

РАЗДЕЛ IV  
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КОСМОЛОГИЯ В ЛИЦАХ

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EPICURUS AND LUCRETIUS ON THE CREATION OF THE COSMOS

**PANOS ELIOPOULOS** – Ph.D.,  
University of Peloponnese,  
(Tripoli, Greece)  
E-mail: ksatriya@tri.forthnet.gr

*Abstract: Although in the extants of Epicurus there is not a direct mention to the atomic swerve, other sources, among them Lucretius, confirm that the Athenian philosopher foresaw in the presence of this unpredictable atomic movement the solution for the cosmological problem. In the epicurean system, as presented through the writings of Epicurus and Lucretius, the creation of the cosmos is owed to the presence of atoms, which form compound bodies, and the void, which allows unimpeded movement.*

*Keywords: Epicurus, Lucretius, Cosmos, Creation, Atom, Atomic Motion, Swerve.*

ЭПИКУР И ЛУКРЕЦИЙ О СОЗДАНИИ КОСМОСА

**Панос Элиопулос** – доктор философии,  
Пелопонесский университет  
(г. Триполи, Греция)

*Статья посвящена компаративному анализу космологических концепций древнегреческого философа Эпикура и его последователя и доксографа, римского поэта и философа Лукреция. Сделан вывод о том, что и Эпикур, и Лукреций не представляют Вселенную хаосом, полагая, что сотворение и функционирование космоса подчинено законам природы и определенному порядку, наиболее значительная и исключительную роль в котором отведена атомам.*

*Ключевые слова: Эпикур, Лукреций, космос, создание, атом, движение атомов.*

The aim of the epicurean reports on Physics is, according to Epicurus himself, to become acquainted with the celestial phenomena so as not to attribute to them characteristics that are shared only in the lives of men, such as will, deliberate action, or even causality (Epicurus, *Letter to Herodotus*, 80–82). Knowing science, discover-

ing that there is nothing to admire in the universe as awe inspiring or of divine origin, liberates the human being from all emotion related with the natural world, with death, and with the absence of teleology. The aim of the human life, in this context, is “eudaimonia”, in the form of tranquility (ataraxia), salvation from convictions and beliefs that cause feelings such as hope or fear. His canonic teaching, a teaching based on rules, depicts the epistemological foundation of Epicurus’ Ethics. The Epicurean method is one that acknowledges the existence of potentially many causes, instead of one single explanation, that need to be employed in order to explicate reality (Epicurus, *Letter to Pythocles*, 97–98). In the line of Democritus (Cambiano, 1997: pp. 5–17), Epicurus and Epicureans like Lucretius fervently foster the theories of materialism and atomism. In this line of thinking, knowledge needs to be substantiated, not through hypotheses and doctrines of a mere theoretical foundation, but on the safety of the observation of the phenomena themselves, as diagnosed and perceived through the senses (Epicurus, *Letter to Pythocles*, 86–87).

To be able to comprehend the Lucretian report of the Epicurean account of the cosmos and its creation one needs to understand primarily these theories straight from Epicurus’ writings. Epicurus bases his Physics on the atomic theory of Leucippus and Democritus and elaborates it as a subordinate discipline to Ethics. Unlike Democritus, he does not recognize strict determinism and he rejects the idea that all movement within the universe obeys immovable natural laws. To preserve the case of free will and free action for the human being, Epicurus admits that there are certain unpredictable movements of atoms that escape the predestined function of what otherwise seems to be a very well ordered universe. These movements, the atomic swerves, become responsible, in his system, not only for the preservation of free will but also for the actual creation of the world, thus obtaining cosmological and psychological significance. Lucretius, the Roman who wrote the poetic masterpiece *De Rerum Natura*, in the first century AD, is a disciple of the Epicurean dogmas and of Epicurus himself who lived in the fourth century BC (Bignone, 1939: pp. 121–139). Although there is ambiguity whether he was connected with the Epicurean circles of his time or not, he follows very closely the tenets of Epicurus and even, most probably, follows the structure of Epicurus’ *On Nature* in his poem. Furthermore, Lucretius is the first writer who introduces Romans to Epicurean philosophy in the Latin language. He, like Epicurus, shares the belief that knowledge of the phenomena which occur in the universe will release the human being from the bonds of ignorance and superstition. Lucretius does not make additions to the Epicurean dogma on the creation of the cosmos; his aim is not to produce original philosophy. However, he proceeds to a remarkable account of Epicurus’ ideas on Physics, in thousands of verses, which exerted great influence in European philosophy in the next centuries, while he remains a trustworthy source that saves Epicurus’ most important belief of the *clinamen* (παρεγκλιτική κίνησης), the sudden and inexplicable swerve of the atoms, which is accountable for the creation of bodies.

