Episode One Hundred Twenty-Nine - Letter to Pythocles 03 - The Implications Of the Epicurean Position On The Size of the Sun

Post by “Cassius” of July 1, 2022 at 8:03 PM

Welcome to Episode One Hundred Twenty Nine of Lucretius 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.

I am your host Cassius, and together with our panelists from the EpicureanFriends.com forum, we'll walk you through the ancient 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 Epicurus' Letter to Pythocles and we look at the implications of the Epicurean position on the size of the sun. Now let's join Joshua reading today's text:

BAILEY:

[91] The size of sun (and moon) and the other stars is for us what it appears to be; and in reality it is either (slightly) greater than what we see or slightly less or the same size: for so too fires on earth when looked at from a distance seem to the senses. And every objection at this point will easily be dissipated, if we pay attention to the clear vision, as I show in my books about nature.

[92] The risings and settings of the sun, moon, and other heavenly bodies may be due to kindling and extinction, the composition of the surrounding matter at the places of rising and setting being such as to lead to these results: for nothing in phenomena is against it. Or again, the effect in question might be produced by their appearance over the top of the earth, and again the interposition of the earth in front of them: for once more nothing in phenomena is against it.

Their motions may not impossibly be due to the revolution of the whole heaven, or else it may remain stationary, and they may revolve owing to the natural impulse towards the east, which

was produced at the beginning of the world . . . . . by an excessive heat owing to a spreading of the fire which is always moving on to the regions nearest in succession.

[93] The tropics of sun and moon may be caused owing to an obliquity of the whole heaven, which is constrained into this position in the successive seasons; or equally well by an outward impulsion of a current of air, or because the appropriate material successively catches fire, as the former fails; or again, from the beginning this particular form of revolution may have been assigned to these stars, so that they move in a kind of spiral. For all these and kindred explanations are not at variance with any clear-seen facts, if one always clings in such departments of inquiry to the possible and can refer each point to what is in agreement with phenomena without fearing the slavish artifices of the astronomers.

HICKS:

[91] "The size of the sun and the remaining stars relatively to us is just as great as it appears. This he states in the eleventh book "On Nature." For, says he, if it had diminished in size on account of the distance, it would much more have diminished its brightness; for indeed there is no distance more proportionate to this diminution of size than is the distance at which the brightness begins to diminish. But in itself and actually it may be a little larger or a little smaller, or precisely as great as it is seen to be. For so too fires of which we have experience are seen by sense when we see them at a distance. And every objection brought against this part of the theory will easily be met by anyone who attends to plain facts, as I show in my work On Nature.

[92] And the rising and setting of the sun, moon, and stars may be due to kindling and quenching, provided that the circumstances are such as to produce this result in each of the two regions, east and west: for no fact testifies against this. Or the result might be produced by their coming forward above the earth and again by its intervention to hide them: for no fact testifies against this either.

And their motions may be due to the rotation of the whole heaven, or the heaven may be at rest and they alone rotate according to some necessary impulse to rise, implanted at first when the world was made ... and this through excessive heat, due to a certain extension of the fire which always encroaches upon that which is near it.

[93] The turnings of the sun and moon in their course may be due to the obliquity of the heaven, whereby it is forced back at these times. Again, they may equally be due to the contrary pressure of the air or, it may be, to the fact that either the fuel from time to time necessary has been consumed in the vicinity or there is a dearth of it. Or even because such a whirling motion was from the first inherent in these stars so that they move in a sort of spiral. For all such explanations and the like do not conflict with any clear evidence, if only in such details we hold fast to what is possible, and can bring each of these explanations into accord with the facts, unmoved by the servile artifices of the astronomers.

Post by “Cassius” of July 1, 2022 at 8:11 PM

Lucretius Book Five, Starting Line 564 (Bailey):

[564] Nor can the sun’s blazing wheel be much greater or less, than it is seen to be by our senses. For from whatsoever distances fires can throw us their light and breathe their warm heat upon our limbs, they lose nothing of the body of their flames because of the interspaces, their fire is no whit shrunken to the sight. Even so, since the heat of the sun and the light he sheds, arrive at our senses and cheer the spots on which they fall, the form and bulk of the sun as well must needs be seen truly from earth, so that you could alter it almost nothing to greater or less.

