Episode One Hundred Fourteen - Letter to Herodotus 03 - The Starting Point of Physics

Post by “Cassius” of March 18, 2022 at 6:20 AM

Welcome to Episode One Hundred Fourteen of Lucretius and Epicurus Today.

This is a podcast dedicated to the poet Lucretius, who wrote "On The Nature of Things," the only complete presentation of Epicurean philosophy left to us from the ancient world, and to Epicurus, the founder of the Epicurean School.

I am your host Cassius, and together with our panelists from the EpicureanFriends.com forum, we'll walk you through the Epicurean texts, and we'll discuss how Epicurean philosophy can apply to you today. We encourage you to study Epicurus for yourself, and we suggest the best place to start is the book "Epicurus and His Philosophy" by Canadian professor Norman DeWitt.

If you find the Epicurean worldview attractive, we invite you to join us in the study of Epicurus at EpicureanFriends.com, where you will find a discussion thread for each of our podcast episodes and many other topics.

Today we continue our review of Epicurus' letter to Herodotus, and we begin with the fundamentals of physics.

Now let's join Joshua reading today's text:

Bailey:

Having made these points clear, we must now consider things imperceptible to the senses. First of all, that nothing is created out of that which does not exist: for if it were, everything would be created out of everything with no need of seeds.

[39] And again, if that which disappears were destroyed into that which did not exist, all things would have perished, since that into which they were dissolved would not exist. Furthermore, the universe always was such as it is now, and always will be the same. For there is nothing into which it changes: for outside the universe there is nothing which could come into it and bring about the change.

Moreover, the universe is bodies and space: for that bodies exist, sense itself witnesses in the experience of all men, and in accordance with the evidence of sense we must of necessity judge of the imperceptible by reasoning, as I have already said.

[40] And if there were not that which we term void and place and intangible existence, bodies would have nowhere to exist and nothing through which to move, as they are seen to move. And besides these two, nothing can even be thought of either by conception or on the analogy of things conceivable such as could be grasped as whole existences and not spoken of as the accidents or properties of such existences. Furthermore, among bodies some are compounds, and others those of which compounds are formed.

[41] And these latter are indivisible and unalterable (if, that is, all things are not to be destroyed into the non-existent, but something permanent is to remain behind at the dissolution of compounds): they are completely solid in nature, and can by no means be dissolved in any part. So it must needs be that the first beginnings are indivisible corporeal existences.

Moreover, the universe is boundless. For that which is bounded has an extreme point: and the extreme point is seen against something else. So that as it has no extreme point, it has no limit; and as it has no limit, it must be boundless and not bounded.

[42] Furthermore, the infinite is boundless both in the number of the bodies and in the extent of the void. For if on the one hand the void were boundless, and the bodies limited in number, the bodies could not stay anywhere, but would be carried about and scattered through the infinite void, not having other bodies to support them and keep them in place by means of collisions. But if, on the other hand, the void were limited, the infinite bodies would not have room wherein to take their place.

Besides this the indivisible and solid bodies, out of which too the compounds are created and into which they are dissolved, have an incomprehensible number of varieties in shape: for it is not possible that such great varieties of things should arise from the same atomic shapes, if they are limited in number. And so in each shape the atoms are quite infinite in number, but their differences of shape are not quite infinite, but only incomprehensible in number.

[43] And the atoms move continuously for all time, some of them falling straight down, others swerving, and others recoiling from their collisions. And of the latter, some are borne on, separating to a long distance from one another, while others again recoil and recoil, whenever they chance to be checked by the interlacing with others, or else shut in by atoms interlaced around them.

[44] For on the one hand the nature of the void which separates each atom by itself brings this about, as it is not able to afford resistance, and on the other hand the hardness which belongs to the atoms makes them recoil after collision to as great a distance as the interlacing permits separation after the collision. And these motions have no beginning, since the atoms and the void are the cause.

[45] These brief sayings, if all these points are borne in mind, afford a sufficient outline for our understanding of the nature of existing things.

HICKS

When this is clearly understood, it is time to consider generally things which are obscure. To begin with, nothing comes into being out of what is non-existent. For in that case anything would have arisen out of anything, standing as it would in no need of its proper germs.

[39]And if that which disappears had been destroyed and become non-existent, everything would have perished, that into which the things were dissolved being non-existent. Moreover, the sum total of things was always such as it is now, and such it will ever remain. For there is nothing into which it can change. For outside the sum of things there is nothing which could enter into it and bring about the change.

Further this he says also in the Larger Epitome near the beginning and in his First Book "On Nature", the whole of being consists of bodies and space. For the existence of bodies is everywhere attested by sense itself, and it is upon sensation that reason must rely when it attempts to infer the unknown from the known.

