

Episode Thirty-Two: The Atoms Are Colorless, But the Implications Are Not

Post by “Cassius” of August 1, 2020 at 1:02 PM

Welcome to Episode Thirty-Two of Lucretius Today.

I am your host Cassius, and together with my panelists from the EpicureanFriends.com forum, we'll walk you through the six books of Lucretius' poem, and discuss how Epicurean philosophy can apply to you today. Be aware that none of us are professional philosophers, and everyone here is a self-taught Epicurean. 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.

Before we start, here are three ground rules.

First: Our aim is to bring you an accurate presentation of [classical Epicurean philosophy](#) as the ancient Epicureans understood it, which may or may not agree with what you here about Epicurus at other places today.

Second: We aren't talking about Lucretius with the goal of promoting any modern political perspective. Epicurus must be understood on his own, and not in terms of competitive schools which may seem similar to Epicurus, but are fundamentally different and incompatible, such as Stoicism, Humanism, Buddhism, Taoism, Atheism, and Marxism.

Third: The essential base of Epicurean philosophy is a fundamental view of the nature of the universe. When you read the words of Lucretius you will find that Epicurus did not teach the pursuit of virtue or of luxury or of simple living. or science, as ends in themselves, but rather the pursuit of pleasure. From this perspective it is **feeling** which is the guide to life, and not supernatural gods, idealism, or virtue ethics. And as important as anything else, Epicurus taught that there is no life after death, and that any happiness we will ever have must come in THIS life, which is why it is so important not to waste time in confusion.

Now let's join the discussion with Martin reading today's text:

Latin text location: Approximately [lines 730-787](#)

Munro Summary: [Notes on the text](#)

730—756: atoms have no colour whatever: the mind has to conceive them as without colour; for any colour may change into any other; but the first bodies are unchangeable, or things would pass into nothing.— He proceeds to shew that atoms have none of what are called secondary qualities, colour and the like: the import of this section is briefly given by Epicurus in Diog. x 54 τὰς ἀτόμους ἰσομετρίαν μὴδεμίαν ποιότητα τῶν φαινομένων προσφέρεινθαι πλὴν σχήματος καὶ βάρους καὶ μεγέθους καὶ ὅσα ἐξ ἀνάγκης σχήματι συμβῆναι ἄντι. ποιότης γὰρ πᾶσα μεταβάλλεται, αἱ δ' ἀτόμοι οὐδὲν μεταβάλλουσιν, ἐπιδηότερ' οὐδὲ τι ὑπομένειν ἐν ταῖς αἰ-

757—767: again if atoms have no colour, but beget any colour by their different shapes positions motions and the like, you can explain change of colour; thus the green sea becomes white: why? by its elements changing their order, and by some going, others coming: but green elements could not become white. But if you say they have different colours, then you should see in the one colour of the sea others quite different mixed up, as in a square composed of various shapes you see these shapes; again these shapes do not prevent the whole exterior being square; but different colours would prevent a thing being of one colour.

Daniel Brown:

Now, come on, attend to the rules which I have found, by a labor very delightful to myself; lest you should think those bodies that appear white to your eyes are composed of white seeds, or such as show black, are formed of black; or what color so-ever a thing wears, you should conclude the cause of it to be that the seeds of which it is made are stained with the same color. For the principles of matter are void of all color, both like or unlike what appears upon the bodies they produce. If you should chance to think that the Mind cannot possibly form an idea of seeds without color, you are under a strange mistake; for persons born blind, who never saw the light of the Sun, yet discover bodies by the touch, as if they had no manner of color belonging to them. So that seeds imbued with no color can offer themselves to our mind, and be conceived by us. And besides, the things we touch in the dark night we distinguish without any regard to the color they may otherwise appear in.

That seeds may be void of color I have shown; I shall now prove that they actually are so. Now every color may be changed one into another; but the principles of things will by no means admit of change, there necessarily must be something that remains immutable, lest all things should be utterly reduced to nothing; for whatsoever is changed, and breaks the bounds of its first nature, instantly dies, and is no more what first it was. Be cautious therefore, how you stain the seeds of things with color, lest all things should recur to nothing, and be utterly destroyed.

