

Prolegomena to a theoretical course in urban morphology based upon the relationships between the shape of the city and the shape of the map

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Since the beginning of the third millennium, the rapid changes that contemporary societies are facing are radically transforming the perception and the structures of our cities. New topics seem to dictate the political agenda, suggesting alternative options to manage the emerging urban mutations.

An increasingly "data driven society" is forcing the migration into an almost immaterial world, prompting Information and Communication Technology together with the Smart City.

The crisis of the traditional real estate industry, propelled by the global finance system, is contributing to re-evaluate the theme of Public Space as a "space of encounter, sharing, experience and inclusivity", mapping the everyday life to discover unexpected Urbanities, through the application of innovative strategies and tools.

As an immediate consequence, new "forms" of cities are strongly brought to our attention: the "city of sharing", the "city of temporariness", the "city of Life between buildings", giving an unexpected impulse to incremental Urbanism of evolving cities.

In such a way, the very idea of the city is radically under discussion. We are then required to answer these numerous questions in order to define the scientific coordinates for the City of the 21st century.

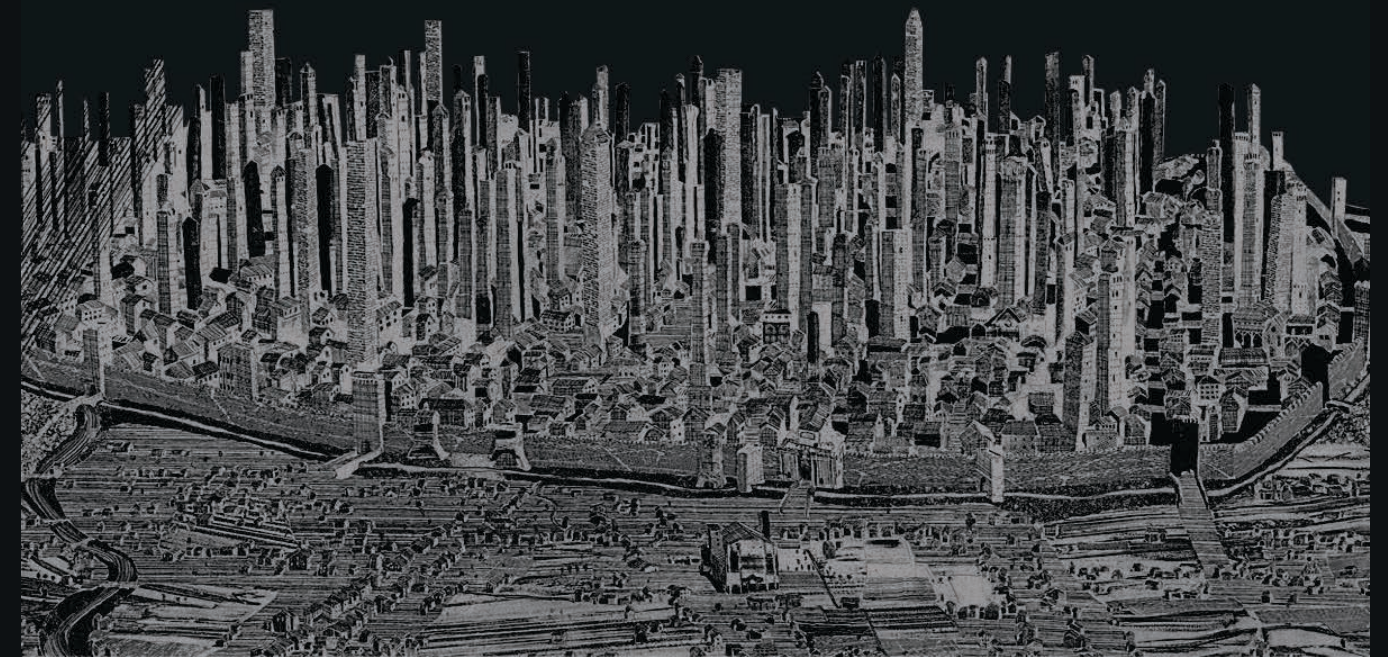
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Marco Maretto, Nicola Marzot, Annarita Ferrante



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MORPHOLOGY AND URBAN DESIGN

new strategies for a changing society

PROCEEDINGS

edited by

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with the collaboration of

Silvia Tagliazucchi, Francesco Scattino, Greta Pitanti

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Contents

Organization	9.
Presentation	13.
Foreword	17.
Plenary Sessions	22.
Conference Themes	59.
Index	60.

Organization

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Sixth ISUfItaly Conference Presentation

We open today the sixth conference organized by the Isufitaly Association, the Italian network of the International Seminar on Urban Form that we founded 38 years ago with the contribution of the English school of geographers which followed the scientific tradition of the researches of M.R.G Conzen (which had, in turn, roots in the tradition of German cultural geography) and the school of Italian architects referred to the studies of Gianfranco Caniggia and Saverio Muratori, with its roots in the studies on urban form conducted between the wars by innovators such as Gustavo Giovannoni, Arnaldo Foschini, Giovan Battista Milani.

From the beginning it seemed clear to all of us how useful the disciplinary differences and how fertile integration between the two groups were.

Geography is a fundamentally descriptive discipline. However, it was interpreted by the Conzenian school with great attention to the shape of the city, and after all the Muratorian school considered reading, in turn, intended as a critical study of the built reality, an integral part of the architectural design itself. Indeed it considered the very form of the territory as architecture. This explains why our Association, made up mainly of architects, had the project as the central object of our studies.

Isufitaly was founded much later, in March 2007, with the aim of promoting above all those studies in urban morphology having the architectural design as their goal.

In these sixteen years, during which I had the honour of being its president, the Association has grown a lot, gaining a significant role in the context of urban morphology scholars.

I think a good job has been done, despite few inevitable mistakes. Above all we remained consistently in our cultural area of interests, within the sphere of what can be rationally verifiable and didactically transmittable. This in a cultural context in which the disciplinary boundaries of the architectural design seemed increasingly uncertain. Today each of us knows well that beyond those boundaries other important questions arise, of different nature, linked to languages and meanings, to new investigation techniques, to perception and to the artistic component of our work. But we also know that it is crucial to preserve and develop in contemporary terms a nucleus of knowledge and methods which allows any aesthetic synthesis to be based on sharable foundations, as required by the civil responsibility of our work.

In this spirit, since its foundation, the Association has organized conferences and communicated its activities. As president, I have also considered vital the parallel activities in which the members of Isufitaly participate, such as the organization of meetings, university courses and publications.

It seems to me that, over time, even in these specific activities, our Association has earned the esteem of similar organizations which, in the wake of Isufitaly, have been founded all over the world.

It would take too long just to list the activities carried out by all of us in these years.

