The street as a layer representing transitional processes

CITY STREET 5

Book of Proceedings

the time of streets

INCISIONS OVERLAPS AND RHYTHMS

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The street as a layer representing transitional processes

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Abstract

The map is the representation tool used in urban morphological studies to make the transition process of city tissue explicit. The urban transition process in analysis occurs through catalysts that have a tangible impact on the urban fabric. Therefore the city is a complex system and its representation needs to be decomposed into parts: the blocks, the streets, and the buildings that all together compose the urban tissue.
The following contribution focuses on studying the systems of representation of transition through analysising the maps used by the master of urban morphology school in Italy. In this context, the street and its identification in maps highlight the limits of urban changes. The research is conducted on Venice's map by Saverio Muratori (1959) and on Como by Gianfranco Caniggia (1973), which shows how different methods of representation of the street system lead to different understandings of the historical stratifications and thus the transition of the city.
As a connecting element represented within the map, the street allows us to relate the different scales of the city. Besides reflecting on the street within the map as a system of representation of the urban layers, the analysis sets the goal towards different representation systems able to recompose what was previously decomposed: the diagrams. The methodological outcome provided through a critical analysis of the studies defines the street as a tool to read the urban systems.

Keywords

Representation, urban morphology, maps, diagrams, tool

Reading the contemporary city as a process

The contemporary city has been described in different ways during the last century: from "World city", "Megalopolis", "Generic city",

"Cybercity", "Network city" to "Postmetopolis" and "Smart city"[1]. From the modern movement to nowadays, the cities' concept has been increasingly associated with the one of space and time, defining the urban tissue as an entity in constant transition and transformation[2]. The above words (transition and transformation) include the concept of dynamism and allow us to understand the city as a system made by catalytic elements leading to a change. These elements aim to transform the shape of the built environment, and its administration, over time and vice versa.[3] In this analysis context where the term dynamicity is mentioned, there is a continuous change from one state of equilibrium to another. An equilibrium that cannot be defined as an exact moment in time. Moreover, it is a process of reaching the point of stability with continuous change. [4] In the transformation process mentioned above, it is possible to recognise a sequence that moves it slightly from the present state of an organism to the next one. As the change occurs, the field of action changes itself. Thereby, the same transformation, guided by the same rule, has different effects each times. [5] In this context, the passage from one state to another is identified as a process of transition characterised by the presence of static elements, the invariants, and dynamic elements, the permutations, which interact with each other at different urban levels. The multi-scalarity of transformations highlights the importance of identifying the characters of mutation to suggest a meaningful change in the city pattern for both the architectural and urban fields.

The study proposed here investigates how a transitory process of form, in continuous becoming, can be read, represented and visualised without losing its high component of dynamism and complexity. To do this, the interest of the research falls in the methodological/instru-

1 Pinzon Cortes, Camila Eugenia. "*Mapping Urban Form. Morphology studies in the contemporary urban landscape".* PhD Thesis, TU Delft, 2009.
2 Wowo, Ding, Arie, Graafland, Andong, Lu. *Cities in Transition: Power, Environment, Society.* Rotterdam: NAI010 Publishers, 2015.
3 Easterling, Keller. *Lo spazio in cui ci muoviamo. L'infrastruttura come sistema operativo.* Milano: Treccani, 2019.
4 Neyant, Frédéric. *The Unconstructable Earth. An Ecology of Separation.* New York: Fordham University Press, 2019.
5 Christopher, Alexander. *The timeless ways of building.* New York: Oxford University Press, 1979.

mental field through the investigation of mapping systems and their possible semantic alterations. However, the specific focus stands on two point: the street as a medium representing urban transition and the concept of the city as a system coming from the studies of Italian morphological school.

Analysing the simple components of the city and their composition in complex systems leads to the construction of readable sequences through the axis of syntax and the paradigmatic one. [6] On the other hands, observing the elements of the city by mapping lead to the identification of the reading subject (street) and its description and its perception of space and time (reading the city to understand). This observation brings the attention back to the morphology of the territory and the urban fabric but without avoiding perplexity. Studying dynamic systems and identifying forms within a temporal unit bring morphological knowledge into a crisis. Specifically, morphology enters into crisis when the image of a form recognised as ideal clashes with the representation of its change. [7] Therefore, the question arises of how a different representation of a map of a static element, the street, can lead us to understand the city differently, contributing to the project through different degrees of transformation.

