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## IS THE GAME OVER?

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#### Abstract

The title makes references to the famous definition of Le Corbusier that “architecture is the learned game, correct and magnificent, of forms assembled in light” and discusses the most interesting examples illustrating this definition from the past and from the present. The special case of Gaudi’s architecture is examined in detail and subjected to analysis; this architecture can be defined as “game and play” conducted in a masterly manner in the world of elementary solids.

*Keywords: Architecture, definitions of architecture, organic architecture, Gaudi’s architecture, architectural forms*

#### Streszczenie

Artykuł nawiązuje do słynnej definicji Le Corbusiera, że *architektura jest mądrą i skoordynowaną grą brył w świetle* i omawia najciekawsze przykłady ilustrujące tę definicję z przeszłości i teraźniejszości. Rozwinięto i poddano analizie szczególnie przypadek architektury Gaudiego, którą można określić jako mistrzowsko prowadzoną „grę i zabawę” w świecie brył elementarnych.

*Słowa kluczowe: Architektura, definicje architektury, architektura organiczna, architektura Gaudiego, bryły architektoniczne*

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Architectural games... With respect to the theme of the current conference defined in this manner, it is difficult not to accept the invitation to participate in “architectural games”, in particular with respect to the possibility of using the 50-year individual “research” perspective.

In discussing architectural games, we cannot omit the conclusions of Le Corbusier, the *guru* of my generation, who believed (this is a fact well known to all the conference participants) that “architecture is the learned game, correct and magnificent, of forms assembled in light.” This is so little and, at the same time, so much. What does “the learned game” mean? Which architecture is learned? And which architecture is not learned, i.e. stupid, thoughtless, dysfunctional, ugly, entering the realm of kitsch?

Adopting Plato’s definition of wisdom, architecture should be a result of possessing, but also the ability to apply, the complete knowledge indispensable for making correct decisions. This was a *sine qua non* condition: it was necessary, but was it sufficient? Plato’s ideas were challenged by his own pupil, Aristotle, who believed that knowledge required something more: a series of “specific psychological skills” such as intuition, reflection, creativity, spirituality and grandeur [10, p. 381–392]. Nowadays, wisdom is frequently understood as a compromise or – to use a better word – a balance between ideas and reality, i.e. rationality.

So where is the space for game and play?

In a publication entitled “Relevance of the Beautiful”, Hans Georg Gadamer discusses play, assigning it a key role in creating art and in social communication systems [5]. He wrote: “play is so elementary a function of human life that culture is quite inconceivable without this element”; it was and still is present in man’s religious practices, worship, management systems, multimedia communication systems, etc. “It is worth becoming aware of the elementary fact of the presence of human play and the structure of this presence, so that play in art is manifested not only in a negative manner as freedom from targeted bonds, but also as a free impulse.” [5, p. 29–31]

From the scientific point of view, a game means activities conducted according to strictly defined rules. The game is known in psychology, philosophy and mathematics and these categories are an integral part of the concept of architecture. The psychology of architecture, philosophy of architecture, mathematics and physics of architecture.

Let me pause for a moment at the mathematical and physical games in architecture. Playing with gravity is one of the fascinating architectural experiences. In order to overcome it and to keep playing, it is necessary to erect stable structures, based on solid bases.

The pyramid in Sakkara, one of the oldest monumental structures in Egypt, is an example of striving for prestige and memory with the use of a game consisting in the placement of elementary solids (i.e. mastabas) on top of one another. On the other hand, a Gothic cathedral is a game consisting in striving for balance between height and experimentally formed base – the foundation.

This principle, supported by continually improving design solutions and the use of new technologies, remains present in modern times, as witnessed to by the static and stable Palace

of Culture and Science in Warsaw, the Empire State Building in New York City and the recent architectural highlight of Dubai, the Burj Khalifa Tower.

As history teaches us, a man, and in this case a builder and an architect, plays a permanent game with nature and aims to overcome gravity, not only in the mathematical and physical senses, but also in the symbolic. In order to make it efficient, apart from clear wisdom, the Aristotelian psychological capacity is also necessary: the player's flair. Nietzsche described it in the following manner: "Courageous, untroubled, mocking and violent – that is what Wisdom wants us to be. Wisdom is a woman, and loves only a warrior."

