

Lucretius and the New Empedocles

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ABSTRACT: The newly discovered papyrus of Empedocles includes a passage which Lucretius imitated closely. It thus confirms an earlier proposed fingerprint test for Empedoclean imitations in Lucretius, namely the near juxtaposition of two or more compound adjectives. By applying this now validated test elsewhere, we can identify in 5.864-7 an imitation or even translation of a lost passage of Empedocles, one which for once acknowledges doctrinal common ground between the two poets, concerning the principle of the survival of the fittest.

The publication in 1998 of *L'Empédocle de Strasbourg* by Alain Martin and Oliver Primavesi¹ will undoubtedly be looked back on as a landmark in Empedoclean studies to rival the golden age of the late 1960s.² The new papyrus fragments of Empedocles' physical poem were recovered by Alain Martin from scraps stored for nearly a century in the library at Strasbourg. They were skilfully reassembled into four main groups by him and Oliver Primavesi, and edited and published with commendable speed in a high-quality but low-priced volume. They contain enough new data to encourage a complete reappraisal of Empedocles' philosophy.³ In the present paper, I shall be looking away from Empedocles himself, to ask what new light is shed on his poetic influence; but one eventual outcome will be the probable recovery of a lost Empedoclean passage.

Given the widespread recognition that Empedocles is the poet by whom Lucretius is most profoundly influenced, what can we learn about Lucretius from the new fragments? While I was working on my 1998 book *Lucretius and the Transformation of Greek Wisdom*, I was lucky enough to be shown in draft some parts of the new Empedocles text by its editors, and to be kept informed of developments. To some extent, therefore, my book already exploits the new information which those fragments have disclosed. But now that the full edition has appeared, I find in it further material I would love to have used. I apologise

¹ A. Martin and O. Primavesi, *L'Empédocle de Strasbourg* (Berlin and New York 1999).

² By the latter I mean the almost simultaneous publication by Jean Bollack, Friedrich Solmsen, Uvo Hölscher and Denis O'Brien of their seminal and radically divergent interpretative studies of Empedocles: J. Bollack, *Empédocle* (Paris 1965-9); F. Solmsen, 'Love and Strife in Empedocles' Cosmology', *Phronesis* 10 (1965) 109-48, repr. in D.J. Furley and R.E. Allen, *Studies in Presocratic Philosophy* II (London 1975) 221-64; U. Hölscher, 'Weltzeiten und Lebenszyklus, eine Nachprüfung der Empedocles-Doxographie', *Hermes* 93 (1965) 7-33 (repr. with additions in Hölscher's *Anfängliches Fragen, Studien zur frühen griechischen Philosophie*, Göttingen 1968); D. O'Brien, *Empedocles' Cosmic Cycle* (Cambridge 1969). For a synoptic assessment of these studies, cf. A.A. Long, 'Empedocles' Cosmic Cycle in the 'Sixties', in A.P.D. Mourelatos (ed.), *The Pre-Socratics* (Garden City, NY, 1974) 397-425.

³ In a forthcoming paper, 'Empedocles' Double Zoogony', I sketch a reappraisal of the cosmic cycle inspired by the data of the new fragments.

for the fact that this paper will have an autobiographical element, but I hope it will soon become clear why this cannot be avoided.

In Book 1, Lucretius criticises Empedocles' theory of the four elements, but in the same breath concedes that Empedocles did make some great discoveries (*praeclara reperta*, 1.736). An important question to pursue is: what discoveries? I remain resistant to one particular proposal,⁴ that the Empedoclean features in Lucretius' proem signal his recognition of Empedocles as a major philosophical forerunner. In response, I have argued that the debt acknowledged here is a literary one, to the founder of his genre, and that Lucretius would not want to allow Empedocles much credit on the two central *philosophical* issues that have been suggested as common ground: the need to posit enduring elements, and the denial of natural teleology. Instead, I have suggested that it is Empedocles' physical explanations of individual celestial phenomena that are more likely to typify the kind of 'discoveries' for which Lucretius wishes to allow him credit.

However, while I still see no evidence that Lucretius was ready to recognise in Empedocles a systematic opponent of teleology, it has always been plausible that one particular Empedoclean thesis, the one on the basis of which Aristotle had interpreted Empedocles as an opponent of the teleological view of nature, constitutes a point on which Lucretius ought to have recognised some degree of philosophical kinship. I am referring to Empedocles' theory of the origin of species by natural selection. What has been lacking hitherto is the textual evidence to support the conjecture that Lucretius acknowledged, and was influenced by, this philosophical kinship. In the light of the new fragments, I hope to make some progress in the matter, albeit by a rather roundabout route. By the end of the paper, I hope to have securely identified one passage where Lucretius can be seen to acknowledge philosophical common ground with Empedocles. His acknowledgement will be accompanied by an equally careful and nuanced distancing of himself from other features of Empedocles' zoogonic theory, and in no way will the outcome lend any new credence to the hypothesis that Lucretius' tribute to Empedocles is meant to emphasise philosophical kinship. But the opportunity to observe Lucretius' cautiously negotiated rapprochement with Empedocles over the specific issue of zoogony will provide a model which, it may be hoped, will admit of extension to other areas of their thought.

