ELEMENTS IN THE PRE-COSMIC CHAOS IN PLATO'S *TIMAEUS*

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ABSTRACT. In this paper I discuss the pre-cosmic state of elements in the *Timaeus,* when they existed as "vestiges of their own nature" (53b2). In the *Timaeus,* Plato distinguishes between two states of the elements: pre-cosmic (47e-53c) and cosmic (53c-57d). While the cosmic state of the elements has been extensively analyzed, the pre-cosmic state remains less clear and continues to be the topic of ongoing scholarly debate. Some scholars share the opinion that in the pre-cosmic state of the world the elements were bodies having certain stereometric forms (e. g. Archer-Hind, Taylor, Mortley, Mohr, Miller etc.). While other scholars believe that there were no bodies, but some forces and qualities placed in the Receptacle (e. g. Cornford, Zeyl, Waterfield etc.). I would like to demonstrate that the first interpretation is more consistent with Plato's overall thought than the second. Firstly, I examine the cosmic state of the elements, shaped by the Demiurge into regular polyhedra, in comparison with the pre-cosmic chaos, described as a "field" of heterogeneous, unbalanced forces. Secondly, I define the status of elements in the *Timaeus*, their role as causes of motion, and the nature of the Receptacle. And finally, I analyze the opinions of ancient commentators on the pre-cosmic chaos, including the presence of primary bodies there and the interpretation of "vestiges" of the elements. I came to the conclusion, that (1) Cornford's interpretation, which posits only forces and qualities in the pre-cosmic chaos, contradicts Plato's fundamental premise that physical movement requires a bodily substrate.*;* and (2) the description of the pre-cosmic state of the world, which suggests the presence of the elements as disordered and unformed bodies, was widely supported by the views of Plato's ancient commentators.

KEYWORDS: Plato, *Timaeus*, pre-cosmic state of the world, primary bodies, qualities, regular polyhedra.

The Cosmic state of the Elements. In Plato's *Timaeus*, there is a distinction between the pre-cosmic (47e-53c) and cosmic (53c-57d) states of the elements. In cosmic state, the elements are shaped by Demiurge in the forms of four of the five regular polyhedra: the tetrahedron (a pyramid) is assigned to fire, the hexahedron

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(a cube) to earth, the octahedron to air, and the icosahedron to water. Surfaces of the polyhedra consist of primary triangles combined in a complex way. These surfaces are constructed out of two, four, six etc. primary triangles (fig. 1). There are two types of primary triangles, a scalene for the tetrahedron, the octahedron, and the icosahedron, while an equilateral for the hexahedron. Plato's theory of the elements has several indisputable advantages over the theories of both his predecessors and followers, precisely over this of Aristotle.

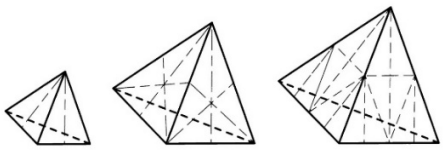

Fig.1 Particles of fire with the different constructed surfaces

According to Opsomer Plato's theory of elements can even be called revolutionary[1]. The first reason is that Plato introduced a quantitative principle as the underlying basis for the description of physical qualities. All physical qualities were reduced to regular, geometrically describable shapes and to calculable quantities. Among the physical qualities that Plato talks about, we can distinguish so called primary and secondary. The primary qualities include mobility, weight and ability to cut. Secondary qualities are products of sense perception: color, taste, temperature, etc[2]. At the same time, such characteristics as mobility are also attributed to geometric figures. Plato offered several criteria of correspondence of the polyhedra to the elements, and mobility is the first of them. In the case of earth, the shape of the primary triangles plays the main role. The earth is the least mobile of all elements. The equilateral triangle belongs a greater stability, so the faces they composed are also more stable (ἀσφαλεστέρα): "the equilateral quadrangle [the square], holds its position with greater stability than does the equilateral triangle, both in their parts and as wholes "(55e)[3]. Therefore, the shape of the cube corresponds to earth. Besides that, Plato proposed an additional argument for identifying the cube with earth: in cosmos, there is no void, the gaps between the larger particles must be filled with the smaller ones (56c–57c). The surfaces of the cubes tide to each other, leaving no room for other elements to penetrate them.

But what determines the mobility of the element, i.e., the type of its state of aggregation, in case of water, air and fire? Plato proposed the following scheme,

[1] Opsomer 2015, 29-30.

[2] Mortley 1967, 15-17.

[3] Unless it is specifically noticed I use Zeyl's translation of the *Timaeus.*

describing the correspondence of remaining polyhedra to the elements in accordance with the increase in mobility and decrease in size:

> And of the solid figures that are left, we shall next assign the least mobile (δυσκινητότατον) of them to water, to fire the most mobile (εὐκινητότατον), and to air the one in between (μέσον). This means that the tiniest body (σμικρότατον) belongs to fire, the largest (μέγιστον) to water, and the intermediate one (μέσον) to air—and also that the body with the sharpest edges (ὀξύτατον) belongs to fire, the next sharpest to air, and the third sharpest to water (56a1–5).

It is clear that fire should have the tiniest body, because it is the most mobile and the lightest, water has the largest particles, and air has the middle ones. In the fragment above, Plato connects not two but three parameters: the mobility of elements – the size of polyhedra – the sharpness of edges. However, the sharpness of edges cannot be considered as an independent parameter. In the series tetrahedron – octahedron – icosahedron, as the number of faces increases, the angles also increase. In the following fragment (56a6– b2) Plato states that in case of fire, air and water the degree of mobility is inversely proportional to the number of faces (βάσεις). The tetrahedron has 4, the octahedron has 8, and the icosahedron has 20 faces. Thus, the largest body of water is the least mobile.

