

Ancient Ideas About the Architecture of the Universe, Their Modernization in Antiquity, and Archaization in the Middle Ages

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ABSTRACT

The article describes in general terms the concept of the world that dominated the imagination and was embodied in the creative activity of man in ancient times. Emphasis is put on the biomorphism of the primordial beings that make up the Earth and Sky and on the most important mythological theme of their separation and distancing one from another, which required special supports. Thus, architectural attributes of the image of a great cosmic structure started to take shape, in which the Earth was seen as a flattened bottom and the sky as a vaulted shell floating above it. The vertical axis of the world, organizing the rotation of celestial bodies, acquired essential importance. Further, the author describes how the ancient natural philosophers saw at the heart of the structure of the Universe the natural distribution of the elements vertically - depending on their weight. At the same time, they recognized the fact that the surface of the Earth is not flat but convex. This led to the discovery of the spherical shape of the Earth and the sky. Aristotle's geocentric model provided the basis for Ptolemy's work, which had practical applications throughout the Middle Ages. However, the advent of the Christian era was marked by a sharp criticism of antique self-consciousness and a programmatic return to archaic cosmological views in their ancient formulation, which provided a basis for the typical features of Christian church architecture as a likeness of the God-created world edifice. Thus, the direct continuity of the development of ancient traditions of architectural forms, increasingly abstracted under the influence of religious creationism, was supported.

Keywords: *Architecture, The Universe, Mythology, Cosmological traditions, The symbolism of forms.*

1. INTRODUCTION

The body of extant myths about the origins of the Universe, known as cosmogonic and etiological, allows us to imagine the most general features of the picture of the world that reigned in the imagination of man in deep antiquity. It is essential for us to find those common features that are of fundamental constructive importance and thus related to the origin of architectural and

construction traditions, whose foundations have, as time has shown, an extraordinary persistence.

After that, it is necessary to characterize the changes in the perception of the cosmos that took place in antiquity. And these changes were very significant, although they did not have a revolutionary impact on the development of architecture.

The third part of this brief study is devoted to the formation of the medieval Christian worldview and its negative attitude towards many of the ideas of antique-pagan natural philosophers. It will focus mainly on the rejection of the Aristotelian concept of the spherical shape of the Earth and the surrounding celestial environment, as contradicting

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the Holy Scriptures. The new historical era was accompanied by an archaization of cosmological beliefs but with a rejection of pantheism in favor of creationism inherent in the monotheistic religion.

This sequence of changing epochs and ideas about the Universe is important to deepen our understanding of the motivations behind the formation of the basic principles of architectural formation and composition, which are able to maintain their universal properties in a variety of historical and cultural situations.

2. THE BIOMORPHISM OF THE UNIVERSE

The most ancient legends about how the cosmos - a bastion of life in the midst of deadly chaos, came to existence tell of gigantic zoomorphic and anthropomorphic primordial beings. It suffices to recall the Mesopotamian Tiamat, the Scandinavian Imir, the Hindu Purusha, the Chinese Pan Gu, as well as Adam from the Dove Book [1]. Without going into the details of the various local traditions, we only note the fact that the bodies of such macrocosmic primordial beings were thought to be receptacles of space for life.

A number of myths tell us that initially, this space was extremely tight, clamped between the opposite sides, which were interpreted as an inseparable pair of congeners or spouses who rested originally in one another's embrace.

For the ancient Greeks, according to the Theogony of Hesiod, this matrimonial pair was Gaia, the Earth, and Uranus, the Sky, which she brought into being. From their union came to life the "chthonic" and "uranic" titans and giants. But the hour came when Gaia decided to break her relationship with Uranus. The myth of how she incited her sons to rebel against their father is well known. The youngest of them, Kronos, had Uranus beheaded and took his power from him [2]. This obviously led to an expansion and filling with the life of the space between heaven and Earth, which was now passive.

In Egyptian mythology, the sky goddess, the cow Nut, and the earth god, the serpent Geb, occur. They, too, were in love with each other and did not want to separate until they quarreled. When this happened, the god of wind and space, Shu, intervened and lifted the cow high above the ground so that she felt dizzy [3]. So, he set up sturdy supports for her. However, the symbols of these props were the four feathers on Shu's

headdress, from which it follows that they were thought to be light, flexible, soaring in the air. In addition, Shu had set this world in motion.