[40] And if there were no space (which we call also void and place and intangible nature), bodies would have nothing in which to be and through which to move, as they are plainly seen to move. Beyond bodies and space there is nothing which by mental apprehension or on its analogy we can conceive to exist. When we speak of bodies and space, both are regarded as wholes or separate things, not as the properties or accidents of separate things.

Again he repeats this in the First Book and in Books XIV. and XV. of the work "On Nature" and in the Larger Epitome, of bodies some are composite, others the elements of which these composite bodies are made.

[41] These elements are indivisible and unchangeable, and necessarily so, if things are not all to be destroyed and pass into non-existence, but are to be strong enough to endure when the composite bodies are broken up, because they possess a solid nature and are incapable of being anywhere or anyhow dissolved. It follows that the first beginnings must be indivisible, corporeal entities.

Again, the sum of things is infinite. For what is finite has an extremity, and the extremity of anything is discerned only by comparison with something else. (Now the sum of things is not discerned by comparison with anything else: hence, since it has no extremity, it has no limit; and, since it has no limit, it must be unlimited or infinite.

[42] Moreover, the sum of things is unlimited both by reason of the multitude of the atoms and the extent of the void. For if the void were infinite and bodies finite, the bodies would not have stayed anywhere but would have been dispersed in their course through the infinite void, not having any supports or counter-checks to send them back on their upward rebound. Again, if the void were finite, the infinity of bodies would not have anywhere to be.

Furthermore, the atoms, which have no void in them – out of which composite bodies arise and into which they are dissolved – vary indefinitely in their shapes; for so many varieties of things as we see could never have arisen out of a recurrence of a definite number of the same shapes. The like atoms of each shape are absolutely infinite; but the variety of shapes, though indefinitely large, is not absolutely infinite. For neither does the divisibility go on "ad infinitum," he says below; but he adds, since the qualities change, unless one is prepared to keep enlarging their magnitudes also simply "ad infinitum."

[43] The atoms are in continual motion through all eternity. Further, he says below, that the atoms move with equal speed, since the void makes way for the lightest and heaviest alike. Some of them rebound to a considerable distance from each other, while others merely oscillate in one place when they chance to have got entangled or to be enclosed by a mass of other atoms shaped for entangling.

[44] This is because each atom is separated from the rest by void, which is incapable of offering any resistance to the rebound; while it is the solidity of the atom which makes it rebound after a collision, however short the distance to which it rebounds, when it finds itself imprisoned in a mass of entangling atoms. Of all this there is no beginning, since both atoms and void exist from everlasting. He says below that atoms have no quality at all except shape, size, and weight. But that colour varies with the arrangement of the atoms he states in his "Twelve Rudiments"; further, that they are not of any and every size; at any rate no atom has ever been seen by our sense.

[45] The repetition at such length of all that we are now recalling to mind furnishes an adequate outline for our conception of the nature of things.

YONGE

"When this is clearly understood, it is time to consider generally things which are obscure. To begin with, nothing comes into being out of what is non-existent. For in that case anything would have arisen out of anything, standing as it would in no need of its proper germs.

[39] And if that which disappears had been destroyed and become non-existent, everything would have perished, that into which the things were dissolved being non-existent. Moreover, the sum total of things was always such as it is now, and such it will ever remain. For there is nothing into which it can change. For outside the sum of things there is nothing which could enter into it and bring about the change. "Further [this he says also in the Larger Epitome near the beginning and in his First Book "On Nature"], the whole of being consists of bodies and space. For the existence of bodies is everywhere attested by sense itself, and it is upon sensation that reason must rely when it attempts to infer the unknown from the known.

[40] And if there were no space (which we call also void and place and intangible nature), bodies would have nothing in which to be and through which to move, as they are plainly seen to move. Beyond bodies and space there is nothing which by mental apprehension or on its analogy we can conceive to exist. When we speak of bodies and space, both are regarded as wholes or separate things, not as the properties or accidents of separate things. "Again [he repeats this in the First Book and in Books XIV. and XV. of the work "On Nature" and in the Larger Epitome], of bodies some are composite, others the elements of which these composite bodies are made.

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For if the void were infinite and bodies finite, the bodies would not have stayed anywhere but would have been dispersed in their course through the infinite void, not having any supports or counter-checks to send them back on their upward rebound. Again, if the void were finite, the infinity of bodies would not have anywhere to be. "Furthermore, the atoms, which have no void in them - out of which composite bodies arise and into which they are dissolved - vary indefinitely in their shapes; for so many varieties of things as we see could never have arisen out of a recurrence of a definite number of the same shapes. The like atoms of each shape are absolutely infinite; but the variety of shapes, though indefinitely large, is not absolutely infinite.

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from everlasting. [He says below that atoms have no quality at all except shape, size, and weight. But that colour varies with the arrangement of the atoms he states in his "Twelve Rudiments"; further, that they are not of any and every size; at any rate no atom has ever been seen by our sense.]