Besides, though Nature bestows no color upon seeds, yet they are endued with different figures, from which they form and vary the colors of every kind which show upon them. (For it is of great concern what seeds unite with others, and what positions they are preserved, and what motions they give and receive among themselves;) and thus you may readily account why things that just before appeared black, should suddenly look white. As the sea, when the rough winds enrage the waters, grows white with foaming waves. So you may say of what commonly appears black to us, when the seeds of which it is formed are mingled, and their order changed, when some new seeds are added, and some old ones are removed, the direct consequence is

that its color is changed, and appears white. But if the water of the sea consisted essentially of blue particles, it could by no means change into a white color. Disturb the order of the seeds how you would, the principles that are blue would never pass into white.

But if you say that the seeds which make the sea look of one uniform white are stained with different colors, as a perfect square that is one figure, is made up of several bodies that are of several figures, then it would follow that, as we perfectly see that dissimilar figures which the square contains within it, so we might discover in the water of the sea, or in any other body of one simple color, the mixed and different colors from which that simple color proceeds.

Besides, the dissimilar figures that go to make up a square do by no means hinder that the surface of the body should appear square, but a mixed variety of colors will forever prevent that the surface of any body should appear of one fixed and uniform color. And then the very reason that would incline us sometimes to impute colors to seeds is by this means destroyed, or, in this case, white Bodies are not produced from white, or black from black, but from seeds of various colors. Now a white would much sooner proceed from seeds of no color at all, than from such as are black, or any other opposite color whatsoever.

Besides, since colors cannot appear without light, and since the seeds of things cannot appear in the light, you may thence conclude that they are covered with no colors at all. For how can any color show itself in the dark, which surround in the light itself, as it is differently struck either with a direct or oblique ray of light? After this manner, the plumes of doves, which grow about their neck, and are an ornament to it, show themselves in the sun. In one position they appear red like a fiery carbuncle, in another light, the greenness of the emerald is mixed with a sky blue. So, likewise, the tail of the peacock, all filled with light, changes its colors, as the rays strike directly or obliquely upon it. Since therefore colors are produced only by the strokes of light, we cannot suppose that they can possibly exist without it.

Munro:

Now mark, and apprehend precepts amassed by my welcome toil, lest haply you deem that those things which you see with your eyes to be bright, because white are formed of white principles, or that the things which are black are born from black seed, or that things which are steeped in any other color bear that color because the bodies of matter are dyed with a color like to it. For the bodies of matter have no color at all either like to the things or unlike. But if haply it seems to you that no impression of the mind can throw itself into these bodies, you wander far astray. For since men born blind who have never beheld the light of the sun, yet recognize bodies by touch, though linked with no color for them from their first birth, you are to know that bodies can fall under the ken of our mind too, though stained with no color. Again, whatever things we ourselves touch in the thick darkness, we do not perceive to be dyed with any color. And since I prove that this is the case, I will now show that there are things [which are possessed of no color].

Well any color without any exception changes into any other; and this first-beginnings ought in no wise to do: something unchangeable must remain over, that all things be not utterly reduced to nothing. For whenever a thing changes and quits its proper limits, at once this change of state is the death of that which it was before. Therefore mind not to dye with color the seeds of things, that you may not have all things altogether returning to nothing.

Moreover, if no quality of color is assigned to first-beginnings and they are yet possessed of varied shapes out of which they beget colors of every kind and change them about by reason that it makes a great difference with what other seeds and in what position the seeds are severally held in union and what motions they mutually impart and receive, you can explain at once with the greatest ease why those things which just before were of a black color, may become all at once of marble whiteness; as the sea, when mighty winds have stirred up its waters, is changed into white waves of the brightness of marble: you may say that when the matter of that which we often see to be black has been mixed up anew and the arrangement of its first-beginnings has been changed and some have been added and some been taken away, the immediate result is that it appears bright and white. But if the waters of the sea consisted of azure seeds, they could in no wise become white; for however much you jumble together seeds which are azure, they can never pass into a marble color. But if the seeds which make up the one unmixed brightness of the sea are dyed some with one, some with other colors, just as often out of different forms and varied shapes something square and of a uniform figure is made up, in that case it were natural that as we see unlike forms contained in the square, so we should see in the water of the sea or in any other one and unmixed brightness colors widely unlike and different to one another.

