Dr Mahnaz Shah

Paper: **Generative City Code: The Case of Le Corbusier's Potato Building Typology 1962-65**

Topic: Architecture

Authors:
Dr Mahnaz Shah
Cardiff School of Art and Design, Cardiff Metropolitan University Wales,
United Kingdom
www.cardiffmet.ac.uk

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Abstract:
What is the form and meaning of the contemporary city? Does the designation of the city still apply to modern day urban zones with sprawling edges? Is it possible to talk about countryside if one encounters similar densities there as in the city? Does the dispersal of the city also mean its dissolution? The above are some of the questions that were raised by Greyter Architects (2002) in their quest to determine the essence of contemporary city. Their study entitled '*After-sprawl'* demonstrates that today urbanity is not based on the classic dichotomy of 'city-countryside', but defined by the state of 'sprawl' – the filling up of the landscape has now become the pattern of the settlement of ever greater expanses of western Europe. Similarly Rem Koolhas in his book entitled, '*The great leap forward'* refers to 'an urban free of urbanity'.

This paper aims to review the above questions and concerns by presenting a possible case study; the proposed typology that Le Corbusier and his associates were developing at the atelier between during the early to mid 1960s. According to Le Corbusier the key solution was a generative design that evolved as a dynamic organism but sans form – and hence the term 'potato building typology' was coined at the atelier Le Corbusier. It is proposed that this study can lead to formulating a number of well-established horizontal city exchange systems along with their strengths and weaknesses. These systems once determined and categorized can be an excellent starting point in the study of the future growth of the city.

The typology as structured and discussed below can become a starting point in generating an urban code that identify a sense of sequence or pattern through the formation of positive public spaces, such as squares. These spaces define focal points and determine a dynamic pattern that can be replicated in the rest of the urban fabric.

This investigation at one level is important as it provides an overview of a body of research that directly addresses the horizontal urban fabric as an independent entity and at another level it hopes to give the dweller/ consumer a diagram that can assist to further develop the fabric according to personal needs and aesthetics. This research is envisioned to initiate an understanding of generate urban codes that approach horizontal urban growth as an important step in future community building.

mshah@cardiffmet.ac.uk

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Le Corbusier's Potato Building Typology 1962–1965: An Analysis

Dr Mahnaz Shah
Cardiff School of Art and Design, Cardiff Metropolitan University, Wales
United Kingdom
www.cardiffmet.ac.uk
e-mail: mshah@cardiffmet.ac.uk

Abstract

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Introduction

Late 20th century and early 21st century architectural and urban discourses are replete with the catch-phrases 'horizontal urban sprawls' and 'after-sprawls' respectively, as urban and architectural theorist and historians try to grapple with the increasing complexity of the contemporary city's expanding perimeters and infrastructural design and logic.

It is important to review the above questions and concerns by a detailed study of past and present horizontal city systems, in particular a number of select medieval water cities. It is proposed that the study will determine a number of well-established horizontal city exchange systems along with their strengths and weaknesses. These systems once determined and categorized can be an excellent starting point in the study of the future growth of the city.

The resultant project is envisioned as generating an urban code that identify a sense of sequence or pattern through the formation of positive public spaces, such as squares. These spaces will define focal points and determine a dynamic pattern that can be replicated in the rest of the urban fabric. Initially this exercise maybe of a purely aesthetic nature, however after a number of patterns are determined, then geometries can be identified and applied to the rest of a proposed urban fabric – from positive public spaces to private dwellings.

As a case study I will present the lesser known research of the Swiss/French Architect Le Corbusier's oeuvre particularly in the final years of his life; the parameters of Potato Building typology – with its direct affinity to the medieval urban configuration of the city of Venice, will be introduced along with the possible future direction in devising it as a generative urban code.

Research Direction

The research aims to analytically deconstruct the modern day city's horizontal expansions, to locate its essentially weak design elements and then reconstruct a computational alternative horizontal expansion, by a series of generative codes derived from the detailed analysis of select medieval cities, in particular the medieval water cities, for their distinct essence and characteristics.

This decision has been taken by keeping in account the importance and dynamism of water in most European cities. In the '*Water Cities'* exhibition held at the *2nd International Architectural Biennale Rotterdam* (2005), it was argued that a great many European towns and urban expansions have usually been shaped by the infrastructure and rail connections when – considering the water tradition in most western European cities, one would expect the planners to take advantage of the rivers, the coast, the tidal basins and the lakes. According to Adriaan Geuze, the curator of the Biennale: these (water areas) are the very places where you can develop attractive towns and cities, but this turns out to be exceptional.

It is hoped that the study will contribute in the research to revive the essence of the ever-expanding contemporary city along with providing a series of generative codes to determine proposed future urban models to determine city's horizontal expansions.

