Matter Doesn't Matter: On the Status of Bodies in the *Timaeus* (30a–32b and 53c–61c)

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Abstract

Many, if not most, commentators assume that Plato's ontology comprises a notion of matter, which, in some way or other, is thought to be connected with the receptacle of the *Timaeus*, or with the elementary triangles that make up the four elements. Indeed, after Aristotle's critique, the Platonists have near always been pointing out that Plato did have a valid alternative to Aristotle's conception of matter. Yet a careful analysis of Plato's works reveals that he does not have any concept of "matter", but that in explaining the order of the cosmos, he is referring to the existence of bodies, without, for that matter, further analyzing their material component.

Keywords

Plato – *Timaeus* – matter – receptacle – elementary triangles – body – geometric atomism

It takes little more than a quick look at the tenth book of the *Laws* to understand that Plato is an anti-materialist: he reacts against the natural philosophers (Presocratics and contemporaries) who explain the world and the order of the cosmos as the result of a self-development of the corporeal realm. The whole discussion against the atheists in *Laws* x is intended to make this point. The materialistic adversaries are described as follows:

Ath. The upholder of this doctrine runs the risk of conceiving of fire and water, earth and air as the first things in the universe, and of using the name of "nature" as referring to those things, whereas the soul is derived from them at a later stage. And he does not just "run the risk" of doing so, but in his argument he explicitly asserts this.¹

¹ *Laws* x 891c1–5: κινδυνεύει γὰρ ὁ λέγων ταῦτα πῦρ καὶ ὕδωρ καὶ γῆν καὶ ἀέρα πρῶτα ἡγεῖσθαι τῶν πάντων εἶναι, καὶ τὴν φύσιν ὀνομάζειν ταῦτα αὐτά, ψυχὴν δὲ ἐκ τούτων ὕστερον. ἔοικεν δὲ οὐ

And after an analysis of how motion comes to be in the universe, the interlocutors reach the conclusion that soul must be prior to body:

Ath. So our statement was correct, authoritative, entirely truthful and utterly complete, when we said that soul is prior to body, and that body came later and takes second place. Soul is the leader, and body its natural follower.—*Clin.* That is indeed absolutely true.—*Ath.* We have kept in mind, haven't we, our earlier admission that if soul were shown to be older than body, the things belonging to the soul would also be older than the bodily things?—*Clin.* Certainly.—*Ath.* So habits, customs, will, calculation, right opinion, diligence and memory will be produced prior to material length, breadth, depth and strength, as soul is prior to body.—*Clin.* Unavoidably.²

Within soul, the intellect takes pride of place as that which sets things in order:

Ath. "If, my fine fellow," we should say [in reply to the question], "the whole course and movement of the heavens and all that is in them have a nature similar to the motion and revolution and calculation of intellect (*nous*), and proceed in a corresponding fashion, then clearly we have to admit that it is the best kind of soul that cares for the entire universe and directs it along the best path."³

All of this is then used as an invective against those who deny the existence of the gods. For if the heavens and all that is in them are ruled by soul (which is endowed with intellect), then the gods must certainly exist. I have argued

κινδυνεύειν ἀλλὰ ὄντως σημαίνειν ταῦτα ἡμῖν τῷ λόγῳ. Translation taken from Saunders, *Plato: The Laws*. Thoroughly modified.

- 2 *Laws* x 896b10–d4: ΑΘ. Ὅρθως ἄρα καὶ κυρίως ἀληθέστατα τε καὶ τελεώτατα εἰρηκότες ἂν εἴμεν ψυχὴν μὲν προτέραν γεγονέναι σώματος ἡμῖν, σῶμα δὲ δευτέρον τε καὶ ὕστερον, ψυχῆς ἀρχούσης, ἀρχόμενον κατὰ φύσιν.—ΚΛ. Ἀληθέστατα μὲν οὖν.—ΑΘ. Μεμνήμεθα γε μὴν ὁμολογήσαντες ἐν τοῖς πρόσθεν ὥς, εἰ ψυχὴ φανείη πρεσβύτερα σώματος οὕσα, καὶ τὰ ψυχῆς τῶν τοῦ σώματος ἔσοιτο πρεσβύτερα.—ΚΛ. Πάνυ μὲν οὖν.—ΑΘ. Τρόποι δὲ καὶ ἥθη καὶ βουλήσεις καὶ λογισμοὶ καὶ δόξαι ἀληθεῖς ἐπιμέλειαί τε καὶ μνήμαι πρότερα μήκους σωμάτων καὶ πλάτους καὶ βάθους καὶ ῥώμης εἴη γεγονότα ἂν, εἴπερ καὶ ψυχὴ σώματος.—ΚΛ. Ἀνάγκη. Translation taken from Saunders, *Laws*. Thoroughly modified.
- 3 *Laws* x 897c4–9: ΑΘ. Εἰ μὲν, ὦ θαυμασίε, φῶμεν, ἡ σύμπασα οὐρανοῦ ὁδὸς ἅμα καὶ φορὰ καὶ τῶν ἐν αὐτῷ ὄντων ἀπάντων νοῦ κινήσει καὶ περιφορᾷ καὶ λογισμοῖς ὁμοίαν φύσιν ἔχει καὶ συγγενὸς ἔρχεται, δῆλον ὥς τὴν ἀρίστην ψυχὴν φατέον ἐπιμελεῖσθαι τοῦ κόσμου παντὸς καὶ ἄγειν αὐτὸν τὴν τοιαύτην ὁδὸν ἐκείνην. Translation taken from Saunders, *Laws*. Lightly modified.