> Now in all these cases the body that has the fewest faces (βάσεις) is of necessity the most mobile, in that it, more than any other, has edges that are the sharpest (τμητικώτατόν τε καὶ ὀξύτατον ὄν) and best fit for cutting in every direction. It is also the lightest, in that it is made up of the least number of identical parts (τῶν αὐτῶν μερῶν) (56a6–b2).

However, the weight of the element is determined not by the size of element, but by the number of identical parts (τῶν αὐτῶν μερῶν). O'Brien explains the way how the number of the identical parts determines the weight of the element[4]. He shows that by the identical parts Plato means primary triangles. So, O'Brien confirmed Cornford's assumption that all primary triangles have the same size, but surfaces of the elements of the same kind can be composed of different numbers of these triangles[5]. Thus, the elements of the same kind can differ in weight. The more primary triangles make up its faces, the heavier it is.

[4] O'Brien 1984, 77

[5] Cornford 1937, 230-231

The second reason why Plato's corpuscular theory so unique and innovative is that he proposed a mathematical method for measuring the transformations of elements. He suggested that all polyhedra can be destroyed into their components up to the primary triangles, so one can calculate how many corpuscles of one type can be formed out of the remains of corpuscles of another type. Therefore, intrinsic properties of each type of the polyhedra determine all interactions between elements. All the movements produced by the elements depend on their geometrical structure. The elements of the same type tend to gather in one region of space. Colliding elements destroy one another. For example, particles of fire are able to cut through particles of water and air, thus bringing out their mutual transformation. Moreover, Plato took a step towards a mathematical description of sense perception, because it is based on the same laws of geometric proportionality. Therefore, in Plato's theory all qualities of the elements form high-level, fundamental, mathematically describable properties.

Motion in the Pre-cosmic Chaos. In the *Timaeus*, the pre-cosmic state of the world was described at least three times. In the first passage, perhaps the most famous, Timaeus says that when God took the visible to put it in order (30 a 3-5): "The god wanted everything to be good and nothing to be bad so far as that was possible, and so he took over all that was visible—not at rest but in discordant and disorderly motion—and brought it from a state of disorder to one of order, because he believed that order was in every way better than disorder" (30a3-5).

In the second passage, the description of the pre-cosmic chaos is more detailed, but also more problematic. Timaeus first stated that before the birth of the heaven, i.e., of all, there were three things: being, space, and becoming. Then he goes on to describe this space as a "field" of heterogeneous, unbalanced forces (52d2-53b5). After that, Timaeus briefly turns to the topic for a third time, saying that before the intervention of God, everything was devoid of order (ἀτάκτως ἔχοντα), and God introduces the principles of symmetry, order, and proportion (69b2-c3).

Status of the Elements in the *Timaeus*. Before Plato, philosophers of nature declared the elements to be the first principles (ἀρχαί) of the cosmos, so they were not a subject of explanation. According to Plato, the elements are neither first principles nor alphabetic 'letters', they are not even syllables. Instead of these, he introduced three other principles needed for cosmos' creation. He doesn't call them ἀρχαί, preferring to name them εἴδη: «There are being, space, and becoming, three distinct things that existed even before the heavens came to be (ὄν τε καὶ χώραν καὶ γένεσιν εἶναι, τρία τριχῇ, καὶ πρὶν οὐρανὸν γενέσθαι)» (52 d 3-2).

If the elements are not the first principles, Plato can question their own nature: «We shall of course have to study the intrinsic nature of fire, water, air, and earth prior to the heaven's coming to be, as well as the properties they had then (τὴν δὴ

πρὸ τῆς οὐρανοῦ γενέσεως πυρὸς ὕδατός τε καὶ ἀέρος καὶ γῆς φύσιν θεατέον αὐτὴν καὶ τὰ πρὸ τούτου πάθη» (48 b 3-5). The cosmos is constructed of them, but what are they by themselves? The discussion about the elements is marked by a new turn in the text of dialog (47e4–5). Up to that point, the story of Timaeus is devoted to "what was crafted by the Intellect" (τὰ διὰ νοῦ δεδημιουργημένα). It was the discussion about intelligent design of the world. Now Plato considers a different order of causes – "that which comes about of necessity" (τὰ δι' ἀνάγκης γιγνόμενα). It turns to be that not only Intellect governs the world – there is another power, which Plato, following the Orphics and Pythagoreans, calls necessity. Plato also calls it the "errant cause" (πλανωμένη αἰτία), by which he meant the agency of elements.

The Elements as Causes of Motion. The first question concerns the character of element's movement, the second – the source of its movement, and the third – the substrate of spatial movement. Analyzing Plato's notion of the errant cause, Cornford asks why he describes actions of the elements as aimless or wandering. For example, fire has the characteristic power of burning heat and it can act only in one way. Plato calls it wandering, because fire's action is not directed by any purpose. Cornford offers a good example: «If I strike a match to light a fire in my grate and warm myself, I am availing myself of the fire's power. The fire is indifferent to my purpose and has none of its own. Yet, within certain limits I can direct its action into a channel leading to a foreseen and purposed end». [6] Cornford underlines that the notion of the necessity as a necessary means for any reasonable activity goes back to the *Phaedo*. In the *Phaedo* (98a6-b3), Socrates gives an account of his early interest in "inquiries into nature", and explains why he was dissatisfied with them: they took no account of the "good". Here Plato makes a distinction (99b) between the "real cause" (τὸ αἴτιον τῷ ὄντι) and the conditions or factors "without which the cause would not be a cause" (ἐκεῖνο ἄνευ οὗ τὸ αἴτιον οὐκ ἄν ποτ' εἴη αἴτιον). For example, Socrates cannot be in prison and stay there without bones and muscles, so they are necessary conditions, but the true cause is his free will to follow courts' verdict. "If you say that without these things, i.e., bones and muscles and the like, I would not be able to do what seemed best to me, you would be speaking the truth" (99a). Thus, the first type of causes answers the question "why", and the second – "how".