Maps to represent transition

In architecture and urban analysis, "reading" can be considered a practical action to achieve a specific goal; to read is necessary to identify a critical tool that allows the action to be operative. In this case, "to read" is understood as an act of discovering transitional processes that bring to the surface the hidden dynamic mechanisms and the formal components of the change of state. The process of reading the city aims to represent and visualise the configuration of the urban tissue. Representing architecture means developing a system of signs and symbols to reveal a new reality of the city.

The map is one of the representation systems used in architecture and urban design to show a particular configuration of the urban tis-

6 Viganò, Paola. *La città elementare*. Milano: Skira, 1999.
7 Vercellone, Federico. *Glossary of Morphology. Lecture Notes in Morphogenesis*. Switzerland: Springer Nature, 2020.

sue. The map as a tool can study a given arrangement of elements at a given time. Already Filarete marks a changing point in the urbanistic theory considering the city as an architectural object. In his representation, the project on the map is made by plan with street, architectural typology, explanatory text and caption of the project. [8] Furthermore, morphological studies went beyond this first theory of the city as an architectural object. They tried to identify the elements of urban change using the map as a tool. The concept of transition, often indistinct from that of transformation, defines the change between one regime and another by passing through two different states of equilibrium. [9] It has the meaning of a process explained through a non-linear, dynamic transition that can be supported or hindered by an external system.[10] Transition as a phenomenon related to process, and consequently to time, is peculiar to urban analysis when the research objective concerns investigating changes in the city. Morphology, is the study of a form in the making.[11] For this reason, it is necessary to operate through instruments capable of reading, representing and visualising dynamism.

The Italian morphological school developed in the Sixties under linguistic structuralism provided the first interpretation of transition through the maps of Saverio Muratori (1959) and Gianfranco Caniggia (1963). Muratori and Caniggia's maps follow the principle of "an overlay on different layers that define the evolution of a specific part of the city".[12] Furthermore, in "Elsewhere mapping" (2006), Peter Hall acknowledges the recent apogee of mapping. This medium has become a valuable instrument to combine information and visualise it to under-

8 Finotto, Francesco. *Città chiusa. Storia delle teorie urbanistiche dal Medioevo al Settecento.* Venezia: Marsilio, 1992.

9 Kemp, René, Marjolein van Asselt, and Jan Rotmans. "More Evolution Than Revolution: Transition Management in Public Policy". 2001. http://hdl.handle.net/1765/7672.

10 Hölscher, Katharina, Julia M. Wittmayer, and Derk Loorbach. "Transition versus Transformation: What's the Difference?" *Environmental Innovation and Societal Transitions* 27 (June 2018). Elsevier B.:1-3. doi:10.1016/j.eist.2017.10.007.

11 Kropf, Karl."Aspects of urban form" *Urban Morphology* 13, no. 2 (2009), pp.105-20.

12 Hall, Peter. *Mapping the next millennium: the discovery of new geographies.* New York: Random House, 1992.

state complex situations and reveal new relations. It recognises the potential of mapping as a way "to make the complex accessible, the hidden visible, the unmappable mappable." [13] In this way, starting from the definition of the map, the process of reading the morphological school can be compared to a diagrammatic method.[14]

By decomposing the map of Venice (Saverio Muratori) and Como (Gianfranco Caniggia), it is possible to define the temporal, symbolic and diagrammatic components that make these maps a tool for studying urban change. These morphological maps are characterised by a diachronic and synchronic component that defines the time component in the study of dynamism. Furthermore, they use symbols and signs to identify permanence. However, at the same time, they present an implicit diagrammatic character that can be used to study permutations. A transition map can represent the dynamic component, albeit with certain rigidity. With the approach focused on understanding how the city changes by linking past and present, maps can be seen as diagrams showing the evolution of collective thinking about a particular spatial domain. In this new representation system, the street is merged with the ground floor of the building without a specific differentiation but, at the same time, implicitly declines its principal role as a stratum representing the structure of the urban tissue.

Analysing street representation

The street, or as Gianfranco Caniggia calls it, the path, is an essential attribute on which the system of representation of the map is based. Path and band of relevance are the two categories used to identify the structure of the urban tissue.[15] The relation between streets and buildings defines four different configurations of the process of formation of the urban tissue:

13 Abrams, Janet, Hall Peter. *Else/where mapping. New cartographies of networks and territories.* Minneapolis: University of Minnesota, 2006.
14 Trisciuoglio, Marco, Michela Barosio, Ana Ricchiardi, Zeynep Tulumen, Martina Crapolicchio, and Author. "Transitional Morphologies and Urban Forms: Generation and Regeneration Processes—An Agenda" *Sustainability* 13, no. 11(2021): 6233. https://doi.org/10.3390/su13116233
15 Caniggia, Gianfranco, Maffei, Gian Luigi. *Lettura dell'edilizia di base*. Venezia: Marsilio, 1979.

construction on matrix path;

construction on building layout routes;

construction on linking routes;

construction on renovation routes.