I will only mention the two most recent, linked to each other, which, I believe, have had particular success and international echo. The first arises from the idea of transforming Isufitaly, from a structure that only plays an aggregative role and disseminates the themes of urban morphology, into an active subject, which carries out research and manages its organization. The occasion was the Kaebup project, (Knowledge Alliance for Evidence-Based Urban Practices) coordinated by Nadia Karalambous of the University of Cyprus with the aim of studying the relationship between urban morphology and design. Unlike the other participating academic partners, who reorganized the research within the university structures, I chose to involve Isufitaly which was supposed to represent, symmetrically to other departments, the Italian referent in research management. It should have been a first experiment: other members could have brought other projects and funding, contributing, while their autonomy would be respected, to strengthening the scientific credibility of the Association.

As part of the research, some of us organized the ISSUM, International Summer School in Urban Morphology, which we will discuss in a future session in this conference. I think it could be a useful experiment not only for Isufitaly but also for all the Isuf regional networks and could have interesting developments.

As president of Isufitaly let me therefore say that the outgoing Isufitaly Board has not only taken care of the administrative aspect of the Association, but of an organic structural project that includes communication (conventions, conferences, website) research (participation in financed projects) and, finally, teaching (with the Summer School).

Let me also make a brief consideration on the future of Isufitaly.

As it should be, within Isufitaly the interests of each of us, our beliefs, even our own values, have differentiated, and are increasingly differentiating, over time. The reasons are several (scientific, professional, academic) and all valid, but we must not hide the fact that, for this reason, we are going through a phase of crisis completely new in the story of our common work.

Change, however, is the salt of any structure aimed at experimentation. If it is likely that this condition leads to difficulties in organizing common work, also implying a risk of losing our identity, it is also true that the differences that have arisen could constitute, if well used, not a reason for division, but a resource. And since I consider that my duty, under the new conditions, has been exhausted, I believe that whoever will take my place, will have to place this consideration at the centre of future projects.

A mention to the specificity of this conference.

This sixth Isufitaly meeting has a particular character for several reasons, all linked to the fact that it takes place in Bologna. For the

first time it is not organized within an architecture faculty but an engineering one, opening up, in my opinion, a new field of interests for Isufitaly. I recall that the Bologna Faculty of Engineering boasts an illustrious tradition in the field of urban studies, and that a well-known representative of it, Adolfo Dell'Acqua, participated in our first conferences proposing important reflections on the integration between morphology and design. This tradition continues today, in contemporary terms, with the work of Annarita Ferrante (co-chair of this conference) on the existing building heritage.

Bologna was also the seat of some of the most interesting urban experiments in Italy.

I recall, among others, the innovative ideas of Pier Luigi Cervellati on the function of the historic centre organically understood in the context of the entire urban and territorial organism.

Furthermore, Bologna has a particular interest for us as well for the tradition of studies and experiments on the relationship between governance and the city development process. Not surprisingly, the city has had, over time, administrations that have sometimes been an example of a virtuous management in the transformations of the building fabric.

For this reason, some of the central themes of the conference are precisely the problems of urban policy, governance, urban communities and public space as a laboratory for transformation.

Another relevant theme is that of the renewal of the analysis and design tools of the urban space, the study of new technologies dedicated to new environmental strategies.

Of course, ample space will be given to traditional themes of our conferences such as the reading and design of the existing city integrated with the ever-current theme of urban regeneration, I believe that the organizers of the conference and their collaborators have done a generous and intelligent job. I thank them all on behalf the Board of the Association and I wish everyone a good job for the next few days.

*Giuseppe Strappa
President of ISUFITALY*

Foreword

Since the beginning of the third millennium, the rapid changes that contemporary societies are facing are radically transforming the perception and the structures of our cities. New topics seem to dictate the political agenda, suggesting alternative options to manage the emerging urban mutations.

An increasingly "data-driven society" is forcing the migration into an almost immaterial world, prompting Information and Communication Technology together with the Smart City .

The crisis of the traditional real estate industry, propelled by the global finance system, is contributing to a renewed consideration of the Public Space as a "space of encounter, sharing, experience and inclusivity", mapping the everyday life to discover unexpected urbanities , through the application of GPS to record pedestrian movement flows.

Most of the deficiencies in the governance methods are addressing us with new social, economic, cultural roles, inviting human beings to perform as strategic Agents of Change. As an immediate consequence, new "forms" of cities are strongly brought to our attention: the "city of sharing", the "city of temporariness", the "city of Life between buildings ", giving an unexpected impulse to the so-called incremental Urbanism processes.

In such a way, the very idea of the city is radically under discussion. We are then required to answer these numerous questions in order to define the scientific coordinates for the city of the 21st century. In that respect, the conference has been calling experts in the field of Urban Studies in order to reflect upon the following main topic:

1. Communities and Governance

The role of Communities and Neighborhoods, conceptually framed within urban policies based on new participatory concepts, sustainable oriented principles and supported by the idea of "proximity" and multi-layer strategies of land management, are one of the test beds of new approaches in Urban Morphology.

Research approaches, as well as design strategies, must be able to read these phenomena, to understand them and translate them into tools for supporting decision makers, stakeholders, citizens, in the transformation process of the city.

2. New methods and Technologies for the urban analysis

The society of the 21st century, being "data-driven", will be highly technological. Urban Morphology should be able to deal with these issues and learn to play an active role in their development, so as to consist in a mediation tool between environmental strategies and the city. It should also experiment with new technological means by developing new analytical methodologies capable of grasping the ongoing transformations.

3. Reading the changing Urban Form

A Classic in Urban Morphology, urban analyzes and the theories underlying them constitute its very foundations, the greatest legacy, of the International Seminar on Urban Form. A legacy that must be fed and implemented in new research and new studies, demonstrating the capacity to deal with the new emerging challenges of evolving cities. If unsuccessful, in that respect, the meaning of the urban morphological discipline will be lost.

4. Designing the sustainable Urban Form

Urban Morphology is also the basis for Urban Design. The city of the 21st century has to be sustainable, to react the ever-changing conditions of existence. The complexity of urban phenomena requires, therefore, a scientific awareness capable of catalyzing different disciplines and expertise, different needs, different themes, within the urban fabrics. Fabrics that will, in turn, be an expression of this complexity, giving "form" to it.

Under those circumstances, Urban Morphology can claim again a disciplinary status.

It is not simply a matter of broadening the disciplinary horizon of Urban Morphology. It is a question of defining a new theoretical and methodological framework, a new "horizon of meaning", and new analytical tools, to understand the complexity of the city's transformation processes. In other words, it is a matter of building a renewed morphological discipline able of intercepting the needs of the globalized society and translate them into physical forms.

