

IN HIS 1985 ARTICLE IN *Phoenix* Shackleton Bailey proposed one emendation and one reinterpretation in Lucretius 1.384–386.<sup>1</sup> This is the text of 384–390:

385        *Postremo duo de concursu corpora lata*  
             *si cita dissiliant, nempe aër omne necessest,*  
             *inter corpora quod fiat, possidat inane.*  
             *is porro quamvis circum celerantibus auris*  
             *confluat, haud poterit tamen uno tempore totum*  
             *compleri spatium; nam primum quemque necessest*  
 390        *occupet ille locum, deinde omnia possideantur.*

(Martin, fifth edition)

In 384 Shackleton Bailey proposes *late* for *lata* and in 385 he opposes Cyril Bailey's taking *cita* in the meaning "quickly," i.e., as an adverbial adjective, and considers it a participle: "set in motion." With respect to *cita* he does not say why his interpretation is superior. He supports the change from *lata* to *late* by stating that bodies do not have to be broad to rebound after collision. He appears to mean, then, that what mattered to Lucretius in this argument was that the two bodies spring apart a great distance—*late*—and that the change to *lata* was made by someone who felt that Lucretius was interested rather in insuring that the bodies were such as to have the capacity to rebound after clashing.

Shackleton Bailey's change of *lata* to *late* has recently won the support of Martin F. Smith, who writes that this alteration much improves the sense and translates: "Lastly, if two bodies set in motion leap far apart after contact, . . ." Smith's translation "set in motion" shows that he, too, takes *cita* as a participle.<sup>2</sup> He reports on the authority of Merrill that *late* is the reading of Cod. Vat. Ottob. Lat. 1954 and occurs as a variant in Cod. Vat. Lat. 3275. He also prints *late* in his revised 1992 Loeb edition of Lucretius.

In this paper I wish to argue against the changes proposed by Shackleton Bailey. It seems to me that the reading *lata*, if properly interpreted, strengthens the argument of Lucretius in lines 384–390; the same may be true of *cita* in the meaning "swiftly" in lines 391–397. The interpretations of Shackleton Bailey, on the other hand, do not appear to make any such contribution.

Although Lucretius may very well have agreed with Shackleton Bailey that bodies do not have to be broad to rebound after collision, it will appear that the distance of the rebound, whether large or small, is not relevant to this argument.

<sup>1</sup> Shackleton Bailey 1985: 27.

<sup>2</sup> Smith 1993: 337. Smith does not say why the sense has been improved by the change from *lata* to *late*.

It will also appear that the reading *lata* must be given preference, although not because it would guarantee bounciness; it must be preferred because the size of the bodies determines the period of time within which the void between them can be filled by air.

The argument of Lucretius in 384–397 is a section of the argument in lines 329–399. In this larger argument he offers several proofs in favour of the existence of void. Lines 384–397 give one of these proofs and deal also with two objections to it. In this proof Lucretius states that when two bodies spring apart after colliding, void appears between them. He does not support this assertion by any argument, thinking, perhaps, that this result is intuitively obvious. In lines 387–390 he deals with the first objection against the existence of this void. This objection does not challenge the assumption of Lucretius that void had indeed arisen between the rebounding bodies. Instead, it denies its reality by asserting, it seems, that this void will be deemed not to have existed if it is filled by the intruding air in a certain brief period of time, sc. *uno tempore*.<sup>3</sup> One could have expected Lucretius to deal with this argument by arguing that no matter how speedy the replacement of the void by air, this void nevertheless must have had existence because the very notion of replacement requires that what has been replaced must have existed. Instead, Lucretius defends void's existence by asserting that air will not be able to fill *uno tempore* the *entire* void space between the two bodies, the *totum spatium*. This assertion implies that some of this void space will be filled *uno tempore*. What will be filled *uno tempore* is, according to Lucretius, that part of the *totum spatium* to which Lucretius refers in 389–390 as the *primum quemque locum*.<sup>4</sup> If, then, the intruding air will have filled *uno*

<sup>3</sup>The term *uno tempore* obviously refers to a very brief period of time, although it cannot be determined from the context whether or not Lucretius has here the technical Epicurean minima in mind. *Unum tempus* referring to very brief periods of time appears to be used in a technical Epicurean sense by Lucretius in 4.775 and 4.794–796. It is unclear, however, whether in his argumentation in 1.384–397 Lucretius intends to use specifically Epicurean doctrines. If he did, he could not accept, as he is doing, the view of his opponents, a view taken for granted in this passage, that if filled by air, the space between the rebounding bodies did not contain any void. In Epicurean physics all compounds, even the densest and hardest ones, contained void (e.g., in Lucretius 1.346–357). In any case it does not matter for the validity of Lucretius' argument in 384–390 whether or not he has the Epicurean minima in mind. On the possibility that *uno tempore* could mean *in zero time* see below, n. 4.