[575] The moon, too, whether she illumines places with a borrowed light as she moves along, or throws out her own rays from her own body, however that may be, moves on with a shape no whit greater than seems that shape, with which we perceive her with our eyes. For all things which we behold far sundered from us through much air, are seen to grow confused in shape, ere their outline is lessened. Wherefore it must needs be that the moon, inasmuch as she shows a clear-marked shape and an outline well defined, is seen by us from earth in the heights, just as she is, clear-cut all along her outer edges, and just the size she is.

[585] Lastly, all the fires of heaven that you see from earth; inasmuch as all fires that we see on earth, so long as their twinkling light is clear, so long as their blaze is perceived, are seen to change their size only in some very small degree from time to time to greater or less, the further they are away: so we may know that the heavenly fires can only be a very minute degree smaller or larger by a little tiny piece.

[592] This, too, is not wonderful, how the sun, small as it is, can send out so great light, to fill seas and all lands and sky with its flood, and to bathe all things in its warm heat. For it may be that from this spot the one well of light for the whole world is opened up and teems with bounteous stream, and shoots out its rays, because the particles of heat from all the world gather together on every side, and their meeting mass flows together in such wise, that here from a single fountain-head their blazing light streams forth. Do you not see too how widely a tiny spring of water sometimes moistens the fields, and floods out over the plains?

[604] Or again, it may be that from the sun’s fire, though it be not great, blazing light seizes on the air with its burning heat, if by chance there is air ready to hand and rightly suited to be kindled when smitten by tiny rays of heat; even as sometimes we see crops or straw caught in widespread fire from one single spark.

[610] Perhaps, too, the sun, shining on high with its rosy torch, has at his command much fire with hidden heat all around him, fire which is never marked by any radiance, so that it is only

laden with heat and increases the stroke of the sun’s rays.

[614] Nor is there any single and straightforward account of the sun, to show how from the summer regions he draws near the winter turning-point of Capricorn, and how turning back thence, he betakes himself to the solstice-goal of Cancer; and how the moon is seen in single months to traverse that course, on which the sun spends the period of a year as he runs. There is not, I say, any single cause assigned for these things.

[621] For, first and foremost, it is clear that it may come to pass, as the judgement of the holy man, Democritus, sets before us, that the nearer the several stars are to earth, the less can they be borne on with the whirl of heaven. For its swift keen strength passes away and is lessened beneath, and so little by little the sun is left behind with the hindmost signs, because it is much lower than the burning signs. And even more the moon: the lower her course, the further it is from the sky and nearer to earth, the less can she strain on her course level with the signs. Moreover the weaker the whirl with which she is borne along, being lower than the sun, the more do all the signs catch her up all around and pass her. Therefore, it comes to pass that she seems to turn back more speedily to each several sign, because the signs come back to her.

[637] It may be too that from quarters of the world athwart his path two airs may stream alternately, each at a fixed season, one such as to push the sun away from the summer signs right to the winter turning-places and their icy frost, and the other to hurl him back from the icy shades of cold right to the heat-laden quarters and the burning signs. And in like manner must we think that the moon and those stars which roll through the great years in great orbits, can be moved by airs from the opposite quarters in turn. Do you not see how by contrary winds the lower clouds too are moved in directions contrary to those above? Why should those stars be less able to be borne on by currents contrary one to the other through the great orbits in the heaven?

[650] But night shrouds the earth in thick darkness, either when after his long journey the sun has trodden the farthest parts of heaven, and fainting has breathed out his fires shaken by the journey and made weak by much air, or because the same force, which carried on his orb above the earth, constrains him to turn his course back beneath the earth.

[656] Likewise at a fixed time Matuta sends abroad the rosy dawn through the coasts of heaven, and spreads the light, either because the same sun, returning again beneath the earth, seizes the sky in advance with his rays, fain to kindle it, or because the fires come together and many seeds of heat are wont to stream together at a fixed time, which each day cause the light of a new sun to come to birth. Even so story tells that from the high mountains of Ida scattered fires are seen as the light rises, and then they gather as if into a single ball, and make up the orb.

