels and lines.
>
> (From Architectura, 1.1.4, in Vitruvius, 1999:22)

With this geometric skeleton applied to the ground, the process of reproducing the detailed proportional scheme guaranteed that the different parts would maintain in cohesion and global articulation with the whole form.

This global cohesion and harmony would, in fact, be one of the main concerns that the use of Proportion Systems addressed. In the process of duplicating a drawing if, for example, developed linearly, to each element reproduced a small margin of error is added, increasing gradually until it results in a visible mismatch between the original drawing and the copy. However, if the copying process is conducted from the general to the particular, from the larger to the smaller forms, the margin of error in the copying process is diluted by the drawing as a whole, resulting in a shape in which the various parts maintain a greater harmony with the whole. Thus, to guarantee this global harmony, Proportional Schemes are almost always applied from larger to smaller shapes in a process of constant progression through division, subdivision, transformation, and repetition. This notion is evident in the description of medieval architecture by Paul Frankl: *"everything that can be divided, is divided"* (Recht, 1995)[1]. The basic shapes used in Proportional Schemes invariably result from the use of the same elementary shapes: the circle, the triangle, the square, and the pentagon. These would be infinitely translated, divided and combined using processes of geometric progression, among which the union of the intermediate points of the base shapes stands out. This process means an apparent shape rotation, identified as the "*ad triangulum*" and "*ad quadratum"* schemes, as well as the more unusual "*ad pentagonum*". However, despite the diversity of possible shapes, the use of square-based geometry is predominant, either through the "*ad quadratum*" or through the folding of its diagonals to generate notable rectangles (golden, sacred, $\sqrt{2}$, $\sqrt{3}$, and $\sqrt{5}$).

The use of Proportional Schemes continued between Classical Antiquity, the Middle Ages and the Renaissance, a time when innovations in the field of

Figure 9.2 Use of the Groma in the initial delineation of Roman public buildings.

cartography and the reformulation of geometry made Proportional Schemes gradually obsolete. The longevity of this design and construction methodology makes its interpretation particularly useful in understanding ancient buildings, where the available information is more fragmentary, thus allowing the model or geometric rule to reconstruct the missing parts of the original structure.

It's important to note that the study of Proportional Schemes present in the design of ancient buildings continue to be a controversial approach, since "*post-facto*" interpretations of built structures are particularly subjective and prone to misinterpretation. In addition to this complex scenario, the simple act of drawing a line on a pre-existing plan can create a connection between two points that wouldn't necessarily exist *a priori*, that is, that may not have been part of the architect's original project or intention, being rather, an *a posteriori* interpretation, dependent on the subjective framework of those studying the plan. The subjectivity of this type of analysis means that the correspondence between the hypothetical proportional

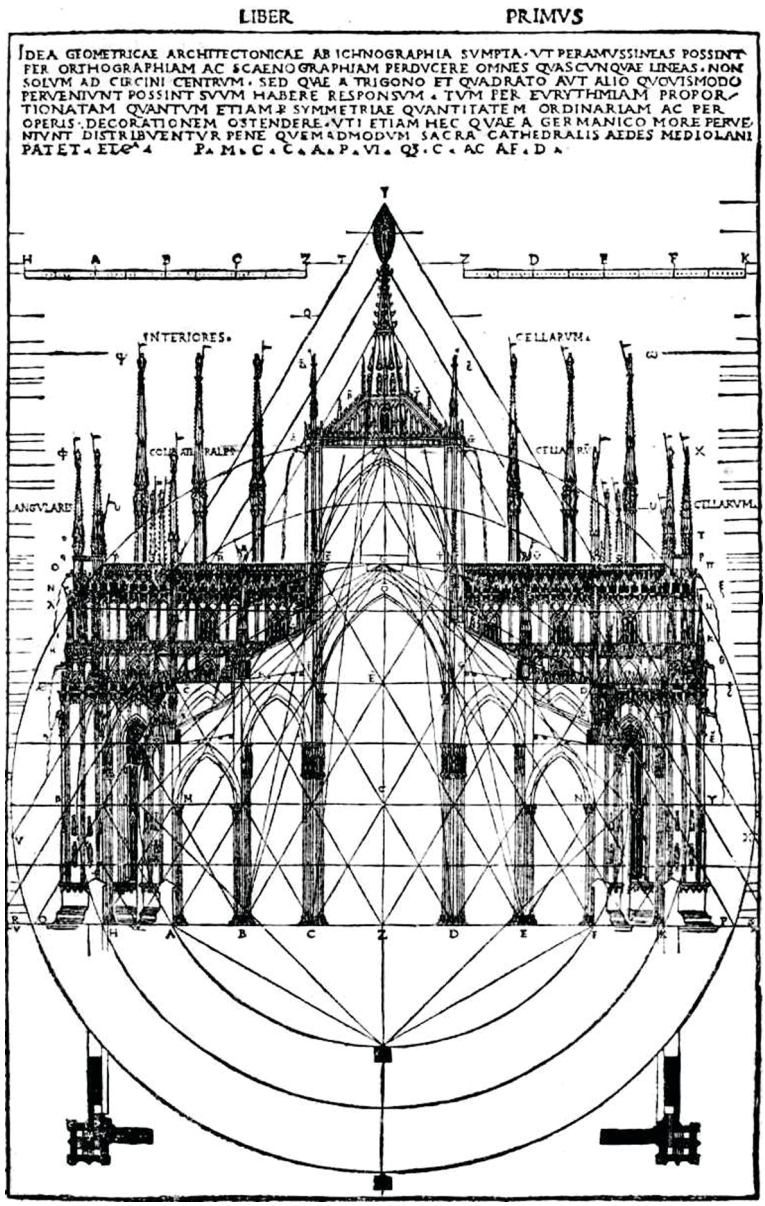

Figure 9.3 Geometric scheme *ad triangulum* applied to the Milan Cathedral, according to Cesare Cesariano.

Source: Drawing from Cesariano, 1521.

scheme and the reality of the remains is almost never clear or evident enough to become indisputable, always remaining in the field of hypotheses. Nuances such as the material thickness of the walls vs. the infinite lack of thickness of the geometry, the existence of construction errors and deformations of the original plan, or even the evolution and constant transformation of buildings throughout their life will always make it difficult and condition the original proportional scheme understanding.

However, if some of the problems mentioned may condition the study of Proportional Schemes for some buildings, their analysis based on comparative or typo-morphological readings makes it possible to considerably reduce the subjectivity inherent to these studies. This type of analysis clearly highlights the variant and invariant components of the design and, therefore, the respective essential composition rules, allowing the proportional scheme to be justified with greater certainty as part of a broader set of composition rules. Therefore, despite the inherent subjectivity of the analysis, the study of the Proportional Schemes that were at the origin of the design and configuration of ancient buildings remains one of the most important sources of information about these structures. Knowledge of these geometric formulas (through their predictable "perfection") has the potential to reveal us either the intended project, and perhaps never fully realised, or on the other hand the original form of the building before its progressive transformation over time.

The Espírito Santo Hospital

One of the most interesting and least-known buildings in the Portuguese city of Évora, can be found in the old Espírito Santo Hospital. The history of this building goes back to 1492, the year in which the king D. João II began work on the Todos-os-Santos Hospital in Lisbon. With the construction of this building, D. João II intended to bring together in a single institution the income and functions of all 43 small shelters and private and ecclesiastical hospitals existing in medieval Lisbon. It is likely that, immediately following the start of the work on this building, D. João II also asked Pope Alexander VI (1492–1503) for similar authorisation for the centralisation of the hospitals in the cities of Coimbra, Évora and Santarém. In Évora, the Espírito Santo Hospital was founded initially as an institution as soon as 1492, with the likely start of the construction work on the building taking place from 1495 onwards (Beirante, 1996). However, the death of D. João II in the same year will compromise the development of the project. The coveted papal letter allowing the merger of the various hospitals in Évora and their income (around 12 small shelters and hospitals under the supervision of various religious institutions) into a single entity was only issued in 1499, that is, already during the reign of king D. Manuel I (1495–1521). D. Manuel I therefore had the role of ensuring the construction of the building to house the institution initially founded by his predecessor (Peres, 1932).

After its construction in the beginning of the 16th century, the Espírito Santo Hospital remained in the same space until the present day as the city's main hospital, playing a leading role in various periods of crisis over the centuries. The building's long life will necessarily involve several moments of profound renovation and expansion with successive improvement works and the construction of several new wings, among which stand out, for example, the 17th century infirmary, completed in 1618, the main Office from the beginning of the 18th century, or even the complete reconstruction of the old Manueline church, in 1780. In the 20th century, a new and building was added juxtaposed to the south face of the old hospital, allowing not only the improvement of the services, but also their modernisation and expansion in accordance with the latest techniques. These successive interventions, carried out in an apparently uncoordinated way, transformed the building over 500 years into an irregular *built mass*, apparently without any underlying order or reason. This apparent constructive disorder contributed to the an underappreciation of the building in the city's history, in such a way that the historian Túlio Espanca when producing the chapter dedicated to the city in the Artistic Inventory of Portugal goes so far as to state that *"Constant works of improvement, enlargement and updating of assistance services have modified, over time, the physiognomy of the building, which does not preserve any architectural remains prior to the first twenty of the century. XVII"* (Espanca, 1966). However, despite the profound interventions carried out in the following centuries, the analysis of the shape of the hospital's original nucleus still clearly displays a configuration of an erudite nature, drawing a cruciform plan with the church's main chapel in the centre of a Greek cross, consisting of four bodies[2].

The Greek cross configuration has clear parallels with a group of hospital buildings first built according to new typological models implemented in Northern Italy from the 15th century onwards. This typology of hospital buildings emerged with the transition from care buildings, initially included in the field of religious buildings, like monasteries, to give rise in the 15th century to a new family of civil buildings dedicated exclusively to the function of healthcare. The change not only implied an autonomy of this typology in relation to its ancestors of religious initiative, but also a gradual "refinement" of its form in parallel to the architectural developments of Renaissance culture.

The first examples of this new typology appear with the Ospedale di Santa Maria Nuova in Florence (1334) and the Ospedale di Santa Maria della Scala in Siena (1440), in which the shape of these buildings adopted for the first time a cruciform configuration, elaborated from of the intersection of four wards, although still with an approximately irregular shape. With the examples of the Ospedale di S. Matteo or della Pietà of Pavia (1449–1513), the Ospedale Grande di San Leonardo of Mantua (1449–1472) and the Ospedale Maggiore of Milan (1456), the typology achieves an erudite form, combining the cruciform configuration with a geometrically rigorous square plan. In addition to these Italian buildings, several examples of the same typology appeared on the Iberian Peninsula, practically simultaneously, such as the ancient hospitals of Todos-os-Santos Hospital

in Lisbon (1492–1504), Valencia (1493) and Zaragoza (1496), or the Royal Hospital of Santiago de Compostela (1501–1507), the Hospital of Santa Cruz de Toledo (1504–1514), the Hospital Real of Granada (1511–1525), the Hospital de Tavera in Toledo (1541–1603) and the Hospital de las Cinco Llagas in Seville (1546–1558) (Pereira, 2021). The shape of all these buildings consists of the application of a cruciform configuration, usually inscribed in a square shape, which generates a building with four cloisters, while also highlighting the central point of the intersection of the four wings in the cross through a lantern tower placement (Moreira, 1993)

We know little or nothing about the architects involved in the design of these buildings, preventing us from knowing the reasons that led to the delineation of their shape, with the notable exception of the Ospedale Maggiore in Milan (1456) designed by Antonio Averlino, commonly known as Il Filarete. Filarete's project departs from the square geometry with four courtyards used in the hospitals of Pavia or Mantua, cities that Filarete claims to have visited, by doubling cruciform design and thus giving it a truly monumental scale (Dias, 2016). Interestingly, we find in the design of the hospitals in Milan, Pavia and Mantua not only the same shape, but also the same proportional scheme, obtained through the combination of several squares with circles (*ad quadratum*), as well as the inscription of the square within a circle, that is*, homo ad circulum ad quadratum*, a prominent figure in fourteenth-century treatises, representing the perfect analogy between man and construction (Crippa, 1998).

