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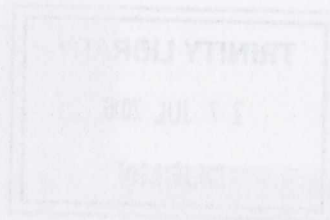
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SIC HOMINUM GENUS EST:
ANIMALS AND THE CONTINUUM OF LIFE
IN THE *DE RERUM NATURA* OF LUCRETIUS

by

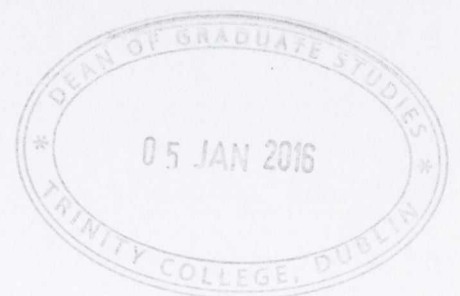
PAMELA ZINN



A thesis submitted for the degree of Doctor in Philosophy

University of Dublin
Trinity College

2015



History PhD
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DECLARATION

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SUMMARY

The objective of this thesis is to analyze the place of animals in Lucretius' account of Epicurean philosophy of mind. It uses philosophy of mind to investigate his representation of animals in *De rerum natura* and the theoretical basis of his views; conversely, it uses his engagement with animals in the exposition of such theories toward a reevaluation of the theories themselves. The thesis approaches *De rerum natura* both sequentially and synchronically, integrating literary and philosophical analysis. Treating causation as a process, it rejoins the analysis of physiological mechanisms to the study of psychological phenomena. It thus reconstructs Lucretius' understanding of the so-called faculties of mind across all living creatures, as well as the faculties' ontology, aetiology, and relationships. It places particular emphasis on how Lucretius uses ancient atomic physics to explain the continuities and differences between humans and other animals.

The thesis begins by introducing its central questions, methodology, and relationship to various scholarly debates. The first chapter treats the physical and metaphysical relationships between all things; it also shows where the boundary between living beings and non-living things lies. The second and third chapters analyze the perceptive faculties of living creatures, demonstrating that this is a broader category than is often supposed and that animals possess all of these in the same way that humans do. The epilogue to chapters two and three synthesizes their overall theory and explores some of its epistemological consequences. The fourth chapter investigates what defines the particular nature of a species and how this affects its strategies for survival. The fifth chapter analyzes the aspects of one's nature over which - it argues - each creature has some control and for which it is thus responsible. The thesis concludes by developing the implications of its results, particularly for the role of animals in Lucretius' ethical and didactic program.

In different ways, the analysis challenges a number of dichotomies which are often assumed of or applied to *De rerum natura*, including: mind and soul, psychological and physiological, perception and feeling, thinking and feeling, rational and irrational, human and animal, argument and imagery, and philosophy and poetry.

On this basis the thesis argues that Lucretius believed that animals possess the same faculties as humans, that these faculties are emergent and operate according to effectively the same underlying structures and mechanisms regardless of species, and that living creatures, not humans, are Lucretius' true category of enquiry. This continuum of life is

significant for our understanding of Lucretius' unique contribution to the debate on the kinship of humans and animals. It also has important implications for our understanding of the poem as a whole and for the function of animals within it. The thesis thus contributes to our knowledge of the representation of animals in *De rerum natura*, Lucretius' interpretation of Epicurean philosophy of mind, and Lucretius' place in the history of human-animal relations in ancient Greco-Roman thought.

For my family
and
in memory of my grandfather,
Fred Sacher
(Vienna, 1920 - New York, 2004)

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Dublin, 2015

Pamela Zinn

ABBREVIATIONS

These abbreviations refer to the following, unless otherwise stated:

Arr.² = Arrighetti 1973

CErc. = *Cronache Ercolanesi*

Diog. Oen. fr. Smith = Diogenes of Oenoanda, in Smith 1993a

DK = Diels-Kranz fragment, in Diels and Kranz 1985

D.L. = Diogenes Laertius, in Hicks 1931

DRN = *De rerum natura*

Ep. Hdt. = D.L. 10.34-83

Ep. Pyth. = D.L. 10.83-116

Ep. Men. = D.L. 10.121-135

KD = D.L. 10.139-54

LSJ = H. G. Liddell, R. Scott, R. McKenzie, P. G. W. Glare. 1996. *A Greek-English Lexicon*. Oxford. 9th revised edition.