As Morrow rightly states: "This passage contains most of the principles that Plato was later to use in the *Timaeus*".[7] The distinction made in the Phaedo between the true and the secondary causes in the *Timaeus* became a distinction between the two types of causality. Plato described the true causes as Demiurge's

[6] Cornford 1937, 174.

[7] Morrow 1950, 150.

agency. Like any other craftsman, he uses materials, which are necessary. They are also causes, but in a different sense, they are "auxiliary causes" (συναίτια, 46cd). In explaining those physical agencies, Plato insists that they all are subsidiary to the final cause. However, even in this case one should not go too far and declare that the agency of "the errant cause" is completely devoid of logic. Taylor gave the example of that, calling it anomalous, exceptional, and singular.[8] Brody pays attention to the fact that the theory of the elements falls under the restrictions of the "likely account". [9] Thus, the physical processes have their own logic and laws, so they can be rationally described.

The second question concerns the source of movement for the elements. The opinions of scholars on this issue differ. Some scholars share the opinion that according to Plato, soul can be the only source of movement, the most zealous defender of this theory was Cherniss.[10] While others suppose that Plato does not reduce all movements to the soul (Festugière, Skemp, etc.). Moreover, as Skemp suggests, the *Timaeus* may even reflect some kind of hylozoism common to previous doctrines on nature.[11] The opinions of modern scholars are more inclined towards the second interpretation. However, the issue still remains unresolved. For present study, our opinion on this matter is not so important, because the question is whether something that is not body can move. The answer must be yes, because the soul is incorporeal, it moves itself and sets the body in motion. But can qualities move without a body? In Plato's cosmology, for all physical movements, which include qualitative changes, the bodily substrate is necessary. Following the corpuscular theory of Democritus, Plato describes qualitative changes (of color, temperature, etc.) in terms of 'division' (διάκρισις) and 'compression' (σύγκρισις), and considers them a result of spatial movements of primary bodies. Thus, all physical movements are reduced to spatial and they need moving bodies.

The Pre-cosmic State of the Elements. In the *Timaeus* the Demiurge creates cosmos on the basis of a previous state of the world rather than *ex nihilo*. Plato described this state as a visible nature in discordant and disorderly motion. Strictly speaking, before the cosmopoiesis earth, water, air and fire were not the elements, but only "vestiges" (ἴχνη) of their own nature. Thus, first of all, the question araises about these traces. Should we consider them as the imprints of intelligible forms, i.e., as bodies, or as imprints of the elements themselves, i.e., as qualities placed in

[8] Taylor 1928, 300.

[9] Broadie 2012, 185–187.

[10] Cherniss 1954

[11] Skemp 1967, 153.

the Receptacle? Plato presents the primordial chaos in the following passage in detail (52d4–53c5):

> And the nurse of becoming, being made liquid and fiery and putting on the forms of earth and air (τὰς γῆς τε καὶ ἀέρος μορφὰς δεχομένην), and undergoing all the conditions that attend thereupon (ὅσα ἄλλα τούτοις πάθη συνέπεται πάσχουσαν), displays to view all manner of semblances; and because she is filled with powers (δυνάμεων) that are not similar nor equivalent, she is at no part of her in even balance[12], but being swayed in all directions unevenly, she is herself shaken by the entering forms, and by her motion shakes them again in turn: and they, being thus stirred, are carried in different directions and separated, just as by sieves and instruments for winnowing corn the grain is shaken and sifted, and the dense and heavy (τὰ μὲν πυκνὰ καὶ βαρέα) parts go one way, and the rare and light (τὰ δὲ μανὰ καὶ κοῦφα) are carried to a different place and settle there. Even so when the four kinds are shaken by the recipient, which by the motion she has received acts as an instrument for shaking, she separates the most dissimilar elements furthest apart from one another, and the most similar she draws chiefly together; for which cause these elements had different regions even before the universe was ordered out of them and created. Before that came to pass all these things were without method or measure (πάντα ταῦτ' εἶχεν ἀλόγως καὶ ἀμέτρως); but when an essay was being made to order the universe, first fire and water and earth and air, which had certain vestiges of their own nature (ἴχνη μὲν ἔχοντα αὑτῶν ἄττα), yet were altogether in such a condition as we should expect for everything when God is not in it, being by nature in the state we have said, were then first by the creator fashioned forth with forms and numbers (διεσχηματίσατο εἴδεσί τε καὶ ἀριθμοῖς).

I have quoted the passage from the *Timaeus* in the Archer-Hind translation,[13] because it reflects the point of view of those scholars, who believe that some imprints of forms are present already in the pre-cosmic chaos. These imprints are stereometric bodies but not complex bodies of living creatures. There are separate particles and their homogeneous conglomerates. Moreover, the presence of primary bodies in the pre-cosmic chaos provides the valid explanation of how the motion arose: it occurs as a result of the tendency of particles to cluster by shape. These motions were not ordered and had no uniformity, because particles had a

[12] Compare with Jowett translation: "The nurse of generation, moistened by water and inflamed by fire, and receiving the forms of earth and air, and experiencing all the affections which accompany these, presented a strange variety of appearances; and being full of powers which were neither similar nor equally balanced".