*Marco Maretto, Nicola Marzot and Annarita Ferrante
Conference Chairs*

Conference Themes

C | *Communities and Governance*

N | *New Methods & Technologies for the Urban Analysis*

R | *Reading the Changing Urban Form*

D | *Design a Sustainable Urban Form*

UD | *Reading U+D Prize*

Communities and Governance

- 68 Type, rule and exception.
Michela Barosio, Martina Crapolicchio
- 80 Città Giardino Aniene. A persistent experience of quality in urban design.
Michele Bianchi, Elena Ogliani
- 92 Ethics, Resilience and Legacy. Some observations on the concept of territory defined by Saverio Muratori.
Pina Giusi Ciotoli
- 102 The definition of borders as a possibility to shape the open space of the city.
Ermelinda di Chiara
- 112 Mapping a genealogy of the in-between the buildings starting from post-war CIAM reflections.
Elena Giaccone
- 124 In)forms of empowerment. The role of the project in inclusive urban transformation processes.
Santiago Gomes
- 136 The concept of "Venustas" in the current design practices.
Andrea Guidotti
- 146 Self-organized peripheries in Mediterranean cities. Examples from Rome and Jerusalem.
Munir Khader, Giovanni Fusco
- 160 Notes for a morphological critique of the notion of territory: The 'archipelago' as a paradigm of the contemporary urban condition.
Nicola Marzot
- 174 São Paulo - the changing city.
Solange Moura Lima de Aragão
- 180 Urban morphology in urbanism: towards a more holistic paradigm.
Lucia Nucci
- 186 Bologna and the Porticoes, the form of a shared space.
Valentina Orioli
- 192 Tourism as impulse of urban and social transformation - Local frames of a global phenomenon.
Christina Papadopoulou
- 198 The School as the City: Rewriting and Collaging an Urban Morphology. Vimercate Schools Campus' Design.
Laura Anna Pezzetti, Helen Khanamiryan

- 212 A strategic-multidisciplinary approach to reduce the seismic risk. Ongoing activities within the Adriseismic project.
Giorgia Predari, Lorenzo Stefanini, Angela Santangelo, Giulia Marzani
- 224 CONF.I.A.N.Ç.A. | a moment of stillness, self-reflection and connection in the ever-moving reality of modern societies.
Vicky Simitopoulou
- 234 Smart Façades for resilient cities.
Ilaria Spasari
- 242 From urban morphology to collective intelligence: co-designing public walks for a new neighborhood narrative.
Silvia Tagliazucchi
- 254 Architects' roles in community regeneration with 'Residents Deep Participation'.
Han Wang, Li Bao

New Methods & Technologies for the Urban Analysis

- 264 Exploring how Amman's Abdali redevelopment project is considered state-led gentrification through text mining techniques.
Ruba Alomary, Javis Ebu Otia
- 278 The new form of the old city. The case of les Halles, urban reasons and project's choices.
Claudia Angarano
- 290 GIS-based procedure for urban fabrics characterisation. The case study of Bologna.
Anna Chiara Benedetti, Carlo Costantino, Riccardo Gulli
- 304 Overwrite the real.
Alessandro Gaiani
- 314 METYS: METropolitan CarTographyY for Sustainability. Modeling Metropolitan Landscapes through maps for Urban-Rural Morphotypes Projects.
Valentina Galiulo, Antonella Contin
- 324 Climatic Performance of urban texture: public spaces in Venice Fabric.
Barbara Gherri, Marco Maretto, Daniela Maiullari, Chiara Finizza, Alice Monacelli
- 334 Reading morphology through diagrams. Exploring methodology.
Rossella Gugliotta

- 344 Typological process of the historical courtyard houses in Yazd, Iran.
Nahal Khorrami, Alessandro Camiz, Alessandra de Cesaris
- 360 Morphogenetics of small size towns. The analysis of urban fringes in internal Ligurian centers.
Giampiero Lombardini
- 372 Parametric analysis of urban form, from geometrical to topological.
Luca Maricchiolo
- 386 Parametric Architecture and Operational Research: an attempt to apply Luigi Moretti's theory on today's urban design analysis.
Martina Meulli
- 392 Learning from Monasteries. New Collective Spaces for Naples Ancient City
Salvatore Pesarino, Ferruccio Izzo, Luigiemanuele Amabile, Lorenzo Giordano
- 402 New methods and Technologies in Urban Analysis: How Dynamic Morphology influences the transformation of Public Space.
Greta Pitanti, Marco Mareto
- 412 A Systematic Approach to Urban Block: Defining Automatic Tool for Urban Form.
Didem Turk
- 422 The role of the urban project in the transition from city to smart city. Case studies in Umbria.
Paolo Verducci, Valerio Palini
- 430 Exploring the evolution process of the urban form model of Xiaoxihu Block in Nanjing from the perspective of topological networks.
Xiao Xiao, Zidong Liu

Reading the Changing Urban Form

- 440 Street space as contact space; a comparative analysis of street regeneration projects between Rome and Barcelona.
Francesca Ambrosio, Sophia Arbara
- 454 Mapping Time. Structures for the Imagination.
Lamberto Amistadi
- 464 Reading the changing Urban Form of Siberian Cities.
Daria Aleksandrovna Belova

- 476 The formation process the Regio quartadecima Constantinopolitana. Relocating Constantine's walls.
Alessandro Camiz
- 486 Novi sed antiqui methods and techniques for urban analysis and project. Knowledge and design for the Vkhutemas museum in Moscow.
Renato Capozzi, Federica Visconti
- 496 The typology of the "Sandal Bedestan" in the Grand Bazaar, Istanbul.
Irem Ezgi Çiftçi, Alessandro Camiz
- 508 The dissent city's urban form.
Maria Fierro
- 520 Programmatic and paradigmatic components. Iconology in the relationship between Architecture and Urban Morphology.
Tommaso Lolli
- 530 Reading the ancient city: projects for the archaeological area of Tyndaris. The form of the nature, the form of the city, the value of the monument.
Oreste Lubrano
- 542 A lesson about the form. Dissonances and complementarities in Luisa Anversa Ferretti's and Giuseppe Samonà's projects for the extension of the University of Cagliari.
Andrea Manca, Giovanni Battista Cocco
- 550 Alternative models for city-density: the city built on itself.
Elisa Maruelli
- 558 The built form and urban morphology in the historic city of Korça, Albania.
Ledita Mezini, Jona Muçollari
- 570 Historical urban renewal as a preface to current city changes. The case of Ciutat Vella, Valencia.
César Damián Mifsut García
- 578 Reading the urban form through the green-grey armature as a tool for spatial regeneration: the case of Piacenza.
Federico Mistò, Carles Crosas Armengol, Antonella Contin, Julián Galindo González
- 590 The concept of porosity in the Japanese reality.
Alice Monacelli, Marco Maretto
- 600 Mapping the evolution of urban form in Tirana
Jonila Prifti
- 610 In-formal settlements: recurrent patterns and permutations. Mapping the changing morphology of informal settlements.
Ana Ricchiardi

