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# **The Cosmic City**

**A proposal by Iannis Xenakis**

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Figure 1 Iannis Xenakis, *Cosmic City* (aerial perspective), 1963, ink on paper, 8 3/4 x 11 3/4 inches, Courtesy Iannis Xenakis Archives, Bibliothèque nationale de France, Paris.

## The Proposal

Xenakis cosmic city is considered one of the avant-garde urbanism projects in France during the 1960. Xenakis designed his model which can adopt 5 million inhabitants in a hyperbolic shell design with a 3000 meters height and 50 meters of width. The Cosmic City includes homes, workplaces, schools and other facilities, regardless of nature, climatic conditions and topography. We can therefore consider it a mega-structure, the dominant progressive concept of architecture and urbanism of that time.



## Iannis Xenakis

Iannis Xenakis was a Greek-French composer, music theorist, performance director and engineer. He fled Greece after 1947, becoming a naturalized French citizen. He is regarded as a major post-World War II composer whose works have helped revolutionize classical music in the 20th century. (Wikipedia, Iannis Xenakis, 2002) In addition, Xenakis was well known for his multidisciplinary interests, such as, mathematics, archeology and urban planning.



## Working For Le Corbusier

Being an illegal immigrant to Paris didn't prevent him from being a part of Le Corbusier office. Started as an assistant engineer, Xenakis proved himself to be able to perform more important tasks. Later on, he started to collaborate with Le Corbusier himself on major projects. Some of these works are:

- 1- The design of governmental building in the new urban proposal of Chandigarh.
- 2- House of Culture and Youth in Paris, where Xenakis design of the "glass half-wave" was to be used for the first time in construction.
- 3- Philips Pavilion 1958 was the shining star of Xenakis works associated with Le Corbusier. The design itself was developed completely by Xenakis himself.

## Music and Architecture: “The Relation”

Xenakis said:

“I felt very strongly the connection that is often made between music and architecture, and their influence on me was fundamental. For example, at the Conservatory, musicians learn that they must start by choosing a theme and create a form from it, by juxtaposing, expanding, reducing, and so on. The starting point in architecture is the terrain, and then the program and the necessary functions and shapes appear within it; then the materials. So, from global to micro, we're running. This architectural movement, as with music, did not seem to me to be completely natural. I figured it could be done differently.” (Xenakis, Autobiographical sketch , 1980)

Le Corbusier approved this and told Xenakis that once he designed a house starting with a drawing of a gargoyle. This widened up Xenakis perspective and since then his works showed a very strong direct link between architecture and music. One of the remarkable works on that matter was the Brazilian Pavilion at the Cité universitaire in Paris (Fig: 2).



Figure 2: Left: Brazilian Pavilion at the Cité universitaire // Right: Iannis Xenakis, Notebook, 1959, spiral-bound notebook, 12 3/8 x 9 5/8 inches.

# Xenakis Vision: The Cosmic City

Xenakis said that the only sustainable way forward is the vertical "cosmic" city. In 1966, he wrote an essay decrying decentralization in favor of building up, up, up... 5 million people to be housed in a single megastructure, a hyperbolic paraboloid of more than 3,000 meters high and 50 meters wide. (OUTPOST, 2018)

When speaking of the cosmic city, Xenakis says, 'The high concentration and the enormous technical effort required imply complete independence with regard to the Earth's surface and landscape. This leads to the vertical city conception that can reach several thousand meter heights. That freedom, in fact, leads to a gigantic standardization in which the formalizations of abstract concepts and their execution will be necessary and successful on their own.' (Esha, 2018) This reflects his opinion of how and how he wants to represent his drawings and his view of the city. He tried to translate the issue of war from architecture to sound and was the first to use his technique as the basis of his music.