[13] Archer-Hind, 1888, 187-189.

great variety of shapes. Archer-Hind comment that passage as follows: "The manifold bodies which are generated in space have most diverse and unequal forces, and inequality is the parent of motion".[14]

Irregular polyhedra. Before the publication of Cornford's book "Plato's Cosmology" in 1937, Platonic scholars followed tradition of the interpretation, expressed by Taylor in his "Commentary to the *Timaeus"* (1928). Taylor compares primary particles with roots of Empedocles: "That is, as yet we must not think of the corpuscles of these four 'roots' as having the very exact geometrical structure which is directly to be described. That exactness is introduced by nous or God with a view to an end. But the particles of the medley fall into four main groups imperfectly exhibiting the shapes which are going to be assigned to the four 'roots'. They approximate to being earth, fire, etc., and it is suggested that the approximation is not very close".[15] Thus, in pre-cosmic chaos, there were bodies, which were particles having no regular geometric shapes (1). The like corpuscles had a tendency to cluster in distinct regions of space (2). The wide range of different shapes caused different motions (3). God transformed shapes of the corpuscles into the shapes of the regular polyhedra (4). By vestiges (ἴχνη) of the elements, Plato presupposes the copies or imprints of intelligible forms in the Receptacle before cosmopoiesis (5). Despite the absence of the regular forms in the primordial chaos, the main four kinds were clearly distinguishable. And even though their shapes were not regular, they were resembling regular polyhedral.[16] This interpretation is confirmed by the following passage, which seems to concern the transformation of the elements in their primordial state:

> First, we see (or think we see) the thing that we have just now been calling water condensing and turning to stones and earth (πηγνύμενον ὡς δοκοῦμεν λίθους καὶ γῆν γιγνόμενον ὁρῶμεν). Next, we see this same thing dissolving and dispersing, turning to wind and air, and air, when ignited, turning to fire. And then we see fire being condensed and extinguished and turning back to the form of air, and air coalescing and thickening and turning back into cloud and mist. When these are compressed still more we see them turning into flowing water, which we see turning to earth and stones once again (ἐκ δὲ τούτων ἔτι μᾶλλον συμπιλουμένων ῥέον ὕδωρ, ἐξ ὕδατος δὲ γῆν καὶ λίθους αὖθις). In this way, then, they transmit their coming to be one to the other in a cycle, or so it seems (κύκλον τε οὕτω διαδιδόντα εἰς ἄλληλα, ὡς φαίνεται, τὴν γένεσιν). (49 c-d)

[14] Archer-Hind, 1888, 189.

[15] Taylor 1928, 357.

[16] Mortly, Mohr and Miller.

Plato represents the processes of transformation in terms of mathematics (56c-57c). It is known how many particles of one type are needed in order to get a certain number of particles of another type. In the process of transformation, the particles are destroyed up to the primary triangles. That is why the earth is excluded from the transformation into other elements, as its faces are constructed by primary triangles of a different type. On the contrary, in the pre-cosmic state, all the elements are converted into each other, so the process of transformation has a cyclic character.

In this fragment, Plato appeals to empirical observations of the mutual transformation of the elements, although he does not consider this way of knowing reliable. Firstly, he adds ὡς δοκοῦμεν talking about the condensation of water and turning it into stone, and secondly, ὡς φαίνεται talking about the cyclic character of transformation. So, his doubts are not related to the description of the transformation of the elements in their pre-cosmic state, but to the reliability of empirical observations. Thus, Mortly's explanation helps to understand why the earth could be involved in the process of transformation. Earth particles were not cubes, but figures only close to a cubic form. At the same time, cubic surfaces could be composed not only of equilateral triangles, but of scalene ones (Mortly 1967). It also makes clear what place the irregular polyhedra occupy in Plato's cosmology. This question was raised by Cornford. He discusses the transformations of the elements and suggests that the they occur at the level of the primary triangles, not at the level of the regular solids themselves. However, the irregular figures appear as temporary forms during the transformation of elements. When one element transforms into another, it first passes through a stage where its atomic structure is neither the regular polyhedron of one nor the regular polyhedron another, but something in between. Gregory Vlastos argued against this view, demonstrating that if that were the case, Plato's universe would be filled with irregular shapes[17]. If irregular figures were indeed intermediate stages, Plato's universe would be permanently filled with them, contradicting his emphasis on the Demiurge's imposition of order and the prevalence of regular geometric forms. However in this article Vlastos doesn't offer a fully developed alternative interpretation, having implied that the transformations of elements should be understood at a more fundamental level, perhaps involving the rearrangement of the primary triangles that compose the faces of the regular solids. This would allow transformations to occur without the need for intermediate, irregular figures. In short, Vlastos' article is a powerful critique of a specific interpretation of the *Timaeus*, arguing that it is inconsistent

[17] Vlastos 1967.

with the broader themes and principles of Plato's cosmology. It highlights the importance of considering the overall context and implications of any interpretation of Plato's complex and often ambiguous text.

Qualities vs Substances. However, as Taylor noticed, Plato himself "tells us to think of space as filled with all sorts of sense-data subject to no recognizable law and executing 'random' movements"[18]. On this ground, Cornford strongly criticizes Taylor's position. In his translation of the fragment (52d4–53c5), he abandoned the word "forms", replacing it with "characters":

> "Now the nurse of Becoming, being made watery and fiery and receiving the characters of earth and air, and qualified by all the other affections that go with these had every sort of diverse appearance to the sight; but because it was filled with powers that were neither alike nor evenly balanced, there was no equipoise in any region of it; but it was everywhere swayed unevenly and shaken by these things, and by its motion shook them in turn". (Cornford, 198).