elsewhere how this conclusion can be drawn from these premises.⁴ For present purposes, however, we should concentrate on Plato's obviously anti-materialistic standpoint. Anti-materialism is, of course, a modern term, but it is worthwhile to raise the question of what it is exactly that Plato is arguing against. In the second text, I admit, I have modified Trevor Saunders' translation, who translated *sōma* on each occasion as "matter." This is incorrect, surely, and it is symptomatic of a reading that—without further ado—imposes onto Plato some basic metaphysical and ontological concepts that we just take for granted. But we must accept the possibility that Plato's philosophical toolkit was less extensive than ours, and look for an unbiased answer to questions such as: What does Plato talk about when he opposes soul to body? What kind of materialism is he arguing against? and—most importantly—does he have a concept of "matter" at all? I believe the answer to the latter question has to be negative, for reasons I will explain.

An age-old view of Platonic philosophy has it that Plato's receptacle is in fact his account of matter. The Middle and Neo-Platonists were eager to prefer Plato's *Timaeus* to Aristotle's *Physics* (and to reject Aristotle's objections against the *Timaeus* expressed in *Physics* IV and in *De caelo*), and argued that the material substrate existed at different levels, the first of which was the recalcitrant receptacle (fully undetermined and formless matter), to be gradually taken up in the Demiurgic design of order. The Aristotelian hylomorphic constellation of matter and form was thus seen as one of the stages, wherein the strictly formless matter had already been subjected to a number of formal determinations. In an Aristotelian vein, the receptacle became the substrate of formation, which differed from Aristotelian prime matter in the sense that the latter was entirely passive and receptive, whereas the difficult and stubborn nature of the receptacle imposed certain burdens and limitations on the imposition of form.⁵

Yet here again, we see later authors adjusting their interpretation of Plato to the philosophical discussions of their days. Many centuries later, it still is not clear if the receptacle has anything to do with matter in Plato's worldview; it might also be referring to his concept of "place" in ways that are not yet fully understood, or to neither matter nor place.⁶ And if the receptacle is not matter,

4 Cf. Van Riel, *Plato's Gods*, 95–103.

5 See Van Riel, "Proclus on Matter and Physical Necessity," for Proclus; Van Riel, "Damascius on matter," for Damascius.

6 See Miller, *The Third Kind in Plato's Timaeus*, 21–32 for a survey of the different interpretation of *chōra*. See also Horn, Müller and Söder (eds.), *Handbuch*, 223–224, where *chōra* is identified as Aristotelian matter ("es handelt sich hier allenfalls um einen Stoff, der ebenso bestimmungslos ist wie die *prima materia* des Aristoteles"), which, in Plato's case, is also

then one finds it elsewhere, namely, in the elementary triangles that make up the four elements.⁷ But maybe we should raise the question in a different way: why would we *have to* look for matter in Plato? Would it make us unhappy if we were to conclude that Plato has nothing to say about matter? Or put in a more relevant way, would it make Plato a lesser philosopher, inferior to Aristotle, if he had no clear view on the role of a material substrate in the cosmos? Does matter really matter?

If we want to answer these questions in a meaningful way, we should turn to Plato's own terms and concepts, and try to understand what the questions were to which they were designed to give a reply. The passages from *Laws* x with which we started (and which belong roughly to the same period of Plato's writings as the *Timaeus*) provide important clues. The main argument of the *Timaeus* sets out to prove that soul is more important than body, and that the cosmos is governed by soul endowed with intellect. If body were to exist on its own, it would be subject to mere chance, and the cosmos would never be a cosmos. What is at stake, then, is a clear-cut explanation of how this intelligent design works, and how it operates on body. This message can well be upheld without elaborating on the material component of body, and it may well be the case that Plato never even felt the need to spell out what this material component was, as it was not important from his point of view.

1 The Perceptibility of the Receptacle

From the very beginning of *Timaeus*' cosmogony, the thing in which the God is to bring order is referred to as "all that was visible":

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.⁸

space [= W. Mesch]; *ibid.*, 57, on the disorderly movement ("Meist versteht man darunter die Ur-Materie") [= J. Söder].

⁷ *Tim.* 53c–56c.

⁸ *Tim.* 30a2–6: βουλευθείς γὰρ ὁ θεὸς ἀγαθὰ μὲν πάντα, φλαύρον δὲ μηδὲν εἶναι κατὰ δύναμιν, οὕτω δὴ πᾶν ὅσον ἦν ὁρατὸν παραλαβὼν οὐχ ἡσυχίαν ἄγον ἀλλὰ κινούμενον πλημμελῶς καὶ ἀτάκτως, εἰς τάξιν αὐτὸ ἤγαγεν ἐκ τῆς ἀταξίας, ἡγησάμενος ἐκεῖνο τούτου πάντως ἀμεινον. See also 30b (τὰ κατὰ φύσιν ὁρατά). All translations are taken from Zeyl, *Plato: Timaeus*.