Because of its immensity, Xenakis, aptly named "Cosmic City," imagined an ecological paradise of hyperbolic towers inspired by a flight over Manhattan City, each curving inward in varying degrees to create the most structural stability. While such a plan was certainly built on a massive scale, Xenakis also considered minute details such as the translucency of the outer shell of each building as well as the double-walled construction of the metal frame of the structure. Focusing on the paraboloid's contrasting non-orthogonal form, Xenakis seemed to disprove with his futuristic city design the "myth" of orthogonality. (Butner, 2014)

Xenakis states on Cosmic City:

The solutions proposed by the so-called avant-garde urban planners and architects are, in fact, nothing but short-sighted and rampant naivetes ... So we continue to decentralize on paper by creating specialized cities with an absurd cubic architecture, all standardized ... However, if concentration is a vital necessity for humanity, the present ideas of urbanism and architecture must be completely chosen. (Pe, 2017)

## Centralization vs. Decentralization

At this point, there is 2 questions go be asked:

1. Why Xenakis didn't accept the concept of centralization?
2. Why he wanted his proposal to not be considered as a decentralized urban concept?

Starting with the first question, First, If we put ourselves in the role of contemporary historical observers, it is apparent that we are witnessing a powerful, blind and irreversible force that, despite all the governments ' joint efforts, produces urban concentrations, an increasing power of density, and of city area. Second, If we take a socio-cultural view of exchange as well as technology and economy, we see the broad centers favoring growth and all sorts of progress. (Ashbery, 2014) The latter clarifies our simple observation of why major centers grow faster than small ones.

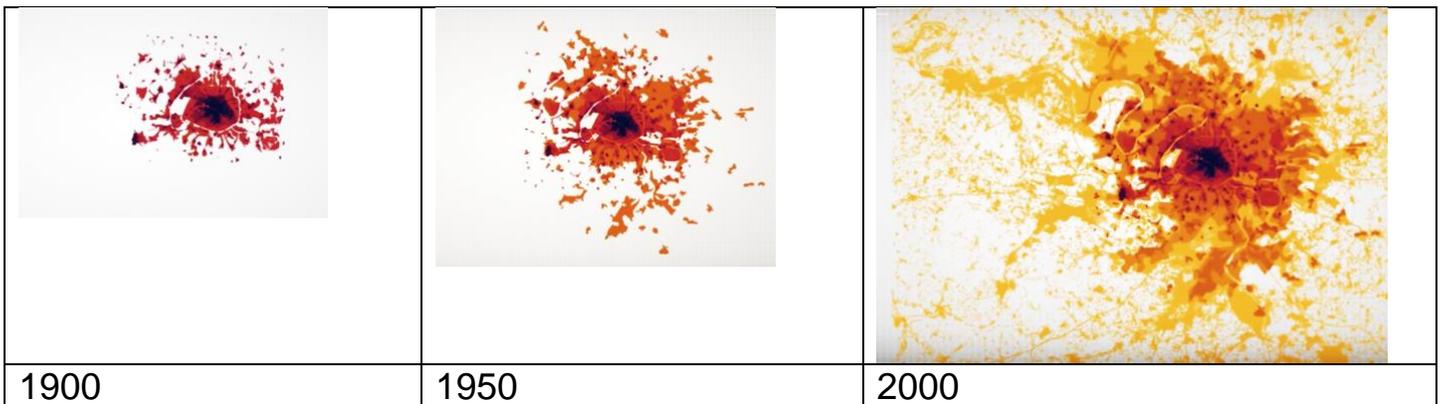
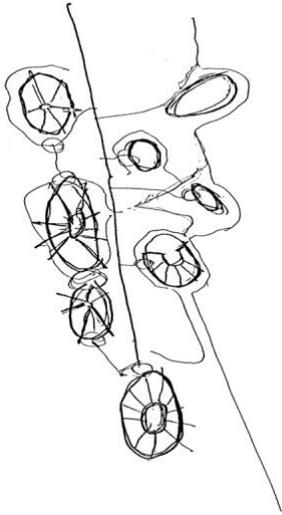


Table 1 Paris central expansion throughout time

For the second question, the answer of why Xenakis did not preferred decentralization comes from two main ideologies:

- a. the suffocation of modern cities under the anarchic wave of networks and the weak coverage of national activities;
- b. The history and mental inhibition of urban geometry and planning which, once again with new force in the 19th century, became developed and entrenched in the 1920s through cubism and constructivism.

