ἀρχαί

AS ORIGENS DO PENSAMENTO OCIDENTAL

THE ORIGINS OF WESTERN THOUGHT

How to Name Invisible Principles? The Challenge of Naming What the Eyes Cannot See

Miriam Campolina Diniz Peixoto [i]
https://orcid.org/0000-0001-5692-4817
mcdpeixotobh@gmail.com

[i] Universidade Federal de Minas Gerais, Belo Horizonte, Brasil

Abstract: What were the guidelines that the ancient atomists followed when coining new terms to name their principles? To what extent the difficulty of apprehension and understanding of the nature of their principles would justify the use of more than one term for naming the same thing? Some modern scholars tend to reduce the

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"indivisible" to a mere formal principle, while other scholars insist in considering the "indivisible" as a material principle. Can anyone find in the ancient texts sufficient elements to evaluate these claims without losing sight of the particular horizon of inquiry and conceptual universe of Presocratic philosophy? I intend to map the problem of the names assigned to the principles in the atomists' thought in order to formulate a few hypotheses concerning some issues that seem to underlie the transmission and the reception of their thought in antiquity.

What were the guidelines that the ancient atomists followed when coining new terms to name their principles? To what extent the difficulty of apprehension and understanding of the nature of their principles would justify the use of more than one term for naming the same thing? Some modern scholars tend to reduce the "indivisible" to a mere formal principle, while other scholars insist in considering the "indivisible" as a material principle. Can anyone find in the ancient texts sufficient elements to evaluate these claims without losing sight of the particular horizon of inquiry and conceptual universe of Presocratic philosophy?

Imagine now a different situation in which the oscillation between one term and another is due to difficulties faced by the authors responsible for the transmission of the atomists' thought. Would it be possible to identify which among the various terms in circulation in antiquity better expressed these principles?

When the first philosophers undertook their investigations and reflections in order to provide an answer to the question "what is the cosmos?", they soon realized that, before they could answer it, it was necessary to identify an anchor point from where they might develop their ideas and build their speech. Their survey was characterized, then, by the search for elementary principles or primary elements that, once identified, could be taken as a basis for thinking and

expounding on the cosmos. They gradually realized the challenge ahead of them to find a principle, or principles, that could satisfy the conditions of comprehensiveness and intelligibility for their explanation of any and all kinds of realities. This resulted in a gradual distancing, in the identification of principles, from elements whose apprehension process still had something related, directly or indirectly, to sense perception.

With the atomists we arrive at an important juncture in the development of this story. Indeed, the identification of principles that neither resemble the things with which our senses were accustomed, nor may be apprehended by the senses because of their subtlety (*epi leptoteron*), [1] allows a significant leap when compared to the explanations produced hitherto. However, this leap also entails an equally significant difficulty. How to name those realities that are beyond sense experience? A new challenge presents itself, then, for these philosophers and for those who would later struggle to understand their thought. They will now need to face the challenge of naming those principles, and thus open in the field of language a way so that they may become objects of thought and discourse. There is a relative variation on the names used by the atomists to designate principles. I intend to map the problem of the names assigned to the principles in the atomists' thought in order to formulate a few hypotheses concerning some issues that seem to underlie the transmission and the reception of their thought in antiquity. As far as we know, there were several paths followed by the first philosophers

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[1] Two texts are particularly interesting when one wants to understand why the senses are not able to apprehend principles. The first is the beginning of the treaty *On the elements according to Hippocrates*, by Galen, before the passage in which Democritus is directly mentioned. This passage refers to the idea of elements that escape the senses. Galen writes: "Because the element is the smallest part of what it is the element of, the smallest is not really as it appears to the senses. Lots of things indeed, by their small size escape sensation." (*de elem. sec. Hipp.*, 1. 1-4, Helmreich). The second is a passage from the *Adversus Mathematicos* of Sextus: "Whenever the bastard kind [of knowledge] is no longer able to see anything smaller (ὅταν ἡ σκοτίη μηκέτι δύνηται μήτε ὁρῆν ἐπ᾽ ἔλαττον) or hear, smell, taste, or perceive by touch, but <requires> finer discriminations, <the legitimate kind takes over>". (*adv. math.* VII, 138; DK 68 B 11; L. 83)."

in the operation of "coining" a personal and appropriate vocabulary to express their own theses. I would like to find out whether this variability was already present in Leucippus's and Democritus's thought and language, or if we are in this case confronted with the difficulty faced by the authors who transmitted their thought to us, trying to explain atomist ideas in their own terms and contexts. Eventual issues may also be due to the difficulty inherent to comprehension and translation in another context, namely the context of interpretation and discussion of the notions, concepts and categories of a particular thinker.

1. The physics of principles

The originality of the theses established by the ancient atomists resides in their intuition that the intelligibility of things that appear to the senses (τὰ φαινόμενα) depends on the identification of their intimate structure, which, in turn, can only be apprehended by the intellect. The recurrent suspicion regarding what we know about things and the conclusion concerning the limits of the senses in the apprehension of the ultimate nature of things does not give rise, in Democritus, to a skeptical abandonment of philosophical investigation. Far, therefore, from leading him to skepticism,[2] the philosopher, who would rather find a cause than become the king of the Persians, sees in his observation a horizon that unfolds and a

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[2] See Diogenes Laertius: "some consider Democritus skeptical, because he rejected qualities (...)" (Diog. IX, 72: DK 68 B 117). P.-M. Morel, proposes, within the framework of the debate on Democritus' skepticism, an interesting hypothesis: "la philosophie de Démocrite conduit logiquement à un certain nombre d'apories et celles-ci ne sont pas des accidents de la doctrine ni les simples rejetons de l'histoire mouvementée des fragments et des témoignages". For him, there was indeed a certain kind of skepticism in Democritus, but distinct from that of the Pyrrhonian matrix. He concludes: "la conception démocritéenne de la connaissance ne peut être en fait résumée par une *thèse* sceptique. Toutefois, l'argument selon lequel Démocrite n'est pas sceptique parce qu'il affirme l'existence des atomes et du vide n'est pas recevable, puisque la façon démocritéenne d'être sceptique réside précisément dans cette affirmation même, en tant qu'elle conduit à des conséquences aporétiques." It would be, therefore, what he called a "skepticism critique" (Morel, 1998, p. 145-163).