The main principles of Epicurean Physics are exposed in Epicurus’ *Letter to Herodotus*, and correspond to texts I–X of the almost lost *On Nature* whose few fragments have been found among the Herculaneum Papyri (Clay, 1983: p. 55). For the Athenian philosopher, who has appropriated the particular tenet of Parmenides, Leucippus and Democritus, nothing comes into being out of nothing, and nothing is reduced to nothing. His argument is that in the case that there was creation out of nothing then everything could be created out of everything, with no distinction, and there would be no need for certain “seeds” (σπέρματα) to exist. Similarly, if things

were reduced to nothing, subsequently that would signify their loss into the Non-Being (Epicurus, *Letter to Herodotus*, 38–39), which is impossible since the universe is neither able to diminish nor to disappear. The universe always was as it is now and will always be, without any change; moreover, it is infinite, centerless, and bottomless (Giannantoni, 1989: pp. 9–26). There is no universe or space other than it, and its being unique certifies that nothing can be added to it and nothing can be reduced from it. As the philosopher clarifies, the space up and down and in all direction is also infinite, never ending (Konstan, 1972: pp. 269–78). Epicurus recognizes the theoretical and very strong chance that, due to the infinity of the number of atoms and their infinite motion, within this universe there can be created several or even infinite worlds (κόσμοι) (Epicurus, *Letter to Herodotus*, 45). These worlds are parts of the universe, they are mortal ones, and they are presented in many different shapes (Epicurus, *Letter to Herodotus*, 73–74). Between these worlds, Epicurus upholds, there are also certain between-worlds areas (Epicurus, *Letter to Pythocles*, 88–90) called “μετακόσμια”, or “intermundia” as Lucretius names them, where gods live oblivious of the human cares and anxieties. Practically, the whole universe is material and consists of these elementary physical principles, the bodies and the void (σώματα καὶ κενόν).

Epicurus uses two methods for the outcomes of his science: one is the empirical method and the other is the logical method. Human beings understand the existence of bodies through their senses, which serves as empirical evidence, and the existence of the void through the logical syllogism that bodies would not be able to move if there was no void. Since bodies are able to move, that means for Epicurus that we can become certain about the existence of the void, which he calls “ἀναφῆ φύσιν”, nature that cannot be touched or known by the senses (Epicurus, *Letter to Herodotus*, 40). Bodies are distinguishable into atoms and their compounds. Epicurus held that the constituent of nature is matter, in the form of discrete, solid and indivisible particles, the atoms. Contrary to Democritus’ beliefs, he further distinguished between the atom, which by its nature cannot be broken apart, and the minimum conceivable expanse of matter. Atoms have such minima as parts, but are not minima themselves (Epicurus, *Letter to Herodotus*, 58–59). While compounds can be dissolved, due to the perplexity of their structure, this remains impossible for the atoms, which are considered to be complete and simple bodies that cannot be broken or dissolved. Atoms are infinite in their number as is the void. The infinity of the atoms and of the void is supported by the claim of mutual functionality, since if the void was not infinite while atoms were, then there would not be enough space for them to move, and if the void was infinite but the atoms were not, then there would not be enough probability for them to come together and form compounds (Epicurus, *Letter to Herodotus*, 41–42). Atoms of similar shape are infinite in number too but the variety of their shapes is indefinite, which is proven by the immense variety of shapes met in nature. In these shapes the atoms are unlike any other form of matter, they are “certissima” (Lucretius, *De Rerum Natura*, 1. 675). This conception is imbued by the idea that a limit of atomic combination needs to be imposed: not all atoms may join with other atoms due to the limited numbers of atomic shapes (Cammell, 2003: p. 95). For Epicurus, in a compound body, change can occur by the addition of new matter, the loss of old matter, or the internal shifting of the parts (Epicurus, X i. 8–9). Atoms have their least parts, these minima, but nothing can be added to them or taken from them and they are incapable of transposition within the atom. Atoms share three of the properties of sensible things: shape, weight, and mass.