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Post by “Cassius” of March 18, 2022 at 6:32 AM

When we record this episode, I'd like to propose that since:

(1) this letter to Epicurus is a high-level outline, and

(2) we've already gone through the process in the earlier episodes of Lucretius of comparing Epicurus' views with modern physics,

I'd like to see us discuss this section in sort of a "Reconstructionist" or "Survivalist" mode: in other words, trying to be sure that we capture what Epicurus was thinking, and how he was fitting things together for his own thought processes.

That way we end up not only with a more accurate version of what Epicurus was thinking, but we also produce a "higher level" set of principles that will be easier for most non-experts to grasp. In that sense we'll produce more of a "survivalist" tool -- something we can use when we're under pressure, or we're talking to young people, or for some reason we don't have access to the technical material.

Post by “Joshua” of March 20, 2022 at 12:14 PM

Show Notes:

On "Primitive Tribes" and Observational Skills

Daniel Everett and the Piraha people:

https://www.youtube.com/watch?v=BNajfMZGnuo

On cave paintings and Renaissance art:

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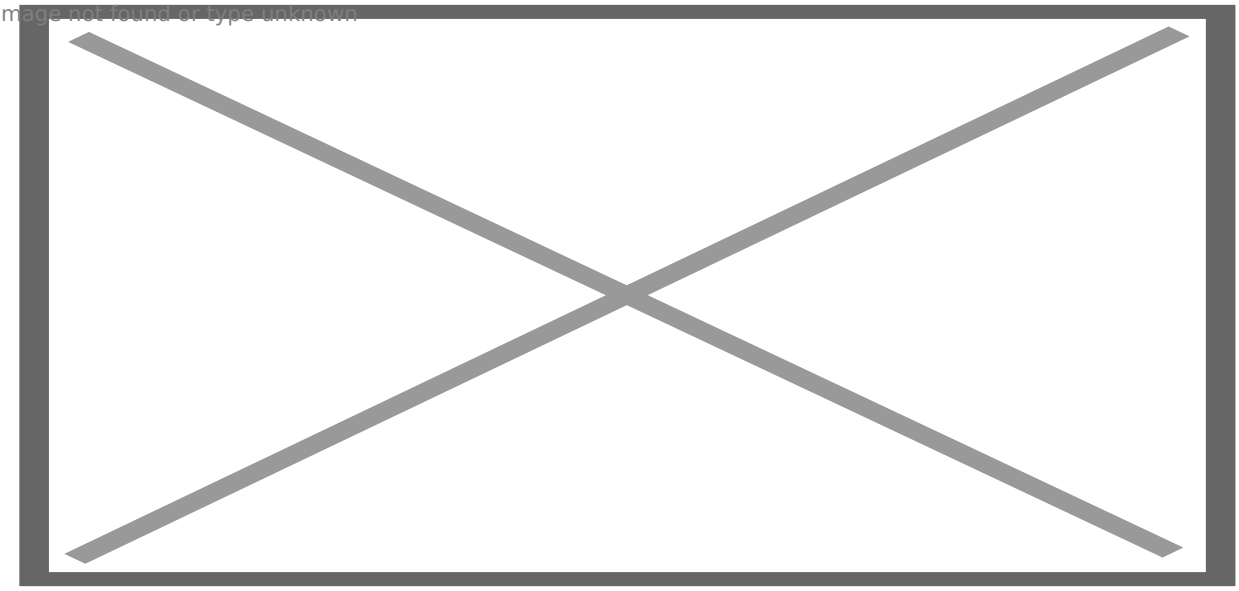

[Cavemen Were Much Better At Illustrating Animals Than Artists Today](#)
A new study finds that prehistoric humans correctly depicted the gait of four-legged animals much more frequently than modern artists
www.smithsonianmag.com

Acute observation necessary for survival:

https://www.survivalinternational.org/galleries/ingenious

Empiricism Vs. Poetry

John Keat's, *Lamia*:

> Quote
>
> [...] Do not all charms fly
>
> At the mere touch of cold philosophy?
>
> There was an awful rainbow once in heaven:
>
> We know her woof, her texture; she is given
>
> In the dull catalogue of common things.
>
> Philosophy will clip an Angel's wings,

> Conquer all mysteries by rule and line,
>
> Empty the haunted air, and gnomed mine—
>
> Unweave a rainbow, as it erewhile made
>
> The tender-person'd Lamia melt into a shade.
>
> Display More

Edgar Allan Poe, *Sonnet--To Science*

> Quote
>
> Science! true daughter of Old Time thou art!
>
> Who alterest all things with thy peering eyes.
>
> Why preyest thou thus upon the poet’s heart,
>
> Vulture, whose wings are dull realities?
>
> […]

