

# Key Citations - The Universe As Infinite In Space - Many Worlds With Life

Post by "Don" of July 17, 2024 at 11:11 PM

Okay, as promised, here's a start to Epicurus's mention of "infinity, infinite" specifically using the term *απειρον / απειρος*. Below are only the mentions in the *Letter to Herodotus* with both Greek and English for comparison. One idiosyncrasy I noticed is that the translator likes to use "ad infinitum" where Epicurus uses *εἰς ἄπειρον* "to infinity". Granted, the Latin means the same as the Greek but it obscures Epicurus's use of the word he says we need to study:

Epicurus, Letter to Herodotus

37

Πρῶτον μὲν οὖν τὰ ὑποτεταγμένα τοῖς φθόγγοις, ὧ Ἡρόδοτε, δεῖ εἰληφέναι, ὅπως ἂν τὰ δοξαζόμενα ἢ ζητούμενα ἢ ἀπορούμενα ἔχωμεν εἰς ταῦτα ἀνάγοντες ἐπικρίνειν, καὶ μὴ ἄκριτα πάντα ἡμῖν <ἴη>42 εἰς ἄπειρον ἀποδεικνύουσιν ἢ κενοὺς φθόγγους ἔχωμεν.

"In the first place, Herodotus, you must understand what it is that words denote, in order that by reference to this we may be in a position to test opinions, inquiries, or problems, so that our proofs may not run on untested ad infinitum, nor the terms we use be empty of meaning.

41-43

"Ἄλλὰ μὴν καὶ τὸ πᾶν ἄπειρόν ἐστι. τὸ γὰρ πεπερασμένον ἄκρον ἔχει: τὸ δὲ ἄκρον παρ' ἕτερόν τι θεωρεῖται: <τὸ δὲ πᾶν οὐ παρ' ἕτερόν τι θεωρεῖται:>51 ὥστε οὐκ ἔχον ἄκρον πέρασ οὐκ ἔχει: πέρασ δὲ οὐκ ἔχον ἄπειρον ἂν εἴη καὶ οὐ πεπερασμένον.

"Καὶ μὴν καὶ τῷ πλήθει τῶν σωμάτων ἄπειρόν ἐστι τὸ πᾶν καὶ τῷ μεγέθει τοῦ κενοῦ. [42] εἴ τε γὰρ ἦν τὸ κενὸν ἄπειρον, τὰ δὲ σώματα ὠρισμένα, οὐθαμοῦ ἂν ἔμενε τὰ σώματα, ἀλλ' ἐφέρετο κατὰ τὸ ἄπειρον κενὸν διεσπαρμένα, οὐκ ἔχοντα τὰ ὑπερείδοντα καὶ στέλλοντα κατὰ τὰς ἀνακοπὰς: εἴ τε τὸ κενὸν ἦν ὠρισμένον, οὐκ ἂν εἶχε τὰ ἄπειρα σώματα ὅπου ἐνέστη.

"Πρὸς τε τούτοις τὰ ἄτομα τῶν σωμάτων καὶ μεστά, ἐξ ὧν καὶ αἱ συγκρίσεις γίνονται καὶ εἰς ἃ διαλύονται, ἀπερίληπτά ἐστι ταῖς διαφοραῖς τῶν σχημάτων: οὐ γὰρ δυνατὸν γενέσθαι τὰς τοσαύτας διαφορὰς ἐκ τῶν αὐτῶν σχημάτων περιειλημμένων. καὶ καθ' ἐκάστην δὲ σχημάτισιν ἀπλῶς ἄπειροὶ εἰσιν αἱ ὅμοιαι, ταῖς δὲ διαφοραῖς οὐχ ἀπλῶς 53 [43] ἄπειροὶ ἀλλὰ μόνον ἀπερίληπτοι, [οὐδὲ γὰρ φησιν ἐνδοτέρω εἰς ἄπειρον τὴν τομὴν τυγχάνειν. λέγει δέ, ἐπειδὴ αἱ ποιότητες μεταβάλλονται, εἰ μέλλει τις μὴ καὶ τοῖς μεγέθεσιν ἀπλῶς εἰς ἄπειρον αὐτὰς ἐκβάλλειν].