Unfortunately the reconstruction of Empedocles' zoogony remains an interpretative battleground. We know from Aetius that he distinguished four stages in the emergence of animal life.⁵ There is no consensus as to whether these four stages all represent the emergence of animal life in the world we still today inhabit, or whether two belong to this world, two to a diametrically opposed world

⁴ David Furley, 'Variations on Themes from Empedocles in Lucretius' proem', *BICS* 17 (1970) 55-64; reprinted in Furley, *Cosmic Problems* (Cambridge 1989) 206-22.

⁵ Empedocles A72 = Aetius 5.19.5: Ἐμπεδοκλῆς τὰς πρώτας γενέσεις τῶν ζώων καὶ φυτῶν μηδαμῶς ὀλοκλήρους γενέσθαι, ἀσυμφυέσι δὲ τοῖς μορίοις διεζευγμένας, τὰς δὲ δευτέρας συμφυομένων τῶν μερῶν εἰδωλοφανεῖς, τὰς δὲ τρίτας τῶν ὀλοφυῶν, τὰς δὲ τετάρτας οὐκέτι ἐκ τῶν ὁμοίων οἶον ἐκ γῆς καὶ ὕδατος, ἀλλὰ δι' ἀλλήλων ἤδη, τοῖς μὲν πυκνωθείσης [τοῖς δὲ] καὶ τοῖς ζώοις τῆς τροφῆς, τοῖς δὲ καὶ τῆς εὐμορφίας τῶν γυναικῶν ἐπερεθισμὸν τοῦ σπερματικοῦ κινήματος ἐμποησάσης.

which many interpreters posit in the other half of the cosmic cycle. For my part—although I cannot argue it here⁶—I am convinced that all four represent the origin of the species alive today, but that in Empedocles’ view there have been two parallel processes of zoogony leading to those species, one governed by Love, the other by Strife. Be that as it may, on the basis of Aetius’ report it seems justified to reconstruct at least the following pair of steps within the process. First, separate limbs and other body parts were created. An example of this, presumably, is B84 on Aphrodite’s creation of the eye, analogously to a craftsman constructing a lantern for a preconceived purpose. At this first stage, then, creative design rather than Darwinian accident is clearly in control. According to Empedocles, these separated limbs—including even independent eyes—actually wandered around on their own (B57: ‘Thus many neckless heads sprang up, bare arms wandered bereft of shoulders, and eyes wandered alone, destitute of faces’: ἦι πολλὰ μὲν κόρσαι ἀναύχενες ἐβλάστησαν,/ γυμνοὶ δ’ ἐπλάζοντο βραχίονες εὐνιδες ὤμων,/ ὄμματά τ’ οἴ(α) ἐπλανᾶτο πενητεύοντα μετώπων). His term for these isolated limbs is reported to have been μουννομελῆ,⁷ ‘single-limbed’, an expression which reminds us that they were not parts severed from previously complex beings, but each at this stage functioning in its own right as an independent ‘single-limbed’ creature, a simple organism with just one specialisation.

Only in the second stage were the limbs combined into composite beings, described as εἰδωλοφανεῖς, ‘apparition-like’ (in this hapax legomenon Aetius is unmistakably preserving another of Empedocles’ own epithets). These fantasy monsters must be the weird beings mocked by Aristotle and his successors, who report that, according to Empedocles, most of them proved non-viable and perished, but a few were able to survive and, eventually, to reproduce their kind. Contrary to the most favoured view, I am convinced that this process of natural selection describes the origin of animal species as they exist in our world today, and not as they existed in some hypothetical counter-world located in the opposite part of the cycle. This is virtually assured by the rarely noticed remark of Aristotle (*Ph.* 2.8, 198b31-2) that, according to Empedocles, the same selective mechanism continues to operate to this day. That the selective mechanism was common in the distant but recorded past was no doubt assured by the myths of now extinct creatures such as centaurs and chimaeras.⁸ That it still occasionally happens today was presumably confirmed, in Empedocles’ eyes, by the reports of monstrous births that circulated in the ancient world.⁹

It was already recognised in antiquity that the Epicureans shared some common ground with Empedocles on this issue.¹⁰ And certainly, as Lucretius

⁶ It is the main topic of my forthcoming paper, see n.3 above.