From the consideration above, it is easy to understand conjecturally how the urban tissue was formed during the time and how much the street pattern is linked with the city's structure. The city's reading is based on understanding the street pattern from a theoretical perspective. However, the practical use of the maps to understand the urban transition raises some questions about the representation of stratification that the Italian morphological school is analysing through comparison of different phases.

To identify how the street declines the city's reading inside the map, attention is paid to two research studies from the Italian urban morphology study tradition. The work on Venice by Saverio Muratori collected in his book "Studi per una operante storia urbana"[16] (1959), and the one on Como by Gianfranco Caniggia collected in "Studi per una città: Como"[17] (1963). The reason why of the two case studies comes from its important role into the definition of a methodology to study the city. The research on the maps of Venice and Como starts from the necessity of improve the existing method through innovative tools able to ride the urban transition inside the city and provide a vision helpful for further transformation. The focus on the street of the maps of Venice and Como helps to define a tool based on recognising the city's permanence and structure without defining a rule of evolution. The street is an essential part of the city that changes slowly over time, which is helpful for comparing different phases. There is no settlement without a route, a precedent that generates it. On this consideration, the building fabric takes on precise characteristics: the modularity of the occupation of the street front, the thickness of the built-up area, and the orthogonality concerning the road axis.[18]

16 Muratori, Saverio. *Studi per un'operante storia urbana di Venezia.* Roma: Istituto Poligrafico dello Stato, 1959.

17 Caniggia, Gianfranco. *Lettura di una città: Como.* Roma: Centro Studi di Storia Urbanistica, 1963.

18 Caniggia Gianfranco. *Strutture dello spazio antropico. Studi e Note.* Firenze: Uniedit, pp.69, 1976.

The question arises from the confrontation of two different case studies that define the street as a critical element of the city's structure. From the analysis of the two maps, it is possible to see that if we give another kind of representation, we have another understanding of the city transition opening the field of design to multiple scenarios. The different systems of representation lead to a different interpretation of the city. The comparison considers the specific case study of Muratori in Venice (San Bartolomeo neighbourhood) and Caniggia in Como (sample of phase II, via Rovelli). The methodology used for the analyses is based on redrawing the phases of the transition maps, emphasising the representation of the street. Therefore, the reading process is based on understanding the different sources (maps and text), secondly, on the interpretation of the single element related to the entire system.

First, the maps is been decomposed in the single phases defined by its author, than, for each phases are defined the microphases: the small transformation that occur during the time span emphasising the structure of the street. The highlighting of the street pattern helps to understand how much the relation between street and building shape the understanding of the transformation. Moreover, one of the focal point is to highlight the street in the representation of the new medium as new interpretation of the structure of the urban tissue.

Venice. San Bartolomeo (Saverio Muratori)

The map of Venice realised in 1959 is made by drawing the transformation of the urban tissue by layer in time. In the specific case of San Bartolomeo, it was possible to analyse the maps representing the four phases of the Venetian expansion:

Phase I. The 11th and 12th centuries comprised the parish construction phase and the late Byzantine expansion.

Phase II. During the 13th and 14th centuries, the late Byzantine settlements were consolidated, and expansions were set up in the island's northern part.

Phase III. In the 18th century, the mediaeval buildings were replaced by masonry structures identified on the map with white backgrounds.

Phase IV. It is the current phase. There have been few changes since phase III, mainly concerned with the representative buildings and the

Fig.1 – Redrawing of San Bartolomio by Saverio Muratori – Studi per un'operante storia urbana (personal rielaboration): Rossella Gugliotta 2022.

