

BETWEEN THE VISIONARY AND THE ARCHAIC.

IANNIS XENAKIS'S « COSMIC CITY ».

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Abstract

This paper discusses “The Cosmic City”, an essay by the composer and architect Iannis Xenakis. In this urban proposal, 5 million inhabitants are housed in a single megastructure, a hyperbolic paraboloid of more than 3000 meters high and 50 meters wide. The Cosmic City is considered here as a case study of avant-garde urbanism in France in the 1960s. Apart from situating it in Xenakis’s oeuvre, this paper offers an investigation of its reception in the writings of Françoise Choay and Louis Marin. Both authors have conceptualised the notion of utopia and discussed Xenakis’s project in that context.

In 1965, the composer and architect Iannis Xenakis (1922-2001) published the essay “The Cosmic City”². It describes an urban proposal, where 5 million inhabitants are housed in slender hyperbolic shells of more than 3000 meters high and 50 meters wide. Independent from nature, climatic conditions and topography, the Cosmic City includes homes, places of work, schools and other facilities. We can consider it thus a *megastructure*, the dominant progressive concept of architecture and urbanism between 1960 and 1970³. With similar, contemporary projects, Xenakis’s proposal has in common concentration, monumentality, a certain symbolism and a comprehensive traffic solution.

Apart from the best-known ambassadors of the megastructure movement, the Japanese Metabolists and the members of Archigram, also in Paris, a loose group of visionary architects (baptized “Urban Spatialists” by Rayner Banham) was carrying out similar research⁴. These architects and artists investigated the air, the deserts and the sea as new inhabitable regions, in a response to a growing concern about demographic and ecological issues in the early 1960s⁵. In the megastructuralist conception, the city became either an overscaled, finished object or a collection of movable volumes, dispersed in a light and abstract spatial frame, high above the ground⁶. Although he cannot be considered a member of the Urban Spatialists (he was fully concentrating on his musical career since 1960), it is safe to accept that Xenakis, while writing *The Cosmic City* in 1964, must have been aware of their approach to the problems of urbanism. In addition, the megastructure movement was at its culminating point at that moment.

Similarly to most visionary urban proposals of that time, the Cosmic City can be interpreted as a critique towards the functionalist city and more precisely, towards the principles of *decentralization* and *zoning*. To the seductive and reductive simplicity of the master plans of Brasilia and Chandigarh, Xenakis opposes here the complexity of biological organisms, with their natural tendency towards concentration. This phenomenon, in accordance with the “law of high numbers” (from statistics), renders the advent of exceptional and rare events (i.e. moments of exchange, creativity and procreation) more probable than in smaller populations. Concentration is thus a natural survival strategy.

The “law of high numbers” also plays a fundamental role in Xenakis’s musical composition technique. At the end of the 1950s, on the search for an objective approach to musical form, he had developed a “stochastic theory of musical composition”, based on mathematical and logical laws⁷. Here, the music became a field of varying parameters, with the composer as its organizer. In this conception, the form and the content of a piece emanate from the rules that determine its *event space*. To deal with the complexity of such a formalization of music, Xenakis introduced statistics into the musical field, considering it as a *space of probability*. Controlled indeterminism, as a catalyst for continuous variation, would remain an important feature of his artistic conceptions.

For what urbanism is concerned, Xenakis’s conclusion is simple but radical: “if concentration is a vital necessity for humanity, the present ideas of urbanism and architecture must be all together changed and replaced by others.” In his vision, the primary problem is the inefficiency of exchange and communication within the city. Like most megastructuralists, he proposes a drastic solution: distance is short-circuited. This results in a conception of the city as an immense but compact architectural object, with a minimal occupancy of the ground. For the same population of Paris, Xenakis’s Cosmic City occupies only one thousandth of its surface! Consequently, individual motorized transport is no longer necessary: inhabitants move in high-speed elevators and escalators. Since land is used exclusively for large-scale, industrialized agriculture, transportation between different cities occurs by helicopters.