starting point for building his thought. <u>This</u> realization led him to postulate the existence of another instance able to constitute itself as an object of knowledge and the proposition of another access route. He did not give up, faced with the established limits of sensitive perception and the ephemeral character of his object of knowledge, to investigate the world around him and to offer an explanation about it capable of revealing it and giving it intelligibility. His research in different fields of the natural sciences attest to this. As Cicero testifies, [3] there is no matter that was not the subject of his considerations. However, the conviction about the need to investigate causes was not enough, it was still necessary to overcome the difficulties inherent to this type of research. Democritus' bet was that there would be another dimension of things, capable of being apprehended and whose knowledge would be possible for man, by virtue of his own nature and the capacities with which it endowed him. Among the most significant texts for the examination of this question, we have the fragments transmitted by Sextus Empiricus,[4] which attest to the interest aroused by the Democritus' theses in the second century of our era. The first two passages are found in Sextus' *Adversus mathematicus*: Democritus abolishes things that appear to the senses (τὰ φαινόμενα ταῖς αἰσθήσεσι), and thinks that nothing appears according to truth (μηδὲν φαίνεσθαι κλήθειαν), but only according to opinion (ἀλλὰ μόνον κατὰ δόξαν) to substances there are atoms and void (ἐν τοῖς οὖσιν ὑπάρχειν τὸ ἀτόμους εἶναι καὶ κενόν). In effect he says "by convention sweet, [and] by convention bitter, by convention hot, by convention cold, by convention color; and in reality (ἐτεῆι) atoms and void." Which means we agree and believe that sensible things exist, but, in accordance with the truth, these things do not exist, but only atoms and the void exist.

> In his *Confirmations*, though he proposed to supply the senses with the force of credible testimony, he does nothing but condemn them. He says in effect: "we do

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[3] Cic. Acad. priora II, 23, 73: DK 68 B 165: "...nihil excipit de quo non profiteatur (...)".

[4] Sext. Adv. math. VII, 135-136 and 138, reported as fragments B 9, 10 and 11 in H. Diels' edition, and 55 and 83 in Luria' edition, respectively.

not grasp anything firm and sure, but only what affects us according to the disposition of our body and the [things] that affect it and offer resistance to it" (DK 68 B 9).

He says: "There are two aspects of knowledge, the legitimate and the obscure. And to the obscure belong all these things together: sight, hearing, smell, taste, touch. And their legitimacy is distinguished". Then he points out the reason for preferring the legitimate to the obscure: "When the obscure can no longer see, taste, nor perceiving by touch [and it is necessary to appeal to a more subtle investigation], it is then that the legitimate intervenes, which has a more subtle organ of thought (ἅτε ὄργανον ἔχουσα τοῦ νῶσαι λεπτότερον)" (DK 68 B 11).

Before anything else, it seems necessary to specify what the neuter plural τὰ φαινόμενα refers to in the context of these fragments. In its passive voice, the verb φαίνω – "to show" or "to appear", "to manifest" – has a well-known fortune in philosophical language. The participle formed from φαινόμαι – "to appear", "to come to light", "to be visible" or "to manifest" –, turned into a noun when preceded by the neuter article, refers to what is seen and therefore everything that can be apprehended by the senses. In various testimonies and fragments we come across terms that express the opposition between the "visible" or "manifest" and the "invisible" or "not apprehensible" by the senses. In another passage of Sextus' *Adversus mathematicos*,[5] we read that according to Diotimus, Democritus identified "the things that appear" (τὰ φαινόμενα) as one of the three criteria (τρία κριτήρια) for the "apprehension of the unmanifest things" (ἡ τῶν ἀδήλων κατάληψις).[6] Thus, τὸ φαινόμενον refers, in philosophical language, most of the time to what is visible to the senses and,

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[5] Sext. *Adv. math.* VII, 14: DK 68 A 111: Διότιμος δὲ τρία κατ᾿ αὐτὸν (Demokr.) ἔλεγεν εἶναι κριτήρια 1) Τῆς μὲν τῶν ἀδήλων καταλήψεως τὰ φαινόμενα, ... 2) Ζητήσεως δὲ τὴν ἔννοιαν, ... 3) Αἱρέσεως δὲ καὶ φυγῆς τὰ πάθη·τὸ μὲν γὰρ ὧι προσοικειούμεθα, τοῦτο αἱρετόν ἐστιν, τὸ δὲ ὧι προσαλλοτριούμεθα, τοῦτο φευκτόν ἐστιν.

[6] The term κατάληψις expresses the "act of catching" or "reaching out", "learning with intelligence" and, by extension, "conception" or simply "apprehension".

therefore, to what is evident, clear and manifest.[7] Referring almost always to the objects of sensation, the term will later lend itself to indicating also what is "visible" to the intellect. In any case, we can say that the meaning that prevails in the use of the term by Democritus is that of the apparent and immediate order of the world.[8] But if phenomena are identified with the apparent surface of things, they are necessarily in connection with what is most elementary in them. What he wants to apprehend is not visible, but that does not mean that the object of our apprehensions is situated on a plane external to the reality of things. Rather, *per contrarium,* it is said of the object of legitimate knowledge that its truth dwells in the depths of things (ἐν βυθῶι γὰρ ἡ ἀλήθεια, Diog. IX, 72: DK 68 B 117), and not outside them, which makes the path that goes from sensible perception to intelligible apprehension not an ascending path, but a descending one. It is about diving into the depths of things in search of what does not appear on the surface. Legitimate knowledge is therefore abyssal.[9] We take our senses away from the "surfaces" of things to take the critical distance necessary to cross them and dive into the reality where they hide. As Ferrari (1980, p. 76.) observes, the authentic way of knowing is dynamic, it is a direction. Indeed, says Democritus, the knowledge in question is λεπτότερον, that is, it implies movement from the coarsest to the finest. But what is this direction? "In reality (ἐτεῆι)", writes Sextus, "atoms and void". That is, what it actually is, is something that escapes the senses. A kind of

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[7] A similar purpose was assigned by Sextus to Anaxagoras. The fragment DK 59 B 21a points to this contiguity between the phenomenal plane and the invisible plane of things: "phenomena are the vision of invisible things" (Ὄψις γὰρ τῶν ἀδήλων τὰ φαινόμενα) (Sext. *Adv. math.* VII, 140).

[8] This also seems to have been Heraclitus' observation about the human difficulty in understanding the world around him. In fragment DK 22 B 72, he talks about the estrangement experienced by those who are separated from homology with the logos: "what they encounter every day seems strange to them (ταῦτα αὐτοῖς ξένα φαίνεται)." (Marc. Ant. IV, 46).

