EPICUREAN KINETICS

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THIS is the brief story of two mistranslated passages in the extant writings of Epicurus, *Epistle to Herodotus*, 46–47 and 62. The former deals with the motion of what he calls εἴδωλα and we shall call "idols," and the latter with the motion of atoms. The portentous title "kinetics" was the invention of Carlo Giussani.[1]

It is a paradox of Epicurean studies that this diligent Italian scholar, who alone among students of Lucretius made an extraordinary effort to master the teachings of Epicurus from the Greek texts, should have become the author and instigator of not a little transcendental nonsense. It is a supplementary paradox that Cyril Bailey, who utters many sane and illuminating judgments of Epicurus, should have involved himself in absurdities and inconsistencies through following the Italian. Consider side by side the following statements from his *Greek Atomists and Epicurus:* "His moral ideal was to be one attainable by all, and his physical system similarly must be grounded on the common-sense of the average man." This average man is to apply his common sense to the following: "The motion of the whole body is the outward expression in continuous time perceptible to the senses of the invisible motion of the atoms."[2]

By way of a return from this weird transcendentalism to common sense, certain statements may be made at the outset. This letter addressed to Herodotus is a brief epitome of physical theory. The student who took it in hand was encouraged to consult the larger epitome or even the thirty-seven monographs on physics.[3] These aids are lacking to us. Consequently, the doctrine seems elliptically expressed. In the two contexts here involved—the first on the motion of idols, the second on the motion of atoms—it is elliptically assumed that mass

[1] *T. Lucreti Cari De rerum natura* (4 vols.; Torino: Loescher, 1896–98), I, Excursus vi, 97–124.

[2] (Oxford, 1928), pp. 233–34 and 337, top.

[3] Norman W. DeWitt, "The Later Paideia of Epicurus," *Transactions of the American Philological Association*, LXVII (1937), 326–33, esp. 328.

motion is one thing and the motion of idols or atoms quite another. Nothing subtle or profound is to be expected. To be really modern in our illustrations, Epicurus is telling us that the motion of a baseball and the motion of an idol are two different things.

Since all are agreed that the idols move at atomic speed, there should be no objection to the following sentence at the end of section 46: "Furthermore, the motion through the void, so long as no encounter with opposing bodies occurs, accomplishes *any conceivable distance* in time unthinkably brief, for resistance and non-resistance take on the semblance of speed and slowness." The words in italics must be kept in mind; they furnish topical reference to the next sentence, of which my translation is quite new: "It certainly must not be thought, however, that the moving mass also arrives at the same time *at the greater distances*[4] in units of time discernible only by reason, for it is unthinkable." What is unthinkable is this—that a javelin or a baseball could be hurled to an infinite distance in atomic time.

Our sentence, however, is a long one. It proceeds:

and this [the moving mass], arriving at a perceptible moment out of the infinite [that is, out of the invisible], will be inseparable[5] from the spot where we shall first discern the motion, for it [the fact of its becoming visible] will be equivalent to retardation, even if down to this point[6] we leave the velocity of the motion unimpeded.

The gist of this may be restated in these words: The motion of a moving mass is a unit; if it is invisible for part of its course and visible for the second part, you cannot consider these two parts separately. While acceleration is not mentioned, it is being impressed upon us that mass motion is subject to retardation; however rapid the previous motion may be, the mass at length comes into view. The motion of idols, on the contrary, knows no retardation but is uniform throughout. This is simple enough for a man of common sense.

The sentences under consideration have been detached by Giussani

[4] Italics mine. With ἐπὶ τοὺς πλείους τόπους (cf. *Epistle to Pythocles* 114: διὰ πλείονος τόπου). Bailey, following Giussani (*op. cit.*, p. 114, n. 1), renders "to the several places to which its component parts move." This is the cardinal error. The Greek text offers no difficulty.

[5] Bailey translates ἔσται ἀφισταμένον, "will be taking its departure." This is not in the lexicon. The ordinary force is "stand aloof, separate one's self."