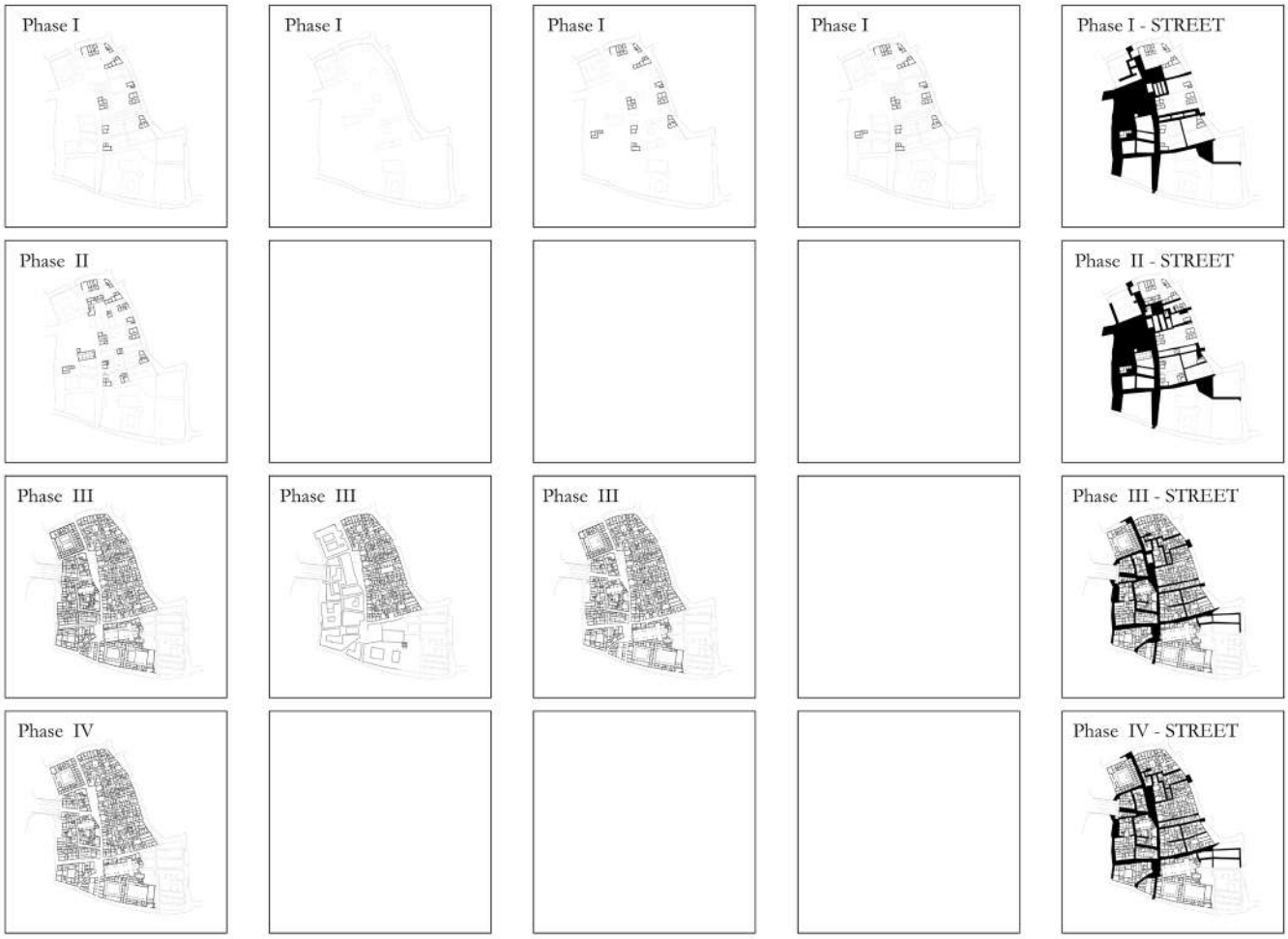

Fig.2 – Decomposition into part of San Bartolomio maps with a focus on street pattern - Studi per un'operante storia urbana (personal rielaboration): Rossella Gugliotta 2022)

connections with the other islands. (Fig.01).

The map shows the ground floors with information from cadastral maps and field surveys. In the first redrawing phase, it is essential to recognise the symbology used by the map and define, through hypotheses, the micro-phases of transformations that each map contains. In fact, because of the dilated time of each map, it is possible to identify small expansions within the individual phases above listed. The aim is to bring the information together in a representation system that considers exploring the time component and allows the information to be displayed simultaneously, thus avoiding graphic approximations and limiting the subjective interpretation of the map.

In this case, by decomposing the maps into more micro-phases, it is possible to see how the street is represented as a space resulting from the construction of the buildings. The comparison between the existing tissue and the new one is also not made on the street path but directly on the relation between closed and open space. In fact, on the map of San Bartolomeo, there is no trace of the street as a single element of the urban tissue. Moreover, it is recognised as the space that intercurred between the buildings. Therefore, despite not being highlighted in the original maps, the street can be understood as an essential element for defining the urban structure and its change. The structure of the urban tissue (the permanence) is not wholly defined in the original maps, but it is understandable. Recognising the street as a structure and highlighting its pattern are the results of reading and understanding the maps of San Bartolomeo (Fig.02).