The supports of the sky were apparently also represented in the form of sacred plants, such as lotuses and papyrus, which stylized groves are depicted in the hypostyle halls of Egyptian temples. Multicolumn halls and porticoes bearing slabs associated with the sky are also known to have been created by other peoples of antiquity.

Among Chinese myths, those draw attention, in which the sky is supported by mountains located on four sides of the world as well as one located in the center [4]. Of particular interest is the legend of how the dragon Gonggong destroyed in anger the western mountain Buzhoushan, and as a result, the universal cataclysm broke out. Nuwa and Fuxi took care of the aftermath. Four paws chopped off from a giant tortoise were used as new heavenly supports [5].

The shaking of the foundations of the Universe is also reflected in the Greek Titanomachy, which ended with the victory of the Olympic gods. The conquered titan Atlas was then placed at the western end of the Earth with the responsibility of holding the firmament of heaven on his shoulders [6]. Judging by its location, the Greeks, like the Chinese, believed that the main damage had been done to the western pillar of the sky and that it was necessary to replace it first. This is confirmed by the legend of the destruction of Atlantis, which sank in the western ocean, named after it - the Atlantic Ocean.

The abovementioned examples, the list of which can be extended, make it clear that the Earth was seen as the bottom and the Sky as the cover of the Universe. Our world is enclosed in a cavity between the two of them, filled by oceans of water and air with an island in the middle.

A bivalve mollusk with a pearl inside and a tortoise with its shell consisting of two halves, the ventral one relatively flat and the dorsal - more convex one, may serve as a visual embodiment of such an image of the Universe. However, the mollusk and turtle are still a tightly bound pair of shells. There are animals with much bulkier torsos, showing the full divergence of the thoracic and dorsal regions - analogs of the Earth and sky. Four-legged animals are best suited to comprehend this model of the world, with their thorax and abdomen facing the surface of the Earth and their backs

facing the sky. Their feet or paws correspond to the four cornerstones of the firmament.

The simplest prismatic constructions reproduce exactly this volumetric and spatial structure, widespread everywhere and surviving through the entire history of mankind. They still have at least a nominal connection with the images of totem animals and ancestors. This is evidenced by the names of the parts of a traditional house: the facade is the "face" with its "forehead" and "eyes" of windows decorated with "brows" and "casings," the gates represent the "mouth," the side wings and porches are the "wings." Meanwhile, Russian churches have "heads," "belts," and "feet".

Now it is worth mentioning the central vertical axis, which in some buildings dominates and determines the shape of the crown. The appearance of the rotational motion of the celestial 'roundels' of zodiac animals and wandering luminaries is related to this axis. According to the Bible, the luminaries were set up on the firmament on the fourth day of the Creation in order to illuminate the Earth and keep track of time [7]. From Greek mythology, it can be understood that this took place after the enthronement of Kronos, the titan of time. And for the Chinese, the same stadial change in the organization of the Universe, which came after the collapse of the initial order, may be symbolized by Nuwa and Fuxi whirling in the vortex and intertwining by their snake tails. In the Hindu Puranas and Mahabharata, this corresponds to the description of the plowing of the world ocean [8].

The axis of the rotation of the firmament, pointing towards the North Pole, may have been marked by an initial pole, pillar, or obelisk. And the entire tiered celestial vault, adorned with stars and planets, was obviously represented by the world tree. A similar meaning might be perceived in the image of the world mountain. The folklore likens the heavenly dome to a steep, smooth mountain that is extremely difficult to climb [9]. Such a mountain was also imagined in the form of the upper half of an eggshell. The lower part of the shell was associated with the Earth - the bottom of the Universe. The birth of the world from an egg is depicted in the myths of different peoples of the world [10].

In the architecture of the ancient world, a prominent place is occupied by mountain-shaped, cone-shaped, and pyramidal structures. There is no doubt that they bear an image of a heavenly dome - sometimes broad and flat, and sometimes rapidly soaring upwards and tapering down to a sharp spire.