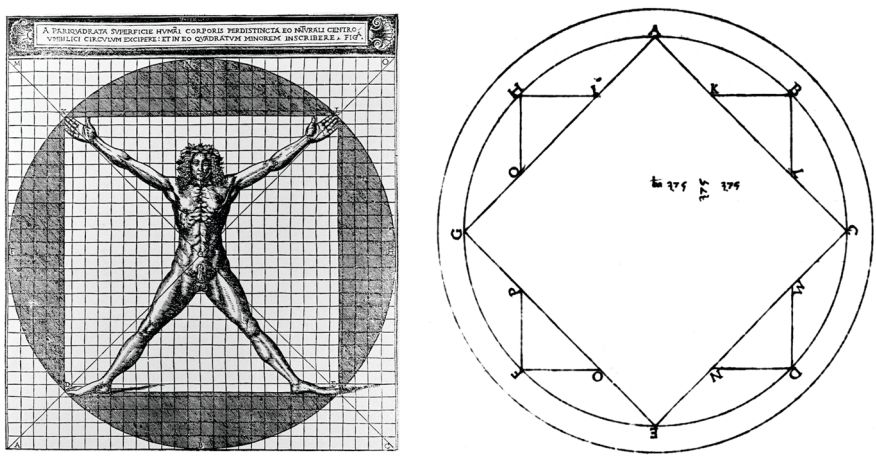

Figure 9.4 "*Homo ad circulum ad quadratum*" scheme (Cesare Cesariano, 1521) and Sforzinda geometric scheme (Filarete, c. 1460–1464).

Source: Drawing from Cesariano, 1521.

It thus seems likely that these types of geometrical patterns based on the use of an *ad quadratum* were the main drawing guidelines, and the basis for the cruciform configuration of almost all these buildings, built in Italy, Spain and Portugal from the 15th century onwards (Figure 5). This notable familiarity is likely the result of on one hand the participation of common architects in the different construction sites, or on the other hand the known sharing of architecture manuscripts probably accompanied by drawings in erudite circles, in a similar fashion to the contemporary dissemination of the several treatises of architecture that were being written at the time, such as Alberti's treatise (c. 1452) or the *Trattato d'Architecttura* of *Il Filarete* (c. 1460?–1464).

In the case of the Todos-os-Santos Hospital in Lisbon, although the existence of drawings is not documented, it is clear from reading its shape that the building followed Italian hospital models, something that is even more evident from reading the will of the king D. João II where the he states that: "*I order that the said hospital is to be done in the way it is started* [...] *which I wanted to more or less follow the regiment used in Florence and Siena…*" (Sousa, 1955). It therefore seems certain that the king, or his architects, would have had access to copies of the drawings that were the basis of some of the previous hospitals. Thus, considering all these precedents with the recourse to a cruciform configuration, and in particular the case of the Todos-os-Santos Hospital in Lisbon, also built under the command of D. João II a few years before the hospital of Évora, it seems clear that also this hospital also used these geometries as de basis for its design.

Observing the plan of the original nucleus of the Espírito Santo Hospital in Évora and combining it with the plans of the existing typological parallels, it is possible to reconstruct the hypothetical configuration of the initial design used to generate the configuration of the hospital. This building would be designed, as in the case of the other hospitals mentioned, using a square measuring approximately 7 metres, the shape of which forms the basis of the design of the main chapel, as well as the three wards that extend from the central nucleus to North, East and South.

The outer limit of the building would be obtained through the use of an *ad quadratum* scheme, topped off by the inscription of the outer square in a circle to progressively increase the square shape of the of the main chapel up to the limit of the building. It is thus, from this analysis, possible to understand that despite successive improvement campaigns, the original core of the Espírito Santo Hospital still essentially maintains its original form. In its configuration, the two North and South wards are perfectly legible, which, if remade, would have respected the initial shape. By contrast to the ward on the East side, which does not correspond to the geometric alignments. For this wing, a probable complete reformulation that erased the pre-existing structure must be considered, or even the possibility that this wing was never implemented according to the initial project. On the other hand, the shape of the four cloisters also seems to have been partially preserved, both in their outer limits and in their internal configuration readapted as circulation corridors for the wards. Likewise, the church, despite a profound reformulation carried out in the 18th century, still respects the original plan (Figure 7).

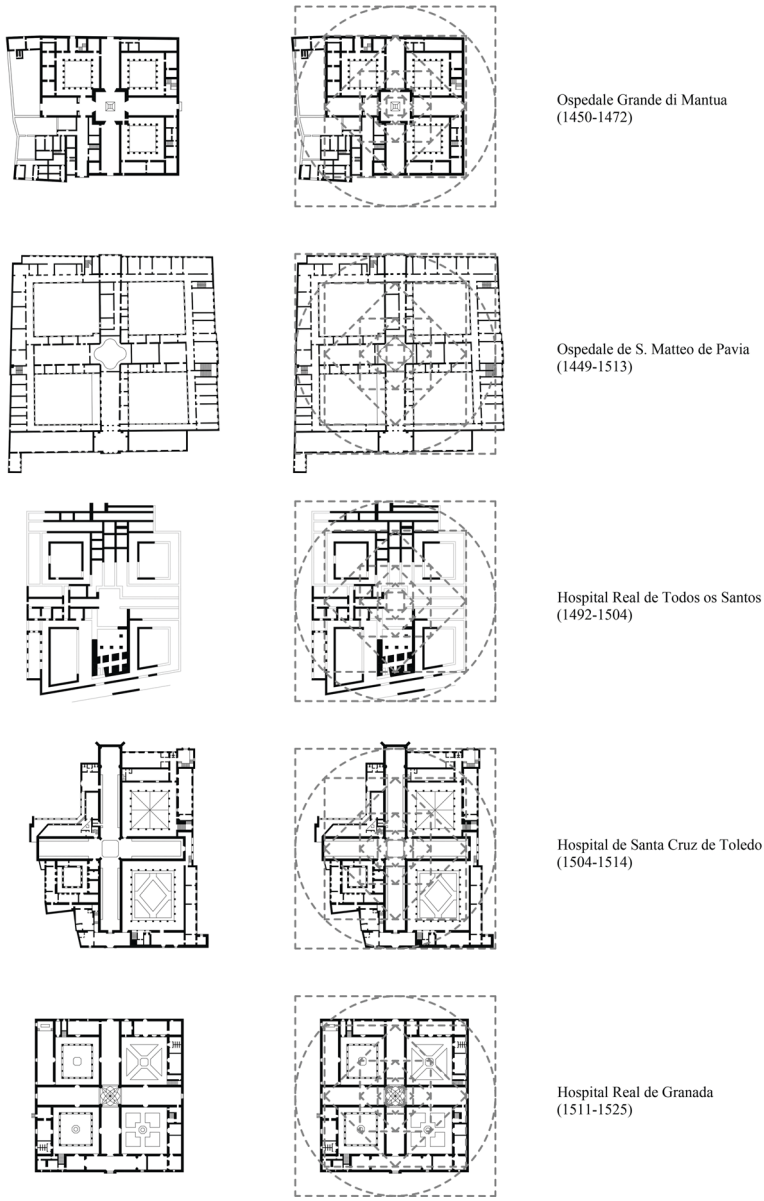

Figure 9.5 Comparison between plans and geometric scheme *ad circulum ad quadratum* of the medieval hospitals of S. Matteo of Pavia (1449–1513), Todos-os-Santos Hospital in Lisbon (1492–1504), Santa Cruz in Toledo (1504–1514), and the Royal Hospital of Granada (1511–1525).

Source: Drawings by author.

Figure 9.6 Identification of the hypothetical original layout of the Espírito Santo Hospital on the contemporary building layout.

Source: Drawing by author.

Comparison with the contemporary Todos-os-Santos Hospital in Lisbon also reveals that both buildings not only share the same cruciform layout, but also the same geometric plan. Everything indicates that the Espírito Santo Hospital, in Évora, is a reduced copy of the earlier Todos-os-Santos hospital. This similarity occurs not only in plan, but also in the elevation of both buildings, particularly regarding articulation between the lower level of the cloisters and the upper level of the wards. If at the Todos-os-Santos Hospital the access to the church and wards was guaranteed by a large staircase on the facade, at the Espírito Santo Hospital the church is at street level, with the cloisters on the south being placed in a lower level similar to that adopted in the Lisbon Hospital.

Evolution of built forms

The analysis carried out on the original nucleus of the Espírito Santo Hospital, in Évora, demonstrates how this ancient building, probably erected in the first years of the 16th century, clearly follows a rigorous and pre-defined geometric plan or a proportional scheme. This proportional scheme, drawn from the combination of square and circular geometry, is apparently very similar to the Proportional Schemes used to design several hospitals built between the 15th and 16th centuries

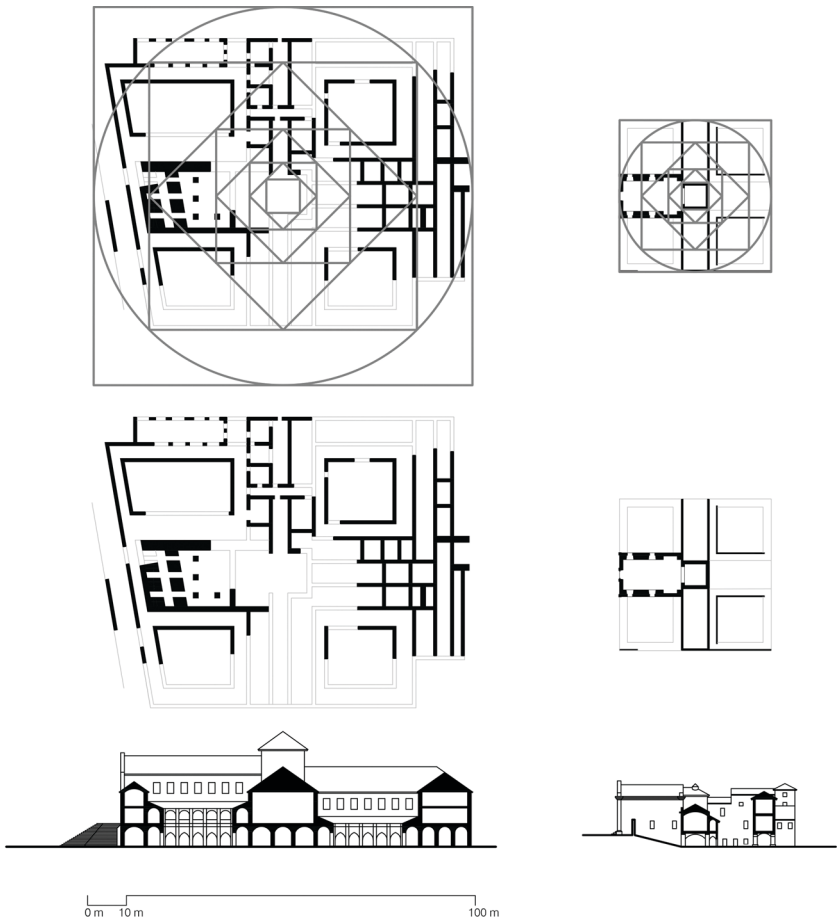

Figure 9.7 Comparison between the geometric schemes of the Todos-os-Santos and Espírito Santo hospitals.