⁷ B58 = Simplicius *In DC* 587.18: ἐν ταύτῃ οὖν τῇ καταστάσει ‘μουννομελῆ’ ἔτι τὰ γυῖα ἀπὸ τῆς τοῦ Νείκου διακρίσεως ὄντα ἐπλανᾶτο τῆς πρὸς ἄλληλα μίξεως ἐπιέμενα.

⁸ See M.R. Wright, *Empedocles: the Extant Fragments* (New Haven and London 1981) 213-14, where mythological correlates for all the creatures described in B61 are suggested.

⁹ Ar. *GA* 4.3, 769b13-16 reports a popular belief that birth defects are freak cross-species hybridisations.

¹⁰ Simplicius *In Ar. Phys.* 371.33-372.14 (= LS 13J): ὡσπερ Ἐμπεδοκλῆς κατὰ τὴν τῆς φιλίας ἀρχὴν φησι γενέσθαι ὡς ἔτυχε μέρη πρῶτον τῶν ζώων, οἷον κεφαλὰς καὶ χεῖρας καὶ

himself attests in Book 5, the Epicureans did posit a process of the survival of the fittest which resembled Empedocles' second stage. Did Lucretius himself acknowledge that common ground?

Here it is advisable to tread carefully. It is striking that Lucretius does not closely echo Empedocles B61, with its famous reference to weird hybrids:

πολλὰ μὲν ἀμφιπρόσωπα καὶ ἀμφίστερνα φύεσθαι,
 βουγενῆ ἀνδρόπρωρα, τὰ δ' ἔμπαλιν ἐξανατέλλειν
 ἀνδροφυῆ βούκρανα, μεμειγμένα τῆι μὲν ἀπ' ἀνδρῶν
 τῆι δὲ γυναικοφυῆ σκιεροῖς ἠσκημένα γυίοις.

Many double-faced and double-chested creatures were born, ox-progeny man-faced sprang up, others conversely man-natured ox-headed, mixed here from men, here woman-natured, wrought with shadowy limbs.

Since we know from Plutarch (*Col.* 1123B) that the hypothesised hybrid creatures were derided by the Epicureans, as well as by the Aristotelians, there is good reason to guess that Epicurus had already indicated his retreat from Empedocles' picture of such cross-species freaks, and that Lucretius was ready to follow suit. That fits well with the fact that, immediately after his evolutionary account, Lucretius devotes a substantial passage to arguing that there can never have been cross-species hybrids such as centaurs and chimaeras. What Lucretius does implicitly posit is ineptly constructed creatures *within* a single kind, which perished or failed to propagate while the well-constructed members of that same kind survived and multiplied. He is thus painting a picture of the non-survivors which, far from being fantastic, more or less mirrors the kind of congenital defects that continue today to mark individual offspring which either fail to survive or cannot go on to reproduce.

So far as B61 is concerned, Lucretius' one significant overlap with it, as we shall now see, is in his description of androgynous creatures, and even here there is no direct linguistic echo of Empedocles' own account of androgyny in lines 3-4 of B61.¹¹

πόδας, ἔπειτα συνιέναι ταῦτα βουγενῆ ἀνδρόπρωρα, τὰ δ' ἔμπαλιν ἐξανατέλλειν ἄνδρογενῆ δηλονότι βούπρωρα, τουτέστιν ἐκ βοῶς καὶ ἀνθρώπου. καὶ ὅσα μὲν οὕτω συνέστη ἀλλήλοις ὥστε δύνασθαι τυχεῖν σωτηρίας, ἐγένετο ζῶα καὶ ἔμεινεν διὰ τὸ ἀλλήλοις ἐκπληροῦν τὴν χρείαν, τοὺς μὲν ὀδόντας τέμνοντάς τε καὶ λεαίνοντας τὴν τροφήν, τὴν δὲ γαστέρα πέττουσαν, τὸ δὲ ἦπαρ ἐξαιματοῦν. καὶ ἡ μὲν τοῦ ἀνθρώπου κεφαλὴ τῷ ἀνθρωπίνῳ σώματι συνελθοῦσα σφύζεσθαι ποιεῖ τὸ ὄλον, τῷ δὲ τοῦ βοῶς οὐ συναρμόζει καὶ διόλλυται. ὅσα γὰρ μὴ κατὰ τὸν οἰκεῖον συνῆλθε λόγον, ἐφθάρη. τὸν αὐτὸν δὲ τρόπον καὶ νῦν πάντα συμβαίνει. ταύτης δοκοῦσι τῆς δόξης τῶν μὲν ἀρχαίων φυσικῶν ὅσοι τὴν ὑλικὴν ἀνάγκην αἰτίαν εἶναι τῶν γινομένων φασί, τῶν δὲ ὑστέρων οἱ Ἐπικούρειοι. ἡ δὲ πλάνη γέγονεν αὐτοῖς, ὥς φησιν Ἀλέξανδρος, ἀπὸ τοῦ ἠγεῖσθαι πάντα τὰ ἔνεκά του γινόμενα κατὰ προαίρεσιν γίνεσθαι καὶ λογισμὸν, τὰ δὲ φύσει μὴ οὕτως ὄραν γινόμενα.