One might assume that in the latter case, the task was to depict a place of convergence with the axis of the world, stretching towards infinity and drawing the surrounding space towards itself, "folding" it [11].

The tiered pyramids and towers attract attention. They may be regarded as the models of that celestial arrangement which resulted from the inclination of the ecliptic plane in relation to the equatorial one. The zodiacal constellations surrounding the ecliptic move one after another on different levels, while the Sun, Moon, and five observable planets move along the belt of the Zodiac from one level to another, drawing spiral traces in the sky, moving up and down. These geometric figures could be built only on the basis of careful observations of celestial phenomena that encouraged architects to develop abstract geometric thinking, which led them further from their initial thrust towards zoo- and anthropomorphism. However, the image of a snake wrapped around a world egg or a tree trunk has not lost its popularity in the course of history.

3. TURNING FROM A VERTICAL MODEL OF THE UNIVERSE TO A SPHERICAL ONE

Antique Natural Philosophy did not destroy but, in many respects, modernized the above-described ancient ideas about cosmic order. It should be noted that both Greeks and Romans developed quite mature and isolated traditions of architectonic craftsmanship. Although the ancient pagan cults and cosmogonic myths continued to live on, the art became less mystical and more realistic - both in painting and sculpture, while becoming more structural-tectonic in architecture and town planning. The nature of the Earth and Sky was subjected to rational interpretation based on empirical knowledge and logical constructions. The thoughts of the philosophers aimed at cognizing the objective laws of physics.

Gaia and Uranus were not forgotten, but the Earth and Sky came to be seen as a geometrically organized set of elemental substances or forces. The vertical model of the Universe has been modernized. It was based on the principle of distributing the elements according to their density and heaviness: Earth was at the bottom, water above it, the air above that, and fire at the very top. However, there were also ideas about underground fire, and it has been speculated that fire was the

center around which the celestial bodies revolved [12].

The development of astronomy and geography has led to the understanding that the surface of the Earth is not flat or concave but convex. The inhabited oikoumene is situated on the southern slope of a mountain-like planet, with its base submerged in the waters of the world ocean. However, observations showed that the firmament continued into the area where the waters should be spilled. And so, Aristotle, in his treatise "On the Heavens," confidently stated that the Earth has the shape of a sphere enclosed within other spheres - celestial ones enclosed inside one another [13]. However, it is fair to say that the idea of a spherical shape of the Earth had been expressed by Parmenides before him. In the Bible, in the third book of Ezra, the "terrestrial sphere" is also mentioned [15]. But the extensive logical justification of the central position of the Earth in cosmic space, which attracts other elements, belongs to Aristotle.

The geocentric model went against the traditional vertical one, as it established the location of the bottom at the center of the Earth and the top across a multitude of centrifugal directions. However, Aristotle himself did not draw such a conclusion. He did not abandon the ideas of the top and bottom of the Universe being on the axis of the world's rotation; he only proposed to change their places [16]. From the treatise "On heavens" we learn that literally all his contemporaries and predecessors associated the top with the north and the bottom with the south. He found arguments that, in fact, everything is the other way round. It is surprising that in his other treatise called the "Meteorology," Aristotle in no uncertain terms reproduced the generally accepted opinion of the location of the top of the Earth in the north, from where, as from the mountain, all the big rivers flow down to the south [17].

Aristotle's doctrine of a spherical earth, surrounded by sky from all sides, had its supporters and gained a lot of weight. It formed the basis of Claudius Ptolemy's major astronomical work, the *Almagest*, which was successfully used in the practice of chronological calculations throughout the Middle Ages.

In ancient architecture, Aristotle's idea is perhaps most vividly embodied in the grandiose dome of the Pantheon. In the interior of this temple of all the gods, a sphere, the upper half of which falls on a coffered concrete vault, is perfectly

inscribed. And yet, the basic scheme of the Pantheon remained traditional, demonstrating the flat Earth being covered by the firmament [18]. The same can be said of the famous ceremonial hall in the Golden House of Nero, which amazed those present with a ceiling depicting the sky, rotating by means of special mechanisms [19].