[9] This image of the depth that characterizes the object of true knowledge evokes a testimony by Diogenes Laertius about the book of Heraclitus. He recounts the words of a certain Seleucus who would have expressed himself in this way about the philosopher's book: "one would have to be a Delian diver in order not to drown in its waters". It is, therefore, a downward movement in a first period.

inversion takes place here, in which what is not manifest, apprehensible by the senses, is the reason for being – and, therefore, more true – than what catches the eye, which is evident. Here we have something similar to what is suggested in the proem of Parmenides' poem, when the visible plane of reality given to sense perception, supposedly day, is identified at night: "when the daughters of the Sun were hastening to send me, leaving the abodes from the Night to the light (...)".[10] Indeed, to the young man led by the Heliades, the reality around him seemed luminous, evident. However, it is associated with the night, because those who travel such paths are immersed in obscurity, they are deprived of the essential thing to know about things: what they are. Such a perspective escapes them, is obscure to them, because it is not accessible to sense perception. Thus, what looks like day is night, while what was night before turns out to be day. Two "dimensions" separated by the door whose keys are in Justice's possession. [11] The distinction between two perceptual dimensions or two levels of knowledge that appears in fragment DK68B11, namely the "genuine" and the "obscure", evokes, to some extent, the distinction between night and day, in Parmenides' proem. As well as the distinction between "what is" and "what appears to be". It also reverberates the Heraclitean "oracle" that claims that invisible harmony is superior to visible harmony.[12] The Democritean purposes are thus well rooted in the reflections of their predecessors.

Atoms and void constitute, from an ontological point of view, the intimate and invisible instance of things, the condition of possibility of their effective visibility, of their intelligibility achieved through the explanation of their atomic constitution. From a gnoseological point of view, they are the object of a finer kind of "perception" that

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[10] DK 28 B 1, vv. 8-10: ὅτε σπερχοίατο πέμπειν / Ἡλιάδες κοῦραι, προλιποῦσαι δώματα Νυκτός, / εἰς φάος (...).

[11] DK 28 B 1, vv. 11-14: ἔνθα πύλαι Νυκτός τε καὶ Ἤματός εἰσι κελεύθων, / καί σφας ὑπέρθυρον ἀμφὶς ἔχει καὶ λάινος οὐδός· / αὐταὶ δ᾽ αἰθέριαι πλῆνται μεγάλοισι θυρέτροις· / τῶν δὲ Δίκη πολύποινος ἔχει κληῖδας ἀμοιβούς.

[12] Hippol. *refut*. IX, 9: DK 22 B 57: ἁρμονίη ἀφανὴς φανερῆς κρείττων. For an approach to the reflection on the senses in Heraclitus and Parmenides, cf. Peixoto (2012).

comes from the intellect, the source of the so-called "legitimate" knowledge, precisely because it is capable of knowing clearly what escapes the senses. Here we are faced with different degrees of perception, something that makes us think about what is equivalent to the distinction of modern devices for capturing or projecting images in low- or high-resolution devices. On the level of atoms and the void, we would have a high-resolution image, free from the interferences that prevent a fair apprehension of the object's nature. The object thus captured reveals itself in the clear definition of its structure. In Ferrari's words, we find ourselves in front of a kind of codex "which translates the perceptual data into properties or characteristics of primary elements, the atoms, thought of as not further decomposable." The atomic theory is often alluded by modern scholars as being "a constructive fantasy" or a "vast metaphor".

The atomic theory provides an account of the observable differences in the exteriority of things, explaining what in its structure makes its explanation possible. In a testimony by Simplicius we read:

> He thinks that "substances are so small (μικρὰς τὰς οὐσίας) that they escape our senses (ἐκφυγεῖν τὰς ἡμετέρας αἰσθήσεις); they admit variations of form (παντοίας μορφὰς), variations of figures (σχήματα παντοῖα), and differences of magnitude (κατὰ μέγεθος διαφοράς). It is from them (ἐκ τούτων) as elements (ἐκ στοιχείων) that visible things (τοὺς ὀφθαλμοφανεῖς) are constituted (γεννᾶι) and the masses perceptible by the senses (τοὺς αἰσθητοὺς ὄγκους) are formed. (Simpl. *de caelo*, 294, 33 Heib.: DK 68 A 37)

The ineptitude of the senses becomes manifest in the face of a reality thus configured. And yet, all the appreciation of atoms will be done with a vocabulary that belongs to the description of visible realities. The acuity of the one who sees beyond the immediately visible will depend on the next step, when using these invisible realities he is equally capable of conferring a higher degree of intelligibility to the sensible reality.

We observe, then, that as speculation unfolds and with it thought and language acquire the "tools" to support it, it becomes possible to

establish principles whose nature is less and less dependent on sensations. The atomists may have gradually realized that the less a principle resembles the objects of sensations, the more it will be able to reach the universality and the intelligibility intended in thought and speech.

2. Naming the principles

It is now a matter of moving from the physical-gnoseological scope to that of language and discourse. That is, to investigate the questions inherent to the act of language in the face of the challenge that consists in naming, in finding the words that best express this reality that escapes the senses. It is necessary to bear in mind that words are a *sine qua non* condition for discussing what was apprehended and thought. Democritus did not ignore, judging by the fragment that Proclus transmitted to us in his *Commentary on Plato's Cratylus*, the plasticity of words and the diversity of aspects involved in the act of naming things and events. Let us see his purposes as reported by Proclus.

> Pythagoras and Epicurus took the view of Cratylus [viz. that names belong to things by nature], Democritus and Aristotle that of Hermogenes [viz. that names belong to things by convention]. ... Democritus supported (ὁ Δημόκριτος θέσει) his view that names belong to things by convention by four arguments (τὰ ὀνόματα διὰ τεσσάρων ἐπιχειρημάτων τοῦτο κατεσκεύαζεν). First, that from homonymy (ἐκ τῆς ὁμωνυμίας): different things are called by the same name (τὰ γὰρ διάφορα πράγματα τῶι αὐτῶι καλοῦνται ὀνόματι), so the name does not belong to them by nature (οὐκ ἄρα φύσει τὸ ὄνομα). Then, that from polyonymy (ἐκ τῆς πολυωνυμίας): if different names fit one and the same thing (εἰ γὰρ τὰ διάφορα ὀνόματα ἐπὶ τὸ αὐτὸ καὶ ἓν πρᾶγμα ἐφαρμόσουσιν), they must fit one another, which is impossible. Third, that from change of names (ἐκ τῆς τῶν ὀνομάτων μεταθέσεως): why was Aristocles' name changed to Plato, and Tyrtamus' to Theophrastus, if names apply by nature? Then, that from absence of similar terms (ἐκ δὲ τῆς τῶν ὁμοίων ἐλλείψεως): why do we form

the verb "think" from "thought," but do not form any verb from "justice"? Names, therefore, apply by chance, not by nature (τύχηι ἄρα καὶ οὐ φύσει τὰ ὀνόματα). He himself calls the first argument "the ambiguous" (πολύσημον), the second "the equivalent" (ἰσόρροπον) <the third "the name-changing" (μετώνυμον)> and the fourth "the anonymous" (νώνυμον). (Translation by Taylor, 1999)

By qualifying Democritean arguments through the terms "homonymy", "polyonymy", "change of names" and "lack of similars", Proclus could be using a late vocabulary that would not be that of Democritus himself or would express his thought exactly.[13] However, in the last lines of the fragment, Proclus indicates what would have been the properly Democritean terms. The fact is that, in registering a language still in gestation, namely the philosophical language, words still enjoy a great plasticity, and their meanings flow to the taste of a thought in progress, in the performances of a language that is becoming, experimenting, seeking their own degree of precision. This kind of concern can be caught in a special way in some testimonies and fragments that demonstrate the philosopher's concern in coining words, in the making of neologisms to escape commonplaces and mark the uniqueness of his thought and speech.