Research Method

The method used will be based on the Generative Design approach as introduced by Prof. Celestino Soddu at the Generative Design Lab, Department of Architecture and Planning, Politecnico di Milano University, Milan.

Generative Design is a logical synthesis of a creative process using transformation rules (algorithms). It can be realized to design a program that is able to simulate this process and to generate outputs as 3D models of architecture, cities and objects. The ability to design accurate 3D models based on the diagrammatic representations of the spatial configurations as determined by the above detailed onsite studies would be extremely beneficial in a number of ways:

1. Generative Design could be represented like a morphogenetic meta-project, an organized idea of "how to run" a design process.
2. It involves subjectivities going more in depth into complexity of (architectural, town environment, industrial objects…) designed artificial systems.
3. It has the ability to move from axonometric to perspective view. Adding subjectivity one can move from the axonometric representation, "objective" because free from subjective views but limited by the dimension of the sheet, to the perspective view that, using subjective points of view, can represent the infinite in one sheet and, following that, the increasing complexity of represented systems.

Design strategy

The proposed research outlined above will be an initial attempt in determining the horizontal exchange system of the contemporary city along with its future expansions, through the lens of past planning solutions and their reinterpretations in the current urban scenario.

Le Corbusier in his final Venice Hospital Project 1964-65, did try to attempt a similar planning solution (by trying to replicate the program of the city of Venice in his hospital project – this was studies in depth in the author's PhD research study). However his untimely death in 1965 – a year after his acceptance to design the hospital project, halted the project, along with further research along the lines of developing a unique typology that he termed as the potato building typology.

Given an opportunity this research hopes to continue in the tradition of looking in the past for the solutions of the future. Along with deriving 'state of the art' city

sequences and patterns as generative codes, determined by the generative design method. It is hoped that these will be further explored and modified by the designers of the future.

The uniqueness of the Generative Design method lies in the fact that it is a subjective operative meta-project, that can be used to design a kind of artificial objects, an artificial DNA of a species of objects because is oriented to set up a process and not only to reach one result. More, it defines and renders explicit all the steps of a "normal" design process, from the first sketch to the final executive project.

The generative design approach is not a technology but a philosophy. It identifies a particular approach to understand, design and manage the incoming complexity of artificial systems, cities, architectures, environment, objects. It can be easily transformed in technological tools because it uses transforming rules that can be easily written in algorithms.

The proposed research can be succinctly outlined into three main phases:

Initial phase includes an in-depth investigation of the urban configuration of medieval horizontal city planning. The case study presented is an initial step in this direction.

Second phase requires the consolidation of the above research to identify coherent and efficient horizontal city systems that can be translated and applied in the future horizontal growth of the city.

And the third phase is to create Generative codes, based on the above system analysis and formally apply these by using the Generative Design Method in the virtual context – so as to critically evaluate its viability and application in proposed actual case studies.

Case Study: Le Corbusier's Potato Building Typology 1962–65

Une telle disposition des bâtiments est une *conception paysagiste*. nous connaissions le site a merveille; nous sommes loin de la ville, le lac, les arbres, les prairies, les montagnes, des horizons immenses. On ne pouvait songer a une conception urbaine, forum, piazza de Venise, place de l'opéra, etc., ou des successions de rues, de places, des masses de bâtisses diverses peuvent épauler les coupoles ou les dômes couronnant une composition pyramidale. Chez nous, la fermeté n'était point dans des soubassements cyclopéens ; elle était en haut, sur le ciel, par la ligne impeccable d'une unique horizontale.

Le Corbusier 1928

As noted above during the later part of his life Le Corbusier moved away from his initial summation of a figure-ground discourse to more of an inside-outside discourse where the distinction between urban/landscape and architecture/built-object becomes secondary and almost irrelevant. In this section I will provide a brief overview of Le Corbusier's extrapolation on the concept of the horizontal within his design vocabulary and hence to further define and therefore

understand the significance of the potato building typology.

The key drawings that are now considered as part of Potato building typology studies series are archived under two main projects: the Venice hospital project 1962–1965 included a single yet extremely significant sketch by Le Corbusier and the Musée du XXe siècle, Nanterre, France, 1965, which includes the 16 sketches these are now considered the main point of reference to the typology.