Moreover the unlike figures do not in the least hinder or prevent the whole figure from being a square on the outside; but the various colors of things are a let and hindrance to the whole things being of a uniform brightness.

Then too the reason which leads and draws us on sometimes to assign colors to the first-beginnings of things, falls to the ground, since white things are not produced from white, nor those which are black from black, but out of things of various colors. For white things will much more readily rise up and be born from no color than from a black or any other color which thwarts and opposes it. Moreover since colors cannot exist without light and first-beginnings of things do not come out into the light, you may be sure they are clothed with no color. For what color can there be in total darkness? Nay it changes in the light itself according as its brightness comes from a straight or slanting stroke of light. After this fashion the down which encircles and crowns the nape and throat of doves shows itself in the sun: at one time it is ruddy with the hue of bright pyropus; at another it appears by a certain way of looking at it to blend with coral-red green emeralds. The tail of the peacock when it is saturated with abundant light, changes in like fashion its colors as it turns about. And since these colors are begotten by a certain stroke of light, sure enough you must believe that they cannot be produced without it.

Bailey:

Come now, listen to discourse gathered by my joyful labour, lest by chance you should think that these white things, which you perceive shining bright before your eyes are made of white first-beginnings, or that things which are black are born of black seeds; or should believe that things which are steeped in any other colour you will, bear this colour because the bodies of matter are dyed with a colour like it. For the bodies of matter have no colour at all, neither like things nor again unlike them. And if by chance it seems to you that the mind cannot project itself into these bodies, you wander far astray. For since those born blind, who have never descried the light of the sun, yet know bodies by touch, never linked with colour for them from the outset of their life, you may know that for our mind too, bodies painted with no tint may become a clear concept. Again, we ourselves feel that whatever we touch in blind darkness is not dyed with any colour. And since I convince you that this may be, I will now teach you that [the first-beginnings] are [deprived of all colour].

For any colour, whatever it be, changes into any other; but the first-beginnings ought in no wise to do this. For it must needs be that something abides unchangeable, that all things be not utterly brought to naught. For whenever a thing changes and passes out of its own limits, straightway this is the death of that which was before. Therefore take care not to dye with colour the seeds of things, lest you see all things altogether pass away to naught.

Moreover, if the nature of colour has not been granted to the first-beginnings, and yet they are endowed with diverse forms, out of which they beget and vary colours of every kind, forasmuch as it is of great matter with what others all the seeds are bound up, and in what position, and what movements they mutually give and receive, you can most easily at once give account, why those things which were a little while before of black colour, are able of a sudden to become of marble whiteness; as the sea, when mighty winds have stirred its level waters, is turned into white waves of shining marble. For you might say that when the substance of that which we often see black has been mingled up, and the order of its first-beginnings changed and certain things added and taken away, straightway it comes to pass that it is seen shining and white. But if the level waters of the ocean were made of sky-blue seeds, they could in no wise grow white. For in whatever way you were to jostle together seeds which are sky-blue, never can they pass into a marble colour.

But if the seeds which make up the single unmixed brightness of the sea are dyed with this colour and that, even as often out of different forms and diverse shapes some square thing is made up with a single shape, then it were natural that, as in the square we perceive that there are unlike forms, so we should perceive in the water of the ocean, or in any other single and unmixed brightness, colours far different and diverse one from another. Moreover, the unlike shapes do not a whit thwart and hinder the whole from being square in its outline; but the diverse colours in things do check and prevent the whole thing being of a single brightness. Then, further, the reason which leads us on and entices us sometimes to assign colours to the first-beginnings of things, is gone, since white things are not made of white, nor those which are seen black of black, but of diverse colours. And in very truth much more readily will white

things be born and rise up out of no colour than out of black, or any other colour you will which fights with it and thwarts it.