Entries in Hesychius' lexicon [14] and in the *Etymologicum genuinum* [15] attest to his activity in this field. Furthermore, his insistence on substituting current terms in the Greek language for

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[13] Cf. Morici (2006).

[14] Cf. DK 68 B 130-141. The Greek grammarian Hesychius of Alexandria compiled the richest lexicon of unusual and obscure Greek words (between 5th or 6th century AD). The *"Alphabetical Collection of All Words"* (Συναγωγὴ Πασῶν Λέξεων κατὰ Στοιχεῖον) brings together more than 50,000 entries, comprising a list of words, forms and peculiar phrases, accompanied by an explanation of their meaning and, in most cases, references to the author who used them or to the region of Greece where they were current.

[15] Cf. DK 68 B 122-123. Discovered only in the nineteenth century, the *Etymologicum Genuinum* is a lexical encyclopedia compiled at Constantinople in the mid-ninth century. It is preserved in two tenth-century manuscripts, *Codex Vaticanus Graecus* 1818 (= A) and *Codex Laurentianus Sancti Marci* 304 (= B; AD 994). The anonymous compiler drew on the works of numerous earlier lexicographers and scholiasts, both ancient and recent.

others forged by him is flagrant. This is the case of terms such as *euthumia* / "good mood", *euestho* / "well-being", which connote new meanings that, to a certain extent, distances themselves from the current meaning of *eudaimonia* / "happiness", or even of verbs such as *phusiopoieo* / "produce nature" and *metarrhuthmizo* / "remodel",[16] among others. On the other hand, it is possible to verify the difficulty that Democritus' vocabulary may have represented for those who would later report or discuss his theses. This is what we can see, for example, in the discussion about the differences between atoms that appears more than once in Aristotle's works.[17]

As for the terms used to name the principles, judging by the different sources and the doxographic tradition, once again we are faced with a variety that perhaps expresses this difficulty in designating realities of which we do not have sensible evidence. There is a substantial number of texts engaged in presenting and explaining the principles postulated by the atomists. In my view, the most important testimonies on this issue were preserved and transmitted in the framework of the discussion on the nature of the principles undertaken by Aristotle and carried out by his followers and commentators.

As for the remaining terms, which often took precedence in the transmission of atomistic thinking, namely "atoms" and "empty", we should attribute the cause of this fortune not so much to Aristotle, but to the tradition of his commentators. In his writings, Aristotle rarely used the term atom as a noun to designate the primordial elements. We agree with M.L. Gemelli Marciano (2007, p. 206) that "the use

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[16] Clem. *Strom*. IV, 151 p. 631; Stob. II, 31, 65 (II, 213, 1 W.); DK 68 B 33: ἡ φύσις καὶ ἡ διδαχὴ παραπλήσιόν ἐστι. καὶ γὰρ ἡ διδαχὴ μεταρυσμοῖ τὸν ἄνθρωπον, μεταρυσμοῦσα δὲ φυσιοποιεῖ.

[17] Cf. Aristot. *Metaph.* A' IV, 985 b 14-17; *Physics* VIII, 2, 252 b 24. In these steps, Aristotle, when examining the differences between atoms, uses his own terms before indicating the terms that would originally have been used by Democritus, denoting his difficulty relative to the atomist conceptions of movement and emptiness. Aristotle chooses to designate what Democritus named *rhusmos*, *diathige* and *trope*, terms that bear the imprint of mobility inherent to principles, by the supposedly equivalent terms: *skhema* instead of *rhusmos*, *taxis* instead of *diathige* and *thesis* instead of *trope*. (Cf. Peixoto, 2010).

and meaning of the term ἄτομον (σῶμα?) by the atomists are therefore a little more problematic than it seems at first sight." The term "atom" is the one that enjoyed the greatest fortune in the doxography that reported the physics of Leucippus and Democritus, which determined the very designation of these thinkers as "atomists". Without denying the relevance of the term to the scope of this tradition and the importance it may have had in the qualification of the corpuscles, we cannot neglect, as Gemelli Marciano (2007, p. 205) noted, "that the testimonies, in particular the Aristotelian one, leave open questions about its use and about its real meaning that need to be raised". The passage referred to before the fragment reported by Sextus Empiricus was current in many later texts: "... in accordance with the truth, these things do not exist, but only atoms and the void exist (ἀλλὰ τὰ ἄτομα μόνον καὶ τὸ κενόν)" (DK 68 B 9). The term appears here in the neuter and does not allow considerations on its original meaning. We find no trace of this sentence in Aristotle's texts. It is still singular that he does not make any mention of a denomination that in other texts he considers obvious and fundamental, especially since he reports the much more unusual one of ναστόν. The corpuscles of Democritus are defined μικραὶ οὐσίαι, ὄντα, ναστά, δέν, but not ἄτομα nor ἀδιαίρετα, and there is no hint at invisibility. Ἄτομος is more used as an adjective or appear in the context of explanation about the properties of the bodies. In other words, most often, what we see is its use as an adjective to indicate the indivisible nature of what is, whereupon he prefers to use solid, or full, or simply "what-is" (cf. *Metaph*. A' 4. 985b4).