Source: Drawings by author.

in Italy and Spain. However, besides these examples, the building that must be considered as the likely precedent for the design used at Espírito Santo Hospital in terms of shape, chronology and geographical context off course the Todos-os-Santos Hospital in Lisbon. This building, begun in 1492, despite having an irregular shape caused by the surrounding urban context, namely the layout of Rossio Square, would have a proportional scheme similar to the one found in the Espírito Santo Hospital. In fact, the Espírito Santo Hospital would present this scheme in a more rigorous way, one would say more perfect, than its Lisbon counterpart, even though on a smaller scale. This great similarity can bring a little more clarity to

the building's construction process, namely whether the start of its construction can be attributed to the king D. João II or the king D. Manuel I. In this sense, the great similarity with the design of the Todos-os-Santos Hospital clearly points to a common genesis anchored at the end of the reign of D. João II, which would have been merely continued by D. Manuel I. On the other hand, the comparison between the proportional scheme and the plan of the building contemporary design also decisively refutes Túlio Espanca's statement, demonstrating how to a large extent the plan of the original building is preserved in the structure of the current hospital.

The Espírito Santo Hospital thus serves as a paradigmatic example of the use of Proportional Schemes in the design and construction, not only in particular buildings, but also in what we could call "families" of buildings, that is, authentic variations on the building typologies. The comparative reading of these buildings and the study of their Proportional Schemes as well as the analysis of the built traces sedimented in the urban fabric allows us to reconstruct and interpret their remains, contributing to a greater understanding of their history as well as the history of the cities and their cultures. Buildings such as Roman Theaters and Forums, Islamic Mosques, Romanesque Churches or Colleges and Convents, whose rigorous Proportional Schemes allow, from elementary remains, to reconstruct the approximate design of the original building as initially constructed, and thus contributing to a greater understanding of history and evolution of built forms.

Notes

1 If there were any doubts regarding the continuity of the processes reported above, and how their projection in time fits with the different practices of different periods, eras, or "styles", we can refer to the demonstrations of considerable precision, if not absolutely reliable, carried out by Lorenzo Árias Paramo (2008) aimed at interpreting the composition and construction of Asturian buildings from the 8th–10th centuries, with a large copy of arguments accompanied by a remarkable work of field and drawing board research – of "drawing", as we like to point out –, which we will not dwell on due to obvious space savings and in light of the examples that we will explore later.
2 The nave of the church and three old infirmaries.

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10 Ruinology

About wrecks, ruins and forms in industrial decommissioned buildings[1]

Stefanos Antoniadis

Intersecting research projects

The case studies of Padua and Lisbon constitute an interesting and emblematic example to address the reasoning on the urban form of productive cities (now, in reality, both are more dedicated to logistics than to production), considering the fact that Northern Italy has the highest increase in land consumption compared to the national territory (8.4% in 2013; ISPRA 2015), that the city of Padua itself ranks first in the region for percentage of land used (49% in 2013; Arpa Veneto 2015), and that Lisbon is a capital city that included large industrial and ship-building areas now in strong disuse (especially the south bank of the River Tagus and the eastern district of Beato-Marvila).

On the one hand, the post-industrialisation process has challenged areas and infrastructural plans for what was the "locomotive of Italy"[2], and on the other, "the process of economic, logistical and port restructuring at the end of the 20th century has significantly affected the industrial fabric in the Lisbon metropolitan area" (Santos, 2019:110).

In this context and period, first the research project *DATA – Developing Abandoned Transurban Areas*[3] and then *iWRECKS – Industrial Wrecks: Reusing Enhancing aCKnowledging Sheds*[4] by the University of Padua were carried out, with the aim of formulating innovative strategies for the regeneration of abandoned areas in complex urban contexts, and of launching paths for the recovery, valorisation and re-functionalisation of industrial areas on the margins of the consolidated city. In parallel, the Research Project *BUILDINGS – Building Typology. Morphological Inventory of the Portuguese City*[5] has repeatedly intersected with these experiences in a transnational network of missions, events and publications offering a rich atlas of buildings, including industrial ones, surveyed, read, photographed and classified as a knowledge and operational basis for their understanding and transformation.

A reconnaissance, still probably underestimated, of the disused (or in the process of being disused) areas awaiting regeneration scattered around the consolidated core of the two cities shows how in fact another city exists, albeit pulverised, precluded to the community and almost as extensive: the sum of the underused or abandoned industrial fragments corresponds to virtual squares of more than a

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kilometre and a half in sides. It is this city of wrecks (or new ruins?) that this essay, following the research experience, intends to look at.

Trans-urban areas and industrial buildings in the post-productive era

Crossing the urban transects at the edges of the consolidated built fabric, it is easy to experience the contemporary scattered landscape (Rasmussen, 1974), now recognisable and almost trendy, but still difficult to codify and read, characterised by the presence of heterogeneous forms and functions, of infrastructures but also of agricultural plots and urban voids seemingly deprived of any vocation. These are complex trans-urban areas in which some trivial dyads and contradictions are still difficult to digest both by the insiders and ordinary observers belonging to the domain of public conversation, even though the potential of these spaces has been exploited for some years now. Good-bad, artifice-nature, city-countryside, large-small built objects, active-decommissioned productive enclaves in support of urban metabolism.

Hence, the legislature's desire to bring order to the land by necessarily choosing only one term in the dyad and by recovering those availabilities and qualities (including formal ones) deemed instead reassuring, conciliatory and opportune, such as ecological balance and soil resource through new generation regulatory instruments. In recent years, laws on the containment of land consumption, and corollaries on the temporary use of abandoned industrial buildings, have been produced for the first time in Italy with the aim of reordering the layout of such densely anthropic territories and redefining more clearly the edges of the built versus the unbuilt.

As much as the initiatives, according to most insiders, definitively mark the collapse of traditional town planning made up of implementation plans lowered from above in favour of a more contracted and liquid activity, which is better able to cope with contemporary transitional dynamics, territorial management tools still draw their strength from visions that are not new (the city-countryside opposition, the centrality of the functional programme), and contemplates the demolition of volumes considered improper, the migration elsewhere of "building credit" – i.e., cubage – the zero balance of the used land[6] not exempt from economic and environmental (and, perhaps, also cultural) costs.

In spite, then, of the evolution of procedures inherent in the way urban planning is done, there remains the risk, typical of regulatory proliferation, of taking attention away from the investigation of the form of the contemporary city, but of the city in general, which is *"the real focus of the matter (...): a real object that we inhabit and experience through all our senses and that probably constitutes the most complex sediment of civilization"* (Dias Coelho and Fernandes, 2022:95–96).

The city, like it or not, through successive formal and identity reconfigurations continues to enjoy good health; the changing urban, economic, demographic and social dynamics at work, on the other hand, highlight the increasingly limited

validity and effectiveness of the tools of reading and intervention (both normative, provided by legislators, and of the arts, distilled from various disciplinary thoughts).

Urban metabolism, enclaves and decommissions

Boar forums, cattle markets, barracks, railway parks, gasometers, sewage treatment plants and landfills, shipyards, commercial docks, and logistics hubs (but there are other types of specialised districts) have always functioned as closed systems serving the city. This is very understandable, given that with the consolidation of functionalist paradigms appeared in the nineteenth century, the efficiency of a district designed to perform a specific function was all the more efficient, the less interference with the city and its ordinary inhabitants was covered. Therefore, the comparison with the "thermal machines" dear to physics, capable of producing utilisable work, is an effective exemplification: the more distinct and separate these devices were from the life of the city, even though they were indisputably part of it in the economy of urban metabolism, the greater their degree of efficiency. When, with changing boundary conditions, these "machines", on the one hand, become engulfed by urbanisation and, on the other, lose their *raison d'être*, there is a transition from a closed system regime to one that will inevitably have to be open. These enclaves thus enter into a process that, formally (through decommissioning, post-management and alienation) or informally (phenomena of appropriation, occupation and squatting), sees them increasingly as "permeable rooms" of a more open and broader urban system, a succession of remarkable areas in a larger pattern of territorial connections. All this, however, must be accompanied by avoiding the typical risk that a thermal machine, the refrigerator at home for example, runs when it is left with its door open, or when, due to failure or programmatic obsolescence, it ceases to function: to become a mere scrap to be disposed of.

But the obsolescence of a productive built environment, made up of large sheds, vast areas, and even whole districts, is, of course, a more complex phenomenon to manage, than the programmatic decay of technological devices. It is one thing to dispose of a refrigerator, a smartphone or a laptop – of course with all the critical issues involved – and it is another to decommission a whole district or large buildings that cease to function. If the form is good, if it pleases, if it convinces, if it is noteworthy, it happens that a refrigerator can be reused as a bookshelf or cabinet (typically the case of those rounded refrigerators from the 1950s, which have made their way into the pop and aesthetic imagination) only by leaving the door open and disconnecting them from the mains. But opening the perimeter of a slaughterhouse (or a barracks, a shipyard, etc.), removing an entire wing of a complex, or making it sufficiently permeable does not represent zero cost. As well as any (admittedly very frequent) cleaning operations: cleaning the inside of a refrigerator is one thing, proceeding with cleanup operations for railroad freight yards sometimes costs as much as the total cost of doing all the construction work. However, while not leaving out the delicate economic issues (which this manuscript does not intend to investigate), these metaphors unquestionably point us, as architects, to

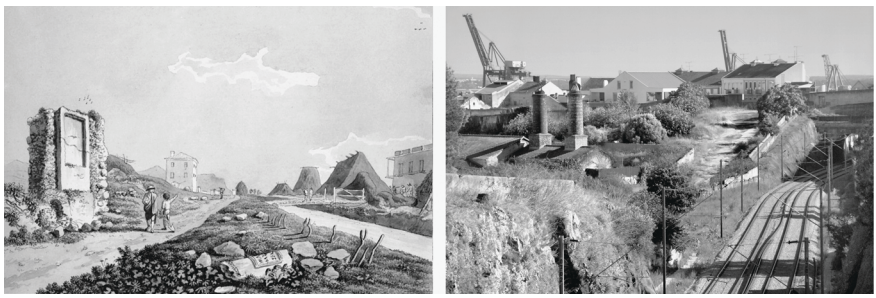

Figure 10.1 Via Appia at the Ponte Maggiore alongside the navigable canal now called the Linea Pia, 12 km from Terracina, Rome, I. Old postcard, painting by Carlo Labruzzi, 1784 (left). Beato-Marvila district from the Ponte do Pátio Do Marialva, Lisbon, P (right).

Source: Photograph by the author, 2022.

what is the formal way forward: on one hand, to open up, modify the perimeters, leave the gates open, encourage the phagocitation of these necrotised pieces by the city; on the other, to look at these artificial wrecks not as a problem, but as potential forms to be acknowledged.

The problem of obsolescence and the production of wrecks

The second French edition of Marc-Antoine Laugier's (1713–1769) successful *Essai sur l'architecture* (Laugier, 1755) contains a rather well-known allegorical engraving by Charles-Dominique-Joseph Eisen (1720–1778). Besides giving a more visible explanation of his known theoretical approach (nature is the origin of everything), the illustration, featuring Architecture as a goddess seated on the ruins of a destroyed building shows the genius of reason (a Cupid), a primitive hut – i.e. not just a temple, but the archetypal industrial shed, in Italy called not by chance *capannone*, big hut – talks about landscape, nature and wrecks: three extraordinarily up-to-date items debates still focus on.

The picture is made up of closely-standing uncut trees supporting slightly-tamed branches that provide a roof among their partially-preserved boughs as model for a possibly obsolescence-proof building. The illustration features an ambiguously anthropised landscape where nature blends with fragments resulting from the collapse of an arrogant (cause irrespective of an "according to nature" praxis) building. Venturing a bold shortcut, we might subscribe to Laugier's tenet "nature generating artifice" as still enjoying large approval. It is a successful interpretative paradigm followed throughout the centuries, in various branches and various scales, in keeping with present-day results and applications both in techno-ecological fields, in the production of architecture and in land management.

