

ANAI DE FILOSOFIA CLÁSSICA

SPONTANEOUS GENERATION AND CREATIONISM IN PRESOCRATIC MONISM IN LIGHT OF ARISTOTLE'S ANALYSIS IN THE *PHYSICS*

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ABSTRACT: In *Physics* II.3, Aristotle outlines his famous theory of the four causes (*aitiai*) — the material, the formal, the efficient, and the final, which are the ways in which something can be said to be “responsible for” something else. It behooves the natural philosopher (*physikos*), he argues, to know all four principles (*archai*) or causes (*aitiai*) in order to answer the “how and why” of all natural change (*Physics* II.7; see also *Metaphysics* V.2). Aristotle is convinced that it is these causes that his predecessors, ancient and modern, were searching for, but he was the first to consciously find a solution to the quest. In his illuminating analysis of the notion of *physis* in *Physics* II.1, which proceeds his doctrine of the four causes in II. 3, the Stagirite contends that the first philosophers identified *physis* or nature with the primary “material” or “substance” (*ousia*), out of which everything in the cosmos is composed (193a10-28; cf. 203a2). After reiterating at the beginning of the *Metaphysics* (I.3. 983a24ff) that there are four recognizable types of principles (*archai*) or causes (*aitiai*), Aristotle then discusses the position of the earliest philosophers (*tôn protôn philosophêsantôn*). He again claims that they only recognized the “material” cause (*en hulên eidei*) of things (983b7-14; at 987a3-7, using the term *sômatikê* or “corporeal”). More to the point, they argued that everything in the cosmos arises from one basic substance, principle or cause, and perishes back into it, such that nothing is ever created or destroyed since any physical difference is only a difference of state or phase of the original material (*Metaphysics* I.3, 983b7-14). In sum, Aristotle insists that the first philosophers were material monists who were unaware of the three other kinds of causes. This interpretation is embraced by the vast majority of scholars and interpreters of ancient philosophy.

What would almost naturally follow from this, is that the first philosophers could be considered atheistic materialists. But Aristotle and many of his modern interpreters were well aware that the monism of the early Ionian philosophers was not so simplistic as to exclude any reference to the other causes in the Aristotelian quartet. In both the *Physics* and the *Metaphysics*, the original substance is invariably characterized as “alive” and/or as having within itself the principle of movement and change (*archê kinêseôs kai metabolês*, *Physics* II.1, 193a 29-30; *Metaphysics* I. 3, 983b7-27; *On the Soul* I.2, 405a19-20; I.5, 411aff). And, in *Physics* III. 4, 203b7ff, Aristotle states that the material monists claim that the primordial substance or *archê* is not only divine (*to theion*), but that it also steers, guides or governs everything (*panta kubernan*). From this perspective, the early Ionian *archê* seems to grasp what Aristotle understands by the material, efficient and final causes. He reproaches them for not “consciously” separating the three. But the philosophical and metaphysical problem with which we are confronted and which deserves our closest attention in light of Aristotle's *testimonia* is the following: what is the relation between “consciousness” and “spontaneous generation” in the all-embracing research on nature (*historia peri physeôs*) put forward by the first philosophers? Or, to put it in more modern terms: what is the relation between “creationism” and “evolutionism” in early Greek philosophy? In this paper, I hope to shed new light on this relation, an area most scholars and historians of ancient philosophy have either skirted or failed to address in a comprehensive manner.

KEYWORDS: Pre-Socratics; Creationism; Evolutionism; Aristotle; Aristotle Physics.

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RESUMO: Em Física II.3, Aristóteles descreve sua famosa teoria das quatro causas (*aitiai*) - a material, a formal, a eficiente, e a final, que são as maneiras pelas quais se pode dizer que algo é “responsável por” algo mais. Cabe ao filósofo natural (*physikos*), argumenta ele, conhecer todos os quatro princípios (*archai*) ou causas (*aitiai*), a fim de responder ao “como e por quê” de toda mudança natural (Física II.7, ver também Metafísica V. 2). Aristóteles está convencido de que são essas causas que seus predecessores, antigos e modernos, estavam procurando, mas ele foi o primeiro a conscientemente encontrar uma solução para a missão. Em sua análise esclarecedora da noção de *physis* em Física II.1, que precede a sua doutrina das quatro causas em II. 3, o Estagirita afirma que os primeiros filósofos identificaram a *physis* ou natureza com o “material” ou “substância” (*ousia*) originários, de que tudo no cosmos é composto (193a10-28; Cf 203a2). Depois de reiterar, no início da Metafísica (I.3. 983a24ss.), que há quatro tipos reconhecíveis de princípios (*archai*) ou causas (*aitiai*), Aristóteles, em seguida, discute a posição dos primeiros filósofos (*ton próton philosophêsantôn*). E mais uma vez afirma que só reconheceram a causa “material” (*en Hulen eidei*) das coisas (983b7-14; em 987a3-7, usando o termo *sômatikê* ou “corporal”). Mais precisamente, eles argumentaram que tudo no cosmos surge de uma substância básica, princípio ou causa, e perece de volta para ela, de forma que nada nunca é criado ou destruído uma vez que qualquer diferença física é apenas uma diferença de estado ou fase do material original (Metafísica I.3, 983b7-14). Em suma, Aristóteles insiste em que os primeiros filósofos eram monistas materiais que não sabiam dos três outros tipos de causas. Esta interpretação é adotada pela grande maioria dos estudiosos e intérpretes da filosofia antiga.

O que se depreenderia quase que naturalmente a partir disto, é que os primeiros filósofos materialistas poderiam ser considerados ateus. Mas Aristóteles e muitos de seus intérpretes modernos estavam bem cientes de que o monismo dos primeiros filósofos jônicos não era assim tão simplista excluindo qualquer referência às outras causas do quarteto aristotélico. Na *Física* e na *Metafísica*, a substância original é invariavelmente caracterizada como “viva” e / ou como tendo em si o princípio de movimento e mudança (*arche kai kinêseôs metaboles*, Física II.1, 193a 29-30; Metafísica I. 3, 983b7-27; Em *De Anima* I.2 405a19-20; I.5, 411a ss.). E, em Física III. 4, 203b7ss, Aristóteles afirma que os monistas materiais afirmam que a substância primordial ou *archê* não é apenas divina (*a theion*), mas que também dirige, orienta ou governa tudo (*panta kubernan*). A partir desta perspectiva, a *archê* dos primeiros jônios parece compreender o que Aristóteles entende como causas material, eficiente e final. Ele repreende-os de não ter “conscientemente” separado as três. Mas o problema filosófico e metafísico com que estamos confrontados e que merece nossa atenção, tendo em conta os testemunhos de Aristóteles é a seguinte: qual é a relação entre “consciência” e “geração espontânea” na pesquisa abrangente sobre a natureza (*historia peri physeôs*) apresentadas pelos primeiros filósofos? Ou, para colocá-lo em termos mais modernos: qual a relação entre “criacionismo” e “evolucionismo” na filosofia grega antiga? Neste artigo espero lançar nova luz sobre esta relação, em uma área que a maioria dos estudiosos e historiadores da filosofia antiga contornou ou não abordou de forma abrangente.