4. THE ANTAGONISM AND COMPLEMENTARITY OF THE TWO IMAGES OF THE WORLD

The advent of the Christian era was marked by sharp criticism of ancient science and a programmatic return to archaic cosmological views in their ancient reading. Cosmas Indicopleustes, in his *Christian Topography*, incriminated the pagan - "external" as he called them - philosophers the departure from divine truths into the realm of human self-reflection, nourished by unbelief. He urged Christians to reject such false scholarship as long as its postulates contradicted the truths of Holy Scripture (20).

The first question for him was to determine the form and composition of the envelope of the Universe. Appealing to the opening lines of the book of Genesis, Cosmas Indicopleustes stated that the Earth could not be surrounded by sky on all sides. Only the top of cosmic space is bounded by the sky, whereas below is the Earth, beneath which there is nothing else, for it rests "on its own weight" [21]. The shape of the "case" for life created on the first day is not at all spherical but prismatic, corresponding to its original static state. The Earth has square outlines, and the sky, tightly connected ("stitched") to it on the perimeter, is the same in its basis, but in the top, it is vaulted - held together by an "arch." Moreover, there are two skies: the highest one, of the first day of the Creation, and the one in the middle, which is closest to the Earth and which was created on the second day and is called the "firmament." Thus, the Universe is like an elementary house with a slab between floors [22].

The author of "Christian Topography" categorically rejected the Aristotelian hypothesis that the stars and luminaries move due to the rotation of their carriers - the celestial spheres. He argued that the heavenly bodies do not move by some laws of physics thought out by people, but with the help of angels, carrying them in space, as the Lord commanded [23].

However, Cosmas Indicopleustes regarded the inhabited Earth, like everyone else, as the southern

side of a mountainous island in the middle of the ocean. The sun rises in the morning from behind the eastern horizon and sets in the evening in the west, hiding behind a high mountain with its peak pointing to the north. That the other sides of this island were inhabited was, in his opinion, out of the question. This is evident from the way he ridiculed those who allowed the existence of "antipodes," i.e., people walking on opposite sides of the globe upside down in relation to each other [24].

The comparison of the structure of the Universe with the head of a man given in the "Hexameron" by another early Byzantine author, Severian of Gabala, is noteworthy. A quote from this source reads: "...above the tongue, there is something like a second heaven, which is a firmament. Therefore in Greek, it is called 'Uranisk' Likewise, above are the invisible spheres like the brain, invisible to us, while below there is the tongue accessible to sight. Accordingly, the higher heaven can only be imagined, whereas the lower one can be seen and described in words" [25]. This story, which includes the designation of the sky as Uranus, speaks of the extraordinary persistence of ancient Greek pagan mythology, which coexisted with the biblical doctrine of the Creation of the World.

Researchers of medieval Christian cosmology tend to distinguish two opposing traditions. One of them is proposed to be called "plano-vaulted," the other one - "geocentric," going back to the Aristotelian doctrine. Such Eastern Christian theologians as Basil of Caesarea, George of Pisidia, John of Damascus, and John the Exarch of Bulgaria did not see the need to disprove the ancient ideas about the sphericity of the heavens and the Earth [26]. Probably, they did not know about the way Cosmas Indicopleustes has criticized these representations.

At the same time, there are reasons to speak about the vagueness of the separation of the mentioned traditions. In many canonical, and even more so, apocryphal descriptions of the Universe, the elements of different origins can be traced. To my observations, the reason consists in the mixing of ideas about the Universe as a whole - with the Earth being the bottom of the ocean and the Earth being the dry land, which is only an island in the middle of this ocean. For Cosmas Indicopleustes, this island, after a certain schematization, can be transformed into a floating one and finally likened to a planet, with a firmament of stars and luminaries whirling in the sky.

An opinion was formed, as if the "plano-vaulted" model was widespread only in the Eastern Christian world, while it remained unknown to the West [27]. The Latin patriarch Lactantius indeed spoke out against the sphericity of the Earth. But it is not so much about finding exceptions to the rules, as about accepting the fact that even those who crafted armillary spheres and created the famous European circular maps with their T-shaped divisions into three continents were not sure about the sphericity of the Earth. Many in medieval Europe also did not accept the possibility of the existence of "antipodes" [28].