The urban setting we live in is no longer the former one, and above all we must admit that the presence of those remains merely occupying the bottom right corner of the French engraving has become much more cumbersome nowadays. Whereas in the abbot's mind that pile of ruins belonging to a decayed building was to have a merely symbolical meaning, our eyes and our awareness turn it into a real everyday experience. In the illustration the ruins are placed almost nicely at one side of a meadow; in our reality litter is massively present even in the space around the Earth (it is called "orbital debris"). The increasing degree of obsolescence of (even architectural) products, the larger and larger amounts of abandoned areas and buildings and the recent resort to laying out untidy clusters of buildings dotting the country reveal the scattered nature of our contemporary landscape.

We live in an era strongly marked by the phenomenon of obsolescence, a dynamic that we are much more familiar with at the scale of our minor technological devices (cars, household appliances, computers, laptops, smart devices...), which concerns machines and, coherently, also all those urban and territorial machines that dot our geography.

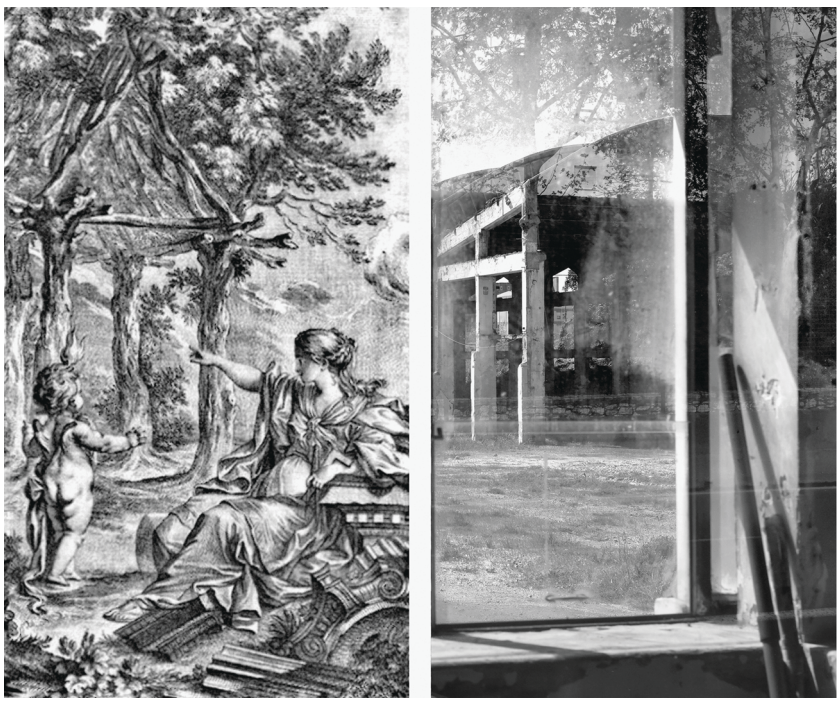

Figure 10.2 Frontispiece for the *Essai sur l'architecture* by Marc-Antoine Laugier. Engraving by Charles Eisen, 1755 (left). Decommissioned Industrial Shed in Braço de Prata, Lisbon, P (right).

Source: Photograph by the author, 2019.

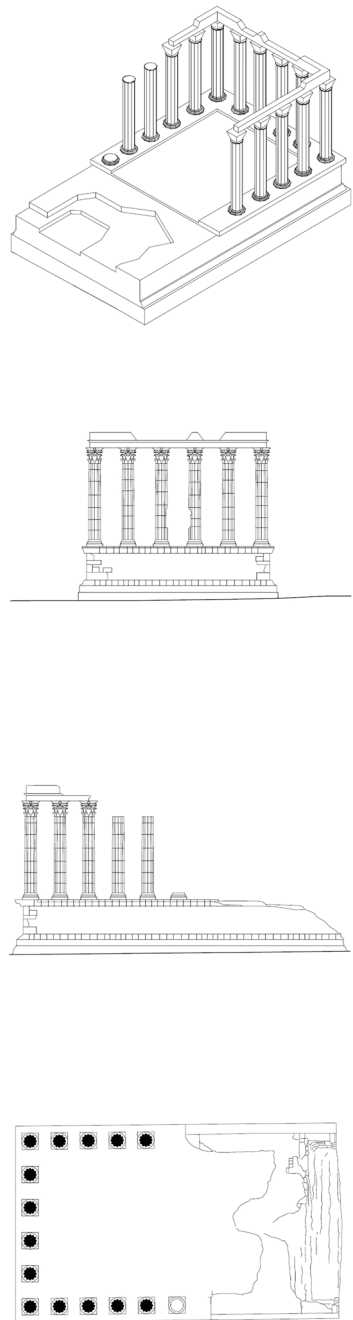

Figure 10.3 Ruins of Diana temple in Évora. Drawings from *formaurbis* LAB, 2022.

In many fields of the human sciences, cures and antidotes to obsolescence have been envisaged, sometimes even programmatic, which for, analytical convenience, we could bring together under the heading of so-called "degrowth" (sometimes happy[7], sometimes less so...).

While it is partly true that producing fewer objects (and buildings) somehow counteracts the frantic rush to consume, the need for an up-to-date model of everything, and reduces hypertrophic metabolism, it doesn't really work that way with the city. A decreasing city is actually not decreasing: it is a city with an increasing ruin park. It may decrease its population numbers, but not its footprint on the land (curiously today everything is measured by ecological footprint). History is not new to these phenomena: immense cities have alternated climaxes with phases of almost total abandonment. Think of Rome, the city *par excellence*, which from the 5th century underwent a vertiginous decline until it was a rural boron of a few thousand inhabitants, but an endless artificial expanse of ruins that continued to burden the territory.

This circumstance, which is by no means insignificant, together with the question of the scale of these objects (they are not a few centimetres of smartphones) should prompt us to think about the concepts of wreck, ruin and form. A wreck often has a negative meaning, therefore it is worth taking a different look at the wrecks potentially much more capable of supporting ecosystems and metabolism, or even generating new ones, than we are led to believe (Antoniadis, 2018). It's proved with simple – yet extraordinary – evidence when dealing with sea wreckage. Sometimes immense chunks of wreck on the bottom of the sea are at first seen as seriously impairing the natural environment, as well as dramatic events for the loss of life, goods, and property, yet later they prove to be the vital triggers of lush oases evincing a high degree of biodiversity. It would be wrong to interpret such evolution as the re-appropriation by nature, as it's winning back what has been stolen: *biofouling*[8] operates in much more fascinating ways: it is more an upgrade than a restoration.

On the Earth's surface the same practice might be resorted to, involving even more discarded materials. Segments of viaducts, portions of water-carrying infrastructures, frames of unfinished buildings, left-behind building-yards and temporary cranes is all wreckage impacting on man and landscape awaiting public opinion deliverance.

The power of the wreck is not only a matter of environmental opportunity; it is actually a matter of culture according to its widest meaning, and can be successfully dealt with from the point of view of architectural, urban and landscape design.

Beyond architecture (in the narrowest sense), all kinds of construction may be considered part of this reservoir of formal and cultural resources, as long as their form is capable to overcome their obsolescence, which stands as their inescapable destiny.

One basic difference between architecture and ordinary construction, and that may actually be held as a conceptual divide between what is architecture and what is not, is that the former is never obsolescent: even when architecture is no longer able to cope with neither their original use nor their eventual ones when it

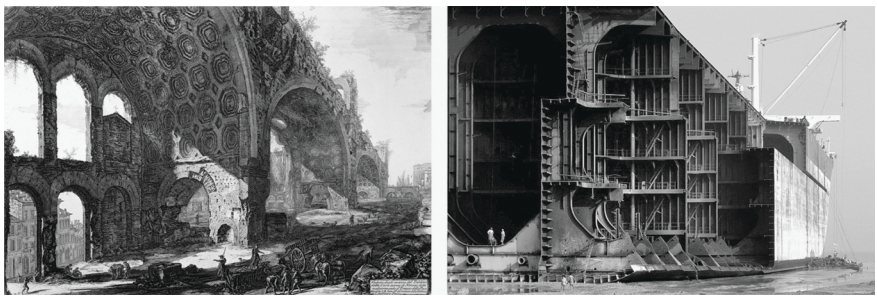

Figure 10.4 *Avanzi del Tablino della Casa aurea di Nerone* (Rests of the Tablinum of Nero's Golden House), actually the Basilica of Maxentius, Rome, I, from *Vedute di Roma*, Tomo II, tav. 19. Etching by Giovanni Battista Piranesi, 1748 (left). Crude oil tanker Kapetan Giannis (former Esso Atlantic), Chittagong Ship Breaking Yard, BD (right).

Source: Photograph by Auke Visser, 2002.

is mutilated and dismembered, even when it is eventually transformed into ruins, it still is architecture (Stendardo, 2014).

While dismissed, decommissioned, or abandoned architecture becomes a ruin, obsolescent ordinary construction is headed to turn into debris. Ordinary construction – and especially infrastructure and machines – is always obsolescent. When some machine or infrastructure is obsolescent, broken in pieces, they become waste, scraps that may be recycled or, at best when it is worthy, exhibited as a relic in a museum. This is why an ancient Roman aqueduct, even when it ceases supplying water to the town, is not held as debris and no one would think of it as a waste management problem to cope with, but everybody would recognise it as an extraordinary landmark across landscape. On the contrary, a technologically advanced contemporary oil pipeline, a highly specialised device, is not likely to play such a significant role in the future. The smarter machines or infrastructure are, the more technologically advanced a device is, the more rapidly obsolescent it becomes. This is clear enough, since planned obsolescence policies, along with disposable smart devices and machinery market, allowing no possibility to fix broken hardware, are actually flourishing, while the production of hazardous waste is over increasing, although we are all eager to flaunt our environmental care worries.

Work on form as an antidote to obsolescence

Actually, the aptitude of a wreck to be acknowledged as architecture depends on its formal features; or rather we should say, on our skill to recognise its potential as formal and spatial material for architecture. It looks like this potential acknowledgement implies the complementarity of the human mind and the wreck, showing some relevant similarity with the concept of affordance as defined in environmental psychology by James J. Gibson (1966–1979).

According to this acknowledgement the power of ruins, which is bound to the widely accepted concept of architecture, may be successfully shifted onto wrecks, so allowing not only rehabilitation and reuse of decayed built environment, through new functions, but a broader re-creation of architecture and space with strong cultural impacts.

These reflections can be implemented both in the recycling of built waste, such as infrastructural and built debris and scraps, and in a more aware attitude in architectural, urban and landscape design. An attitude that is not actually new, if we just recall that one of the most powerful images of the project for the Bank of England, designed by Sir John Soane (1830), that was represented by its author as an imagined view of the building in ruins. Although nowadays the trend of architecture and civil engineering is to make artefacts based on such concepts as fitness and smartness, while ignoring any long-term anti-obsolescence resilience, trying to image one's project as ruins should be a must for today's architects as well.

The importance of form in the dichotomy between ruins and debris should finally be taken into account both for good design practices of new buildings, and for the acknowledgement of the wide asset of existing built objects that are spread throughout today's landscape.

Any effort in this direction is a step forward in the enlargement of our architectural and imaginative dictionary, and possibly a step forward towards a world that is richer in culture, health and, why not, happiness.

In order to hope for and spark off a change in assessment and outlook (which is where projects start from when approaching unused or partially-used, end-of-life industrial and manufacturing buildings in suburban areas of modern towns), it is useful to construct (nay, to deconstruct) some wider arguments. Such arguments involve the perception and the awareness of shapes and relate to the cognitive abilities of people in general, not just of insiders or architects.

