THE X OF THE UNIVERSE (*TIMAEUS* 36b6 sq.)*

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The central part of the passage of the *Timaeus* I wish to comment says:

> Next, he sliced this entire compound in two along its length, joined the two halves together center to center like an X, and bent them back in a circle, attaching each half to itself end to end and to the ends of the other half at the point opposite to the one where they had been joined together (Ti. 36 b6 -c 2).[1]

The general explanation of this passage in *Timaeus* 36b6 ss. suggests that the Demiurge traces a geometrical configuration to serve as macro-structure of the universe. With this purpose, lay-outs of the two great cosmic pathways of forces are delineated: the orbit of the Same towards the right, around which the stars of the Zodiac have to turn and the orbit of the Other, towards the left, whereby the planets will soon circle. All this has been made from the total mixture of the numerical portions just previously discussed (35b). The basic combination of this original stuff is constituted from a

mixture of the Same, the Other and the Essence, since the Demiurge had made a complete whole out of the three (35 b1).

Further down in the text, the circuit of the Other is shown to be divided by the Demiurge 'in six places into seven unequal circles, severally corresponding with the double and triple intervals, of each of which there were three' (*Ti.* 36d)[2]. The three circuits mentioned here, 'similar in speed' are a sign of orbits which the outer planets will cross presently: Mars, Jupiter and Saturn. The other orbits account for the circles where the Moon, the Sun, Venus and Mercury will be situated later on. But Plato's text does not refer here to stars or planets yet, but to circles in motion[3] or else, to express it in a terse gloss, it is about *lineae intelligibiles* [4]. It does not seem necessary, therefore, to

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[2]   According to Cornford's translation, *Plato's Cosmology* London 1971 (1937).

[3]   'But Plato's rings symbolise motions and nothing else', F. M. Cornford, *Plato's Cosmology* London 1971 (1937) p. 78.

[4]   'Nos vero dicimus circulos eorum nichil esse aliud quam intelligibiles lineae in illa parte etheris qua currunt, velut si videamus avem aliquam frequenter per eandem partem aeris volantem, dicimus: "hic est semita avis", non aliquid corporale significantes', Guillaume de Conches, *Glossae super Platonem, Texte critique avec introduction, notes et tables par Édouard Jeauneau*, Paris 1965, p. 171. We may say that these circles express the 'all-encompassing' character of the World-Soul, since this soul explains in its entirety the order and regularity of the sensible world (cf. R. D. Mohr, *The Platonic Cosmology,* Leiden 1985, p. 39).

The last configuration of this Chi represents in a certain way 'the indivisibles' of the macro-scheme of the universe. G. Vlastos (*Plato's Universe,* Seattle 1975, p. 70) when analysing the *stoicheia* of the atomists explains how Plato, conscious of the importance of their theories, went much further: 'The indivisibles of his physics were still more remote from the bodies of sense experience: they were not even bodies but only bounding surfaces of bodies'. Analogically, I suggest, the X of the universe represents the 'indivisible' macro-structure of the cosmos —also of a geometric character— in some degree the bounding surface of

insist on armillary spheres or on material models since no kind of sensible objects is at issue[5]. With reference to the text I am commenting, there is nothing to point to vision but to intellect [6].

The matter at issue, then, seems to be the description of a cosmos –with all its complex psychic network– in process of achieving its proper and whole geometric configuration in the mind of the Demiurge. The fusion of its three intermediate component parts denotes the rational character of the Soul, through which this mass of life-force exerts its cognitive capacity. The Soul of the cosmos will become, then, a power eminently intermediate between the indivisible and the divisible; but its present stage of reality is its existence as a project of world in the mind of the Demiurge.

Likewise, the ontological structure of the universe (still as a kind of demiurgic purpose and thought) expresses the impending cognitive activity of the Soul, being an independent and intermediate organization subsisting between the intelligible and the sensible spheres of existence. Therefore, this passage of the *Timaeus* deals with the description of the last phases of the descent from the ideal realities –the paradigm– toward the corporeal, i. e. the framework of the Soul of the World.[7] The intelligible and

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the whole reality of the cosmos.

[5]   It seems not necessary to say here, with Cornford (*op. cit.* p. 74) that 'The language of the myth has here described the construction of a material model of the revolution of the heavenly bodies, an armillary sphere'. Cf. Luc Brisson, *Le Même et l'Autre dans la structure ontologique du Timée de Platon*, Paris 1974 p. 41: 'C'est l'aspect global et définitif de la sphère armillaire construite par le démiurge'. Nevertheless, L. Brisson seems to allude to the process in its entirety.

