

Toward a Dynamic Approach of the Urban Planning

Lefebvre Eric 京都大学工学研究科 建築学専攻

Especially in Japan, with the explosion of the land speculative bubble, the last years of the twentieth century witnessed the slowdown and the end of excessive urbanization in the suburbs of the big cities. Certain cities in North America and Central Europe are also hard hit by the impact of the economy globalization and its induced offshoring phenomenon, as well as the demographic and social changes that derive from it. This paper aims to study the evolution of the urban theories related to these geographic regions of the modern and contemporary world that share a common socio-economic history. However, it goes without saying, that the urban space of other so-called Southern Countries, which are not discussed here, is collaterally affected by the problems of Northern Cities.

Currently, the dynamics of contemporary urban planning are no longer linked to a centrifugal extension of large urban cores but finds new definitions in the terms of “Shrinking Cities” and “Smart Cities” which characterize a slowdown if not a regression in development of the urban space. Specialists in town planning and its history are faced with a new problem in the culture of the city. If the phenomenon of the disappearance of cities or entire civilizations is not historically new (Mesopotamia, Greece, Roman Empire, etc.), the increase of empty housing in Japan as well as the dramatic situation of the urban communities in the North American Rust belt refute the notion of a city in perpetual growth. Validating the theories formulated by the club of Rome in 1978 in the report “The Limits of Growth”¹, the existence of these problems in the contemporary era and further is for the theoreticians and the designers of the city a new challenge that requires significant paradigmatic changes in the understanding of the urban space.

Through the presentation of the work of certain town planning theoreticians of the twentieth century, I will try in this article to present the ins and outs of this theoretical and methodological transition. I will notably highlight the change from the planning of a static object, spatially ordered towards the design of a dynamic object, motivated by the understanding of the human rhythms that inhabit it. Thus and if such a definition can exist, we will see that this change also brings about a possible redefinition of the definition of the urban object.

Indeed, if it is important to recognize that during the prehistoric period,

1 Meadows D.H.(1972). *The Limits of Growth*, Potomac Associates

the urban object adopted multiple forms reflecting the imperatives of geography, climatic conditions or human activities themselves. It is however useful to put forward the hypothesis that it is the evolution of construction techniques and civil engineering that allowed to distance the vision of the city as an object submitted to nature vis-à-vis that of an artificial and dominant entity in binary opposition with natural space. We could also argue that the segregative nature of this relationship is the source of representation of the city as a unique object.

The beginnings and the rise of the industrial revolution marked a profound change in thinking about the design of urban space. The massive influx of people into what will become the big industrial cities changed the way the city was enlarged. The multiplicity of urban responses and experiments on workers' housing in the suburbs of major European cities are the foundations of urban planning in contemporary suburban areas.

In addition, these concerns related to the implementation of a habitat vis-à-vis a production tool introduces an important consideration related to the rhythms of the city. These rhythms, generated by the pendulum movements of workers from the habitat to the places of production, highlighted the importance of the interdependence of the distances of the means of transport and the performances of production. From then on, mastering and planning transport networks was a priority for major European cities. However, it was not until much later that this awareness of the relationship between distance and means of transport found an echo in the analysis of urban territory.

■ Urban cycles in the vision of Mr. R.G. Conzen

It was in 1960 that R.G. Conzen (1907-2000), a student of the Austrian geographer Herbert Louis and pioneer in the field of urban morphology research, presented his paper: "Alnwick, Northumberland: A Study in Town-Plan Analysis."² In this text, he presented his reflection on the phenomena governing the growth of agglomerations. An important concept he identifies is the "Urban Fringes."

According to him, those are areas that exist on the border of the urban area and which are characterized by a strong disparity in their spatial and social morphology in comparison to the surrounding urban fabric. These are areas that are too distant spatially from the old urban core, and that for a time escape from urban planning operations. By doing so their main characteristic is to be on the border between the city and the countryside. Here, one can find the activities and the people who cannot have a place within the city. The categories that are located outside of the city vary across the ages. Thus, in the Middle Ages it was the tanneries, or cemeteries, while in the modern period it was the small factories and the dwellings of immigrants that were characteristic of these urban areas. The

² Conzen M.R.G. (1960). *Alnwick, Northumberland: A Study in Town-Plan Analysis*, *Transactions and Papers (Institute of British Geographers)*, No. 27, Wiley



Fig. 1: Schematic representation of the chronologic Fringe area generation process