Moreover, since colours cannot be without light nor do the first-beginnings of things come out into the light, you may know how they are not clothed with any colour. For what colour can there be in blind darkness? Nay even in the light it changes according as it shines brightly, struck with a straight or slanting beam of light; even as the plumage of doves, which is set about their throats and crowns their necks, is seen in the sunshine; for anon it comes to pass that it is red with bright garnet, sometimes in a certain view it comes to pass that it seems to mingle green emeralds among coral. And the tail of the peacock, when it is bathed in bounteous light, in like manner changes its colours as it moves round; and since these colours are begotten by a certain stroke of light, you may know that we must not think that they could come to be without it. And since the pupil of the eye receives in itself a certain kind of blow, when it is said to perceive white colour, and another again, when it perceives black and the rest, nor does it matter with what colour things you touch may choose to be endowed, but rather with what sort of shape they are fitted, you may know that the first-beginnings have no need of colours, but by their diverse forms produce diverse kinds of touch.

Post by “Cassius” of August 16, 2020 at 8:36 AM

Related issue: events vs properties, from Book One:

say, It neither Body is nor Void, which you may call a third Degree of Things distinct from these. For every Being must in Quantity be more or less; and if it can be touch'd, tho' ne'er so small or light, it must be *Body*, and so esteemed; but if it can't be touch'd, and has not in itself a Power to stop the Course of other Bodies as they pass, this is the *Void* we call an empty Space.

AGAIN, * whatever Is must either act itself, or be by other Agents acted on; or must be somewhat in which other Bodies must have a Place and move; but Nothing without Body can act, or be acted on; and where can this be done, but in a Vacuum or empty Space? Therefore, beside what Body is or Space, no third Degree in Nature can be found, Nothing that ever can affect our Sense, or by the Power of Thought can be conceiv'd. All other Things you'll find essential *Conjuncts*, or else the *Events* or Accidents of these. I call essential Conjunct, what's so joined to a Thing that it cannot, without fatal Violence, be forced or parted from it; such is Weight to Stones, to Fire Heat, Moisture to the Sea, Touch to all Bodies, and not to be touch'd essential is to *Void*; but, on the contrary, Bondage, Liberty, Riches, Poverty, War, Concord, or the like, which not affect the Nature of the Thing, but when they come or when they go, the Thing remains entire; these, as 'tis fit we should, we call *Events*.

has been done long since, the Thing that present is, and what's to come. For no one, we must own, e'er thought of Time distinct from Things in Motion or at Rest.

FOR when the Poets sing of ^z *Helen's Rape*, or of the *Trojan State* subdued by War, we must not say that these Things do exist now in themselves, since Time, irrevocably past, has long-since swept away that Race of Men that were the Cause of those *Events*; for every Act is either properly the Event of Things, or of the Places where those Things are done.

FURTHER, if Things were not of Matter form'd, were there no Place or Space where Things might act, the Fire that burn'd in *Paris's* Heart, blown up by Love of *Helen's* Beauty, had never rais'd the famous Contests of a cruel War; nor had the Wooden Horse set *Troy* on fire, discharging from his Belly in the Night the armed *Greeks*: from whence you plainly see that Actions do not of themselves subsist, as Bodies do, nor are in Nature such as is a *Void*, but rather are

⁷ *Pythagoras*, *Heraclitus* and others believed, that Time was a Body; but *Lucretius* calls it an Event, attributed to Things by the Mind or Thought only, according as they are conceived to persevere in the State in which they are, or to cease from it, and to preserve a longer or shorter Existence, and to have it, or to have had it, or to be to have it. *Epicurus*, because he saw that Time is nothing besides Body and Void, asserted, that it does not exist of itself, nor as a Con-junct or Event, but as the chief Event of Events; he taught, that it exists not in Reality, but only in the Mind, and therefore may properly be called a Being of the Understanding.

^z The Rape of *Helen*, and the Destruction of *Troy*, are not at this time, nor do exist in themselves as Body and Void do, but are, as it were, the Events of Things, of Persons, or of Places, for the Time past has carried off those Men of whom

Post by "Cassius" of August 16, 2020 at 8:45 AM

From Chapter 15 of A Few Days In Athens:

To conceive of mind independent of matter, is as if we should conceive of color independent of a substance colored: What is form, if not a body of a particular shape? What is thought, if not something which thinks? Destroy the substance, and you destroy its properties; and so equally — destroy the properties, and you destroy the substance. To suppose the possibility of retaining the one, without the other, is an evident absurdity."