Como. Sample of Via Rovelli (Gianfranco Caniggia)

The map of Como drawn up for Caniggia's study at the beginning of the 1960s is presented as a succession of layers that make up the expansions of the city. The study of the Roman camp defines the period analysed by Caniggia. In turn, it is divided into five phases of expansion:

Phase I. Roman settlement or Castrum Marcello phase.

Phase II. Roman settlement or phase of the Castrum of Cn. Pompeo or colony of C. Scipione.

Phase III. Novum Comum.

Phase IV. Polarisation towards the lake or imperial complexes.

Phase V. Early medieval belt.

A cartographic analysis is carried out, which always relates the reconstruction of the Roman Castrum to the present-day fabric (of 1963) to understand and read the permanence within the urban fabric. Moreover, in Caniggia's construction method for each phase are taken some samples on a smaller scale to explain the relation of the past structure of the Domus with the courtyard house of nowadays Como (Fig.03).

The importance of the street is fundamental to understanding how the urban pattern has been modified from the roman castrum to nowadays. From this, it can be seen that permanence (structures and streets) can be recognised on a building scale. The analysis of Como aims to identify the variations between one arrangement and the next one. In the redrawing, this feature is emphasised. The maps are constructed by identifying the last plan (the present one), relating it immediately to the first phase, and then moving towards the subsequent growth. Unlike Muratori, who proceeds backwards by subtraction, Como's map is generated by adding transformation parts.

For Caniggia, the map is primarily based on structure. For this reason, the plan for the current situation is made by defining street patterns. How the streets overlap with the roman reconstruction and generate relationships can explain how the city changes. The streets in this specific representation method are the map's structure, the representations structures, the city's structure, and the transition phenomenon structure.

Proceeding with Como with the same decomposition of Muratori maps in micro-phases, it is possible to recognise the importance of the street as the first layer to conjecture on urban transformation (Fig.04).

Different representations for a different understanding

The analysis conducted in this research considers the city as an interconnected system of space[19] representing the urban structure. Both Muratori and Caniggia defined the city made by a structured object

19 Marcus, Lars. "The emergence of second form: the urgent need for the advancement of morphology in architecture". In *The morphology of urban landascape. History Analysis Design*, edited by Andri Gerber, Regula Iseli, Sefan Kurath, Urs Primas, pp.77-86. Berlin: Reimaer, 2021.