PALAVRAS-CHAVE: Presocráticos; Creacionismo; Evolucionismo; Aristóteles; *Física* de Aristóteles.

Cornford famously contended that “Pre-Socratic philosophy begins with the discovery of nature” (1932, 4). By this he means “the discovery that the whole of the surrounding world of which our senses give us any knowledge is natural, not partly natural and partly supernatural. Science begins when it is understood that the universe is a natural whole, with unchanging ways of its own—ways that may be ascertained by human reason, but are beyond the control of human action. To reach this point of view was a great achievement” (1932, 8).

Cornford, of course, is not alone in this contention. Although the term *physis* is absent from the extant writings of the early Ionians, that is, the first philosophic writings, it is, I believe,

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unanimously accepted today, as it was in antiquity, that the concept of *physis* was a creation of Ionian science. It was a creation to the extent that the word *physis* permitted the Ionians to present a new conception of the world in which natural causes were substituted for mythical or supernatural ones. In sum, with the emergence of philosophy, the universe is seen as wholly natural, as beyond the control of human "action" (prayers, sacrifices,...) and the supernatural forces it presupposes. There is a de-personification of the entities behind or controlling the universe. The (entire) universe is now reduced to, and explained in terms of, the "predictable" properties of the basic components or entities themselves; that is, the nature and behaviour of the universe are determined by the essential properties of the primary entities out of which it is composed (as Hussey 1995, 532, so aptly expresses it). Moreover, what characterizes their respective investigations or *historiai*, in addition to the predictability of the basic components, are economy and symmetry—all of which are intellectually and empirically justified. In conjunction, we find, for the first time, the advent of conscious methodologies and rigorous proofs (e.g., Lloyd 1979, 232–33; Hussey 1995, 533–34; Long 1999, 13–14; Gregory 2007, 7–8; for a synopsis of these positions, see Naddaf 2006, 161).

One could get the impression that god or the divine has disappeared from these accounts or, at the very least, withdrawn to the background. But most scholars, ancient and modern, have also correctly noted that the notion of god (or of the divine) did not disappear from the works of the Presocratics. In fact, as Vlastos (1952/1993, 1) observes, the word *theos* is listed more often than the word *physis* in the Diels/Krantz index to *Die Fragmente der Vorsokratiker*. More importantly, it is surprising how often the term *theos* is employed to qualify *physis*. And this has led to a range of often conflicting interpretations of the relation between god, nature, and traditional religion in early Greek philosophy. Burnet (1930, 14 and n. 3), the old exponent of the Greek miracle, saw the *physiologoi* as pure naturalists and argued that any references to gods in their work were to personifications of natural phenomena and not, of course, to objects of worship. He thus sees them as atheistic materialists. Jaeger¹ (1947, 36), for his part, argues that what we have with the *physiologoi* for the first time is a rational or natural theology (*and* theodicy) which was connected with a public cult: "there is a re-creation of religion in terms of the idea of God and the divine government of the world as revealed in nature." Vlastos (1952/1991, 10) insists (contra Jaeger) that "the divinity of the *physiologoi* has no direct connection with public cult and is indeed so independent of it as to leave the very existence of the cult gods in doubt." In fact, he insists that the *physiologoi* were a united group of intellectual mavericks, alone against the world, insisting that the regularities of nature could never fail and that when something unusual did occur (e.g., an eclipse), its cause could be naturally and rationally

¹ Burnet reproaches Cornford for failing "to realize how completely the old 'collective representations' had lost their hold in Ionia" (1930, 14 n.3). Guthrie (1950, 133–36) wholly endorses Burnet's view. Any form of religion seems antithetical, for Guthrie, to their new rational way of seeing the world.

² In his introduction to *Plato's Universe*, Vlastos argues that, with the exception of the *physiologoi*, Greek and

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explained (1970, 10)². Gerson (1990, 2–3) argues that the theology of the early Greek philosophers was “natural” because they needed god or gods to explain “their larger scientific enterprise”³. Hussey (1995, 537) sees the concept of the divine as it was described by Aristotle (and others) as explaining “the unity and lawlike behaviour of the contents of the universe.” Scacca (1967, 12), on the other hand, sees a number of the earlier philosophers as religious reformers like Xenophanes or as true mystics like Anaximander, Heraclitus, and Empedocles.

As we can see, the claims with regard to the relation between *theos* and *physis* in early Greek philosophy vary considerably. And there are obviously numerous other nuanced positions, some of which I will discuss here. Aristotle, of course, has provided us with perhaps the best insights into the relation between god and nature in early Greek philosophy. Moreover, he is well aware that he is himself a historical and intellectual product of *this* tradition. Many, if not most, of the references to the Presocratics in the current context are found in the *Physics*, but other texts, in particular the *Metaphysics*, supplement and/or clarify what he states in the *Physics*. In what follows, I would like to examine the problem of the relation between god and nature in early Greek philosophy from a historical perspective. My focus is on the early Ionians, for they are, in many respects, the most problematic. This presentation, as we will see, will necessitate a certain number of brief historical digressions in order to argue for my general thesis: the first philosophers and most of their immediate successors, while having consciously introduced an iconoclastic world view, consciously endeavoured to accommodate, if not endorse and reinforce, civic and traditional religious practices, including various forms of divination and mystery cults.

Aristotle informs us that Thales was the founder of the earliest school of philosophy (*philosophia*, *Meta.* 983b7, b21) and that he was the first to explicitly claim that philosophy began with Thales⁴. On the other hand, he says little about how philosophy originated. He simply notes that *philosophia* began through wonder (*to thaumazein*, 983b14)⁵, and this could only have occurred after the basic necessities of life were acquired, that is, after one had the leisure time for disinterested intellectual inquiry (982b21–22, 983a15–17)⁶. Aristotle is obviously well aware that numerous other civilizations, past and present, had the prerequisite of leisure. So why Miletus? In reality, the Stagirite is convinced that “philosophy” in its various stages has, like all the arts, appeared and disappeared on innumerable occasions (e.g., *Meta.* 1074b10; *Politics* 1329b25)⁷. But let me say that the pursuit of the

² In his introduction to *Plato's Universe*, Vlastos argues that, with the exception of the *physiologoi*, Greek and barbarians alike believed in divine intervention and thus divination, and he cites Herodotus, as himself a child of the Enlightenment, as still believing this (1970, 13; and ditto for Pindar, etc).

³ But while the new theology, Gerson cautions, had an aversion for myth-making and the capricious gods of polytheism, this “did not entail hostility to civic religion ... which explains references to traditional deities found alongside anti-myth argumentation” (1990, 12).

⁴ Plato associates Thales most often with the famous sages of ancient Greece (e.g., *Protagoras* 343a).

⁵ Plato makes the same claim at *Theaetetus* 155d3.