However, unlike the sensible things, they are immutable and indestructible (Epicurus, *Letter to Herodotus*, 54, 107, 204, and Lucretius, *De Rerum Natura*, 1. 798), and they comprise the solid constituents of all compounds. As such they have to be eternal, since they are basic units; by not dissolving they transfer and stick together, in different variations, and they are, in consequence, responsible for the creation and endless continuation of the cosmos.

As regards atomic motion in particular, it is constant, of the same speed (for the light and the heavy atoms as well) and of two kinds. Motion even for those subtle compounds that Epicurus calls images (εἰδῶλα) and Lucretius calls “simulacra”, which according to the Epicurean theory are responsible for the formation of representations in the human mind, may be much faster than our human mind can perceive and huge distances can be covered as, due to their delicate structure, there is no substantial resistance within the void to make them slow down (Epicurus, *Letter to Herodotus*, 46–47). The same goes for atoms, thus providing a solution to entropy, for since atoms can never slow down, the universe can never come to a halt. Atomic motion happens within the compound, as atoms move within its given space, and also it happens with free atoms which wander downward in the void. Both motions take place at an immense speed. When free atoms collide they leap to any possible direction, even upwards, and they form compounds with the atoms that they have collided with and with others that they find on their route. Inside the compound the atomic motion is understood by Epicurus as a form of vibration (ταλάντωσις), since there exist atoms and void as in the rest of the universe. Motion stops only when there is an obstruction from the outside or when the weight of the atom brings it again back to its downward orientation. The absence of other orientation in the universe is thus the reason why any given world would, like our own, be similarly oriented in respect to gravitation. Lucretius’ theory demonstrates how the restless atoms come to rest in compounds which are apparently still. Although the atoms are continually in motion the world of macroscopic compounds seems at rest with the exception of the motions of individual bodies. This great turmoil, by analogy, establishes the possibility that the whole universe is like that (Fowler, 2002: p. 187).

In the formation of the world, no ordering principle played any part at all. Epicurus and his followers do not recognize any sort of divine intervention in the creation. The creation of the cosmos is the product of the movements and collisions of the atoms, while there is no providence and the atoms gather together to form compounds by chance; that is, all beings are the result of accidental gatherings of atoms in their occasionally interrupted downward movement (Epicurus, *Letter to Menoeceus*, 133–134). Lucretius repeatedly affirms this supposition. The cosmos developed, after many useless combinations of atoms, when the *dispositurae* (atomic configurations) first appeared. The fact that human eyes cannot observe these atoms as physical entities does not mean that they are immaterial or that they do not exist. Since they are invisible to our eyesight, obviously their motions must also escape our notice (Lucretius, *De Rerum Natura*, 2. 308–314). However, the invisible is corporeal as is the visible (Schrijvers, 2007: pp. 255–288). Lucretius employs many terms in order to name those “invisible” elements that constitute the material world: *genitalia corpora*, *materies*, *rerum primordia*, *semina rerum*, *corpora prima*, *corpora caeca*. These names depict the ability of the atoms to be the primitive starting points of all entities rather than their smallness (Sedley, 1998: p. 38).