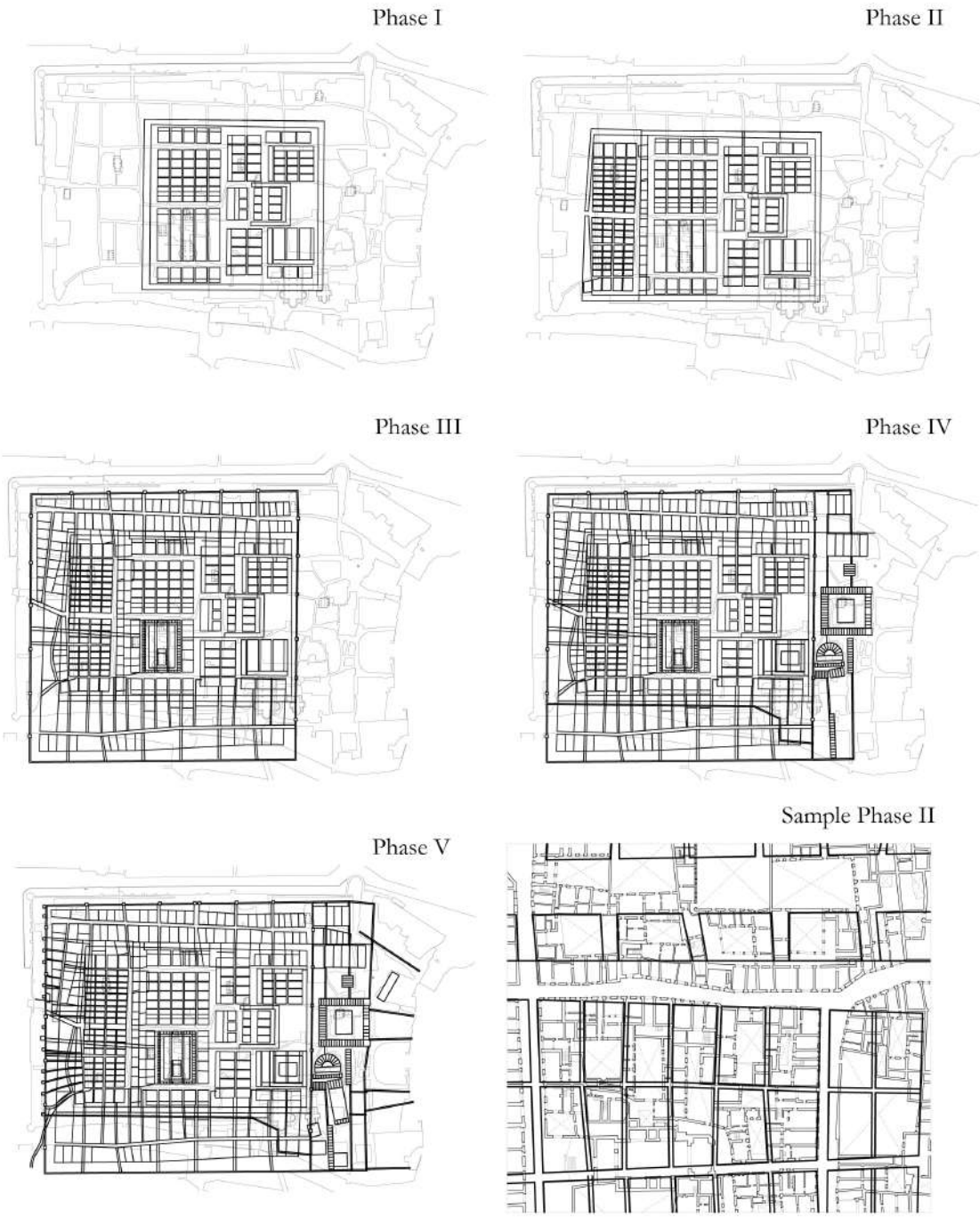

Fig.3 – Redrawing of Como and via Rovelli (sample II) by Gianfranco Caniggia – Studi di una città. Como (personal rielaboration): Rosella Gugliotta 2022)