OLD = P. G. W. Glare (ed.) 2012. *Oxford Latin Dictionary*. Oxford. 2nd revised edition. 2 vols.

PHerc. = Herculanean Papyrus

SV = *Sententiae Vaticanae*, in Bailey 1926: 106-19

Usener = Usener fragment, in Usener 1877

Abbreviations of classical authors and works generally follow the conventions of *LSJ* and *OLD*; editions are given in the bibliography unless different from above or relevant. Usually Latin titles of ancient works are retained and Greek ones translated.

A NOTE ON THE TEXT

The Latin text of *DRN* follows that of Rouse and Smith's 1992 edition unless otherwise noted. Other editions of the whole and of individual books (whole and partial), as well as commentaries, have been consulted throughout. Translations are my own unless otherwise noted.

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INTRODUCTION

In his epic poem, *De rerum natura*, Lucretius uses ancient atomic physics to address questions which continue to fascinate us to this day:¹ Are there fundamental differences between humans and animals? Can animals think, feel, and reason as we do, or do they act through instinct alone? What are life and these abilities, really, and how do they work beneath the surface? What are we born with and what develops? Do species evolve? This study explores Lucretius' answer to such questions. It focuses on the place of animals in his account of Epicurean philosophy of mind, with particular emphasis on the continuities and differences between humans and animals.

Traditional approaches to his poem have concentrated on the human being and generally treated animals either as mere epic imagery, digressions, or little more than exempla and comparanda for largely anthropocentric readings.² Schrijvers, for example, considers them to be '*specula naturae*' or a mirror of natural conditioning, consistent with Dierauer's interpretation of their employment in Epicurean philosophy more generally.³ Such approaches fail to explain why Lucretius is far more generous to animals in various respects than most ancient thinkers and even - insofar as the surviving evidence suggests - most Epicureans. Sorabji and Newmyer, for example, note that Lucretius is one of the only ancient thinkers to consistently attribute to animals a *mens*, *voluntas*, and dreams, among other faculties.⁴ Konstan, on the other hand, insists that animals lack *ratio* and takes the fact that Lucretius attributes certain things, like 'cognitive' emotions, to animals as evidence that those things are not the same in animals as they are in humans.⁵ Annas

¹ The controversy stirred when Pope Francis recently assured a boy, who was grieving about the loss of his dog, that heaven is open to all of G/d's creatures is but one attestation; cf. Gladstone 2014. Peter Singer's work is particularly illustrative of the various contemporary debates and their concerns; cf. e.g. Singer 1989.

² However, as Hawtree notes, 'animals form a considerable part of every epic text' and in 'any of its manifestations the epic animal may provide a variety of possible meanings'; Hawtree 2014: 72. The above approach would be appropriate to Gilhus' characterization of the general practice of using of animal comparanda in ancient Greco-Roman literature, which is perhaps colored by his primary focus on explaining their use in early Christian literature and its development; cf. Gilhus 2006: esp. 263-7. Kitchell, who takes a considerably broader perspective, seems to be closer to the mark (or at least to the tenor of this study) in noting not only that 'Greek and Roman authors knew, well in advance of Lévi-Strauss, that "animals are good to think with"' but also that they were intimately interwoven into the fabric of daily life and often the subject of keen interest (of various sorts) in their own right; cf. Kitchell 2014: xii.

³ '[P]rimär findet das Vorhandensein derartiger Tierschilderungen seine Erklärung in der Tatsache, dass innerhalb der epikureischen Philosophie Tiere als *specula naturae* gelten dürfen: das Tierische bildet einen Spiegel des Naturbedingten.'; Schrijvers 1980: 143, cf. Dierauer 1977: 194-8 (esp. 194).

⁴ Sorabji 1993: e.g. 28-9, 115, Newmyer 2007: esp. 167-8, Newmyer 2014: 525-6. As they - among others - note, there are some precedents for such things in Plato, but he is not consistent, as well as in certain Pre-Socratic thinkers.