"Again, the sum of things (The All, τὸ πᾶν) is infinite (ἄπειρόν). 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 :64) hence, since it has no extremity, it has no limit ; and, since it has no limit, it must be unlimited or infinite

(ἄπειρον).

"Moreover, the sum of things (The All, τὸ πᾶν) is unlimited (ἄπειρόν) both by reason of the multitude of the atoms and the extent of the void. [42] For if the void were infinite (ἄπειρον) and bodies finite, the bodies would not have stayed anywhere but would have been dispersed in their course through the infinite (ἄπειρον) void, not having any supports or counter-checks to send them back on their upward rebound. Again, if the void were finite, the infinity (ἄπειρα) 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 (ἄπειροί); but the variety of shapes, though indefinitely large, is not absolutely infinite. [43] [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." (ἄπειρον)]

45

"Ἄλλὰ μὴν καὶ κόσμοι ἄπειροί εἰσιν, οἳ θ' ὅμοιοι τούτῳ καὶ ἀνόμοιοι. αἳ τε γὰρ ἄτομοι ἄπειροι οὔσαι, ὡς ἄρτι ἀπεδείχθη, φέρονται καὶ πορρωτάτω. οὐ γὰρ κατανήλωνται αἱ τοιαῦται ἄτομοι, ἐξ ὧν ἂν γένοιτο κόσμος ἢ ὑφ' ὧν ἂν ποιηθείη, οὔτ' εἰς ἓνα οὔτ' εἰς πεπερασμένους, οὔθ' ὅσοι τοιοῦτοι οὔθ' ὅσοι διάφοροι τούτοις. ὥστε οὐδὲν τὸ ἐμποδοστατήσόν ἐστι πρὸς τὴν ἀπειρίαν τῶν κόσμων.

"Moreover, there is an infinite number of worlds (κόσμοι ἄπειροί kosmoi apeiroi), some like this world, others unlike it. For the atoms being infinite (ἄτομοι ἄπειροι) in number, as has just been proved, are borne ever further in their course. For the atoms out of which a world might arise, or by which a world might be formed, have not all been expended on one world or a finite number of worlds, whether like or unlike this one. Hence there will be nothing to hinder an infinity of worlds (τὴν ἀπειρίαν τῶν κόσμων).

47

[47] "Οὐ μὴν οὐδ' ἅμα κατὰ τοὺς διὰ λόγου θεωρητοὺς χρόνους αὐτὸ τὸ φερόμενον σῶμα ἐπὶ τοὺς πλείους τόπους ἀφικνεῖται -- ἀδιανόητον γάρ,-- καὶ τοῦτο συναφικνούμενον ἐν αἰσθητῷ χρόνῳ ὅθεν δῆποθεν τοῦ ἀπείρου οὐκ ἐξ οὗ ἂν περιλάβωμεν τὴν φορὰν τόπου ἔσται ἀφιστάμενον: ἀντικοπῆ γὰρ ὅμοιον ἔσται, κἂν μέχρι τοσούτου τὸ τάχος τῆς φορᾶς μὴ ἀντικόπτον καταλίπωμεν. χρήσιμον δὲ καὶ τοῦτο κατασχεῖν τὸ στοιχεῖον. εἴθ' ὅτι τὰ εἶδωλα ταῖς λεπτότησιν ἀνυπερβλήτοις κέχρηται, οὐθὲν ἀντιμαρτυρεῖ τῶν φαινομένων: ὅθεν καὶ τάχη ἀνυπέβλητα ἔχει, πάντα πόρον σύμμετρον ἔχοντα πρὸς τῷ <τῷ>61 ἀπείρῳ αὐτῶν μηθὲν ἀντικόπτειν ἢ ὀλίγα ἀντικόπτειν, πολλαῖς δὲ καὶ ἀπείροις εὐθὺς ἀντικόπτειν τι.