⁶ In the *Critias* 110a, Plato makes a similar contention when he notes that mythology and research into the past are contingent on leisure time.

⁷ For some relevant texts on Aristotle, see Boas and Lovejoy (1973, 169–91).

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origins of philosophy in ancient Greece is one of the most hotly debated contemporary topics, the solution to which, assuming a consensus among scholars, would be akin to any truly great scientific discovery. I will return to some of these positions in context toward the end of this presentation.

Meanwhile, what preceded *philosophia* according to Aristotle was *philomuthia* (*Meta.* 982b19) of the poets or *theologoi*. The fundamental difference between the two, for Aristotle, is that Thales' position was based on observation and argument, while the poets accepted tradition (984a1)⁸. Indeed, Aristotle notes that myths are also composed of wonders (*ho gar muthos sugkeitai ek thaumasiōn*, 982b19-20) and even hide certain "primitive" truths about the universe (*Meta.* 983b28ff; 1074b1-14)⁹. Aristotle has, in fact, a rather ambiguous attitude toward myth because of his own philosophy of history. Humanity did not have a beginning in time, and civilizations are always coming into being and passing away in large part because of natural catastrophes, with the result that primitive truths get left behind by past civilizations. In conjunction, even before introducing Thales and his material monism at the foundation of philosophy, he notes that the ultimate *sophia* or wisdom is knowledge (*epistēmē*) (of the first causes and principles of all things and that this is the ultimate end of the pursuit of knowledge for its own sake (982a4ff). Aristotle characterizes this science as divine (*theia*, 983a7-8) and argues that there is universal acceptance on this point (reading: *pasin*, 983a9) because everyone agrees [A] that God is such a cause and principle, on the one hand, and [B] because only God can possess such knowledge, on the other (*Meta.* 983a7-12)¹⁰. Aristotle is convinced that the pursuit of these divine causes or principles should be the ultimate end for man. And so after informing us that there are only four recognizable types of principles (*archai*) or causes (*aitiai*), the formal, material, efficient, and final, which he notes were already investigated in the *Physics* (983b1), Aristotle then goes on to discuss the position of the earliest philosophers (*tōn protōn philosophēsantōn*). He claims that they only recognized the "material" cause (*en hulēn eidei*) of things (983b7-14, see also *Physics* 184b15ff; 187a12ff; 189b3ff; 192b21ff; 193a21ff)¹¹. More to the point, they argued that everything in the cosmos arises from one basic substance, principle, or cause, and perishes back into it such that nothing is ever created or destroyed, since any physical difference is only a difference of state or phase of the original material (*Meta.* 983b7-14). In sum, Aristotle insists that the first philosophers were material monists who did not consciously recognize the three other kinds of causes in his famous doctrine. He asserts, as I noted above, that Thales of Miletus was the first philosopher and thus the first material monist and that he identified his first principle or material

⁸ There is some irony here, for Aristotle himself was, more often than not, a proponent of tradition, including the common and relevant assumptions about the traditional gods. For an excellent detailed analysis, see Bodéüs (2000, chapters 4 and 5).

⁹ On Aristotle and allegory, see Babut (1974, 111–13); Bodéüs (2000, chap. 4); Laks (2004, 211–20); and Naddaf (2009, 119).

¹⁰ This was Plato's position in the *Timaeus*; it suggests a reference to divine inspiration, a point to which I will return.

¹¹ At 987a3-7, he uses the term *sōmatikē* or "corporeal"; see also other references to Aristotle in Naddaf (2005, 31–32).

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cause (that is, *physis* as *archē* or *aitia*) with “water.” Aristotle implies that there is a correlation between Thales' choosing water as the first principle and basic nature of all things and his contention that the earth rests on water (983b23)¹². He conjectures that Thales may have based his affirmation on his observation that the nutriment (*tēn tropēn*) of everything is moist and that heat (*to thermon*) is derived from moisture, and so if the seeds of everything have a moist nature, water must be the first principle (983b23-28)¹³. This is why, as I noted above, Aristotle believes that Thales based his assumption on observation and argument. He then seems to contest Thales' claim that he was the first to declare water as the first principle, for those, he suggests, who first speculated about the gods (*prōtous theologēsantes*, 983b10) also had the same opinion about the first principle. Thus Homer, he insists, sees Ocean and Tethys, the primordial water gods, as the parents of all things¹⁴. And Aristotle notes that the fact that we swear by what is the most ancient and revered, in this case water, would seem to confirm this (983b31-35). Of course, for Aristotle, this is not an argument. But nor is it exactly chance. It may be a possible reference to the allegorical tradition. Aristotle has considerable respect for tradition, and he is not immune to dabbling into allegorical interpretation himself. As Brisson (2004, 38; for more detailed discussion, see Bodéüs 2000, chapter 4; Laks 2004, 211–20) observes, *Metaphysics* 1074b1-14 shows that for Aristotle the initial or pre-anthropomorphic notion of divinity that was handed down in the form of myth (*en muthou schēmati*) and that identified the primary natural forces or substances with gods must have been divinely inspired (*theiōs eirēsthai*), for it constitutes the germ of his own philosophical theology¹⁵. More importantly, Aristotle (*Movement of Animals* 699b35ff.), as do so many others, provides, with his own notion of the Unmoved Mover, an allegorical exegesis of the famous scene in Homer's *Iliad* 8 (18–27) in which Zeus describes his formidable power in the form of suspending *all* the other gods and thus the entire universe, from a golden chain. I'll return to the possible role of allegorical interpretation for the case at hand later.

Aristotle obviously favours lucid language and argument when making a claim. As he notes on two occasions in the *Metaphysics* (985a5 and 993a15), the statements of the earlier philosophers were not always clearly formulated and sometimes, as in the case of Empedocles, the language seems to be *intentionally* obscured. But beginning with Thales, it is clear that for Aristotle there has been a giant leap forward in the conscious pursuit of first causes and principles.

Aristotle's description of Thales first principle or material cause leaves no doubt, in my view,

¹² This is reiterated in *On the Heavens* 294a28, where he informs us that Thales asserts that the earth remains in place because it floats on water like a piece of wood.

¹³ Since Aristotle makes no separate reference to a separate moving cause here, this suggests a kind of spontaneous generation. Elsewhere, as we will see, he addresses the factors behind the need for a separate efficient and then final cause.

¹⁴ This was a common belief in Near Eastern creation myths. See Burkert (2004, 30–32, 62–65, 120–22). But while Thales probably went with the flow, he added some arguments based on observation as the source of his conviction.

¹⁵ The ancient traditional wisdom is that “the heavenly bodies are gods and that the divine pervades the whole of nature” (*periechei to theion tēn holēn physin*, *Meta.* 1074b3-4). This reinforces, in my view, the contention that the first philosophers considered the primordial matter to be both living and divine. More on this below.

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that Thales' primordial stuff was alive and/or in motion. He insists that it was only after Parmenides and in response to him that philosophers consciously sought to seek an *archē tēs kinēseōs*, that is, a separate moving cause (984a26-27)¹⁶.

