Briefing Paper 2
Typological-Processual Approach to Urban Morphology

Urban morphology considers the form as the the visible aspect of a structure in transformation.

The significance of the term form refers to a development through a formative process which is able to be studied rationally as a design tool. According to this point of view, the urban form can be considered the visible aspect of an organism able to produce transformations through its own internal rules which link the different parts in unity. Therefore, the knowledge of the urban environment is not just through a matter of perception but is the perceptible aspect of the territorial structure. The same interpretation could be used for urban organisms and fabrics: cities are conceived as the result of a transformation process: a form in continuous evolution where buildings are considered as an organism of which the actual shape derives from the transformation of matter to material, elements, structures.

This approach originates from early experimentation at the Roman School of Architecture and has evolved through Gianfranco Caniggia's work, whose teachings have been collected, followed and developed, often in new and original ways, from designers and design professors of different faculties. This approach, whilst considered original and innovative, has a legacy that has not always been recognized as such deriving from Gustavo Giovannoni, Giovan Battista Milani, Saverio Muratori and Luigi Vagnetti. The certainly sizeable group, deriving from this same school, has been active in Florence, Italy. Important contributions to the knowledge of the processual reading method are due to Carlo Chiappi and Giorgio Villa. In Genoa, Donatella Morozzo della Rocca and Maria Giovanna Figoli, Vagnetti's students, and Guido Gozzoli have developed a didactic and research role. In Bari, a research group coordinated by Giuseppe Strappa has developed in an innovative way the Caniggian's forewords within the study of architectural and urban

Key ideas

- Organism: an integrated, self-sufficient correlation of complementary elements expressing an unitary aim.
- Process: sequence of phases of formation and transformation phases of the built reality, that is of territorial, urban, aggregative, building organisms.
- Urban Fabric: the sum of the processually determined characters that distinguish the formation of a building aggregate.
- Node: is the particular point of a continuum resulting from the intersection of two continuums or by the "gemmation" of one continuum from another.
- Pole: is the "sublimation" of the term "node", in general resulting by the presence of more continuums, not so intersecting, as ending or starting from a point.
- Base Building: is all the buildings whose purpose is directly related to life activities and dwelling.
- Special Building: is the non-residential part of the built environment, including the building types where the housing function is secondary to the one giving rise to the specialization of the type.

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organism and now his research group is operative in the Architecture and Construction Department of the Sapienza University of Rome. Several professors and researchers in various venues and university courses of design, use the Caniggian method of urban form interpretation throughout the design process. Outside academia, urban processual readings have been used by municipal administrations, specifically evident in Como (Maurizio Veronelli, Luigi Botta, etc.) and in Cesena (Giordano Conti, Delio Corbara, Enrico Lavagnino). The processual method is also used by several research projects on urban form such as the ones carried in by Velia Gini on Lucca or the ones accomplished by Maria Grazia Soldini.

On an international level, the theories deriving, in very different ways, from the processual interpretation of the urban fabric formation and specialized building, have influenced several research centers as the Washington University di Seattle (Anne Vernez Moudon), the Oxford Brooks University (Ivor Samuels), l' École d'Architecture de Versailles (Jean Castex), the Hosei University di Tokio (Hidenobu Jnnai), l'Universitè Laval del Quebec (Pierre Larochelle), l' École d'Architecture de Alger (Yassine Ouagueni), l' École Politecnique de Lausanne (Silvayn Malfroy, author of an introduction to the Italian specific vocabulary used by the Italian school on the interpretation of the formative processes of the building environment). Finally at the Birmingham University an entire geography school, coordinated by Jeremy Whitehand, has formulated on the basis of M.R.G. Conzen teachings, meeting a particularly fertile ground of confrontation in respect to Caniggia's thinking. An important contribution to the processual method's widespread dissemination is the translation of Caniggia's books in English, French, Chinese and Spanish. Finally, important links have been recently established within the architectural conservation topics.

For this method the Roman School heritage, starting from didactic experiments conducted in the interwar period, are especially relevant and are based on:
(1) History's new centrality in built-environment-interpretation
(2) Reading and design: architectural "redesign" as a tool to transmit the notion of process and organism intended as an "integrated, self-sufficient correlation of complementary elements expressing a unitary aim".