[47] "Not that, if we consider the minute times perceptible by reason alone,<sup>69</sup> the moving body itself arrives at more than one place simultaneously (for this too is inconceivable), although in time perceptible to sense it does arrive simultaneously, however different the point of departure from that conceived by us (...from the infinite). For if it changed its direction, that

would be equivalent to its meeting with resistance, even if up to that point we allow nothing to impede the rate of its flight. This is an elementary fact which in itself is well worth bearing in mind. In the next place the exceeding thinness of the images is contradicted by none of the facts under our observation. Hence also their velocities are enormous, since they always find a void passage to fit them. Besides, their incessant (ἀπείρω) effluence meets with no resistance, or very little, although many atoms, not to say an unlimited number (ἀπείροις) , do at once encounter resistance.

56-57

"Πρὸς δὲ τούτοις οὐ δεῖ νομίζειν ἐν τῷ ὠρισμένῳ σώματι ἀπείρους ὄγκους εἶναι οὐδ' ὀπηλίκοις οὖν. ὥστε οὐ μόνον τὴν εἰς ἄπειρον τομὴν ἐπὶ τοῦλαττον ἀναιρετέον, ἵνα μὴ πάντα ἀσθενῆ ποιῶμεν κἀν ταῖς περιλήψεσι τῶν ἀθρόων εἰς τὸ μὴ ὄν ἀναγκαζόμεθα τὰ ὄντα θλίβοντες καταναλίσκειν, ἀλλὰ καὶ τὴν μετάβασιν μὴ νομιστέον γίνεσθαι ἐν τοῖς ὠρισμένοις εἰς ἄπειρον μηδ' ἐπὶ τοῦλαττον.

[57] "Οὔτε γὰρ ὅπως, ἐπειδὴν ἅπαξ τις εἶπη ὅτι ἄπειροι ὄγκοι ἐν τινι ὑπάρχουσιν ἢ ὀπηλικοί οὖν, ἔστι νοῆσαι ὅπως 78 ἂν ἔτι τοῦτο πεπερασμένον εἶη τὸ μέγεθος. πηλικοί γὰρ τινες δῆλον ὡς οἱ ἄπειροί εἰσιν ὄγκοι: καὶ οὗτοι ὀπηλικοί ἂν ποτε ὦσιν, ἄπειρον ἂν ἦν καὶ τὸ μέγεθος. ἄκρον τε ἔχοντος τοῦ πεπερασμένου διαληπτόν, εἰ μὴ καὶ καθ' ἑαυτὸ θεωρητόν, οὐκ ἔστι μὴ οὐ καὶ τὸ ἐξῆς τούτου τοιοῦτον νοεῖν καὶ οὕτω κατὰ τὸ ἐξῆς εἰς τοῦμπροσθεν βαδίζοντα εἰς τὸ ἄπειρον ὑπάρχειν καὶ τὸ τοιοῦτον ἀφικνεῖσθαι τῆ ἐννοίᾳ.

"Besides, you must not suppose that there are parts unlimited (ἀπείρους) in number, be they ever so small, in any finite body. Hence not only must we reject as impossible subdivision ad infinitum (εἰς ἄπειρον) into smaller and smaller parts, lest we make all things too weak and, in our conceptions of the aggregates, be driven to pulverize the things that exist, i.e. the atoms, and annihilate<sup>87</sup> them ; but in dealing with finite things we must also reject as impossible the progression ad infinitum (εἰς ἄπειρον) by less and less increments.

[57] "For when once we have said that an infinite (ἀπείροι) number of particles, however small, are contained in anything, it is not possible to conceive how it could any longer be limited or finite in size. For clearly our infinite (οἱ ἄπειροί) number of particles must have some size ; and then, of whatever size they were, the aggregate they made would be infinite (ἄπειρον). And, in the next place, since what is finite has an extremity which is distinguishable, even if it is not by itself observable, it is not possible to avoid thinking of another such extremity next to this. Nor can we help thinking that in this way, by proceeding forward from one to the next in order, it is possible by such a progression to arrive in thought at infinity (εἰς τὸ ἄπειρον).