A few lines further on, this qualification of “visible” is explicitly linked to the corporeal nature of things:

Now that which comes to be must have bodily form, and be both visible and tangible,⁹

adding that nothing could be visible without the presence of fire:

but nothing could ever become visible apart from fire, nor tangible without something solid, nor solid without earth.¹⁰

This means, I take it, that the “material” which the Demiurge was moulding was of a bodily nature, even though at first it was disordered and moving in all directions. Now Timaeus’ account notoriously leaves room for discussion, as visibility seems to be the effect of the Demiurge’s intervention (ordering the substrate into the elements, with fire as the necessary condition for visibility). This is also stated in the conclusion of this passage:

Hence the god set water and air between fire and earth, and made them as proportionate to one another as was possible, so that what fire is to air, air is to water, and what air is to water, water is to earth. He then bound them together and thus he constructed the visible and tangible universe.¹¹

On the other hand, visibility had been there from the beginning, as indicating that which the God found before him when he first started to work. This contradiction vexed commentators of old.¹² As there seems to be no solution to it, any account will be fallible. But it does not seem too outlandish to suppose that the initial visibility of the receptacle may be linked to the presence of the “traces of the forms,” mentioned in Timaeus’ account of the role of Necessity as a third kind (from 48e onwards). Here again, visibility is introduced as belonging to

9 *Tim.* 31b3–4: Σωματοειδές δὲ δὴ καὶ ὁρατὸν ἀπτόν τε δεῖ τὸ γενόμενον εἶναι.

10 *Tim.* 31b5–6: χωρισθὲν δὲ πυρὸς οὐδὲν ἄν ποτε ὁρατὸν γένοιτο, οὐδὲ ἀπτόν ἄνευ τινὸς στερεοῦ, στερεὸν δὲ οὐκ ἄνευ γῆς.

11 *Tim.* 32b3–8: οὕτω δὴ πυρὸς τε καὶ γῆς ὕδωρ ἀέρα τε ὁ θεὸς ἐν μέσῳ θείας, καὶ πρὸς ἄλληλα καθ’ ὅσον ἦν δυνατὸν ἀνά τὸν αὐτὸν λόγον ἀπεργασάμενος, ὅτι περ πῦρ πρὸς ἀέρα, τοῦτο ἀέρα πρὸς ὕδωρ, καὶ ὅτι ἀήρ πρὸς ὕδωρ, ὕδωρ πρὸς γῆν, συνέδησεν καὶ συνεστήσατο οὐρανὸν ὁρατὸν καὶ ἀπτόν.

12 Proclus, for one, sees visibility as the effect of the Demiurge’s intervention, reading πᾶν ὅσον ἦν ὁρατὸν at 30a as an anticipation: *In Tim.* I 383.1–22.

the second kind, i.e. the sensible world (“the second, an imitation of the model, something that possesses becoming and is visible”).¹³ Yet the discussion of how the four elements are present in the third kind contains some interesting observations: the receptacle is subject to a permanent flux of transformations, whereby earth, water, fire and air are never present as such; the ever-moving qualities of the receptacle do not allow one to “put one’s finger” on one specific quality as “this” (τόδε or τοῦτο, 49d–e). The only definite thing we can point at is the substrate in which these transformations take place. In itself, this receptacle is invisible and formless (ἀνόρατον εἶδος τι καὶ ἄμορφον, 51a7). Hence Timaeus’ repeated question about how the existence of the four elements is to be conceived—a question which he now reformulates as follows: do fire and the other elements exist in themselves (ἄρα ἔστιν τι πῦρ αὐτὸ ἐφ’ ἑαυτοῦ, 51b7–8), i.e. as corresponding to intelligible forms (see 51d4–5)? The receptacle does not seem to bear these elements in their pure form, as it is always shaken, like a winnowing basket, at one moment being fluid, then burning, then taking the shape of air or earth, in an unstable state of ongoing transformations. It is in this context that the “traces of the forms” are discussed:

Indeed, it is a fact that before this took place the four kinds all lacked proportion and measure, and at the time the ordering of the universe was undertaken, fire, water, earth and air initially possessed certain traces of what they are now. They were indeed in the condition one would expect thoroughly god-forsaken things to be in. 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.¹⁴

I think the status of these “traces” is often misunderstood, as if the qualities they represent were created somehow by the Demiurge. However, the problem is not that the qualities of the four elements were not present before the Demiurgic intervention, but rather that their perpetual flux did not allow there to be fixed entities like the elements. For indeed the presence of the qualities in the receptacle before the Demiurge’s intervention does not seem to be in doubt: the receptacle, though quality-less on its own, does undergo the flux of qualities. The problem at issue is the unstable nature of the flux, and the lack

13 *Tim.* 48e6–49a1: μίμημα δὲ παραδείγματος δεύτερον, γένεσιν ἔχον καὶ ὁρατόν.

14 *Tim.* 53a7–b5: καὶ τὸ μὲν δὴ πρὸ τούτου πάντα ταῦτ’ εἶχεν ἀλόγως καὶ ἀμέτρως· ὅτε δ’ ἐπεχειρεῖτο κοσμεῖσθαι τὸ πᾶν, πῦρ πρῶτον καὶ ὕδωρ καὶ γῆν καὶ ἀέρα, ἔχνη μὲν ἔχοντα αὐτῶν ἅττα, παντάπασί γε μὴν διακείμενα ὥσπερ εἰκὸς ἔχειν ἅπαν ὅταν ἀπῇ τινος θεός, οὕτω δὴ τότε πεφυκότα ταῦτα πρῶτον διεσχηματίσαστο εἶδεσί τε καὶ ἀριθμοῖς.

of order that would allow one to recognize the presence of fire, water, earth, and air in it, and yes, even the recognition of “motion” in this pre-cosmic state would presuppose the existence of separate entities.¹⁵ All of this is what the Demiurge offers. So, strictly speaking, it is absolutely correct to say that “there was no fire, water, etc. in the receptacle.” But the receptacle *was* burning, watery, earthy and airy before the ordering began. I take this to mean that the qualities of the four elements were there, before the Demiurge’s intervention; yet they were floating around, and nothing determinate or stable came out of this.¹⁶ The Demiurge set things straight, so as to “give those elements their distinctive shapes, using forms and numbers.” Now, at last, fire, etc. can be recognized as such, and as participating in the intelligible forms, whence they also get a stable and permanent nature.