- 624 Diachronic urban morphology: The formation process of Ait Ben Haddou, Morocco.
Imane Saidi, Alessandro Camiz
- 636 Character and applications of Historical Judgement in architectural and urban design.
Francesco Scattino, Marco Maretto
- 644 The Trullo dwelling type in historical core of Alberobello. Survey on relationship between urban morphology and building typology.
Raffaele Tarallo
- 654 The urban morphology of cities in the future: Évora and Setúbal – Portugal.
Maria Céu Simões Tereno, Manuela Justino Tomé, Maria Filomena Mourato Monteiro
- 666 Architecture and culture in cities with a gender perspective. Complex evaluation from antiquity to the present.
Maria Guadalupe Valiñas Varela
- 678 The city of the dead: an in-vitro city. Rethinking Liège starting from cemeteries.
Giovangiuseppe Vannelli, Marc Goossens
- 692 Drawing as a multidisciplinary tool. A semantic experimentation in Venice.
Chiara Vernizzi, Chiara Finizza
- 702 Three flyovers in the city of Lisbon.
Pablo Villalonga Munar

Design a Sustainable Urban Form

- 712 Piazza dei Cinquecento Alberi. Interweaving Uses and Spaces for Rome's Central Station.
Luigiemanuele Amabile, Marianna Ascolese, Alberto Calderoni, Vanna Cestarello
- 722 Patterns of Intention Project hypothesis for San Siro district, Milan.
Francesca Belloni, Francesco Bruno
- 736 A modern and ancient way of making a square.
Nicola Campanile
- 748 Urban regeneration. From the edge of the city walls to the proposal for a square at Porta Maggiore in Rome.
Paolo Carlotti

- 758 The city between nature and artifice. Space and form of Prague river's settlements.
Domenico Chizzoniti, Yuliia Batkova
- 768 Urban morphology and anthropogenic heat flux. Case studies in Barcelona.
Helena Coch, Agnese Salvati, Antonio Isalgue
- 778 Saverio Muratori. Architecture and reality.
Francesca Delia De Rosa
- 786 Salerno in the making: sustainable urban regeneration proposals for the disused railway area of ex scalo merci.
Felice De Silva
- 798 A sustainable and social-orientated re-shaping of the urban building blocks.
Annarita Ferrante, Rachele Corticelli, Cecilia Mazzoli
- 810 Cities and earth's shape
Luigi Franciosini
- 822 Searching for the sustainable "form" of the city.
Andrea Iacomoni
- 828 Before and Beyond adaptation. An integral review on local perspectives for morphological transformability.
Diego Reinaldo Moya, Diego Andrés Sepúlveda Carmona
- 840 Designing a sustainable urban landscape. Between urban and rural morphologies.
Giulia Annalinda Neglia
- 852 Urban Form Balance in Landscape's Folds.
Rita Occhiuto
- 864 New centralities in the widespread city
Camillo Orfeo
- 876 Continuing to Write in Small Historic Cores. A Design-Led Strategy for Meda's urban blight.
Laura Pezzetti, Helen Khanamiryan, Maria Giulia Atzeni
- 888 Recovering a lost identity. The ancient river village at the origin of Noventa Padovana.
Enrico Pietrogrande, Alessandro Dalla Caneva, Massimo Mucci
- 896 From Mastercampus to Mastertown: forms of a self-reflective urban community.
Carlo Quintelli

- 906 Formal / informal / syncretic. Towards a different notion of sustainable city.
Antonio Vito Riondino
- 918 Margins in contrast: the former Palomba quarry in Matera.
Giuseppe Francesco Rociola
- 930 Sustainable land reading.
Jlenia Ruggiero
- 944 Shaping the ecological transition: addressing technical strategies from a design point of view.
Kevin Santus
- 952 Prolegomena to a theoretical course in urban morphology based upon the relationships between the shape of the city and the shape of the map.
Marco Trisciuglio
- 964 Morphology, Morphogenesis, Metamorphosis. The need of a lexicon.
Marco Trisciuglio, Federico Vercellone

Reading U+D Prize

- 972 Piecemeal Planning. Survey on San Gimignano.
Marco Marino
- 978 Architecture, urban form and landscape: the work of Bruno Violi in Bogotá.
Serena Orlandi
- 990 The city of macroisolato. A tool per the urban regeneration project of the medium-size city.
Giuseppe Verterame

Prolegomena to a theoretical course in urban morphology based upon the relationships between the shape of the city and the shape of the map

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Abstract. *The aim of the paper is describing the contents (and the critical approach) of a theoretical course held in Spring Term 2022 between Politecnico di Torino (PhD Program in Architecture. History and Project) and Southeast University Nanjing (Master Program in Architecture). The course introduced the main open questions of urban morphology through 10 cities, 10 maps and the approaches of 10 scholars/designers/cartographers.*

The archaeological map of Pompei by William Bernard Clarke (1831/1840), in the comparison with the new topography of Rome by Giovanni Battista Nolli (1748), show the methodologic instruments of maps for studies on urban form. The map of Venice by Saverio Muratori (1959), the map of Como by Gianfranco Caniggia (1963) and the map of Torino by Augusto Cavallari Murat (1968), in their differences and at the same time in their deep relationship with the idea of urban dynamics in time, can be considered the main epistemological basis for Italian studies on urban morphology (whose excellent outcome can be represented by the plan of Palermo's historical center by Pier Luigi Cervellati in 1992). The Plan Voisin by Le Corbusier (1925) and the representation of Boston by Kevin Lynch (1960) represent two modern ways to look at the form of the cities, while the London portrayed by Space Syntax (2012) and the studies by Fumihiko Maki towards the possible morphologic map of Tokyo (1980-2018) introduce relevant topics (digital representation, the nature of Asian cities) in the contemporary debate about urban morphology.

The paper, written in the framework of the debate about the teaching urban morphology, will face the topic of collecting conceptual and functional tools able to help in describing the transitional changes in urban form.

Introduction

In the framework of the activities of the Joint Research Unit "Transitional Morphologies", established in 2018 between Southeast University in Nanjing and Politecnico di Torino, the course MORPHOLOGIES. The Form of Cities has been held for the first time in Spring Term 2022 by whom is writing this paper, together as PhD level course (in Italy) and as Master elective course (in China), in the context of educational programs in Architectural and Urban Design.

Each of the ten lectures was divided into three parts:

- a) in the first part, a city (Pompeii, Rome, Venice, Como, Torino, Palermo, Parigi, Boston, Londra, Tokyo) was described in its main morphologic features;
- b) in the second part a map of the city was introduced (together with the studies and the role of the scholar who traced it), trying to observe its capability to show the main characters of the settlement, but overall trying to describe the methodology that support the making of that specific map (and also its reproducibility for another similar case);
- c) in the third part attention was paid, to a specific topic related to the methodology adopted to trace the map.