[666] Nor again ought this to be cause of wonder herein, that these seeds of fire can stream together at so fixed a time and renew the brightness of the sun. For we see many events, which

come to pass at a fixed time in all things. Trees blossom at a fixed time, and at a fixed time lose their flower. Even so at a fixed time age bids the teeth fall, and the hairless youth grow hairy with soft down and let a soft beard flow alike from either cheek. Lastly, thunder, snow, rains, clouds, winds come to pass at seasons of the year more or less fixed. For since the first-beginnings of causes were ever thus and things have so fallen out from the first outset of the world, one after the other they come round even now in fixed order.

[680] And likewise it may be that days grow longer and nights wane, and again daylight grows less, when nights take increase; either because the same sun, as he fulfills his course in unequal arcs below the earth and above, parts the coasts of heaven, and divides his circuit into unequal portions; and whatever he has taken away from the one part, so much the more he replaces, as he goes round, in the part opposite it, until he arrives at that sign in the sky, where the node of the year makes the shades of night equal to the daylight. For in the mid-course of the blast of the north wind and of the south wind, the sky holds his turning-points apart at a distance then made equal, on account of the position of the whole starry orbit, in which the sun covers the space of a year in his winding course, as he lights earth and heaven with his slanting rays: as is shown by the plans of those who have marked out all the quarters of the sky, adorned with their signs in due order.

[696] Or else, because the air is thicker in certain regions, and therefore the trembling ray of his fire is delayed beneath the earth, nor can it easily pierce through and burst out to its rising. Therefore in winter time the long nights lag on, until the radiant ensign of day comes forth.

[701] Or else again, because in the same way in alternate parts of the year the fires, which cause the sun to rise from a fixed quarter, are wont to stream together now more slowly, now more quickly, therefore it is that those seem to speak the truth \[who say that a new sun is born every day\].

[705] The moon may shine when struck by the sun’s rays, and day by day turn that light more straightly to our sight, the more she retires from the sun’s orb, until opposite him she has glowed with quite full light and, as she rises, towering on high, has seen his setting; then little by little she must needs retire back again, and, as it were, hide her light, the nearer she glides now to the sun’s fire from the opposite quarter through the orbit of the signs; as those have it, who picture that the moon is like a ball, and keeps to the path of her course below the sun.

[715] There is also a way by which she can roll on with her own light, and yet show changing phases of brightness. For there may be another body, which is borne on and glides together with her, in every way obstructing and obscuring her; yet it cannot be seen, because it is borne on without light. Or she may turn round, just like, if it so chance, the sphere of a ball, tinged over half its surface with gleaming light, and so by turning round the sphere produces changing phases, until she turns to our sight and open eyes that side, whichever it be, that is endowed with fires; and then little by little she twists back again and carries away from us the light-giving part of the round mass of the ball; as the Babylonian teaching of the Chaldaeans,

denying the science of the astronomers, essays to prove in opposition; just as if what each of them fights for may not be the truth, or there were any cause why you should venture to adopt the one less than the other.

[731] Or again, why a fresh moon could not be created every day with fixed succession of phases and fixed shapes, so that each several day the moon created would pass away, and another be supplied in its room and place, it is difficult to teach by reasoning or prove by words, since so many things can be created in fixed order. Spring goes on her way and Venus, and before them treads Venus's winged harbinger; and following close on the steps of Zephyrus, mother Flora strews and fills all the way before them with glorious colours and scents. Next after follows parching heat, and as companion at her side dusty Ceres and the etesian blasts of the north winds. Then autumn advances, and step by step with her Euhius Euan. Then follow the other seasons and their winds, Volturnus, thundering on high, and the south wind, whose strength is the lightning. Last of all the year's end brings snow, and winter renews numbing frost; it is followed by cold, with chattering teeth. Wherefore it is less wonderful if the moon is born at a fixed time, and again at a fixed time is blotted out, since so many things can come to pass at fixed times.