Nonetheless, the primary reference in Aristotle to Thales' first principle as being "alive" is in his treatise *On the Soul*, where he suggests that for Thales *psuchē* or soul, a self-moving force (*ti kinētikon*, 405a19), pervades (*memeichthai*, 411a7) the universe (*en tōi holōi*, 411a7). Aristotle implies that Thales arrived at this conclusion after observing that amber can move iron, an apparently inanimate substance (*On the Soul*, 405a20; and Diogenes Laertius 1.24). In a similar vein, he reports that Thales asserted that "everything is full of gods" (*panta plērē theōn einai*, *On the Soul*, 411a8; echoed in Plato, *Laws* 10, 899b8). This is the case, one can assume, because gods are by nature (or definition) both alive and eternal, like the living primordial principle. The implication is that Thales' water is a living divine substance and, as such, intelligent/conscious. Indeed both immediately before and after Aristotle's reference to Thales, he is quite explicit on five occasions (405a9, 14, 18, 24, 28)¹⁷ that the soul qua principle has both the power of knowing and the power of moving (*On the Soul*, 405a8-28). In sum, animated matter knows what it is doing. Cicero later makes this precise claim when he comments that for Thales, god, as mind, fashioned the universe out of water (*On the Nature of the Gods* 1.10. 25). And Aetius makes a similar contention when he maintains that "the mind of the *kosmos* is god for Thales" (*Thalēs noun tou kosmou ton theon*), and this mind is the divine power which moves the primordial moisture" (1.7.11).

My own contention here is that for Thales the *kosmos* or the present world order (universe and its contents) originated from a living conscious primordial substance. Of course, there are those who argue that it originated from a living unconscious primordial substance. But no one contests, I believe, that the earlier philosophers beginning with Thales claimed that the universe had a beginning in time. Aristotle, in fact, reiterates this on several occasions. But some of the texts, it is true, can lead to contradictory interpretative conclusions with regard to the characterization of the primordial principle. Consider the following passage taken from the *Parts of Animals* (640b4-22) before turning to the *Physics*:

The ancient philosophers who first studied nature (*hoi oun archaioi prōtoi philosophēsantes peri physeōs*) investigated the material principle and cause (*peri tēs hulikēs archēs*) to understand its nature and properties; how the universe is generated from it (*pōs ek tautēs gignetai to holon*) and under the influence of what motion (*tinōs kinountos*), whether, for instance, by strife or love or mind or

¹⁶ They were, as he notes, compelled by truth (984b10). And the first to address this was Empedocles (985a29) and, shortly thereafter, Anaxagoras (985a18). Although he explicitly states that Hesiod and Parmenides may have considered the question given the devised role of *Erōs* (Love) as a principle of attraction in their respective accounts of creation (*Meta.* I.984b23-31; quoting Hesiod, *Theogony*, 116–120; Parmenides, DK28B13), otherwise, there are no explicit references in the *Metaphysics* to the material monism of the first philosophers as being a creative force. However, as I noted above, and it is a point ignored by most scholars, Aristotle seems to assert that they all consider such a principle as a conscious divine principle (983a7-12).

¹⁷ The references are to Democritus, Anaxagoras, Anaximenes, Diogenes, and Heraclitus respectively.

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chance, the substratum of matter (*tēs hupokeimenēs hulēs*) being assumed to have necessarily a certain kind of nature—fire, for instance, to have a hot nature, earth, a cold one; the former to be light, the latter heavy. This, indeed, is how they explained the genesis of the universe (*houtōs gar kai ton kosmon gennōsin*).

It is clear from this passage that Aristotle's predecessors from the Milesians onward assumed that the *kosmos* had a beginning in time. The temporal and spatial starting point was a material cause or principle which also acted as a moving cause or principle. In the *Generation of Animals* (778b7-10; see also *Physics* 189a12ff.; 193a21ff.), Aristotle maintains the same discourse when he says that the first physicists (*hoi d'archaioi physiologoi*) did not clearly distinguish between the material and efficient causes (and paid no attention at all to the formal and final causes). Initially, he is alluding to the Monists, but further on he explicitly mentions the efficient causes of Empedocles, Anaxagoras, and Democritus. The physicists, meanwhile, begin their investigation *peri physeōs* by studying the material principle itself, that is, the nature and properties of the principle from which the whole universe developed. *To holon*, indeed, refers to the result, that is, the universe as a *kosmos*. Therefore, the *historia* or investigation here alludes to the entire development from beginning to end, and not, as some imply, to the material cause or principle strictly speaking¹⁸.

Let me pause here a moment to add a reflection on the notion of *physis* or nature in the context of a *historia peri physeōs*. While it may be true that the birth of philosophy (and science) began when the Greeks discovered *physis* or nature, scholars are far from unanimous on what the Presocratics, beginning with the early Ionians, really understood by the term *physis*. I have shown elsewhere that a linguistic analysis of the word *physis* shows (1) that the fundamental and etymological meaning of the word is that of "growth" and (2) that as an action noun ending in *-sis*, it includes three things: the origin, the process, and the result—that is, the whole process of the growth of a thing from its birth to its maturity. In other words, when it is a question of inquiring into the *physis* (nature) of a thing, one must consider the whole process from beginning to end¹⁹.

There seems to be some consensus among scholars that what the Presocratic philosophers were seeking was an "investigation" into the nature of things, that is, an *historia* of the *peri physeōs* type²⁰. But what is one to understand by this? If *physis* refers to the origin, development, and result of a thing, and if it is true that the Presocratics in their works *peri physeōs* were looking not for the *physis* of a particular thing but the *physis* of *all* things (that is, the *physis* as *archē*), then it follows that the term *physis* in the expression *peri physeōs* refers to the origin and growth of *all* things from beginning to end. In sum, the Presocratics in their works *peri physeōs* were seeking to explain how the *present* order of things was established and, of course, how it continues to function. They were thus not

¹⁸ It is surprising how many fall into this trap! Many cite a famous passage in Plato's *Phaedo* (97b-99e) as another key reference to the notion that the *historia peri physeōs* of the *physiologoi* was concerned first and foremost with material causes of the generation and destruction of all things. See most recently, Darbo-Peschanski (2007, 132–38).

¹⁹ For my detailed analysis and pertinent examples, see Naddaf (2005, chapter 1).

²⁰ For an in-depth discussion on the term *historia*, see Darbo-Peschanski (2007).

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interested in a description of the universe as it is (although a case could be made for Heraclitus) but in a history of the universe; in an explanation of its origin (*physis* as absolute *archē*), of the stages of its evolution (*physis* as process of growth), and finally of its result, the *kosmos* or *to holon* as we know and/or see it (*physis* as the result). In this regard, it is important to note that such a cosmogony involves not one but two departure points, one chronological and the other logical. The chronological or temporal starting point is called chaos in the modern sense of the term: to wit, the state of confusion before creation. The logical starting point, on the other hand, is the *kosmos* itself, that is, the natural world conceived as a structured whole in which each constituent part has a place. Indeed, people have always sought to know how the present order of things originated from the primordial chaos. From this perspective, all four of Aristotle's famous principles or causes are implicit in the Presocratic accounts of the *peri physeōs* type beginning with the Milesians²¹.

