

“Forma Urbis LAB” and the Morphological Atlas of Portuguese City

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Resumen:

This paper presents the results of the Morphological Atlas that has been built over the past decade. In 2018 the research group “Forma Urbis LAB” won a grant to develop an extensive inventory of the Portuguese building typologies that address the final chapter of the Atlas of urban form in Portugal. After the accomplishment of the several previous phases with the approach to the city: urban-fabric; urban-layout; theoretical grid, urban samples, and later to the public space: square and street; and finally, to the block, plots and buildings as units of the city's private space it will be possible for the first time, to carry out an articulated approach between all the components of urban fabric having as case study around 100 Portuguese cities.

The project aims to satisfy three main objectives. The first is to provide a didactic and pedagogical tool for the study and teaching of architecture and urbanism that will prove as fundamental as cartography itself. The second is to provide a tool that can be used for the professional practicing in architecture and urbanism. 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 information, which will enable to all scientific community to have access to a unique source of material for conducting and extending research on urban morphology topics, standing as a resource the Portuguese city form.

“The essence of an object is its form.

Form and limit are the substance of things. Substance is essence, matter and structure.” (Aristotle, 2002)

Aristotle

On urban form

The birth of Urbanism as a discipline that addresses the production of urban form stems from the demands placed on the city in the 19th century, above all from the emergence of planning and building the expansion of pre-existing nuclei for an industrialized and progressively more urban society. In the inaugural texts of this new discipline such as “Teoría General de La Urbanización” (Cerdà, 1867), “Der Städtebau nach seinen künstlerischen Grundsätzen” (Sitté, 1889) or “Town Planning in Practice” (Unwin, 1909) the question of the shape of the city is, moreover, the main subject behind these works.

At the beginning of the 20th century, the ideological vanguards supported by the currents of progressive thought rejected the inherited city, the past, history, tradition. According that the urbanism and its scientific aspect, became the solutions for the urban problems, in which the study of the new forms for urban growth is therefore the opportunity to create radically different ideal urban models.

The history of the built city and, above all, the post-war urbanistic production demonstrated the failure of scientific urbanism and the ideal models that presupposed the creation of an ideal city, seductive, but unable to gather the essential urban values of the city and to understand the urban form as a process of organic sedimentation, and above all, time as a variable of the project.

The imagined visions by utopias defines a position against to the disappearance of the old organic unit of the city under the disintegrating pressure of industrialization, accentuating the different and even antagonistic views on the future of the city.

For those that Françoise Choay aligned with the current of culturalist thought (Choay, 1965), it was no longer the situation of the individual that was questioned, but that of the city's human settlement, as an urban organism. The position “against the city” is based on the inevitability of the death of the existing city, the disappearance of a reality and the object we know and the emergence of a new artefact for a new society. Another different position is “towards the city” in the sense of the historical continuity of an inherited object, where the civilizational values and collective life are concentrated, an organism that renews itself and adjusts itself to the circumstances of each moment, still preserved the fundamental support of human life.

It was in the context of this debate that one of the most relevant and fruitful theoretical positions on the city was established and came to determine the birth of Urban Morphology as discipline, whose cultural foundations were built on the values of memory and context, adopting the disciplines of history and geography as a basic support to defend the permanence of the city as an eternal object.

This new attitude towards the city began in the middle of the 20th century, with the critical review of the scientific principles of Modern Urbanism, and aimed to understand the city as a work of

art, as a manufacture and as a process of construction in the long time. The return to the historic city and the reading of the shape of the built city demanded the disciplinary autonomy of the analysis procedure. The responsibility for investigating urban form is a specific responsibility of architects, and the problem of producing the shape of the city is primarily a problem of space composition.

As Giuseppe Samonà explained, the birth of urban morphology as discipline is mainly an opportunity to create a new point of view on architecture, when architecture means understand the city from an architectural point of view. In the words of the Italian *maestro* "Urban morphology is animated by a dual theoretical and analytical objective, also aims the reunification of architecture and urbanism in a single discipline, in this sense, architecture finds the analytical dimension of the intellectual tradition, and urbanism finds its traditional interest in the physical and spatial object." (Samonà, 1978)

The birth of urban morphology is, however, directly associated with the crisis of the city in the 20th century. The consequence of World War II was devastating, particularly for cities. Tokyo and London, as well as Rotterdam or Berlin, became paradigms of post-1945 urban reality. In Europe, the birth of studies on the existing city is organized in response to the problem of reconstruction and emerges as a manifest, formulated from the valorization of the built city and its recognition as an artistic, historical and civilizational legacy.

Morphology and the urban form study

The concept of morphology first emerged as a generic term that refers to the study of forms and their origin. When Johann Wolfgang von Goethe became interested in the study of the mutability of plant forms at the end of the 18th century, he adopted the term morphology as a science of form observation, but the interest of the German humanist was not restricted only to classification, having addressed the study of form in botany from the notions of formation, transformation and metamorphosis of plants.

Etymologically, the term used by Goethe is constructed by combining the Greek word *morphê*, which refers to the notion of form, and the word *logos*, which refers to the concept of study, science or treatise, allowing today to understand the meaning of the expression Urban Morphology as a study of the shape of the city and the phenomena that determined it, that is, the production processes.

The transposition of the study of the formation of organic bodies to the study of urban forms - Urban Morphology - comes from a line of thought that adopted the built city as a conceptual model for its own creation and renovation. According that the inherited city thus became the object of study and Urban Morphology the method to decode the mysteries that involve the production process of a complex and extraordinary physical entity, so seductive in the environments it creates, as sometimes, apparently inexplicable in its materializing expression.

The fundamental behind the urban reading procedures such as the concept of Urban Morphology itself was stabilized in the middle of the 20th century, in different cultural and even disciplinary contexts. In Southern Europe, Urban Morphology acquired, in the disciplinary field of Architecture, the status of a new discipline. It was widely disseminated by the architects trained in the ideological line of Saverio Muratori who, from the Italian context, profoundly influenced

the various approaches to the study of urban form, but also the position on the design of its production process, formulated from the idea the urban-project and the notion of the city as an organism.

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When about 15 years ago was set up a research laboratory in urban morphology at the Lisbon School of Architecture of the University of Lisbon, with the original and ambitious purpose of undertaking the survey of the shape of the built city in Portugal, one took as reference the “Encyclopédie de l’Urbanisme” directed by Robert Auzelle and Ivan Jankovic who assumes in the preface that the book as an “irreplaceable instrument of work and culture” (Auzelle, R., Jankovic, I. c.1950).