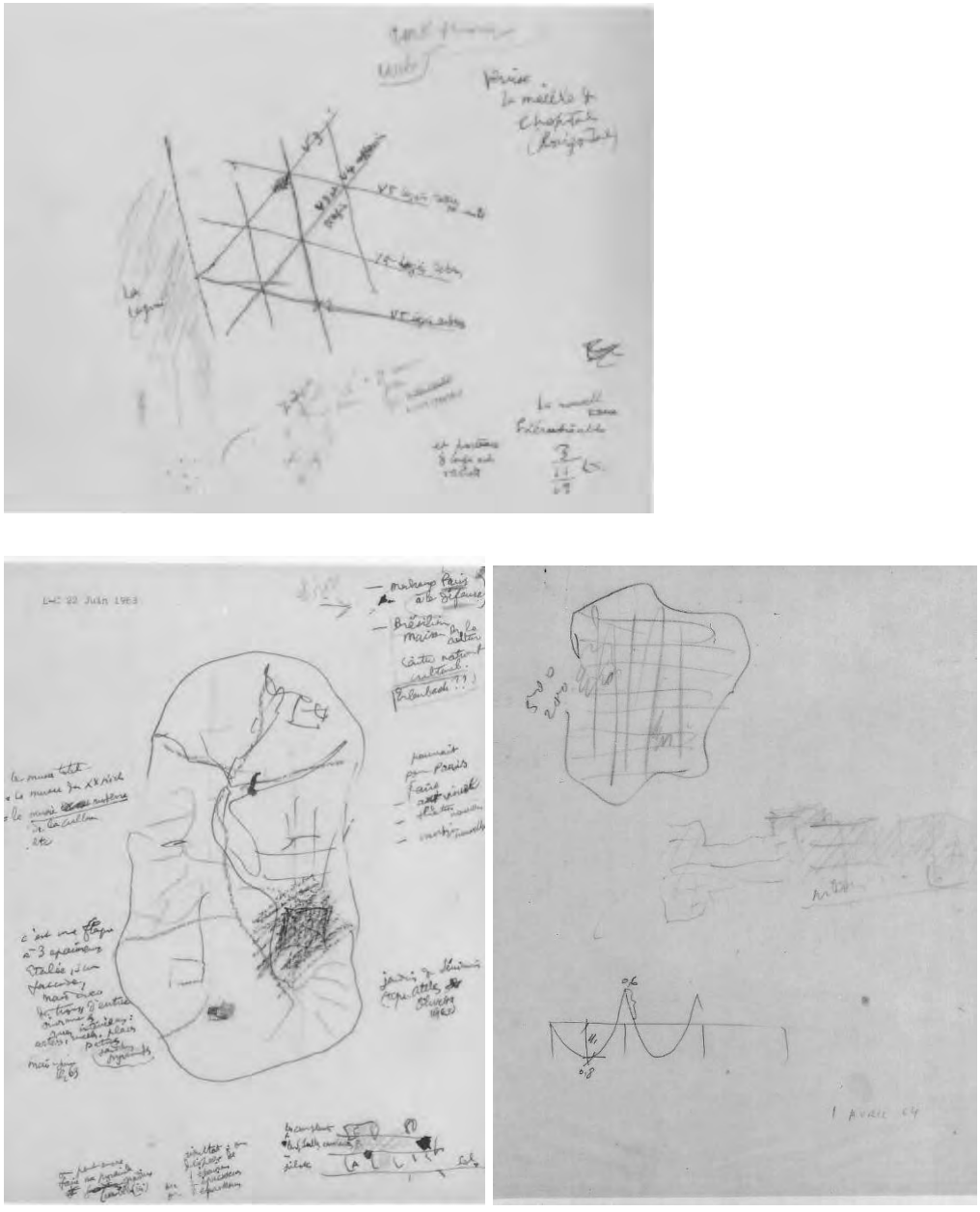

Fig. 1 a,b and c. select drawings from Le Corbusier's Potato building typology series CCA Montreal.

The above drawings distinctly reference the proposed hospital for Venice along with

the city itself as important guiding principles in the study of horizontal structures and possible sprawls. Le Corbusier identifies:

1. Venice as a Mesh, outlining the schematic relationship between the lagoon, the *rii* and the *calli*. The proposed hospital project referenced as an important example of this horizontal mesh.
2. Type solution: *sans façade*. Identifying three points of entry, through the interior streets, courts and patios.
3. The logic of the horizontal circulation system is emphasized as well as a restricted building height. The piloti to create a porous geometrical structure.

Based on the above analysis, it can be postulated that in the studies of the 'Potato Building' typology, the medieval urban configuration of the city of Venice was used as a diagram to determine the logic of horizontal circulation in resolving urban planning issues.

