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## Corbu's Hands

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**Abstract:** The aim of presented paper is to grasp a sense in which Le Corbusier influenced his professional partners within ATBAT at 35 rue de Sèvres in Paris. On the example of Iannis Xenakis (Greek) and Jerzy Soltan (Pole), which curriculum and experience will be superposed, authors wish to analyse a means in which the formation of Le Corbusier's Collaborators induced a profoundly individualistic paths of both apprentices. Moreover it enabled both artists to develop autonomous views on creative activities, which still stayed in mutual compliance. That allows to speculate upon the forcefulness of approach towards passing skills that Le Corbusier applied in his Studio. With a parallel example of two pavilions for the World's Fare Expo '58 in Brussels, it is presented how compatible, despite of being completely different in form, those two projects are.

**Resumen:** El objetivo del artículo es comprender cómo Le Corbusier influenciado sus socios profesionales en ATBAT a los 35 rue de Sèvres en París. Con un ejemplo de Iannis Xenakis (griego) y Jerzy Soltan (polaco), autores desean analizar un medio en el que la formación de Colaboradores de Le Corbusier indujo a profunda individualistas sendas de los dos aprendices. Con un ejemplo paralelo de dos pabellones para Expo'58 Fare del Mundo en Bruselas, se presenta el grado de compatibilidad, a pesar de ser completamente diferente en la forma, son los dos proyectos.

**Keywords:** Le Corbusier; Xenakis; Soltan, post-war architecture, ATBAT, composition.

**Palabras clave:** Le Corbusier; Xenakis; Soltan, arquitectura de la posguerra, ATBAT, composición.

### 1. Introduction

The turmoil of II World War and a vibrant recovery from the trauma in the late 1940s and 1950s; this is a socio-political context of the times when ATBAT (Atelier des Bâisseurs – Builder's Studio) has operated. This particular studio was constructed by Le Corbusier for the purposes of the Unité d'Habitation de Marseille – a vast housing project that was commissioned by the French government as a partial realization of a much bigger theoretical pre-war concept - the Cité Radieuse (Radiant City, 1924). It is also when the Modulor is comprehended in architectural objects – penetrating all scales of elaboration: from an overall structure up to the minutest detail. Ultimately, it is the circumstance in which revolutionary ideas of the mid-war modernism – of an utopian, highly ordered structure that is able to induce certain behaviors in the members of a renewed society - is tested in reality.

In such a context, both: Jerzy Soltan (Pole) and Iannis Xenakis (Greek) independently joined the Studio at 35 rue de Sèvres in Paris. The aim here is to present, what was the nature of the cooperation with Le Corbusier of those two great personas. On those instances it will be analysed how an attitude toward architecture was not taught but induced by the Master and what were the results of such an approach to the young modernists.

## 2. Le Corbusier's Collaborators in the Paris Studio.

In the considered times, among the assistants in Le Corbusier's Studio, besides Xenakis and Sołtan, were Roggio Andreini, Roger Aujame, Georges Candilis<sup>1</sup>, Nicos Chadzidakis, Fernand Gardien, Andre Maisonnier and Andre Wogensky.<sup>2</sup> The Studio played a significant role in spreading ideals of modernism worldwide. Many prodigious adepts were invited to take part in the process of establishing contemporary architecture through the hands of visionary Le Corbusier.

### 2.1 Xenakis in the Paris Studio.

Xenakis<sup>3</sup> was not initially interested in architecture. He started working for Le Corbusier simply to earn a living. Considering his dramatic context of arrival to Paris (1947), those reasons are perfectly understandable. It is worth to remember that at the end he was sentenced to death in absentia by Greek government in 1948<sup>4</sup>. Having no legal documents, heading to USA, he needed to find a way to live in Paris for some period of time. His main interest was in music and he only needed a day job to be able to pursue his ambition.

Xenakis claimed himself, that his consciousness on contemporary architecture practically did not exist. He gained all of the needed knowledge and experience through Le Corbusier: “[he] was the one who taught me to think in architectural terms[...] The main thing I learned from Le Corbusier was the way he solved problems and his attitude to architecture.”<sup>5</sup>

In ATBAT Xenakis was an engineer responsible for calculating the resistance of reinforced concrete. As he stated in one of his articles - that work opened his eyes to “*the bewildering imperialism of technique over architecture*”<sup>6</sup>. He described how easily he could have shaped architectural views in the Studio with his judgements on their structural realisability<sup>7</sup>.