The “Forma Urbis Lab” was founded and is still coordinated by Dias Coelho, chair of urbanism at the Lisbon School of Architecture, having been formed from a multidisciplinary team of teachers/researchers, PhD students and research fellows with common interests and complementary perspectives in the study of the urban form. This working group integrated previous work that the founding members had done and is currently aiming to build the morphological Atlas of the City in Portugal, a task that is under development and that deals with around 100 cities from the point of view of their global shape and the shape of the elements that compose it. The main objective of the research undertaken by “Forma Urbis LAB” is to build an operational database based on the use of drawing as the principal instrument for studying the shape of the city.

The architectural drawing and the study of the urban form that are an important part of the “rhetoric of speech” in the pioneering urbanism treaties, by Ildefonso Cerdà, Camilo Sitte or Raymond Unwin. In all these authors the use of the interpretative drawing allowed access to the level of knowledge that the built city contains as an archive of information about itself.

Besides this topic, a series of studies has gone to the printing press over the last years, contributing significantly to reflection on cities through looking at their forms. The readings of the city undertaken by architects are exemplary within this subject, from Robert Auzelle (Auzelle, R., Jankovic, I. c.1950), Pierre Pinon (Borie, A., Micheloni, P., Pinon, P. 2006 [1978]) or Philippe Panerai (Panerai, P., Depaule, J. C., Demorgon, M., 1999) in France, or the researches developed by Rob Krier (Krier, 1979) in Vienna, the studies of Anne Vernez-Moudon and Mário Gandelsonas (Gandelsonas, 1991) in USA, or the work of Manuel Solà-Morales (Solà-Morales, 1993) in Barcelona. Under the same research topic is most recent the Atlas of the Dutch Urban Block coordinated by Susanne Komossa, Han Meyer (Komossa, 2010) or even the work about building typologies carry out by Emanuel Christ and Christopher Gantenbein (Christ, E., Gantenbein, C. 2012). And also the reading of Venice through its elements by Julia Foscari (Foscari, 2014) or about the Urban Grids edited by Joan Busquets (Busquets, J., Yang, D., Keller, M. 2019) and among too much more others works.

A systematic study of the built city since the middle of the 20th century reveals that architects believe that studying the shape of the existing city can help us build better cities and may even become a way to improve the cities where we live today.

The morphological ATLAS of cities in Portugal

In order to develop the morphological Atlas of the Portuguese city, the research group – “Forma Urbis LAB” – was created. Its creation arose from the educational work carried out by teachers and students in the pioneer study of squares in Portugal, carried out at the Lisbon School of Architecture. This relationship with teaching, particularly in the approach to urban form, aims to transform the Atlas into a pedagogical tool. The students are involved in a process of learning urban form through selection, characterization, graphic restitution and description, with an effort in the use of drawing to understand the urban space. The preliminary collection of case studies represents the diversity of urban elements that make up the urban fabric of Portuguese cities.

The project of the Atlas aims to satisfy three main objectives. The first is to provide a didactic device for the study and teaching of architecture and urbanism that will prove a fundamental as cartography itself. The second is to provide a tool that can be used for the professional practicing in architecture and urbanism. 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 information, which will enable to all scientific community to have access to a unique source of material for conducting and extending research on urban morphology topics, standing as a resource the Portuguese city form.

Through this wide research it will be possible to compile for the first time an Atlas of the urban form in Portugal. The originality of the work lies with a systematic approach (Fig. 01) although supported by tested methodologies that have been used in previous international researches. The methodological approach to each city adopted as case study deals with all features of the urban form in a cross-cutting and integrated way, and has never been developed or even attempted elsewhere. It includes tackling the urban fabric of each city, the two main features making up public component and private component of the urban form, approached from the characterization of the shape of its elements (urban elements).

1. Methodology

In methodological terms, researching and producing the features are based in an exhaustive fieldwork in which the whole country is visited. This research includes analysing existing information available in bibliographic references and archives of technical departments of the different municipalities.

The selection of cases studies is always supported by a criterion based in the need to translate the diversity and wealth of situations present within the scope of the territorial universe. Regarding this task, the selection includes examples that are representative of different historical periods or from different processes of lengthy sedimentation, understanding the urban form as result. The criterion answers also the representativeness of morphological characteristics of the urban elements, their typologies and their geographical distribution through the country.

The encyclopaedic objective of the Atlas means the cities, case study, need to be handled synthetically and follow a standard model in order to enable comparison between the various selected cases, and depiction of their cellular nature in making up the urban fabric and building typologies. In this sense, each city case study is characterized through complementary