This last point shows a sequence of questions, that all together are able to create the epistemological back-bone of the course:

1. What is an archaeological map?
2. Which can be the interplay among ground, figure and type in tracing a map?
3. May an "operating" urban history open to "transitional" projects?
4. May urban morphology become a Darwinian science based on evolution and analogies?
5. How can ground floor maps be transferred in conjectural diagrams?
6. Which can be the role of urban morphology in urban regeneration activities?
7. May new urban models be the starting point for new urban forms?
8. How is it possible to move from the connection Tectonics/Typology/Topography to the connection Uses/Perception/Behaves?
9. What can link, in the logic of urban form, physical walls and neural networks?
10. Are the Western maps able to describe Asian cities?

This paper will not answer specifically to those ten questions, because it has been written in the framework of the pedagogy of urban morphology, rather than in the epistemology of the same subject.

What will be described here is the long story underlying the development of the course, which for many of the students was the discovery of fascinating documents (such as urban cartographies in modern and contemporary history) and of the existence of a specific form of cities, while for others it was a useful reorganization of one's own skills and knowledge.

The conclusions will try to build a critical methodological and historical connection between the ten cities/maps that does not coincide with the diachronic sequence adopted during the ten lessons.

Ten lectures, ten cities, ten maps

The first map was the map of Pompeii, traced by William Barnard Clarke between 1831 and 1840, published under the superintendence of the Society for the Diffusion of Useful. It is an engraved hand colored map. It shows the ancient city of Pompeii, that was covered by ashes during the eruption of the Vesuvius in 79 A.D. and slowly rediscovered only from late 18th century. The map by Clarke shows a limited excavation of the city, from where Pompeii is coming out from the ground as a complex system of walls and streets. An important key, useful to understand the entire map, appears on the left half of the board: it is the type of the "domus"

(the Roman house) that allows archaeologists in reading what remains of the city. Watching this map, we can say that, since an archaeological map shows the ground floor of a city (all the other parts of buildings are destroyed), every map of the ground floors of a city is based on typologies and can be named as "typological map". A map of the ground floors of a city is an "archaeological map" of something that was not yet destroyed and it is a map that can tell a lot about the configuration of internal and external spaces of the city itself, connecting the space of the rooms and the space of the streets.

The second map was traced by Giovanni Battista Nolli as the giant New Topography of Rome (between 1736-1748) in 12 engraved boards (with the help of the three young drawers Carlo Nolli, Giovanni Battista Piranesi and Giuseppe Vasi). It is not an archaeological map, like the one of Pompei (engraved one century later): it is the first real map of a city. The blocks are drawn as shapes painted in black, while the main buildings (palaces, churches, temples) are represented through their ground floor (their typological basis). Thus, the map by Nolli describes the city through grounds (streets and urban spaces left, in white) and figures (what is built, in black), but overall typologies (of the main buildings).

The map of Venice traced by Saverio Muratori in 1959 is the third map considered within the course. It is not really a map, but a book, printed in 1959 and related to an impressive work of survey of the urban form of Venice. Another book, written by Paolo Maretto, Muratori's pupil, will later (1963) describe the specific typology of the Venetian house as the "cell" of the Venice urban "tissue".

The book by Muratori shows two maps (1/10000 and 1/4000) and above all some "critical surveys" on specific areas. The great novelty is that each of those zones are pictured in different phases of development (example: 11th, 14th, 16th, 18th century). That means that the book is the first work demonstrating the dynamics of urban form: urban form is never the same forever, but something always changing and a designer (as Muratori was) must understand those dynamics in order to preview the new orders for the future. The title of the Muratori's book ("for an operative -working- urban history of Venice") means that the aim of the book is not only describing, but creating the background for renovation/regeneration projects.

In Saverio Muratori there is the first "transitional" consideration of urban form. In his lectures, Muratori followed a sharper and sharper methods, whose are witnesses some great boards (the famous "Tabelloni"): topography, typology, tectonics are together the keywords useful to study urban morphology.

The fourth map is the one of Como, drawn and published by Gianfranco Caniggia. Also in this case, the map has been conceived as part of a book: Reading a city: Como (1963). The map is a deeply detailed map of the city of Como in a specific historical moment: the beginning of 19th century. Even if Caniggia was pupil of Muratori, even if he considered the book on Como in continuity with the two works by Muratori about Venice and Rome, even if Muratori and Caniggia are always quoted together as the two main Masters of the Italian Urban Morphology's Studies, the map of Como is totally different from the one of Venice. Caniggia doesn't really work on surveys (more on documents and old maps) checking analogies, Caniggia traces not a map of Como in 1963, but a historical map (beginning 19th century), Caniggia is not interested in generically describing the continuous transitional change of urban forms (as Muratori is), but in describing the Roman rules of Como, looking for traces of the Roman city that can have influenced the shape of the city of today, Caniggia at the end enters in detail, trying to explain the role of a wall, of a street, of an ancient public building, in determining the shape of urban objects of nowadays. Caniggia was for a scientific approach to urban form and it is evident that he was not only interested in archaeology, but also in biological evolution (Charles Darwin)

and in the role of analogy in improving comparisons and taxonomy.

The fifth map is the map of Torino, drawn and published by Augusto Cavallari Murat and his team at Politecnico di Torino in 1969. The map is not really a map, but a "box", that contains three books and one of those books contains three maps of the historical center of Torino in three different periods. The title of the entire work (translated here in English) is: *Urban Form and Architecture in Baroque Torino. From the classical premises to the neo-classical conclusions.* The map nr. 2 (1750-1800) can be considered the real Torino map by Cavallari Murat, while map nr. 1 is a more conjectural map of previous years and map nr. 3 is a later integration of map nr. 2. The most important novelty is the graphic solution: Cavallari Murat invented a new one to describe morphology based on in order to: describing elevation's elements (what the ground floors plan cannot do), describing something that is not sure, but just hypothetical and conjectural.

Even if he was professor of Architectural Design at Politecnico di Torino, he didn't give an "operative" role to his maps. He was more concerned on creating a National rule (UNI 7310/74 standard: conventions and symbols for the survey of historical urban fabrics) in a moment in which the design question of urban regeneration in Italian and European historical center was very urgent. Furthermore, adopting the idea of conjectural survey, he is continuously questioning documents and maps about the previous periods. The result is a series of map, maybe not so well defined like the ground floors map by Muratori and Caniggia but useful to make overlappings and understanding the transition of urban forms.

Cavallari Murat also describes urban morphology through diagrams, linked to the functional distribution in urban survey. It was for a long time something considered as totally abstract. Nowadays we know that it could be the basis for a logic and digital description of urban morphology (even investigating the question of topology and of machine learning as Space Syntax theories are doing nowadays).

The typological map of Palermo (sixth map of the series) was "designed" by Pier Luigi Cervellati as one of the attached boards in the new General Plan for Palermo (1989). It has been published (like it were a project!) in the Italian Architectural Journal "Domus" in May 1990. So, it was not made for analysis (neither an "operative" analysis), but for suggesting rules to design the regeneration of a historical center (40 years after the book by Muratori about Venice).