Xenakis was engaged in several important undertakings. He was, inter alia, the main designer of so called Undulating Glass Panes, which was one of the most significant outcomes of Le Corbusier-Xenakis cooperation and resulted in a patent application in 1955. Earlier he participated in works upon the Modulor.<sup>8</sup>

After a while his interest in architecture grew stronger and he asked Le Corbusier to be responsible for an overall project. Thus, he was made a project manager of the La Tourette convent and, later on, for a Philips Pavilion for the Expo'58 exhibition, which will be discussed later in this paper.

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<sup>1</sup> Georges Candilis, due to their mutual Greek friend, was an indirect cause of Iannis Xenakis' employment in ATBAT. (compare with Xenakis & Kanach, 2008, p. 3)

<sup>2</sup> compare with Sven Sterken's *Iannis Xenakis' Architectural Projects: Catalogue raisonne*, in: Kanach, Sh, (ed.), *Music and Architecture by Iannis Xenakis*, p. 294.

<sup>3</sup> Iannis Xenakis (1922-2001) was a Greek contemporary music composer. He graduated in engineering from the Athens Polytechnic Institute, which enabled him to take a job at ATBAT. He developed in architecture through experience with Le Corbusier during 12 years of employment in his Paris studio.

<sup>4</sup> Xenakis participated as a leader in student's demonstrations of Greek Resistance against the Germans in 1941, then in 1945 lost left eye from shrapnel during fighting with the British in Athens.

<sup>5</sup> Xenakis in Balint Andras Varga. *Conversations with Iannis Xenakis* (London: Faber & Faber, 1996), p. 20-22.

<sup>6</sup> Xenakis article in *Le Fait culturel* (Paris: Fayard, 1980), ed. by Gerard Montassier p. 213-228. English version in: Xenakis&Kanach, 2008, p. xvi.

<sup>7</sup> *Ibidem*, p. xvi.

<sup>8</sup> More in: Xenakis & Kanach, 2008, p. 11-48.

## 2.2 Xenakis' impact on contemporary music – background.

Cooperation between Le Corbusier and Xenakis appears as a highly mutual transaction. Both played major roles in constituting and converting their domains (architecture and music). Both had a wide and recognised impact on their followers. Despite of belonging to different generations without a doubt they were the icons of dynamics of the XX century.

As Le Corbusier's influence is widely discussed and commonly known to architects, it is crucial to shortly present the impact of Xenakis on contemporary music. That will allow an understanding of what kind of an artistic personalities were confronted at *35 rue de Sèvres*.

The Greek composer is a canonical figure in his primary field of interest, which is musical composition, for several reasons. Most importantly he introduced indeterminacy to music. Even though there were instances of such experiments before, it was for the first time that a composer envisaged form of the composition (here with a use of a particular stochastic mathematical model), which was indeterminate in detail. *Metastasis* (1953-54) definitively breaks with a static linear thinking (horizontal-melodic / vertical-harmonic) in musical composition, establishing new spatial relationships, which can be regarded only as a whole. It exposes the raw sound material (choice of instruments) while rejecting orchestration (tone color formation) as a separate layer. As a result, a passionate musical work is created, highly expressive, emanating a direct energy. The analogy to Le Corbusier's methodology in this case is clear.

To summarize, Xenakis' importance in the domain of music lays in the conversion of musical form, which from that moment cannot be considered in previously operating terms. Although stochastics are in the center of its justification, the core result lays in widening of emotional expression. *“Mathematical formulas are important primarily for the purpose of analysis of the creative process. Xenakis rightly held that even using traditional instrumental means of expression it is possible to create new sound effects. The important value is in sonoristic properties of a form. Analogous results can be achieved without using mathematical formulas, by purely spontaneous creativity”*<sup>9</sup>.