Cornford supposes that before the cosmopoiesis the Receptacle had not received any intelligible form, but was somehow qualified by the main characters of fire, air, water, and earth, i.e. hot, cold, moist, dry and by other "affections" (πάθη). These qualities are also interpreted by Cornford as 'powers' (δυνάμεων) or 'vestiges' (ἴχνη) of fire, air, water, and earth. Many other scholars after Cornford support this explanation.[19]

Cornford's claim that the "vestiges" of elements are not bodies, i.e., substances, rests on his understanding of the previous passage (49a6-50a4), where Plato considers the way of naming the content of the Receptacle. In case of transforming elements, Plato proposes to abandon the words "this" and "that", i. e., nouns, and replace them with word "such", i.e., adjectives (hot or cold, etc.). Plato agrees to call "this" and "that" only the Receptacle, because it never changes. In the preface to his

[18] Taylor 1928, 351.

[19] Waterfield follows Cornford's interpretation. "… the nurse of creation presents a complex appearance (as a result of being moistened and heated, of assuming the characters of earth and air, and of acquiring all the qualities that follow from all this), it is also thoroughly imbalanced (as a result of being filled with dissimilar and imbalanced powers), and not only is it shaken by the things it contains, so that it lurches haphazardly all over the place, but its motion in turn further shakes them. (Waterfield 2008). So does Zeyl. "Now as the wetnurse of becoming turns watery and fiery and receives the character of earth and air, and as it acquires all the properties that come with these characters, it takes on a variety of visible aspects, but because it is filled with powers that are neither similar nor evenly balanced…".

translation of the *Timaeus*, Zeyl call it "A Much-Disputed Passage",[20] referring to the famous work of Cherniss "A Much Misread Passage of the *Timaeus*",[21] which was a turning point in the history of the interpretation of this fragment and caused a lot of controversy. The essence of the dispute was about possibility of naming elements by their proper names – fire, air, etc. Zeyl calls the Cherniss' way of reading the passage an alternative one, and contrast it with the traditional one proposed by Archer Hind and Cornford.[22] According to the traditional interpretation, in this passage, Plato argues that one should speak of fire, water, and the rest of the elements as qualities, calling them "such", and not as substances, that is, not calling them "this". But Plato does not at all forbid us to call them by their usual names ("fire", "air", etc.). Cherniss, on the contrary, argues that Plato goes much further. According to Cherniss, Plato agrees that names can only refer to unchangeable entities, which are ideas and the Receptacle. Thus, Cherniss insists that elements not only cannot be called "this" or "that", but also not named separately, because all the elements convert into each other. Moreover, one cannot give name to any physical thing, since they are mutable ("phenomena cannot be distinctively denominated"[23]).

Plato is well known to refer the names to ideas. Therefore, bodily things can be named only by analogy with corresponding ideas. In the case of the elements in their cosmic state, it is obvious that they have such ideas, which are forms of regular polyhedra. Defending the traditional approach, Zeyl rightly points to the following fragment of the *Timaeus*, where Plato came back to the description of the primordial state of the elements last time: "For at the time they had no proportionality at all, except by chance, nor did any of them qualify at all for the names we now use to name them, names like fire, water, and so on" (69b6-7). Thus, on the one hand, in cosmic state it seems that Plato does not forbid calling fire by name "fire" or water by name "water". On the other hand, in the pre-cosmic state, the elements cannot yet be called by their names, because all of them are only "such as water, etc." Since in the passage 49a6-50a4 Plato speaks of the pre-cosmic state of the elements, Cherniss' interpretation seems to be more reliable than traditional. However, in the case of cosmic state of the elements and other bodily things, Cornford's assumption seems to be excessive and erroneous, because it leads to renunciation of language.

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[20] Zeyl 2000, lvi–lix.

[21] Cherniss 1954.

[22] Traditional interpretation: Gulley 1960; Zeyl 1975; Gill 1987. Alternative interpretation: Lee 1967; Mills 1968; Silverman 1992.

[23] Cherniss, «A Much Misread Passage of the *Timaeus*», 128.

The Receptacle. Though Plato states that the primordial fire cannot be called by name "fire" etc., it does not mean that the elements are qualities or characteristics of the Receptacle. In this fragment, Plato wants to prove that the elements are not the first principles of the cosmos and uses adjectives to describe elements because there is no better way in language to show that they are dependent and non-self-sufficient entities. The qualities also cannot exist independently, they must be placed in some substrate. The Receptacle, in turn, cannot be such a substrate due to its nature. Plato calls it the third kind (τρίτον εἶδος) existing before the cosmopoiesis. The Receptacle cannot be comprehended neither by reasoning nor by sense perception. Nevertheless, it is absolutely necessary, because the images of forms need a place in which they can come to be. That is why Plato calls it "space" (χώρα, 52a8), "place" (τόπος, 52a6) and "Receptacle" (ἕδρα, 52b1). However, Plato offers a number of other comparisons. He compares the Receptacle with "gold", from which various shapes are molded (χρυσός, 50a6), with "recipient of impressions" (ἐκμαγεῖον, 50c2), with "the liquid that is to receive the fragrances" (ἄλειμμα, 50e6). He even calls it "mother" (μήτηρ, 51a4) and "nurse" (τιθήνην, 52d5).