In fact, the result of the urban history of Palermo, at the end of 20th century, is a city with a rich but often forgotten historical center, totally in decay and with a great need to be restored and re-qualified. Cervellati is not Muratori or Caniggia or Cavallari Murat: he is not an urban analyst. He is an architect in charge to drive the regeneration processes in historical centers. He worked here together with other two urban planners: Leonardo Benevolo and Italo Insolera.

The PPE was approved in 1989 (already ten years before, in 1979, Giancarlo De Carlo and Giuseppe Samonà worked at a Program Plan for the historical center, an interesting idea to develop the internal paths, elaborated on a typological map). However, the typological map-based plan for the historical center shows some limits: the urban form is "frozen" in a map valid forever, like it were sculptured in marble. As a consequence, the plan is really conservative and suggests to make every time a deep survey, understanding clearly typologies and only after that organizing a restoration project. Pier Luigi Cervellati was much more operative in his city, Bologna, in 1969, when he was the Administrator of Urbanism activities and he studied a lot the question of historical centers and their renovation. But in Bologna he gave typological rule and never draw a typological map.

The seventh map (Plan Voisin for Paris) describes a demonstrative urban project and a provocative manifesto for the idea of "modern city" (in 1925) by Le Corbusier. The Plan Voisin

is well described in the first volume (1910-1929) of the Le Corbusier's Complete Work (a very precious series of 7+1 volumes). Mr. Voisin was and industrial businessman in the field of cars, the sponsor of the art and design journal *l'Esprit Nouveau*, founded by Le Corbusier with his friend, the painter Ozenfant. In 1925 they built in Paris an *Esprit Nouveau Pavillon* (a simple and modern villa, demonstrative of the modern ideas in architecture, design and art) and they exhibited a new urban plan for Paris as a tribute to the sponsor, Mr. Voisin.

The vol.1 of the Complete Work described this project in around 10 pages with some drawings and some pictures and also an essay, published in French, German and English, with the title "The Street": it is evident that the street is the main feature of the historical center and that it will be the main focus of the critics by Le Corbusier, who dreams a city governed by the mechanical transports and by wider and wider green areas.

The same vol.1 shows other interesting pictures, linked in some ways with the Plan Voisin: the *Esprit Nouveau Pavillon*, the plan for the city for three thousands inhabitants (an abstract city for no places, but it could be Paris), the sketches for the book *Vers une Architecture* (1925), with also, again, some references to Paris.

Le Corbusier uses some pages of the book *Concerning Town Planning* to say something about the history of Paris, its transitional way to continuously renovating (always its sketches are watching historical monuments and places of the city). He also uses some pages of another book, *Precisions on the Present State of Architecture and City Planning*, to express his idea about the modern city and the problems that it must face, giving some solutions, such as "destroying the corridor-street", where again Paris is the example.

In the Archive of Le Corbusier there are two maps of the Plan Voisin that can show his idea (and consideration) of the urban morphology of Paris. At the end, maybe the best representation of the Plan Voisin is the one with the overlapping of the cross shaped skyscrapers on the plan of the historical center: it is a way to suggest a new urban form, totally modern, for one of the most important European capitals of ever.

The map of Boston is the eighth map. It appears in the book *The Image of the City* (1960) by Kevin Lynch and represents a paradigm shift in the description of urban form: in a city it is possible (and necessary) not only mapping physical objects and spaces in their consistence, but also their perception by human beings (citizens and also visitors) in order to take care of their feelings in making urban projects. The morphology of Boston, read in a traditional way, shows a Main Street coming from the continent and reaching the center (where are churches and important public buildings), other streets connecting that core with the wharfs of the port, some park and an important role played by some hills.

In detail, the figure 3 of the book (and many other similar maps) gives an idea of the revolution operated by Lynch. In the late 1950s, back from a period of study in Italy, Kevin Lynch had started studying his town (Boston) with the help of his students and adopting an innovative method: taking and watching photographs, doing interviews with people walking in the city, mapping the perception of urban space (negative and positive) by hand made maps and some written reports: all these materials is now on-line, consultable on the MIT Lynch Archives.

To do this, Lynch lists five families of elements: paths, edges, districts, nodes, landmarks.

Effectively, the paradigm shift given by Kevin Lynch proposes the change of the sequence tectonics/typology/topography with a new sequence, made by the caring of uses/perception/behaves. These new concepts can be used to analyze urban forms and also to drive urban design processes. Kevin Lynch wrote his book in the same years when Muratori published his book on Venice. Maybe they show two different side of the same coin and an effort in keeping them together (instead of thinking to a hard opposition) can be fruitful.

Six theoretical "fruits" coming from the idea of the city by Lynch can be listed here:

1. the "townscape" described by walking in a city and sketching on sequences of photographs (Gordon Cullen);
 2. the reflections on the social uses of urban spaces (Jane Jacobs);
 3. the design practice driven by the idea of uses and behaves (Team Ten);
 4. the design practice with bottom-up participation (Giancarlo De Carlo);
 5. the potentiality of describing urban form through diagrams (Christopher Alexander);
 6. the suggestions given to design by the deeper consideration of human behaves (Jan Gehl).
- Thus, the urban design of the last 60 years owes to Kevin Lynch a lot, but the question still is: "does the map of Boston explain enough of the city of Boston?"

The ninth map (the one of London by Space Syntax) was used during the Opening Ceremony of 2012 Olympic Games in London as the floor for all the parts of the show at the Olympic Stadium, directed by the Danny Boyle. This "pop" use was a tribute to a way to describe the form of a city, which is considered innovative and the last outcome of urban studies devoted in mapping cities (for a research unit based in London, UK). The map of London was traced by Space Syntax upon an idea by Bill Hillier, Professor of Architecture and of Architectural and Urban Morphology in London (Bartlett School) and Founder and Director of the Space Syntax Laboratory at University College London. That complete London Map already appeared in 1996 in the book by Hillier, *Space is the Machine*, which theoretically completed the previous book, *The Social Logic of Space* (1984, with Julienne Hanson).

Hillier worked on the relationships between spaces and on the paths used by people to cross them.

In order to shortly describe the Space Syntax approach, it is possible to list some statements:

- a) cities are complexes of flows and networks;
- b) cities are the place where built environment and society meet each other;
- c) cities are made by spaces (buildings are there just to put space in order and organize hierarchies);
- d) "space syntax" is a series of theories and tool useful to describe the "syntactical" relationships (like in language) between spaces and buildings (as they were words);
- e) every open urban space can be described through a straight line (AXIS) and a point moving on it;
- f) a city described through the consideration of its open urban spaces can be described by an axial map;
- g) the axis of axial maps can be understood through "justified graphs", topological elements able to describe the different uses of the same architectural typologies (see famous schematic drawings by Hillier);
- h) the axis allows to measure "integration" and "choices": "integration" means the capability of a space to be strictly connected (or not) with another space, "choice" means the feature of a linear path to be more (or less) open to changes of direction;
- i) an axial map always shows a foreground network (main structures or infrastructures) and a background network (the dense and complex system of urban residential fabrics).