Upon that, we can consider that Xenakis Cosmic City can be considered as a critique towards decentralization and zoning (functionality)

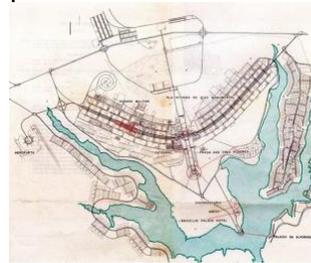


Cosmic City (interpreted by the author)



plan from 1951

Le Corbusier's Chandigarh



BRAZIL PILOT PLAN

Lucio Costa and Oscar Niemeyer  
Goiás, Brazil. 1956

Xenaki contrasts the complexity of biological organisms and with their natural tendency to concentrate with the seductive and reductionist simplicity of Brasilia and Chandigarh master plans.

In accordance with "Law of large numbers" (Mathematics, statistics), this phenomenon is more probable than in smaller populations when the occurrence of exceptional and rare occurrences.

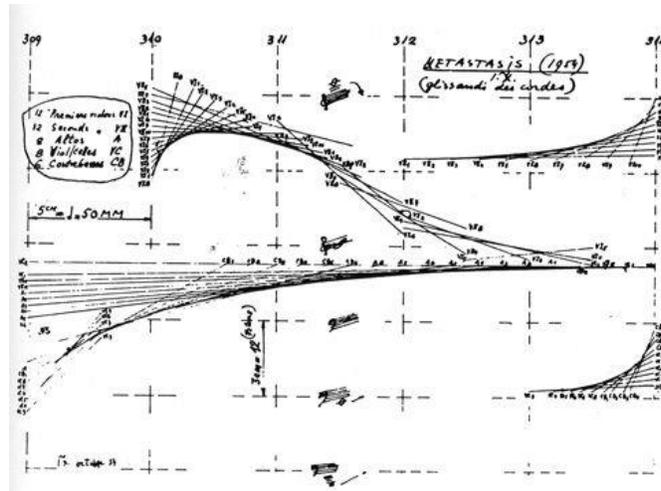
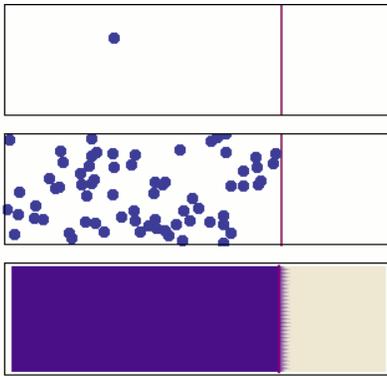
### Law of large numbers and Xenakis works

In Xenakis' musical compositional technique, the ' Law of Large numbers' also plays a fundamental role.

He had developed a "Stochastic theory of musical composition" based on mathematical and logical rules at the end of the 1950s, on the quest for an objective approach to musical form.

There, with the composer as coordinator, the music became an area with differing parameters.

The structure and substance of a pieces emanate from the rules governing their case spaces in this generation.



Law of Large numbers (Wikipedia) Iannis Xenakis – Metastasis 1953-54 // (Pinterest)

The question that arise here is: How Xenakis benefit from this law in his urban proposal of the Cosmic City?

Xenakis himself answered this question by saying: “When concentration is an indispensable need for civilization, the present urban and design concepts must all be changed and substituted by another.”

The main problem of concentration for society is the inefficiency in the interaction and connectivity within the community. For that, he proposed a creative solution like other megastructures: “distance to be shortened.”

More clarification is observed while comparing the area needed for the cosmic city versus the total number of inhabitants. The same population of the city of Paris of that time, can live in the cosmic city which will occupy only one thousandth of the area of Paris.