[751] Likewise also the eclipses of the sun and the hidings of the moon, you must think may be brought about by several causes. For why should the moon be able to shut out the earth from the sun's light, and thrust her head high before him in the line of earth, throwing her dark orb before his glorious rays; and at the same time it should not be thought that another body could do this, which glides on ever without light. And besides, why should not the sun be able at a fixed time to faint and lose his fires, and again renew his light, when, in his journey through the air, he has passed by places hostile to his flames, which cause his fires to be put out and perish?

[762] And why should the earth be able in turn to rob the moon of light, and herself on high to keep the sun hidden beneath, while the moon in her monthly journey glides through the sharp-drawn shadows of the cone; and at the same time another body be unable to run beneath the moon or glide above the sun's orb, to break off his rays and streaming light? And indeed, if the moon shines with her own light, why should she not be able to grow faint in a certain region of the world, while she passes out through spots unfriendly to her own light?

[772] For the rest, since I have unfolded in what manner each thing could take place throughout the blue vault of the great world, so that we might learn what force and what cause started the diverse courses of the sun, and the journeyings of the moon, and in what way they might go hiding with their light obscured, and shroud the unexpecting earth in darkness, when, as it were, they wink and once again open their eye and look upon all places shining with their clear rays; now I return to the youth of the world, and the soft fields of earth, and what first with new power of creation they resolved to raise into the coasts of light and entrust to the gusty winds.

Post by “Joshua” of July 3, 2022 at 9:45 AM

Edit: I need to review some of this information to make sure the comparisons refer to the diameter of the Sun in relation to the diameter of Earth. Don't take it at face value just yet

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Anaxagoras, 500-428

-Sun as a mass of blazing metal, larger than the Peloponnese

Eudoxus of Cnidus, 408-355 BC

-27 Concentric Spheres

Epicurus, 341–270 BC

-"The sun is to us the size that it appears"

Aristarchus of Samos, 310-230 BC

-Heliocentric

-Sun is 6 times bigger than the Earth

Hipparchus of Nicaea, 190 – 120 BC

-Sun is 1,880 times bigger than the Earth

Claudius Ptolemy of Alexandria, 100-170 AD

-Geocentric Universe

Actual Size of sun; 109 times the size of the earth?

Post by “Joshua” of July 3, 2022 at 9:53 AM

I'll try to summarize what I recall to be the main points of the essay;

-Epicurus' primary interest in the size of the sun is to rule out the supernatural.

-A superficial reading of the passage will always be plagued with error.

-The author stresses the importance of considering the question in light of the whole philosophy.

-And that includes offering a few explanations, not just asserting one.

-Epicurus draws a distinction between how we interpret things that appear to our senses, and how those things actually are.

-The senses themselves are to Epicurus never wrong. Merely the judgment we make about sense-perception can be wrong, or not.

-The sun may be bigger or smaller than it appears, but it's not possible to know which (in the fourth century B.C) because we can never change our perspective by getting closer or going further away.

-The passages in both Pythocles and Lucretius are very noncommittal in their grammar and diction. Something like 8 subordinate clauses in five lines. So there's a resistance to speaking certainly about it. Nowhere does any Epicurean actually make a definite claim about the size of the sun.

-In the discussion on eclipses, the ancient sources seem to imply or suggest that the sun may be larger than the Earth. One of the explanations offered for eclipses is the interposition of the Earth between the sun and the moon.

-The author suggests that the sun-size issue is a didactic challenge to students and readers; like the plague at the end of Lucretius, it sets up a test to see how well you've grasped Epicurean method. The reader will come to that passage, and then feel compelled to review the other material to make sure they haven't missed something.

-The final suggestion the author makes is that the sun-size issue became a shibboleth for ancient Epicureans. That it became a way of 'sounding out' the Epicurean knowledge-base of the interlocutor. Cassius often says that hard cases make bad law. But the argument being made here is that this hard case is useful for determining how well other people really understand this. Useful for teachers with their students, or for scholarchs with their scholars.

The essay does not make the following point, which I think is nevertheless important; namely, how stupid do people think Epicurus was to say that he thought the sun was the size of an orange!?

Certainly the sun is, at minimum, bigger than the biggest object that crosses it but fails to entirely eclipse it. A lifetime's accumulated experience would surely have been sufficient for Epicurus to know that the sun was bigger than a bird. Bigger than a horse, a house, a tree, a

trireme--bigger than the better part of a mountain. Bigger than the moon.