Finally, the map of London is an innovative map, made just by lines. There are more and more versions of the same map, also because in time Space Syntax developed more and more complex tools, useful to capture behaves of people and treatment of the urban spaces, at the same time for analyzing and designing parts of the cities (historical and contemporary ones). The road open by Kevin Lynch (an urban form is not made by tectonics, typology and topography, but by uses, perception, behaves) brought to an interesting result: it is possible to

describe some intangible features of cities in a logic way. A logic way is something that, in our digital era, can be told to a machine through topology, the specific geometry which investigates the logic of places. A logic way is something which can become part of mathematics. Nowadays a logic way is something that can be connected to the studies about "neural networks".

That means that, maybe one day, it will be possible to generate and organize urban space in an automatic way, using the same decision criteria adopted by human brain. The efforts by Michael Batty (from the same UCL) are towards this kind of goals.

In Asian Countries, for a lot of reasons, Space Syntax is getting nowadays a greater and greater interest. So, the last map is the map of Tokyo traced by Fumihiko Maki. Once again, the map is not a real map, but a book that has been written as a premise for a map (effectively never made). The book is by the famous architect Fumihiko Maki and his team, published in 1980 in Japanese. In 2018 was finally translated in English with the title *City with a hidden past*. It means that a city like Tokyo contains some important traces that we all, as urban designers, must know, even if they don't appear immediately, but only after a "critical interpretation of urban forms" (buildings and spaces).

The book tries to organize a systematic approach to the main morphological features of Tokyo facing in order: the overlapping of urban fabrics in past times, the relationship of the settlement with nature, the topography read in ancient maps, the several typologies of traditional residential buildings. There's not a map by Fumihiko Maki, but several drawings that can be useful to trace a map of Edo/Tokyo. So, the question is: is it possible to map a complex Asian city as Tokyo, adopting Western conceptual tools?

The answer is that not only this is possible, but adopting all what is possible to be learnt about the Western studies' tradition (in this course, for example) can be improved really a lot once it will be tested on an Asian city. The "Transitional Morphologies" Joint Research Unit has been established with this mission.

Conclusion

The sequence of the ten maps/lessons of the theoretical course in urban morphology based upon the relationships between the shape of the city and the shape of the map has been here described in a diachronic way. However, it is possible another kind of description, here simply traced in the conceptual map in figure 6. The core of the course is represented by the map of Venice by Saverio Muratori, whose direct precedent are the map of Rome by Nolli and the map of Pompeii (that both represent the archaeological background of Italian urban morphology). From the experience of Muratori, the map of Como by Gianfranco Caniggia (with its scientific approach to urban morphology) moves towards the "map/project" of Palermo by Pier Luigi Cervellati and also to the "project/map" by Le Corbusier (both design experiences based on different ideas of urban form). The map of Torino by Cavallari Murat, close in date and in hypothesis to the map by Muratori (even without a direct and openly declared link) is the first approach within the realm of graphs and diagram, where the map of Boston by Kevin Lynch and the map of London by Space Syntax can be placed. The map of Tokyo by Fumihiko Maki shows the possible role of all the described approach in reading the Asian city.

The conceptual map shows to be rich and fruitful for new and further experiences of studies and cities mapping.

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Illustrations and tables

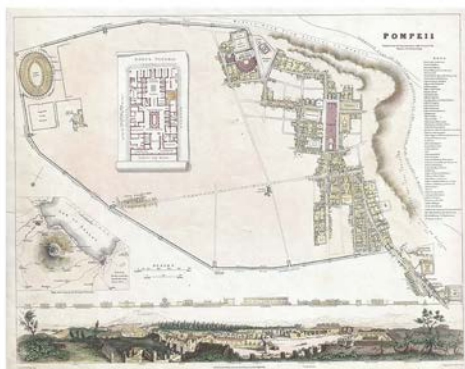


Figure 1. (Above: William Barnard Clarke (1806-1865), Pompeii. Published under the Superintendence of the Society for the Diffusion of Useful Knowledge. Engraved hand coloured map with a panorama (1831/1840); Below: Giovanni Battista Nolli (1701-1756), *New Topography of Rome* (1736-1748), 176x208 cm, in 12 engraved boards (with Carlo Nolli, Giovanni Battista Piranesi and Giuseppe Vasi) [detail])



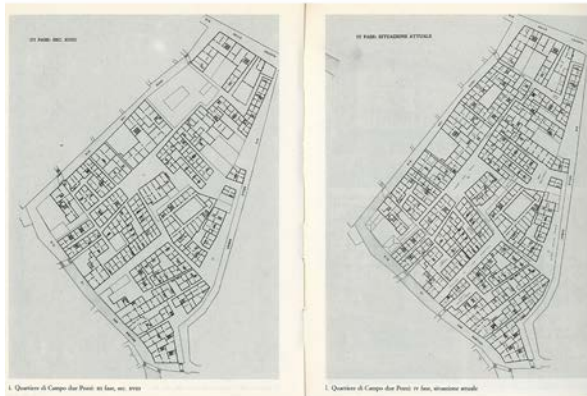


Figure 2. (Above: Saverio Muratori, Study for an Operational Urban History of Venice, [Studi per una Operante Storia Urbana di Venezia], Istituto Poligrafico dello Stato, Roma 1959 [the case study of Campo do' Pozzi]; Below: Gianfranco Caniggia, Plan of the City of Como, referred to the beginning of 19th century, [BOARD nr 22, from Reading of a City: Como, Centro Studi di Storia Urbanistica, Roma 1963 (1984)])

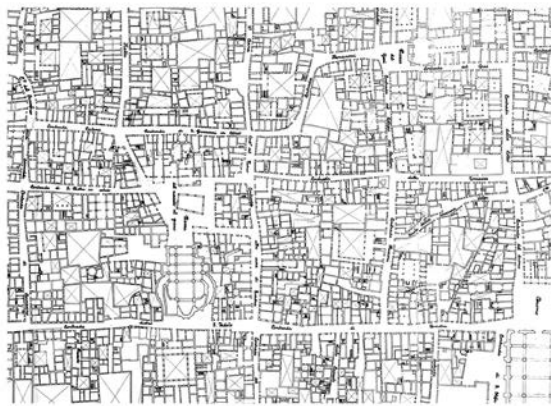


Figure 3. (Above: Augusto Cavallari Murat (1911-1989), Urban Form and Architecture in the Baroque time Torino (from the classical premises to the neoclassical conclusions), UTET and Technical Architecture Institute at Politecnico di Torino, Torino 1968, Map 2, Vol. 2 [Detail]; Below: Pier Luigi Cervellati (1936), PPE (Detailed Master Plan). Ground Floor, and Open Spaces, Board 10/13 of the Palermo General Master Plan (1989))