⁵ Konstan *passim*, e.g. Konstan 2008: esp. 18-22, 22 n.30.

thinks that animals possess similar capacities, including lower level reasoning ones, but not to the degree that humans do.⁶

Having noted that Lucretius is a 'Tierfreund',⁷ Schrijvers proposes that Lucretius' interest in animals is an attempt to integrate Aristotelian biology with atomist physics, as well as to integrate the scientific and literary aspects of the poem.⁸ Sorabji, however, has shown a sharp dividing line in Aristotle's thinking between animals and humans.⁹ Nevertheless, Schrijvers may be correct that Lucretius' degree of interest in animals is original and not an echo of Epicurus;¹⁰ it is certainly not incidental or an artifact of sentimentality, as Newmyer alleges.¹¹ Indeed, Gale's analysis of Virgil's engagement in the *Georgics* with Lucretian animals indicates their profound significance in *DRN*.¹² The work of Sedley and of Campbell suggests Lucretius' interest in animals may reflect dialogue with Empedoclean ideas, if not outright influence.¹³ Some scholars, such as Amory, Betensky, Saylor, and Massaro,¹⁴ who have focused on animals in *DRN* from a literary perspective also notice their sympathetic treatment at Lucretius' hands, but neglect, to varying degrees, the theoretical underpinnings of Lucretius' views. Important contributions to our understanding of animals and animal imagery in *DRN* have also been made by Segal, Shelton, and particularly Gale.¹⁵ Gale, for example, claims that the frequent comparisons between animals and humans function both as poetic simile and scientific argument, reflecting Lucretius' belief in their fundamentally similar natures.¹⁶

⁶ Annas 1992: 135-6 incl. n.46.

⁷ Schrijvers 1980: 143.

⁸ Schrijvers 1997: esp. 156. Schrijvers' observations about the number of parallels between *DRN* and particularly Aristotle's *HA* are well noted, but the possibility that it was a source (directly or indirectly) for Lucretius does not necessitate this argument. Tutrone 2006 (repr. in Tutrone 2012b: 295-328) and Tutrone 2012b: 87-111 further explores the parallels between *DRN* and, particularly, Aristotle's zoological works; N.B. Tutrone 2006: 70-1.

⁹ Sorabji 1993: esp. 13. Osborne takes a somewhat different view; Osborne 2007: chs 4-5. Theophrastus, if Porphyry's report is reliable, would be a more likely candidate; on which, cf. Newmyer 2007: 163.

¹⁰ Schrijvers 1997: 156.

¹¹ Newmyer 2007: 168 claims that 'it might be an overstatement to see any real violation of Epicurean orthodoxy in Lucretius' touching portrayal of animals, or any intentional innovation ... since, after all, animals are mentioned only incidentally in his poem'; that said 'he was certainly more sympathetic to animal creation than were the vast majority of his fellow Romans'.

¹² Gale 1991, Gale 2000. Virgil's temporal proximity to Lucretius, his own training in Epicurean philosophy and poetic corpus, and the depth and sensitivity of his engagement with Lucretius' work, as both philosophy and literature, make Virgil's interpretation of *DRN* - often being to problematize it - at least as worthy of serious consideration when formulating one's own as that of any modern scholar.

¹³ Cf. Sedley 1998a: esp. 10, 19-20, 31 (and on Empedoclean influence more generally: 1-34, 201-4), Sedley 2003, which is much more cautious than Campbell about the degree and nature of any potential influence on such ideas, Campbell 2003: *passim*, Campbell 2008. Any influence of this kind would not derive from a belief in the transmigration of souls, as per Pythagoras and Empedocles.

¹⁴ Amory 1969: esp. 161-4, Betensky 1972: esp. chs 1-2, Betensky 1980, Saylor 1972, Massaro 2011.

¹⁵ Segal 1970, Segal 1990: esp. ch.9, Shelton 1995, Shelton 1996, Gale 1991, Gale 2000, Gale 2009.

¹⁶ Gale 1991: 416; cf. 415-17 more generally.

This point has never been sufficiently tested. Until quite recently, it remained the case, as Amory, Saylor, and Long noted back in the 1970s, that there was no systematic study of animal nature in *DRN*.¹⁷ Perhaps as a result, scholars still tend to assume or agree with Dierauer that Epicurean animals lack reason and rational thinking and thus cannot achieve ἀπαρξία.¹⁸ Since the inception of this thesis, two major studies have attempted to fill this lacuna.¹⁹ The monographs of Camardese²⁰ and Tutrone²¹ focus to varying degrees on the literary and philosophical dimensions of animals in *DRN*. With respect to the rationale for Lucretius' views on animal natures, their emphasis remains on cosmic cycles, phenomenology, and ethics, or what Tutrone calls 'zooanthropology'. This does not sufficiently justify their view that Lucretian animals primarily function as the *specula* or *vox naturae*. Both authors also assume a gradation or scale of living beings in *DRN*.²²