[6]   These 'visible models' or representations –δι ' ὄψεως– of the sensible evolutions of the heavenly bodies may seem necessary later on (cf. *Tim.* 40d).

[7]   The World Soul becomes then a newly contrived model for the world to come.

numerical harmonization of this Soul symbolises, likewise, its faculty to bring a cosmos into being. On the other hand, the interrelation of the Same and the Other –typified by the configuration of the Chi– is the expresion of this fundamental ontological and epistemological constitution of the Soul. This interrelation is conceived with regard to a world wich is coming into being as an orderly reality.

So, the Demiurge conceives a structural division of the whole intermediate mass 'into two halves' (36b). Beginning from the unique length of this mass the circles of the Same and the Other are derived. Then he conceives a geometric and intellectual combination of these two halves and, finally, he has them pass each other across their respective centres to form the figure of a letter X. This figure, then, is conceived in such a manner that only the opposite angles above and below the Chi are equal, and the adjacent angles are unequal. This intersection of the two halves and their mutual adherence is accomplished, no doubt, as a mental act of immanent and still plane geometry. The cutting of the structure 'lengthwise' –κατὰ μῆκος– is an indication that the elaboration of the figure is set in a bidimensional plane. [8]

Right after this, the Demiuge proceeds to bend this figure over into a circle as he joins the extremes on the opposite side of their first point of contact. By this mathematical action, the God seems to accomplish the last geometric movement through which the hitherto plane X figure –obtained from the interaction of the two lines or strips produced by a progression of intelligible character– reaches stereometric depth by being forced into the concavity of a curve. In a like manner, it is possible to bend the figure of a X in a computer to produce a spherical configuration of volumetric look; that

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[8]   In *Rep.* 527 b7 it is asserted that geometry is 'the knowledge of the eternal being' (τοῦ γὰρ ἀεὶ ὄντος ἡ γεωμετρικὴ γνῶσίς ἐστιν). Cf. *Theet.* 147 e9-148 a4.

figure –from the point of view of the spectator– will be devoided *per se*, as in a drawing, of a third-dimensional material consistency.

The Demiurge had bent round and joined up that figure in order to give it height and density; for when the God started to bend the hitherto bidimensional X figure into a circle and provided it hence with a solid volume of immaterial character, he in fact had managed to design a spheroidal figure. This process consequently, corresponds to a mathematical and decisive progress –realized in the creative mind of the God– previous to any possible dimensional existence of ordered bodies in a spacial universe.[9] This is the reason why the Demiurge takes the whole mental fabric 'round about' (περιξ). The resulting figure is already orbicular, containing one outer and one inner circle, i. e. the motion of the Same and the motion of the Other,[10] though possessing a spiritual consistency but devoid of external movement. The God has only 'named' both movements (ἐπεφήμισεν, *Tim.* 36c) described in a passage preceded by a kind of transitional particles (μὲν οὖν). [11]

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[9]   The Atomists considered very important for the explanation of the world not only the atoms and the void but also the circular motion of the whole scheme of the cosmos. Cf. Lynne Ballew, *Stright and Circular*, Assen (1979) p. 63: 'For cosmos and order to arise, the introduction of circular motion turns out to be essential to counter the dissorder of rectilinear motion'. The bending of the Chi could also allude, in a general sense, to the act of persuasion made by *Nous* on the pre-cosmic realities of generation.

[10]   It is known that the sphere is conceived as comprising within itself the shapes of the regular bodies. O. T. Brendel (*Symbolism of the Sphere,* Leyden 1977 pp. 52-53) concludes that, in the celestial vision of the *Republic*, 'The sky is held together from the outside by bands as a barrel is by staves', and establishes besides a comparison with the passage of *Timaeus* 36b-c.

[11]   'This transitional use is very frequent in prose', J. D. Denniston, *The Greek Particles*, Oxford 1981 (1934) p. 472.

The Chi, then, has two moments: one in which it posseses a plane consistency and another, which coincides with its circular folding. This twofold action points to and signifies both its capacity to revolve and its immanent volumetric condition to be presently exerted around the universe. With regard to the text I am commenting, F. M. Cornford basically reproduces Heath's explanation,[12] who in turn collects an important amount of previous information about the theme. They all basically say that Plato is talking here of a rectangle; but in fact, Plato does not seem to be speaking about rectangles here, although a rectangular figure —or a description of similar nature— appears to be certainly suggested by expressions as 'by the way of the side', 'by the way of the diagonal' or, as T. Heath translates, 'to follow the side' (κατὰ πλευρὰν) [13]. This contrived configuration is finally caused to rotate towards the right (τὴν μὲν δὴ ταὐτοῦ κατὰ πλευρὰν ἐπὶ δεξιὰ περιήγαγεν, 36c5),[14] and naturally it is toward the right of the Demiurge and on our right if we look to the South.[15] Now, the side of the model could hardly be the side of a rectangle (as commentators use to say) since the figure is now

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12   Thomas L. Heath, *Aristarchus of Samos*, Oxford 1966 (1913) pp. 159-164.