According Simplicius, in his quotation of Aristotle's Περὶ Δημοκρίτου,

> Democritus considers the nature of everlasting things (τὴν τῶν ἀιδίων φύσιν) to be tiny substances infinite in number (μικρὰς οὐσίας πλῆθος ἀπείρους). He posits a distinct place for them which is infinite in size. He calls place by the names the void, not-thing, and the boundless (τῶι τε κενῶι καὶ τῶι οὐδενὶ καὶ τῶι ἀπείρωι), and each of the substances by the names thing, the compact, and what-is (τῶι τε δενὶ καὶ τῶι

ναστῶι καὶ τῶι ὄντι.) (Simpl. *de caelo*; p. 294, 33 Heib.; DK 68 A 37)

This extract from Aristotle's Περὶ Δημοκρίτου seems to suggest that the various terms appearing in the sources available for the study of ancient atomism could have been those originally employed by Leucippus and Democritus. Aristotle seems to believe that the names κενόν / 'empty', οὐδέν / 'nothing' and ἄπειρον / 'unlimited' have been employed by Democritus to designate space (*topon*); likewise terms as δέν / 'thing', ναστόν / 'compact' and ὀν / 'what-is' have been used to name the small and innumerable substances (μικρὰς οὐσίας πλῆθος ἀπείρους...).

In a passage from Plutarch's *Adversus Colotes*, we also come across the use of the term ἄτομος to qualify ideas / forms:

> What does Democritus say? That substances infinite in number and indestructible, and moreover without action or affection, travel scattered about in the void. When they encounter each other, collide, or become entangled, collections of them appear as water or fire, plant or man. All things are really what he calls indivisible forms (εἶναι δὲ πάντα τὰς ἀτόμους ἰδέας ὑπ᾽ αὐτοῦ καλουμένας), and nothing else (ἕτερον δὲ μηδέν). From what-is-not there is no coming to be (ἐκ μὲν γὰρ τοῦ μὴ ὄντος οὐκ εἶναι γένεσιν,), and from things that are there can be no coming to be (ἐκ δὲ τῶν ὄντων μηδὲν ἂν γενέσθαι) because atoms are not affected or changed owing to their solidity. Hence there is no color from what is colorless, nor nature or soul from what is without action or <affection>.[18]

Let us see how the principles of the atomists were transmitted to us among their doxographers, starting with Aristotle himself. Two

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[18] Plut. *adv. Colot*. 8; p. 1110f; DK68A57; L. 42: Τί γὰρ λέγει Δημόκριτος; οὐσίας ἀπείρους τὸ πλῆθος ἀτόμους τε κἀδιαφόρους, ἔτι δ᾽ ἀποίους καὶ ἀπαθεῖς ἐν τῶι κενῶι φέρεσθαι διεσπαρμένας· ὅταν δὲ πελάσωσιν ἀλλήλαις ἢ συμπέσωσιν ἢ περιπλακῶσι, φαίνεσθαι τῶν ἀθροιζομένων τὸ μὲν ὕδωρ τὸ δὲ πῦρ τὸ δὲ φυτὸν τὸ δ᾽ ἄνθρωπον εἶναι δὲ πάντα τὰς ἀτόμους ἰδέας ὑπ᾽ αὐτοῦ καλουμένας, ἕτερον δὲ μηδέν· ἐκ μὲν γὰρ τοῦ μὴ ὄντος οὐκ εἶναι γένεσιν, ἐκ δὲ τῶν ὄντων μηδὲν ἂν γενέσθαι τῶι μήτε πάσχειν μήτε μεταβάλλειν τὰς ἀτόμους ὑπὸ στερρότητος· ὅθεν οὔτε χρόαν ἐξ ἀχρώστων οὔτε φύσιν ἢ ψυχὴν ἐξ ἀποίων καὶ <ἀπαθῶν> ὑπάρχειν.

testimonies of Aristotle, one from the *Physics* and the other from the *Metaphysics*, constitute our oldest sources on the naming of principles.

> Democritus makes the solid (τὸ στερεὸν) and the void (κενόν) principles, of which he claims the one exists as what-is (τὸ ὄν), the other as what-is-not (τὸ οὐκ ὄν).[19]

> Leucippus and his companion Democritus say the elements are the full (τὸ πλῆρες) and the empty [or void] (τὸ κενὸν), calling them what-is (τὸ ὄν) and what-is-not (τὸ μὴ ὄν); of these the full (πλῆρες) and the solid (στερεὸν) are what-is (τὸ ὄν), the empty (τὸ κενὸν) what-is-not (τὸ μὴ ὄν) (...).[20]

Let us now consider the two utterances contained in these two testimonies:

1. τὸ [στερεὸν] μὲν ὡς ὄν, τὸ [κενόν] δ᾽ ὡς οὐκ ὄν (φησιν)

2. τὸ μὲν πλῆρες καὶ στερεὸν τὸ ὄν, τὸ δὲ κενὸν τὸ μὴ ὄν (λέγοντες)

Concerning to the association of τὸ στερεὸν with τὸ ὄν and of τὸ κενόν with τὸ μὴ ὄν, it is interesting to highlight Aristotle's tendency to examine the theses of the so-called "pluralists" in light of Eleatic theses. In this case, however, interpreters tend to think that Democritus could actually be borrowing from the Eleatics, to name his principles, the Parmenidian notions of "what-is" and "what-is-not", displacing them, however, from the terrain of a logical-metaphysical debate, which takes "what-is" in predicative and existential meanings, to the terrain of a physical-cosmological

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[19] Aristot. *Phys.* I 5. 188 a 22; DK68A45; L. 238: Δημόκριτος τὸ στερεὸν (πλῆρες Simplic. 44, 16) καὶ κενόν, ὧν τὸ μὲν ὡς ὄν, τὸ δ᾽ ὡς οὐκ ὄν εἶναί φησιν·. The following translations, unless otherwise noted, are those by Graham (2010).

[20] Aristot. *Metaph.* A᾽ 4. 985 b 4; DK67A6; L. 173: Λεύκιππος δὲ καὶ ὁ ἑταῖρος [5] αὐτοῦ Δημόκριτος στοιχεῖα μὲν τὸ πλῆρες καὶ τὸ κενὸν εἶναί φασι, λέγοντες τὸ μὲν ὂν τὸ δὲ μὴ ὄν, τούτων δὲ τὸ μὲν πλῆρες καὶ στερεὸν τὸ ὄν, τὸ δὲ κενὸν τὸ μὴ ὄν (διὸ καὶ οὐθὲν μᾶλλον τὸ ὂν τοῦ μὴ ὄντος εἶναί φασιν, ὅτι οὐδὲ τοῦ κενοῦ τὸ σῶμά, αἴτια δὲ τῶν ὄντων ταῦτα ὡς [10] ὕλην.

investigation.[21] But in the context of the Aristotelian physics and his interest concerns the nature of the primordial elements, the physical principles. Thus, he chooses to name the principles by the terms στερεὸν and κενόν, more easily identifiable with an explanation about the principles of physics. In this case (I), "what-is" and "what-is-not" serve as predicates that make explicit the nature of both the principles and say what something is and what that something is different from. Moreover, in the context of his ontology, in the *Metaphysics* quotation (II), there seems to be an identification of full and solid with "what-is", i.e. being, and empty with "what-is-not", i.e. not being. "What-is" and "what-is-not" cast aside their role as attributes that indicates the existence of one way or another, to assume the position of terms that replace, even more abstractly, "solid" and "empty". In other words, the principles become "what-is" and "what-is-not".