Context:

"Our young friend," observed Metrodorus, "lately made use of an expression, the error involved in which, seems to be at the root of his difficulty. In speaking of matter," he continued, turning to Theon, "you employed the epithet inert. What is your meaning? And what matter do you here designate?"

"All matter surely is, in itself, inert."

"All matter surely is, in itself, as it is," said Metrodorus with a smile; "and that, I should say, is living and active.

Again, what is matter?"

"All that is evident to our senses," replied Theon, "and which stands opposed to mind."

"All matter then is inert which is devoid of mind. "What then do you understand by mind?"

"I conceive some error in my definition," said Theon, smiling. "Should I say — thought — you would ask if every existence devoid of thought was inert, or if every existence, possessing life, possessed thought."

"I should so have asked. Mind or thought I consider a quality of that matter constituting the existence we call a man, which quality we find in a varying degree in other existences; many, perhaps all animals, possessing it. Life is another quality, or combination of qualities, of matter, inherent in — we know not how many existences. We find it in vegetables; we might perceive it even in stones, could we watch their formation, growth, and decay. We may call that active principle, pervading the elements of all things, which approaches and separates the component particles of the ever-changing, and yet ever-enduring world — life. Until you discover some substance, which undergoes no change, you cannot speak of inert matter: it can only be so, at least, relatively, — that is, as compared with other substances."

"The classing of thought and life among the qualities of matter is new to me."

"What is in a substance cannot be separate from it. And is not all matter a compound of qualities? Hardness, extension, form, color, motion, rest — take away all these,

and where is matter? To conceive of mind independent of matter, is as if we should conceive of color independent of a substance colored: What is form, if not a body of a particular shape? What is thought, if not something which thinks? Destroy the substance, and you destroy its properties; and so equally — destroy the properties, and you destroy the substance. To suppose the possibility of retaining the one, without the other, is an evident absurdity."

"The error of conceiving a quality in the abstract often offended me in the Lyceum," returned the youth, "but I never considered the error as extending to mind and life, any more than to vice and virtue."

"You stopped short with many others," said Leontium. "It is indeed surprising how many acute minds will apply a logical train of reasoning in one case, and invert the process in another exactly similar."

"To return, and if you will, to conclude our discussion," said Metrodorus, "I will observe that no real advances can be made in the philosophy of mind, without a deep scrutiny into the operations of nature, or material existences. Mind being only a quality of matter, the study we call the philosophy of mind, is necessarily only a branch of general physics, or the Study of a particular part of the philosophy of matter."

Post by "Cassius" of August 22, 2020 at 1:24 PM

Episode 32 of the Lucretius Today Podcast is now available. In this episode, the panel discusses the Epicurean viewpoint that the atoms are colorless, and the implications of this doctrine. As always we appreciate your listening and we're happy to entertain comments or questions about the episode in the thread below or at the Epicureanfriends . com forum. Remember that you can subscribe to the podcast on your smartphone using any podcast application. Thanks for listening!

<https://www.spreaker.com/episode/40451339>

Post by "Don" of August 22, 2020 at 9:34 PM

From my perspective, you're reading too much into Lucretius's "there necessarily must be something that remains immutable." I think he's simply talking about the "seeds" or Epicurean

<https://www.epicureanfriends.com/thread/1655-episode-thirty-two-the-atoms-are-colorless-but-the-implications-are-not/>

"atoms/un-cuttables" of which there are supposed to be types.

For Lucretius, the "immutable" somethings are "seeds" like smooth atoms and hooked atoms. These remain *unchanged* whether the smooth atoms are in water or wine; whether the hooked atoms are in iron or stone. These "seeds" remain unchanged. In a modern sense, a carbon atom is the same whether it is in my body or coal; a hydrogen atom is the same whether it is in water or in a star. The atom remains unchanged.

For Lucretius and Epicurus, the fundamental "particles" *were* the "un-cuttables" which remain unchanged when combined in different bodies. We can't hold Lucretius and Epicurus to our quantum field theory ideas of what fundamental particles are.