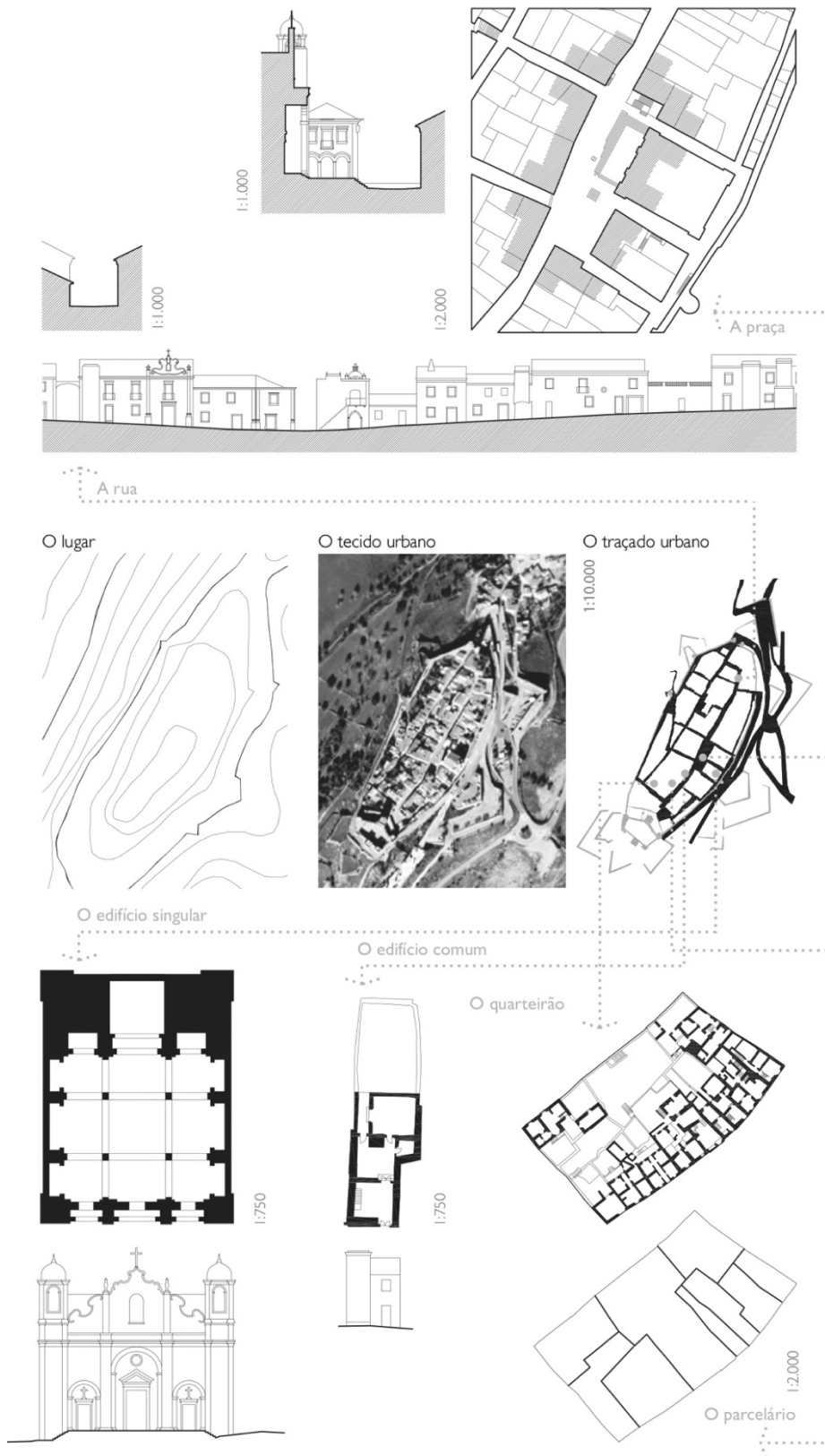


Fig. 01 Monsaraz. Example of Atlas case study characterization. (Dias Coelho, C. (ed.). 2013)

approaches, namely the decomposition of systems and the decomposition of the most representative urban elements.

The decomposition of systems means delayering of the urban form and consists in the analytical representation of the systems of the city through the urban fabric, namely, the site or the topographic support where the city was built, on the other hand, the urban layout or the analytic representation of the public ground, and the plot pattern or the division of the private space, and even the theoretical grid system behind the shape.

In the elementary decomposition are addressed the public and private components that compose the urban fabric, namely, square, street, urban-block and the building typologies, represented by common buildings and singular buildings. Each urban element is always characterized with a plan of the urban context or, on other words within the morphological region where it is part.

In terms of the graphics, each urban element is represented by classically drawn features, plans, cross-sections, elevations, axonometric views. The aim is to characterize each case study identically and comparably, i.e. using the same representation codes of drawing and on the same scale, using a series of bespoke reference pieces.

2. The ongoing research behind the Atlas

The research group has conducted different phases of the "morphological atlas of the Portuguese city", which was designed to be laid out in two parts, the first regarding public space and for which the phases on "urban-layout and squares" (Fig. 02 and Fig. 03) have been concluded and published (Dias Coelho, C., Lamas, J. (coords.). 2005 and Dias Coelho, C., Lamas, J. (coords.). 2007), and for which the phase on "streets" (FCT reference: PTDC/AUR/65532/2006). is also concluded but not yet published.

The second part of the Atlas, regarding the private space, approached first from the aggregation unit of the buildings, i.e. looks especially to the build fabric through the "urban-block" (FCT reference: PTDC/AUR-URB/111835/2009) (Fig. 04). The synthesis of this research as publish in "Cadernos de Morfologia Urbana - Estudos da Cidade Portuguesa" collection, that consists on a series of transversal researches conducted by scholars with distinct perspectives about the research topic of the project. In 2013 the first volume was published and was dedicated to the Urban Elements and focused on the elementary decomposition of the urban fabric (Dias Coelho, C. (ed.). 2013). In 2014 was published the second volume of the same book collection, dedicated to the Time and Shape of the city, which focused on the role of time in the formation of the urban form. Its second edition was published in 2017 (Coelho, C. (ed.). 2017).

The final phase of the Atlas deepens the study of buildings in Portugal and begins in 2018, when the research group "Forma Urbis LAB" won a grant to develop an extensive inventory of the Portuguese building typologies (FCT reference: PTDC/ART-DAQ/30110/2017). Thus, after the accomplishment of the several previous phases of research it will be possible for the first time, to carry out an articulated approach between all the components of urban fabric having as object the Portuguese city. (Fig. 05, Fig. 06, Fig. 07 and Fig. 08)

The milestone of the first-year of work behind the research project "Building Typology" was resulted in a "Opening Exhibition" with the objective presenting the project conceptual approach stabilization, namely the specific methodology based on a case study characterization and