By contrast with the muscular visual rhetoric of most megastructures, Xenakis has published only one drawing of the Cosmic City – however, this drawing was not included in the original publication in Choay’s book **[Figure 2]**. Consequently, the Cosmic City is more a *theory* of the city than an *ideal model*. In fact, it is a first attempt by Xenakis to formalize the principles of architecture and urbanism. At this aim, the second part of the text contains a series of fourteen axioms, meant to logically structure the conception of the Cosmic City. These axioms vary from almost technical details (“Communication will be achieved by means of cylindrical coordinates, with the advantage of great vertical speeds, between 100 to 200 kilometers per hour.”), to a truly utopian message in the

concluding axiom: “By definition, the Cosmic City will not fear the devastation of war since disarmament will have been accomplished on earth and outlets and other expansions will be sought in cosmic space. The present nations will have transformed themselves into provinces of a giant World State.”

Also the Cosmic City’s scale makes an important difference with other, contemporary megastructures: its towers are “between 3000 and 5000m high”. As he illustrates with the calculations included in the third and concluding part of his text, according to Xenakis, the feasibility of such constructions is only a matter of time. [Figure 3] Questioned about his opinion on the proposals by his colleagues, he would reply: “I find them timid next to mine⁸”. Indeed, the Cosmic City is only rivaled by Buckminster Fuller’s Manhattan Dome (1960), covering an air-conditioned area of Manhattan, 2 miles in diameter.

On the formal level, the Cosmic City can be considered a manifesto of *volumetric architecture*, a concept developed by Xenakis as an alternative to the modernist paradigm of the straight line and the right angle, considered obsolete and even obstructive by him⁹. The idea to realize architecture “where no two sections are the same” is taken here to a monumental scale. Xenakis had gained experience with complex forms and hyperbolic surfaces while designing the famous Philips Pavilion for the 1958 Brussels World Fair. Earlier, he had also done the calculations for the « cooling tower » of Le Corbusier’s Assembly building in Chandigarh¹⁰ [Figure 1]. Interestingly, as opposed to Friedman’s or Constant’s megastructures, structure and form collide here: the 50m wide space in-between the hyperbolic shells is open and entirely flexible, as to allow (and even stimulate) internal nomadism. However, defining the container but not the content must not necessarily lead to spatial indeterminism. As Xenakis has argued later: “The designer must anticipate a distribution of elements in space. (...) Polyvalence is the proof of absence of taste, of will, of the architect’s reflection. One must create a space which is the permutation of things and events. (...) One must invent this architectural space and not choose it as if it were already in existence¹¹.” Consequently, to avoid the formation of specialized ghettos or class segregation, the spatial distribution of the population in the Cosmic City is statistically programmed and controlled by a special bureau, as to maintain a homogenous mix of all members of society. As a result, “Young people and blue-collar workers will live in the same sector as old people and government officials, for the mutual well being of all categories.”

This somehow totalitarian element (paradoxally necessary to maintain the “ideal situation”) reveals the utopian aspirations of Xenakis’s project. Originally a literary concept (in fact a neologism with a

double meaning: *u-topia* means “nowhere” as well as “the good place”), in its migration to the domain of urbanism at the end of the nineteenth century, the notion of utopia has often become synonym with “visionary”, “improbable”, or “fantastic”. This semantic impoverishment, implicitly caused by the importance given to the vision on the built environment and its description in the original utopian paradigm, often excludes further investigation or neutralizes the political or cultural issues raised by many of these projects. Divergent readings of the utopian concept are thus possible. Referring to its original paradigm, as introduced by Thomas More in 1516, Françoise Choay particularly stresses the social dimension of the original utopian discourse. In her perception, the projected built environment is first of all *instrumental* in the realization of a perfected social order, which is in turn built upon a critique of contemporary society¹². This marks a distinction with the tradition of Ideal Cities, where the projected environment often constitutes finality in itself, or can be considered a tool in the consolidation of the current ideology. The essence of utopia is precisely to overturn this¹³.