The element of this game is the artistic avant-garde, which created the paradoxical "feedback loop" throughout the history, as noticed by Gombrich. It consists in the fact that every new avant-garde thought that struggles for broader acceptance ceases to be avant-garde after it has obtained such acceptance and after it has become a part of common circulation; subsequently, it falls prey to new innovators, who destroy the previous artistic ideas as obsolete and worthless [6]. The nature of a carefree hothead was revealed by Marinetti who wrote in the Futurist Manifesto: "So let them come, the gay incendiaries with charred fingers! Here they are! Here they are!... Come on! Set fire to the library shelves! Turn aside the canals to flood the museums!... Oh the joy of seeing the glorious old canvasses bobbing adrift on those waters, discoloured and shredded!... Take up your pickaxes, your axes, your hammers and wreck, wreck the venerable cities, pitilessly!". [1] Eventually, Marinetti did not turn out to be a warrior, but a skirmisher, who became a member of the respected Italian Academy of Art, which he initially fought against and despised.

Looking at architectural games and play and being a member of them, as well as a tiny *being* embedded in the existential sphere which, as defined by Porębski, constitutes material processed "anew and always differently" [11], I will venture to make a division of creators of such space, which we tend to call cultural, into three categories: warriors, skirmishers and manufacturers (i.e. those that produce something). These categories can be illustrated by examples, but designation of the bordering lines between them is left to the readers, along with the determination of the point where it is necessary to decide: is the game over? Let it be the individual privilege of every reader.

However, let us go back to Le Corbusier's term of the "learned game of forms assembled in the light." It is impossible to overlook the phenomenon of Gaudi's architecture, as his forms are a result of the special transformation of elementary solids, whereas natural light plays a primary role in this transformation and in final perception. They are the "learned game of forms assembled in the light."

Numerous groups of researchers dealing with interpretation of Gaudi's work believe that, after Vitruvius and Alberti, he is the continuator of the pragmatic understanding of architecture and, at the same time, a pioneer of parametric design<sup>1</sup>. "Learned game of forms assem-

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<sup>1</sup> "Architect Gaudi's extensive use of double curved surfaces in the design of the Sagrada Familia is unique in the field of architecture and an extraordinary example of a pragmatic, yet astonishingly elegant design approach. Representing an outstanding cultural and intellectual achievement, these aesthetics and the underlying geometric concepts are consequently of great public interest yet at the

bled in the light” consisted, in Gaudi’s case, in the creation of a mechanism for transforming elementary Euclidean solids into architectural forms and details. This mechanism, relying on organic forms occurring in nature, interprets them on the basis of mathematical and geometric rules; this issue is discussed in detail by Cameron Browne in a publication entitled “Gaudi’s Organic Geometry.”<sup>2</sup> According to Browne, Gaudi reaches for clear, multi-lateral forms, which he intentionally deforms and provides with more organic shapes. He does this not only via “softening” the surface of polyhedrons, but by applying additional mosaic lining. Browne distinguishes four simple geometric operations softening surfaces, edges and peaks of the initial solids.

- a) Relax: softening, blurring;
- b) Sag: bending, shrinking;
- c) Smooth: smoothing;
- d) Twist: twisting.

Browne shows this process on specific forms and refers to it in individual examples. Among many simulations, it is worth mentioning the tetrahedron (a polyhedron composed of three triangular faces) transformation process by turning it and its “self-permeation” and subsequent extension to the fractal structure and subjecting individual stages to the smoothing process. In effect, we receive forms that are well known from the tops of La Sagrada Familia.

However, it seems that Gaudi delved into the complex relations between Euclidean geometry and forms occurring in nature by applying, in La Sagrada Familia, forms and figures that contradict such geometry and are characterised by self-similarity, i.e. they offer a possibility of unlimited construction of such forms/ figures as a sum of identical fragments in the scale of self-similarity. In other words, this means that we can find identical and similar mutations within a greater fragment of such form/ figure; they are only smaller in size. Such spatial structures, which can be found in multiple works of Gaudi, are currently called *fractals*, and since the 1970’s they have been the object of interdisciplinary research and fractal theory is partly incorporated in chaos theory [8, 9].