Post by “Don” of July 4, 2022 at 8:04 AM

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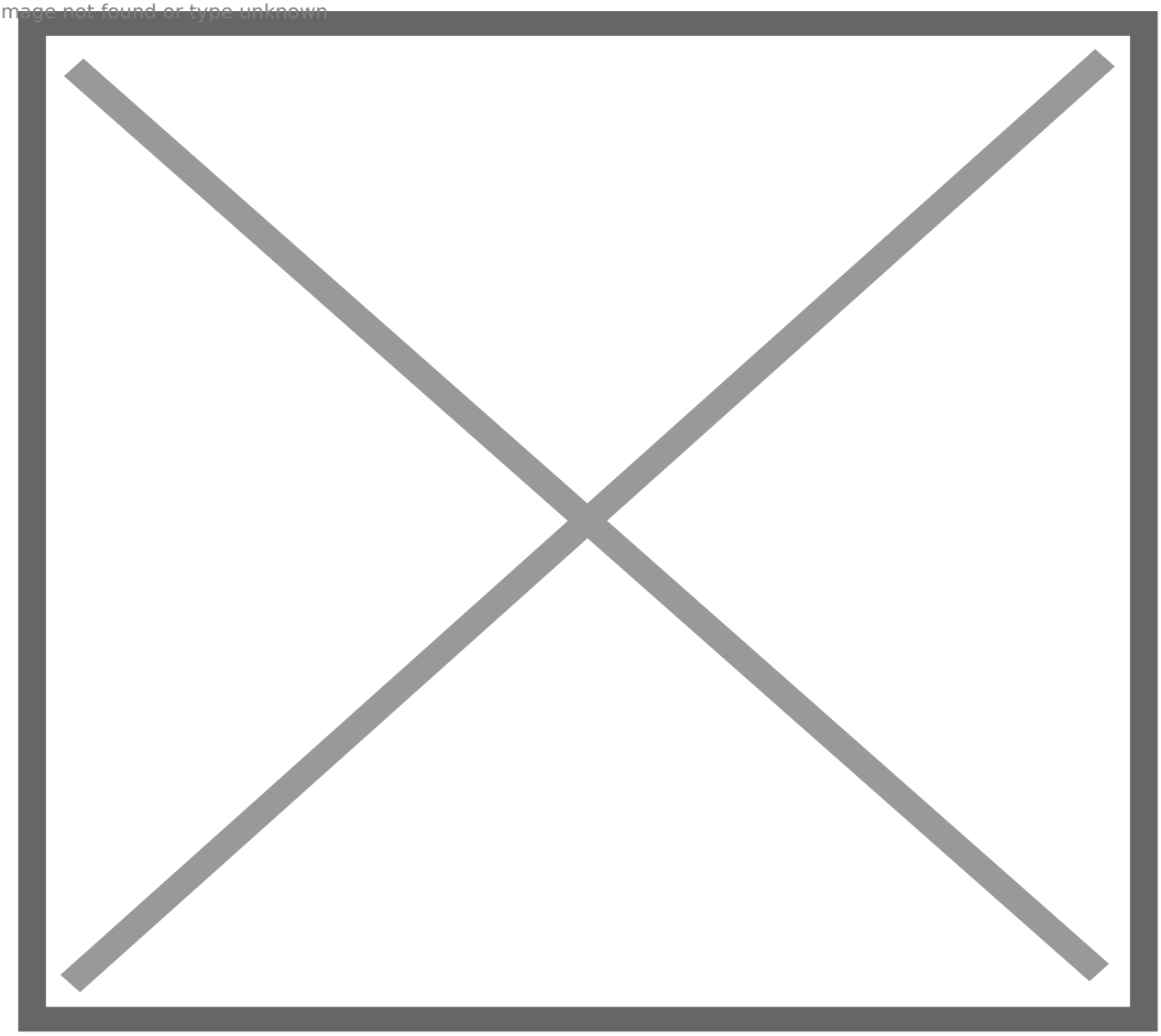

How Big is the Sun? | Comparisons, What Is Bigger, Facts

So, how big is the Sun? More than one million Earths could fit inside the Sun if it were hollow. Click for more information.

nineplanets.org

Post by “Cassius” of July 4, 2022 at 8:51 AM

Don one thing we talked about in warmup is the point that the diameter of the sun is apparently 109 times the diameter of the earth. At first glance I thought the proportion was larger than that but apparently not. It is what it is but did you think larger too?