It should however be noted here that for Le Corbusier this horizontality of the site, and or the broader sense of horizontal circulation may have acted as a principle of abstraction, in which he continued to disturb and retract the observer at his will. This is further substantiated in Rowe's analysis:

In this idea of disturbing, rather than providing immediate pleasure for the eye, the element of delight in modern architecture appears chiefly to lie. An intense precision or an exaggerated rusticity of detail is presented within the bounds of a strictly conceived complex of planned obscurity; and a labyrinthine scheme is offered which frustrates the eye by intensifying the visual pleasure of individual episodes, in themselves only to become coherent as a result of a mental act of reconstruction.[15]

The idea of a 'mental act of reconstruction' remains an important element in Le Corbusier's later projects and it seems is the key element in understanding the new typology that he was developing at the atelier. In *Une Maison, un palais* (1928) Le Corbusier had identified this mental construct by stating: Jamais l'œuvre architecturale participant du site qui l'entoure n'a dit son dernier mot. [16]

What Le Corbusier initiated in 1928 as an ongoing horizontal discourse between the built object and site, developed in his later years as a substantially dynamic and discursive exercise between a number of horizontally stratified internal and external urban/architectural mechanisms that both connect and refute the viability of the voids and spaces.

Grid-Field-Diagram: Re-contextualizing the typology

Le Corbuiser in a sense introduced a diagram of a typology or rather a dynamic 'urban field'. The essential diagrammatic qualities of this field can be accessed on the basis of an analysis of the city of Venice, with its unique medieval topological growth, its horizontality and irregularity, as the sketches above illustrate.

However, Alan Colquhoun points out that, a diagram can be a number of interpretations based on certain rules. It therefore gives a concept in its simplest form, and in actuality does not correspond to the object of study, but rather is a reduction.[1]

Given the above definition of the diagram by Colquhoun, it can be argued that Quatremere de Quincy's definition of the type, is similar to that of a diagram: the idea of an element which should itself serve as a rule of a model. Here again the rule is presented as the basic possible denominator of a design method, which can be applied and interpreted in a number of ways. Similarly Guilio Carlo Argan's types, approximating archetypes, are regressed or reduced to a common 'root form', type here is more a principle allowing for variation, rather than an a priori set of fixed entities. [2]

The use of typology as a design method acknowledges the presence of precedence, this precedence according to Colquhoun, is an instrument of cultural memory, and operates as a condition of architectural meaning.[3] Memory and meaning are both subjective entities and take occasional recourse to intuition. According to the Italian theorist Tomas Maldonado:

The area of pure intuition must be based on a knowledge of past solutions applied to related problems, and that creation is a process of adapting forms derived either from past needs or from past aesthetic ideologies to the need of the present.[4]

In the potato building typology Le Corbusier uses the city of Venice as the prime precedence. Here the city is analyzed for its past solutions, for its complexity, its history and its ability to integrate past aesthetic ideologies to the need of the contemporary sensibility. Le Corbusier adopts the physiology of the city history – a city built over large wooden stilts inserted in the salt waters – hence identifying the field like grid, rather than the medieval configuration of its urbanity in the form of the pinwheel system.

Le Corbusier was familiar with the city's historical development along with important artists and cartographers such as Cristoforo Sorte (1506 –1594), the use of Euclidian geometry featured prominently in most works of the time along with Palladio's *The Four books of Architecture* (1570) as a key text accentuating the inter-relatedness of the built object within the context of the immediate landscape.

The field like grid introduced by Le Corbusier in the potato building typology may also have been influenced by speculative geometry particularly popular during the high Renaissance. According to Cosgrove (2002) the speculative side of geometry was regarded as far more exalted than the practical, for only a theoretical discourse is certainty possible.[5]

The potato building typology can thus be given two main attributes; one relating to deterministic geometric type solutions and the other alluding to intuitive discourse based on plastic events. According to Le Corbusier, these plastic events; are not regulated by scholastic or academic formulae, they are free and innumerable.[6]

This can be particularly pertinent within the context of the recent shift of emphasis in architectural and urban projects – from the design of enclosed objects to the design and manipulation of larger urban surfaces. The effects of urbanization today are multiple and complex, but two are of particular significance with regard to planning and design.

1. First is the rise of new kinds of urban site. These are the ambiguous areas that are caught between enclaves. They may even be so extensive so as to constitute entire generic zones. These might be called *peripheral sites,* middle landscapes that are neither here nor there.

2. The second involves a fundamental paradigm shift from viewing cities in formal terms to looking at them in dynamic ways. Hence, familiar urban typologies of *square, park, district,* etc., are of less significance than the infrastructures, network flows, ambiguous spaces and other polymorphous conditions that constitute the contemporary metropolis. [7]

The design strategy proposed in the typology may have the capacity to increase its structural and programmatic capacity to support and diversify activities in time – even activities that cannot be determined in advance. Its importance lies in its ability to extend continuity while diversifying its range of services. [8] Rather than a fixed design strategy, the typology offers a framework for developing flexible uses as requirements change. A future analysis of the urban devices found within the typology may provide programmatic solutions to rebuilding, incorporating, connecting and intensifying generative architectural elements within the urban realm.

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