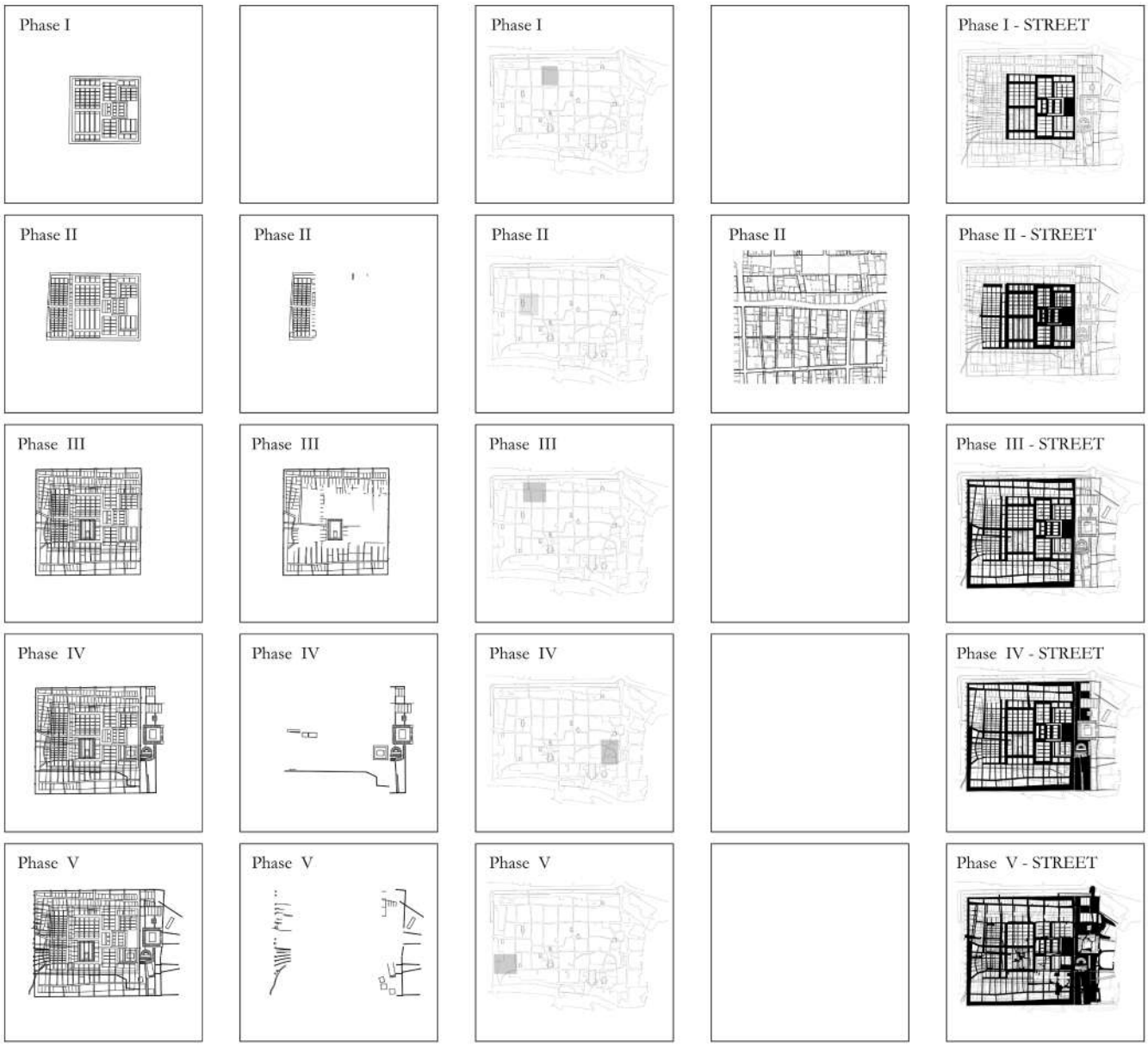

Fig.4 – Decomposition into part of Como maps with a focus on street pattern - Studi di una città. Como (personal rielaboration): Rossella Gugliotta 2022)

defined by the street. However, only Caniggia stresses the concept of the representation of the road inside the maps of comparison of different phases of transition. The importance of the street allowed Caniggia to reconstruct the city patterns and to understand the relation between the development of the street network and the overlapping of different stages. Instead, in the map of Muratori, it is more difficult to understand the structure of San Bartolomeo because the streets are not drawn but are shown in contraposition with the built area.

That is one of the points that can open up some new questions on the layer of representation of the city.

The map is a powerful instrument to define the city's structure. Nevertheless, it is necessary to redefine a system of representation that brings the street as a hidden layer into a more complex and complete representation of the new reality. Considering these two case studies that have been previously analysed, it is possible to define some variables of the map that show how the representation of the dynamicity can be reshaped and represented through a diagrammatic process.

The analysis brought the decomposition of various maps into parts. However, it is necessary to recompose them by developing instruments that consider the street as an element showing the structure and the city's permanence. The starting point of the new output is considering the method of representation of the two case studies. From the street, as an element shown in the maps is possible to stress how another representation method can lead to different understandings. In this process, the diagram enters the process of analysis, showing the street's function as the space's structure. In the first case of Muratori, the street is just what is not building; in Caniggia, the street represented in the maps defines the formal structure of the urban tissue. Testing the cases studies into a diagram is possible to declare the function of the street in identifying the structure and as a generative element composing the variable of permutation of the city. As much as there is a tendency to decompose the city into parts is not possible to define a single element. However, the general overview of the system brings knowledge about the city.

It is possible to represent the city differently highlighting the street pattern as a permanent element inside the city, and as information

about its transition. The diagram does not aim to show a specific representation. Its construction is made by decomposing the micro-phases in the zone of transformation where the main change occurs. Then each transformation zone is related with two axes: scale and time. For each part of the city, it is possible to recognise the relation between the scale of transformation, time and other parts of the city. In the output of the diagram, there are two rows, one of permanence and one of permutation. In the row of permanence, it is possible to recognise the structure of the street. In the row of permutations, it is possible to define which changes in street configuration also define a change in the urban tissue. Defining the street of San Bartolomeo as a specific element in recognition of its permanence put a new accent on the element previously hidden on the map (Fig.05).

Conclusion

For contemporary cities, time becomes indeterminate: a time that can no longer be contained within pre-established movements.[20] The built environment (as well as the street) becomes a pattern in time; therefore the idea that the urban system is explained in static terms becomes limitation. In its transformations, the system is challenged. The composition of the different elements of the city is always something different from the sum of the parts. The dynamic element takes on such importance that it is not enough to study the city from a single point of view. However, it is necessary to analyse transformation causes by undertaking diachronic and synchronic investigations. This subdivision opens up the need for a multi-scalar and multi-dimensional approach to understanding transition by questioning the value of the tools used to represent and visualise it in its dynamism.

Paul Virgilio has pointed out that the representation of the contemporary city is no longer determined by the definition of monumentality nor by the succession of streets and avenues. Moreover, from now on, architecture must deal with the advent of technological space-time. [21]

Abstraction is placed by different degrees of interpretation and read-

20 Rajchman, John. *Construction*. Massachusetts: MIT, 2000.
21 Allen, Stan. *Practice. Architecrue, technique + representation*. New York: Routledge, 2009.