This may, then, be the reason why the “thing” that the Demiurge found before him was called “all that was visible”: it would have been a chaotic whirl in which you could identify nothing steady: one moment you would see something that looks like fire, but before you realized this, it would have become something else already. But it could well be described as “visible.”

If this is true, then we should say that even in its pre-ordered state, the whirling chaos would be corporeal (as corporeality is explicitly linked to visibility), again with the qualification that the moment you recognize something like a body in it, it will have become different already. Whatever else the receptacle may be, it does not look like it is the “matter” out of which the bodies are composed. It might be the “place” in which bodies occur, but I am more than happy to leave open the question of what this “place” might be. My question here does not concern the status of the receptacle as such, but rather the reverse: if there is matter in the *Timaeus*, would the receptacle then be a good candidate to locate it in? And despite the incongruities Plato leaves open, I think we can conclude that the receptacle is not the material component of the universe (in the sense of “prime matter”), but that it is of a bodily nature, i.e. something in which visible bodies occur under the guise of floating constellations of qualities.

15 Cf. Johansen, *Plato's Natural Philosophy: A Study of the Timaeus–Critias*, 96–97.

16 One might even go as far as to assume that these floating qualities may have come together in an “elemental” combination, i.e. that they became fire, or earth, water, or air for a short and unstable moment. That may explain how the receptacle became fiery or “burning”: it would, by mere accident, have the aspect of what the Demiurge was to install in an ordered and permanent way as the element of fire.

2 Plato's Geometric Atomism

If we can take for granted that the receptacle is of a corporeal nature (and not material, in the sense of prime matter), we ought to look further down in Timaeus' account to find clues about where Plato might discuss matter. The place to be is then certainly the account of the composition of the elements out of elementary triangles at *Tim.* 53c–61c. This theory has come to be referred to as “Geometric Atomism,” meaning that the elementary triangles are the indivisible atoms, the composition of which constitutes the four elements as specific solids, out of which the entire bodily world is made.¹⁷

Our question should then be, are those triangles Plato's version of “matter”? Do they correspond—*mutatis mutandis*—to Democritus' atoms in that sense, that they are the bulk or mass out of which a body is composed? That is at least what Aristotle suggests in his *De generatione et corruptione*, comparing Plato's planes to Democritus' solids.¹⁸ Aristotle's criticism of Plato's theory is elaborated in his *De caelo*, which is the oldest extant text that confronts Plato with the shortcomings of his alleged theory of matter. At the end of the third book, Aristotle raises a number of objections (amounting to 15 in total, on Simplicius' count) against Plato's theory of the elements.¹⁹ Most of them deal with specific points about specific elements. Some, however, have a more general bearing. The fourth one in particular is important for our present purposes:

Further, those who would hold these views must needs suppose that generation does not start from a body. For what is generated out of planes cannot be said to have been generated from a body.

tr. J. L. Stocks²⁰

Aristotle here opposes the two-dimensional nature of the planes to the three-dimensional structure of the body, stating that if things are generated from a plane, then the generation of bodies comes from something incorporeal,

17 The relation between this part of the dialogue and the discussion of the receptacle is not clear; see, for an evaluation of possible positions, Miller, *Third Kind*, 186–195.

18 See, e.g., Aristotle, *De gen. et corr.* I 2, 315b24–32; also I 8, 325b25–34.

19 For a full presentation of the objections and the Neoplatonic reactions against them, see Mueller, “Aristotelian Objections and post-Aristotelian Responses to Plato's Elemental Theory.”

20 Aristotle, *De caelo* III 8, 306a23–26: “Ἐτι δ' ἀνάγκη τοῖς ταῦτα λέγουσιν οὐκ ἐκ σώματος ποιεῖν γένεσιν· ὅταν γὰρ ἐξ ἐπιπέδων γένηται, οὐκ ἐκ σώματος ἔσται γεγονός. All translations taken from Stocks, *On the Heavens*. Cf. *De gen. et corr.* I 2, 316a3–4: “Nothing except solids results from putting planes together” (οὐδὲν γὰρ γίνεται πλὴν στερεὰ συντιθεμένων [sc. ἐπιπέδων]).

which is obviously seen as absurd.²¹ In the general conclusion of book three, Aristotle summarizes his argument as follows:

From what has been said it is clear that the difference of the elements does not depend upon their shape.²²

This conclusion takes up the question in the terms in which it was stated at the beginning of the book, where Aristotle pointed out that:

a theory which composes every body of planes is, as is seen at glance, in many respects in plain contradiction with mathematics.²³

He substantiates this claim, among others, by the argument that, in this theory, the parts of the physical solids are not of the same kind as the whole: planes consist of lines and lines of points (III 1, 299a5–10); moreover, according to him, it would be impossible that planes that have no weight would, by their composition, bring forth things that have weight (III 1, 299a 25–b23).

All of these arguments rely on the implicit view that Plato's geometric atomism is a theory of matter, and that, in this theory, Plato would explain the existence of solidity or mass of bodies in an impossible way, by reducing it to the existence of two-dimensional planes. Aristotle clearly understands the planes and solids as intended, but failed material components of bodies.