[6] Needless doubt has arisen over μέχρι τοσούτου. It surely means "thus far, down to this point," that is, down to the time that the moving mass comes into view.

and Bailey from sections 46–47, dealing with idols, where they are needed, and switched to section 62, where they are superfluous. I come now to the latter, dealing with the motion of atoms. The principle is first laid down that the motion of atoms is equal and uniform. Then the contrast between mass motion and atomic motion is assumed precisely as the contrast between mass motion and the motion of idols in section 47. As before, my translation will differ utterly: "It will be objected,[7] however, that in the case of compound bodies one atom will move faster than another, the atoms being characterized by the same speed[8] as the compound because of the fact that atoms in masses move in a single direction." Let us modernize this. Suppose that two baseballs are pitched, one fast, one slow. The unthinking novice will object that the atoms in the fast ball will travel faster than the atoms in the other. Nothing could be simpler. The objection is true but not to the point.

It may here be interposed that the sentences of Epicurus are not always integrated units but sometimes are built like freight trains, by means of couplings. We have here an example. Epicurus assents to the objection that the atoms in one moving body travel faster than the atoms in another and then goes the objector one better—"and that too in the minimum unit of continuous time." Finally, in a loosely attached conditional clause, he appends the vital answer to his objector: "if not in a single direction in units of time discernible only by reason, but they [the atoms] are vibrating at high frequency, until the continuity of the motion [that is, of the moving mass] comes under observation."

I do not claim that the meaning here is clearly expressed, but I do claim that it is unmistakable when once apprehended. The ἕως ἄν clause denotes the last stage of the motion, not a *terminus ad quem.* Let us assume that a mass makes such a traject that the first part of its course is invisible but the latter part visible. This might be true of the flight of an arrow. It certainly would be true of a meteor. In the previous stage the mass motion, like the atomic motion, is invisible;

[7] Hicks changes ῥηθήσεται to φορηθήσεται.

[8] The usual meaning of ἰσοταχεῖς is "having the same velocity as one another," but here "having the same velocity as the compound body" is required. This point has escaped all the editors whose work is accessible to me.

in the latter stage it becomes apparent that the mass motion is in a straight line or, as Epicurus says, is "continuous" as opposed to vibratory. It need hardly be mentioned that the distinction still holds if the line of mass motion be curved.

We now come to a sentence which, if rightly translated, will compel us to make drastic modifications of our statements of the Epicurean theory of knowledge and will nullify whole sections of Giussani's *Lucretius* and Bailey's *Epicurus*[9] and his *Greek Atomists and Epicurus*. We are called upon to assume, as before, that we have visible minima of motion, or minima of time in which motion is visible, and, corresponding to these, certain theoretical minima discernible by reason alone or by intuition. What Epicurus then tells us is this, that the analogy between visible mass motion and invisible atomic motion does not hold beyond a certain point: "For the gratuitous inference of opinion concerning the unseen, that naturally units of time discernible only through reason will also be characterized by motion in a straight line, is not true of such things [as atoms endowed with motion]."

To this is appended a clause of supreme importance for the Epicurean theory of cognition, which has, nevertheless, been more atrociously mistranslated than any passage that has come to my knowledge. Consequently, I think it best to print the Greek text, which is undisputed, and to build up a version piecemeal: *ἐπεὶ τό γε θεωρούμενον πᾶν ἢ κατ' ἐπιβολὴν λαμβανόμενον τῇ διανοίᾳ ἀληθές ἐστι.*

We all recognize *τὸ πᾶν* as the universe of atoms and void. Since this is discernible only by reason, it follows that we must supply from the preceding context either *λόγῳ* or *διὰ λόγου* with *τὸ θεωρούμενον πᾶν*, which certainly means "the universe of atoms and void as viewed by reason." With the above participle is co-ordinated *ἢ κατ' ἐπιβολὴν λαμβανόμενον τῇ διανοίᾳ*, which the Frenchman, Alfred Ernout,[10] untroubled by hampering preconceptions, rightly renders "saisi par l'intuition de l'esprit." My rendering would be "or received through in-

[9] Oxford, 1926.

[10] *Lucrèce, De rerum natura* (Paris: Société d'édition "Les belles lettres," 1925), p. lxxv. In Bailey's *Epicurus* (pp. 259–74) there is an appendix "On the Meaning of *ἐπιβολὴ τῆς διανοίας*"; but he overlooks examples in Alexandrine and Byzantine writers which would affect his judgments; his interpretation of passages in Epicurus are highly questionable, and he makes Epicurus an intuitionist without quite recognizing the fact. I have discussed the question in the *Transactions of the American Philological Association*, LXX (1939), 414–27.

tuition by the intellect." Finally, it is not out of place to invite attention to the affirmative, confidential γέ; Epicurus is speaking of the concept dearest to his heart—the universe of atoms and void: "because, of course, it is the universe of atoms and void as viewed by reason or received by intuition through the intellect that is true."