60

[60] "Καὶ<sup>84</sup> μὴν καὶ τοῦ ἀπείρου ὡς μὲν ἀνωτάτω καὶ κατώτατω οὐ δεῖ κατηγορεῖν τὸ ἄνω ἢ κάτω. ἴσμεν μέντοι τὸ ὑπὲρ κεφαλῆς, ὅθεν ἂν στῶμεν, εἰς ἄπειρον ἄγειν ὄν, μηδέποτε φανεῖσθαι τοῦτο ἡμῖν, ἢ τὸ ὑποκάτω τοῦ νοηθέντος εἰς ἄπειρον, ἅμα ἄνω τε εἶναι καὶ κάτω πρὸς τὸ αὐτό: τοῦτο γὰρ ἀδύνατον διανοηθῆναι. ὥστε ἔστι μίαν λαβεῖν φορὰν τὴν ἄνω

νοουμένην εἰς ἄπειρον καὶ μίαν τὴν κάτω, ἂν καὶ μυριάκις πρὸς τοὺς πόδας τῶν ἐπάνω τὸ παρ' ἡμῶν φερόμενον εἰς τοὺς ὑπὲρ κεφαλῆς ἡμῶν τόπους ἀφικνῆται ἢ ἐπὶ τὴν κεφαλὴν τῶν ὑποκάτω τὸ παρ' ἡμῶν κάτω φερόμενον: ἢ γὰρ ὅλη φορὰ οὐθὲν ἦττον ἑκατέρω ἑκατέρω ἀντικειμένη ἐπ' ἄπειρον νοεῖται.

[60] "Further, we must not assert 'up' or 'down' of that which is unlimited (ἄπειρου), as if there were a zenith or nadir. As to the space overhead, however, if it be possible to draw a line to infinity (εἰς ἄπειρον) from the point where we stand, we know that never will this space --or, for that matter, the space below the supposed standpoint if produced to infinity (εἰς ἄπειρον) -- appear to us to be at the same time 'up' and 'down' with reference to the same point ; for this is inconceivable. Hence it is possible to assume one direction of motion, which we conceive as extending upwards ad infinitum (εἰς ἄπειρον), and another downwards, even if it should happen ten thousand times that what moves from us to the spaces above our heads reaches the feet of those above us, or that which moves downwards from us the heads of those below us. None the less is it true that the whole of the motion in the respective cases is conceived as extending in opposite directions ad infinitum (εἰς ἄπειρον).

73

"Ἐπί τε τοῖς προειρημένοις τοὺς κόσμους δεῖ καὶ πᾶσαν σύγκρισιν πεπερασμένην τὸ ὁμοειδῆς τοῖς θεωρουμένοις πυκνῶς ἔχουσαν νομίζειν γεγονέναι ἀπὸ τοῦ ἀπείρου,

"After the foregoing we have next to consider that the worlds and every finite aggregate which bears a strong resemblance to things we commonly see have arisen out of the infinite (ἀπὸ τοῦ ἀπείρου).

74 in a scholia

[ἀλλὰ καὶ διαφόρους αὐτοὺς ἐν τῇ ιβ' Περὶ φύσεως αὐτός φησιν: οὐς μὲν γὰρ σφαιροειδεῖς, καὶ ὠσοειδεῖς ἄλλους, καὶ ἀλλοιοσχήμονας ἑτέρους: οὐ μέντοι πᾶν σχῆμα ἔχειν. οὐδὲ ζῶα εἶναι ἀποκριθέντα ἀπὸ τοῦ ἀπείρου.]

[On the contrary, in the twelfth book "On Nature" he himself says that the shapes of the worlds differ, some being spherical, some oval, others again of shapes different from these. They do not, however, admit of every shape. Nor are they living beings which have been separated from the infinite (ἀπὸ τοῦ ἀπείρου).]