In his review of the definitions of the word *physis* in *Metaphysics* V.5. 1014b16-1015a19, Aristotle notes that the word can be used to designate the material cause, the efficient cause, the formal cause, or the final cause, or some combination of these—which is consistent with my definition above. Indeed, his definitions of the terms *archē* and *aitia* in *Metaphysics* V.1 and V.2 respectively cover the same quartet such that all three terms could, and are, used interchangeably. The *Physics*, the text under consideration in the present conference, confirms and contextualizes, to a considerable degree, most of the above.

In *Physics* II.3, Aristotle outlines his famous theory of the four causes, *aitiai*, that is, the ways in which something can be said to be “responsible for” something else: the material, the formal, the efficient, and the final. It behooves the natural philosopher (*physikos*), he argues, to know all four in order to answer the “how and why” of all natural change (*Physics* II.7; see also *Metaphysics* V.2). There is thus a correlation between knowledge of the causes of things and knowledge of the nature of things. Indeed, at the opening of *Physics* II, he characterizes natural things as those that have within themselves a principle of movement and change (192b13-15; 200b12-14) and shortly thereafter defines *physis* as precisely this principle and cause (192b21-22)²². Since natural things can be distinguished from one another according to their forms, then each natural object must have within itself a particular kind of formal active cause or agent (and thus nature qua agent inherent in the thing). Of course, the easiest examples to use when demonstrating the four causes are in an analysis of fabricated things, but as Aristotle notes (*Physics* III.3), the analysis only applies indirectly to them because their causes are not natural, e.g., it is not because of a wooden table that there are trees or again, it is not in the nature of a tree to become a wooden table. So causes are only causes in the complete sense when applied to natural things, and the best examples of these are biological. And in many instances, as Aristotle argues, three of these *aitiai* or causes coincide, “for the essential nature of

²¹ For a similar position with regard to Thales, see Drozdek (2007, 7).

²² “The principle and cause of motion and rest to those things and to those things only, in which she inheres primarily” (192b21–22). Or again, as anything that has within itself such a principle (192b33–34).

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a thing and the purpose for which it is produced are often identical ... and moreover the efficient cause must bear some resemblance in form to the effect ... for instance, a man is begotten by man" (*Physics* 198a22-29). This explains why Aristotle sees an identity between the essential nature of a thing and the purpose for which it was produced (Pellegrin 2003, 45). But while nature always produces what is best, it is not perfect because of the presence of indeterminate matter (that is, matter that can be potentially many different things) in the sublunary world. Perfection implies an unchanging eternity. The most natural beings can do is *imitate*, and what they imitate are the eternal and perfect circular motions of the heavenly bodies, which are responsible for the seasons, which are behind all growth and life (*On Generation and Corruption* 337a-338b)²³. These motions are considered unmoved movers because, unlike the natural objects of the sublunary world, they are not perishable and subject to reproducing their own kind. However, they in turn imitate, as an object of desire, the ultimate principle of motion, the ultimate unmoved mover, that Aristotle identifies with God.

Aristotle's notion of God is intimately connected with motion; more precisely, with the source of motion. The world around us is in motion, and without motion the world would not, strictly speaking, exist. It would come to a standstill and cease to be²⁴. At the opening of *Physics* III, Aristotle reminds us that the study of nature is about the study of movement (200b12-18), and in *Physics* VIII he argues that there could never have been a time when there was no motion²⁵. Since whatever is in motion, he insists, is moved by something else, this series cannot go on ad infinitum, and therefore motion must be traced to a cause that is not in motion: an unmoved mover (*prōton kinoun akinēton*) (*Physics* 258b10-12)²⁶.

Unmoved movers are not strictly speaking in motion, but are nonetheless characterized as in a state of actuality. Since thought, Aristotle insists, is the noblest (and happiest) of activities, then God must be engaged in an activity of this sort (*Meta.* 1072b14ff). Moreover, he associates the actuality of God's thought with life (*zōē*), and thus God is an eternal living being who is also the source of life (and order) in the universe (1072b13-31). As we saw above, Aristotle has already cited a passage from Homer's *Iliad* as the first intimation of the power of his unmoved mover. Was he as graceful and perceptive toward his early Ionian counterparts?

In a controversial passage in the *Physics*, Aristotle seems to establish that there are a number of similarities between his notion of God and the primordial substance of the first philosophers. The material monists, he states, claim that the primordial substance or *archē* is not only divine (that is, immortal and indestructible) but that it also steers, guides, or governs everything (*panta kubernan*).

²³ The motions of the heavenly bodies also keep the basic elements, earth, air, fire, and water, from separating and bringing everything to a standstill. Plato has a similar position in the *Timaeus* (57d-58c).

²⁴ Plato makes a similar argument at *Laws* 10, 895a-b.

²⁵ Plato suggests the same thing in both the *Timaeus* and the *Laws*, albeit not in the same context. See Naddaf (2004, 114-19).

²⁶ "Since motion must always exist and must not cease, there must necessarily be something, either one thing or many, that first initiates movement, and this mover must be unmoved" (*Physics* VIII.6. 258b10-12).

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“The unlimited (*tou apeirou*) has no *archē* ... but is itself understood as the *archē* of all other things and to surround and govern all (*periechein apanta kai panta kubernan*), as it is said by all those who do not suppose other explanations, such as mind or love, beyond the unlimited. Further they identify it with the divine (*to theion*), for it is immortal and indestructible (*agenēton kai aphtharton*), as Anaximander and most of the *physiologoi* say” (*Physics* III.4.203b7-15)²⁷.

In most of the other passages in the *Physics* in which Aristotle makes a direct reference to the early Ionian philosophers, he seems to suggest that the motion and change proper to the primordial substance of the early monists, and thus the cosmogonic process, is mechanical and hence a world order that would derive from that process would be, at best, some sort of spontaneous generation (184b17-18; 187a12ff; 188a19; 189b4ff; 191a23ff; 198b10ff; 203a1ff; 207b35ff; 250b16ff).