Aristotle certainly was not the only one to read Plato's atomism as a theory of matter. Present-day adherents of this interpretation include, for instance, Dana Miller. Ancient Platonic commentators of Aristotle, like Philoponus, would also read Plato's atomism in this way, as in the following passage:

Plato was not so weak at geometry as to think that body could be dissolved into surfaces, rather he was talking of physical surfaces, i.e. corporeal ones, which had depth as well. And clearly things like this also

21 The Neoplatonists, Proclus and Simplicius alike, would reply that Plato's solids have depth, and hence, that he wanted them to be corporeal (Simplicius, *In De caelo* 648.19–22, who is relying on Proclus; cf. Mueller, "Objections," 130). That is to say (as we have seen above), they agree with Aristotle's basic premise, that Plato is talking about physical things, or material components, not about mathematical solids.

22 *De caelo* III 8, 307b18–20: "Ὅτι μὲν οὖν οὐ τοῖς σχήμασι διαφέρει τὰ στοιχεῖα, φανερόν ἐκ τῶν εἰρημένων."

23 Aristotle, *De caelo* III 1, 299a1–5: τοῖς δὲ τοῦτον τὸν τρόπον λέγουσι καὶ πάντα τὰ σώματα συνιστάσιν ἐξ ἐπιπέδων ὅσα μὲν ἄλλα συμβαίνει λέγειν ὑπεναντία τοῖς μαθήμασιν, ἐπιτολῆς ἰδεῖν.

have matter in them; so in Plato's view the things that come to be are not without matter.²⁴

But we should not be too keen to follow Plato's early interpreters as representing the right reading. In fact, it might well be the case that they were reading him on their own terms, i.e. that they were imposing a specific view on Plato, which they then tried to refute or rescue. Aristotle would surely be propagating his own view of matter as the better one, whilst reading into the *Timaeus* a theory of matter that was bound to be insufficient. And Philoponus would enter the grounds on Aristotle's conditions, in an endeavour to show how Plato's theory of matter was stronger than Aristotle had figured. But maybe we have to de-Aristotelianize the interpretation of Plato, and we should not too easily condone the views Aristotle wants to impose on his old tutor.

What I want to argue here, specifically, is that the triangles and their combinations do not in fact constitute a theory of matter. In order to make this claim, we need to have a careful look at how Plato characterizes the triangles. First of all, whatever else they may be, Plato leaves no doubt about these triangles' being two-dimensional, whilst their combination produces bodies having depth (*bathos*):

First of all, everyone knows, I'm sure, that fire, earth, water and air are bodies. Now everything that has bodily form also has depth. Depth, moreover, is of necessity comprehended within surface, and any surface bounded by straight lines is composed of triangles.²⁵

The triangles' two-dimensionality is implied here, not argued for, but it is clear that a body's depth depends on the combination of flat planes. The triangles (subdivided into the isosceles right-angled triangle and the scalene right-angled one) are thus seen as the basic constituents of any body, which allows Timaeus to say that "this" (i.e. the fact that any body can be seen as composed from these two kinds of triangles) is "the originating principle of fire and of the other bodies" (53d4–5). The triangles can therefore be described as

24 Philoponus, *In De gen. et corr.* 329a15 ff., p. 210.12–16: εἰδέναι δὲ χρὴ ὅτι οὐχ οὕτως ἀγεωμέτρητος ἦν ὁ Πλάτων, ὥς οἶσθαι τὸ σῶμα εἰς ἐπίπεδα διαλύεσθαι, ἀλλ' ἐπίπεδα ἔφασκεν ἐκεῖνος φυσικά, δηλονότι σωματικά, τὰ καὶ βάθος ἔχοντα· τὰ δὲ τοιαῦτα δηλονότι ἐν αὐτοῖς καὶ τὴν ὕλην ἔχει θεωρουμένην. ὥστε οὐκ ἄνευ ὕλης κατὰ Πλάτωνα τὰ γινόμενα. Translation taken from Williams, *Philoponus*.

25 *Tim.* 53c4–8: Πρῶτον μὲν δὴ πῦρ καὶ γῆ καὶ ὕδωρ καὶ ἀήρ ὅτι σώματά ἐστι, δηλὸν που καὶ παντί· τὸ δὲ τοῦ σώματος εἶδος πᾶν καὶ βάθος ἔχει. τὸ δὲ βάθος αὖ πᾶσα ἀνάγκη τὴν ἐπίπεδον περιειληφέναι φύσιν· ἢ δὲ ὀρθή τῆς ἐπιπέδου βάσεως ἐκ τριγώνων συνέστηκεν.

the “elementary constituents” or “elements” (*stoicheia*),²⁶ not to be confused with the “four elements,” which are obviously the result of the combinations of these triangles. The combinations of the triangles (i.e. the four elements) are described as visible only when they are numerous enough to be seen:

Now we must think of all these bodies as being so small that due to their small size none of them, whatever their kind, is visible to us individually. When, however, a large number of them are clustered together, we do see them in bulk.²⁷

The aspect of visibility is now refined, as it only occurs when there are enough particles of an element. For our purposes, though, the main point is that, *a fortiori*, the triangles are invisible. They are, moreover, moving around, i.e. they change place, but there is no consensus about the triangles themselves being unchangeable.²⁸ Plato does refer to the triangles as not always being perfect, and as being susceptible to wear.²⁹

In view of the triangles’ being “elements,” some have upheld that they must be material components, that is, that they have mass or extension.³⁰ Yet there is no textual evidence at all to build this claim on, and I don’t believe anyone still subscribes to it.