This thesis uses philosophy of mind to more thoroughly investigate Lucretius' views about animals as well as to establish and analyze their theoretical basis. Not only can this not be accomplished without also considering human nature, as this study will bear out, it should not be. The investigation integrates questions, methodologies, and scholarship which are usually kept too far apart by studies of a more exclusively philosophical or literary bent. It reconstructs Lucretius' understanding of the so-called faculties of mind across the species, as well as the faculties' underlying mechanisms. The reconstruction proceeds from the ground up - i.e. beginning from their ontology and aetiology and linking these with the phenomenology. In the process, this offers a new interpretation of the evidence for the fundamental nature of these faculties and their

¹⁷ Cf. Amory 1969: 162 n.30, Saylor 1972: 306, and Long 1977: 82.

¹⁸ The theoretical underpinnings of this too have not been adequately investigated with respect to Lucretius. Cf. Dierauer 1997: 196-8, esp. 197. Dierauer's *Tier und Mensch* remains a landmark study in animal philosophy of mind and an important predecessor to Sorabji's equally significant and influential study, *Animal Minds and Human Morals* (1993). Dierauer bases his influential interpretation primarily on the evidence of book one of Philodemus' *On the Gods* and anti-Epicurean polemics, e.g. of Plutarch, supplemented by Cicero's *Fin.* and Polystratus; Epicurus and Lucretius are barely treated, and then only in the footnotes. Sorabji's consideration of the evidence, on the other hand is more comprehensive and thus much more cautious and nuanced in his conclusions - allowing for the plurality of Epicurean views on many topics in philosophy of mind, including the possibility of animal reason; Sorabji 1993: *passim*. This study will take issue with the assumption (even in Gale's corpus, cf. esp. Gale 2000: 88-100) or conclusion (e.g. in the work of Konstan and Schrijvers (e.g. 1997: 159-61)), that Lucretian animals lack *ratio*.

¹⁹ Also, L'hermitte 2015 was recently published concerning the belief in animal intelligence and its ethical implications during the Roman empire; part I covers many of the same topics as this study and presumably takes account of precedents including *DRN*. However it came out too recently to be taken account of.

²⁰ Camardese 2010. Her difficulties with reconciling which she sees as antithetical continuities and discontinuities between human and animal natures (on which, cf. esp. ch.3) follow from the largely literary and linguistic nature of her investigation.

²¹ Tutrone 2012b: part I.

²² While this study will cover many of the same topics and passages in *DRN* as do these two studies, it will do so from quite a different perspective. Their contributions to our understanding of said material, while valuable, will only be noted as relevant to this analysis.

relationship to one another. The thesis thus adds primarily to two scholarly discussions - namely, the function of animals in *DRN* and Lucretius' interpretation of Epicurean philosophy of mind; this is achieved partly by relating them.²³

Specifying a few methodological details will better clarify the nature and scope of the enquiry. While evidence from *Quellenforschung* and the history of philosophy is brought to bear on the analysis, this study does not attempt to use Lucretius' oeuvre as a means of reading Epicurus' philosophy. It does not presume consistency between Lucretius and Epicurus - e.g. with respect to doctrinal interpretation or terminological correspondence. Nor is its purpose to analyze Lucretius' originality or fundamentalism relative either to his proclaimed *praeceptor*²⁴ or to other literary and philosophical models and intertexts, such as Empedocles and Ennius; the poem's relationship with Hesiod, Parmenides, Plato, Aristotle, Theophrastus, Aratus, Cicero, Catullus, and Varro, as well as mythology generally, is more open to debate. Contributions to such questions are touched upon as they arise in the context of the task at hand and insofar as they are relevant to it. Rather, and with due attention to the limitations it entails, this study approaches the philosophical content of *DRN* as Lucretius' selective synthesis and representation of the Epicurean system.²⁵ Lucretius places particular emphasis on the physics of Epicurus in the service of his own didactic agenda. This study operates on the premise that the poem is intended, in part, as a self-contained or stand-alone account of Epicurus' philosophy from first principles - such that even one who does not pursue further reading will have

²³ Many of these topics are vast and the scholarly literature on them anything but insubstantial. This study does not presume to offer an exhaustive account but includes only what is most relevant to the analysis at hand and/or has been most useful to formulating the interpretation presented.

