

NOTES/NOTES DE LECTURE

A NOTE ON LUCRETIUS *DE RERUM NATURA* 5.613

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AMONG THE EXPLANATIONS GIVEN BY LUCRETIUS for the sun's capacity to radiate such a vast amount of light when its actual size differs little from its apparent size (5.592–613), there occurs the following hypothesis in 610–613:

*forsitan et rosea sol alte lampade lucens
possideat multum caecis fervoribus ignem
circum se, nullo qui sit fulgore notatus,
aestifer ut tantum radiorum exaugeat ictum.*

Perhaps, too, the sun, shining on high with his rosy torch,
has at his command much fire with hidden heat all
around him, fire which is never marked by any radiance,
so that laden with heat, it only increases the stroke of the
sun's rays. (text and translation from Bailey 1947)

In 613 *aestifer ut* is an emendation found in *Laurentianus* xxxv 31 for the transmitted readings: *aestiferi utantum* Q *aestiferi utantur* O. (In Bailey 1947 *utantur* is mistakenly attributed to Q.) The syntax is much debated because of the perceived ambiguity of *tantum*. Bailey offers three possibilities in his note: (1) *tantum* is an adverb modifying *exaugeat*; (2) *tantum* is a predicative adjective modifying *ictum*; (3) *tantum* is an adverb modifying *aestifer*.¹ As his translation indicates, he preferred the first interpretation, which restricts the effect of the external *ignis* on the sun to the production of heat only, a restriction which is

¹ In his commentary C. D. N. Costa (1984) recognizes two possibilities: *tantum* is either adverbial ("only") with *aestifer* or adjectival ("so great a") with *ictum*. Similarly Munro (1886) notes that "it is not clear whether *tantum* is 'only' or 'so much'," although in his translation he takes it as a predicative adjective, "to such a degree." Perhaps it is worth noting that *tantum* meaning "only" does not occur elsewhere in *De rerum natura*. The phrase *tantum quod* (2.220) is not an exception; there *tantum* is an adverbial accusative of extent which picks up *paulum* in the previous line, and *quod*, as Merrill (1907) rightly observes, is the relative pronoun. One would expect *quantum* to follow ("just so much as you could call a change in motion"), but *quod* was introduced by assimilation to the predicate *momen mutatum*. Some commentators have been misled in taking *tantum* as adverbial here by the very different use of *tantum quod* as a temporal expression, meaning "just" or "only just," but in this expression *tantum* is the adverb and *quod* the conjunction: Cic. *Ad fam.* 7.23.1: *tantum quod ex Arpinati veneram cum mihi a te litterae redditae sunt* ("I had only just come from Arpinum when a letter from you was delivered to me"). See further Kühner and Stegmann 1914: 2.2.271–272; Leumann, Hofmann, and Szantyr 1965: 583.

clearly out of place in an explanation designed to account for *tantum . . . lumen* (593).²

The apparent syntactic ambiguity of *tantum* results from an incomplete understanding of the poet's train of thought. In 564–591 the poet concludes that the actual size of the “heavenly fires” differs very little from their apparent size. Then in 592–593 he undertakes to answer a question which naturally arises from that conclusion: how can such a diminutive sun generate such a great amount of light (*qua ratione tantulus ille queat tantum sol mittere lumen*)? The marked antithesis between *tantus* and its diminutive *tantulus*, both of which call upon the reader's sensory experience, defines the nature of the problem, namely the disparity between the size of the sun and the amount of light it generates. Moreover, the analogies which are employed to show that the size of the sun does not limit its capacity to generate light illustrate how a single small source produces a widespread phenomenon: a small spring (*parvus aquai . . . fons*, 602–603) waters entire fields, and a single spark (*una scintilla*, 609) generates widespread fires. Therefore, since the question is based on relative magnitudes measured by *tantus* and *tantulus*, and since the purpose of the three explanations is to show how a single small source generates a widespread phenomenon, it follows that *tantum* must refer to magnitude and modify *ictum*.³ And thus *tantum radiorum ictum* in 613 functions as a restatement, in the third and final explanation to be given, of the phenomenon to be explained (*tantum lumen*, 593); it is the poet's way of saying Q. E. D.⁴