Aristotle, designating the corpuscles of Leucippus and Democritus as στερεά, charges them with a mathematical connotation typical of the Platonic school. As Gemelli-Marciano noted (2007, p. 210), στερεά is a "technical term with which Plato designates geometric solids (which, for him, are also bodies)" and it seems that it is also in this sense that Aristotle uses the term. In doing so, he approximates the Platonic to the atomic doctrine. However, when he wants to emphasize their difference, he distinguishes between the bodies (σώματα) of Leucippus and Democritus and the geometric solids (στερεά) resulting from the combination of Platonic triangles. The term στερεόν is also used by Eusebius in his *Praeparatio evangelica* to describe corpuscles.

> Democritus said that the first principles of the whole consist in the void (τὸ κενὸν) and in the full (τὸ πλῆρες), calling "being" the full (τὸ πλῆρες) and qualifying it as a "solid" (στερεόν), and "non-being" void (τὸ δὲ κενὸν μὴ ὄν). That is why he states that "being" (τὸ ὄν) is not "non-being" (τοῦ μὴ ὄντος) and

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[21] This can be seen not only in *Physics*, but also in *On Generation and Corruption*.

> that eternity moves continuously, quickly and in a vacuum.[22]

The term serves in this case to qualify the term πλῆρες, alongside which it will appear on other occasions. The term πλῆρες is present in all the doxography on Democritus since Theophrastus. Let us see some of the occurrences of the term in sources other than those of Peripatetic origin. In the following passage from Clement of Alexandria's *Protrepticus*, the term appears again as a counterpart of τὸ κενόν to refer to principles.

> Leucippus of Miletus and Metrodorus of Chios were limited, apparently, to two primary principles: the full (τὸ πλῆρες) and the empty (τὸ κενόν). Democritus of Abdera added a third: the "reflected images" (τὰ εἴδωλα).[23]

Judging by the occurrences, πλῆρες seems to have been a genuinely Democritean term. However, it sounds less specific than the term ναστόν and, for this reason, it is more current and widespread in doxographic literature. The text reported by Simplicius in his quotation of Aristotle's Περὶ Δημοκρίτου refers to both terms, ναστός and πλῆρες, but the term πλῆρες seems to be a more genuine term than ναστός:

> For positing the nature of the atoms (τὴν γὰρ τῶν ἀτόμων οὐσίαν) as solid and a plenum (ναστὴν καὶ πλήρη) he said that it is what is and that it travels about in the void, which he called 'what-is-not' and said that it is no less than what-is.[24]

Aristotle's commentators and other doxographers will also do the same when confronted with the term ναστόν. Aetius reports that, for

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[22] Euseb. *Praep. Evang.* XIV, 3 (*P. G.*, 21, p. 1185 D); L. 194: Ὁ δὲ Δημόκριτος ἀρχὰς τῶν ὅλων ἔφη εἶναι τὸ κενὸν καὶ τὸ πλῆρες· τὸ πλῆρες ὂν λέγων καὶ στερεόν, τὸ δὲ κενὸν μὴ ὄν. Διὸ καί φησι "Μηδὲν μᾶλλον τὸ ὂν τοῦ μὴ ὄντος εἶναι".

[23] Clem. *Protr.* 5, 19 (*P. G.* 8, p. 199 A); L.191: ὁ δὲ Μιλήσιος Λεύκιππος καὶ Χῖος Μητρόδωρος διττάς, ὡς ἔοικε, καὶ αὐτῷ ἀρχὰς ἀπελιπέτην, τὸ πλῆρες καὶ τὸ κενόν. προσέθηκε καὶ λαβὼν τούτοιν τοῖν δυεῖν τὰ εἴδωλα ὁ Ἀβδηρίτης Δ.

[24] Simpl. *In phys.* 184 b 15, 28, 13: DK 67 A 8: ...τὴν γὰρ τῶν ἀτόμων οὐσίαν ναστὴν καὶ πλήρη ὑποτιθέμενος ὂν ἔλεγεν εἶναι.

Democritus, "compacts and empty things (τὰ ναστὰ καὶ κενά) are the principles".[25]

The term ναστόν is very rare and above all it is not a "technical" or "philosophical" term. Its oldest attestation is found in the Attic comedy of the fifth century B.C., where it designates a sort of cake offered in sacrifices. The *Etymologicum Magnum* describes it as "the pressed bread, compact, full and without anything light"; so, called because it is completely stuffed with condiments and dried fruit.[26] These characteristics correspond perfectly to those of the Democritean corpuscles, and it is entirely plausible, given its style full of images, that Democritus defined them precisely in analogy with this commonly used dessert that must have been extremely difficult to cut. Ναστόν remains in the whole doxographic tradition inextricably linked to the Democritean atom and is rarely used when reporting doctrines of other authors.[27]

During the first two centuries of our era, we find echoes of the debate over the atomistic principles in different authors and traditions. Plutarch, Cicero, Galen, Diogenes of Oenoanda, and a little later Diogenes Laertius, are some of the authors who gave us important information about this debate.

In his *Adversus Colotes*, Plutarch, takes as target a writing by the epicurean Colotes of Lampsacus entitled *On the fact that conformity*

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[25] Aet. I 3, 16; DK68A46; L. 214: Δημόκριτος τὰ ναστὰ καὶ κενά (nämlich ἀρχὰς εἶναι).

[26] ναστός ὁ πεπιλημένος ἄρτος, ὁ μεστός, πλήρης, καὶ μὴ ἔχον τι κοῦφον ἀπὸ τοῦ νάσσεσθαι ἀρτύμασιν ἢ τραγημασί τισι.