¹¹ Below we will meet, in the new fragments, Empedocles' reference to the 'the twin progeny of human beings', probably reflecting his typical way of referring to humans as 'men and women' (although in my forthcoming paper, n.3 above, I consider an alternative interpretation). One might have thought 'twin progeny' in this sense no more suitable to humans than to any other sexually differentiated animals. A plausible solution, which I owe to Myles Burnyeat, is to hypothesise that Empedocles, like Plato in the *Timaeus*, regards women as representing a lower rung of the transmigratory ladder. If that is so, we can see why in B61 androgyny appears in the context of

Lucretius' own equivalent creatures are to be found at 5.837-44:

multaque tum tellus etiam portenta creare
 conatast mira facie membrisque coorta,
 androgynem, interutras nec utrumque utrimque remotum,
 orba pedum partim, manuum viduata vicissim, 840
 muta sine ore etiam, sine voltu caeca reperta,
 vinctaque membrorum per totum corpus adhaesu,
 nec facere ut possent quicquam nec cedere quoquam
 nec vitare malum nec sumere quod volet usus.

And at that time the earth also tried to create many monsters, with amazing appearance and limbs—androgynous, lying between the two, and neither one of them, different from either, sometimes lacking feet, sometimes deprived of hands, or again dumb for lack of a mouth, or found to be without eyes and blind; or with their limbs stuck together throughout their body so that they could neither do anything nor go anywhere nor avoid harm nor get what they needed.

It has been claimed that this is based on Empedocles B57.¹² I confess that I find the resemblance slight at best. But, more important, if Lucretius did have B57 in mind when composing these lines, he was also maintaining a studied intellectual distance. Empedocles had been describing the utterly weird spectacle, in his first zoogonic stage, of isolated limbs roaming the earth. Lucretius, in contrast, is most emphatic that what first appeared out of the ground were already *composite* creatures, albeit often non-viable ones. The cacophonous linguistic and metrical jumble of line 839 ('androgynem, interutrasque nec utrum, utrimque remotum') skilfully reinforces the inept nature of these combinations. So if Lucretius was thinking of Empedocles B57 when writing these lines, he was also consciously correcting Empedocles' story.¹³

We are still no nearer to finding Lucretius exploiting common ground between himself and Empedocles. Nevertheless, I hope by the end of this paper to

cross-species malformation, in a way it would never do for Lucretius. At 5.839 Lucretius simply includes it among a series of physical handicaps which prevented survival, or in this case (owing to inappropriate sex-differentiation) breeding.

¹² Furley (n.4) 61 with n.15.

¹³ J. Bollack (n.2) IV 420-1 suggests that in B60 the Empedoclean phrase εἰλίποδ' ἀκριτόχειρα (although Bollack himself prints it all as a single word, like an Aristophanic compound) describes the same kind of physical handicap as at Lucretius 5.842-3, 'vinctaque membrorum per totum corpus adhaesu/ nec facere ut possent quicquam nec cedere quoquam', I find it much likelier that once again we have here hybrids of two species: one kind of feet, another kind of hands. The first adjective was well known to Homer's readers as a stock epithet of oxen, described by their shuffling feet (cf. W.K.C. Guthrie, *A History of Greek Philosophy* II (Cambridge 1969) 203 n.4), and therefore will not easily have been understood as indicating any kind of deformity. We can infer that the second adjective was meant to designate some other species, described by its 'undivided (or 'dense') hands'. My guess would be bears. The hybrids in question have the feet (at least the hind feet) of an ox, but the front paws of a bear. (But even if we suppose that Lucretius nevertheless understood the expression as Bollack does, he says nothing to recall the Empedoclean expression at 5.842-3, so there would still be no question of Lucretius *acknowledging* an intellectual kinship here.) Cf. the useful discussion of ἀκριτόχειρα in Laura Gemelli Marciano, *Le metamorfosi della tradizione: mutamenti de significato e neologismi nel Peri physeos di Empedocle* (Bari 1988) 108-10, who however favours 'with innumerable hands'.