² Bailey (1947) comments: “the *ignis* is *nullo fulgore notatus*, but as *aestifer* it only increases the heat.” In his commentary Ernout (1925–28) says nothing about the interpretation of the line, but it is clear from his translation (1920) that he too takes *tantum* with *exaugeat* and understands the line to refer the generation of heat only: “une chaleur uniquement destinée à augmenter l'ardeur de ses rayons.” However, it is not the sun's capacity to generate so much heat that requires special explanation, because heat, as the senses attest, is invisible; therefore, the poet can easily hypothesize that the sun utilizes supplies of heat particles external to itself without violating the evidence of the senses. It is the generation of light that presents the real difficulty, because the sun is seen to be the sole source of light and is admitted to be a rather small source in comparison to the amount of light that it generates. If one were to hypothesize that *corpora luminis* are supplied to the sun from an external source, that hypothesis would immediately be rejected by the evidence of sense perception because a continuous stream of these *corpora*, in the vast quantity necessary to account for the phenomenon of sunlight, would have to be visible to the eye like the rays of the sun itself. To meet these difficulties the poet offers three explanations whose common element is the idea that invisible heat aids the sun in the generation of light.

³ Word order of course would suggest the same: cf. 6.567: *cum videant tantam terrarum incumbere molem*. As Lachmann (1850) rightly pointed out, the force of *tantum* is “so great as we perceive it to be” (“*tantum, quantum scilicet fieri intellegimus, radiorum exaugeat ictum*”).

⁴ Avancius's conjecture *aestiferum* (defended by Woltjer 1877: 127 with n. 3) spoils the purpose of the explanation, which would then account for *aestus* but not *lumen*. Wakefield's conjecture *in tantum*, brought to my attention by Gerald Heverly, a student in my Lucretius seminar, was motivated by purely palaeographical considerations. It substitutes a non-Lucretian phrase to achieve what amounts to the same meaning as the perfectly acceptable *tantum . . . ictum*.

The first and third interpretations (above) actually weaken the effectiveness of the poet's explanation because they emphasize that this invisible fire around the sun produces *only* heat, when clearly the poet wants the reader to understand that this external source of heat is used by the sun to generate more light than the sun can generate on its own. Indeed, the principle upon which all three explanations are built is that particles of heat, either coming from an external source or found in the sun's rays themselves, increase the sun's capacity to generate light. In the first explanation (597–601), *elementa vaporis* are said to gather together from all over the *mundus* about the sun and then emanate from it as “blazing light” (*ardor*, 600); in the second explanation (604–609), “blazing light” (*ardor*, 605) from the sun propagates itself by heating (*calidis fervoribus*, 605) the air through which it travels so that the air itself is actually kindled (*ut queat accendi parvis ardoribus ictus*, 607). And likewise in the third explanation (610–613) an invisible heat source (*caecis fervoribus*, 611; *nullo . . . fulgore notatus*, 612), located around the sun, enhances the power of its rays to generate light. The poet avoids details about the actual mechanisms which make these processes possible, and instead relies on the general idea, plausible in itself, that sources of heat which cannot be observed (the first and third explanations)⁵ or the heating and kindling of the air by the sun's rays themselves to propagate light (the second explanation) give the sun the extra energy it needs to generate *tantum lumen*. In this way Lucretius overcomes the main difficulty in accounting for the diminutive sun's luminosity, namely that the sun is seen to have no external source of light. In responding to this difficulty the poet suggests the possibility that “invisible” sources of heat external to the sun, or the heating and kindling action of the sun's rays themselves, enhance the sun's capacity to generate light. By invoking the light-generating action of invisible heat-sources, whether those sources are external to the sun or are found in the sun's rays, the poet is able to offer three plausible hypotheses which explain, in a way that agrees with the evidence of the senses, the sun's capacity to generate such a vast amount of sunlight.⁶

⁵ The first and third explanations are similar in that they both postulate the existence of sources of heat which are external to the sun. They differ, however, in their treatment of the sun itself: in the first explanation the sun is described as a fountain-head of light to which flow particles of heat from throughout the *mundus* (Bailey [1947] is mistaken when he says “particles of heat *and* light” [my emphasis] in his introductory note on 592–613); in the third explanation the sun is described as a torch which is surrounded by an invisible fire.

⁶ According to the atomic conception of solar activity, the sun emits particles of heat and particles of light (4.185–190): *in quo iam genere est solis lux et vapor eius / propterea quia sunt e primis facta minutis* (4.185–186). See also 2.150–164 on the radiation of heat (*corpuscula quaeque vaporis*, 2.153) and 5.281–305 on the radiation of light (*primum quicquid fulgoris*, 5.284; *primum quicquid flammaram*, 5.304). The Epicurean inscription of Diogenes of Oenoanda preserves a fragmentary passage on the nature of the sun; in it the sun is said to be a charcoal-like disc and to function like a spring with fire flowing into and away from it: see Smith 1993: fr. 13. iii.13–iv; text 171–172, translation 374.