An interesting interpretation of Gaudi’s fractals from the Sagrada Familia Church, as well as analysis of shapes (initial forms and manner of transforming them into architectural detail) can be found in a publication penned by Marcelli Giulli Lorenzi from Calabria University and Mauro Francaviglia from the Department of Mathematics of the University of Turin [7, p. 125–145].

Conducting further analysis of the morphology of architectural detail of La Sagrada Familia on the basis of Euclidean geometry, but from the IT and mathematical perspective, they noticed that even though the bodies of the four central towers of the church resemble, via their form, organic termite mounds built by these insects in the form of slender, vertical and spindle-like

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same time anything but easy to understand. The challenge is to explain complex geometry to people of various levels of spatial understanding, and to do this effectively, efficiently and across cultural boundaries such as language barriers.” [4, p. 132].

<sup>2</sup> C. Browne writes: “Gaudi drew inspiration from natural curves, forms and growth patterns, and incorporated these principles into his designs using a process known as organic construction in which one structural idea adds to another and transforms as it grows. His creations are bold, eccentric, and quite often breathtaking; after 100 years they still look fresh and even ahead of their time.”[3].

mounds, they are crowned with tops in the form of pointed pinnacles built of clear geometrical forms relying on a sequence of five Platonic solids<sup>3</sup>. These forms are built upon the principle of combining identical multilateral regular surfaces into multi-sided forms with tops constructed as convergent points for three edges. Combinations of such forms, consisting in juxtaposing and merging them, offer the unique richness of “fractal-derivative” forms:

These are:

- Regular tetrahedron: symbol of fire;
- Regular hexahedron, cube: symbol of earth;
- Regular octahedron: symbol of air;
- Regular dodecahedron: symbol of the universe;
- Regular icosahedron: symbol of water;

The sequence of these forms is not only characteristic for La Sagrada Familia; it can also refer to other works by the Catalan architect. This enables us to conclude that this may be considered a legible, fundamental grammar of shapes in Antonio Gaudi’s architecture. Its morphology consists of these five forms and their derivatives; its syntax is the artistic combination of forms which can be generated thanks to them and arranged in sequential series which are, at the same time, “the learned game of forms assembled in the light.”

Gaudi’s play with forms and shapes built with the use of such forms required proper light displaying the accomplished dynamics of the construction regime. He was aware of the value of light and assigned special significance to it in the perception of architecture, especially in southern geographic latitudes. He believed that true art and beauty are to be searched for and admired in the region of the Mediterranean Sea, as Egypt, Syria, Greece, Rome, Spain and Northern Africa had the best conditions for natural display: thanks to the geographic latitude offering light with an angle of incidence of 45°. Northern light (flat) and zenithal (southern) light deforms objects and hinders observation of its actual values. Therefore, the Mediterranean culture is so sensitive to the richness of forms and shapes existing in nature; what is more, it was capable of using the perfect natural light for mystic and religious purposes<sup>4</sup>.

However, architectural talents are not only born under the southern skies as experience teaches us.

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<sup>3</sup> M. G. Lorenzi, M. Francaviglia: “...These towers are terminated by cusps having a precise geometric form, covered by multicolored ceramic tiles, certainly influenced by Cubism (they were in fact finished around 1920); their pinnacles are a composition of various intertwined geometrical elements (among which Platonic Solids abound: triangular pyramids, cubes, octahedral; but also spheres and other figures;...”[7, p. 130].

<sup>4</sup> Boada I. P.: “Do not go to the north to seek art and beauty, this is found in the Mediterranean; from its shores – Egypt, Syria, Greece, Rome, Spain, North Africa – have come all works of art. In the North and the tropic they do not receive the light at 45 degrees, which best illuminates objects for a perfect viewing; when light is scarce or is overly zenithal, objects with inadequate lighting appear deformed; northerners, instead of the object see the ghost of the object; their heads fill with ghosts and in them fantasy predominates. In the North, literature is fantastic and Gothic architecture, too. We in the Mediterranean do not have eyes accustomed to ghosts but to images, which is why we are more imaginative than fantastic, and therefore more appropriate for the visual arts.” [ 2, p. 92].

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