The distant origins of the method go back to the didactic system originated from Monument-Restoration teaching, imparted by Sebastiano Locati during the first year of the Regia Scuola di Architettura in 1920-21, before it became a university faculty. Locati played a significant role in linking up roman didactic with lombard researches of Camillo Boito. Trained at the Brera Academy and then at the Milan Polytechnic School and an authority on Roman monuments, Locati proposed restoration based on rules analogically derived from a comparison between synchronic works. Restoration was considered as the synthesis of all architectural disciplines. For that reason, restoration was not just intended as preservation of the document's historic and artistic aspects but also as a real design operation which, like all design, is a critical modification of the built environment.

2.1. Key concepts in the Typological Approach to Urban Morphology

Conceiving the built environment as an organism, the first steps in the interpretation of it are related to the individuation of the principal development phases of the organism. In this analysis, routes play a fundamental role: from the interpretation of the connecting system we are able to identify the early phases of formation of the built environment. The following steps are related to the analysis of the urban fabric first, and the building type second. In this case the morphology and the organism notion helps us to identify the type and the structure which allows us to interpret the development phases.

The concepts of the organism and the built environment as a process are strongly related and are the principal structural links with the other sub-concepts. In order to understand the meaning of the urban form (starting from the organism) we can divide the built reality in the following systems which represent these sub-concepts:

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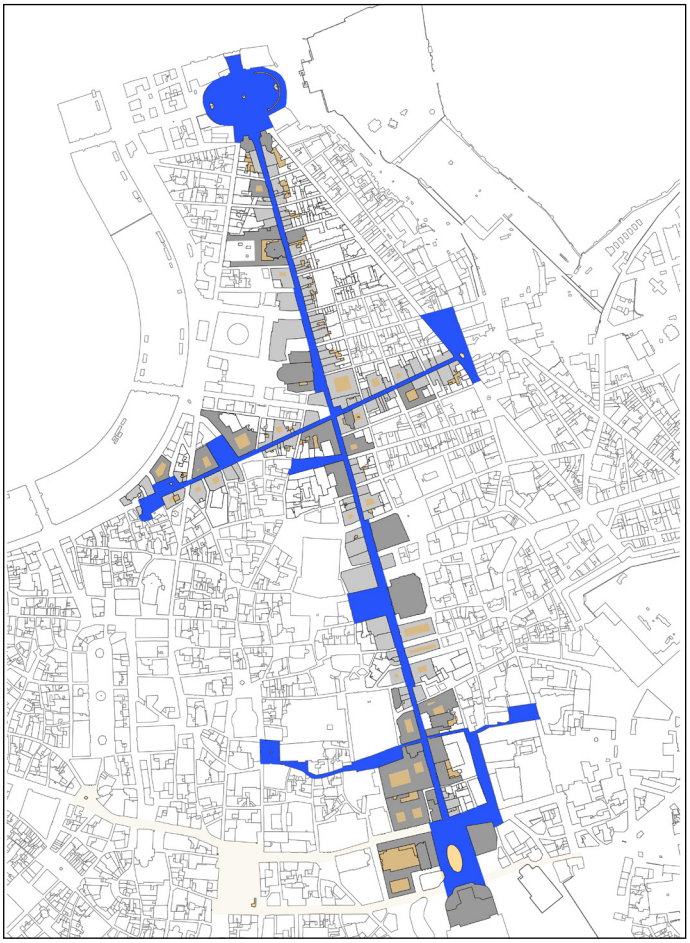

Image 1: Polarizations in the historical center of Rome: the via del Corso axis with its poles of piazza del Popolo, piazza Venezia and minor polarities formation.

2.1.1. Routes

In the processual approach on urban morphology routes can be interpreted as:

Matrix route is the original route that exists before the construction takes place. The notion of the matrix route derives from the obvious consideration that the first phase of structuring the territory is its crossing. The forms of the resulting routes are conditioned by the solidarity with the shape of the soil, but also by a planning will or by historical and anthropological pre-existences.

Building routes are chronologically successive and hierarchically subordinate to the matrix route and are traced in the function of the construction in depth. For economical and functional reasons, it can be understood how, after the first building on matrix routes, the aggregate tends to use the rear areas instead of continuing a linear expansion. This second phase of construction generally takes place by orienting the new routes orthogonal to the matrix ones, distancing each other from the depth of two of the new plots.