At this point we may assemble these two disjointed versions and set side by side the passages dealing with two analogous problems, namely, the difference between the motion of idols and the motion of masses and the difference between the motion of atoms in compound bodies and the motion of masses. The former from sections 46–47:

Furthermore, the motion through the void, so long as no encounter with opposing bodies occurs, accomplishes any conceivable distance in time unthinkably brief, for resistance and non-resistance take on the semblance of speed and slowness. It certainly must not be thought, however, that the moving mass also arrives at the same time at the greater distances in units of time discernible only by reason, for it is unthinkable, and this [the moving mass], arriving suddenly at a perceptible moment out of the infinite [that is, out of the invisible], will be inseparable from the spot where we shall first discern the motion, for it [the fact of its becoming visible] will be equivalent to retardation, even if down to this point we leave the velocity of the motion unimpeded. It is worth while to grasp this principle too.

The second passage is from section 62:

It will be objected, however, that in the case of compound bodies one atom will move faster than another, the atoms being characterized by the same speed as the compound because of the fact that atoms in masses move in a single direction, and that too in the minimum unit of continuous time if not in a single direction in units of time discernible only by reason, but they [the atoms] are vibrating at high frequency, until the continuity of the motion [that is, of the moving mass] comes under observation; for the gratuitous inference of opinion concerning the unseen, that naturally units of time discernible only through reason will also be characterized by motion in a straight line, is not true of such things [as atoms endowed with motion]; because, of course, it is the universe of atoms and void as viewed by reason or received by intuition through the intellect that is true.

Of the last clause, beginning with "because," the astonishing version of R. D. Hicks[11] runs as follows: "Our canon is that direct observation by sense and direct apprehension by the mind are alone invariably true." In the text, of course, there is nothing to justify the

[11] *Diogenes Laertius*, Vol. II ("Loeb Classical Library" [Cambridge: Harvard University Press, 1938]).

use of the word "canon" and least of all the assertion of the supremacy of sense-perception. What Epicurus is telling us is rather that reason and intuition are the avenues of knowledge to a world of higher certainties than the world of sense-perception. As for "direct apprehension by the mind," if this means something definite, it must be intuition, for of this no neater definition need be sought; and, if intuition, along with sense-perception, be "alone invariably true," there is no place for reason, which arrives at truth not by direct apprehension but by a process of thought, either inductive or deductive, analogical or syllogistic.

Obviously, therefore, Hicks has not tested his translation by the use of reason. Bailey's version is similar, possibly influenced by the former. Ernout professes not to understand but obviously is influenced by Giussani. The latter has the vice of making this and some other problems too intricate. We need a fresh translation of the *Herodotus* and a thoroughgoing restatement of the Epicurean theory of knowledge. The currently accepted views of this problem, as well as judgments of Epicureanism in general, are not too firmly founded on the text of Epicurus but hark back to Eduard Zeller's *Stoics, Epicureans and Sceptics*,[12] now almost one hundred years old, or R. D. Hicks's *Stoic and Epicurean*.[13] The latter was less interested in Epicureanism than in Stoicism, and he followed H. A. J. Munro, who did not know his Epicurus, and Giussani, whose fantastic explanations did not convince him but did mislead him. Usener's *Epicurea*[14] is still catalogued as "epoch making," but it has made no epoch; Zeller, who long antedates him, still dominates the field. Our chief progress has been made in the domain covered by Ettore Bignone's *L'Aristotele perduto e la formazione filosofica di Epicuro*,[15] but the substance of his findings concerning the early Epicurus are not as yet a common possession. Perhaps the more notable advances have been made in subsidiary studies, that is, the Herculanean papyri and especially those of Philodemus.

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[12] London: Longmans, Green & Co., 1880. The original volumes on Greek philosophy were published between 1844 and 1852.

[13] New York: Charles Scribner's Sons, 1910.

[14] Leipzig: Teubner, 1887.

[15] Firenze: "La nuova Italia" editrice, 1936.