have found him doing just that. And it is the new fragments that may help us feel our way towards such a goal. What we need, if we are to make progress, are Empedoclean fingerprints: linguistic or other clues which can enable us to recognise when Lucretius may be working with some specific Empedoclean text in mind. I am increasingly hopeful that I have managed to identify one such fingerprint. In *Lucretius and the Transformation of Greek Wisdom* (24-5), I reworked an earlier discussion¹⁴ of the astonishingly high Empedoclean content of Lucretius' opening lines, where, as Furley in particular has stressed, we find not only Empedocles' four elements but also his two motive forces Love and Strife (in the guise of Venus and Mars). This time, however, I noticed a further Empedoclean feature, one which is clearly recognisable as literary or linguistic, rather than doctrinal. It occurs in 1.3, *quae mare navigerum, quae terras frugiferentis* ... This pairing of two compound adjectives in the same line is almost unique in Lucretius' entire poem. (I suppose that the exotic ring of compound adjectives in the Latin language made a pile-up of them hard to take, analogously perhaps to the jarring effect on us of a mixed metaphor.)¹⁵ The pairing of compound adjectives is, on the other hand, a ubiquitous feature of Empedocles' poetry.¹⁶ Sometimes they even turn up there in larger numbers.

The realisation that the compound adjectives in line 3 are so emphatically Empedoclean encouraged my speculation that the opening hymn to Venus is, as a whole, directly echoing a corresponding passage of Empedocles—sadly, if so, a lost one. I do not intend to reopen the case for that speculation here. Instead I want to take up an observation which I made in a footnote,¹⁷ that the nearest Lucretius comes elsewhere to the same accumulation of compound adjectives is in one passage of Book 2 and one of Book 5, but that there the adjectives in question are two lines apart, both times qualifying items which occur respectively first and third in a list. I confess that my motive for mentioning these two passages was to emphasise the uniqueness of 1.3, rather than its resemblance to them. But the time has now come to examine the two passages in their own right. It will also be important to add a line that I had overlooked, 5.789, which like 1.3 contains a pair of compound adjectives.¹⁸

The first passage is 2.1081-3. Lucretius is arguing that our world cannot be the only one in the universe, and his premise here is that nothing else in our experience occurs as a one-off. Think especially of animals, he says (1081-3):

huc accedit ut in summa res nulla sit una,
 unica quae gignatur et unica solaque crescat,
 quin aliquoius siet saecli permultaque eodem
 sint genere. in primis animalibus indice mente 1080
invenies sic montivagum genus esse ferarum,

¹⁴ 'The Proems of Empedocles and Lucretius', *GRBS* 30 (1989) 269-96.

¹⁵ I have found no such pairings in the fragments of Ennius, the major Latin poetical influence on Lucretius, apart from the highly idiosyncratic 'bellipotentis sunt magis quam sapientipotentis' (198 Skutsch).

¹⁶ See the full study in Gemelli Marciano (n.13) ch. 2.

¹⁷ *Lucretius and the Transformation of Greek Wisdom* 25, n. 92.

¹⁸ I am grateful to Gordon Campbell for bringing this line to my attention.

**sic hominum geminam prolem, sic denique mutas
squamigerum pecudes et corpora cuncta volantum.**

qua propter caelum simili ratione fatendumst
terramque et solem, lunam mare cetera quae sunt, 1085
non esse unica, sed numero magis innumerali;
quando quidem vitae depactus terminus alte
tam manet haec et tam nativo corpore constant
quam genus omne, quod his generatimst rebus abundans.

... Thus you will find the mountain-wandering race of beasts to be, thus the twin progeny of mankind, thus too the silent flocks of scale-bearers and all the bodies of those that fly...

Now compare, among the new fragments of Empedocles, a(ii) 26-8, which we know also to be lines 296-8 of the poem:

τοῦτο μὲν [ἄν] θηρῶν ὀριπλάγκτων ἀγ[ρότερ' εἶδη⁹],
τοῦτο δ' ἄν' ἀ[νθρώ]πων δίδυμον φύμα, [τοῦτο δ' ἄν' ἀγρῶν⁹]
ρίζοφόρων γέννημα καὶ ἀμπελοβά[μονα βότρυν⁹]

This (you will see) among the wild species of mountain-wandering beasts; this among the twin progeny of mankind; this among the offspring of the root-bearing fields and the vine-climbing grape-cluster.

The new editors, Martin and Primavesi, spotted in these lines the original which Lucretius was imitating. In fact, for the first line and a half to call it 'imitation' would be an understatement: it is a translation. δίδυμον φύμα is plausibly taken by Martin and Primavesi to refer to 'men and women', given that elsewhere Empedocles standardly refers to the human race as 'men and women' (a(i) 9, B21.10, 23.6, 62.1, 112.8).¹⁹ Lucretius' translation of this, *geminam prolem*, is much less readily intelligible from within the resources of his own poem—so much so that a textual corruption has often been suspected, with the reading sometimes emended to Marullus' *genitam*. We can now, instead, recognise it as an Empedoclean import, its intelligibility depending on that external literary allusion.