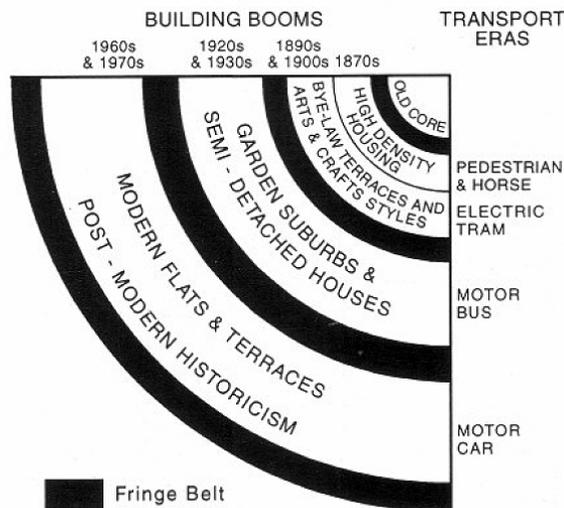


Fig. 2: Historical relationships between transportation modes and city growth areas typologies in Great Britain cities (Whitehead 2001)

urban fabric generated by those use is mostly spontaneously generated on the previous agricultural land, outside the frame of the urban planning regulations that are enforced inside the city. (fig. 1)

Conzen then poses technological and social breakthrough (in particular means of transport) as a condition for the implementation of a new extension zone. Beyond the previous urban fringe the city grows in a centrifugal manner and the distance covered depends on the characteristics of the means of transport available at the time (fig. 2). As the time lapse between two urban growth phases is enough for the settlements present in the Fringe Belt to mature and attain a stable spatial state that cannot be simply erased by the imposition of the next new urban fabric. Of course, some arbitrary urban planning can overwrite some parts of the fringe areas, but in many case such a scar in the urban fabric dating from older times is still to be observed nowadays³.

By building the present urban model, Herbert Louis and in a more visible manner Conzen have expressed a dynamic characteristic of the growth of

³ Marques de Sousa S. (2016). Fringe Belt Analysis: a method for confirming the establishment of the historical boundaries of Rabat. *Folia Geographica socio-oeconomica*, 25: 24.

the urban space. More than a layered thematic analysis of the actual urban morphology, a comprehensive understanding of the city structure can be attained by the introduction of an urban timeline linking urban space and socio-economic parameters in an historical referent⁴.

⁴ Whitehand, J.W.R. (2001). 'British urban morphology: the Conzenian tradition', *Urban Morphology*, 5: 7.

It is however important to consider that even if it is adaptable to geographically complex city configurations, the presently explained model of the Fringe Belts is used from a theoretical standpoint that require the continuous growth of the city area. Thus this urban morphology analysis tool is best suited to lead the study of the city growth until the advent of the suburban city.

■ System Theory, Cybernetics and urbanism

Developed during the first part of the twentieth century and first formalized in 1954 by the “General Theory System”⁵ of Ludwig Von Bertalanffy (1901-1972), the system theory stand as an alternative view opposing and completing the cartesian science views of the world. Where the classic science isolate the experimental subject from the context (Closed System) in order to analyze the inner phenomenons, the system theory state that the inner interactions between the diverse parts of an observed object or “system” are seamlessly linked to its own environment (Open System). Adding to this, the “cybernetic” theories proposed by Norbert Wiener in 1942 and developed in the continuity of the “General System Theory” explore the communication (information theory) between the diverse parts of a given system. There, the “cybernetic” introduce the “Feedback” and “Time-lag” theories. The conceptualization of the city as a system was a simple step made by many scholars. This is the case of the French neurologist Henri Laborit, member of the “Groupe des dix”: an informal French scholars think-tank group based especially on the discussions about system theory, and cybernetics theories.

⁵ Bertalanffy L. v. (1954). *General system theory, Foundation, Development, Applications*, George Braziller

In a transdisciplinary approach he used his medical knowledge about the brain cellular information transmission processes to analyse the city object as a complex system in which, the humans and their behaviour lead the transformations of the urban tissue. Laborit states:

“Contemporary urban planning can also be seen in an experimental form: let’s make a city and we’ll see what happens there. But is this experimentation? Isn’t it more a coin flip? Can a human production as the city be experienced in ignorance of the mechanisms that direct the behavior of its worker, the man, or more exactly of the human group that designs and realizes it”⁶ (author’s translation)

⁶ Laborit, H. (1971). *L’homme et la ville*, Flammarion, p.10

Here, more than the build urban space, those are the human interactions with their environment that constitute the object of research. And from now on we can observe a broad change also in the urban planning methodology.