²⁴ Whatever of *DRN* one regards as original - e.g., in the sense of not drawn from or reworking Epicurus' expositions on physics - it is nevertheless possible to hold with Sedley 1998a: 135, with respect to what Lucretius *did* base on those expositions, that '[q]uite apart from his numerous distinctively poetic achievements, no one need doubt for a moment that he has done much to develop, illustrate, expand and sharpen the arguments as he found them', according to Sedley, largely in Epic. *On Nature* 1-15. Gale (forthcoming b) suggests that the poem's overall didactic technique and his adaptation of high-status epic poetry to a vehicle for Epicurean philosophy, are among his most significant general innovations, the latter operating within a broader tradition in Hellenistic poetry of versifying prose sources.

²⁵ Cf. e.g. Clay 1983, Sedley 1998a, Warren 2007, and, for a handy overview of the state of related questions, Gale (forthcoming b).

sufficient *vestigia* or traces to work out the rest on his or her own.²⁶ Therefore, even in the face of unfamiliar phenomena, the reader will be steeled against unnatural and unnecessary fears and desires, and thus remain able to live a life worthy of the gods.

DRN is by far the most detailed and complete of the surviving witnesses to Epicurean philosophy of mind; but *DRN* reflects Lucretius' version thereof. Moreover, it is unclear whether other Epicurean authors had much to say about animals. The most extensive of these is the bit of Hermarchus preserved in Porphyry's *On Abstinence*; there are also scattered references in Philodemus, particularly in *On the Gods*, Polystratus' *On Irrational Contempt of Popular Opinions* columns 1-7, and the contentious *KD* 32 and *On Nature* 25 of Epicurus. Much of the little extant evidence is quite fragmentary, based on textual conjecture, or both. The overall picture suggests divergent views about animals' psychological capacities²⁷ - and perhaps about the nature and mechanisms of the capacities themselves.²⁸ Lack of consensus among the followers of Epicurus points to questions left under- or undetermined in the doctrine established by their Master.²⁹ Such topics were fair game for extrapolation. What was laid down by Epicurus, on the other hand, was at least open to interpretation and elaboration. Such were the means by which disciples of the school innovated within the tradition; moreover, later Epicureans other than Lucretius rely

²⁶ It lends itself to intratextual analysis thus - and in seeking to offer a text of the world which also sees the world as text; cf. Kennedy 2000: 395 and Kennedy 2002. By 'from first principles' should not imply that Lucretius does not draw on any concrete sources. Sedley, for example, has argued persuasively about the extent to which *DRN* draws on material from Epicurus' *On Nature*; cf. esp. Sedley 1998a: 93-165, 186-204. Clay rejects that thesis (cf. Clay 1983: esp. 18-19) and argues that Lucretius is elaborating on a set of core doctrines very much like the *KD*, as well as other 'tributary' sources, but in fact independent of a written text by Epicurus; Clay 1983: 13-53. The theses that proposed Epicurus' *Letter to Herodotus* and/or *Great Epitome* have largely been dismissed; cf. Sedley 1998a: 135-44. Here, by 'from first principles', rather means that Lucretius constructs his account of the nature of the universe and all things in it beginning from the most fundamental premises of Epicurean ontology and aetiology. The logic is this: if the reader understands the fundamental nature of things and the natural laws by which they operate, s/he will be able to work out on his/her own even the things which Lucretius does not himself explain. N.B. Lucretius' statement early in the poem to Memmius, his exemplary reader, that the practice of the poem is to set out the traces or *vestigia* necessary for one to work out the rest on one's own, just as (e.g.) dogs following the trail seek out their quarry at *Lucr. DRN* 1.400-17, cf. 1.1114-17; this will be treated in chapter five. On such psychagogic elements of Lucretius' relationship (as *praecetor* and as *poeta-auctor*) with Memmius (as exemplary reader), cf. Clay 1983: 212-22, esp. 225 on the reader 'by himself and for himself, *tute tibi*', and on possible distance (and distancing) of the ideal reader from the intratextual addressee, as well as from Roman society, cf. Gale (forthcoming a). On Lucretius' readership and his relationship with contemporary issues more generally, cf. Gale (forthcoming b). That Lucretius himself is tracking Epicurus (*DRN* 5.55), perhaps constitutes further evidence that he considered some of the philosophical content of the poem to build upon, rather than to repeat, Epicurus.

²⁷ Today we might refer to some of these as cognitive. For Lucretius, these terms could in many cases be used interchangeably, but in this study generally the faculties will be referred to as psychological. Further on this issue below.