As we saw above, Aristotle observes that the notion that the divine pervades the whole of nature (*periechei to theion tēn holēn physin*) and that the heavenly bodies are gods, is a tradition that has been handed down from the most ancient of times (*Meta.* 1074b3-4). Thales, as we saw, appears to provide an argument for this. And Anaximenes' *archē*, air, is also described in terms of a steering principle: “Just as our soul, being air, holds us together and controls us (*sunkratein*) so do breath (*pneuma*) and air (*aēr*) surround the whole kosmos” (DK13B2, trans. McKirahan). A century or so later, Diogenes of Apollonia, a follower of Anaximenes, makes the claim more explicit, when he writes: “That which has intelligence (*noēsin*) is called air (*aēr*) by men, and all men are steered (*kubernasthai*) by this and it has the power (*kratein*) over all things. This seems to be God (*theos*) to me and to have permeated everywhere, to arrange (*diatithenai*) all things and to be in all things” (DK64B5)²⁸. Anaximander, as we know, contends that his indeterminate primordial substance, the *apeiron*, secreted a seed, that was pregnant with the primary opposites: hot and cold, and wet and dry. And these opposites continue to “pay penalty and retribution to each other for their injustices according to the assessment of time” (DK12B1). Most of the testimonia that have come down to us with regard to Anaximander and Anaximenes explain the origin and function of the universe in mechanistic terms with the help of political, biological, genealogical, and craft metaphors and/or models. And so many scholars have a tendency to explain away the reference to a steering principle as if it were an isolated reference, which it isn't.

Many commentators associate the “discovery of nature” with a secular revolution and the Milesians, my primary focus here, as having shunned traditional religion. Other commentators see them as intellectual mavericks, as the discoverers and advocates of a mechanistic universe, and others again as our first atheistic materialists.

To explain the present world order (natural and social) as being mechanistic does not preclude,

²⁷ For an enlightening description of Anaximander's *apeiron* as a divine principle, see Drozdek (2007, 8-12). He also makes an interesting distinction between the activity of the *apeiron* and the mechanical processes. He thus argues that nature and the *apeiron* are two different things.

²⁸ Air for Diogenes (DK 64B4) is the source of both soul (*psuchē*) and intelligence (*noēsis*).

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I would argue, that it is the product of a conscious divine entity who continues to oversee its functioning and our place in it. Nor preclude the conclusion, given the historical period, that the divinity does not communicate with its human products. There are, to my knowledge, no philosophical schools and/or individual philosophers in antiquity who did not see humans as having a privileged status in the universe. And again, to my knowledge, there are few if any philosophers in antiquity who categorically denied all forms of divination, or indeed, anything we could characterize as God. It is worth remembering that there were no arguments for the existence of God or gods until the existence of God or gods was challenged (see Naddaf 2004). This occurred late in the fifth century BC, but was restricted to a small number of intellectuals that were not characterized as “philosophers.” This brings me to Xenophanes of Colophon.

Xenophanes was not only a close contemporary of the Milesians but someone who most certainly spent time with them after, if not before, his flight from Colophon (see Naddaf 2003, 38–43). He thus provides, I would argue, a better snapshot of the Milesian conception of the divine that would be most compatible with the information we have about them. After famously repudiating the traditional anthropomorphic conception of gods, Xenophanes describes his own notion of God as a divinity “the whole (*oulos*) of which sees, knows (*noei*), and hears, and can shake (*kradainai*) all things (*panta*) effortlessly by the thought of his mind (*noou phreni*)” (DK21B24, 25, 26). If this were a direct quote from Thales, Anaximander, or Anaximenes, what interpretation would this lead us to? Xenophanes was no less a “naturalist” than his contemporary Milesian colleagues (all of whom were struck by the consistently “natural” way in which the universe worked), but he was nonetheless convinced that “the gods (*theoi*) did not reveal to men all things (*panta*) from the beginning (*ap'archēs*), but, by searching, they discover what is better in time” (DK21B18). Elsewhere he suggests that we may never know the truth (DK21B34). The two fragments are not necessarily incompatible. Nor would they exclude that Xenophanes retained a firm and pious religious belief in the popular, but non-anthropomorphic, notion of the gods, gods who would be compatible with a naturalized vision of the universe but who did not always freely divulge nature's secrets.

There is a famous reference in Xenophanes, the fragment on his naturalistic explanation of the rainbow, that suggests to many that he repudiated all forms of divination (DKB32)²⁹. But did Xenophanes, or any of the early Ionian philosophers, awaken one morning to declare that all oracles were a hoax? Did they awaken one morning to declare publicly that they would no longer be seen in the temples, praying, sacrificing, and/or attending religious ceremonies in such a tight knit political community?³⁰ In sum, that piety and religious observation would be for the ignorant other! These are

²⁹ For a discussion of the various but converging positions on this fragment of Xenophanes, see Lesher (1992, 139–44); but also 153–55 on Xenophanes' repudiation of divination in general. Cicero seems to have been the first to contend that Xenophanes repudiated divination in general (*On divination* 1.3.5).

³⁰ Aeschylus makes it clear that one of the most important *technai* that humans received from Prometheus was *mantikē* or the art of divination and he goes into some detail on the different forms of divination that were practised (*Prometheus Bound* 484-99).

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questions that scholars seem to disregard. Indeed, many describe them as confirmed agnostics, if not atheistic materialists.

It is worth remembering that forms of divination, ways of ascertaining the future, are found in every culture and are based on the conviction that the gods who control natural phenomena send messages to humans about the future that can be interpreted. Methods or *technai* were developed over time based on experience which attempted to prove the connection between certain events. Divination, as Bottéro (2000, 43–50) notes, originated as a deductive and knowledge-based art. Could divination be a key to understanding the predictability associated with the discovery of nature and thus the advent of philosophy? We tend to forget that divination, like the theories of the *physiologoi*, was based on the notion that the universe was predictable. Yes, there were capricious gods, but divination was a way of “predicting” what they had in store for us. What can we know!

I find it almost unimaginable that the first philosophers would have held the famous oracles in contempt; yet, this is what so many contemporary interpreters seem to suggest. Heraclitus certainly believed in oracular inspiration and first and foremost in Delphi (DK22B93). For Heraclitus, it's a question of how to interpret correctly! Although “nature loves to hide” (*physis kruptesthai philei*, DK22B123), humans can unlock the secrets of nature, and thus Zeus (DK22B64), with an intellectual effort. And such an effort can change the course of man's fate. As Heraclitus notes: “a man's character is his fate” (*ēthos anthrōpōi daimōn*, B119), but one's fate is not predetermined. Life is about the pursuit of truth, about discovering the laws of the universe, and living in conformity with them. This is a perfect instance of “philosophic” inspiration! Parmenides (DK28B1) and Empedocles (DK31B1, 3, 4, 131), for their part, insist that a divinity *via* inspiration is also the sole source of truth. But this is open to an elected few and requires a conscious intellectual effort. It can be argued that Anaxagoras' Mind (DK57B12) is behind the present order of things and *continues* to control all—despite the objection on the part of Plato and Aristotle and some recent modern interpreters³¹. And Democritus, the famous materialist, was still convinced that the gods sent “messages” to humans (DK68B116) and that Homer's poetic genius must have been the result of divine breath or possession (68B18, 21). There is evidence that most of the Presocratics—I will avoid “all”—were engaged in allegorical interpretation and believed in divine inspiration (see Naddaf, 2009a and 2009b). But there is a shift from “poetic” to “philosophic” inspiration.