The first "bad habit" to deconstruct is the trend of resorting to the "former" prefix (a kind of blocking syndrome that also affects relationships with ex-partners). Actually, it sounds odd to refer to the pyramids of Giza as "former tombs", or to the Coliseum as a "former amphitheatre", or to the Eiffel Tower together with the wide mall stretching at its feet as a "former Expo area" (whereas immediately after the 2015 Milan Expo it was deemed necessary to set up the "Expo after Expo"[9] nationwide team of experts, heavens know why).

This unwillingness to overcome the function and abstract the form of things, which end up being defined according to their functional call, leads to a corresponding inability of the buildings themselves to adapt to new features and new lives. In this strange – though easily understandable – hypothesis formulated by Sapir-Whorf[10] applied even to urban organisms, the destiny of buildings seems to be unsplittable from the language describing them, piling up cognitive and manipulative staples that condition any possible future re-purposing. Naming a decommissioned industrial building as the "former- plus the name of what it produced" accumulates inertia among the building stones, betrayed by this established cliché of naming, which affects any eventual and subsequent reuse or rethink. Re-purposing becomes, in fact,

the typical solution for buildings and slices of urban areas no longer performing, before the inescapable moment of rethinking.

An alternative hypothesis in the method might instead contemplate the possibility of renaming – or re-signifying – a building, or set of buildings, with respect to formal rather than functional categorisations. In order to facilitate this process, the industrial sheds will have to gradually lose their rigid plant as silhouettes against a background, in order to undergo re-significations and contaminations from the surroundings. Therefore, the theme of how to pulverise the limits, whether they are constituted by the sharp caesuras of the linear infrastructural bundles, or by the hard edges of these specific enclaves subtracted from the city, in order to favour the reuse of abandoned areas, acquires significant importance. Fragmentation, subtraction, excavation, bending, erosion, breaking of the perimeter (and even within certain rigidity of layout), dismantling and relocation of prefabricated elements typical of industrial construction are just some of the compositional techniques capable of transforming a figure, isolated against a neutral and homogeneous background, into matter to be reacted with the context, now an active and varied support.

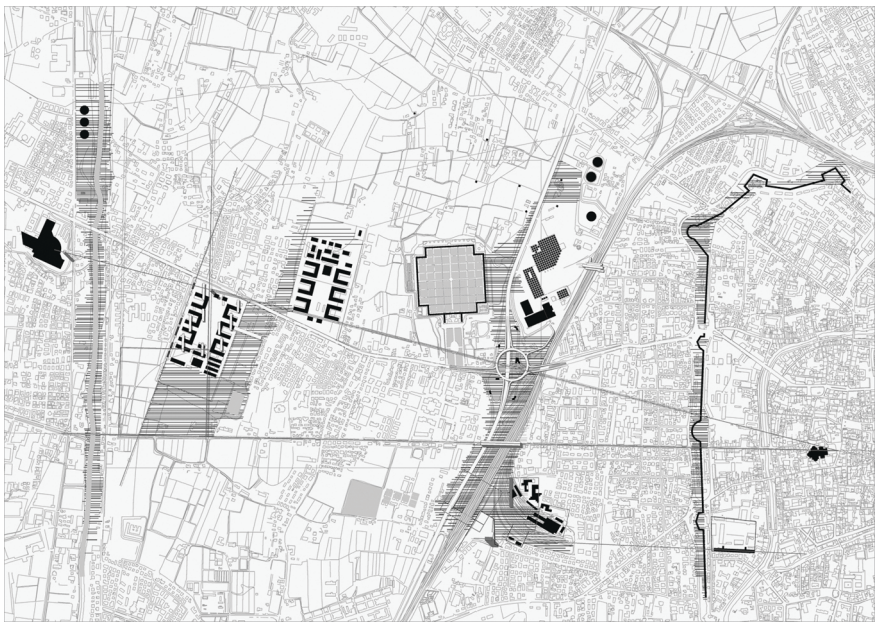

Figure 10.5 Open perimeters, new green rooms, deflagrated prefabricated elements, new and old large urban objects in relation. *DATA – Developing Abandoned Transurban Areas* (P.I. Luigi Stendardo), a masterplan for west Padua, I.

Source: Urban design by author, 2018.

Possible operations on industrial wrecks

The nature (serial and, more recently, precast) and scale (often large and very large) of most industrial buildings in the last decades favour a series of operations that can easily be systematised into design strategies. In truth, these are dynamics that always happened with large architectural objects throughout history. Of course, buildings commonly considered historical and monumental also embody that condition of solidity and durability that has always averted demolition as a convenient and prevalent operation, in favour instead of cannibalisation and "sculptural" transformation of the architectural organism. Now, factories, warehouses, hangars, and shipyards are more easily demolished and dismantled than a Roman bath complex or a basilica. But the operations, from an exquisitely formal point of view, can remain the same, inserting themselves in a sort of legitimate continuity of process and adapting, this time, to a more stringent and frequently cited need: reduce waste production. The prefabricated construction characteristics of some buildings allow simple operations useful for the opening up of predominantly closed systems in the past: for example, dismantling and relocation elsewhere can be envisaged for certain serial components of the construction such as large portal structures, in numbers and ways that do not undermine recognisability, and formal autonomy of the pre-existence. These artificial fragments and devices, when relocated, can find and fix new meanings, uses – more or less informal – and contribute to enriching and regenerating the surrounding ground like underwater wrecks do on the seabed. The great wall perimeters of the extensive buildings, on the other hand, can be modified, opened up and interrupted in strategically interesting and convenient points, constituting new configurations of public or semi-public spaces, covered or semi-covered squares, green rooms, etc., a bit like what happened with the inversion of the axis in the Roman basilica by the Christians by suppressing an apse and placing the main opening on the short side, or like what happened with the main nave of the cathedral of Siena: from the ruin of an unfinished project to a town square.

It is also possible to work with the surrounding natural elements, such as trees, providing specific placements and densities to weave favourable ambiguous relationships with the building elements of the factory: the trunks of new trees, planted according to the structural grid of the industrial building just as if they were pillars, can extend the artificial metrics of the wreck outside the built perimeter in spatial configurations of controlled hybridisation.

The operations of manipulation of the existing must obviously also concern the interior of the buildings, and the part to be made purely habitable. In this case, it is worth pointing out the risk that now often recurs in regeneration operations, namely that of transfiguring the industrial wreckage into a "posh" cool building (Roberts and Sykes, 2000), endowed with a new skin (whether internal or external), capable of complying with the prescribed demanding and performance requirements but celebrating architectural and urban amnesia (Antoniadis et al., 2019). On the other hand, these objectives can be fulfilled by new formal devices inserted in their belly (towers, boxes, inhabited tubes, plates, plug-in infrastructures, equipped

walls), capable of constructing new spatial and functional conformations with different degrees of flexibility and satisfying, at the same time, thermo-hygrometric and safety parameters (in the sense of offering both sufficient protection in case of material detachments and adequate fire resistance). In fact, it is well known that the preponderant part of the economic costs to be borne in disused industrial heritage redevelopment operations is to be found in the reclamation costs – the heaviest percentage – and in the adaptation to the requirements in force both on the building envelope and, above all, on the structures. An issue, the economic one, that is less and less negligible nowadays, in times and policies of limited resources or bonus manoeuvres of dubious economic sustainability but questionable aesthetic outcome[11] in which the architectural project increasingly becomes the stone guest. Here it is that containing the costs of adaptation to be carried out directly on the constituent elements of the existing building, transferring them to newly constructed artefacts to be inserted inside, constitutes an opportunity for economic sustainability as well as work on the form of spaces. Moreover, the provision of new volumes, with a presence that is not necessarily timid, placed in relation not only formally with the relics of the past but with the objects and layers of the territory, aims at guaranteeing an opportunity for valorisation (understood precisely as income) in support of economic feasibility.

Notes

1 Research Lab of Architecturban Design at the Department of Civil, Environmental and Architectural Engineering at the University of Padova. Director: Luigi Stendardo
2 A formula by which the city of Padua is known because of its economic driving capacity on a national scale until a few decades ago.
3 Regional Operational Programme "Veneto" 2014–2020, DATA_Developing Abandoned Transurban Areas, DGR n. 2216 13/12/2016, project code 2105-114-2216-2016, funded by ESF, University of Padova. Steering Board: M. De Marchi, A. Giordano, M.C. Lavagnolo, M. Savino, L. Stendardo (Principal Investigator).
4 Regional Operational Programme "Veneto" 2014–2020, iWRECKS_Industrial Wrecks: Reusing Enhancing aCKnowledging Sheds, DGR n. 11 05/01/2018, project code 2105-59-11- 2018, funded by ESF, University of Padova. Steering Board: C. Dias Coelho, G. D'Acunto, M.C. Lavagnolo, C. Pellegrino, M. Savino, L. Stendardo (Principal Investigator).
5 Research Project BUILDINGS: Building Typology. Morphological Inventory of the Portuguese City, 2017, project code PTDC/ART-DAQ/30110/2017, funded by FCT - Fundação para a Ciência e a Tecnologia.
6 Veneto Regional Law n. 14/2017, *Disposizioni per il contenimento del consumo di suolo e modifiche della Legge Regionale n. 11/2004 "norme per il governo del territorio e in materia di paesaggio"*.
7 On the subject of degrowth, a complex of ideas has developed that is supported by alternative, anti-consumerist, anti-capitalist and ecologist cultural movements. The term degrowth is sometimes accompanied by adjectives, in expressions such as "sustainable degrowth" or "happy degrowth" (i.e. Latouche, 1993).
8 From the verb "to foul", it is the process of colonization of submerged surfaces by submarine organisms.

9 An initiative triggered by Oxway and "Corriere della Sera", and accepted by numerous Italian universities, research and professional groups, with the aim of preventing the site of the Milan 2013 Universal Exhibition from becoming just a huge brownfield site.

10 The Sapir-Whorf hypothesis holds that human thought is shaped by language, leading speakers of different languages to think differently. This hypothesis has sparked both enthusiasm and controversy, but despite its prominence it has only occasionally been addressed in computational terms.

11 Note, for example, the Italian "Superbonus": the tax relief governed by Article 119 of Decree-Law No. 34/2020 (called "Relaunch Decree") which consists of a 110% deduction of the expenses incurred as of July 1, 2020 for the implementation of specific interventions aimed at energy efficiency and static consolidation or reduction of seismic risk of existing buildings. The subsidised interventions also include the installation of photovoltaic systems and infrastructures for recharging electric vehicles in buildings.

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11 Buildings metabolism

From pre-existence to urban regeneration

Júlia Beltran Borràs

Introduction: building restoration and urban sedimentation

If we accept the distinction between conservation and restoration proposed by Manfredo Tafuri (Tafuri, 1997) and think of restoration as a dialogue of contraposition between different elements, a dialogue that creates new distances precisely because it interprets the values and elements of the historical world, we can believe that each of the selected architectural projects represents an interpretive form of restoration. Each project is a modification of the relationships between things that already existed and the establishment of new laws between the new project and the old.

In the city, we are constantly witnessing the phenomenon of the mutation of pre-existing buildings. The encounter between the new and the old usually involves a degree of confrontation, and the result can sometimes be violent. Many authors have tried to explain how this encounter takes place. There are those who focus the architectural discourse on the preservation of the monument, but there are also those who want to highlight the innovative design of the new part. There is a wide vocabulary for specifying design intentions: recovery, reconstruction, rehabilitation, requalification, reuse, etc.