²⁸ For an overview cf. Sorabji 1993: 28-9, 52-8, 76. Moreover, according to Sorabji, psychological concepts related to reason, such as 'perception, appearance, belief, memory, practical impulse, foresight, emotion, experience, concept-acquisition', shifted in relation to the concept of reason, which itself shifted; Sorabji 1993: 65. Newmyer goes so far as to characterize Lucretius' views as a 'decidedly un-Epicurean fondness for animals' coupled with, at times 'highly uncharacteristic doctrinal innovation'; Newmyer 2014: 526.

²⁹ For a case study in how instances of this could play out, cf. esp. Sedley 1989b: 107-17 on *Phld. Rh.* 2.

also on the school's other founders, as well as subsequent scholars.³⁰ For those reasons, coordinate discussions in other Epicurean authors, such as Epicurus, Philodemus, and Diogenes of Oenoanda, as well as in other accounts, e.g., Cicero's, are only noted as relevant to the analysis, not exhaustively.³¹ This approach facilitates the evaluation of Lucretian human-animal philosophy of mind on its own terms (without prejudicing his interpretation) as a coherent system.³²

Similarly, where possible and relevant, Lucretius' views about and representations of animals' faculties are connected to their more general Greco-Roman context. In dealing with the greater context of ancient approaches to animals as well as with developments in medicine and philosophy, arguments from silence are brought in - sparingly - where they shed light on Lucretius' choice to represent things in a particular way which advances his purposes. Also, the thesis does not attempt to anachronistically evaluate the degree to which Lucretius and Epicurus were correct (in their views) according to the ever fluctuating standards of modern science and philosophy. General parallels between their theories and modern ones are noted insofar as they are relevant to this analysis, but these observations should not be overdrawn or taken as support for any teleological narrative of the history of ideas.

In its ground up approach, this study builds on the increasing recognition in scholarship on Epicurean philosophy of mind of a need to (re)account for the material physiological processes involved in *all* psychological phenomena - not just those directly

³⁰ All Epicureans (other than Epicurus) claim to be following the founder (Epicurus), as did Lucretius, or founders (Epicurus, Metrodorus, Hermarchus, and Polyaeus), as did Philodemus - who was also influenced heavily by Zeno of Sidon. The tradition of commenting on the works of the canonical authorities - as in the case of the other schools of Hellenic philosophy - was essential to the fostering of an Epicurean identity and to the survival of the school. On this dimension of philosophical praxis in general, with particular emphasis on the Epicurean school and with Philodemus as a case study, N.B. Sedley 1989b. Cf. also Sedley 1998a: 18, 62-93, Sedley 2009: 29-30, 35-8, 41, Annas, 1989: 147 (incl. n.6), 164, Annas 1993: esp. 69-71, and, on potentially less traditional adaptations by Zeno of Sidon and Philodemus for a Roman audience, cf. e.g. Procopé 1993. Polemical treatises against other schools served a similar function; cf. Clay 2009: 17-18.

³¹ On the possibilities of comparing and pitfalls of forcing rapprochement between Lucretius and Philodemus, cf. e.g. Bollack 1996, and between Lucretius and Diogenes of Oenoanda, cf. e.g. Smith 1986 and p.45 n.180. Philodemus hardly wrote on physics and then only insofar as it pertained to other inquiries, and 'no significant philosophical links between him and Lucretius' have yet been discovered'; Sedley 2009: 35-6, 41; cf. Sedley 1998a: 66-8. The text of *DRN* is probably among the Herculaneum papyri, but at what stage before the eruption of Mt Vesuvius it entered the library is open to speculation, cf. Sedley 1998a: 66, Obbink 2007, and Kleve (as follows). Building esp. on his 1989 article in *CErc*, Kleve 2011 recently offered new evidence to suggest that Philodemus may have had some knowledge of *DRN*, but this is insufficient to support his thesis, in Kleve 1997, that Lucretius was a member of Philodemus' circle.