Post by “Cassius” of July 4, 2022 at 9:01 AM

On that "hard cases make bad law" maxim, this is a good summary:

Hard cases make bad law - Wikipedia

Now that I am more well versed in Epicurus I think discussion of the maxim is probably good more for illustrating the limits of "law," and for illustrating why the Epicurean Doctrines on justice contemplate constant changes in circumstsnces.

In fact I now question even such sayings as the overall desirability of "government by law and not by men." Most of us certainly prefer to know the rules and to see them apply uniformly most of the time, but unless their is a mechanism for suspending them when circumstances "justify" suspension then "the law" can become just as intolerable as any sole dictator.

The contention that a single law could or should be the same for all people at all times and all places is very Ciceronian / Stoic / Platonic but probably not at all Epicurean.

Generalities can be useful, yes, but can also be fatal when we don't recognize their limits and that "hard cases" do exist.

So I am more now in the camp of saying that any legal system has to be able to incorporate hard cases in order to be just. Something like "Considering hard cases makes for good law."

Post by “Don” of July 4, 2022 at 9:53 AM

> Quote from Cassius

> At first glance I thought the proportion was larger than that but apparently not. It is what it is but did you think larger too?

There's a huge difference between the diameter of the Sun (109 times) and the *volume* of the Sun (a million Earths). Either of which are hard to comprehend.

Post by “Cassius” of July 4, 2022 at 10:19 AM

Yes that's the issue that i stumbled over when I first read the "109."

Post by “Cassius” of July 8, 2022 at 8:51 PM

This week's podcast will be posted later tonight, and as usual in the editing process I find it appropriate to make a remark or two.

In this case, my remark is that this episode marks the return of Joshua after a two week absence, and as I complete the editing I keep thinking to myself that this is one (of many) strong episodes by Joshua.

Finding the Gellar-Goad article on the size of the sun was a great contribution, and Joshua explains the issues in this episode very well.

I would be tempted to remark that the strong performance comes from Joshua being rested, but actually I am more than certain that the real credit goes to the fact that he spent his absence communing with the great status of Athena inside the only full-scale replica of the Parthenon in existence.

I can now count at least three of us who have been there on separate occasions (Kalosyni, me, and now Joshua). Maybe when we look to the future for a place for a live gathering, we shouldn't overlook the benefits of an environment that (in replica) would have been very familiar to Epicurus himself!

(That reminds me - How many others here have seen the Parthenon in Nashville? It's well worth seeing!)

Post by “Godfrey” of July 8, 2022 at 8:59 PM

I was there about 4 years ago. And to the original in the 1980s. Of course there's also the Getty Villa in Malibu, CA: a replica of the Villa de Papyri

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Post by “Cassius” of July 8, 2022 at 9:13 PM

So we'll keep a list and make it into a sort of challenge,

So far the list is:

1. Godfrey,
2. Kalosyni,
3. Cassius,
4. Joshua

Post by “Cassius” of July 8, 2022 at 10:10 PM

Episode 129 is now posted. Joshua returns and helps us discuss the issue of the Size of the Sun!

https://www.spreaker.com/episode/50515805

Post by “Don” of July 8, 2022 at 10:50 PM

Joshua brought up the κλεψύδρα (klepsydra): a water-clock, like our sand-glasses, used to time speeches in the lawcourts

This has a great parallel to English words:

kleps- related to kleptomania

-(h)ydra - related to hydro "water"

Therefore, κλεψύδρα "water-stealer"