<sup>4</sup>This argument seems to exclude the taking of *uno tempore* in the meaning *in no time at all, in zero time*. Lucretius would then be saying that although air cannot fill the *entire* void in zero time, it can fill a part of this void in zero time. Such a statement would result in Lucretius' contradicting himself. If it continues rushing in at unchanged speed, this air will take the same zero time to fill each successive part as well until it has filled the *totum spatium*. In that case the time expended on filling the entire space would consist of an addition of zero times; hence the total time taken to fill the *totum spatium* would also be zero time. This result would directly contradict the statement of Lucretius that the intruding air cannot fill the entire space *uno tempore* (with *uno tempore* taken in the meaning "zero time"). It is furthermore doubtful that in Latin *uno tempore* can be the equivalent of *nullo peracto tempore*, of "in zero time." No such meaning is given in the *Oxford Latin Dictionary* or appears to be required in the poem of Lucretius.

*tempore* some of the space between the rebounding bodies, the size of these bodies becomes a matter of importance, i.e., it matters whether or not they are *lata*. If these two bodies were small enough to produce an area of void that *could* be filled by air *uno tempore*, no void would be deemed to have arisen and the argument of Lucretius for its existence would collapse. Therefore, it contributes to the argument of Lucretius to specify that the *corpora* be wide—*lata*—, wide enough to produce an area of void that cannot be filled by air *uno tempore*. The reading *late*, on the other hand, contributes nothing to his argument. Whether the bodies do, or do not, separate widely—*late*—in their rebound will have no effect on the length of time required for each part of the void created between them to be filled by the circumambient air.

In lines 1.391–397 Lucretius deals with the second argument against the presence of void between the rebounding bodies. The interpretation of these lines, especially of 391–394, has been much contested. In what follows an interpretation is offered that appears to fit the context best. Within this interpretation *cita* taken as an adverbial adjective may help the argument; taken as a participle it does not.

In lines 391–392 an opponent asserts that when the *corpora* spring apart no void occurs between them because air is capable of condensation.<sup>5</sup> These are lines 391–397:

395                    *quod si forte aliquis, cum corpora dissiluire,*  
                       *tum putat id fieri quia se condenseat aër,*  
                       *errat; nam vacuum tum fit quod non fuit ante*  
                       *et repletur item vacuum quod constitit ante,*  
                       *nec tali ratione potest denserier aër*  
                       *nec, si iam posset, sine inani posset, opinor,*  
                       *ipse in se trahere et partis conducere in unum.*

(Martin, fifth edition)

The text does not tell us how exactly this capacity for condensation was meant to prevent the appearance of void. It has been widely and plausibly assumed, however, that in this argument air was meant to be compressed between the bodies when they clashed and was meant to expand quickly enough to keep pace with them as they were flying apart after their clash. In this way no void would be created between these bodies. This condensed air argument against the occurrence of void was countered by Lucretius in lines 393–397. In these lines he adduces three arguments against the condensed air hypothesis, one in lines 393–394 and two in 395–397. Since the arguments in 395–397 are introduced by *nec . . . nec*, they must be intended by Lucretius to be arguments additional to, and different from, the argument in 393–394. In 393–394 Lucretius asserts that when the two

<sup>5</sup>The context requires that *id fieri* in 392 refer to the filling of the void in 389–390 rather than to the clause *cum corpora dissiluire*. The latter interpretation was proposed by Bernays (1885: 42) and has been followed by some others. As was pointed out, however, by Giussani (1896: 55), the cause of the two bodies' rebounding is irrelevant to the discussion at hand.

*corpora* spring apart, the space between them will contain void. In other words, he must believe that the presence of the compressed air in the space between the *corpora* will not eliminate the presence of void. After many decades of discussion there is still no agreement on precisely how Lucretius must have pictured the coming about of this void. The fullest discussion is still that of Bailey in his commentary to Lucretius—he believes that the refutation in 393–394 consists in asserting that the theory of compression does not eliminate the presence of void between the two bodies because the presence of void is necessary if air is to be compressed. Line 393 would then be stating that void arises when air rarefies and line 394 would be stating that condensation involves the filling of void.

The chief weakness of Bailey's argument has been pointed out by Brown, who says that after a categorical assertion in 394 of the need for void if air was to be compressed, the repetition of the same assertion in 396–397 accompanied by the qualification *opinor* would be an intolerable anticlimax.<sup>6</sup> Brown's objection is especially cogent because of the wording of line 396; the *nec* at its beginning indicates that this line was meant to introduce an additional argument rather than repeat one immediately preceding. Also, on Bailey's interpretation of the Latin the *tum* in 392 would have the temporal meaning "at that moment" and go closely with *cum corpora dissiluerent*, whereas the *tum* in 393 would not be temporal but rather mean "in that case" and make a statement not about the separation of the *corpora* but rather about the condensation of air. This switch in reference and meaning is very harsh and unexpected. Furthermore, one would normally expect the inferential *nam* in 393 to pick up the thought of the preceding main clause rather than that of the subsidiary *quia* clause.