³² Insofar as is possible given the state of the evidence, such an analysis might usefully be carried out with respect to each of our main Epicurean authors independently. On that basis, their ideas could then be properly compared and definitive conclusions reached about (i) 'the Epicurean position' on this subject (to the extent that the school's position could or should be described monolithically), as well as (ii) the relevance of historical context, genre, and authorial intent to variation and originality within the tradition with respect to such topics; but that is the work of another and much larger project.

related to the swerve. Scholars such as Konstan, Nussbaum, and Annas have either proceeded or at least begun more or less phenomenologically. In 1997, Fowler rightly called for scholars of Epicureanism to rejoin the analysis of physiological mechanisms to the study of psychological phenomena; he demonstrated the explanatory potential of such an approach, by challenging particularly the work of Annas on anger.³³ That said, in demonstrating the significance of the mechanisms for the experiences, Fowler did not go quite far enough. As this study will show, the categories of 'physiological' and 'psychological' are somewhat misleading with respect to Lucretius.³⁴ The latter category is meant to encompass everything which involves the activity of what this study will call 'the *animus-anima* complex', but no body has life, feeling, or other such properties, without the activity of this part; moreover, the nature and operations of the complex as body are significant. Furthermore, as both the title of the poem and its emphasis on '*naturae species ratioque*' (1.148, 2.61, 3.93, 6.41) indicate, Lucretius considers his treatment of living things to fall under the broader heading of physics, for which Epicurus' preferred term was φυσιολογία.³⁵ The boundaries and complementarities between the two categories become increasingly difficult to distinguish.

The evidence pertaining to specific topics in animal philosophy of mind is dispersed throughout *DRN*, not contiguously presented.³⁶ Lucretius not infrequently revisits ideas, foreshadowing, (re)activating, illustrating (or describing), and developing - certain aspects in some places and others in others.³⁷ This study attempts to read the said evidence in three ways simultaneously: (i) locally, or in its own immediate functional context, (ii) diachronically, or sequentially, and (iii) synchronically - i.e. across the poem

³³ D. Fowler 1997, Annas 1989 and Annas 1992.

³⁴ With respect to living things, they can sometimes be a shorthand for talking about the underlying bodily mechanisms as opposed to the corresponding phenomenological experiences. That said, physiology is more generally used to refer to the study of nature (e.g. natural philosophy or science, i.e. physics writ large), including of the nature and operations of the body in general, and their causes, independently of or minimizing the contribution of whatever one interprets as the ψυχή and its faculties and functions.

³⁵ Cf. Long and Sedley 1987: i.70-1 and Sedley 1998a: 21-2, 37. Epicurus' brief discussion of the nature of the ψυχή occurs in *Ep. Hdt.*, which - as he states - concerns φυσιολογία (or the study of φύσις); *Epic. Ep. Hdt.* 37, cf. 78, 82, *Epic. Ep. Pyth.* 86. N.B. also Clay 1983: 82-95, on Lucretius' relationship with and evolving depiction of '*physis/natura*'.

³⁶ The disparate presentation of the evidence will be seen to be related to their function in their respective contexts. Cf. Newmyer 2007: 167-8, that Lucretius' references to animals are scattered throughout the poem, but one can appreciate from those references that he was more generous to animals than were other Epicureans.

³⁷ For a recent account of these and related techniques in Lucretius' *DRN*, cf. Kenney 2007.

as a whole at once.³⁸ The synthesis and analysis of dispersed evidence is - wherever possible - justified by applying the following criteria: (1) topical relevance, such as discussion of either the same or closely related content, (2) intratextuality, such as verbal echoes which link passages like cross-referencing footnotes - a special case of which being verbatim repetition,³⁹ (3) explanatory value, (4) parallels in the context of other causal mechanisms, (5) proximate (re)presentation of the ideas elsewhere in the poem or in a probable source or intertext, (6) some combination of the above.

This ground up analysis also benefits from certain modern philosophical debates about ontology and causation.⁴⁰ Without presupposing a particular paradigm in the case of Lucretius, this study makes use of the fact that these debates are asking some similar questions of related subject matter. In this way it selectively employs relevant questions and distinctions insofar as their application is suggested by the reconstruction of Lucretius' account of human-animal philosophy of mind. The issue of reductionism versus emergentism will be seen to shape Lucretius' presentation of his ontology. It extends to his concerns about the nature of various sorts of properties⁴¹ (particularly the faculties of living things), under what circumstances they manifest, and to what extent they cause or co-cause other properties.⁴² Moreover, Lucretius' approach to causation as process (rather than, e.g., discrete instances of stimulus-response) incorporates ideas about necessary, sufficient, proximate, principle, and helping or joint causes; it also favors an interactive causal model, rather than active-passive dichotomies. The implications of his representation of causation require engagement with topics which broadly fall under the headings of determinism, natural law, providential force(s), and chance. Thus this study