The question about the nature of the Receptacle has been discussed since the Old Academy. Aristotle was the first to identify the Receptacle with his own concept of matter. In the *Metaphysics*, he ranked Plato among those philosophers who taught about two causes – formal and material (Met. 988a7-14). By the material cause Aristotle means Plato's principle of "great-and-small". In the *Physics*, Aristotle declares the principles of physical things: two opposites and the nature, which receives them, that is, matter. The principle of "great-and-small" turns to be this underlying nature (Phys. 192a13-14). Finally, Aristotle states that "in the *Timaeus*, Plato himself identifies the matter and the space (Πλάτων τὴν ὕλην καὶ τὴν χώραν ταὐτό φησιν εἶναι ἐν τῷ Τιμαίῳ)" (209b11–12). The ambiguity of the *Timaeus*, and the interpretation proposed by Aristotle caused many problems. Firstly, according to Aristotle, matter is a substratum and a logical subject that receives definitions. In this respect the matter is similar to the first substance. Secondly, matter has its proper activity: it strives to receive a form and is capable of holding it. How then can it be identical with the space, which is eternal, unchangeable and unaffected by forms? Briefly summarized, Miller proposes the following disjunction; we have four possible interpretations of Plato's Receptacle: "it is either matter, or space, or both, or neither of them".[24]

Algra proposes to change the approach to the interpretation of Plato's concept 'χώρα'. He believes that one should not try to make a choice in favor of one of the solutions, but understand the core of Plato's idea about the Receptacle. Thus, he

[24] Miller 2003, 15.

proposes to keep distance from Aristotle's or other interpretations. Carefully reading the *Timaeus*, Algra notes that when Plato defines the Receptacle as space, he is not talking about its nature, but only about its role or function. The main function of the Receptacle is to receive (τὸ δεχόμενον), which is connected with its very nature (φύσις). In the *Timaeus* 50c-d, the Receptacle is called "nature, which receives all bodies" (τῆς τὰ πάντα δεχομένης σώματα φύσεως). At the same time, it is unchangeable. Thus, the Receptacle eternally receives all things, but is not changed by them. In the same fragment, Plato compares the Receptacle with a material ready to receive any impression (ἐκμαγεῖον γὰρ φύσει παντὶ κεῖται), for example wax. But the wax is not the material of which the thing consists, but only that which takes the impression. Without wax, the impression cannot come into being. In this sense, the Receptacle is a condition for the impressions' emergence. But it does not mean that the Receptacle undergoes any changes and is a part of the things. However, in the *Timaeus,* there are places where Plato speaks of the recipient as an element of physical things and even as ex hou (in the famous analogy with gold, 50a). Thus, the *Timaeus* allows us to interpret the Receptacle not only as space, but also as a constitutive element of bodily reality.

Miller proposes a very elegant solution to this problem. For Plato, the nature of the Receptacle is fundamentally unknowable, but it can manifest itself in different ways. For example, when a seal is pressed on wax, it becomes the place where the impression appears. Wax can even be seen as a material of impression. But up to that moment it was neither the place nor the material of the impression. Thus, the Receptacle can manifest itself in relation to the form either as the material from which the thing is made, or as the space or the place where the thing emerges. But the Receptacle itself is none of these. Therefore, the Receptacle cannot receive any physical quality or power, because they are characteristics of bodily nature.

The primary triangles. Cornford's opinion on the primordial state of the elements was opposed by Mortly (1967). He returned to the question of what the traces mean. If the qualities of the elements are completely determined by geometric structure, how they can exist without the elements? That is why he insisted that in the pre-cosmic state there should have been primary bodies composed out of primary triangles. His opinion was supported by Mohr (1985). He continued arguing for the view that the primary bodies are present even in the pre-cosmic chaos as stereometric particles prior to any intervention by the Demiurge: "the primary particles existed as recognizable, though usually degenerate, forms of what they would become when the Demiurge eliminated their deficiencies and made them,

each and all, completely regular".[25] This interpretation was supported by Miller and Harte.

Nevertheless, following Crombie, Mohr believed that the primary triangles are two-dimensional objects. Plato does not say that the Demiurge created the primary triangles, which means that they always exist. In this case, several questions arise. First, if the primary triangles compose physical bodies, how can they be two-dimensional objects? Second, if they are bodies, how they are composed? Considering the nature of the triangles, Sachs concluded that they are bodies and must be made of some material, because it is impossible to be made of nothing. The only possible material is the nature of the Receptacle. To support this position she reminds Plato's example for the golden triangle. Crombie opposes this concept. He is sure that the Receptacle is shaped by the primary triangles, which are geometric objects. Crombie believes that Plato in the *Timaeus* offers a Pythagorean view on the nature of things, so it is not surprising that he considers physical bodies as consisting of geometric figures. Miller rightly notes that triangles cannot form the Receptacle, because it is not affected by forms. So, she proposes the following solution: the primary triangles are bodies and, like all bodies, they have third dimension. Plato called them triangles homonymous by analogy with the idea of triangle. For example, we can say "a line" or "a circle" when we draw it on a blackboard.

Ancient Commentators on Pre-cosmic Chaos. The notion that the elements were always stereometric bodies is well supported by the evidences of ancient commentators. Among them are Pseudo-Timaeus of Locri, Plutarch, Diogenes Laertius, and Philo of Alexandria. They were the first to face the problem of interpreting Plato's first principles. In *De natura mundi et animae* Timaeus of Locri proposes three main principles of the cosmos: ideas, god and Receptacle, which he followed by Aristotle called matter.