Post by "Cassius" of August 22, 2020 at 10:01 PM

Don as I recall from the episode there was discussion to the effect that "indivisible" ultimate particles might be sustainable by modern science and something that we can or should still maintain to be true, but not "immutable."

I think that's probably the issue you're addressing but I am not quite sure from what you wrote where you would come down on that.

Could you clarify what you're saying as it applies to that issue?

Over the last several episodes - and this is likely to continue - I think we're debating explicitly or implicitly our varying perspectives on whether Epicurus / Lucretius were going too far in their logical extrapolations about ultimate particles, or whether there is a perspective based on a combination of logic and observation in which their opinions were justified or even may still be justified in certain respects. Certainly as we drill down deeper into the atom then the levels that we once thought to be uncuttable are now cuttable, but how really does that translate into an expectation as to whether there is a limit on uncuttability. I thought Elayne made a significant point about how we need to hold "both sides" (those who say there is a limit, and those who say there is not) to the same standard of proof, which certainly makes sense to me, but on the other hand it is not clear to me what that standard of proof really is.

I think this "standard of proof" issue is what we are really wrestling with, and we need to be as clear as possible about the "standard of proof" position we think is correct when we reach the limit of observation available to us at a particular moment.

I am definitely interested in hearing what you (Don) or anyone else may be thinking after hearing these recent discussions on this issue. This is going to be a recurring issue as we go

through the rest of the book and it would be good if we could begin to come to terms with a general approach to this issue, which is I think directly related to some of the details discussed in Philodemus' "On Methods of Inference."

Post by “Don” of August 22, 2020 at 10:47 PM

I always forget these episodes are at least a week old for you as opposed to those of us just listening to them 😊

Quote

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I'm responding to the extended discussion starting at when you quoted DRN at 14:23 and then you ([Cassius](#)) said Lucretius is talking about an "ultimate particle of some kind that has unchanging characteristics" and [Elayne](#) says "there's no such thing as that."

My contention is that Lucretius was simply talking about the Epicurean "un-cuttables" or "seeds" as Lucretius sometimes calls them. Here he uses *principiis* (line 757, Latin) "first-beginnings" as a name for the "atoms" or what is unchanging. Then he goes on to talk about how important it is in how they're held together. That's what gives these "unchanging" things the ability to impart characteristics to the things we see. But, being the basic building blocks of the universe, these seeds/atoms/first-beginnings don't change, just like (at a basic - NOT modern chemistry/physics level) carbon atoms are carbon atoms no matter whether the arrangement is coal or graphite or diamond.

Post by “Cassius” of August 23, 2020 at 5:53 AM

At risk of cluttering up this thread I want to copy/paste here [a set of clips from Delacy's commentary to On Methods of Inference that I posted here](#). I think what we are debating here involves the category of knowledge in the Epicurean scheme that Delacy refers to under his heading 2b, which DeLacy says "**is important because it involves validity of the doctrine of atoms and void.**"

Below is the clip, and I think what we are wrestling with are our opinions of the validity of the terminology and how we should express our confidence in things we may conclude to be true using this standard:

_____ (clipped from the other thread on [Syllogistic and Canonical Reasoning](#)_____

I think these three pages pretty well sum up what DeLacy sees as the three categories into which Epicureans divided things (I am using DeLacy's numbering so that is why it appears out of order):

1 - Things we can validate directly through the senses because they are nearby. (Position here should not be controversial, but contradicts Plato.)

2 a - Things which can never be known due to our own limitations, such as whether the number of stars is odd or even - there is no test of truth for these - they can never be known.

2 c - Things we may have to wait to validate through the senses, but ultimately we can get enough data to validate them through the senses. (Position here more aggressive but should not be controversial, still contradicts Plato.)