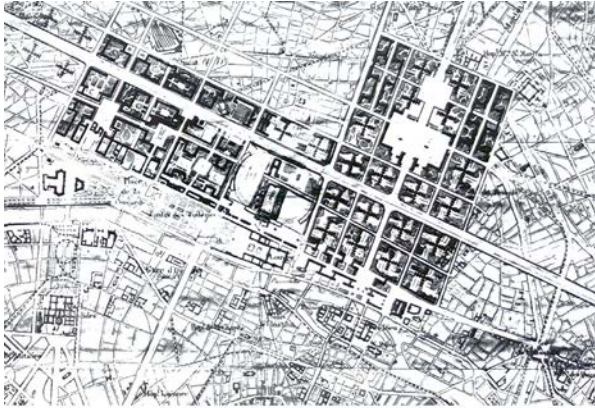


Figure 4. (Above: Le Corbusier (1887-1965), «Plan Voisin» of Paris (1925), exhibited at Esprit Nouveau Pavillon and at the International Exhibition of Decorative Arts; Below: Kevin Lynch (1918-1994), Fig. 3 The visual form of Boston as seen in the field, in *The Image of the City*, MIT Press, Cambridge (Massachussettes), 1960)

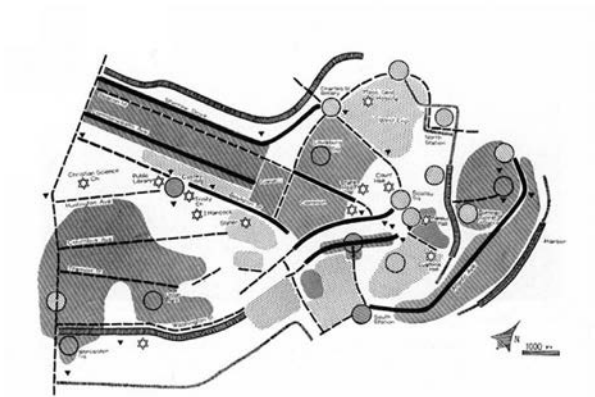
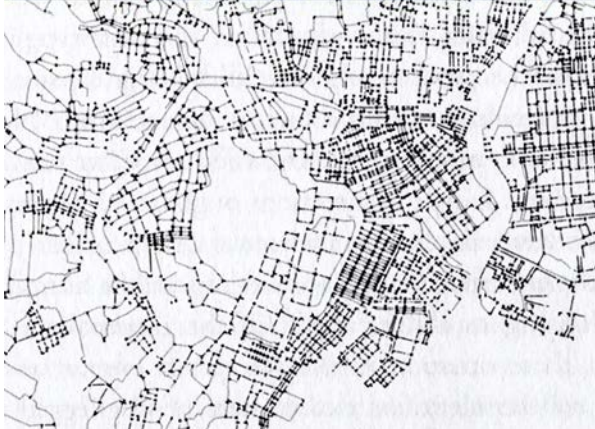


FIG. 3. *The visual form of Boston as seen in the field*



Figure 5. (Above: London's street network as an iconic part of the Opening Ceremony for the 2012 London Olympic Games, by Space Syntax Ltd (from Bill Hillier, *Space is the Machine. A Configurational Theory of Architecture*, 1996); Below: Fumihiko Maki and others, *Mie-Gakure Suru Toshi* [The city of the unseen], Tokyo 1980 (English-language edition: *City with a Hidden Past*, Tokyo 2018), Page 44, Distribution of street patterns in Edo [DETAIL])



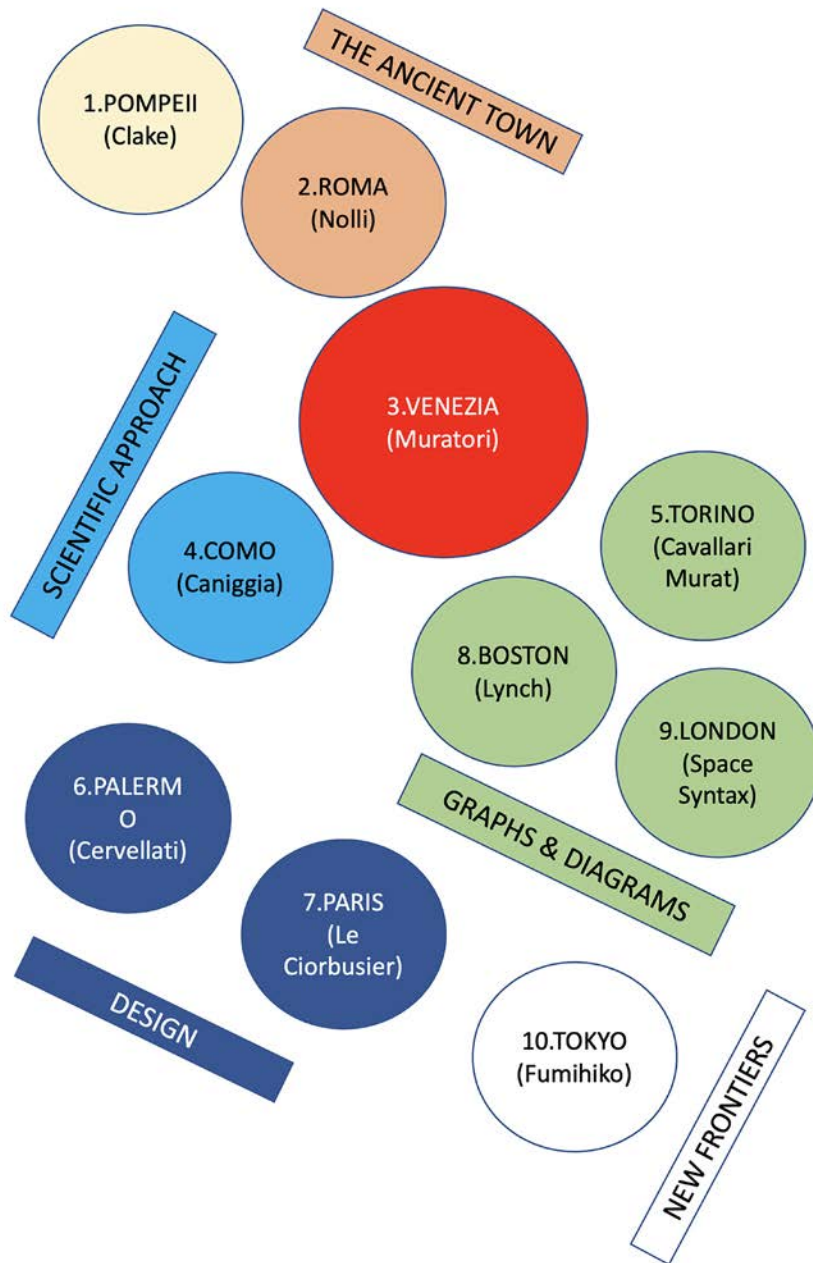


Figure 6. (The conceptual map of the theoretical course in urban morphology based upon the relationships between the shape of the cities and the shape of the maps)