If, then, the two-dimensional triangles have no extension, how about the solids that are constituted by their combination? Shouldn’t we say that the three-dimensionality is, ultimately, the bulk we were looking for in the constitution of the universe? In a way that would remain to be explained, the putting together of a number of two-dimensional triangles would lead to the existence of extended things, whereby flat surfaces suddenly yield not only depth, but also bulk. And indeed, depth is what Plato refers to in this context, as we have seen (53c). Moreover, as we saw, this is exactly the way in which Aristotle read the *Timaeus*, as making an illegitimate jump from flat planes to things that have bulk.

26 E.g., *Tim.* 54d6, 55a8, 55b4, 57c9, 61a7.

27 *Tim.* 56b7–c3: πάντα οὖν δὴ ταῦτα δεῖ διανοεῖσθαι σμικρὰ οὕτως, ὥς καθ’ ἓν ἕκαστον μὲν τοῦ γένους ἐκάστου διὰ σμικρότητα οὐδὲν ὁρώμενον ὑφ’ ἡμῶν, συναθροισθέντων δὲ πολλῶν τοὺς ὄγκους αὐτῶν ὁρᾶσθαι.

28 *Pro* the changelessness of the triangles: Johansen, *Plato’s Natural Philosophy*, 126; *contra*: Miller, *Third Kind*, 171–172.

29 *Tim.* 73b6; 81c6–d1; 82d6–7; 89c1–4; see Opsomer, “In Defence of Geometric Atomism: Explaining Elemental Properties,” 151–152.

30 Martin, *Études sur le Timée de Platon*, II 2.241 (cf. Miller, *Third Kind*, 176). Also some ancient Platonists upheld this idea (see Simplicius, *In De caelo* 646.21–24; cf. Miller *Third Kind*, 176–177).

But this reading misses the most important point of Plato's account. Nearly everybody, including Aristotle, agrees that Plato's analysis is a *mathematical* one, but very often—as in Aristotle's case—the consequences of this fact are not properly acknowledged. The mathematical analysis of three-dimensionality (Plato's "depth") does not primarily refer to bulk or mass (or "weight", as Aristotle summarizes it) out of which a physical thing is made. To be sure, Plato does use a constructivist language to explain how solids come to be: the key word of the entire discussion of the composition of the four kinds of polyeders (53c–55c) is the verb *synistamai*,³¹ alternated with forms of *sympēgnymi*³² and *synarmottō*.³³ That does not mean, however, that the two-dimensional triangles are some kind of material constituent of stereometric bodies. *Synistamai* can obviously refer to a physical construct,³⁴ but it is used very commonly in mathematical contexts to refer to the construal of figures and solids.³⁵ I believe that is the meaning that applies here.

On the other hand, the four elements, which come into existence as combinations of the triangles, are explicitly referred to as bodies (*Tim.* 53c, quoted above). That would suggest that, after all, their corporeal existence as physical things depends on the presence of the triangles. But that does not *have to* be our reading. Plato in fact never discusses the contents of the four elements, he only explains how their specific quality is based on the specific construction of their nature: the tetrahedron (constituting fire), the octahedron (air), the icosahedron (water), and the cube (earth).³⁶ This means that the quality (and the possibility to transform into another element) is entirely dependent on the *structure* of the solid, not on its materiality. For indeed, the solid bodies, *stereā*, that come out of the combination of the triangles, are set together as mathematical structures, not as physical things, just like present-day mathematicians and geometers are dealing with (ideal) structures, abstracted from any material existence. And that would not be an anachronistic comparison, for it would also fit with Plato's own view on the existence of mathematical objects: whatever they may be, they are certainly non-physical—and if indeed the triangles

31 συνέστηκεν (53c), συστήσεται (54c), συνιστάμενον (54d and 55b), συνίσταται (55a), συστάων (55a).

32 συμπαγέντων (55a–b), συμπαγέντα (55c).

33 συναρμόσασθαι (53e), συναρμολοθέν (54c).

34 Cf. Miller, *Third Kind*, 172: "[Plato] treats the triangles as though they were bricks used in building a wall."

35 See, among many other examples, Archimedes, *Stomachion* III 71.18; Euclid, *Elem.* III dem. 32.13. Also Ps.-Aristotle, *De lineis insecabilibus* 970a9, and the sophist Antiphon, DK B 13.42.

36 *Tim.* 54d–56a.

and solids are Platonic mathematical objects, they would be intelligible, i.e., in the ontology of the *Timaeus*, they would belong to the first kind, not to the second (the sensible world) and certainly not to the third one (the receptacle). As we have seen before, the existence of physical or sensible things requires the existence of bodies that are solid (i.e. three-dimensional) and visible. The quality of visibility would then, logically, not apply to these two-dimensional triangles. Yet, just as mathematicians do, the two-dimensional triangles are referred to *as if* they were physical objects. That is not just a specific feature of *Timaeus*' "likely myth": any mathematical language is bound to describe its objects in terms of physical existence. But a mathematical description always remains void of material content—meaning, for instance, that a description of how polyeders are composed of two-dimensional triangles indicates how the surfaces of these solids are constructed; it does not tell us what is inside them. In fact, when looked at from this perspective, the Platonic polyeders look like glass models or, if you wish, skeletons of those volumes, whereby the sides and surfaces have no mass. The solids do cover (mathematicians would say: "span") a certain volume, without for that matter taking into account what is inside the volume. This abstraction of a reference to the physical state of things is constitutive of mathematics, and I believe this is exactly what Plato is doing here.³⁷ We never find any reference to an underlying mass that is structured by those figures, even though there is some sort of corporeal existence that predates the ordering by the Demiurge. In that sense, the statement that the triangles "construct" the bodies has to be taken in a specifically mathematical sense: they do indeed determine how things are constructed, but they are not the material out of which the world is made. To be sure, Plato does speak of bulk, but not in the sense of material mass. At 56c3 (quoted above), he says that the four elements as bodies can only be seen when a large number of them is clustered together, and we see them in bulk. Yet the *onkos* referred to is not the "bulk" of the material contents of the polyhedra, but the amount of polyhedra needed in order to have a visible element. Again, at 54d1–3 Plato seems to be referring to the solids' contents:

When numerous small bodies are fragmented into their triangles, these triangles may well combine to make up some single massive body belonging to another kind.³⁸

37 Cf. Vitrac, "Les mathématiques dans le *Timée* de Platon: le point de vue d'un historien des sciences," 22.

38 *Tim.* 54c8–d2: καὶ σμικρὰ ὅταν αὐ πολλὰ κατὰ τὰ τρίγωνα διασπαρῇ, γενόμενος εἰς ἀριθμὸς ἐνὸς ὅγκου μέγα ἀποτελέσειεν ἄν ἄλλο εἶδος ἐν.

But, when taken in a mathematical sense, this *onkos* can refer to the volume that is spanned by the surfaces (as is ubiquitous in Archimedes' *De corporibus fluitantibus*) rather than to the mass that fills it, in which case again the polyhedra do not have to be taken as material atoms.

Opponents of this view, like Cornford and Miller,³⁹ may argue that this interpretation makes the elemental bodies empty solids, and indeed they may have a point (as in my example of the glass containers or the skeleton). But that should not be a problem. The point I want to make is that these polyhedra do not exist on their own as physical bodies. They are the mathematical structures *of bodies*, all of which can be analyzed into the elemental solids and triangles. What I mean is that, again, Plato conceives of the world as existing in bodies, rather than in a material constituent, and that a geometrical analysis of these bodies into planes, surfaces and their combination disregards a material factor. To Plato, the bodies simply exist, and they form the content that is delineated by the elemental geometrical figures. Timaeus' theory thus does not suggest the existence of what Cornford refers to (and rejects) as "empty boxes"—the boxes are, rather, the abstract structures that are recognized in the construction of bodies.

Finally, I want to argue that this "non-material" reading does not have to deal with a number of difficulties and incongruities that emerge from a "material" reading—without obviously claiming that no problems are left. First of all, the transition from two-dimensional surfaces to three-dimensional bodies does not cause any problems, if they are seen as mathematical figures and solids. There is no need any longer to argue for a "bulk" that fills up the solids. Moreover, the problem of empty space vanishes. The acceptance of empty space is seen as necessary for Plato's geometric atomism to work, as had already been argued by Aristotle (in his sixth argument against Plato's elements: *De caelo* III 8, 306b3–9): the triangles as building blocks must move and be combined within an empty space (as Leucippus and Democritus had maintained). But Plato denies that there would be empty space (e.g. *Tim.* 58a4), even though, as Jan Opsomer indicates, "Plato occasionally refers to emptiness (58b3) and gaps between the particles (58b5, 60e5, 61a5, b1, b4)"—which Opsomer interprets as a reference to "transient interstitial voids."⁴⁰ That may well work, but I think one avoids the problem altogether by accepting that Plato's analysis of the triangles and polyhedra does not subdivide the world into particles of bulk, but applies a mathematical standard to understand their order. The borders between the lines and triangles are no material surfaces,

39 Cornford, *Plato's Cosmology*, 205; Miller, *Third Kind*, 163–195.

40 Opsomer, "Geometric Atomism," 151.

then, or places at which one atom comes into contact with another, but markers of mathematical structures within continuous bodies. Thirdly, one no longer has to cope with the problem of how the material bulk of the receptacle could exist before the Demiurge's intervention, if material bulk is always triangular and hence ordered by the Demiurge. If one leaves out the reference to material bulk, then it makes perfect sense to describe the order of bodies solely in terms of the structures imposed by the Demiurge.

Finally, a purely mathematical reading also allows one to understand the wearing down of the triangles as referred to above. Here, again, translators who do not recognize the mathematical jargon render the most relevant passage in a mistaken way: *Tim.* 81c–d explains how an organism grows old and decays as a result of the influx of external triangles that break up the internal ones. In Zeyl's translation, this passage runs as follows:

Now when the triangles that constitute the young living thing's food enter its body from the outside and are enveloped within it, the body's own new triangles cut and prevail over these others, which are older and weaker than they are. The living thing is thus nourished by an abundance of like parts, and so made to grow big. But when the roots of the triangles are slackened as a result of numerous conflicts they have waged against numerous adversaries over a long period of time, they are no longer able to cut up the entering food-triangles into conformity with themselves. They are themselves handily destroyed by the invaders from outside. Every living thing, then, goes into decline when it loses this battle, and it suffers what we call 'old age'. Eventually the interlocking bonds of the triangles around the marrow can no longer hold on, and come apart under stress, and when this happens they let the bonds of the soul go.⁴¹

This translation may leave the inattentive reader with the idea that, indeed, the triangles are destroyed. However, from the description of the final destruction of the body, it becomes clear that the triangles themselves are not destroyed, but that their combinations are dissolved. In that respect, εὐπετῶς διαίρεῖται at