I have argued at length elsewhere (Naddaf 2002, 2003, 2005, 2006)³² that the “decisive” factor, if not a sufficient condition, behind the critical and open debate characteristic of accounts of the

³¹ Graham (2006, 44), while arguing that Anaximander's boundless has a “creative function,” denies it any individual character and thus any form of conscious cosmic theodicy. He argues the same for Anaxagoras' Mind. In both cases, the *apeiron* and *nous* initiate the process but eventually fade into the background. For other recent and somewhat similar positions, see Gregory (2007, 30–31, 47–52); and Sedley (2007, 2–10).

³² Of course, I have not been the first to argue for the importance of the novel Greek political experience as a decisive factor behind the advent of philosophy, but I have examined, unlike others, the contextual historical development, in particular, as it concerns Miletus and Anaximander's particular cosmological model; see Naddaf (2003, 7–69).

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peri physeōs type and their corresponding models (beginning with the Milesians) was the political experience embodied in the institutions of the Greek city-state. Rob Hahn, in a series of studies (2001, 2003, 2010) has recently argued that architecture (and the use of artefacts in general) was a decisive factor—if not again a “sufficient condition,” behind the origins of philosophy. More precisely, he argues that monumental temple-building—and this again brings the relation between god, nature and the birth of philosophy back into the picture from a different, but crucially relevant angle—was the model behind Anaximander's own cosmological model, and he uses a barrage of comparative images to make his case. Hahn also sees a political connection. He argues that it was the aristocrats who brought the architects to the centre stage as a way of bolstering their failing authority, which was severely eroded after the invention of the hoplite. This was a time when the struggle for land intensified with the growth of population, and when citizenship was tied ever more closely to land ownership. So the aristocrats sought, he argues, to appropriate land by special appeal to their relation, their lineage, to Apollo, Hera, or Artemis. And so the role of the divine is once again omnipresent among the intellectual elite.

Temple-building sought to foster those alliances in keeping with the genealogical model³³. But, Hahn argues, the irony of the new initiative is that in the process of building the monumental temples, new technologies undermined the very ethos that motivated their construction. In the process of orchestrating these enormous technological projects, a new vista was opened for the archaic Greeks, revealing that nature had an exquisite order that, remarkably, could be grasped and controlled to a much greater degree than anticipated earlier. In sum, this optimistic horizon was opened, ironically, at the temple, the very mystifying institution that expounds the view that humans are helpless creatures. Hahn invites us to imagine Anaximander and the architects, together at the temple, conspiring in a rather unforeseeable way to undermine the very mindset that motivated the monumental projects (2000, 203). In sum, they observed that temple construction needed mathematical precision and then realized that the universe must work in the same way, that is, there is an inherent order even when disorder seemed to arise out of nowhere (e.g., storms that were seen as due to the will of the gods). And human social institutions should function in the same way, that is, in conformity with nature so that the citizens of the polis should, like the components of the universe, be considered as equals. As a result, the aristocratic project backfired, he claims, and the consequence was egalitarian and democratic reforms through Greek society (Naddaf 2002, 163).

I have argued at length that the historical evidence suggests that the egalitarian and democratic reforms to which Hahn refers antedate the advent of philosophy in Miletus (review of Hahn 2002, 153–69). As Vernant (1965, 63) correctly notes, “The phalanx made the hoplite, as the city made the citizen, an interchangeable unit, one element like all the others.” And this bodes well with Vitruvius,

³³ Aristocrats insisted, as did the Homeric heroes, that they could trace their lineages to a particular god or goddess.

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the first-century BC Latin architectural writer, who claimed that temple columns represent citizens who stand in uniform distances from the centre of power, thus reflecting a sense of *isonomia* (*On Architecture* 4.1.5-7). I thus believe that the evidence suggests that socio-political factors were more of an inspirational force behind Anaximander's cosmological model than architecture, but this doesn't detract from an architectural influence. More importantly, as Hahn himself notes: "the purpose of the religious monument was to foster the consolidation of the divergent elements that comprised the polis through uniformity or regularity of worship" (2000, 95). In conjunction, whatever design choice one may want to assign to the column and the temple (and there are many), the fact remains that both had a cosmic and symbolic religious significance; moreover, they were places of religious worship and ritualistic sacrifices. From this perspective, they had a number of commonalities with the temples of their Near Eastern neighbours, except that the temple was constructed for, and open to, the entire citizen body in the case of ancient Greece.

Temples are generally replicas of the universe, the place where creation began, and embody both the socio-political structure of society and the relations between gods and men. This would explain why Anaximander's cosmological model could be grounded both in politics and a new view of religion. Despite its circular form, Anaximander's cosmological model has many elements in common with the contemporary temple construction, not the least of which is the column drum as Hahn has so masterfully demonstrated³⁴. We thus see the same natural laws at work in both models. Anaximander's cosmological model could thus be understood as a divine temple, a mixture of rationalism and mysticism, as exhibiting a theology and a theodicy.

As we all know, religion in ancient Greece had a strong public character that was often imposed by the polis. But there were also a number of flourishing specialty cults which addressed individual concerns (Cosmopoulos 2003, xi). We know that the mystery cults were flourishing in Miletus and their colonies during the lives of Thales, Anaximander, and Anaximenes³⁵. Would the fertility ritual and mysteries connected with Dionysus and the agricultural cult it presupposes (to mention only this one) be incompatible with the new Milesian view of nature and living in conformity with its laws, with its revelation? "*Physis* loves to hide" (DK22B123)³⁶, says Heraclitus, a great admirer of the Milesians a generation later, and it was perhaps not by chance that he is said to have deposited his book as a dedication in the great temple of Artemis. According to Heraclitus, nature exhibits precise laws that humans must follow or else the Erinyes will seek them out (22B67)³⁷. I see no Presocratic philosopher, and Aristotle's testimonia in the *Physics* and elsewhere reinforces this, who does not see a conscious divine creative force in nature, a force indicative of some kind of

³⁴ We find this most recently in Hahn (2010, 11-86).

³⁵ See in particular Robertson (2003, 218-40). For a masterful contextual analysis that would support my thesis, see Burkert (2004). And I refer to almost the entire book here.

³⁶ For a fascinating study of this fragment, see Pierre Hadot (2004).

³⁷ As Burkert (2004, 60) notes, "Cosmic order is the paradigm of Justice whether it is said that Maat or Misharu accompany the Su, or that the Erinyes watch out for any transgression."

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theodicy exhibited first and foremost in the regularity of the rhythms of nature. Nor would this be necessarily incompatible with the age-old belief in divination. Would it be impious to interpret oracles from a naturalistic and/or rationalistic perspective?

Richard Bodéüs has shown that while Aristotle recognized that popular beliefs about the gods contained a number of fantastic elements, the Stagirite was convinced that much of the common belief was nonetheless reliable, including the convictions that the gods are living immortals, supremely happy, beneficent, and that they reward good humans who, in return, owe them duties of piety and thus sacrifices and prayers. But piety for Aristotle took many forms and the highest was trying to be like the gods, that is, to practice philosophy. From this perspective, the Milesians were his “living” ancestors³⁸.