Empedocles' (presumably) triple use of τοῦτο μὲν ... τοῦτο δὲ ... τοῦτο δὲ is accurately picked up by Lucretius' triple *sic*. Incidentally, since Lucretius's *sic* is expanded with *invenies* to mean 'thus you will find', he apparently understood Empedocles' τοῦτο in context likewise, not merely as an adverbial intensifier of the μὲν and the δὲ (thus Martin/Primavesi, pp. 166-8 and 230), but as the subject of a suppressed verb, meaning—as I have translated it—'This (you will see) in ...' (cf. B76, where τοῦτο μὲν ἐν κόγχαισι ... is glossed by ἐνθ' ὄψει ...). Whether Lucretius is right is of course another matter, but his evidence is of key importance.

As for ὀριπλάγκτος, 'mountain-wandering', its only other comparably early attestation is in Aristophanes' *Thesmophoriazousae* (326), which postdates Empedocles by decades, and where it is applied to nymphs, not beasts. As often in his use of compound adjectives, Empedocles may justly be suspected of

¹⁹ See further, n.11 above.

introducing his own coinage. Likewise in Latin literature Lucretius is the earliest attested user of the corresponding *montivagus*, which is likely enough to be, similarly, his own invention. The present passage offers one of the word's three occurrences in his poem. In view of the existence of a direct Empedoclean model, an obvious inference (already drawn by Martin and Primavesi) is that *montivagus* is a pointedly Empedoclean neologism on his part. It is therefore worth mentioning in passing (in accordance with a further helpful observation of Martin and Primavesi) that the other two lines (1.404, 2.597) in which Lucretius uses the same adjective, *montivagus*, occur in passages which look themselves only too likely to be of Empedoclean inspiration.²⁰

After the first line and a half, Lucretius and Empedocles go their separate ways. Where Empedocles goes on to add plants to his list, Lucretius carries on with further animal kinds. Martin and Primavesi rightly acknowledge the possibility that Lucretius is following, not the actual passage we now have from Empedocles' prologue, but a partly identical passage from elsewhere in Empedocles' poem. I am sure that this is correct, and it finds support in my proposed Empedoclean fingerprint-test. For Lucretius to insert two compound adjectives into a single list is such a rarity as to indicate that he is here echoing a specific Empedoclean original. If so, that original surely contained not only Lucretius' mountain-wandering beasts but also his 'silent flocks of scale-bearers' ('*mutas/ squamigerum pecudes*', 1083-4). In Empedocles, catalogues of the various kinds of living being are a recurrent motif, and in its full form his list does indeed include fish and birds, alongside beasts, humans, gods and trees (e.g. B21.11 οἰωνοί τε καὶ ὕδατοθρέμμορες ἰχθῦς; likewise at B23.7, in the accusative). His extant fragments do not offer any epithet for fish with the meaning 'scale-bearing', but one must make due allowance for his inventiveness in this department: even the new passage, at line 298, supplies us with a previously unattested compound adjective, apparently ἄμπελοβάμων, 'vine-climbing'. As the hypothesised original of Lucretius' *squamiger*, a compound of λεπιδο- is entirely imaginable (the non-compound λεπιδοτός although attested, seems too prosaic). Incidentally, the same compound adjective *squamiger* occurs in at least two other Lucretian passages which could well be of Empedoclean inspiration.²¹

On the one hand, then, Lucretius 2.1081-3 is demonstrably based on Empedocles, and thus confirms that the Empedoclean fingerprint test really does

²⁰ It now looks highly plausible that a much-cited passage of Empedocles (B101) on dogs following the scent of their prey came from a longer passage which was the model for *DRN* 1.398-417, in which Lucretius asks Memmius to follow up the preceding arguments with others of his own, like *canes ... montivagae* (404) following the scent of a wild beast. Likewise 2.589-99, which includes the reference to the *montivago generi ... ferrarum* at 597, hymns the earth's all-providing nature, and the Sicilian reference constituted by the inclusion of Aetna's fire among her gifts supports the hypothesis of an Empedoclean origin.

²¹ One is 1.372, for which cf. Empedocles A35: Empedocles would thus be Lucretius' source for a doctrine which he strongly denounces, the heretical theory of motion by *antiperistasis*. The other, 2.343, is already noted by Martin and Primavesi, 186: it is another occurrence in a list of animal species, and may have no greater significance for an actual philosophical debt to Empedocles than we will find in 2.1081-3, or (immediately below) in 5.788-91.

work. On the other hand, lines 296-8 of Empedocles' first book are, despite a partial overlap, not the actual original that Lucretius was following. Given Empedocles' fondness for repetition (amply confirmed by the new fragments), the most plausible hypothesis is that Lucretius is imitating lines of his, from an unknown location in his poem, which partially coincided with those in a(ii) 26-8.