Connecting routes join together different building routes. They can be formed mainly in two ways:

- to suppress buildings insistent on two contiguous plots. In this case the intervention is recognizable for the parallelism of the terminal lots on the new route with the previous ones.
- to construct a new route in the completion phase of the building aggregate. In this case the planning is recognizable to be the new lots all orientated orthogonally to the new route.

Restructuring routes intervene in mature aggregates at the end of the forming process, where new poles are formed creating new connection requirements. These are therefore “traumatic” routes that characterize the transformation of modern cities, overlapping with the existing organism, considered obsolete, on the basis of a new notion of fabric.

2.1.2. Nodes and Poles

Within the relation between each route and in the definition of the urban form, poles and nodes play a fundamental role:

Node is the singular point of a continuum determined by the intersection of two continuums or by the “gemmation” of one continuum from another (CANIGGIA 1979). Each component of a structure, connecting with each other, determines a nodality (quality of forming a node) of different grades in relation to the congruence between the components and its scale. The notion of “continuum” can be applied to different scales, from building to territorial: in particular, an urban node can be formed from the intersection between two routes.

Pole is the “sublimation” of the term “node”, in general determined by the presence of more continuums, not

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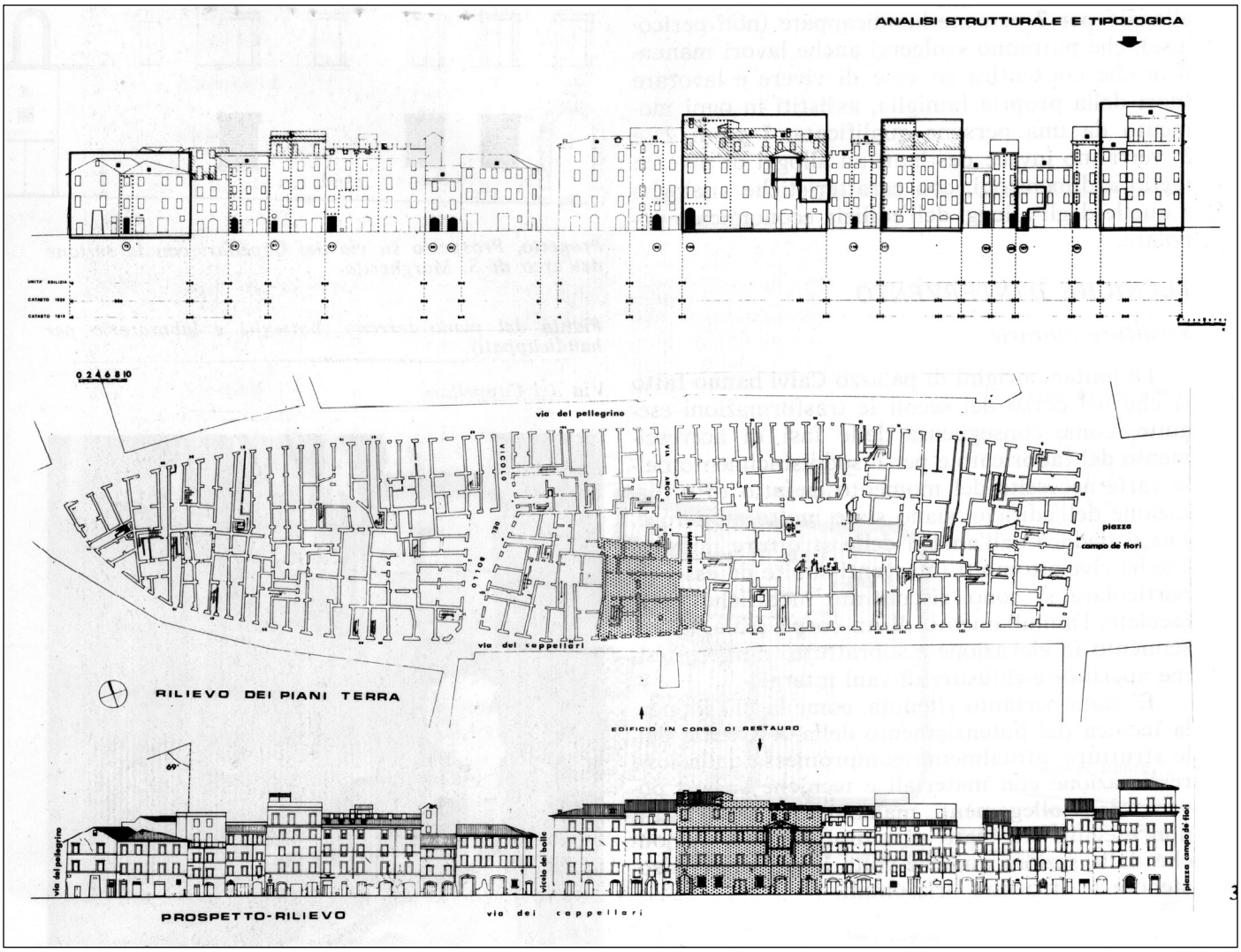

