The Atomic Billiard Board, or: Understanding the Swerve to Mechanistic Determinism

Post by “Cassius” of November 12, 2022 at 6:55 AM

> Quote from Martin
>
> hard determinism appeared to be the most fitting to a materialist world view

It's very interesting that Epicurus did not think so. That article by Sedley which talks about the swerve being more the product of Epicurus' logical reasoning on epistemology (I think it was) rather than in physics may be the best explanation, and also a guidepost for us in understanding better how he thought and the correctness of his view. I will find and link that here.

I am pretty sure it is this one, now to see if I can point to the right section. Here's the article, Sedley: "Epicurus' Refutation of Determinism" and here's a link to a thread discussing it: Sedley: "Epicurus' Refutation of Determinism"

I was thinking I would find something more pithy but this interesting page has basically the assertion I remember:

credit for anticipating 20th-century quantum physics. On the other hand, he deserves more admiration than he usually receives for arriving at the possibility of physical indeterminism within atomism on purely a priori grounds. During the long reign of Newtonian physics only one thinker, C.S. Peirce, had the wisdom to point out that its overwhelming predictive success did not, and indeed never could, rule out the existence of indeterminism at a level below the range of the most accurate measuring instruments.[3] Epicurus' insight was a comparably bold one when he reasoned, in defence of the swerve, that no amount of observation of falling objects' trajectories could establish that they were perfectly rectilinear to *any* degree of accuracy (Lucretius II 246-50).

I do not propose to expend much discussion on the swerve's cosmogonical function (Lucretius II 216-42), which I suspect to be a problem dreamed up with a preconceived solution in mind. Chains of atomic collisions in extra-cosmic space could have quite adequately been explained by the lateral intrusion of one or more atoms from elsewhere, despatched, say, by the break-up of a nearby world. The question of how such collisions ever started in the first place would not arise, given the infinity of past time and past worlds. That is, indeed, the view strongly implied by the *Letter to Herodotus* and the *Letter to Pythocles*,[4] the physical epitomes which Epicurus wrote when he had already worked out his main cosmological views in Books I-XIII of his *On nature*. Since these two works also contain no hint of the swerve doctrine, the likelihood is that it was his later work on psychology, apparently in the closing books of the thirty-seven book magnum opus, that led him to the innovation, and that it was only then grafted onto the existing cosmological scheme.[5]

[3] C.S. PEIRCE, *Collected papers* 6 (1935), esp. p. 35, 37.
[4] *Ep. Hdt.* 44; *Ep. Pyth.* 89.
[5] See my *The structure of Epicurus' On nature*, «CErc» 4 (1974), pp. 89-92, and *Epicurus and the mathematicians of Cyzicus*, «CErc» 6 (1976), pp. 23-54, note 73, for this chronology.

And this is the interesting comment in Lucretius of which I would never have seen the significance without Sedley's article:

> Quote from Lucretius Book 2
>
> For all things that fall through the water and thin air, these things must needs quicken their fall in proportion to their weights, just because the body of water and the thin nature of air cannot check each thing equally, but give place more quickly when

> overcome by heavier bodies. But, on the other hand, the empty void cannot on any side, at any time, support anything, but rather, as its own nature desires, it continues to give place; wherefore all things must needs be borne on through the calm void, moving at equal rate with unequal weights. The heavier will not then ever be able to fall on the lighter from above, nor of themselves bring about the blows, which make diverse the movements, by which nature carries things on. Wherefore, again and again, it must needs be that the first-bodies swerve a little; yet not more than the very least, lest we seem to be imagining a sideways movement, and the truth refute it. For this we see plain and evident, that bodies, as far as in them lies, cannot travel sideways, since they fall headlong from above, as far as you can descry. But that nothing at all swerves from the straight direction of its path, what sense is there which can descry?