“Distance To Be Shortened” is possible with the Hi-Tech technologies where Xenakis believed that the transportation between places will occur through high-speed elevators or escalators. Whereas, to move between cities, helicopters will do the job.

Only one Cosmic City drawing was provided by Xenakis. The Cosmic city is therefore not a perfect model but rather a philosophy of the city. Yet, it is Xenakis’ first attempt to formalize the architectural and urban values.

The very direct description of the proposal of the cosmic city can be “volumetric architecture manifesto”. A concept which Xenakis developed as an alternative to the modernist straight-line and right-angle paradigm, which he considers obsolete and even

obstructive. The idea for the construction of architecture in a monumental scale, "where no two sections are the same"

## Xenakis and Other Visionary Architects of that Time

During the same time Xenakis proposed his concept of the Cosmic City as megastructure, others like Metabolists, Archigram and Superstudio were conducting the same research.

These art movements or architects considered the air, the sea, the desert as the location for their portable megastructure projects. All this conception came out from the growing demographic and ecological issues in the 60s. The cities they designed were usually either over-scaled, unfinished or collection of movable objects.

In his book "Urban Spatialists" Rayner Banham said, all the 1960s art and architecture movements, can be considered visionary. Banham couldn't consider Xenakis as a member of urban spatialists, because the former believed that Xenakis, while designing and writing the Cosmic City, was aware of those architectural movements approach to the urbanism problem. (Sterken, 2010)

### Metabolism Movement

Metabolism is the most prominent new movement in architecture in the 1960s—which was established around the turn of the late 1950's to the beginning of the 1970's.

The term metabolism describes the way in which living cells are preserved. After World War II, young Japanese architects used this word to describe their belief on how to design buildings and towns, which imitate a living being. (Craven, 2019)



Figure 3 City in the Air for the Shinjuku neighborhood in Tokyo

## Archigram

Archigram was a revolutionary architectural community, founded in the 1960s and focused on development in neo-futurism, anti-heroism and pro-consumerism, in order to create an entirely hypothetical reality. (Wikipedia, Archigram, 2016)

Archigram believe was that architecture ideas are to be spread and understood by everyone. They focused on the structure (mega structure) where the city is a network and different parts of the city are interrelate with each other.

The main idea of the network was to combine different programmatic elements (Lego-like architecture).

One of the main goals in their city design was the people's adaptability to technology.

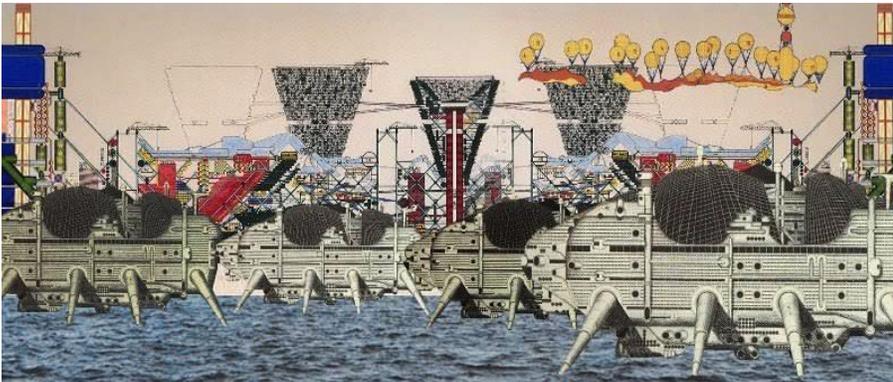


Figure 4 Walking City 1960

## Xenakis and his Colleagues in the 1960s

When Xenakis was asked about his opinion about his colleagues works, he said: "I find them timid next to me." (Xenakis, Arts-sciences alliages, 1979, p. 80)