Image 2: Base Building formation on the subtratum of roman insulae beetwen via del Pellegrino and via dei Cappellari.

so intersecting, as ending or starting from a point. The distinction between node and pole depends, it should be noted, on the reading scale (CANIGGIA 1979). The pole (from the Latin polus, pivot) thus indicates the place of convergence or origin of the routes, resulting in a progressive specialization of the fabric.

2.1.3. Buildings

Base Building is the building in which the function is related to life activities and the dwelling. The term base derives from its main characteristic: following the building process where each form of architecture and building derives from the house. A clear example is evident in european cities where great majority of the construction is made by dwellings that have developed into more complex buildings and structures that have formed the cities in general.

Special Buildings are the non-residential parts of the built environment, including the building types where the housing function is secondary to that which gives rise to the specialization of the type.

In a schematic way we can divide Special building in:
The special serial building is made up of special buildings which do not have a dominant space, but are structured

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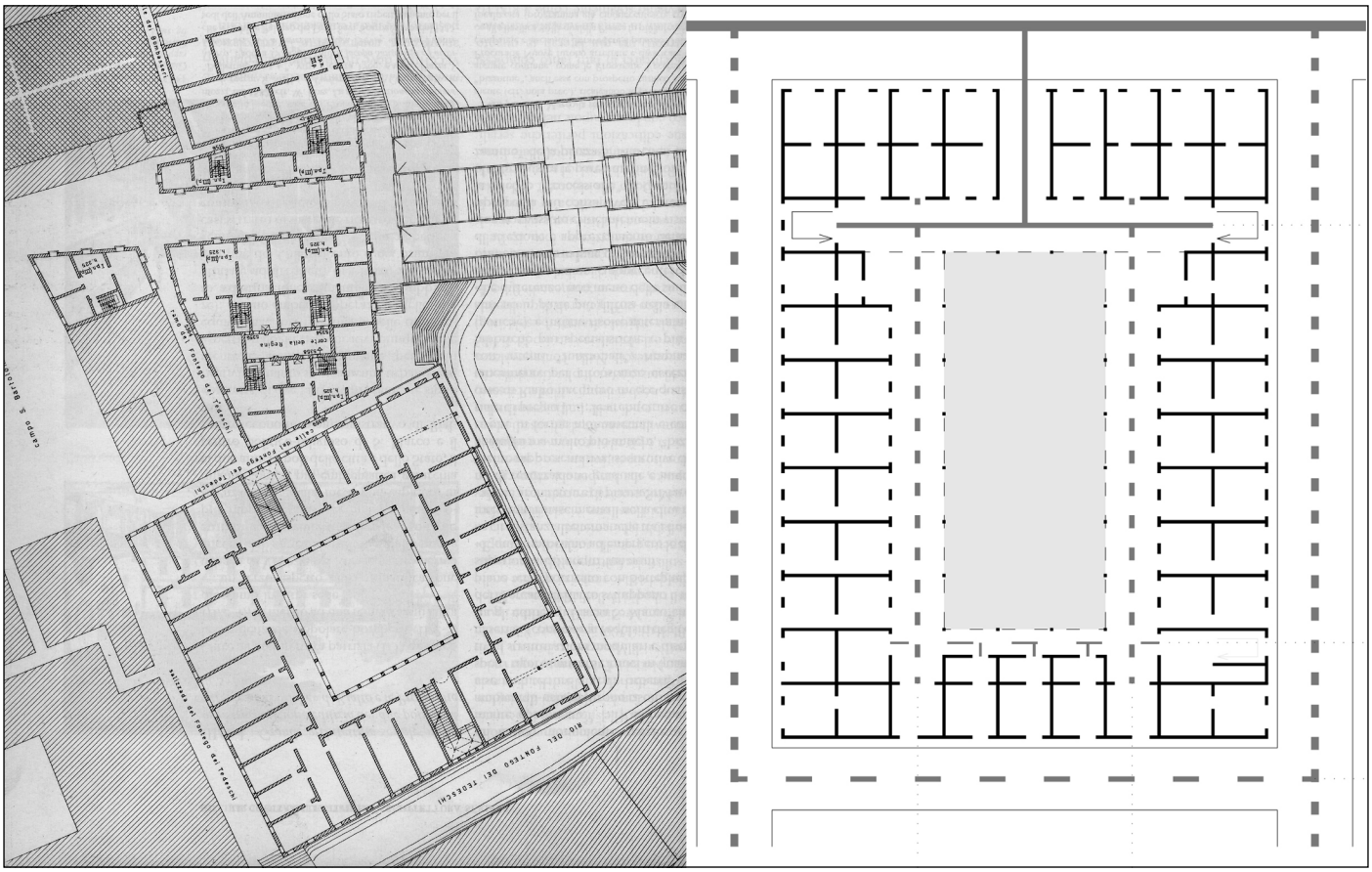