## 2.3 Jerzy Soltan's experience with Le Corbusier's Studio: “Mais mon cher Soltan, il faut que ce soit beau”

Jerzy Soltan started his adventure with Le Corbusier with a book *“Quand les Cathedrales etaient blanches”* which he got from his fiancée's mother and he felt obliged to read<sup>10</sup>. During the war, as a prisoner of war in Geramn POW camps, he established a correspondence with Le Corbusier, which he considered the “true advanced studies”, along with conversations held with other imprisoned Polish intellectuals. He confronted it with academic studies that he completed in Warsaw University of Technology. It was also in POW where he really understood the essence of creative teamwork.<sup>11</sup>

On the 1<sup>st</sup> of July 1945 Jerzy Soltan arrived at Paris and became a collaborator of Le Corbusier. In ATBAT, as it was mentioned before, he encountered the times of work upon the *Modulor* and the *Unite d'Habitation*. Among other aspects, he was delegated to be a project manager of the town plan of La Rochelle.

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<sup>9</sup> Chomiński, Józef; Wilkowska-Chomińska, Krystyna, *Formy muzyczne, Vol.2: Wielkie formy instrumentalne*, Warszawa: Polskie Wydawnictwo Muzyczne, 1987, p. 820.

<sup>10</sup> Braniewski, W., *Amerykańskie impresje*, in: Introduction to Polish edition of *Quand les Cathedrales etaient blanches - Kiedy katedry były białe. Podróż do kraju ludzi nieśmiałych*, Warszawa: Fundacja Centrum Architektury, 2013, p. 18.

<sup>11</sup> Gola, Jola, Jerzy Soltan. Monografia, Warszawa: Wydawnictwo Akademii Sztuk Pięknych, 1995, p. 316.

Sołtan stayed in Paris only for 4 years (in comparison to Xenakis' 12-years-experience in ATBAT), but that time determined his whole professional career.

After terminating in Le Corbusier's studio Jerzy Sołtan formed a spectacular architectural team back in Warsaw. It was constructed according to the ideals that he had learned in Paris – multidisciplinary of its members enabled complex coding in architectural design and diverted their concerns onto spatial beauty instead of the form-follows-function commandment that was at that times firmly taught in schools.

In 1961 Jerzy Sołtan received an extremely prestigious proposition to become a Chairman of the Department of Architecture at Harvard University (until 1958 occupied by Walter Gropius and then left vacant for several years). Difficulties mounted by the Polish authorities postponed taking this position until 1967.

### 3. World's Fair in Brussels - The Story of two Pavilions.

As interesting as it is elegant, there is an extraordinary occasion to compare the influence of Le Corbusier on both Polish and Greek architect. They were commissioned a parallel architectural projects – pavilions for the same exhibition in Brussels – Expo'58. Both buildings are completely different in form, but show an intriguing sameness in consistency and multileveled artistic disposition. For the sake of grasping the means in which they are composed according to the similar principles, a short presentation and analyses of those instances is required.

#### 3.1 The Philips Pavilion by Xenakis.

Although research upon the Philips Pavilion is vast and widely known<sup>12</sup> in the society of architectural historians, for the purposes of analysis and furtherly employed comparison with the Polish National Pavilion, it is needed to shortly introduce the principal issues.



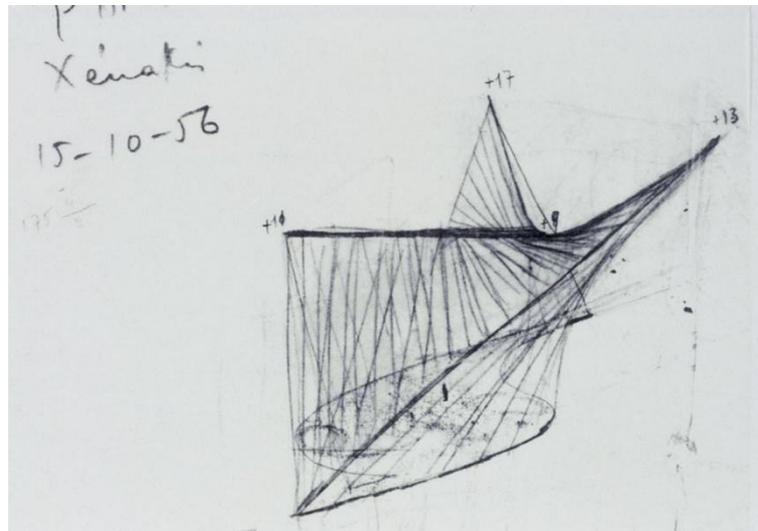
1. Philips Pavilion inner surface of the hyperbolic paraboloid structure with a view on so-called mathematical object, 1958.