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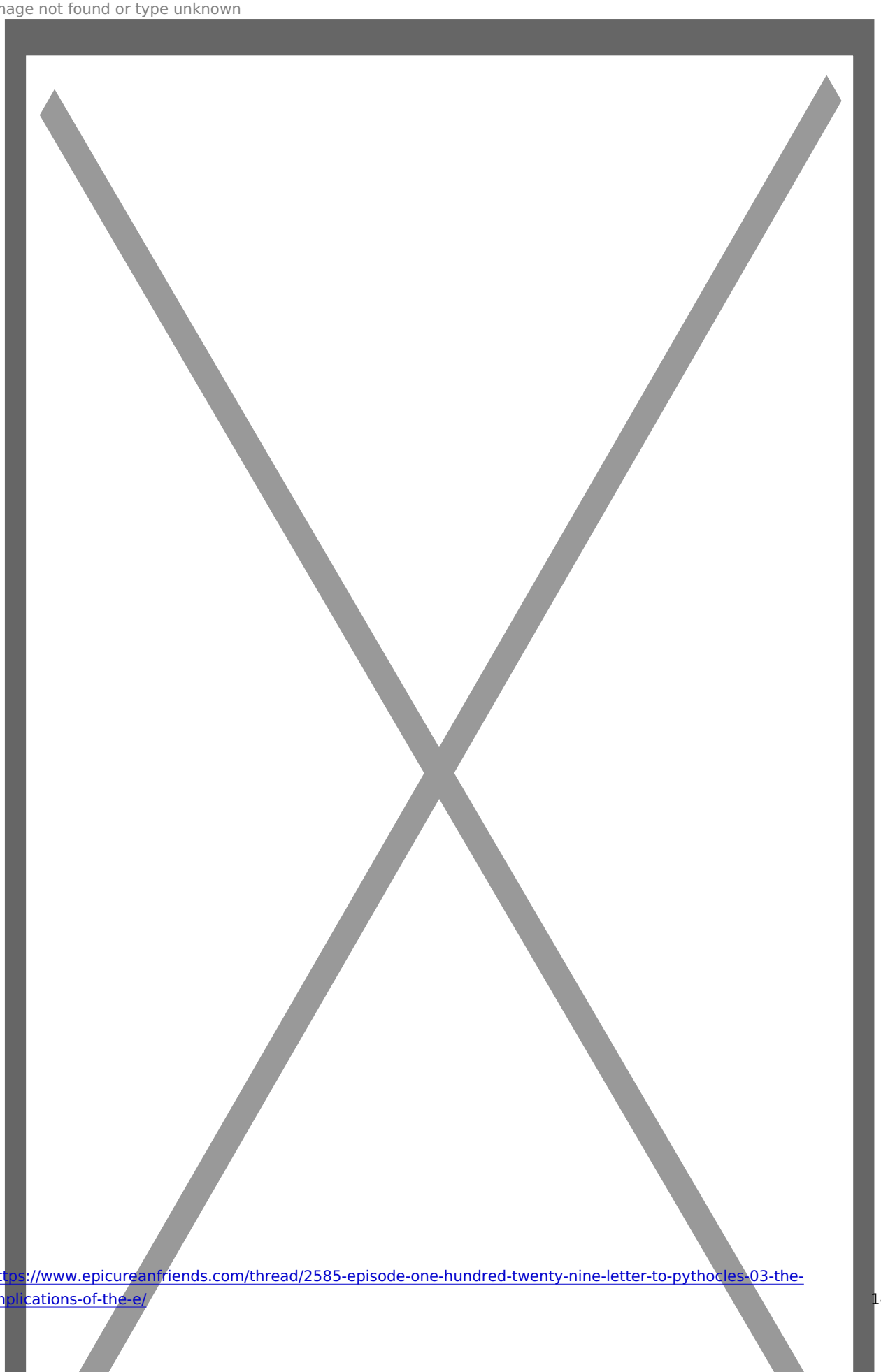