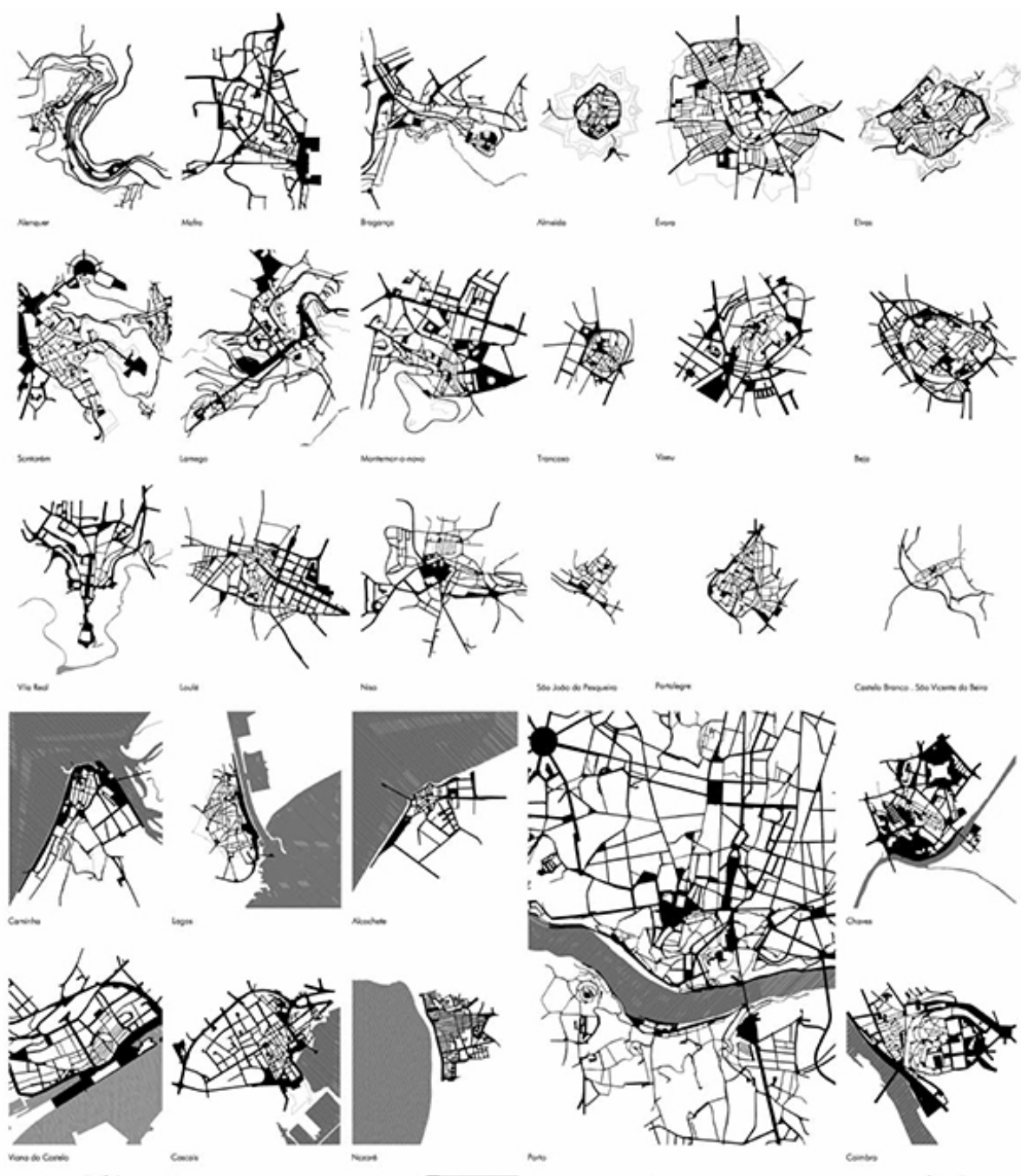


Fig. 02 Urban Layout of Portuguese Cities, Comparative Table. (Dias Coelho, C., Lamas, J. (coords.). 2007)

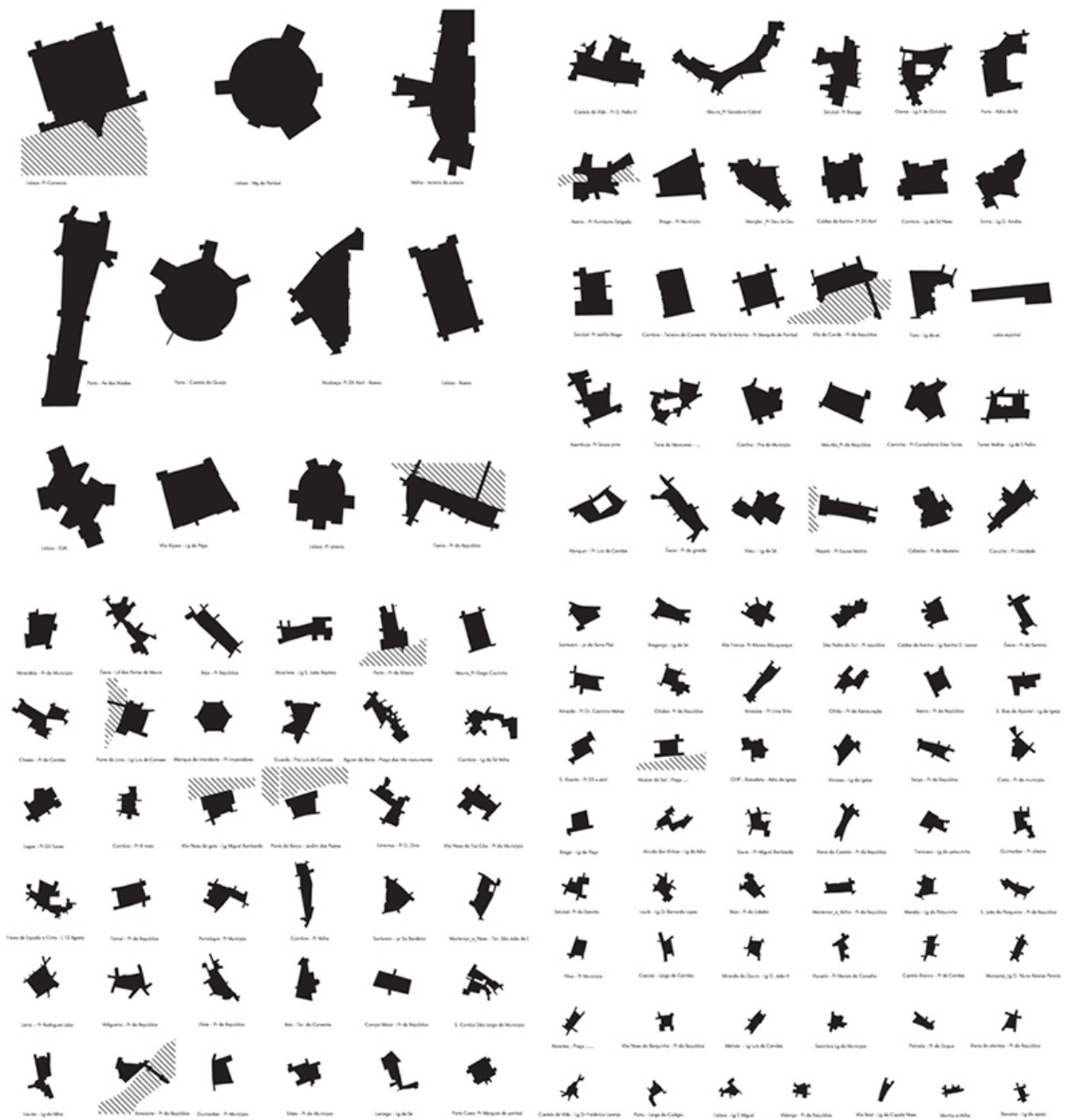


Fig. 03 Squares of Portuguese Cities. (Dias Coelho, C., Lamas, J. (coords.). 2007)