Despite its ambition to intervene in the realization of a non-hierarchical society, we could argue that, besides social and political concerns, Xenakis’s vision primarily reflects a frustration shared by many architects in the 1960s: if man is capable of flying to the moon, split atoms and travel under the sea, why then is he still petrified by the idea of having to change his habitat? To eliminate this backlog of architecture and urbanism, in the Cosmic City and many other megastructures, technology becomes in fact the dominant ideology. As a result, these projects are in fact “inversed Utopias”: not technology, but society itself becomes instrumental in the realization of a new environment. With Choay, we could designate this practice as *technotopian*¹⁴. Their extreme reductionism, separating technology from the internal dynamics of society, may well be the reason why most of these “visionary” projects seem so archaic today.

However, if we emphasize the *narrative* mode of the utopian discourse, rather than the *descriptive*, we can make abstraction of the operative qualities of the political and social program of Xenakis’s Cosmic City and stress its literary qualities. Doing so, it can be read as “the poem of science and technology of another era”, as Louis Marin has convincingly argued¹⁵. In his vision, the Cosmic City can be considered a true projection of More’s Utopia into the Space Age. There are also historical parallels: just as in the 16th century, in the 1960s, with the advent of space travel, the frontiers of the known world became transgressed; this coincided with a moment of demographic instability and a growing ecological awareness. Consequently, in a similar way as in the 16th century, the newly disclosed spaces became a surface of projection for the hopes and fears of Western society.

The extreme polarization in the Cosmic City between *what is* and *what could be*, is another typically utopian figure. In Marin’s vision, one of the functions of the utopian discourse is precisely “the resolution of the (historical) contradiction between two antithetical conceptions”. Therefore, with his

Cosmic City, Xenakis disorients the elements of the existing discourse on urbanism in order to prepare the way for the appearance of something inconceivable or inexpressible within this same discourse – shaping the reader’s imagination is the actual first step in the realization of Utopia. However, contrary to most of his contemporaries (like Friedman, Constant or Archigram), Xenakis’s perspective on the near future is not that of an immanent leisure society. The Cosmic City is both a metaphor for a new era of discoveries and exploration, and an interface for its realization: “The great height of the city, in addition to the very high density it will be able to achieve (between 2,500 to 3,000 inhabitants per hectare), will also have the advantage of rising above the most frequent clouds, those moving between 0 and 2,000-3,000 meters, and will put the populations in contact with the vast spaces of the sky and stars. The planetary and cosmic era has begun and the city must no longer be earthbound but oriented toward the cosmos and its human colonies.” With its fundamentally u-topian condition (in the literary sense of the word: *no-where*), Xenakis’s Cosmic City is not a comfortable home for the *homo ludens*, but the disturbing representation of an uncertain future, somewhere *between* the Earth and the cosmos.

Images:

- **Figure 1:** Le Corbusier, Assembly, Chandigarh (1955-1964). Photo : Sven Sterken (2002), © Fondation Le Corbusier, Paris.
- **Figure 2:** Iannis Xenakis, *Cosmic Cities* (Source: Iannis Xenakis, *Musique/Architecture*. Tournai, Casterman, 1971)
- **Figure 3 :** Iannis Xenakis, Sketches and calculations for The Cosmic City (Source: François-Bernard Mâche, *Portrait(s) de Iannis Xenakis*, Paris, Bibliothèque Nationale de France, 2002).

NOTES

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² Iannis Xenakis, “La Ville cosmique”, in : Françoise Choay, *L’Urbanisme, utopies et réalités*. Paris, Seuil, 1965, pp. 335-342. Reprinted in Iannis Xenakis, *Musique/Architecture*. Tournai, Casterman, 1971, p. 151-159. Quotes without further indication are from Xenakis’s text. I am indebted to Sharon Kanach for the English translation.