> «According to this account then, before the heaven came to be, the idea and matter, as well as the god who is the fashioner of the better, already existed. Since the elder is superior to the younger and the ordered is prior to the disordered, the god, who is good and who saw matter receiving the idea (τὰν ὕλαν δεχομέναν τὰν ἰδέαν) and being changed in all kinds of ways but in a disordered manner, wanted to put matter in order and to bring it from a condition of indefinite change into a state with a definite pattern of change, so that the differences among the elemental bodies might become proportional and matter might not undergo alterations at random (ἐξ ἀοριστᾶν μεταβολᾶν ἐς

[25] Mohr 1985, 109.

ὡρισμέναν καταστâσαι, ἵν' ὁμόλογοι ταὶ διακρίσιες τῶν σωμάτων γίγνωνται, καὶ μὴ κατ' αὐτόματον τροπὰς δέχηται)".[26]

Thus, elements thought to be bodies and forms, which had been in the Receptacle before the cosmos was created by God. As Baltes noticed, like other Middle Platonists, Timaeus equates matter with the Receptacle. He also puts the ideas, but not their copies in it. Since Timaeus did not see the difference between Aristotelian and Platonic first principles. [27] According to Timaeus, god made the differences among the primary bodies proportional, in order to make their alterations rational in accordance with the new cosmic order.

In the *De animae procreatione in* Timaeo, Plutarch considers the question about the pre-cosmic chaos in detail. Plutarch's special interest is due to his concept of the world soul, new for Platonism. According to Plutarch, the γένεσις has to be identified with a pre-cosmic soul, namely with the irrational soul (ἄνους ψυχή), to which the chaotic and disordered movement of the body before the Demiurge 's intervention is traced back. Plutarch opts for a literal interpretation of Plato's allusions to the pre-cosmic phase, therefore he needs to explain all three named principles (being, space, becoming). Plutarch identifies being with the intelligible cosmos (and sometimes with the Demiurge). The identification of the Receptacle with matter looks unavoidable and even natural for Plutarch as many other Platonists after Aristotle. But the question of the nature of γένεσις appears to Plutarch as more complex. He adopts the axiom that the soul is the only source and principle of motion; even disorderly motion is caused by the soul. This is why Plutarch identifies γένεσις with the soul whose existence would explain movements before the birth of the cosmos. It obviously cannot be the world soul, which is the principle of the ordered movement of the cosmos. Plutarch quotes a long fragment of Plato's text (53 a-b), and summarises it as follows: "So he (Plato) most manifestly teaches that god was father and artificer not of body in the absolute sense that is to say not of mass and matter, but of symmetry in body and of beauty and similarity (σαφέστατα διδάσκων ὡς οὐχὶ σώματος ἁπλῶς οὐδ' ὄγκου καὶ ὕλης, ἀλλὰ συμμετρίας περὶ σῶμα καὶ κάλλους καὶ ὁμοιότητος ἦν ὁ θεὸς πατὴρ καὶ δημιουργός.)"(1017 A).[28] Thus, god does not create bodies, just as he does not create matter; he only brings proportionality to them.

[26] Tobin 1985, 35.

[27] Baltes 1988, 51.

[28] Cherniss, 1926, 205-207.

In the Diogenes Laertius we find the following description of Plato's doctrine of the principles of the world (3.75-77). There are two eternal causes – god and necessity, which he identifies with matter. "Some things are due to reason and others have a necessary cause. The latter being air, fire, earth and water, which are not exactly elements but rather recipients of form (οὐκ ὄντα μὲν στοιχεῖα κατὰ ἀκρίβειαν ἀλλὰ δεκτικά)".[29] The elements came about of matter that is why they are the recipients of form. The adjective δεκτικός is not Platonic, it belongs to Aristotelian tradition. It is found, however, in the *Didascalikos*, in Philo, in Plutarch, and in Neoplatonic texts, so it is a part of the platonic school vocabulary. According to Diogenes, in the pre-cosmic chaos "the primary bodies are composed of triangles, and are resolved into triangles" (ταῦτα δ' ἐκ τῶν τριγώνων εἶναι συντιθεμένων καὶ διαλύεσθαι εἰς ταῦτα). They haven't yet received the forms of four elements and represented a wide range of stereometric forms. Diogenes described the relations between forms and matter in an Aristotelian way and called the forms placed in matter substances: "For it (matter) somehow receives the ideas and so generates substances, and it moves because its power is not uniform, and, being in motion, it in turn sets in motion those things which are generated from it (δεχόμενον γάρ πως τὰς ἰδέας γεννᾶν τὰς οὐσίας, καὶ δι' ἀνομοιότητα δυνάμεως κινεῖσθαι καὶ κινούμενον τὰ γινόμενα ἐξ αὐτῆς ἀντικινεῖν." The presence of forms into matter makes plausible the hypothesis that the world of ideas was already in contact with the Receptacle before the cosmopoiesis. But the forms were incorrectly reflected in matter, so their powers were unbalanced.

Philo follows Plato postulating that the disordered state of the pre-existent chaos is caused by the traces of the forms. The elements moved chaotically and haphazardly in the Receptacle. Runia underlines that Philo's description implies conception of bodily chaos, even if it is not explicitly mentioned. Philo speaks of 'automatic reflection' or 'shadow-reflexes of the Forms' in the Receptacle. But those shadows were indirectly caused by god, because Philo united god and the world of ideas. "De Providentia" (1.22) confirms that Philo supported the common view of Middle Platonists on the pre-cosmic state. The 'water' and 'air' in the Genesis 1:2 had been present before the cosmos came into being. Therefore, they might be identified with the traces of the elements in the primordial chaos of the *Timaeus*. Philo describes the act of creation primarily in terms of a builder constructing a house or a city, or a sculptor shaping a statue. He also declares that the forms are potentially present in unformed matter. So, he obviously relies on Aristotelian doctrine of potentiality and actuality. The question is, in what relation are the traces of forms to the capacities?