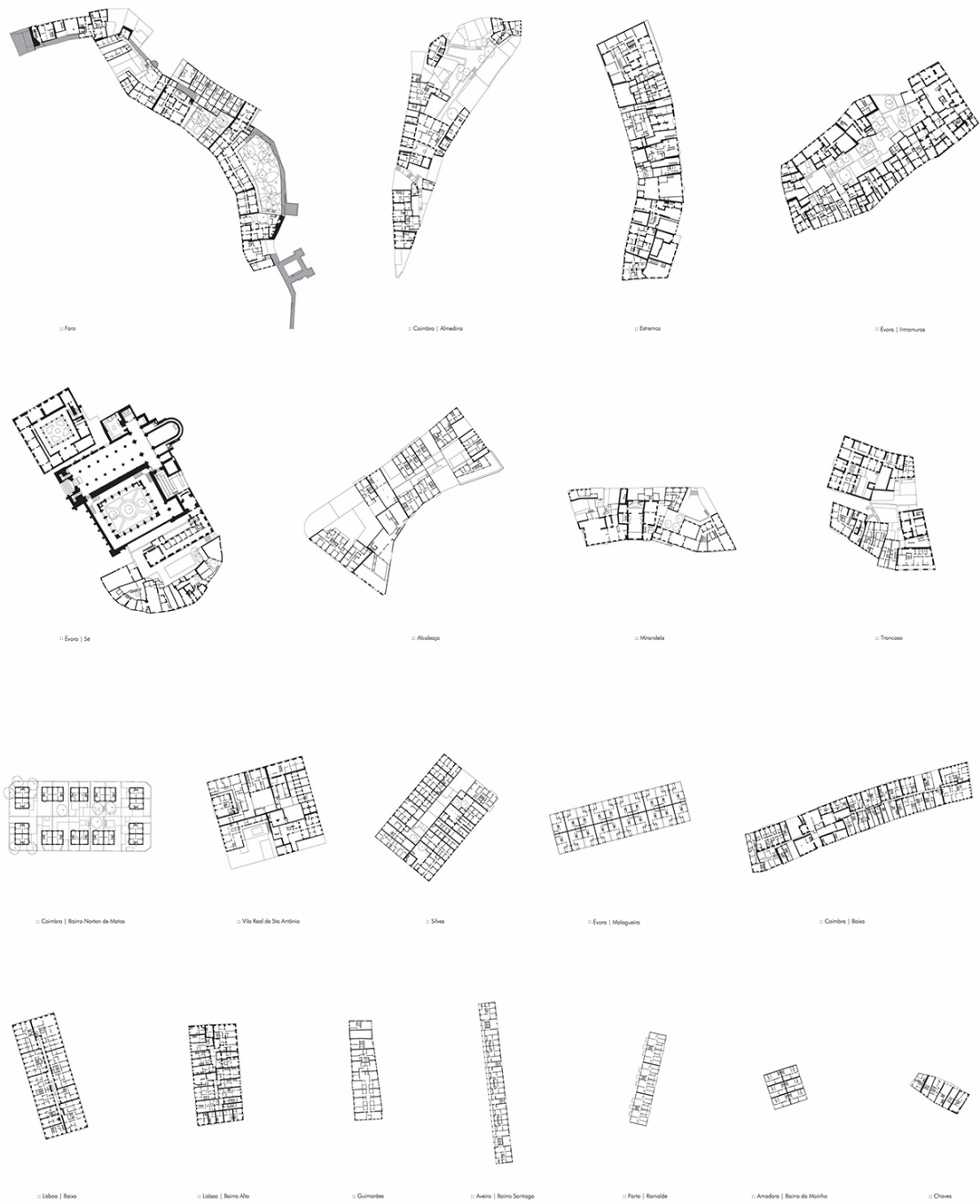


Fig. 04 Urban-Block of Portuguese Cities Comparative Table.
 Made by Forma Urbis LAB – Morphological Atlas of Portuguese Cities

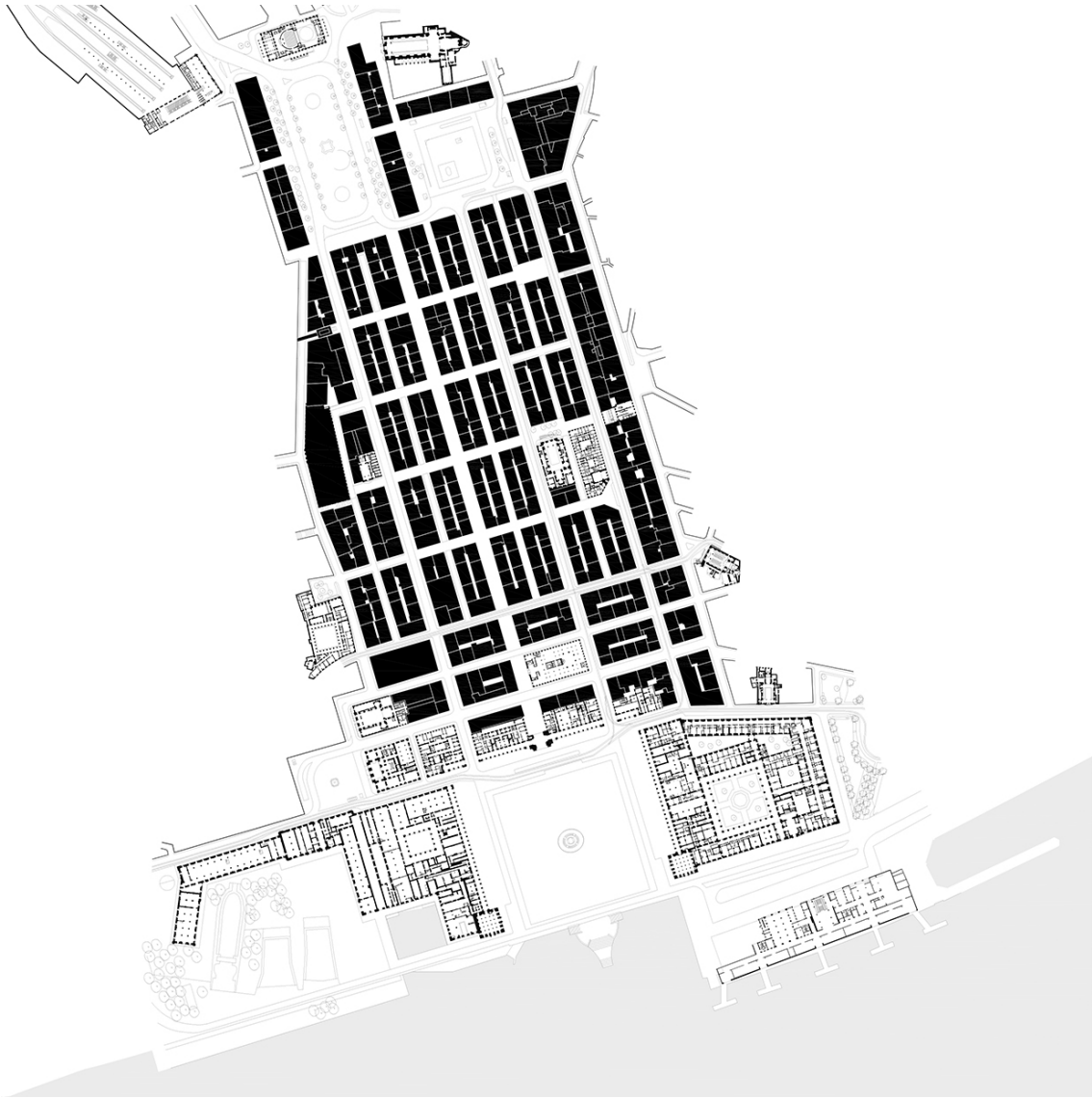
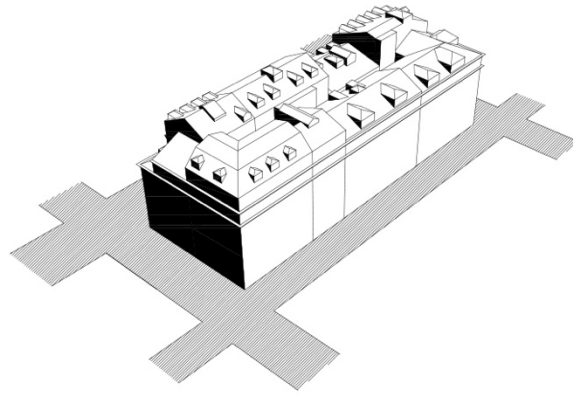