Because of these shortcomings an interpretation different from that of Bailey must be considered. In lines 391–392 the opponent asserted that air rather than void was present between the rebounding bodies. Two counterarguments seem to have been available to Lucretius. He could be asserting when he writes *errat* in 393 that there could not be any compressed air at all between the rebounding bodies; alternatively, he could be granting his opponent the presence of such air but also insisting that void as well would be present. The first alternative, the denial of the presence of the compressed air, seems to be excluded by line 395. As was seen already by Giussani, it is in this line that Lucretius denies the presence of condensed air between the two bodies.<sup>7</sup> It is, therefore, unlikely that the assertion of void in line 393 was already based on this reason. Therefore, it should be based on the alternative reason, the belief that void will occur between the rebounding bodies even with the compressed air present. Lucretius must have thought that

<sup>6</sup> Brown 1984: 111.

<sup>7</sup> Giussani 1896: 57. Bailey, *ad locum*, thinks that in this line Lucretius is making the dogmatic assertion that air does not condense and rarify. This explanation fails to take into account the force of the words *tali ratione*. As pointed out by Giussani, *tali ratione* must refer to the specific situation, i.e., to the clashing of the bodies. In this situation, then, the air is not compressed because it is not there, having been squeezed out by the clash.

when the *corpora* sprang apart void arose between them just as it had arisen in 384–386. The space between these *corpora* would in consequence contain both the residual compressed air and the newly created void. This new vacuum would subsequently be filled, just as it had been in 386–390, by the influx of the air from the sides; Lucretius could also have admitted that this filling would be accelerated by the expansion of the compressed air. He would, of course, still be maintaining that it would be gradual, with the *primum quemque locum* being filled first.

The problem with this scenario is that it does not seem to provide an obvious refutation of the opponent's position. As was already suggested by Christ in 1855, the opponent probably argued that no void was created between the two bodies as they sprang apart because the previously compressed air kept expanding and filling the space opening up between the bodies as fast as it was being created.<sup>8</sup> Perhaps the answer of Lucretius, or his source, to this argument was to assert that the speed of separation of the two bodies could, in fact, be greater than the speed of the expansion of the compressed air. Support for this hypothesis may be found in line 385 where Lucretius specifies that the two *corpora* must be *cita* as they rebound. If *cita* is given the meaning "swiftly," then the putative argument of Lucretius is strengthened. He may, then, have specified that the bodies had to be swift precisely because he thought that they could, in that case, surpass the speed of the expanding air and allow void to arise. On this interpretation *cita* in the meaning "swiftly" would be making a contribution to his reasoning underlying his assertion in 393–394, whereas *cita* in the meaning proposed by Shackleton Bailey—"set in motion"—would not.

There seems to be another argument available to Lucretius that would justify his defence of void in 393–394, one that does not rely on a race between the two *corpora* and the expanding air. Both Lucretius and his opponents would know from everyday experience that when two reasonably flat surfaces meet, no visible gap is left between them. Therefore, if there was a layer of compressed air present between the two bodies when they met, it would have to be invisibly thin. In consequence, Lucretius could have argued that if air in its expansion could indeed keep up with even the very quickest rebounds, this particular layer of air would not possess enough mass to fill in its expansion the entire void arising between the two bodies. The unfilled void would again be gradually filled, just as in lines 386–390, by the air flowing in from all sides. These two hypotheses are, of course, not mutually exclusive. Lucretius could have believed both that some clashing bodies could rebound more swiftly than air could expand and also that the amount of air compressed in the manner suggested by his opponents would not suffice to fill the entire void between the bodies.

Both of these hypotheses postulate the same sequence of events in 393–394 that was present in lines 384–390: first a void arises between the separating bodies; next this void is filled by air. This is not, however, how these two lines

<sup>8</sup> Christ 1855: 12–13.

have been understood by the two latest commentators. Neither Brown nor Bailey thinks that the events in 393 and 394 occur in succession. Bailey asserts that these lines refer to the presence and absence of void in the air upon its rarefaction or condensation. The problems attached to Bailey's theory were pointed out earlier in this paper. Brown, on the other hand, states that line 393 refers to the creation of void between the bodies and line 394 to a simultaneous filling of a void outside of these bodies. Such an outside void seems, however, to be incompatible with the argument of Lucretius. It was first posited by Munro in his commentary because he thought that the two actions in 393–394 were simultaneous.<sup>9</sup> In consequence, two voids were needed, one opening and one being closed. The first void would be the one between the bodies; the second one would presumably have arisen as the two bodies were approaching each other for the clash. It would be filled as they recoiled. This notion of an earlier void must be rejected. If Lucretius had, indeed, thought that a void had formed outside the bodies *before* their clash, he would have needed no further proofs of its existence. It would not now matter any more whether or not a void arose between the two bodies when they rebounded after their clash. In fact, there would be no need to posit two bodies at all for the formation of this type of void. If, then, there is only one void present, the actions in lines 393–394 must be successive; this single void is first created, then filled.

As is the case with all previous attempts to flesh out the sketchy information given us by Lucretius in 391–394 this attempt, too, of necessity contains much that is speculative. I hope, however, that it will be found to be more in harmony with the entire context of lines 384–397 than the earlier interpretations.

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<sup>9</sup> Munro 1908: 64.