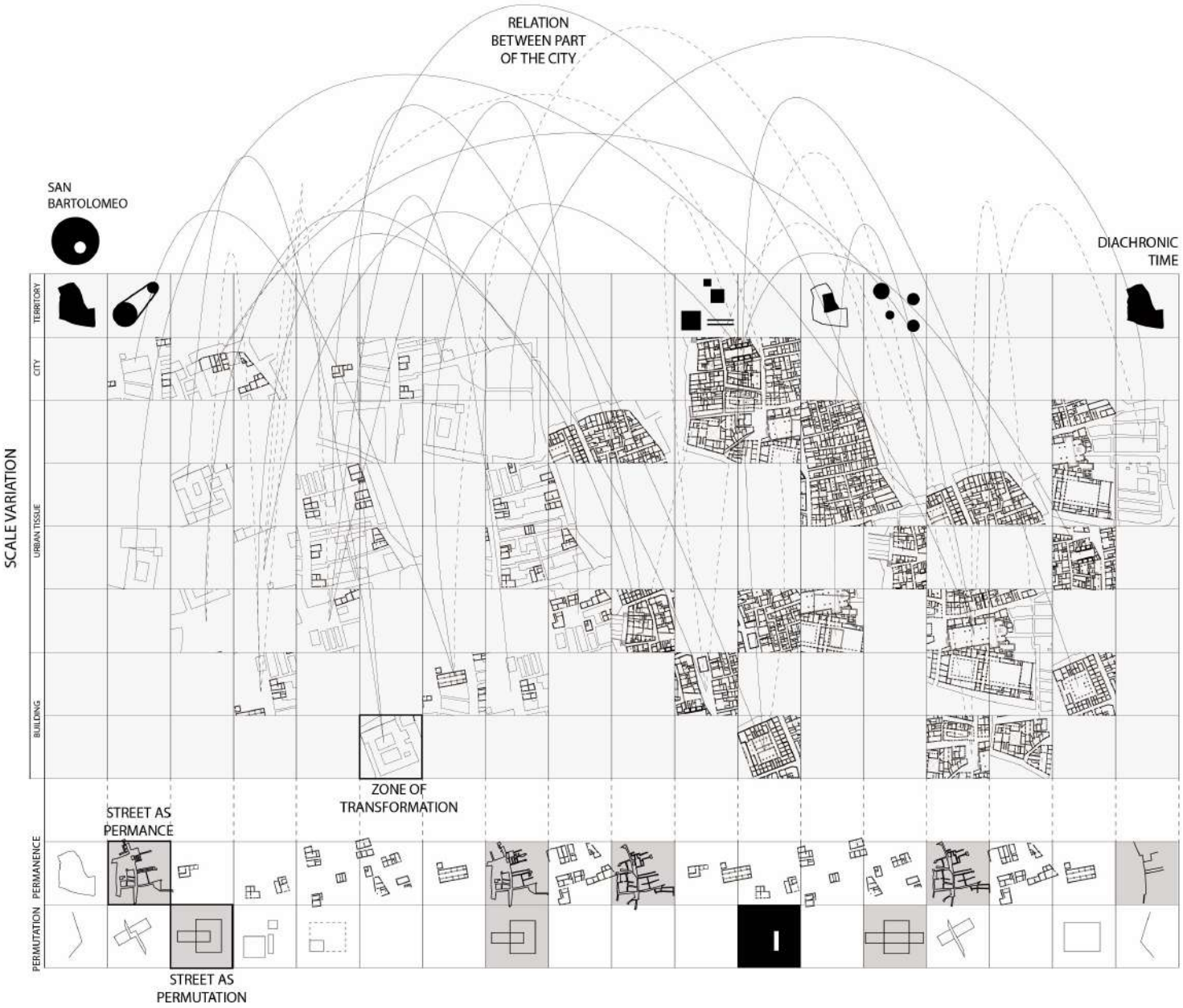

Fig.5 – Diagram representation of San Bartolomio with emphasis on the street as structure - Rossella Gugliotta 2022)

ing of the phenomenon. The street can be included as a layer for reading the transition because it reveals the changes in the city and not only its structure and fixed element. The streets in both Caniggia and Muratori's examples represent a specific city structure capable of bringing out permutations. However, in developing a possible tool to read the transition as a sum of permanence and permutations, the street can show not only the city structure but also the relation between the fixed part of the transformation and the changing one. Nevertheless, the street is just a part of the complexity of the city that needs to be defined for its purpose: to reconstruct the spatial structure and define the limits of change in the urban pattern. Different interpretations of the street representation can lead to overcoming the concept of structure as a fixed element in time and embracing the possibility of identifying the change and generating permutation with the project.

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