Fig. 05 Build Fabric of Baixa in Lisbon. Made by Forma Urbis LAB – Morphological Atlas of Portuguese Cities



façade
[design project]



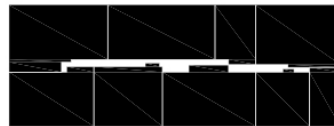
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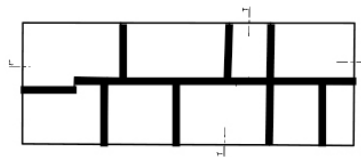
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Baixa urban-block



plots



urban-block floor-type

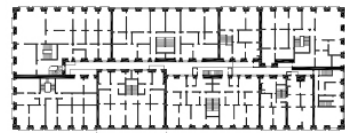
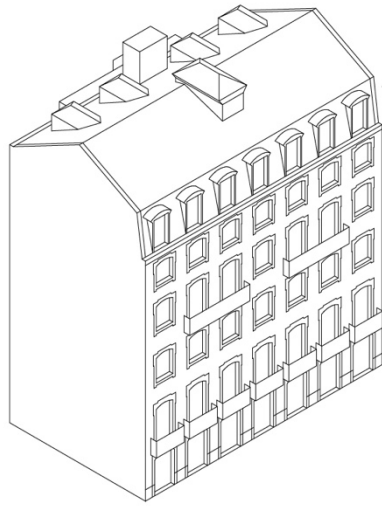
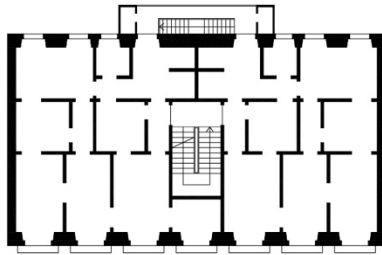


Fig. 06 Urban-Block of Baixa in Lisbon. Made by Forma Urbis LAB – Morphological Atlas of Portuguese Cities



Baixa . floor-type plan



ground floor plan

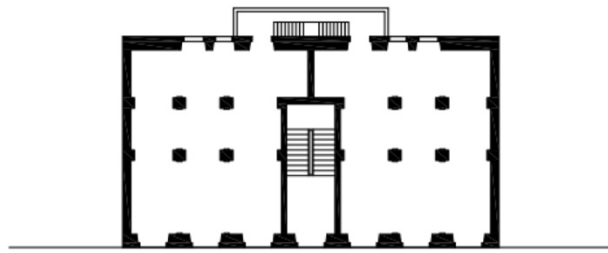


Fig. 07 Building of Baixa in Lisbon. Made by Forma Urbis LAB – Morphological Atlas of Portuguese Cities

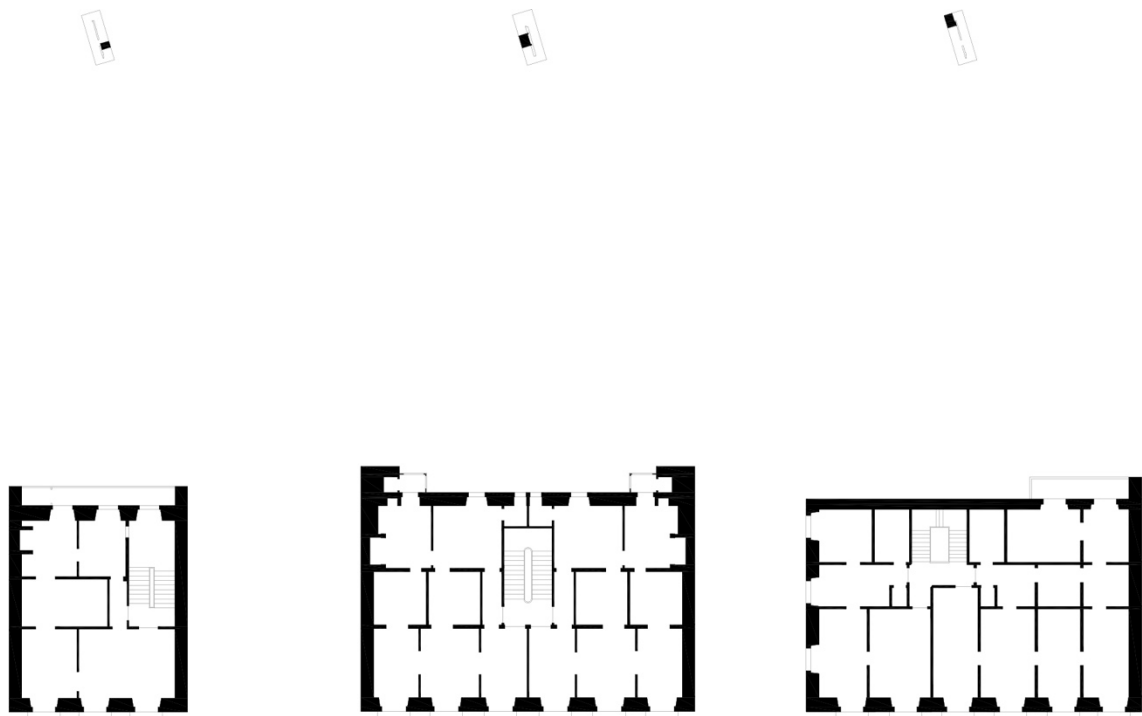


Fig. 08 Building variants, Baixa in Lisbon. Made by Forma Urbis LAB – Morphological Atlas of Portuguese Cities

interpretation through the use of the drawings as a reading process. This exhibition also showed the initial field survey of cases studies and the experimental graphic representation and drawing tests for the predicted pilot case studies. (Dias Coelho, C., Fernandes, S., Justo, R., Proença, S. et al. 2019.). This milestone, the exhibition and also the critical review workshop with the international consultant is crucial for the second year of the project, which is essentially focused on the building of the inventory.

During this first year of work, it was essential to carry out 2 tasks of the project: the methodological definition and the identification of case studies.

The task of “Methodological Definition” was entailed the establishment of a classification framework for the buildings – case studies – considering its typological, morphological and functional nature, as well as its relevance regarding the surrounding urban nucleus and the representativeness of the national diversity.

The classification framework was resulted from the construction of an abstract model, based on a thorough subject literature revision and from its permanent evaluation from a set of written and graphic information on the building diversity.