Le Corbusier was commissioned to design a Philips Pavilion for the World's Fares Expo'58 by the Artistic Director of the Philips Company, Luis Kalff in 1956. The architect was concentrated on an eight-minute

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<sup>12</sup> Exhausting study is presented in: Treib, M., *Space Calculated in Seconds*. (Princeton: Princeton University Press, 1996), *The Philips Technical Review*, vol. 20 n°1, Eindhoven, 1958/59.

spectacle called *Poème électronique*, while the architectural design was delegated entirely to Xenakis<sup>13</sup>. It is worth to notice that Le Corbusier was at that time deeply involved with the Chandigarh Project and, thus, 34-year-old Greek was left free-handed in designing a spatial disposition of the Pavilion.



2. Xenakis' initial sketches for the Philips Pavilion, 1956.

### 3.1.1 The structure, the material and the mathematical model.

When one sees the preliminary sketches made by Xenakis for the Pavilion, a stunning impression is as if they were made spontaneously, even instinctively. Those hyperbolic paraboloids, despite of being unambiguously defined and precise, produced a tensive spatial relationships that was highly emotional and expressive. Nonetheless, its strictness brought a clear structural solutions that were possible to be developed in reinforced concrete. It certainly pushed the limits of engineering of that time. The only way for structural design of the Pavilion was to work on scale models, by trial and error.<sup>14</sup> It was the same in the case of The Polish National Pavilion, which will be discussed later in this paper.

Here, the final reinforced concrete slabs that formed an outer shell of the building were 5 cm thick and were spanned like a tent on a steel cables that formed a self-supporting surfaces of 22-meters high. Such a structure became an adequate “envelope” for a spectacle, that was composed to present the cutting-edge sound and light technology of a commissioning company.

It is worth to emphasize that in the Philips Pavilion mathematical model were explored explicitly and were the basis for a form of the building. The use of math in the Polish case is different and will be presented later.

### 3.1.2 Fusion of stimuli.

For the purpose of the Philips Pavilion, Edgar Varese<sup>15</sup> was asked to compose a piece of electronic music which was meant to be played in the Pavilion along with diverse visualisations and light spectacles. The inner surface of the shell was packed with sound equipment of 425 speakers in the form of diamonds that enabled the show. The sound was complemented with projections of intriguingly juxtaposed images.

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<sup>13</sup>Description and information based on: Kanach, S. [2008], pp. 93-118.

<sup>14</sup> Xenakis & Kanach, 2008, p. 94.

<sup>15</sup> Edgar Varese (1883-1965) French-born innovative composer of electronic music.

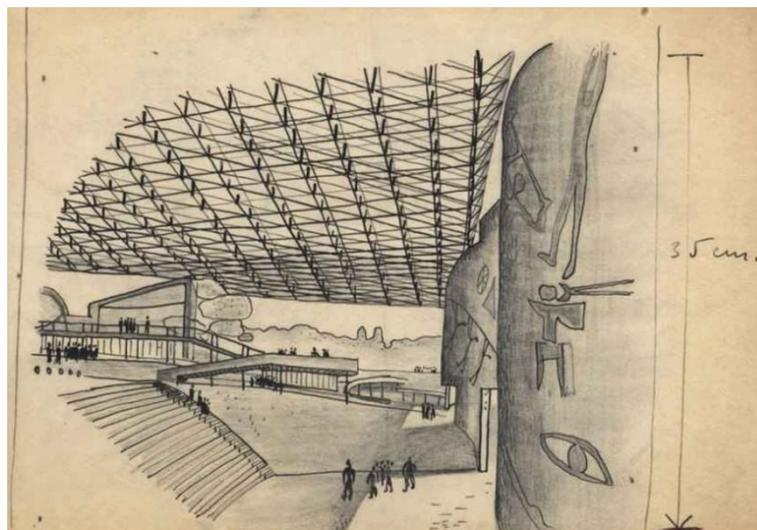
Along with noticing the beauty of the particular aspects of that spectacle, authors wish to reflect upon a specificity of an approach itself. The unbounded flow of stimuli, synaesthesia and the unity of arts were the dream of Le Corbusier himself and was the grounds of Xenakis' furtherly explored research in music and architecture.

As in the scenario for the *Poème électronique*, in the building of Philips Pavilion there is no separate elements. All issues are regarded in an inherent context. The Vitruvian triadic notions cannot be isolated - form, function and structure are intertwined in the sublime interdependence.