The description of the imperial orb in the shape of a golden globe with a cross on top is very remarkable in this respect. It embodied the whole world resting on the hand of the sovereign. One may think that it is a likeness of a globe. However, the description tells another story: the sphere frames the vital space inside which the atmosphere, sea, and Earth are enclosed, and due to its weight, the Earth only occupies the bottom of this cavity - "...the bottom full of earthly weight" [29]. The same representation of the Earth as the bottom and an island surrounded by water and enveloped by air is found in the images of some armillary spheres, in Greek Gospel of the XII-XIV centuries, preserved in the Russian National Library [30]. Consequently, the orb could be represented as an eggshell, fusing together the Sky and the Earth.

Architectural embodiments of such a rounded center-axis model of the Universe were rotundas, known from the earliest times in the form of various huts, tepees, yurts, and in monumental Greco-Roman architecture as monopteros or tholos. It can be stated that they were transferred from pagan to Christian architecture without significant changes; fortunately, the late antique scholarship could not modify their ancient cosmological semantics.

However, the predominant form in Christian church-building was the parallelepiped. Most temples of antiquity were also known to be rectangular. Tholoi were rare: they seemed to have been endowed with some special significance. The distinctive feature of the Christian church is a deliberate combination in its structure of orthogonal external outlines with circular inner space, pierced with a vertical axis of symmetry. This refers not only to the cross-in-square churches but also to the columnless and basilical ones, in which the place of intersection of a central nave with a transept is always accentuated in one way or another.

This tells us about the certain correspondence of the church architecture to the "plano-vaulted" model of the Universe, described and very vividly illustrated by Cosmas Indicopleustes [31] in his "Christian Topography." The peculiarity of this model was that it did not reject the other "geocentric" model but incorporated it, placing it in its core.

This fact allows us to assume that in the Early Byzantine period, a consensus was reached among the Church Hierarchs over the question of what the Universe created in the first days of the Creation was and how it should be reflected in the architecture of the church. The work of Cosmas Indicopleustes, of course, could not serve as a guide for this great work, but it did convey to us the very ideas that guided the founders of the Christian church-building tradition.

It should be noted that Western European medieval architecture, for all its differences from Byzantine architecture, followed the same tradition of reproducing the image of the Universe in the form of a quadrangular building. Obviously, the idea of a heavenly veil circling around the Earth did not apply to the entire Universe, but only to our island of land, washed by the cosmic ocean. It was especially important for church architecture to recognize that above this heavenly canopy, at the top of the world, the Lord God himself resides in radiant glory.

5. CONCLUSION

The general conclusion from the aforesaid is that the rise of Christianity over paganism disavowed the discoveries of ancient science and actualized the ancient worldview. Thus, it supported a line of direct continuity in the development of the very ancient traditions of architectural composition. I do not mean to say that it was a hopelessly barbaric age. However, Rome fell, and the Great Migration of Nations occurred, which could not but contribute to the archaization of architectural and artistic thinking. At the same time, Greco-Roman scholarship continued to be valued, especially at court. Arab medieval scholars borrowed much from ancient treatises. And they are known to have helped the revival of science in Europe.

The concept of creationism - that is, not Creation but the Construction of the world by the Creator - became more and more apparent in architecture. This intensified the fight against traces

of pantheistic biomorphism in architecture. But the fundamental model of the Universe remained the very ancient one, not only in the Christian world but also in the Islamic world. To agree with this statement, it is enough to look at the remarkable domes of mosques, madrasahs, and mausoleums, many of which are covered with blue glazed tiles, perfectly conveying the radiance of the rounded sky over the flat, quadrangular Earth.

Most surprisingly, this archaic model in its various architectural interpretations continues to exist in the modern professional subconscious, despite the emergence of completely different ideas about the structure of the Universe.

AUTHORS' CONTRIBUTIONS

This paper is independently completed by Igor Bondarenko.

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