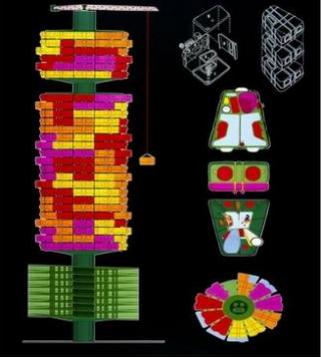
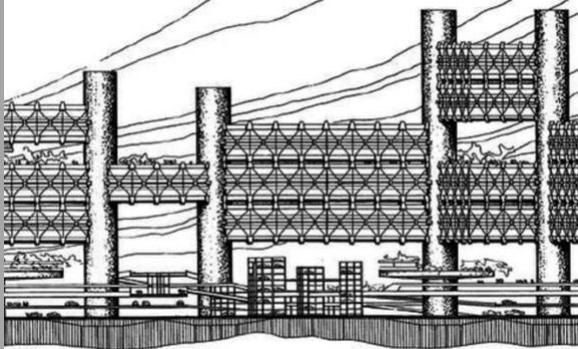
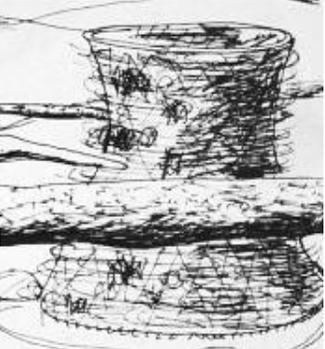
This in away reveals that Xenakis was seeking a utopian set-up in his project.

A side note, the word u-topia is a double meaning word: "nowhere" and "the good place". Throughout time in the domain of urbanism the word was used as a synonym to visionary or fantastic.

Despite Xenakis's thoughts of the other movements in the 60s, they share the same vision: Why is man still petrified by the idea that he has to change his habitat, if he can fly to the moon, split atoms and travel under sea? In the Cosmic City and many other megastructures, technology becomes the dominant ideology to eliminate this backlog of architecture and urbanism. (Sterken, 2010)

But Xenakis' vision of the near future is not that of the immanent leisure culture, contrary to most of his contemporaries (such as Friedman, Constant and Archigram). The Cosmic city, in addition to its high density (between 2,500-3,000 inhabitants / hectare) will also offer the opportunity to rise above the most frequent clouds of 0 to 2,000-3,000 meters. The city's highest density is the main feature of the new discovery and exploration era. The Cosmic City of Xenakis is not a comfortable home for homo-ludens, but a frightening reflection of the uncertain future between Earth and the universe, because it is basically Utopian as the term: "No-Where."