If I am right, although the new fragments prove that Lucretius had an Empedoclean original in these lines, they cannot help us determine the context of that original. This severely reduces our chances of answering the question whether Lucretius' imitation incorporates and acknowledges any kind of philosophical debt to Empedocles. Nevertheless, it is not at all obvious how it could. Empedocles held that there is only one world at a time, and therefore cannot have been a precursor of the actual argument Lucretius is deploying for the limitless multiplicity of worlds. It is just conceivable that in the original context Empedocles argued from the never-ceasing reproduction of animals to the endless succession of future worlds, albeit only one world at a time, but if so the analogy was a poor one, and a reference to the *twin* progeny of man was a particularly unfortunate analogue for a succession of single worlds. Disappointingly, it is easier to believe that the Empedoclean passage was just a recurrence to his standard list of living beings, probably, as elsewhere, in connection with the origins and reproduction of life.

In the light of this, we may be obliged to adopt an equally weak explanation of another passage containing a pair of compound adjectives, 5.789. Explaining why the first life forms put out by the young earth were grasses and trees, Lucretius compares the way that feathers, hair and bristles are the first things to grow from young animals and birds (5.788-91):

ut pluma atque pili primum saetaeque creantur
quadripedum membris et corpore *pennipotentum*,
 sic nova tum tellus herbas virgultaque primum
 sustulit.²²

As feathers, hair and bristles are created from the limbs of four-footed beings and the bodies of the wing-powering ones, so too at that time did the new earth bring up grasses and saplings.

Are we in Empedoclean territory? Although Empedocles famously (B82) proposed a functional equivalence between hair, leaves, feathers and scales, thus crossing the animal-plant divide, these are all on the same biological level, and there is no evidence that he reapplied that same analogy at a cosmic level to the sprouting of whole plants from the earth itself; on the contrary there is at least some evidence that he used a different zoological analogy for plants' relation to the earth, comparing them to embryos still attached to their mother's womb. It would therefore be risky to conjecture that the analogy in the above lines is borrowed from Empedocles. The duller but safer guess is that as in the previous passage we examined it is simply the list of animal kinds that echoes an Empedoclean original. We do not in this case know the original Empedoclean line

²² Contrary to the received punctuation and interpretation, I would place a full stop after 'sustulit' and take the analogy to end there.

that is in all probability being echoed, but τετράπους, ‘four-footed’, lends itself to hexameters, and as regards ‘wing-’ compounds, at least πτεροβάμων, ‘wing-travelling’, is an attested Empedoclean epithet of birds (B20.7).²³

The results so far may be unexciting, but we are not beaten yet. For one thing, we have gained something from dwelling on the foregoing passages. The first of them has, if nothing else, proved beyond dispute that paired compound adjectives in Lucretius really can point to an Empedoclean original. Moreover, we still have left the last of the passages which I identified as bearing that same Empedoclean fingerprint. This is 5.864-6. Very promisingly indeed, these lines occur within Lucretius’ proto-Darwinian account of the survival of the fittest, exactly where we should be hoping to find some serious Empedoclean input. Here he is talking, not of the deformed creatures that became almost instantly extinct, but of the those few among them which did survive, in this case thanks to their usefulness to mankind (864-7):

at *levisomna* canum fido cum pectore corda,
et genus omne quod est veterino semine partum,
lanigeraeque simul pecudes et bucera saecla,
omnia sunt hominum tutelae tradita, Memmi.

But as for the light-sleeping (*levisomna*) minds of dogs, with their faithful heart, and every kind born of the seed of beasts of burden, and along with them the wool-bearing (*lanigerae*) flocks and the horned tribes, these have all been entrusted to the care of the human race, Memmius.

I do not want to dwell for long on the actual Greek pedigrees of the two compound adjectives. The wool-bearing flocks may easily, in a hypothesised Empedoclean original, have been the Homeric εἰροπόκων ὄϊων or εἰροπόκοις ὄϊεσσιν (‘woolly-fleeced sheep’). I have not been able to identify an attested Greek equivalent for Lucretius’ hapax *levisomna*, but one could easily enough have been coined by Empedocles (e.g. κυνῶν ἐλαφρύπνων?). (Incidentally, the Greek derivative *bucera*, ‘horned’, in 866 may also reflect a Greek original, for example the genitive form βουκέρω εἶδους.) It is worth noting that neither *levisomna* nor *lanigerae* is here introduced merely on the model of Homeric stock epithets, but that each plays an explanatory role by picking out the feature for which the species in question commended itself to mankind. This too is perfectly coherent with Empedoclean usage, which, although it regularly uses compound adjectives as stock epithets,²⁴ does on occasion give them a similarly explanatory