Bibliography

BABUT, Daniel. 1974. *La religion des philosophes grecs*. Paris.

BOAS, George, and Arthur O. Lovejoy. [1935] 1973. *Primitivism and Related Ideas in Antiquity*. New York.

BOTTÉRO, Jean, with C. Herrens Schmidt and J-P. Vernant. 2000. *Ancestor of the West*. Chicago.

BODÉÜS, Richard. 2000. *Aristotle and the Theology of the Living Immortals*. Albany.

BRISSON, Luc. 1996. *Introduction à la philosophie du mythe: Sauver les mythes*. Paris.

BROADIE, Sarah. 1999. “Rational Theology.” In *The Cambridge Companion to Early Greek Philosophy*, ed. A. A. Long, 202–24. Cambridge.

BURNET, John. 1930. *Early Greek Philosophy*. 4th ed. London.

BURKERT, Walter. 2004. *Babylon, Memphis, Persepolis*. Cambridge, Mass.

COGNIOT, G. 1964. *Le matérialisme greco-romain*. Paris.

COSMOPOULOS, Michael B., ed. 2003. *Greek Mysteries*. London.

CORNFORD, F. M. 1932. *Before and After Socrates*. Cambridge.

COUPRIE, Dirk, Robert Hahn, and Gerard Naddaf. 2003. *Anaximander in Context: New Studies in the Origins of Greek Philosophy*. Albany.

DARBO-PESCHANSKI, Catherine. 2007a. *L'Historia: Commencements grecs*. Paris.

———. 2007b. “The Origin of Greek Historiography.” In *The Blackwell Companion to Greek and Roman Historiography*, ed. John Marincola, 27–38. Oxford.

³⁸ As the story goes, Charles Darwin delayed the circulation and publication of *The Origin of Species* for a generation after he discovered his theory of natural selection. He remained throughout his life a deeply pious and religious man. Nature, he could argue, works in mysterious ways and it doesn't exclude a divine force behind the scenes. Living creatures are just not immutable!

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- DROZDEK, Adam. 2007. *Greek Philosophers as Theologians. The Divine Arche*. Aldershot.
- GREGORY, Andrea. 2007. *Ancient Greek Cosmogony*. London.
- GUTHRIE, W. K. C. 1950. *The Greek and Their Gods*. Boston.
- GERSON, Lloyd. 1990. *God and Greek Philosophy: Studies in the Early History of Natural Theology*. London and New York.
- GRAHAM, Daniel. 2006. *Explaining the Cosmos: The Ionian Tradition of Scientific Inquiry*. Princeton.
- HAHN, Robert. 2000. *Anaximander and the Architects*. Albany.
- . 2010. *Archaeology and the Origins of Philosophy*. Albany.
- HADOT, Pierre. 2004. *Le Voile d'Isis: Essai sur l'histoire de l'idée de Nature*. Paris.
- HUSSEY, Edward. 1995. "Ionian inquiries." In *The Greek World*, ed. A. Powell, 530–49. London.
- HURWITT, Jeffrey. 1985. *The Art and Culture of Early Greece, 1100-480 B.C.* Ithaca.
- JAEGER, Werner. 1947. *Theology of the Early Greek Philosophers*. Oxford.
- LAKS, A. 2004. "Aristote, L'allégorie et les débuts de la philosophie." In *L'allégorie de l'antiquité à la renaissance*, ed. B. Pérez-Jean and P. Eichel-Lojkine, 211–20. Paris.
- LESHER, James. 1992. *Xenophanes of Colophon*. Toronto.
- LLOYD, G. E. R. 1979. *Magic, Reason, and Experience*. Cambridge.
- KAHN, Charles. [1960] 1994. *Anaximander and the Origins of Greek Cosmology*. Indianapolis.
- KINGSLEY, Peter. 1995. *Ancient Philosophy, Mystery and Magic: Empedocles and the Pythagorean Tradition*. Oxford.
- KIRK, G. S., J.E. Raven and M. Schofield. 1984. *The Presocratic Philosophers*. 2d ed. Cambridge.
- McKIRAHAN, Richard, 1994. *Philosophy Before Socrates*. Indianapolis.
- NADDAF, Gerard. 2002. "Robert Hahn and the Origins of Greek Philosophy." *Ancient Philosophy* 22 (1): 153–70.
- NADDAF, Gerard. 2003. "Anthropogony and Politogony in Anaximander of Miletus." In *Anaximander in Context: New Studies in the Origins of Greek Philosophy*, 7-69. Albany.
- NADDAF, Gerard. 2004. "Plato: The Creator of Natural Theology." *International Studies in Philosophy* 36 (1): 129–50.
- . 2005. *The Greek Concept of Nature*. Albany.
- . 2006. "What is Presocratic philosophy?" *Ancient Philosophy* 26 (1): 161–79.

Naddaf, Gerard

Spontaneous Generation and Creationism in Presocratic Monism in Light of Aristotle's Analysis in the *Physics*

- . 2007. “La alegoría: Orígenes y desarrollo de la filosofía desde los presocráticos hasta la Ilustración.” *ARETÉ: Revista de Filosofía* 19 (1): 41–86.
- . 2009a. “Algunas reflexiones sobre la noción griega temprana de inspiración poética.” In *Mythos y Logos: Homenaje a los profesores Federico Camino Macedo y José León Herrera* (eds. Miguel Giusti and Raúl Gutiérrez). In *ARETÉ Revista de Filosofía* 21 (1): 51–86.
- . 2009b. “Allegory and the Origins of Philosophy.” In *Logos and Mythos: Philosophical Essays on Greek Literature*, ed. W. Wians, 99–131. Albany.
- PELLEGRIN, Pierre. 2003. “Aristotle.” In *A Guide to Greek Thought*, ed. J. Brunschwig and G. E. R. Lloyd, 32–53. Cambridge Mass.
- ROBERTSON, Noel. 2003. “Orphic Mysteries and Dionysiac Ritual.” In *Cosmopoulos*, 2003, 218–40.
- SCHMALZRIEDT, Egidius. 1970. *Peri physeōs: Zur Frühgeschichte der Buchtitel*. Munich.
- SCACCA, M. F. 1967. *Platone II*. Milan.
- SEDLEY, David. 2007. *Creationism and its Critics in Antiquity*. Berkeley and Los Angeles.
- SOLMSEN, F. 1942. *Plato's Theology*. Ithaca.
- VERNANT, J-P. 1962. *Les origines de la pensée grecque*. Paris.
- VERNANT, J-P. *Mythe et pensée chez les Grecs*, Paris, 1965.
- VEYNE, Paul. 1988. *Did the Greek Believe in Their Gods?* Chicago.
- VLASTOS, Gregory. 1993. “Theology and Philosophy in Early Greek Thought.” In *Studies in Greek Philosophy*, vol. 1: *The Presocratics*, ed. Daniel Graham, 3–31. Princeton.
- . 1970. *Plato's Universe*. Washington.

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