41 *Tim.* 81c2–d7: τὰ δὴ περιλαμβανόμενα ἐν αὐτῇ τρίγωνα ἔξωθεν ἐπεισελθόντα, ἐξ ὧν ἂν ἡ τὰ τε σιτία καὶ ποτά, τῶν ἐαυτῆς τριγώνων παλαιότερα ὄντα καὶ ἀσθενέστερα καινοῖς ἐπικρατεῖ τέμνουσα, καὶ μέγα ἀπεργάζεται τὸ ζῶον τρέφουσα ἐκ πολλῶν ὁμοίων. ὅταν δ' ἡ ῥίζα τῶν τριγώνων χαλὰ διὰ τὸ πολλοὺς ἀγῶνας ἐν πολλῷ χρόνῳ πρὸς πολλὰ ἡγωνίσθαι, τὰ μὲν τῆς τροφῆς εἰσιόντα οὐκέτι δύναται τέμνειν εἰς ὁμοιότητα ἑαυτοῖς, αὐτὰ δὲ ὑπὸ τῶν ἔξωθεν ἐπεισιόντων εὐπετῶς διαίρεῖται· φθίνει δὴ πᾶν ζῶον ἐν τούτῳ κρατούμενον, γῆράς τε ὀνομάζεται τὸ πάθος. τέλος δέ, ἐπειδὴ τῶν περὶ τὸν μυελὸν τριγώνων οἱ συναρμοσθέντες μηκέτι ἀντέχουσιν δεσμοὶ τῷ πόνῳ διιστάμενοι, μεθίσιν τοὺς τῆς ψυχῆς αὐτοῦ δεσμούς.

δ₃ does not mean “they are handily destroyed,” as Zeyl has it, but rather “they are easily torn apart.” But the most important point here is the meaning of ὅταν δ’ ἡ ῥίζα τῶν τριγώνων χαλᾷ at 81c6–7. Zeyl translates this as “when the roots of the triangles are slackened,” without glossing what these “roots of triangles” may refer to.⁴² I think it makes little sense to translate *rhiza* as “root” here. When one takes it in a mathematical sense, however, the phrase suddenly gets a relevant meaning. In mathematics, *rhiza* is the base,⁴³ in this case, the base of our triangles. The sentence ἡ ῥίζα τῶν τριγώνων χαλᾷ means, then, that the base of the triangles is untied, i.e. that they are cut loose in the joints where they clung together. Hence, the triangles themselves are not destroyed, which would be difficult to maintain if indeed they are mathematical figures, but their combinations do fall apart.

To cut things short, it is much easier to argue that in Plato’s account of the construction of bodies, “construction” refers to their “structure,” and not to their contents—or, in Aristotelian terms: to their form, not to their matter. Paraphrasing Philoponus, one could say that, indeed, Plato was not so *ageōmetrētos* as to say that bodies are made up from two-dimensional surfaces. But that is not, as Philoponus would have it, because Plato is talking *physikōs* here. It is, rather, because the whole account needs to be taken *mathēmatikōs*, and because the referent is not matter, but the formal structures of the body.

Let us conclude. If Plato were indeed saying that geometric atomism is a theory of matter, then Aristotle is certainly right: lines and figures have no bulk or mass—hence, how could the composition of lines and figures lead to the existence of solid bodies? And, indeed, how could mathematics ground physics in this respect? But Aristotle is approaching Plato with the wrong question: he is looking for a theory of the composition of matter and form, focusing on the material component—and, admittedly, Plato did suggest this, by speaking of the world of generation as the receiver of the forms—but Plato himself is not focusing on a material component. His main point is, as I highlighted at the beginning, that bodies cannot come to be ordered out of themselves, but that soul and intellect are needed to accomplish this. Hence, what he is doing is to analyze the order one finds existing in bodies, and bring it back to mathematical structures brought forth by the intelligent design of the Demiurge.

42 W. R. L. Lamb (in the Loeb edition) also translates it as “the roots of the triangles,” and adds a footnote saying “i.e. the radical structure of the primary triangles,” apparently taking *tōn trigōnōn* as an epexegetical genitive.

43 See, e.g., Theon, *Commentaria in Ptolemaei Syntaxin Mathematicam* 637.20. Cf. Ps.-Timaeus 215.12: ῥίζα πάντων καὶ βᾶσις τῶν ἄλλων ἁ γὰρ.

The material out of which these bodies are composed, i.e. the bulk or mass, or matter, is not part of the question.⁴⁴

This amounts to saying that Plato does not offer a genuine theory of matter. The existence of a material world is taken for granted, and not explained. The receptacle and the triangles may have been some embryonic conceptualizations of it, but all of the inconsistencies and all of the diverse formulations that elicited so many different interpretations are tokens of the simple fact that Plato did not have a clear view on the matter. But, as I have tried to show, that was not Plato's real concern. Timaeus' entire account is set up to show that the truly important causes of the cosmos are soul and intellect. I hope to have made an argument that this is the state of the art we must accept as Plato's, without imposing on him theories or concepts that have been discovered or elaborated after him, even if they were designed to safeguard him against opposing views. Ultimately, to Plato, matter does not matter.

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44 One may repeat here Broadie's conclusion on Plato's account of the receptacle: "Some may find it disappointing that Plato's concern is conceptually primitive and unsophisticated by comparison with concerns that might have motivated a more controlled and incisive categorial selection," whilst adding that a greater perspicuity would probably not "have advanced the great project of the *Timaeus*, which is to explain nature while thoroughly respecting the basic principle that the cosmos is as superlatively beautiful and excellent, and therefore as stable and harmonious, as anything in the world of becoming can be." (Broadie, *Nature and Divinity in Plato's Timaeus*, 242). The heart of the matter is, I think, that Plato should be approached starting from the questions which he wanted to answer, and not from the questions later interpreters like Aristotle have imposed on him.

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