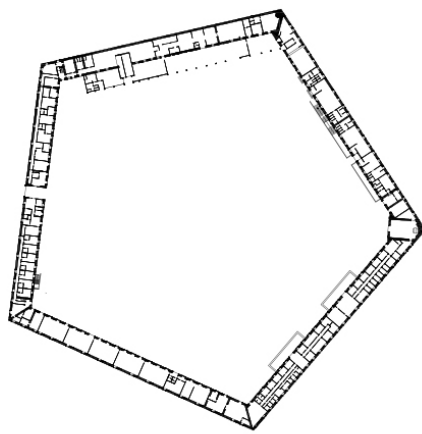
This task resulted in (i) the criteria definition for the selection and classification of case studies; (ii) the research elements definition; (iii) the information sources definition; and (iv) the reconnaissance of auxiliary, bibliographic, iconographic and photographic information. Although these lists are elaborated in this task, they will remain open along the morphological inventory elaboration, allowing the integration of future findings.

Along with the execution of the classification framework, considering the vast group of urban fabrics, the classification of buildings typologies was implemented fulfilling as much as possible all the established variants and proceeding to critical identification of examples. (Fig. 08) The task implied a broad survey of the buildings constructed in the Portuguese territory, which was took in account the work already developed in the previous phases of the Atlas, in particular the research that dealt with the private space components and with the urban block.

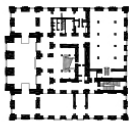
The task of classification of buildings also includes the elaboration of an experimental graphic representation for the pilot case studies selected in Lisbon with different morphological characteristics. As a result, this will allow a preview, a testing and a selection of all the predicted graphic pieces. The expected outcomes of this task resulted in a list of exemplifying cases, covering the wide variety of built typologies, topographic areas, urban nucleus relations, shapes, functions, states of evolution and/or other categories deemed relevant in the task “Methodological Definition” and also in the task of “Identification, case study”. These preliminary identification of case studies will be representative of the subsequent selection, from that the inventory of building typologies will be build. This task was also fundamental to define the graphic representation criteria of the pilot case studies. (Fig. 09 and Fig. 10)

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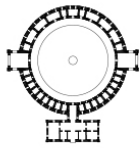
The ongoing project and whose previous phases of elaboration of the Atlas were financed by different public institutions (mainly with research grants from FCT, the Portuguese Foundation for Science and Technology) and which resulted several publications, some of them award-winning. The Atlas carry out a database in the urban form that will allow to make available to a specialized as well as a generalist public the processed material with the different components of



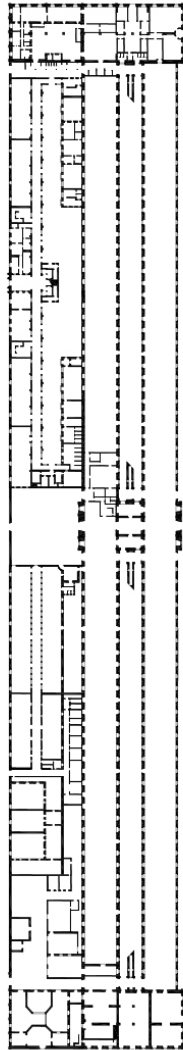
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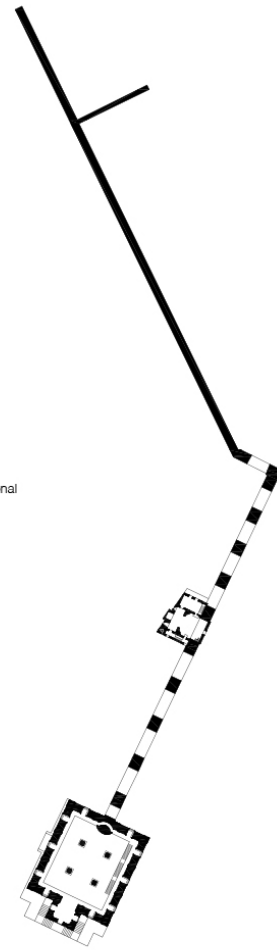
Paços do Concelho



Pavilhão 8



Cordoaria Nacional



Aqueduto - Mãe d'Água - Capela de Nossa Senhora de Monserrat

Fig. 09 Singular Buildings of Lisbon, comparative table.