[27] Ναστόν occurs in a passage of the *Corpus Hippocraticum* precisely with the meaning of "compact, thick" applied to the male body in contrast with the sparse structure of the female body: "In males the narrowness (of the interstices) and the density of the body greatly contributes to the reduced size of the glands; in fact, the male is compact (ναστόν) and like a thick cloth to the eye and to the touch; the female, on the other hand, is sparse and porous and like wool when seen and to the touch (...)." (*Gland.* 16,2: Joly 121, 20; Littré VIII 572). The use of the term and the synonyms that accompany it in the work *On the Glands* they are important as they distance themselves from the Aristotelian and Peripatetic "translations" of the same. For Gemelli Marciano, the Hippocratic author, fond of refined words, certainly had Democritus as a model (2007, p. 213).

with the theses of other philosophers makes life impossible, and denounces the ineptitude of the Epicurean[28] in his interpretation of Democritus' theses, as well as his misunderstanding of the philosopher's vocabulary:

> [Colotes] objects to [Democritus] first, that because he says that each thing is no more this than that, he has undetermined our experience. But Democritus is so far from thinking that each thing is no more this than that, that he contended in writing against Protagoras, the sophist, who did hold this view, advancing many convincing arguments against him. But Colotes, because he did not even dream there were such writings, *mistook the meaning of the words* (ἐσφάλη περὶ λέξιν), in which he explains that [F6] thing is no more than not-thing (μὴ μᾶλλον τὸ δὲν ἢ τὸ μηδὲν εἶναι). Democritus calls the body thing (δὲν μὲν ὀνομάζων τὸ σῶμα), the void not-thing (μηδὲν δὲ τὸ κενόν), meaning the latter has a certain nature and reality of its own.[29]

In the fragment reported by Plutarch, we see how Democritus, perhaps to highlight the uniqueness of the principles postulated by him and the relationship he glimpsed between them, did not hesitate to coin his own term to name the elementary corpuscles. This procedure he resorted to frequently and in the most diverse domains of his investigation, each time it proved necessary to give greater precision to his words in the exposition of his theses. In this quotation, the opposition is established through a particle of deprivation, but in a diametrically opposite way. While in the first pair, τὸ ὄν / τὸ μὴ ὄν, we have the addition of the particle of negation

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[28] About Colotes' incompetence in the interpretation of Democritean theses, see the article by Pierre-Marie Morel and Francesco Verde (2013).

[29] Plut. *adv. Colot.* 4; p. 1108f; DK68B156; L. 7: Ἐγκαλεῖ δ᾽ αὐτῶι πρῶτον, ὅτι τῶν πραγμάτων ἕκαστον εἰπὼν οὐ μᾶλλον τοῖον ἢ τοῖον εἶναι συγκέχυκε τὸν βίον ἀλλὰ τοσοῦτόν γε Δημόκριτος ἀποδεῖ τοῦ νομίζειν μὴ μᾶλλον εἶναι τοῖον ἢ τοῖον τῶν πραγμάτων ἕκαστον, ὥστε Πρωταγόραι τῶι σοφιστῆι τοῦτο εἰπόντι μεμαχῆσθαι καὶ γεγραφέναι πολλὰ καὶ πιθανὰ πρὸς αὐτόν· οἷς οὐδ᾽ ὄναρ ἐντυχὼν ὁ Κωλώτης ἐσφάλη περὶ λέξιν τοῦ ἀνδρός, ἐν ἧι διορίζεται μὴ μᾶλλον τὸ δὲν ἢ τὸ μηδὲν εἶναι, δὲν μὲν ὀνομάζων τὸ σῶμα, μηδὲν δὲ τὸ κενόν, ὡς καὶ τούτου φύσιν τινὰ καὶ ὑπόστασιν ἰδίαν ἔχοντος.

μὴ before the participle to form its opposite, in the second case, τὸ δὲν / τὸ μηδὲν, it is by the suppression of the same particle in μηδὲν that the opposite term is produced.[30] This is a rare case in which the negative term is prior and is the origin of the positive term. In my view, the pair τὸ δὲν / τὸ μηδὲν is the one that better expresses the spirit of Democritean language, judging by his practice, observable in the testimonies that came from his thought, of creating words to escape to common sense and to make it possible to think of those realities which do not have an immediate reference in the sensible reality. The pair δὲν / μηδέν also appears in a fragment reported by Galen.

> ... in truth "thing" (δὲν) and "nothing" (μηδέν) is all there is. That too is something he himself said, "thing" (δέν) being his name for the atoms (τὰς ἀτόμους ὀνομάζων), and "nothing" (μηδέν) for the void (τὸ κενόν). All the atoms (ἄτομοι) are small bodies without qualities, and the void is a space (...).[31]

The sentence "in truth 'thing' (δὲν) and 'nothing' (μηδέν) is all there is" evokes the concluding sentence of the fragment reported by Sextus Empiricus (DK 68 B 9): "in reality (ἐτεῆι) atoms and void (ἄτομα καὶ κενόν)". The indivisible (corpuscles) (ἄτομα) and the void (κενόν) are in a very economical way reduced to the terms "thing" (δὲν) and "nothing" (μηδέν), one not being anything less than the other. The pair δὲν / μηδέν thus preserves the essential polarity proper to a dual principle that evokes, in the end, the contemporary binary system, employed in all our technological gadgets.

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[30] According to Bernabé (2013, p. 59), "Es claro que *den* es una palabra creada como contrario de *ouden* 'nada' por um falso corte, como si se interpretara *ouden* como un compuesto de la negación *ou* y *den* (y no, como ES en realidad, *oude* 'ni' y El numeral *hen*)."

[31] Galen. *de elem. sec. Hipp.* I, 2; DK68A49; L. 185: "...κατὰ δὲ τὴν ἀλήθειαν δὲν καὶ μηδέν ἐστι τὰ πάντα (cfr. B 156)·καὶ γὰρ αὖ καὶ τοῦτ᾽ εἴρηκεν αὐτός, 'δέν' μὲν τὰς ἀτόμους ὀνομάζων, 'μηδέν' δὲ τὸ κενόν. Αἱ μὲν οὖν ἄτομοι σύμπασαι σώματα οὖσαι σμικρὰ χωρὶς ποιοτήτων εἰσί, τὸ δὲ κενὸν χώρα τις (...)."

Among Roman thinkers, there is another type of challenge: translating into Latin the Greek terms employed to name the principles. Two passages from Cicero attest this:

> Leucippus full and empty (*plenum et inane*). Democritus resembled him in this (*huic in hoc similis),* more fertile and in other cases.[32]

> The things which [Democritus] calls atoms (*atomos*), i.e. indivisible bodies (*corpora individua*), because of their solidity (*propter soliditatem*) (...).[33]

Atoms and empty will be named by Cicero as "*plenum*" and "*inane*", and "*atomos*", which appears written in Greek, is translated in its text by the expression "*corpora individua*" which is justified by the recognition of its solidity (*propter soliditatem*). We can see here a possible translation for στερεόν, just as "*plenum*" corresponds to the Greek term πλῆρες.