2 b - Things which by nature we can never get so close as to validate by the senses (the atoms, the far reaches of space). In this category things are considered true when there is some evidence from them and no evidence to the contrary. Multiple things can be considered true / possible. Choosing from among them, that only one is true, is improper absent sufficient evidence to do so, in which case you are in category 2c rather than 2b. (Position on this category is the most controversial; contradicts Plato)

The list of the categories:

[&thumbnail=1](#) or type unknown

The test of truth for category 2a of Delacy List - Opinions about things immediately before us are validated directly against the object itself:

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The test of truth for category 2c of Delacy list - Opinions about things that can eventually be validated directly by the senses are validated when we get that information :

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The test of truth for things in category 2 b, those things which the senses can never examine closely enough to validate. This is the most challenging category and constitutes the Epicurean canonical reasoning on ultimate issues rather than syllogistic reasoning which arguably does not rely on sensory evidence.

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Post by “Don” of August 23, 2020 at 6:48 AM

From what I can read from those categories, the ancient Epicureans would have had a lot of phenomena stuck at 2b whereas modern science, with its extension of the senses (e.g., microscopes, telescopes, etc), is able to have many more move into 2c. Major 2b ones that we still wrestle with are the deep structure and origin of the universe, the origin of life, etc. BUT we can literally see into deep space and "see" deep into matter at the interactions of atoms and molecules with experimentation and even deeper to understand sub-atomic particles via instruments like the Large Hadron Collider.

I also think when Epicurus and Lucretius talk about things like hooked "atoms" (*their* atoms, not our atoms) in, for example, diamond, they were intuiting the rigid crystalline atomic structure of this substances without realizing what we know today. In their experience, something with hooks could become entangled (a box of fishhooks, let's say). Likewise, "atoms" with hooks would result in a material difficult to disentangle. Same way with the smooth "atoms" in liquids. In their experience, smooth grains of sand slide past each other. At the "atomic" level, smooth "atoms" would allow a substance to flow.

Now, in modern times, we know these properties have to do with atomic and crystalline structures and the properties of molecules, etc. We don't see atoms (our atoms, not Epicurean atoms) as un-cuttables or fundamental particles but through the ancients' observations, they reasoned that if things like hooks and sand behaved one way, that if similar structures were analogous at their "atomic" level, that's how things too small to see could account for the things we see. You can go down to that unseeable world and still have unchanging particles that could give rise to things we can see. The "smooth atoms" and "hook atoms" don't change, merely their arrangements. But if you insisted on dividing below the level of the atoms** infinitely, there's nothing that could hold together to form matter and you'd end up with nothing being able to be formed. Essentially, there'd be nothing for the universe to be made of. Stopping at the "atoms" provides the universe's building blocks.

**NOTE: To be clear, I'm talking here about the Epicurean atoms/seeds. I have no problem at all "dividing below the level of the [modern] atoms" to discover quarks, mesons, quantum fields,

<https://www.epicureanfriends.com/thread/1655-episode-thirty-two-the-atoms-are-colorless-but-the-implications-are-not/>

etc.

Post by “Cassius” of August 23, 2020 at 10:55 AM

We just finished recording Episode 33 and I think we had a very interesting discussion that will help us advance our thinking on these topics. I will work to edit and post this asap so we can keep the flow going.

Post by “Godfrey” of August 24, 2020 at 6:52 PM

Is there any relevance of the idea of "necessary and sufficient" for items in category 2b? (Full disclosure: not being a philosopher, I'm unaware of the detailed ramifications of the necessary and sufficient argument. So I'm definitely asking a question and not proposing an argument.)

It seems like 2b describes a "sufficient" condition for truth. However I think there may be many instances where "necessary" is implied. For instance with the void it seems that part of the argument of Lucretius is that the void is necessary for motion. Likewise, and I guess where I'm going with this, is an atomist universe "necessary" to describe a world in which things don't appear out of nothing, at random, or disappear into nothing?

"Necessary and sufficient" is different from verification and lack of evidence to the contrary. I'm curious if it has a place in the Epicurean methods of inference or if verification and evidence completely supercede it.

Post by “Cassius” of August 25, 2020 at 8:55 AM

If I am following you correctly then I definitely agree that "necessary" and "sufficient" are very relevant terms. However I think where this goes is that simply using those terms does not really advance the ball to the ultimate conclusion, which is understanding when we can confidently apply those terms, and why we are confident in applying them in a particular situation. Ultimately in every case we have a conceptual issue of what happens at the limit of our ability to observe directly. Is it proper to conclude that 'seeing is believing' is the appropriate standard

of considering something to be true? At what point are we confident in going further to make a confident statement about something that we can and probably never will observe directly.