An interpretive problem still remains, the relationship of the *ut*-clause to the rest of the sentence. Whether it be taken as a purpose clause or a result clause, it is rather loosely appended to what precedes it: purpose seems unlikely because the explanation should give the result of the sun's being surrounded by an invisible fire, and result seems unlikely because *ut* <*ignis*> *exaugeat* does not follow as a result from the main clause *sol possideat* or from the relative clause *ignem . . . qui sit notatus*. Let me suggest another line of interpretation.

*forsitan et rosea sol alte lampade lucens
 possideat multum caecis fervoribus ignem
 circum se, nullo qui sit fulgore notatus
 aestifer, at tantum radiorum exaugeat ictum.*

Perhaps, too, the sun, shining on high with his rosy torch,
 has at his command much fire with hidden heat all
 around him, fire which, though causing heat, is never
 marked by any radiance, yet increases the stroke of the
 sun's rays to such an extent.

Because of the peculiar nature of this *ignis* (it produces heat but not light), the poet elaborates on the initial description (*caecis fervoribus ignem*) with a relative clause, *nullo . . . qui sit fulgore notatus* (= *caecis fervoribus*), and with an epithet that identifies the essential characteristic, *aestifer* (i.e., *ignis* which in this instance produces heat but not light). This invisible *ignis* is peculiar in another way: although it does not radiate any light itself, it increases the stroke of the sun's rays; this is the poet's way of saying that it increases the sun's power to generate light. Moreover, the capacity of the *ignis* to do so makes the most sense if it is stated as a characteristic in the relative clause which fully defines the nature of the *ignis*: it produces heat; it does not produce light; yet it increases the sun's power to produce light. This last point is introduced by *at*, my conjecture for the transmitted *ut*, because what follows contains a very important qualification of *nullo . . . fulgore notatus*; although the *ignis* radiates no light of its own, it does increase the sun's power to do so. Lucretius does not stop to explain how this happens or to illustrate the process with a simile, as he does with the other two explanations. It seems to have been sufficient to his purpose to suggest the reasonable possibility that there exists an invisible fire, external to the sun, which seems to function like a generator which boosts the sun's power to produce light.⁷

One final point. It looks as if there is an interlingual "phonetic" pun in the clause *at tantum radiorum exaugeat ictum*.⁸ The phonetic similarity of the syllables

⁷ There is a good parallel for *at* in this position, i.e., following a word in the first foot that runs over from the previous line, in 2.392: *et quamvis subito per colum vina videmus / perfluere, at contra tardum cunctatur olivum*.

⁸ On such puns in general, see O'Hara 1996: 63 and Wills 1996: index, s.v. "sound allusion (Greek to Latin)." The closest parallels in *De rerum natura* to this type of paranomasia are etymological puns on proper names: in 1.638–639 on the second element of Heraclitus's name, *Heraclitus . . . clarus*

auge to Greek αὐγή, meaning “light of the sun,”⁹ and the juxtaposition of *exaugeat* and the noun *radiorum*, a word which may function as a gloss on the plural αὐγαί, bring to mind the Homeric phrase αὐγαί or αὐγὰς ἡελίοιο, “the rays of the sun.”¹⁰ Moreover, the presence of this phonetic pun is strongly suggested by the first line of the passage in which there is a clear reminiscence of another Homeric phrase, “rosy-fingered dawn,” in *rosea sol lampade* (*lampas*, of the sun, however, is post-Homeric). The subject matter, the Homeric reminiscence and the juxtaposition of *radiorum* and *exaugeat* work together to plant the acoustic suggestion of hearing in *auge* an echo of αὐγή. Truly, then, does this invisible *ignis* augment the stroke of the sun’s rays.

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pointing to the derivation from the Greek κλειτός, “famous”; in 3.1034 on the cognomen Scipio, *Scipiadas, belli fulmen*, pointing to the derivation from the Greek σκηπτός, “thunderbolt”: see Snyder 1980: 117–120.

⁹The difference in quantity between the e and the η is negligible in light of the associative cues given by the context. On the role of vowel quantity in wordplay, see O’Hara 1996: 61–62.

¹⁰ Cf., for example, *Odyssey* 11.498 and 619. I thank the readers for their comments and suggestions.