The final relationship between the pre-existing object and the new can be declined in an infinite number of paths and final objectives. However, there is only one assumption that must be transversal to every alternative: the relationship between reading the pre-existences and design in the field of urban morphology can never assume a deterministic mood, but only inform a creative and individual process (Dias Coelho and Fernandes, 2022). Focusing on this individual creative process, that is on the role of designers in bringing back the historical precedents to bear on the present practice, the question is: how have architects used the pre-existences in the design process?

This process of mutation of buildings has an impact on the socio-physical regeneration of cities, which sometimes goes beyond the walls of the building, modifying elements of public space. Therefore, restoration projects also participate in the process of urban sedimentation, which affects all urban fabrics. Urban sedimentation results from the movement of each plot and the movement of the elements of public space. The tension between private plots and between them and the

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public space slowly reconfigures the urban fabric over a very long period, which is essentially characterised by its deformation (Dias Coelho, 2014). On the other hand, it is necessary to consider the reverse process, when the collective power decides to "correct" a fabric. It is a process of constant interaction: the built environment is shaped by design, which at the same time learns from and modifies the human mind.

The city is the common case study that allows us to relate the configurative historical knowledge of urban form, contemporary architecture that solves current problems and, finally, urban life. In other words, the city allows us to observe the interactive dialogue between different approaches to architectural research.

Spatial and temporal factors in the mutation of buildings

The scientific proposal began by defining the criteria for selecting the case studies. The main ones are three: firstly, that the buildings are part of Portuguese cities and of the research project "Building typology. Morphological Inventory of Portuguese City"; secondly, that the role of the pre-existence represents an original contribution to the project; and finally, that they were designed by different Portuguese architects.

The methodology includes morphotypological studies to explore the spaces, always starting from the planimetry and the current situation, distinguishing what remains, what is added and what is subtracted. The descriptive reports of the projects and the observations of the architects themselves are also analysed in order to understand the design mechanisms of manipulation of form and materiality, of fusion or contraposition of different times. Finally, the works were visited to photograph the current state and to observe the passage of time and the adaptation of the new use.

The case studies represent a balanced and varied sample of changes in the life of the buildings, in their successive life histories, allowing us to observe the typological adaptability of the old buildings, the use of the pre-existence as material for the restoration project and the mechanisms for adding the new elements and pieces: from market to music school, from slaughterhouse to cultural centre, from university greenhouse to visitor centre, from fortified lighthouse to museum, from episcopal palace to museum and, finally, from festival hall to congress centre.

The different forms of approach to architecture in relation to space and time were defined by Giancarlo Cataldi in his contribution entitled "Self-critical reflections on urban morphology" during the 3rd ISUFItaly International Conference in Rome in 2017: architectural disciplines (syntopic), socio-economic disciplines (synchronic), historical disciplines (diachronic), geographical disciplines (diatopic). But these approaches cannot be considered in isolation, because they are interrelated. Vitruvius himself wrote between 30–20 BC:

> *The architect's expertise is enhanced by many disciplines and various sorts of specialized knowledge; all the works executed using these other skills are*

> *evaluated by his seasoned judgment. This expertise is born both of practice and of reasoning. Practice is the constant, repeated exercise of the hands by which the work is brought to completion in whatever medium is required for the proposed design. Reasoning, however, is what can demonstrate and explain the proportions of completed works skilfully and systematically.*
>
> in Vitruvius (De architectura libri decem, Book I. Chapter 1)

A fundamental part of this metabolism process has to do with the establishment of the new programme of use. The buildings analysed are financed by public funds, and therefore all of them have a strong commitment to social services. In the last twenty years in Portugal, it has been common to give predominantly symbolic functions through cultural or institutional use to essentially utilitarian buildings. These operations have successfully grafted reasonable programmes onto exanimate buildings, assuming a risk of obsolescence linked to socio-economic (synchronic) factors. On other occasions, recourse to imprecise cultural or institutional content fails to bring the dead back to life, and architectural rescue results in social frustration and budgetary waste.

Approaches to place and the complexity of reality

The territory is constantly changing as a result of complex dynamics and processes, and the ways of reading it are multiple, variable and influenced by different cultures and visions. The exponential growth of urbanisation leaves urban areas with obsolete buildings. To avoid urban degradation, it is necessary to give them a new function that prolongs their life and responds to the problems of the adjacent public space or urban landscape. The urban condition is an essential component in all the cases analysed. The projects for the reconversion of the Braga market into a music school and the Carnival Arts Centre (CAC) in Torres Vedras, are paradigmatic examples to talk about this urban condition of the metabolism of buildings. Both projects generate new urban elements – a street, a square – making an original interpretation of what already exists and, above all, drawing two useful strategies for planning the city of the future.

The case of the Braga market is unique because it allowed Eduardo Souto de Moura to build twice on the same site, the second time by creating an "archaeological ruin" of his first intervention and adapting the interior and exterior spaces to the new use of "cultural market".

The first building, designed in the 1980s, has a distinctly urban character. It was conceived as a covered public passage connecting two radial streets, counteracting the radio-centric character of the urban gird. The deep idea behind the architectural project was to create a kind of "Greek stoa" on two levels, divided into three zones, each specialising in one type of product (vegetables in the middle, fish on the right and meat on the left), creating a clear separation between the circuits of goods and people.

The market fell into disuse and lost its function when supermarkets opened nearby, and in 2004 Souto de Moura was commissioned to design a second life

for the building. The architect noted that the market was still used as a transit area, which was a kind of confirmation that the use could be changed to another one, more in line with the socio-economic situation of the neighbourhood and the city, but the urban function of the "street" had to be preserved. Souto de Moura approached the subject of the pre-existences with complete freedom of thought (Bogoni, 2020), proposing an original form of "contemporary archaeology", removing the parts that were no longer useful and preserving those that could be used for new purposes. The use of history as a design tool is the main feature that makes the second intervention on the site exceptional. The roof of the market has been demolished, leaving the columns with their steel cables exposed at the top, which resemble concrete trees, giving shape to a contemporary garden with artificial elements, where architecture and nature enter into a dialogue, in a monumental and ceremonial *promenade architecturale*.

The original market's reference to the Greek stoa has been preserved, with the columns transformed into pieces of modern architectural archaeology that diversify and enrich the sensory experience in the open space. The building of the new School of Music and Dance preserves the triple division of the old market, for the sale of vegetables, fish and meat, transformed into spaces for the Association, the Music School and the Dance School respectively (Souto de Moura, 2021). The remains of the old building, the courtyards and the urban routes alternate with places for human activities: resting, meeting, walking, enjoying the weather and the views. An architectural project has a very specific logic, based on a construction that is internal to the project itself, but fed by the geographical and historical culture contemporary to the moment of the creative act. In this example, we can clearly see that the originality and strength of the project lie in the architect's attitude to pre-existence. The building speaks for itself about the temporal relativity of time in the valorisation of the past. The architect can enter into a dialogue with a more or less distant past, even metaphorically, by evoking the columns of ancient Greece.

The Carnival Arts Centre in Torres Vedras (2012–2020), designed by the architect José Neves, was born with the aim of giving a second life to an abandoned slaughterhouse and a disused quarry on the outskirts of the city, with the aim of regenerating the urban fabric and life. The interesting thing about this project is to see how the pre-existing forms are empowered to create a new urban space, an example of the power that pre-existences exert, seeking their permanence through a "resistance of form".

Before the intervention, the urban landscape in front of the slaughterhouse was characterised by the presence of viaducts, hypermarkets and car parks at one of the main entrances to Torres Vedras, and at the back by the adjacent neighbourhood, Bairro dos Reis. The project attempted to respond to these two realities without creating a confrontation with these pre-existing conditions, acting as an articulating link between the urban scale of access to the city and the everyday scale of the neighbourhood. The historic building itself has no heritage value, but the façade is preserved as a layer of historical significance and as the main access to the complex.

Figure 11.1 Conversion of the Braga market into a music school (2004–2010). The left photograph shows the remains of the stairs and columns that remained after the demolition of the market's roof. In their original design they were inspired by Greek stoas, and in their current state of ruin they reinforce this analogy with the project. The right image shows the main entrance of the Music School.

Source: Photograph by Carlota Gala, *formaurbis* LAB, 2022.

José Neves admits that the existence of a disused quarry behind the slaughterhouse building became one of the main references for the project. The architect affirms that one of the tasks of professional work is to know how to discover the possibilities of each project in order to make an "offer", to propose something that was not foreseen and that in the end turns out to be the obvious solution. This idea makes it possible to go beyond the task of reusing an abandoned building and to think about the city, about approaches to the building, about the creation of new forms of public space.

The aim of the project was to create a new central square for the neighbourhood, which had been marginalised from the city for many years. The square is located on the opposite side of the main entrance, and although it is permanently open, it has only one access point from the side street at a tangent, so it is not a space for transit but exclusively a place to be. This limited accessibility and its almost hidden location for those approaching the building from the city centre or the main road make it seem more like the backyard of the building than a square.

In addition, the building has a wing that embraces the elliptical shape of the square, merging with the open space and reinforcing its reserved character. The steep slope of the quarry forms the backdrop of the public space and is transformed into a grandstand that closes the ellipse, giving the open space a strong scenographic character, which is used to host the main events of the carnival. The construction of the Carnival Arts Centre shows that the site almost always already

Figure 11.2 Carnival Arts Centre in Torres Vedras (2012–2020), architect José Neves. The first one shows the façade of the old slaughterhouse, which is the main access to the complex: the ground floor houses a temporary exhibition hall, documentation centre and a shop, and the upper floor houses a permanent exhibition hall.

Source: Photograph by Stefanos Antoniadis, *formaurbis* LAB, 2022.

contains a project, if the architect is able to read the opportunities, always thinking of the city.

Ethics and aesthetics of the project and professional practice

Architects act with an enormous historical awareness of the place or object, developing a profound work of decomposition of time and of the objects with which they enter into dialogue, understanding that all of them are not whole objects, but the result of a history of changes, they have been destroyed, modified, divided and enlarged. With the restoration project, history is dismantled and reassembled in such a way that the elements that survive are those that enter into dialogue.

It is necessary to protect the pre-existences so that they can participate in the contemporary territory as a place for human activities. The aim of the project is to create or transform a space so that certain activities can be carried out, or in other words, to consolidate a new *utilitas*, resulting from the need/will to introduce new uses next to or within the same pre-existences, incorporating the place into social, economic and/or tourist circuits. The Lighthouse Museum of Santa Marta de Cascais (2003–2007) and the Coimbra Botanical Garden Tropical Greenhouses (2016) are located on the periphery of the cities. Both cities have experienced a growth in tourism in recent decades and have created extensive museum programmes to turn the city into a cultural attraction.

The Santa Marta Lighthouse Museum is located in the Cascais Museum Quarter, on the outskirts of the city, along with the famous Paula Rego House of Stories,

designed by Eduardo Souto de Moura. The project by Manuel and Francisco Aires Mateus combines an exhibition space with its previous function as a coastal landmark. The project was born from the idea of leaving the pre-existences untouched, while adding a thick wall to which matter is subtracted so as to make it habitable.

The Santa Marta lighthouse is an example of the process of adapting a 17th-century military structure – the Santa Marta Fort – to a 19th-century lighthouse. Its current shape is the result of successive extensions and adaptations of its spaces to a new programme and the need to increase its logistical and signalling capacity. The old lighthouse, the old engine room, the old barracks and the former lighthouse keeper's house have been adapted to house the museum areas. All these volumes are tiled. The thick wall is used to house new service areas such as security, the ticket office, a small bookshop, bathrooms and technical areas. All the surrounding fortification walls are painted almost uniformly white, creating an effect that blends the different periods. The constructive idea of the building as a site is somewhat Miesian in that it uses very complex constructive systems to establish clear and simple expressive systems.