Here's something else that is relevant, a jibe from Cicero, in his "On the Nature of the Gods." This is a jibe, but it is easy to see how an Epicurean might appear to be overly confident to a skeptic. I think what we're looking for here is first an understanding of the ancient Epicurean position on when to be confident and when not to be, and then we have to decide for ourselves which we are "confident" to adopt:

Quote

Hereupon Velleius began, **in the confident manner (I need not say) that is customary with Epicureans, afraid of nothing so much as lest he should appear to have doubts about anything.** One would have supposed he had just come down from the assembly of the gods in the intermundane spaces of Epicurus! "I am not going to expound to you doctrines that are mere baseless figments of the imagination, such as the artisan deity and world-builder of Plato's *Timaeus*, or that old hag of a fortuneteller the *Pronoia* (which, we may render 'Providence') of the Stoics; nor yet a world endowed with a mind and senses of its own, a spherical, rotatory god of burning fire; these are the marvels and monstrosities of philosophers who do not reason but dream.

Post by "Cassius" of August 25, 2020 at 8:58 AM

I am about 50% of the way through editing Episode 33, which is a discussion directly relevant to these issues, and I definitely hope to have it up in the next 12 hours. As you'll see we struggled through many of these same issues and though I don't think we resolved anything permanently I think you'll find it helpful.

Post by "Don" of August 25, 2020 at 10:36 AM

I'll admit I was out of my depth on [Godfrey](#)'s post on necessary and sufficient. [This site helped explain it for me](#), especially the examples.

Looking forward to 33.

Post by “Cassius” of August 25, 2020 at 12:08 PM

Good link on necessary and sufficient. The words can seem obvious, but that's a good reminder that ALL of the necessary conditions must be present in order to reach the "sufficient" level. But in common discussion, even "sufficient" implies that something more is needed, so you have to be conscious of whether that is true or not and the basis on which you're making the conclusion.

Post by “Don” of August 25, 2020 at 12:08 PM

An even more striking line from Cicero's Epicurean is:

Quote

I am not going to expound to you doctrines that are mere baseless figments of the imagination,

He's going to use observation and evidence to **the best of his ability**.

But...

Do we hold the ancients' reasoning from their evidence to our standard of knowledge? Or do we approach them on their terms and limits?

We know there are not "hooked atoms" and "smooth atoms" but do we applaud them for using their available observations (e.g., fishhooks in a box) and extrapolating a natural explanation of nature, free of supernatural and divine intervention?

Post by “Cassius” of August 25, 2020 at 1:31 PM

[Quote from Don](#)

Do we hold the ancients' reasoning from their evidence to our standard of knowledge?
Or do we approach them on their terms and limits?

We know there are not "hooked atoms" and "smooth atoms" but do we applaud them for using their available observations (e.g., fishhooks in a box) and extrapolating a natural explanation of nature, free of supernatural and divine intervention?

I do not see these as contradictory. The evidence hopefully improves with technology, but the analysis process - the rules that constitute how to apply the observations as standards of proof - ought to be (in my mind, anyway) - exactly the same.

I think what you are hearing in recent podcasts is our working toward a way to better articulate this -- and we have quite a way to go yet, I think.

That's why I am personally not nearly as concerned with the specifics of their conclusions as I am HOW they reached those conclusions. So far, I am very comfortable that their "process" is valid, even where they may reach conclusions we today think are "wrong" because we have evidence not available to them

I personally even hesitate to use the word "wrong" to describe this situation.

Post by “Godfrey” of August 25, 2020 at 3:58 PM

Great link [Don](#). I'm out of my depth on that as well, which is why I asked the question. 😊

A further thought on "necessary and sufficient" is that that is a logical exercise where DeLacey 2b seems to be a Canonic exercise. So I'm curious if considering the two might shed some light on the extent of reason in determining truth using EP.

[Cassius](#) this is a fascinating and important topic and I look forward to episode 33! I actually listened to 32 twice. 🤔 Between the podcasts and the forum I, for one, am getting a lot more clarity on the topic. Even if it's not *resolved*.