Based on these passages, we can see that there are several terms used to designate the atomistic principles. An interesting point is that many of the terms listed are principles as in other occasions, terms which serve to define the nature of each of the primordial realities. Two of them stand out because (1) are terms coined (apparently) by Democritus specially to highlight the distinct nature of his principles in face of those of his predecessors; and (2) by the very singularity of the procedure whereby he did this coinage. While some of the ancient sources worry about how to show, regarding Democritus, to which extent his vocabulary reproduces that of Leucippus, other sources call attention to the innovation operated by Democritus in the vocabulary of his predecessor.

In general, the terms they used indicate realities that, notwithstanding the fact that they are opposed, have some kind of

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[32] Cic. Acad. Pr. II 37, 118; DK67A11: "Leucippus plenum et inane. Democritus huic in hoc similis, uberior in ceteris."

[33] Cic. de fin. I 6, 17; DK68A56; L. 180: "ille [Democr.] atomos quas appellat, id est corpora individua propter soliditatem (...).""

relation, more or less substantial, between them. Examining them together, we can group them as follows:

τὸ ὄν	what-is	τὸ μὴ ὄν	what-is-not
τὸ δὲν	something	τὸ μηδὲν	nothing

In the table below, we present a review of the various terms that atomists (or their sources) used to name the principles. Those which concern "what-is" result from a transformation of the attribute in the substance that it qualified previously, thus making a step towards something more abstract.

"what-is" / τὸ ὄν		**"what-is-not" / τὸ μὴ ὄν**	
ἄτομος / ἄτομον τὸ ἀδιαίρετον	indivisible	τὸ κενόν /*inane*	void / empty
atomos / *corpora individua*			
σῶμα	body	οὐδέν	not-thing
νάστον	compact	ἀπείρον	boundless
στερεόν	solid		
πλῆρες / *plenum*	full		
ἄτόμοι ἰδέαι	indivisible forms		

Conclusions

The panorama outlined here offers us some indications of the challenge faced by Leucippus and Democritus when the coining of a vocabulary capable of expressing their physics of principles. In view of the variety of the terms that appear in the different registers presented above, it seems possible to sustain that each of the pairs of opposites that were employed for naming the principles reveals a premise that underlies them all: the need to reveal a contrast in their relationship, capable of explaining the constitution of all composite bodies, that is, of all things, their becoming, their acting and their

suffering, as well as their passing away. This dual model of great simplicity is extremely adequate for understanding a diverse and complex cosmos. The proposition of a pair of principles, which is sometimes done by associating terms that express naturally opposing states, sometimes by resorting to negation particles or the privative alpha, seems to satisfy this requirement. Furthermore, in his linguistic endeavor, whether in the field of his physics or in the other areas in which his speculation was developed, Democritus did not hesitate to create terms, to forge his own vocabulary that would give his speech a greater degree of intelligibility.

It is interesting to point out, despite the terminological variations that we find in the doxography concerning the physics of principles, the persistence of a model that is recurrent in the main previous cosmologies, namely one that is constructed based on the use of pairs of opposites. The atomists established as the basis of their physics and cosmology a double principle, no longer a single one. Although the so-called pluralists (apart from Leucippus and Democritus, Empedocles and Anaxagoras, in particular) have most often been attributed with this way of answering the question about "physical" principles, they were not the first to resort to some kind of duality or "polar expression" [34] in the construction of their cosmological discourse. The use of some form of polarity was already present in Anaximander's sentence, or in the well-known tables of opposites attributed to the Pythagoreans. They were also present, in an even more evident and fundamental way, in Heraclitus.[35] The fragment transmitted to us through Aristotle's *De mundo* is significant in this sense:

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[34] According to A. Bernabé, "*Stricto sensu*, una 'expresión polar' es la designación de una totalidad por medio de dos términos semánticamente contrarios." (Bernabé, 2009, p. 103)

[35] When discussing the use of polar expressions by Heraclitus, A. Bernabé observes that "tales expresiones, que incluyen diversos tipos, no sólo pretenden ser un modo de describir la realidad, sino que van más allá para convertirse en una especie de trasunto de la propia configuración del mundo" (Bernabé, 2009, p. 103).

And perhaps nature rejoices with the opposites and of these and knows the agreement of them, while not interested in likes (ἴσως δὲ τῶν ἐναντίων ἡ φύσις γλίχεται καὶ ἐκ τούτων ἀποτελεῖ τὸ σύμφωνον οὐκ ἐκ τῶν ὁμοίων), she came to an agreement first only through contraries and not through similars (τὴν πρώτην ὁμόνοιαν διὰ τῶν ἐναντίων συνῆψεν, οὐ διὰ τῶν ὁμοίων). Now, it also seems that art imitating nature also does this. Because painting, mixing the pigments of white, black, yellow and red, produces images in accordance with the model. Music, mixing high and low, long and short sounds, produces a unique harmony with different voices. Writing, operating a mixture of vowels and consonants, builds all its art from them. This is what Heraclitus' words meant:

Conjunctions (συνάψιες): all, not all (ὅλα καὶ οὐχ ὅλα); convergent, divergent (συμφερόμενον διαφερόμενον); consonant, dissonant (συνᾷδον διᾷδον); of all things, one; of one, all things (ἐκ πάντων ἓν καὶ ἐξ ἑνὸς πάντα). (Arist. *de mundo*, 5. 396 b 7; DK 22 B 10)

As far as the Pythagoreans are concerned, it is worth mentioning, as an example, Philolaus' unlimited-limiting, even-odd, or the well-known Pythagorean tables of opposites. At *Metaphysics* 986a22, after presenting the philosophy of "the so-called" Pythagoreans (985b23), Aristotle assigns to them a table of opposites where the principles of reality, consisting of ten pairs of opposites, are arranged according to column (τὰς κατὰ συστοιχίαν λεγομένας) limit / unlimited, odd / even, unity / plurality, right / left, male / female, rest /motion, straight / crooked, light / darkness, good / bad, square / oblong.[36]

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[36] According Carl Huffman (2019), "similar tables of opposites appear in the Academy (Aristotle, *Metaph.* 1093b11; *EN* 1106b29 referring to Speusippus; Simplicius in *CAG* IX. 247. 30ff.), and Aristotle himself seems at times to adopt such a table (*Metaph.* 1004b27 ff.; *Phys.* 201b25). Later Platonists and Neopythagoreans will continue to develop these tables (see Burkert, 1972a, p. 52, n. 119 for a list). The table of opposites thus provides one of the clearest cases of continuity between early Pythagoreanism and Platonism."

Democritus perhaps intuited, as Heraclitus and the Pythagoreans before him, that the act of thinking underlying the explanatory impulse that moved them consists, ultimately, in establishing relationships. And more than that, that the power to engender a cosmos presupposes principles that maintain an oppositional relationship among themselves, such that "something" or "non-something", whatever the names they have used themselves and their sources to express the nature of the principles.

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