This case study shows us that the relationship between buildings, or between the new project and the existing building, is no longer subject to the dilemma of copy or ignore, repeat or destroy. There is a wide range of interpretations. The new forms that perforate the thick wall of the new volume establish a dialogue with the pre-existence on different levels: periods, identities, cultures, forms, degrees of abstraction, etc. (Beltran and Antoniadis, 2023). Manuel Aires Mateus acknowledges his interest in the city and ancient architecture as a reference for his projects: *"When I was very young, when I was a student or just graduated, what interested me most was to go and see the latest project, but now I go to see what is in the city. Ancient architecture is what I like the most and what I find most suggestive; you have to perceive it with all your senses, it is an architecture that is very difficult to feel from a drawing, from what is published, from books. It is an architecture that is lived, in which we are lucky to live"* (Yanguas and Gámiz, 2020:16).

The building of the Coimbra Botanical Garden Tropical Greenhouses was degraded, but not abandoned. The original building, dating from 1859, is one of the first examples of iron architecture in Portugal. The recovery and restoration project was carried out by João Mendes Ribeiro and inaugurated in 2016. The desire to valorise what already exists is a fundamental theme of this project. The architect wanted to create a fusion of different times, without leaving his own mark. In this way, people do not notice the new gesture, even though many things have changed.

The premise of this project is that the new programme preserves and enhances the main qualities and characteristics of the building. In the case of buildings of high spatial and material quality, it is sometimes necessary to return to the origins, giving priority to the recovery of the original spatial qualities, even if this means dismantling interventions from earlier historical periods. In the central space, the upper concrete gallery has been removed and replaced by a metal one that is more integrated into the complex, and a black-painted lake has been added, where the space is enhanced by the reflection on the water. In addition, two spiral staircases

Figure 11.3 Conservation and extension of the Farol Museu de Santa Marta (2003–2007), architects. Manuel e Francisco Aires Mateus. The first image shows the new open space created in front of the inhabited "wall", within a fortified enclosure and connected to the circuit of the Cascais Museum Quarter. The second image shows the entrance to the Lighthouse Museum.

Source: Photograph by author, *formaurbis* LAB, 2022.

have been placed along the central longitudinal axis, reinforcing the symmetrical character of the building.

In this project, the rule is dictated by the pre-existence which helped to provide some answers. In an interview conducted on 2021 (Ribeiro and Nunes, 2021), the architect stated that strengthening of what already exists is a work of research and that the solutions to some current problems can be found in the same place. The architect designed a "new" door at the back wall of the greenhouse, facing north, to create a new visual and physical relationship. When the opening work began, they discovered that the door was already there. Mendes Ribeiro explains that he has found working that even ideas that seem innovative are often already present in the building, but hidden. Therefore, this ability to perceive the place, the pre-existence, was fundamental to this intervention.

It takes a lot of discipline to "invent" contemporary architectural solutions based on the interpretation of what already exists. In the case of the greenhouse, the first problem to be solved was that of shading and the way in which the prefabricated 3 mm glass shell was handled. In the summer, the greenhouse would get too much sun and the glass would break, creating a danger for people. The architect researched old documents and photographs and the answer was there, the form of shading he put in was the one that was already there. Buildings undergo successive transformations and the memory of the original function of the building is lost. There is a kind of collective forgetting of how the buildings were transformed,

Figure 11.4 Coimbra Botanical Garden Tropical Greenhouses (2016), João Mendes Ribeiro architect. The first image shows the northern façade of the building and the side door on the central axis of the main route through the three naves. The second shows how the new elements, such as the spiral staircase, are integrated with the preexisting structural elements of the central nave.

Source: Photograph by the author, 2022

and then through historical research the architects find the answer to the current problem.

The architect Antoni Gaudi (1852–1926) rightly argued that "originality consists in returning to the source. What is original is what returns with its means to the simplicity of the first solutions", which shows us the value of references from the past and how their application in contemporary architecture is useful for enriching new architectural proposals (Beltran, 2023).

The decomposition of time and objects

As Rafael Moneo (2017) points out, buildings move in time, they do not have the permanence and immobility that we sometimes wish for them. They are not exactly what they were, and we have to accept that their life implies constant change, imposed by other architects' interpretations and readings of the past. In the transformation of a building, the architect has to bring together in the new project the pre-existences as well as the different points of view, meanings and symbols, both of the culture of origin and of the present culture. The projects of the Machado de Castro National Museum (MNMC) in Coimbra and the Thalia Theatre in Lisbon are examples of this convergence, although each one has its own approach to the problem of the relationship between the aesthetics of the monument (or ruin) and the ethics of the project. They represent a dialogue-based and socially responsible vision of the architectural project.

Firstly, because they succeed in recovering the aesthetic values of the monument for contemporary society. Buildings become monuments when it makes sense for the community to revalue them. In this sense, the restoration intervention solves the problem of bringing the ruin into contemporary space-time in a lively way. The intention of the project is not to uncover the traces (a task for archaeologists), but to enhance them and make them understandable.

The restoration and extension of the Machado de Castro National Museum (1999–2013) is a project by Gonçalo Byrne Architects in the centre of Coimbra, born from the desire to make visible the traces of almost two thousand years of the city's history within the building itself, preserving and enhancing the archaeological remains from different periods as a collage of fragments: the Roman cryptoportico, the 12th-century Romanesque cathedral, the Episcopal Palace and its original 16th-century courtyard (Alarcão, 2018).

Avant-garde art, such as Futurism, contributed new ways of conceiving time and space, fragmented, moving away from the static image inherited for centuries and helping to conceive other unexplored aspects, such as dynamism and movement, which helped to explain through art these same characteristics in a world that was beginning to be transformed by technology through industry, transport and communication. In architecture, the experience of living space and time with dynamism and movement can be understood through Le Corbusier, who understood the contribution of machines as the pinnacle of human progress and contributed his concept of the *promenade architecturale*, where the experience of the quality of space is intimately linked to the time of its journey.

The "collage of fragments", in Byrne's words, is linked by a "museological architectural promenade" (Byrne, 2021:78), which not only museologises the remains of the old city in the interior spaces, but also opens up to the outside through large panoramic windows that frame views of the historic city and introduce features of recognition of the current city.

The creation of such an iconic building makes sense when there is a common recognition by the people, and in order to survive, it must be designed and built in such a way as to reinforce the features that make it unique in the city, that tie it to the context. If the strength of the building lies precisely in this way of connecting different times, of merging different layers, of linking past and present, of creating contacts and overlaps, the greatest fragility of the project is revealed in the confrontation of the west-facing façades with the pre-existing houses. The blind wall of the museum is perceived as a wall full of graffiti, and the Roman ruins behind the gates are difficult to see. New interventions in the city of Coimbra will have to work on the urban regeneration of these streets, where the houses are in poor condition.

The Thalia Theatre Recovery Project (2009–2012), designed jointly by Barbas Lopes Architects and Gonçalo Byrne Architects, aims to stop the deterioration of the building's remains. Inaugurated in 1843, the theatre was destroyed by fire in 1862 and remained in ruins for 150 years. The central space of the project is a large multi-purpose hall that preserves the image of the ruin, consolidating the original wall structures and leaving them as decoration so as not to erase the memory of the building.

Figure 11.5 Rehabilitation and extension of the Machado de Castro National Museum, MNMC (1999-2013), Gonçalo Byrne architects. The western façade shows the volume added in the latest architectural intervention. On the upper floor is the bar, with panoramic views of the city and the river. Inside the museum, the archaeological remains, evidence of previous uses, appear along the route as part of the permanent exhibition.

Source: Photograph by the author, 2022.

The space is reconstructed volumetrically with a mono-material and continuous concrete structural shell, which becomes the façade of the building on the outside. The interior of this central nave creates an atmosphere of darkness that enhances the aesthetics of the ruin, allowing a single ray of natural light to enter through a corner. The architects emphasise this detail by alluding to a quote from Kahn: *"Even a room that must be dark needs at least a crack of light to know how dark it is"*. (Byrne, 2021:149)

There is no reconstruction of damaged parts and elements, walls, statues, etc. in the building. There are only three materials used, apart from the ruins: concrete, steel and glass. The relationship with the environment is reinforced by the design of the annexed pavilions, which are intended to create an ambiguity between inside and outside and to blend in with the exotic atmosphere of the zoo: wild animals, palm trees... in contrast to the closed nature of the main hall. On the street side, the glass of the façade reflects the buildings opposite, recreating the pre-existing urban landscape itself, which seems to be a good strategy to solve the usual problem of matching the different scales of the building.

In Cubism's contributions, space and time are seen as fragmented yet unified. In architecture, architects work with multiple fragments that need to be identified and then rearranged. Different moments from the past that are considered important can be drawn upon and used as guidelines for the architectural project. New narratives emerge from this confrontation.

Figure 11.6 Thalia Theatre (2009–2012), Barbas Lopes Architects and Gonçalo Byrne Architects. Seen from the street, the preexisting structures of the main auditorium are covered by a uniform structural mass. The side wall facing the street has a single storey height to offer a human scale to people strolling along the pavement, in contrast to the monumentality of the main hall. Inside, the preexisting buildings are represented as ruins.

Source: Photograph by Stefanos Antoniadis, *formaurbis* LAB, 2022.

In the same way that a cubist work shows us different times and spaces in a single view, these two architectural projects allow us – through the promenade – to appreciate different times that are not subject to historical linearity. In the case of the Machado de Castro National Museum, it is a historical collage of temporal layers; in the case of the Thalia Theatre, it is a dialogue between two moments in the life of the building.

The transition from history to project and from project to history

As the examples analysed confirm, there is no single architectural history and each professional relates to the past on the basis of their own experience and culture. Studying the historical vision of architects working in Portugal is key to understanding the relationship between the project and the pre-existences in each case. Projects designed with a vision of great respect for memory and history have managed to be more interesting and culturally innovative for the city than other new buildings. Precisely because of the effort to preserve what was there before, not to demolish too much, to restore the relationship with the immediate surroundings. There is no doubt that the quality of an architect's project that considers and improves the urban form is much better.

All the buildings have been selected because they meet all the conditions that were a prerequisite for the study: the chronological component of dialogue between times, the urban component of improvement of the public space, the architectural