As far as the creation of the living beings is concerned, according to Campbell (Cambell, 2003: pp. 2–3), Lucretius consciously chooses to present an Empedoclean

version of zoogony but also imports extra Empedoclean material into the Epicurean account. As the Roman poet (having followed Epicurus) is an anti-teleologist, he rescues both Democritean and Empedoclean zoogony, and implicitly he argues against the platonic *Timaeus*. Lucretius can be classed as an anti-evolutionist in the sense that he insists on the fixity of species and, simultaneously, as an evolutionist since he accepts the differentiation of the human race from animals in the evolutionary process (Cambell, 2003: p. 8). Both humans and animals are described as *mortalia saecla* (Lucretius, *De Rerum Natura*, 5. 791–792). Nothing can be born except from a specific seed, which necessarily predetermines each being. Things are in a specific way and cannot be otherwise (Morel, 2000: passim). Destruction is only apparent as it concerns individual beings but not being as a whole. The world is characterized both by a constant fluidity and by an underlying permanence and stability, a generation and dissolution. Lucretius stresses the fact that only the whole universe is really immortal, as *summa summarum*, not the individual phenomena. Death is a necessary concomitant of every new life. In the *Letter to Herodotus* (39) it is stressed by Epicurus that the outcome of this fluidity is constancy in the total sum of matter in the universe, a balance, regulated continuously by means of death and life. Epicurus and Lucretius, no matter how much opposed to determinism, manifestly conclude that there is necessity in the genitive part of the world but not in the regulatory processes of the world.

The Roman Epicurean asserts that the atoms have always had and will always have the same motions, and the properties of the compounds will always be governed by the same laws. No force can change the sum or types of things (Lucretius, *De Rerum Natura*, 2. 297–303). There is no place into which any type of matter might be lost from the universe, nor from where a new force might come to change its nature. Despite the minimal disturbance of the “clinamen”, i.e. the atomic swerve, there is regularity and order in this autonomous cosmos which is imbued by an endless uniformity of events, owing to unchanging and unalterable laws. Lucretius maintains that the number of atoms is infinite but the number of different shapes is finite (Lucretius, *De Rerum Natura*, 2. 478–580). The universe, exactly like the compound bodies, is a collection of atoms of various shapes moving in various ways; if it is going to change into something else, the number of atoms or the number of types of atom or the number of ways they can move must be increased or reduced (Fowler, 2002: p. 370). There is a discernible contrast between the eternity of the universe and the mortality of the individual worlds, also between the stability of the world structure and the turmoil that lies within. However, “non est mirabile”, as Lucretius holds, nothing is to admire since there is an explanation for everything.

For the Epicurean poet, the world is not a plenum; it is the addition of plenum and void, like in the theories of Epicurus’ atomic predecessors. The atoms do not cease to move when they form compound bodies, but are constantly in motion. The world is not providentially ordered due to the fact that there are unpredictable divergences (Lucretius, *De Rerum Natura*, 2. 62–79). Although nothing can move upwards of its own force, there is the “clinamen”, a swerve, which is a sudden and occasional sideways jump of the atom at random time and position while the atom is falling vertically downwards in the void. For Lucretius, who records the element of the swerve, the motion of atoms has three specific forms: a) a downward natural motion owed to their weight, b) motion in all other directions due to “plagae” caused from collisions with other atoms, c) the “clinamen”, which is a sudden small divergence of an atom’s natural route. The Epicurean and Lucretian point that the atoms are con-

stantly in motion is in accord with the Democritean theory. Nonetheless, the “clinamen” is an Epicurean invention. Lucretius asserts that without the “clinamen” atoms could not have come into collision with each other, and compounds could not have been formed. He adds that without the supposition of the “clinamen” we could not account for the fact of free action either (Lucretius, *De Rerum Natura*, 2. 251–293). Practically, Lucretius is supporting the thesis that the creation of the compounds and free will has the same source, which is the “clinamen”. It has to be noted, though, that this equals with the subsequent, although indirect, acceptance that the cause of free will and the cause for the formation of the compounds are totally unknown, since the “clinamen” is an unpredictable and inexplicable swerve of the atom during its downward gravitational movement. Lucretius’ argument follows hypothetical premises based on a negative Modus Tollendo Tollens (ifAthenB; but notB, hence notA) on the pattern of the Epicurean “οὐκ ἀντιμαρτύρησις” (no counter-witnessing): if the “clinamen” does not exist, “voluntas” (free will) does not exist; but “voluntas” exists; therefore it is not the case that the “clinamen” does not exist.