Image 3: Special building: on the left the Fondaco dei Tedeschi, Venezia; on the right the theorical scheme of the special building formative process starting from the base fabric.

through repetition in a series of equal spaces or partially in a hierarchical series. The special serial building spaces are aggregated, as we shall see, with laws similar to those of the urban fabric.

The special nodal building is made up of buildings that have a predominant space with respect to the other associated ones, that encompasses a spatial, constructive and functional nodality that unifies the whole organism.

2.1.4. Urban Fabric

We can extend the notions of type, intended as a building structure made by transmissible characteristics, to urban fabric. In this sense the fabric could be defined as the sum of the processually determined characters that distinguish the formation of a building aggregate. In other words, the notion of fabric is to the aggregate, as the notion of type is to the building (CANIGGIA 1979). A fabric is thus characterized by a law recognizable, iterative and identifiable synchronously in a set of aggregates, depending on the various cultural areas, and diachronically in successive phases of the transformation process of the aggregates. The formation of the fabric is determined by the forms of soil properties: the fractionating in plots, as a system of perimeter bounded areas, through their shapes and sizes, “identify” the susceptibility of the spaces to be built.

2.2. Methodology

Starting from the consideration to understand the urban form we should understand its process, we have two essential tools to analyse cities:

The study of the urban system including the routes, the polarities system and the urban fabric.

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Image 4: Urban fabric spontaneous formation in Bellegra historical center, Italy (on the right the map in the Catasto Gregoriano, 1817-21)

In this case the analysis is oriented to the interpretation of the process of which data is recognizable starting from the main characteristic of the territory: the land form. Therefore the tools consist of big scale plans with orography indication. The second step for the interpretation of the urban morphology is the analysis of the routes hierarchy: in this case it is necessary to use historical maps to show the principal phases of transformation of the urban organism. In regards of the routes hierarchy, another important tool is the reconstruction of the ground floor of the urban fabric. This tool can show the orientation of the buildings within the block and their relation with the routes. In this case we can try to interpret the routes hierarchy and the historical documents can be a prove of our interpretation. The analysis of the routes hierarchy could be reinforced by plans that show the land use and the form of the plots. As in the previous case the morphology of the plots demonstrates the relationship between the building and the route and together with the shape of the block depicts the hierarchy of the routes.

The study of the visible part of building and architecture. On the basis that the building is an organism in which each part is strongly connected, the facade is the element in which every system composing the architecture is revealed, from the static structure to the distribution system and its construction. In an architectural organism the facade is the synthesis of each system in which one can recognize the building's type and its process.

EPUM is an international research project which aims at the integration of different urban form research and teaching approaches through pedagogic innovation and Information and Communication Technology (ICT). The activities of this 28 months project (2017-2020) are funded by Erasmus+ and focus on the development of an innovative, open and inclusive system of teaching and training in urban form from a multidisciplinary perspective, capable of enabling the current and future generation of planning and design professionals to address comprehensively and effectively the variety of issues and challenges faced by contemporary cities. This website provides information about the project activities to partners and to other parties interested in the work of the project.

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