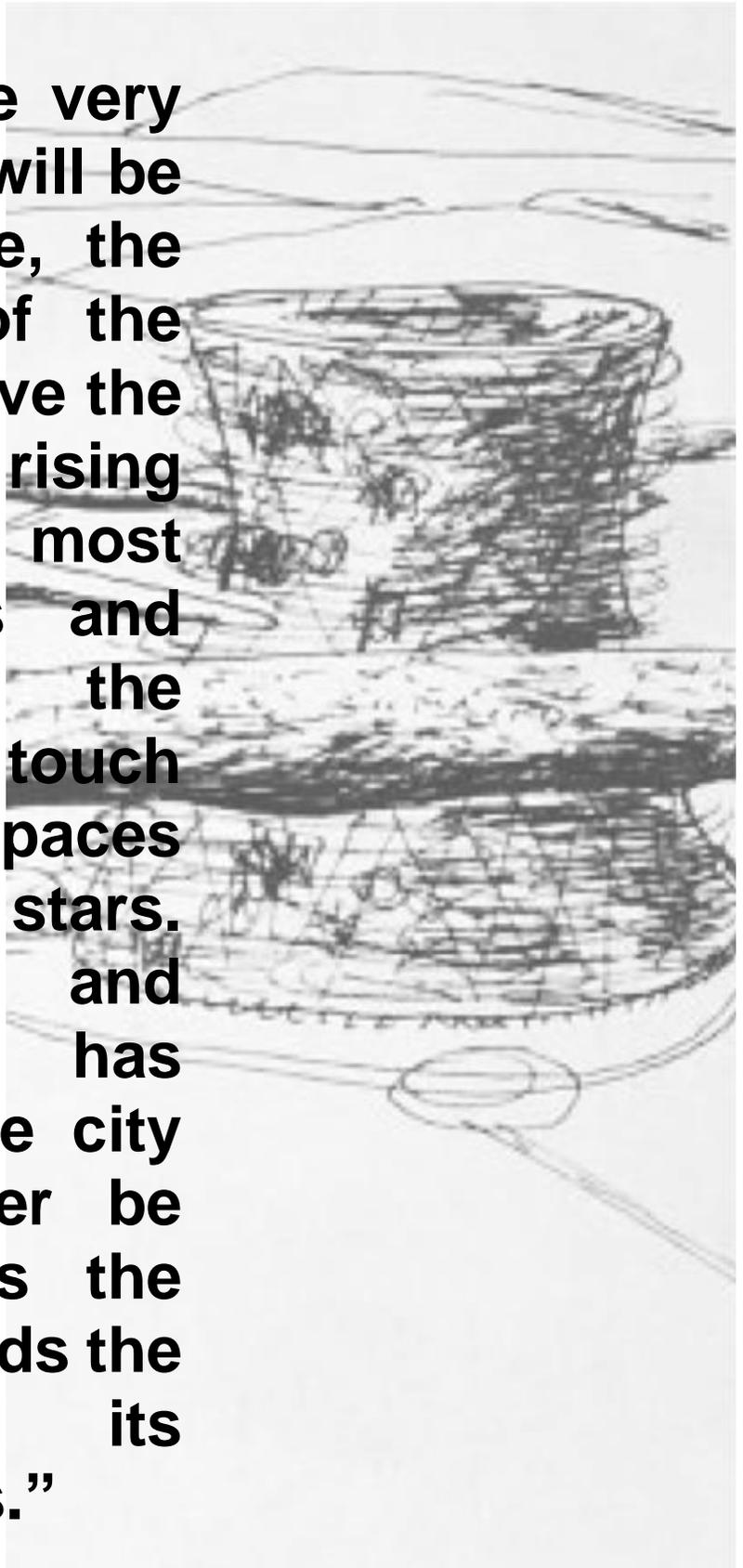
In the Table below, we can see a simple yet clear comparison that brings Xenakis to be a part of the "Urban Sptailists" as per described by Banham.

Capsule Homes// Plug-in city project // Peter Cook// Archigram	The City in the Air// Arata Isozaki // Metabolist Architecture	Cosmic City // Xenakis
		
Capsules as Houses, offices etc.... and can change upon need	Designed as houses units because of the need	Capsules as houses, offices etc. ...
Focus on showing the structure (Pillar // construction approach)	Focus on showing the structure (Pillar // construction approach)	Focus on showing the structure (cylinder hyperbolic // based on mathematics)
Monumental scale	Monumental scale	Monumental scale
Technology as the main goal		Technology as the main goal (Hi-speed elevators, escalators and helicopters)
Movable City	To look like a movable habitat	
Designed with no regards to typography, climate and cultural background.	Designed with regards to the need after the world war II.	Designed with no regards to typography, climate and cultural background.
Not Built	Built	Not Built

These projects are actually “inverted utopians”: not technology, but a new environment that is played a role in society itself. According to Choay, These projects become Techotopian. (Eveno, 1998) Their extreme reductionism, which separates technology from society's internal dynamics, might well be the reason for the present day's most of these visionary projects to look archaic.

As Louis Marin argued convincingly, the Xenakis project can be seen as the science and technology poetry of a different era named as a Utopia of Space Age.

**“Apart from the very high density it will be able to achieve, the great height of the city will also have the advantage of rising above the most regular clouds and bringing the inhabitants in touch with the vast spaces of the sky and stars. The planetary and cosmic age has started, and the city must no longer be geared towards the earth, but towards the universe and its human colonies.”**



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