³ As defined by Fuhimio Maki, in *Investigations in Collective Form* (1964): “(...) a large frame in which all the functions of a city or part of a city are housed. It has been made possible by present day technology. In a sense it is a man-made feature of the landscape.” (cited in Rayner Banham, *Megastructure. Urban Futures of the Recent Past*. London, Thames & Hudson, 1976, p. 8).

⁴ See Banham, *op. cit.*, p. 57-64. The work of the Parisian Urban Spatialists was extensively published in *Architecture d’Aujourd’hui* and by Michel Ragon. See for instance *Où vivrons-nous demain?* (Paris, Laffont, 1963) and *Les Visionnaires de l’architecture* (Paris, Laffont, 1965).

⁵ The “nightmare of the number” was a frequently used expression to designate the predicted and supposedly fatal demographic pressure. See for instance Ragon in his introduction to *Où vivrons-nous demain?*, p. 12-15.

⁶ As representants of the first tendency, apart from Xenakis, we can mention Walter Jonas, Paul Maymont, Claude Parent, whilst the projects conceived by Yona Friedman, Constant and Arati Isozaki are typical for the second, more “spatially oriented” approach. For an exhaustive overview, see Michel Ragon, *Prospective et Futurologie* (Tournai, Casterman, 1978), and Banham, *op. cit.*

⁷ Iannis Xenakis, *Musiques formelles. Nouveaux principes formels de composition musicale*. Paris, Ed. Richard Massé, 1963. Translated as *Formalized Music*. Stuyvesant, Pendragon Press, 1992.

⁸ Xenakis, in: Iannis Xenakis, *Arts/Sciences, Alliances*. Tournai, Casterman, 1979, p. 80. We can hear here an echo of Le Corbusier’s provocative observation during his first visit to Manhattan in the 1930s: “The skyscrapers aren’t tall enough!”

⁹ See his essay “Le Pavillon Philips à l’aube d’une architecture”, in *Revue Technique Philips*, 1958. Also published in *Musique/Architecture* (1971), p. 123-143.

¹⁰ Trained as a structural engineer, between 1947 and 1959, Xenakis was a close assistant of Le Corbusier. Apart from the Assembly in Chandigarh and the Philips Pavilion, he also played an important role in the design for the Monastery of La Tourette, nearby Lyon (1954-1961). For an account of Xenakis’s role in Le Corbusier’s office, see : Sven Sterken, “Travailler chez Le Corbusier : le cas de Iannis Xenakis. Le conflit comme stratégie créative.”, in: Josep Quetglas (ed.), *Massilia 2003. Le Corbusier Studies Annual*. Barcelona, Architecture School of Barcelona, 2003 (forthcoming). For a general overview of Xenakis’s work as an architect, see my article “Une Invitation à jouer l’espace: Iannis Xenakis, architecte.”, in: François-Bernard Mâche, *Portrait(s) de Iannis Xenakis*, Paris, Bibliothèque Nationale de France, 2002, p. 185-193.

¹¹ Xenakis, in “Xenakis on Xenakis”, *Perspectives of New Music*, vol 25, 1987, p. 40.

¹² Françoise Choay, “L’Utopie et le statut philosophique de l’espace édifié”, in : Lyman Tower Sargent, Roland Schaer (ed.), *Utopie. La Quête de la société idéale en Occident*. Paris, Bibliothèque Nationale de France, 2000, p. 337-343.

¹³ On this aspect of Utopia and Ideal Cities, see Ruth Eaton, *Utopianism and the (Un)Built Environment*. London, Thames & Hudson, 2002.

¹⁴ On the notion of Technotopia, see Choay, *L’Urbanisme, utopies et réalités*, p. 54-58.

¹⁵ See Louis Marin, “A propos de Xenakis : l’utopie de la verticalité”, in: *Utopiques: Jeux d’Espace*. Paris, Editions du Minuit, 1973, p. 325-342.