²³ A question helpfully pressed on me by Stephen Harrison is whether there is an adequate match between Empedocles and Lucretius in the way they use these compound epithets of living things. In Lucretius they are most often used periphrastically, as kennings, while in Empedocles they most often accompany and qualify an explicit naming of the creatures in question. This is, I think, a genuine difference of tendency between the two, although (a) where for once we can make a direct comparison between original and imitation, as at 2.1082, ‘montivagum genus ... ferarum’, we find a near-perfect match, and (b) as Dirk Obbink has pointed out to me, Empedocles B76.1, although of disputed construal, may contain a kenning (perhaps more plausibly so if one follows the emended reading in DK).

²⁴ Plutarch, *Q. conv.* 683E in fact considers Empedocles’ epithets attempts to capture things’ essences or powers, and never merely decorative.

role. B61, with its βουγενῆ ἀνδρόπρωρα, is a closely matching example: the pair of adjectives sums up the cause of these creatures' failure to survive and multiply. A final feature which may conceivably be Empedoclean is the sudden vocative address to Memmius, the first in some 700 lines. Does this perhaps echo an address by Empedocles to his own dedicatee Pausanias at the equivalent point?²⁵

But let me hasten on to the doctrinal content of the Empedoclean and Lucretian passages. This time we have in Lucretius not only, in the twin compound adjectives, the traces of an Empedoclean original, but also a theme, the survival of the fittest, which we know to have been common to the two poets. Although Aristotle has ensured that Empedocles' zoogonic theory is best remembered for its hybrid freaks—the 'ox-progeny man-faced' (βουγενῆ ἀνδρόπρωρα, B61)—we know from him that Empedocles also spoke of those randomly compounded creatures which could and did survive. If Lucretius has here, in his own zoogony, finally chosen to imitate an Empedoclean original, there is every probability that he is this time acknowledging a substantive doctrinal agreement with his revered poetic forerunner. And at the same time we incidentally acquire indirect evidence that Empedocles' own full account of the zoogony will have included the theme of certain species' survival through their usefulness to man.²⁶ The twin compound adjectives in Lucretius' account are clear evidence that Empedocles, before him, had described just the same process of selection.

The very provisional upshot is as follows. In zoogony the Epicureans, Lucretius included, not only dismissed Empedocles' first stage, in which the world was populated by isolated limbs and organs, but also apparently maintained a studied distance between themselves and Empedocles regarding one part of the second stage, the part which concerned the *non*-survival of the *un*fittest. Empedocles had here introduced all kinds of cross-breed fantasy creatures, thereby making his theory a laughing stock with Aristotle and his followers. Epicurus, who took very seriously the criticisms of early physicists catalogued by one particular follower of Aristotle, Theophrastus,²⁷ seems to have followed suit in rejecting this part of Empedocles' theory. And Lucretius, in turn following Epicurus' lead, prefers implicitly to limit the failures to ineptly constructed creatures within a single animal kind, likewise emphatically steering clear of Empedocles' extravagant minotaur-like hybrids.

When it comes to the survival of the fittest on the other hand (as distinct from the non-survival of the unfittest), the Epicurean and Empedoclean accounts converge. This is hardly surprising, because the nature of the survivors was, obviously enough, determined with hindsight by the actual range of present-day species, leaving much less room for disagreement. Thus it proves to be on this topic, the survival of the fittest, that Lucretius in Book 5 finds in Empedocles'

²⁵ The same suggestion is made independently by Campbell (n.28), *ad* Lucretius 5.867.

²⁶ All the species listed have a usefulness to man independently of slaughter for meat-eating, which Empedocles regarded as a sinful perversion of man's original way of life (B128). This too coheres with an Empedoclean origin, which would have been harder to postulate if the list had included, for example, pigs.

²⁷ I argue this in *Lucretius and the Transformation of Greek Wisdom* ch. 6.

physical poem one of the *praeclara reperta* on which he has already complimented his illustrious forerunner in Book 1. And it is a meeting of minds which he apparently celebrates by imitating, perhaps even translating, the lines in which Empedocles himself portrayed the fitness of the fittest and their consequent capacity to survive.²⁸

²⁸ My thanks, for comments on earlier versions, to participants in meetings in Oxford (October 1999) and Paris (May 2000), at the Leeds International Latin Seminar (March 2001), and at the University of Virginia (November 2001); also to Gordon Campbell, Simon Trépanier and Myrto Gkarani for correspondence. Although my main contentions remain as they were in the original version of this paper, I have learnt much from discussions with Gordon Campbell of his Oxford D.Phil. thesis in January 2001 and of the revised version which is shortly to appear in print as *Lucretius on Creation and Evolution* (Oxford).