[29] Hicks 1925, 343-345

The author of the *Didaskalikos* described the agency of the Demiurge and chaos, paying attention to the notion of the "traces":

> He created it, then, out of the totality of matter. This, it moved without order and randomly, prior to the generation of the heavens, he took in hand and brought from disorder into the best order, adorning its parts with suitable numbers and shapes (ἀριθμοῖς πρέπουσι τὰ μέρη κοσμήσας αὐτοῦ καὶ σχήμασιν), with the result that he distinguished off fire and earth so as to have their present relationship to air and water, whereas they previously possessed only traces and the mere capacity of receiving the potency of the elements (ὥστε διακρῖναι ὅπως νῦν ἔχει πῦρ τε καὶ γῆ πρὸς ἀέρα τε καὶ ὕδωρ, ἴχνη μὲν τέως ἔχοντα καὶ τὸ δεκτικὸν τῆς τῶν στοιχείων δυνάμεως), and agitated irrationally and immoderately that matter by which they were themselves in turn agitated.[30]

English translator of the *Didaskalikos*, Dillon, notes that the expression 'the mere capacity of receiving the potency of the elements' equates the 'traces' (ἴχνη) with the 'potency' (δυνάμεως). Dillon found the explanation of this equation in Calcidius: "the trace signifies the potency of a thing, not the thing itself" («vestigium quippe potentiam rei, non rem significat», in Tim. 377, 1-5[31]). Calcidius considers matter twofold: before and after the cosmopiesis, which he describes as receiving qualities or forms. Before that, matter "was neither at rest nor in motion but had a certain natural ability to receive rest and motion; after taking up the qualities, thus being decorated and made a perfect body by God"(...). So, before the cosmopoiesis, there were no bodies but only the vestiges of the elements. Calcidius compares the vestiges with natural ability of receiving qualities or forms. That is why he is forced to argue that in chaos matter "did not stand and was not moved" ("neque stabat neque movebatur", 375 15-20). The vestiges neither move, because bodies are the only beginnings of motion, nor they are in rest, because it contradicts Plato's text.[32]

The last remark of Calcidius brings us back to the question of how the Demiurge operates when he shapes the elements. What does it mean in Platonic sense to be able to take the form of a regular polyhedron? The description of the Demiurge's first interventions into chaos is presented in passage 53a7 -c3. It begins with a suggestion that all the elements were without proportion or measure (ἀλόγως καὶ ἀμέτρως) in chaos (53a8) and had certain traces of their own nature (ἴχνη μὲν ἔχοντα αὑτῶν ἄττα). "So, finding them in this natural condition, the first thing the god then did was to give them their distinctive shapes, using forms and numbers (οὕτω δὴ τότε πεφυκότα ταῦτα πρῶτον διεσχηματίσατο εἴδεσί τε καὶ ἀριθμοῖς, 53 b 3-5). Later, it

[30] Dillon 1995.

[31] Waszink 1962.

[32] van Winden 1965, 236-237.

is said that the Demiurge produces proportion and measure in each of the primary particles (69b4). Mohr reminded that Plato's theory of relation of measure to artistic production is laid out most fully in the *Statesman*, where the measures are represented as paradigmatic forms (283c-287b). The Demiurge or the craftsman looks at the measures or forms, then he takes what is a degenerate instance of them and makes a perfect instance out of it. This is what precisely the Demiurge is said to do at the beginning of the *Timaeus* (28a, 29a). Miller adds the following analogy between the agency of the Demiurge in the *Timaeus* and the philosopher in the *Republic* (500 d-501 b). The philosopher who arranges the policy, at the beginning must clear the place, purify the souls of people, and only then he begins his creative activity. If to consider this analogy in detail, firstly, the philosopher is the one who has prototypes of things in his soul, that is, the one who has knowledge of eternal and self-identical things (484c7-9). Secondly, Plato explicitly calls the philosopher a craftsman (δημιουργόν, 500 d). Thirdly, that "the city will never find happiness until its outline is sketched by painters who use the divine model" (500e). At the same time, Socrates also offers a method of fashioning:

> "They'd take the city and the characters of human beings as their sketching state, but first they'd wipe it clean (πρῶτον μὲν καθαρὰν ποιήσειαν ἄν)—which isn't at all an easy thing to do. And you should know that this is the plain difference between them and others, namely, that they refuse to take either an individual or a city in hand or to write laws, unless they receive a clean slate or are allowed to clean it themselves. (501a-b).

Based on this analogy, it can be argued that the Demiurge in the *Timaeus* acted in a similar way. First, he freed chaos from all traces of forms that were present in the Receptacle, and then he combined the primary triangles into regular polyhedra.

Conclusion. In conclusion, I would like to underline, that Cornford's interpretation that posit only forces and qualities without a bodily substrate contradicts the fundamental premise of Plato's theory of movement, including qualitative change, which requires a physical body. Plato's own descriptions of pre-cosmic chaos, coupled with his views on the cosmic order, strongly suggest the presence of the elements, albeit in a disordered and unformed state. Texts of Plato's commentators offer a robust defense of the view that the pre-cosmic state was characterized by a chaotic mixture of primary bodies. Further studies may continue to explore the nuances of Plato's cosmology, particularly the nature of the Receptacle and the precise relationship between the pre-cosmic and cosmic states of the elements.

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