Maybe in correlation with the social manifestations in France, North America

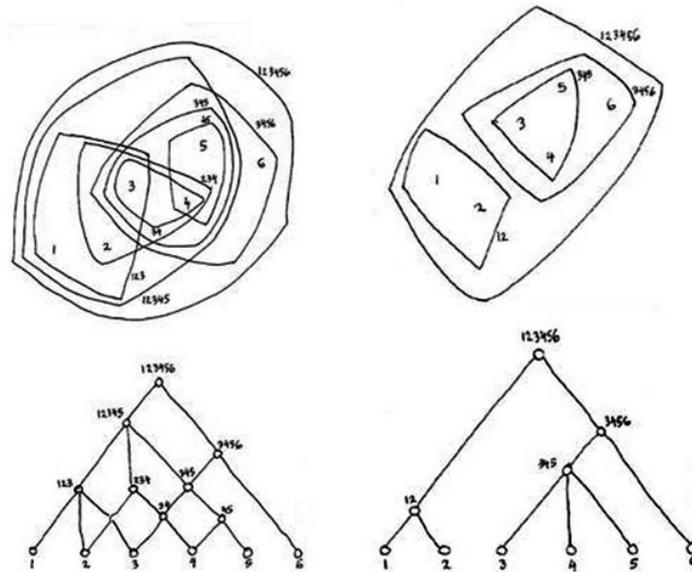


fig. 3: Christopher Alexander Semi-Lattice network versus Tree shaped network (1965)

an Japan that happened after the end of the second world war in the 60's, critics where made about the city thinking and production methods. Especially in regard to the hierarchical decision-making structure, statements were made to introduce a Down Top approach contrary to the classical Top Down management method. This stance, putting the city inhabitant at the center of the observation process was also eventually used in the urban space analysis field as a prerequisite to lead an operational Down Top urban planning operation. In « A city is not a tree », published in 1965⁷, Christofer Alexander shows his affiliation to this thinking process by advertising the fact that a city existence cannot be explained by a simple, pyramidal, tree like, causal relationship between the elements that compose it. On the contrary, his well-known definition of the city is that its component and their relationships form a semi-lattice structure: an intricated network where the elements have access to the other without hierarchical restrictions (fig. 3) More than putting the inhabitants first in line during the decisional process, this theoretical model tend to tie classical decision-making body and inhabitants in a more communication oriented network.

The consideration of the socio-economic state of the city inhabitants and many other parameters stated to be observed in order to produce new analysis methods. But, even if the diversity and quantity of the urban theory was growing, practical use of the produced models was not possible because of their high degree of complexity.

■ The city as a complex dynamic system

The application of the complex system theories on the urban development was finally explored by Jay Forester (1918-2016) in his “Urban Dynamics”⁸) in

⁷ Alexander, C. (1965) A City is Not a Tree. *Architectural Forum*, Vol. 122, No.1, April 1965, pp 58-62

⁸ Forester J.W. (1969). *Urban Dynamics*, Pegasus Communication

1970. In this work, after building a theoretical city model, the use of the computer assisted calculation allowed the researcher to drive a simulation based on the implication of selected socio-economic parameters. The results of this experiment gave Forester the proof of the non-linearity of the urban planning processes as stated by the Cybernetic theories. Here also, the development of new technologies was the driving core of the birth of new urban modelling method. Nowadays, the possibilities provided by the IT tool allows various analysis ways that encompass more and more parameters in order to provide better previsions.

In consideration to the counterintuitive nature of the behaviour of the complex systems, the micro-simulation, or cell automata simulation method focus on the spontaneous reproduction of know behaviour or phenomena by large quantities of digital robots. Those methods are used to predict demographical changes according to internal and external factors of a given city sample. In a sense, if the early operational urban planning was focussing on the production of a spatially usable and agreeable urban object, now the production method of urban space is focussing on the regulation of the city parameters.

If the rise of modern societies from the nineteenth century was intimately linked to the rise of the large cities, the evolution of the theories of urban planning and the related methodologies happened under the influence of successive scientific revolutions. From the observation of an object considered to be static, the approach to the analysis of urban space and the spatial practices that result from it have been profoundly transformed. Conzen's approach identified an urban dynamic linked to distances and means of transport. Considering the place of public transport and the use of the car, it is a founding element of the city of the second half of the twentieth century. This notion of distance is just as relevant in the contemporary city and more precisely in suburban areas that are subject to the problems of urban sprawl, desertification of housing and the decline in the level of services. In such a context of dissension of the urban fabric, the redefinition of urban polarities is closely related to the accessibility of urban areas.

Where the Conzenian analysis of the urban area evolution was implicating a one-way city growth dynamic the analysis presented by Forester in "Urban Dynamics" tended to confirm the presence of urban cycles of growth and degrowth. On this point, it would seems that the use of complex dynamic system urban models integrating a wide range of scientific subjects such as demographic and economic studies could lead to a better understanding of the phenomena that occurs in the concerning parts of the large post-industrial cities that are the sub-urban areas.