Walt Whitman

> Quote
>
> When I heard the learn’d astronomer,
>
> When the proofs, the figures, were ranged in columns before me,
>
> When I was shown the charts and diagrams, to add, divide, and measure them,
>
> When I sitting heard the astronomer where he lectured with much applause in the lecture-room,
>
> How soon unaccountable I became tired and sick,
>
> Till rising and gliding out I wander’d off by myself,
>
> In the mystical moist night-air, and from time to time,
>
> Look’d up in perfect silence at the stars.
>
> Display More

The Second Law of Motion

Newton's Three Laws of Motion

> Quote
>
> This is the most powerful of Newton's three Laws, because it allows quantitative calculations of dynamics: how do velocities change when forces are applied. Notice the fundamental difference between Newton's 2nd Law and the dynamics of Aristotle: according to Newton, a force causes only a change in velocity (an acceleration); it does not maintain the velocity as Aristotle held.
>
> This is sometimes summarized by saying that under Newton, F = ma, but under Aristotle F = mv, where v is the velocity. Thus, according to Aristotle there is only a velocity if there is a force, but according to Newton an object with a certain velocity maintains that velocity unless a force acts on it to cause an acceleration (that is, a change in the velocity). As we have noted earlier in conjunction with the discussion of Galileo, Aristotle's view seems to be more in accord with common sense, but that is because of a failure to appreciate the role played by frictional forces. Once account is taken of all forces acting in a given situation it is the dynamics of Galileo and Newton, not of Aristotle, that are found to be in accord with the observations.

Epicurus' postulated that all matter is in constant motion: this appears to place him closer to Newton's position (F=ma) than to Aristotle's (F=mv), but without gravity as a reference point (to say nothing of relativity) the question is largely academic. Aristotle proposed that the natural condition of matter was not inertia, but rest.

All things are born from their seeds

Spontaneous Generation

https://en.wikipedia.org/wiki/Spontaneous_generation :

> Quote
>
> The doctrine of spontaneous generation was coherently synthesized by Aristotle, who compiled and expanded the work of earlier natural philosophers and the various ancient explanations for the appearance of organisms, and was taken as scientific fact for two millennia. Though challenged in the 17th and 18th centuries by the experiments of Francesco Redi and Lazzaro Spallanzani, spontaneous generation was not disproved until the work of Louis Pasteur and John Tyndall in the mid-19th century.

John Tyndall striking a blow for Epicurus yet again!

In salamanders:

https://sdzwildlifeexplorers.org/animals/fire-s...%20the%20flames.

Post by “Cassius” of March 25, 2022 at 9:36 AM

Episode 114 will be out soon (later today). In final editing, I am finding that I think we have significantly more work to do on the topic discussed near the end of the podcast, which is the line:

> Quote
>
> Furthermore, the universe always was such as it is now, and always will be the same. For there is nothing into which it changes: for outside the universe there is nothing which could come into it and bring about the change.

We (correctly I think) discussed this as an example of Epicurus reasoning at a "logical" rather than "empirical" level, but I am not sure by the end of the podcast we had put this in perspective of how much of Epicurean physics follows exactly this course (reasoning from what is observable to draw things that are not observable). We're pretty comfortable that atoms are an example of things we can't see and yet we draw firm conclusions about, but in dealing with this conclusion (that there is nothing outside the universe which can come into it) we probably need to spend more time discussing what level of confidence Epicurus placed in this conclusion. Our discussion may not have been clear enough in bringing out that issue of level of confidence.

I'm not sure that what I am noting here deserves specific backtracking to cover more in the next episode, but I wanted this note here in case someone listening to the podcast also makes the same observation that this issue probably needs further treatment as part of our development of discussion of Epicurean logic.

Post by “Cassius” of March 25, 2022 at 11:36 AM

Episode 114 of the Lucretius Today Podcast is now available. Today we continue our discussion of the Letter to Herodotus with first principles of Physics.

https://www.spreaker.com/episode/49200593

Post by “Don” of March 26, 2022 at 9:56 PM

FYI The "sum of things" in the original is ΤΟ ΠΑΝ (to pan). Here's a link to a thread on this phrase:

Post

ΤΟ ΠΑΝ: The Sum of All Things

I was just reading the *Letter to Herodotus* in working on my personal Epicurean outline and realized I had forgotten how much I love the word Epicurus (and other ancient Greeks) used for the universe:

τὸ πᾶν

Transliterated, this is:

tò pãn or simply **"to pan"**

This is the same "pan" as in "panhellenic" or "pantheism."

I've seen it translated as:

- the sum of all things
- the sum total of all things
- the universe as a whole
- the whole of being

... among others, sometimes using several of these in the same...

Don
March 9, 2020 at 11:47 PM