Made by Forma Urbis LAB – Morphological Atlas of Portuguese Cities

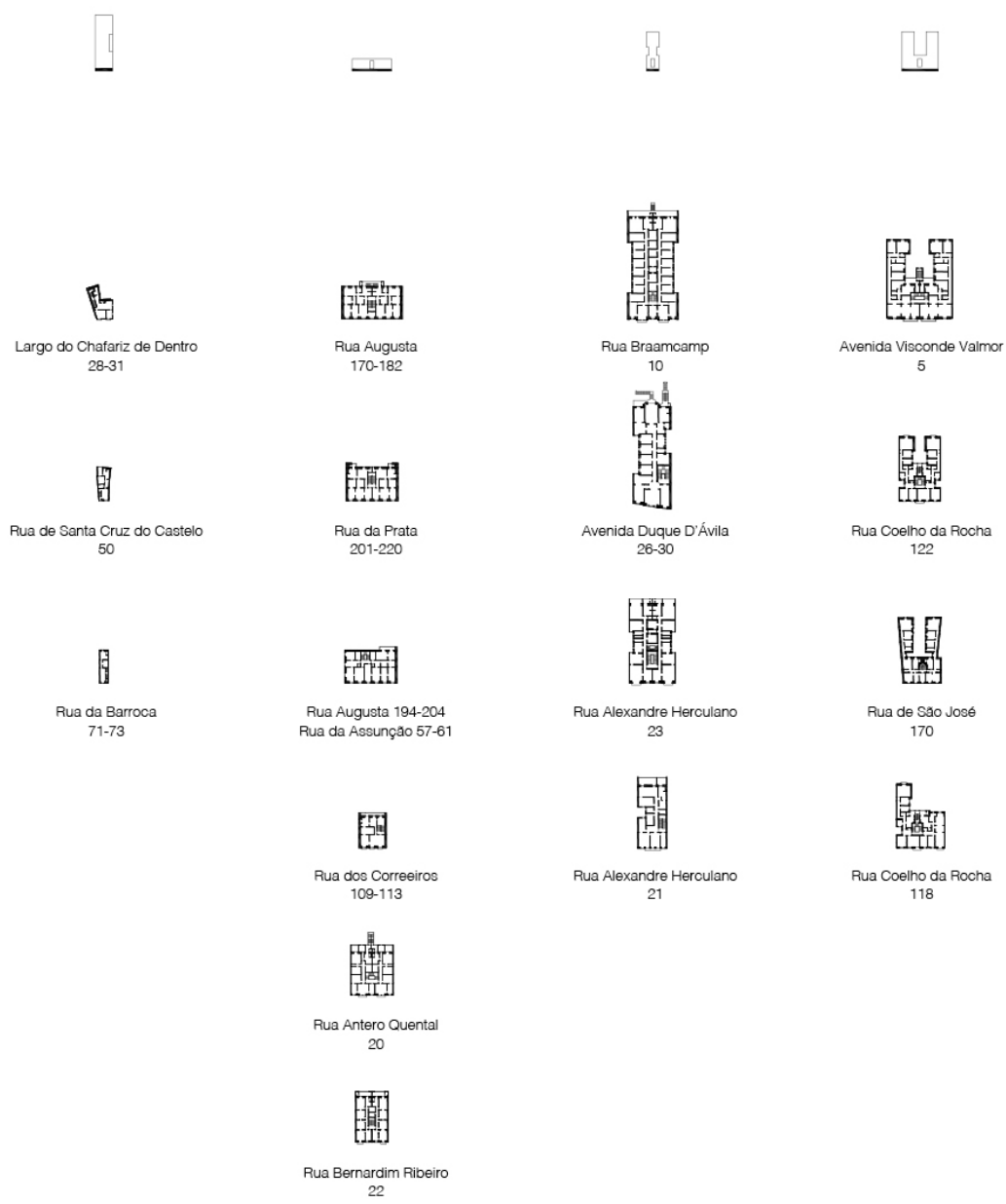


Fig. 10-1 Common Buildings of Lisbon, comparative table.

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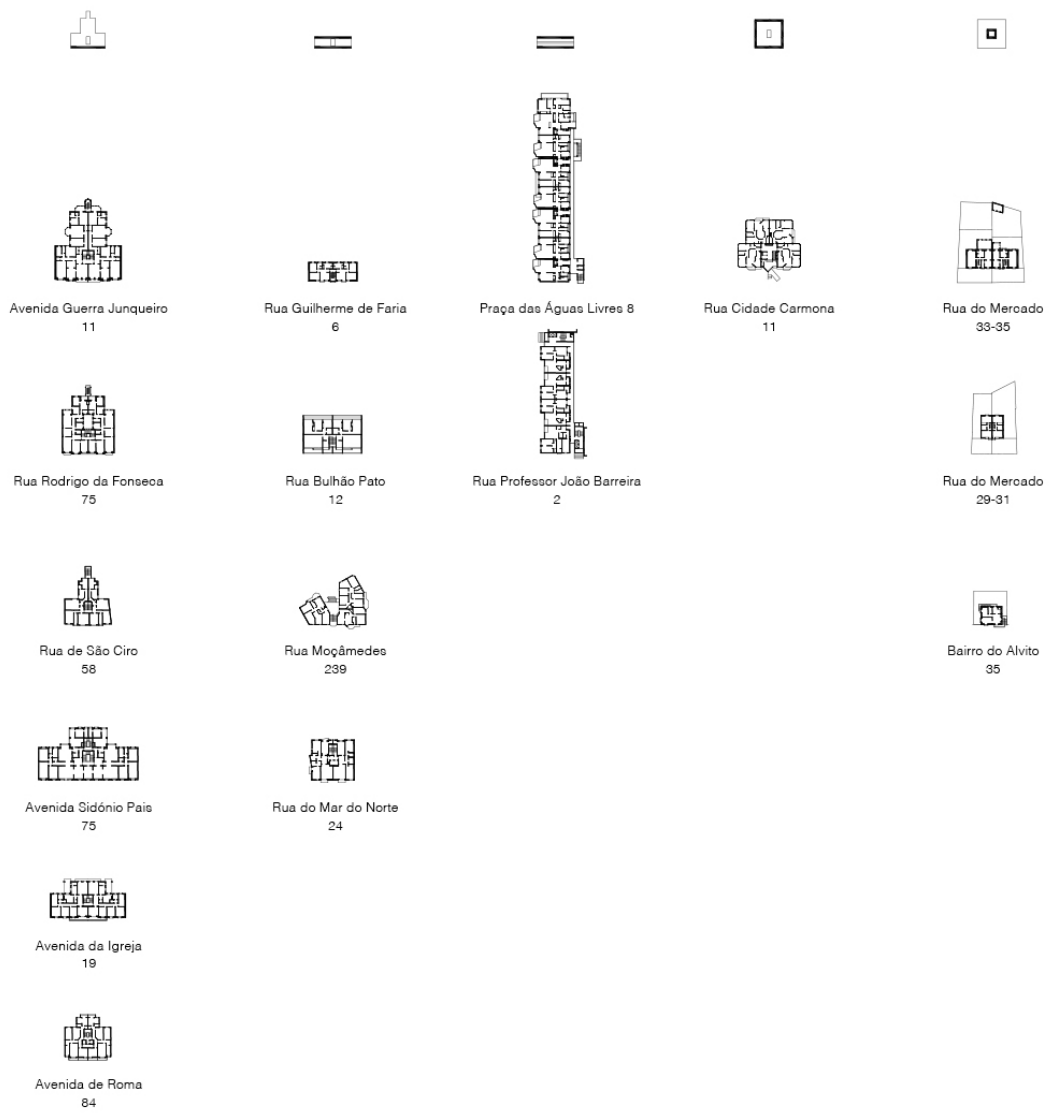


Fig. 10-2 Common Buildings of Lisbon, comparative table.

Made by Forma Urbis LAB – Morphological Atlas of Portuguese Cities

the urban fabric of each city, all of them represented and described in an identical and comparable way.

Towards a *città analoga*

It is possible to accept that the usefulness of the research procedure comes from the implicit relationship between the analytical reading and the design process of composition.

In this sense the morphological Atlas can be understood as an instrument for the practice of urbanism, as well as for the teaching of this discipline. The selected urban fabrics, and whose operability is based on the ability to constitute a reference for the development of contemporary urban creations. As part of our daily lives, the inherited city may constitute an inspiring reference for the conception of the urban space.

From these considerations it is possible to admit that the knowledge extracted from reading the existing city may be transferred to the development of new concepts, as well as to the creation of new urban realities or even to design the urban fabric, whereby it may inform a position on the way of thinking the production of the form of the city.

In this sense, the “Città Analoga” presented by Aldo Rossi in Biennale di Venezia 1976 still seems actual today. The legacy from the past means, more than ever, collecting references and autobiographical memories from the history of the city that can serve as guidelines to imagine a parallel reality in the future.

According to that, also Colin Rowe and Fred Koetter give us the same message in its book published in 1978 under the title City Collage. In both manifestos the same notion of modernity is expressed: the idea of continuity that is based on the acceptance of the built city as legacy and repository of its memory; and also the city as an unfinished work and the urban design as a possibility of reinterpreting the forms of the inherited city by overlapping new meanings to the layers of the past.”

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