13   Heath, *op. cit.* adds: 'To follow the side (of a rectangle)', p. 159. On the other hand, these expressions, as P. Duhem cautiously says, 'assimilent l'axe du monde au côté d'un rectangle et l'axe de l'écliptique, oblique à l'axe du monde, à la diagonale de même rectangle', *Le système du monde, Histoire des doctrines cosmologiques de Platon à Copernic*, vol. 1 p. 52. The matter is well stated by Th. H. Martin (*Études sur le Timée de Platon*, Paris 1841 vol II p. 46): 'ce qui rend ce passage obscur dans le texte grec, c'est que l'auteur, sans parler d'un parallélogramme, dit simplement que ce deux mouvements on lieu, l'un κατὰ πλευρὰν, l'autre κατὰ διάμετρον.

14   Cf. *Laws* 760d 1: 'In a direction from left to right, and that will be towards the East' (if we look to the North).

15   Is it not said in the Psalm 110, 1, 'Dixit Dominus Domino meo sede a dextris meis'?

clearly spheroidal. Therefore, in my opinion, then, this 'side' refers to a *generatrix*. For in a general sense a *generatrix* is a line, point, or figure that generates another figure by its motion. When speaking of displacements and diagonals it may seem helpful to conceive here rectangular figures; but they represent an intermediate and transient phase in the general explanation of this matter. The Chi will soon end in the shape of an orbital sphere. That which circulates toward the right is not any more a rectangle but a sphere originating in the X, as I suggest, by the way of a *generatrix*. Then, it is not about the act of inscribing a rectangle in a circumference but of educing a sphere from a figure 'similar to a Chi' (οἷον χεῖ). So to speak, it is about a geometric action designed to make possible the passage from a plane to a volumetric dimension. Thereby the discourse flows naturally from a plane to a solid geometry by means of a 'no[n] elaborate conceptual machinery',[16] and the language of mathematics 'seems to be completely non-arithmetised'[17]

If the X had turned round its base, it would have generated two cones; conversely, once it was bent orbicularly by the Demiurge (κατέκαμψεν εἰς ἓν κύκλῳ, *Timaeus* 36 b-c) and each end-line was connected with itself (αὐταῖς), and finally, with the other extreme (τε καὶ αλλήλλαις), the Demiurge generates, in fact, a type of sphere. The fixed point of this geometric figure could be considered here to be the middle of the intersection between the two lines of the X with their opposite respective angles. The letter Chi, consequently, having been bent should have generated the orbital figure now supposed to be in motion. Thus the movement 'by the side' (κατὰ πλευρὰν) engenders a

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16   As it is said, in relation to another context, by D. H. Fowler, *The Mathematics of Plato's Academy* Oxford 1990 (1987) p. 21.

17   *ibid.* p. 10.

novel geometric reality by way of a *generatrix*. This shape appears to be an area of intelligible consistency produced by the Demiurge in a decisive and bordering mental activity of his own. The consistency of the narration, despite it being figurative, demands a strict parallel between the progression of the geometric action and the internal order of the account. The new geometric creature –in actual fact a sphere caused to revolve about its axis– is about to earn independent existence and to join itself to the body of the world 'centre to centre' (μέσον μέσῃ, *Tim*. 36e 1).

In the same way the orbit of the Other starts its motion 'to the left by the way of the diagonal' (κατὰ διάμετρον); It seems that here Plato refers neither to the diagonal of a parallelogram but rather to the oblique condition of a circular motion in depth –the revolution of the Other– in a diametrical position to the circuit of the Same,[18] the former then turns toward the left, the latter to the right. By this combined activity, brought about κατὰ πλευρὰν and κατὰ διάμετρον it is made clear that –again from the point of view of the spectator– the movements are both combined and opposite. On the other hand, the sovereing motion (i. e. that of the Same) is said to be caused by the geometric configuration of the outer circle.[19] Thus the Soul is ready to perform its creative activity

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[18]   The motions of the planets will turn obliquely to the outer circle of the Same in a contrary – 'diametrically opposed'– direction to it. On the other hand, pleurav is, according to Mugler (*Dictionnaire Historique de la Terminologie Géometrique des Grecs*) *ad loc.*: 'Nom désignant les segments qui limitent, dans les plans, les figures rectilignes, dans l'espace, les faces des polyédres ou les génératrices des cylindres et des cônes'. Euclide I, def. 20'.