Water clock - Wikipedia
en.wikipedia.org

Post by “Don” of July 8, 2022 at 11:05 PM

T. H. M. Gellar-Goad

https://youtu.be/sp_TrovyT8c

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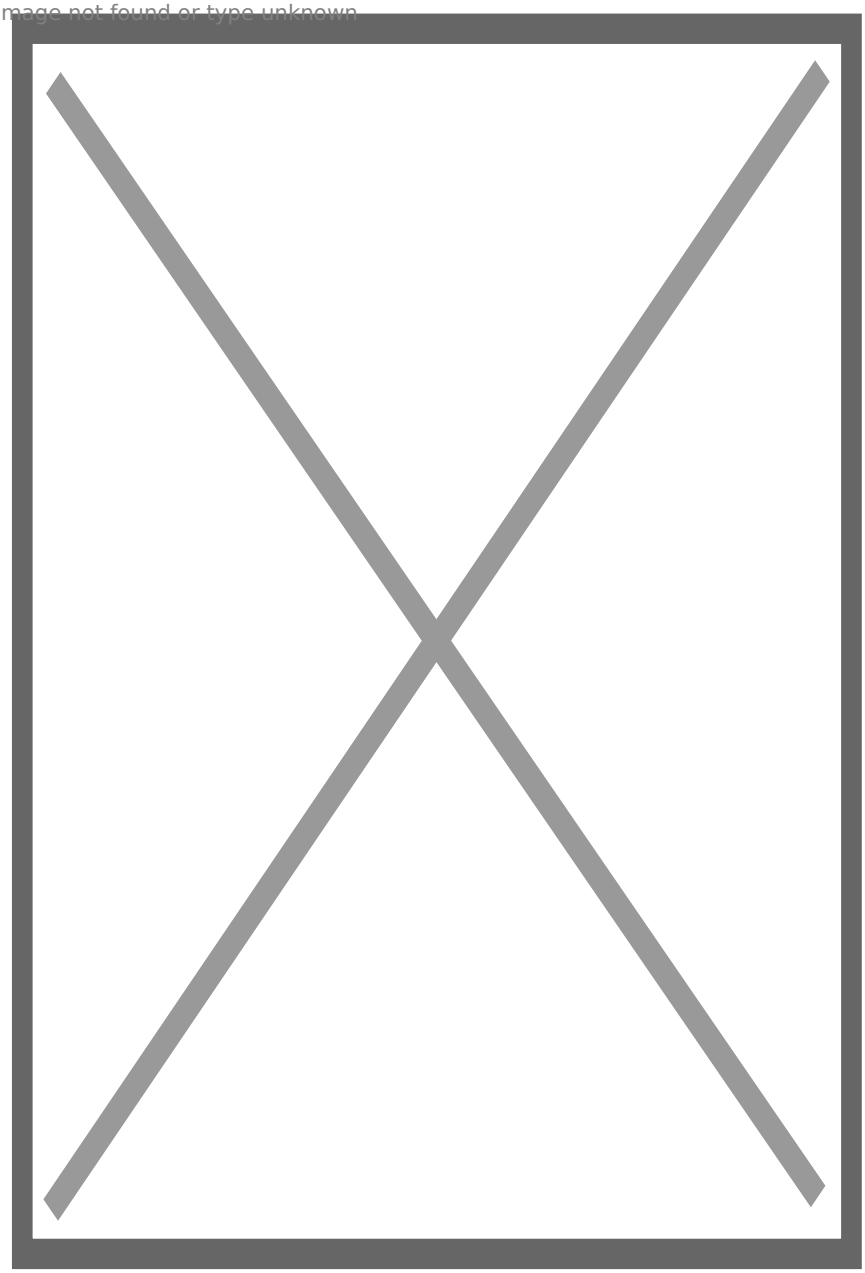

[Epicurus in Rome]
Cambridge Core - Ancient Philosophy - Epicurus in Rome
www.cambridge.org

Post by “Joshua” of July 8, 2022 at 11:42 PM

> Quote
>
> In this case, my remark is that this episode marks the return of Joshua after a two week absence, and as I complete the editing I keep thinking to myself that this is one (of many) strong episodes by Joshua.

Ha! I thought things were getting off to a bad start at the very beginning of the recording when I made some excuse and instantly pushed it back over to you.

Post by “Joshua” of July 8, 2022 at 11:45 PM

And I will add that the Parthenon in Nashville is WELL worth seeing!

Post by “Cassius” of July 9, 2022 at 6:32 AM

> Quote from Joshua
>
> and instantly pushed it back over to you

The older I get the more convinced I am of the importance of teamwork. Without it no project can go very far.