Same can be seen in an approach of the Polish crew, led by Jerzy Soltan, in an independent project of The Polish National Pavilion. That was symptomatic and shows plausible grounds to speculate upon the manner of an influence that Le Corbusier had upon his apprentices.

### 3.3 The Polish National Pavilion by Jerzy Soltan and partners.

When Poland was invited to participate in the World's Fair Expo'58 in Brussels (first such an exhibition after the War), in 1956 an open competition was held for a project of a pavilion. Among the 100 submitted works the one titled BX 58 made by Jerzy Soltan received a special award and has been assigned for realization. From the very beginning it was known that it will be a true intermedial opus that will combine the space, cutting-edge technology, visual art, video, changing illumination and sound - avant-garde *musique concrete*. A free non-hierarchical plan with no predefined way and time of exploration in conjunction with an open structure, was a direct application of an innovative approach.

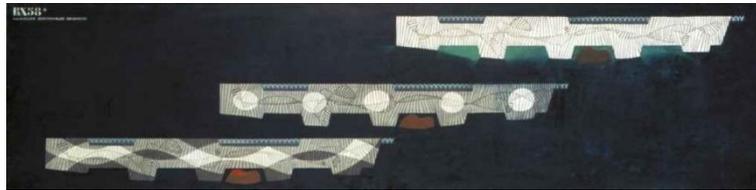


3. The view on the southern wall and the entrance to The Polish National Pavilion for Expo'58, Drawing by Jerzy Soltan, 1956.

The pavilion enabled entering from every direction, the main entrance was not designed. Thanks to the openness and transparency the space was free from oppressiveness. The assigned plot was a part of a park. For the sake of preservation of all existing trees, the team proposed the use of spatial structure as roofing, which allowed to keep openings for tree crowns, as well as a free distribution of supporting columns.

Nevertheless, the precedent aim was to create a space that is acting on the senses directly and in a multi-threaded manner. The engaged tool for such a task was - a synthesis of all arts. Abstract graphics on the main façade was designed according to the variation of mathematical curves and was casted on a folding façade. Such an approach can be ascribed to the participation of a mathematician – structural designer in the Soltan's team. At

night, to emphasize the plastic expression, façade was to be illuminated by moving reflectors. According to the drawings of Wojciech Fangor (a part of the team), it is possible to judge that such a play with light could have been very powerful.



4. The project of a floating illumination with mobile headlights - the Polish National Pavilion. Drawing by Wojciech Fangor, 1956.

After the political changes that followed the year 1956, the vast savings program was introduced in Poland, and project funding has been stopped. The only element that was realized (for the sake of research upon material and structural strength) was a fragment of roofing structure. An alternative simplified project was later on commissioned, but due to the substantial limitation in funding the expressive power of the design significantly diminished. Sołtan's wrote in his notes: *"And then - the slow drying up of the venture....Its smaller version...and its death for.... financial reasons.It is obvious that in this project we were not focusing on the shell or on the framing of the exhibit items or on the <<architecture>> of the exhibit box, but on the issue of COMMUNICATION or on transmitting to the visitor nformation and the mood in the most direct manner. We wanted to use all the means of communication, assaulting simultaneously the largest number of human senses"*<sup>16</sup>

The process of that collapse initiated an increasing misunderstanding of highly innovative assumptions of the BX 58. The team was forced to reply to strong criticism not only of the insufficiency and ineffectiveness of a structural design, but also of the inadequate emotionality of the project. It is worth to mention that Jerzy Sołtan fought for his views forcefully: *"Architecture lacking emotion is not architecture but building. While every work of building that produces emotions becomes "ipso facto" architecture..."*<sup>17</sup>

#### 4. Is there a common spirit of the apprentices of Le Corbusier?

As it is easy to notice in all compositional parallels in presented above pavilions, the manner in which Le Corbusier was forming their architectural partners proved to be very powerful. Surely he did not tend to transmit fixed solutions in architectural design. The reason why Sołtan can be recognized as his apprentice lays more in the way the Polish architect was constructed in the means of an approach to architecture regarded as an abstract phenomenon. Recalling his mentioned earlier in this paper statement upon architecture and emotions, one can purely hear the voice of his Master, when he emphasizes that: *"Architecture has another meaning and other ends to pursue than showing construction and responding to needs (and by "needs" I mean utility, comfort and practical arrangement). Architecture is the art above all others which achieves a state of platonic grandeur, mathematical order, speculation, the perception of the harmony which lies in emotional relationships. This is the AIM of architecture"*<sup>18</sup>

Xenakis was maybe more independent in his convictions on architecture, despite the fact that, as he admitted, before the experience with Le Corbusier at his studio in Paris, he had known very litte of it. Nevertheless, in the

<sup>16</sup> Sołtan, J., Correspondence to Biszo, in: Gola, 1995, p. 320.