[19]   As LSJ show –at least in Archimedes, pleurav is used (*Sph. Cyl.* 1. 8. 12) in the sense of *generatrix* of a cone or cylinder (pleurai; gavr eijsin tou' kovnou. Cf. ibid. u{yo" de; th;n pleura;n tou' kovnou).

about the world revolving within itself.[20] In this way, the whole mental fabric 'initiated a divine beginning of unceasing, intelligent life for all time' (*Tim.* 36 e4).[21] And this was only possible when all the previous mathematical progressions were considered to be fulfilled in agreement 'to its maker's mind' (κατὰ νοῦν τῷ συνιστάντι, *Tim.* 36 d8). It is here when finally the spacial geometric structure of Soul encounters time by activating itself.

The common use of the term πλευρὰ in Plato is related to mathematics and geometry. In fact its basic sense is that of 'side', whether it is used to describe a certain type of geometric figure –for example when he speaks about the original source of the triangles (*Tim.* 53d; cf. 54c)– or when he considers numbers, since they are 'intermediate', they are therefore 'always contained in greater and smaller sides (πλευρὰ, *Theet.* 148a); in this case of numbers I agree that they are represented by figures of the type of a rectangle: the πλευρὰ is the factor of a specific product. The notion of the side of a quadrangle or a cube, and of a root of a square or cubic number is already found in Euclid. If the root represents a quantity that multiplied by itself a specific number of times gives a definite quantity; and if, on the other hand, that numerical quantity can be represented by geometric figures, it seems natural that the term 'side' could finally signify a *generatrix*, as in fact it does occur in Archimedes. This is the case of a pyramid circumscribed to an isosceles cone whose surface without its base is equivalent to a

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[20]   The circular movements of the world are plainly the result of a noetic activity of God conceived as *Nous*. That is the reason why it is possible to assert (L. Ballew, *op. cit.* p. 84) that 'in fact, regular forward circular motion seems to be in some sense identical with *nous* itself.'

[21]   D. J. Zeil's translation.

triangle that has a base equal to the perimeter of the base of the pyramid; and it is said that 'it has the *generatrix* of the cone as height' (ὕψος δὲ τὴν πλευρὰν τοῦ κώνου) [22].

Therefore, it is about a notion related to generative motions which, as in the situation of the X of the universe, produces –by means of movements to the side and diagonal lay-outs– a spheroidal bi-directional figure. In a similar way, Theon of Smyrna refers to the situation of the unity (ἡ μονάς) which, he says, since 'according to the supreme generative principle, is the starting-point of all the figures, so also in the unit will be found the ratio of the diameter of the side (πλευρά)'.[23]

Therefore, the outline of the X and its mental demiurgic conception, has revealed the original capacity of this figure to sever itself, so to speak, from the immanence of its originative constructor. There was a mental structure for a world to come, a Soul made to embrace the body of the world –while its maker, as a result of these actions, remains now beyond that universe– the whole of all which existed disorderly in the receptacle of generation. This intelligible fabric was conceived to cope with chaos and to persuade necessity; it was conceived, then, as an act of goodness evolving *more geometrico* (if it is possible to state this in a figurative way and say that it acts by means of volumetric diffusive designs) toward the completion of the cosmos.[24] Therefore, a rational order

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[22]   Archimedes, Ed. Charles Mugler, *De la sphère et du cylindre* I, 8, Les Belles Lettres, Paris 1970, pp. 22-23. The term πλευρά in the *Thesaurus Graecae Linguae*: 'Ex usu geometrarum, latus quodcumque figurae cujuscumque'.

[23]   *Greek Mathematical Works* vol. I, Ivor Thomas, Loeb Classical Library, p. 133.

[24]   In conformity with the αἰτία of the generation (cf. *Tim.* 29d) the goodness of the Demiurge is the main *principle* (ἀρκὴν κυριωτάτην, *Tim.* 29 e4) for the existence of the universe. By *diffusive designs* I intend to mean the *descent* of the projected universe from the maker's mind to the realities of the material

compatible with generation and with ideal being has been established in the universe: a cosmos has come into being, as Timaeus says, 'a generated shrine for the everlasting gods'.[25]

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world. The last phases of this evolving image are pointed out this way: 'In virtue of this reasoning, when he framed the universe, he fashioned reason within soul and soul within body, to the end that the work he accomplished might be by nature as excellent and perfect as possible' (*Tim*. 30 b, Cornford's translation).

[25]   *Tim.* 37 c.