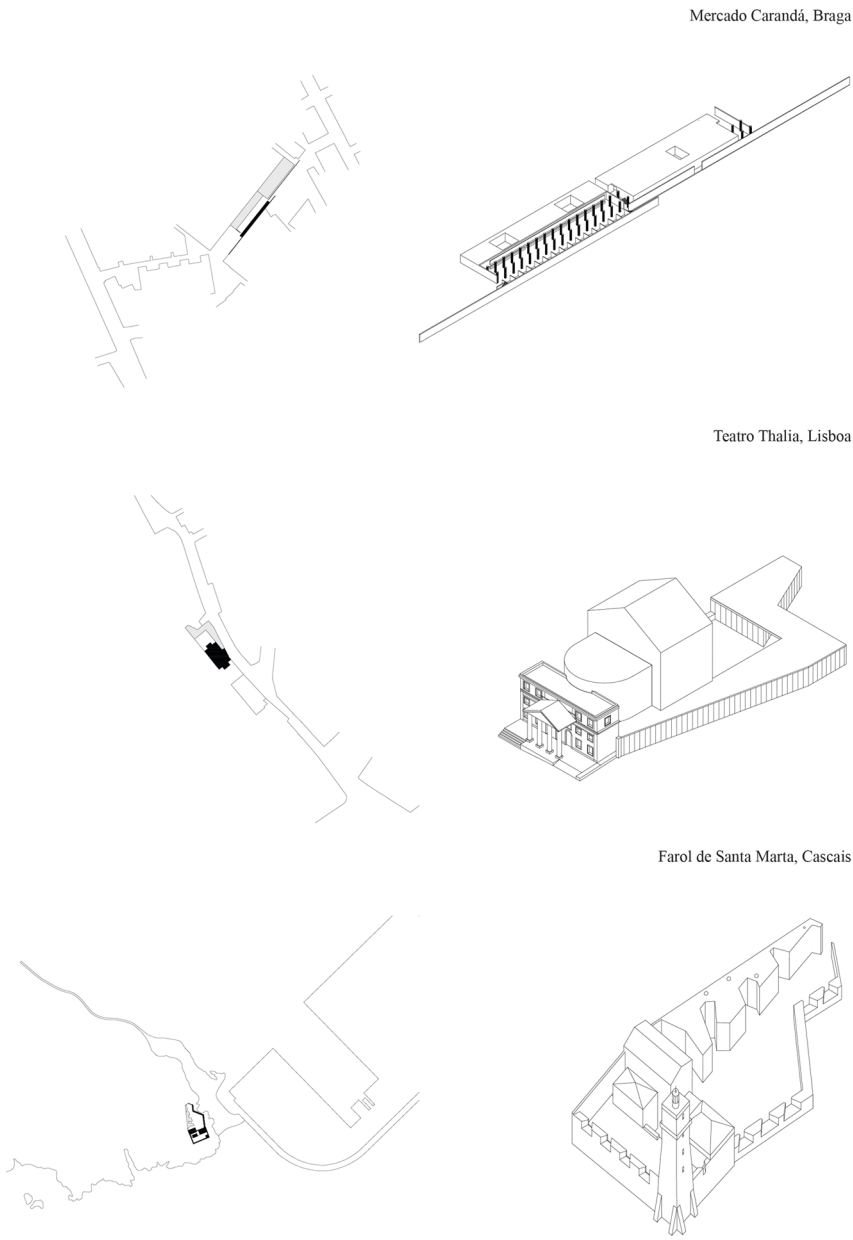

Figure 11.7 Plan of the site of the works, with the distinction between what is left and what is added in yellow, and the axonometric view of the building.

Source: Drawings from *formaurbis* LAB, 2022.

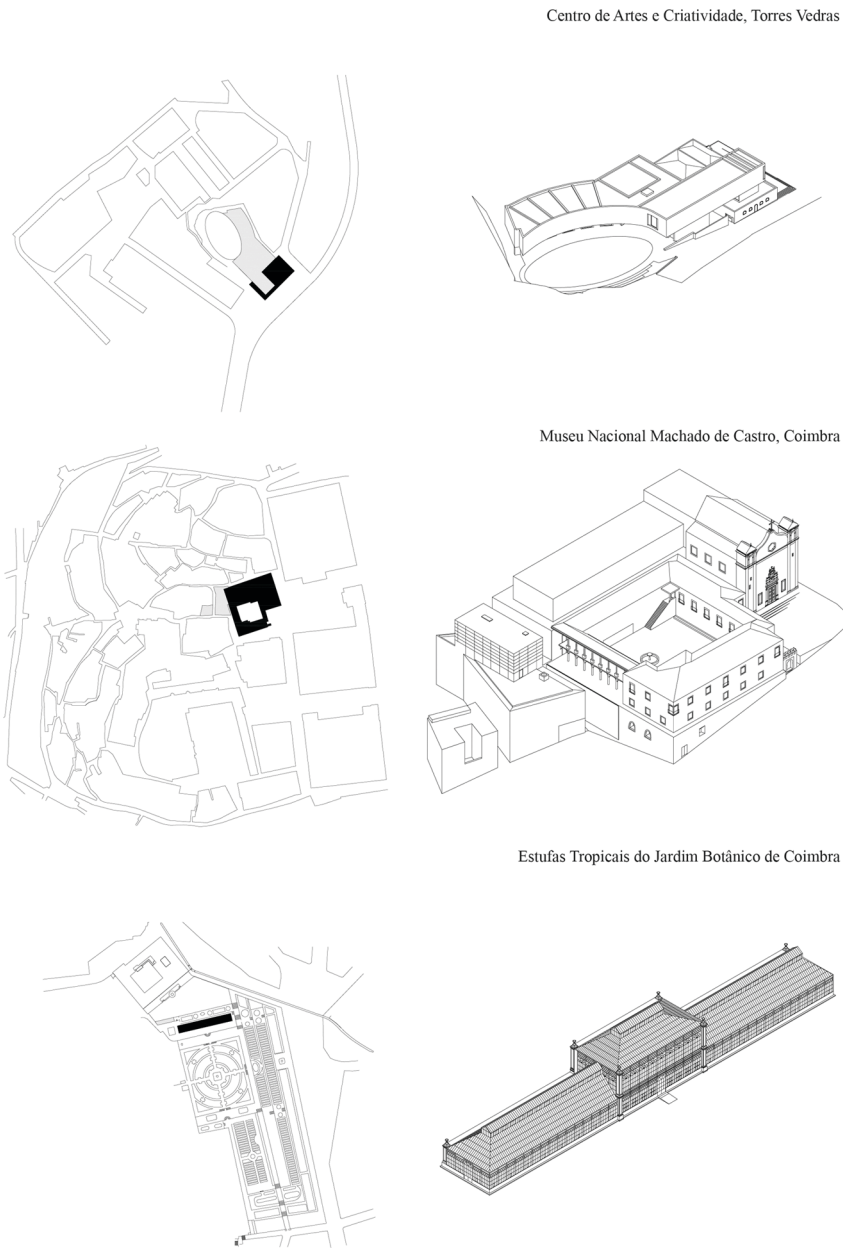

Figure 11.8 Plan of the site of the works, with the distinction between what is left and what is added in yellow, and the axonometric view of the building.

Source: Drawings from *formaurbis* LAB, 2022.

component of formal, material and/or compositional innovation and, finally, the socio-economic component that explains the change of use and the improvement of urban life.

The case studies have proved useful in advancing a broader examination of the relationship between project and history. On the one hand, the examples of urban sedimentation, based on the work of Souto de Moura and José Neves, in places such as Braga and Torres Vedras, consider the architectural work in an area of the city at a specific time, so that in these cases the importance of reading urban form as a design tool is more clearly perceived, that is, the value of history as a basis for the project.

The examples of mutation of buildings, from the work of Barbas Lopes Arquitectos with Gonçalo Byrne himself, Aires Mateus and João Mendes Ribeiro, in places such as Lisbon, Coimbra and Cascais, involve the intervention of an architect (or team) in a building with great historical significance, which obliges the architect to use the history in an operative sense, to establish a strong dialogue with the preexisting, so that in these cases the value of the project in history is clearly perceived.

The analysis of each architect's space/time has been useful in understanding their work, but we have also seen that the author's explanation is not the only determining factor. This analysis had to be complemented by a configurative study of the built works and a refigurative study to check whether the works are integrated into their social and urban context. By crossing the different voices and points of view, a different approach was developed, providing new data on the architecture.

The relationships studied between buildings built in Portugal and architectural history are based on the fact that both "the architect as historian" and "history as a basis for projects" make the passage from history to project and vice versa transparent. The methodology developed shows its potential as a versatile and valuable tool for diagnosing the reuse of buildings in the present, while at the same time allowing the extraction of useful strategies for planning the city of the future.

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Trajectories

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In the same way as dictionaries and encyclopaedias, atlases don't require sequential or even complete reading. This fact in no doubt undermines the importance and usefulness of these works and, like the others, they are publications that no library can be without, and which became the basis of knowledge, education, and research in Western culture from the Modern Age onwards.

Reading them should make it possible to choose subjects and gaps according to the user's interests, considering the relative autonomy of entries in dictionaries, for example, or tablets in the work discussed here. The reader is thus given the essential freedom to approach and use the information provided, taking the goal that aroused their curiosity or needs into account.

The theoretical framework chapter that opens this collection makes it possible to understand the options taken in the construction of our atlas of the building typology and the reasons behind them. The other ten chapters have a clearly autonomous character and are the result of individual readings by each of the authors of the potential offered by the material made available by the inventory. These readings, far from being exclusive or conclusive, show us that, in addition to the knowledge they offer on the subject, there are still infinite possibilities for interpreting material as fundamental as that contained in an Atlas of Buildings.

Having proven its usefulness as a repository and synthesis of an urban culture through the achievements that support it, the most ambitious objective of this work remains to be explored, which is to stimulate informed creativity, a lever to produce architecture as one of the greatest expressions of civilisation.

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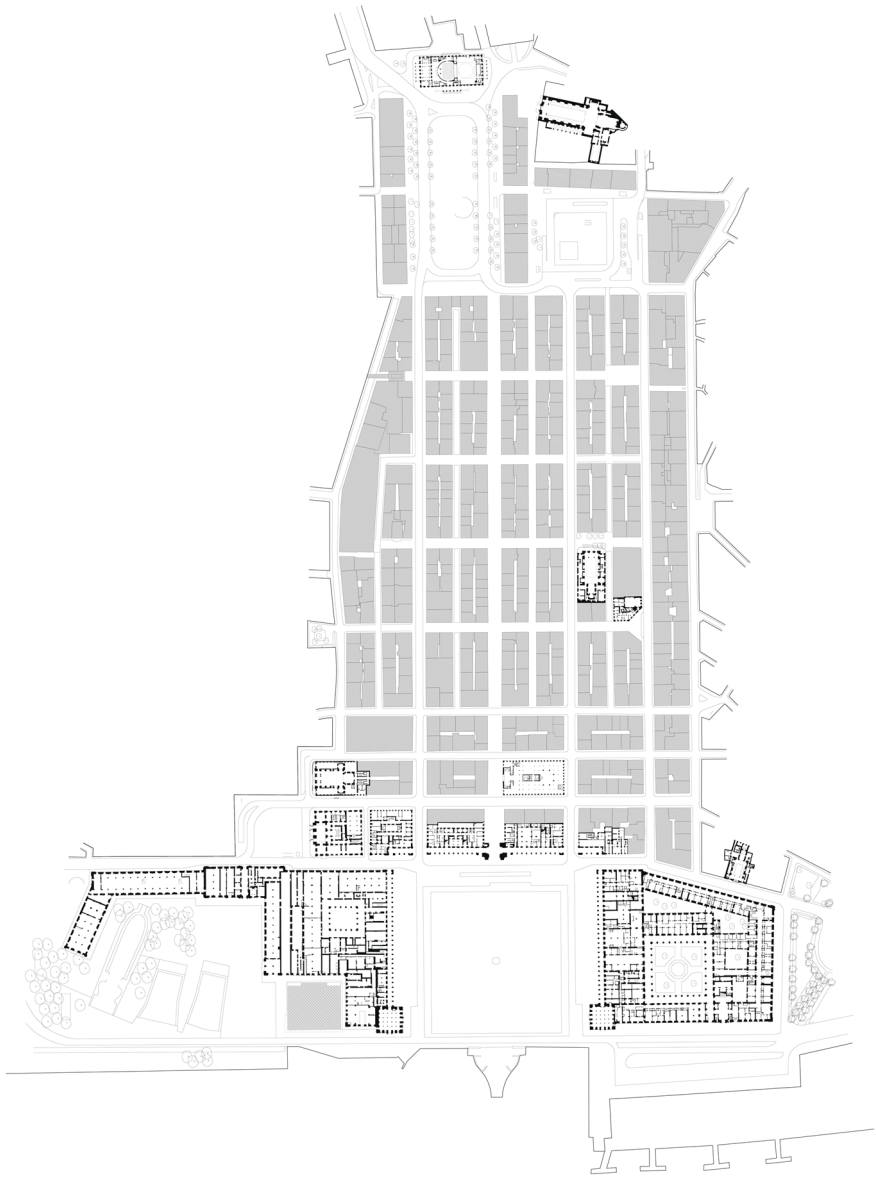

Figure T.1 Singular buildings and Urban Fabric, Baixa Pombalina, Lisbon.

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