<sup>17</sup> Sołtan, J., Fangor, W., Ihnatowicz, Z., Tomaszewski, L., 1956, *Reply to criticism concerning the design* in: Gola, 1995, p. 175.

<sup>18</sup> Le Corbusier, *Towards a new architecture*, Dover Publications, New York, 1986, p. 110-111.

conscious affirmation of the manner on which the Studio conducted their research, he showed the grand formative significance of those 12 years at 35 rue de Sèvres. He wrote about Le Corbusier: “*his way of working was a liturgy, a secret transmutation. Metric proportion, but also the power of space, and functionality, as well as materials, not to mention light, colour, technique...all in a dazzling carousel of interdependence*”<sup>19</sup>.

It was probably this interdependence, that was the most powerful factor in the ferment of Le Corbusier’s Studio.

## 5. Summary – why Corbu’s Hands?

Le Corbusier ATBAT was not just another architectural studio. It was a monastery, where space was contemplated. The new face of contemporary architecture was developed, realised and felt through a direct experience engaging all senses in respond to the full gamut of stimuli.

Xenakis and Sołtan found their individual creative means, developed very different curricula. But authors wish to present one extraordinary rendezvous of those two personas that happened years later. It explains how both artists were formed and deeply structuralised by an experience of being Le Corbusier’s assistants – Cobru’s Hands.

*„And thus with the our first project in the atelier – linked with all its design investigations is a search for the ineffable space (espace indicible), that Le Corbusier wrote and spoke so much about.*

*It seems to me now that I feel that post-cubist space, there at Mokotów, was experienced simultaneously from all sides, and not gradually, as in a step by step process. I don’t know of any other larger spatial realization in Poland that would evoke similar feelings in the viewer. Iannis Xenakis felt and understood those visual events when we visited the stadium together. The spatial sensibility and training of this Corbuserian architect and composer produced faultless reaction. It seems to me, however, that what to a Xenakis was not only a pleasant but also intellectually clear experience, remains for those less initiated simply the pleasure of being there with its causes left unconsidered.”*<sup>20</sup>

## 6. Source of images:

1. Philips Pavilion inner surface of the hyperbolic paraboloid structure with a view on so-called mathematical object, 1958. Source: <http://ad009cdnb.archdaily.net/wp-content/uploads/2011/08/1312860839-image-3.jpg>, access: 8-6-2015.

2. Xenakis’ initial sketches for the Philips Pavilion, 1956. Source: <http://www.iannis-xenakis.org/images/archi/philips2.jpg>, access: 8-6-2015.

3. The view on the southern wall and the entrance to The Polish National Pavilion for Expo’58, Drawing by Jerzy Sołtan, 1956. Source: [http://www.muzeum.asp.waw.pl/collective/pawtucket/index.php/Detail/Object/Show/object\\_id/403](http://www.muzeum.asp.waw.pl/collective/pawtucket/index.php/Detail/Object/Show/object_id/403), access: : 8-6-2015.

4. The project of a floating illumination with mobile headlights - the Polish National Pavilion. Drawing by Wojciech Fangor, 1956. Source: [http://www.muzeum.asp.waw.pl/collective/pawtucket/index.php/Detail/Object/Show/object\\_id/413](http://www.muzeum.asp.waw.pl/collective/pawtucket/index.php/Detail/Object/Show/object_id/413), access: 8-6-2015.

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<sup>19</sup> Xenakis, I., Concerning Le Corbusier 1965, in: Xenakis, I., Music and Architecture, ed. Kanach, S., Pendragon Press, Hillsdale, New York, 2008, p. 121.

<sup>20</sup> Sołtan, J., Correspondence to Biszo, in: Gola, 1995, p.319

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