It must be reminded that atoms can diverge in any direction when collided with another atom. Epicurus remarks that an atom that has been struck will eventually return to vertical downward motion (Epicurus, *Letter to Herodotus*, 61). As Lucretius explains, the heavier atoms do not fall more quickly (Lucretius, *De Rerum Natura*, 2. 216–250); Epicurus has already noticed that there is the same speed (ἰσοτάχεια) for all. If they did not move aside slightly at undetermined times and places, and instead fell forever straight down, then no atomic compounds could have been formed. As a result, the “clinamen” gives birth to “plagae” and the “plagae” give birth to compounds. The atoms owe their movement in the vacuum of the void either to “gravitas” (gravity) or to “ictus” (stroke) (Lucretius, *De Rerum Natura*, 2. 83–88. Cf. Epicurus, *Letter to Herodotus*, 61–62). When they collide they leap apart because they are solid and there is void around them. There is no bottom to the universe, and therefore no place where the atoms could collect, since space is infinite in all directions. Those atoms which rebound at large intervals make up air and sunlight (Lucretius, *De Rerum Natura*, 2. 105–108). Bodies like the sun, the moon and the planets, were gradually formed during the years, with the twirls and the additions of new atoms which eventually made them so great (Epicurus, *Letter to Pythocles*, 90). Many other atoms wander through the void uncompounded with any others. Fowler observes that the use of the verb “solerent” (Lucretius, *De Rerum Natura*, 2. 219) perhaps shows that the “clinamen” can happen more than once with a single atom (Fowler, 2002: p. 313). The compound remains in existence so long as motions ensure that the number of atoms entering the compound is at least as large as the number lost to the environment. Eventually, though, under the influence of blows from outside, more atoms will be lost to the outside world, and the compound will disintegrate. No compound can last forever, but neither can all compounds cease to exist before the world finally disintegrates (Lucretius, *De Rerum Natura*, 2. 569–572).

It is noteworthy that the doctrine of the atomic swerve does not appear in the *Letter to Herodotus*, which covers the books I–XIII of Epicurus’ *On Nature*, and this may mean that perhaps Epicurus dealt with that in a later book of *On Nature*. Purinton argues, and I tend to accept his thesis more than another, that Epicurus did not himself draw much attention to his positive doctrine of the swerve, preferring to emphasize the untenability of the deterministic alternative (Purinton, 1999: pp. 253–299). The reason I see is that in fact the “clinamen” does not seem to solve conclusively the issue of determinism and free will, or of cosmological creation, but is re-

stricted to being a mild endeavour of supporting the view that human beings and their actions can be considered as self-governing and independent from the cosmic procedures, and that the cosmos was not created by the hand of a god. In the doctrinal system exposed by Epicurus and Lucretius, which is prominent for supporting the regularity of the phenomena, the concept of the “clinamen” is orientated in contributing to an epistemic theory for the creation of the natural world as well as to the affirmation of free “voluntas”. Like Fowler, I believe that the theory of the “clinamen” must belong to Epicurus himself although we do not have the testimony of such written evidence from him. Nevertheless, I consider major evidence the inscription of Diogenes of Oenoanda (Smith, 1996: fr. 54 II. 3) which explicitly mentions that it was Epicurus, not Democritus, who brought to light the motion of the swerve (παρεγκλιτική κίνησης); also the testimonies of Stobaeus and Plutarch which are conducive to the same conclusion. The fact remains that the swerve changes everything in a universe which exists without a telos. However, Epicurus and Lucretius do not see the universe as a chaos; in the creation of the cosmos there is order and natural laws according to which the atoms, the builders of the being, play the most significant and most extraordinary role.



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