³⁸ That the poem is intended to be read thus may assume a multiplicity of audiences, which topic is beyond the scope of this thesis, but the strategy corresponds to three general camps: those dipping into the poem, those linearly reading the whole of *DRN* through for the first time, and those rereading it (including in some non-linear fashion, e.g. scrolling back and forth in the process). Surely the second sort of reader, as envisaged by Reinhardt, is the exemplary reader in the first instance and, as surely, the audience extends beyond it; cf. e.g. Clay 1983: 212-66, Reinhardt 2002: 292. Both the second and third types of reader would be affected, in different ways, by illustrations which become *illustranda*, if Schrijvers (e.g. 1980) is correct about this technique. On the qualities and knowledge (literary and philosophical) expected of the poems' readers and the range thereof which it could accommodate, cf. e.g. Gale 1994b: 89-90, Erler 1997: 82 and *passim* regarding the novice, *lector doctus*, *lector philosophus*, and *lector doctus et philosophus* (which seem to stand whether or not one is persuaded that for Lucretius and the Epicureans more generally, *philologia medicans* was subordinated to *philosophia medicans*).

³⁹ There is a consensus that they can serve as functional footnotes, but repetition is always not sufficient to establish a connection between two passages; cf. Ingalls 1971. Repetition also serves other functions in the poem, like inculcation; cf. e.g. Clay 1983: 176-85, Reinhardt 2002: 303-4 n.37.

⁴⁰ All of these modern debates had their ancient counterparts or at least roots.

⁴¹ Here the term 'properties' is meant generally, both with respect to the modern debates and with respect to Lucretius' own terminology.

⁴² In modern philosophy, these are being explored in noteworthy ways by scholarship on powers. For a recent overview of the debates, cf. e.g. Marmodoro 2010: esp. 1-7.

lays some of the groundwork for a full treatment of Lucretian metaphysics; while a subject worthy of exploration in its own right (which may well have significant implications for the modern debates), that lies outside the scope of this investigation.

From analyzing Lucretius' account as his own interpretation and representation of Epicurean philosophy of mind, a few methodological corollaries also follow with respect to language. First, there are a number of potential sources of difficulty which the study avoids. It does not presume that Lucretius is a translator using Latin equivalents of established Greek philosophical terms; there was no such consensus in the discourse - neither across thinkers nor time. Likewise, it does not even presume that Epicurus' terms were used with consistent signification across his corpus, which is by no means certain in all cases, or that such terms would have meant the same thing in Lucretius' day. Such assumptions have led, as we shall see, to considerable scholarly disagreement on the meanings of key terms. Lucretius left us a single, coherent, systematic work.⁴³ This fact potentially circumvents the need to ground analysis of his work on such assumptions and thus avoids the difficulties which follow. Furthermore, the milieu of traditions within which the poem was written was more than merely philosophical and this too bears on Lucretius' use of language.⁴⁴ As Kenney notes, there "is not a word or phrase that can

⁴³ This point is particularly well illustrated with respect to the poem's structure and didactic strategies, e.g., by Schiesaro 1990 and 1994, Gale 2004, and Farrell 2007. They show that form, content, and argument of the poem work together on every level and are fully integrated with the philosophy, such that the poem is a *simulacrum* of the nature of things - wherein, as Farrell 2007: 79 notes, the principles of unity, sequence, balance, parallelism, and inversion 'inform the structure of the poem at every level'. Thus, as Schiesaro concludes, particularly with respect to repetition and the possibility thereof in the poem, it 'is a self-reflexive body which strives to eliminate any divergence between what is being told and how it is told'; Schiesaro 1994: 103. Gale 1994b shows that myth, or rather the subversion of it, is equally well integrated into Lucretius' coherent didactic program. As she concisely summarizes: 'As much modern scholarship has demonstrated, far from conflicting with Epicurean doctrine, every poetic device, from alliteration to personification, is deliberately adapted to the clear and persuasive presentation of Epicurus' *aurora dicta* ... this is as true of the poet's use of myth as it is of his similes or repetitions' (Gale 1994b: 2). Farrell 2008 suggests that the poem's structure itself also existed within and helped to shape a literary tradition. On Epicurus' influence on *DRN*'s structure, cf. Sedley 1998a: esp. 134-65, 186-201. Nevertheless, some elements of the poem, such as the two summaries in the proem to book four (Lucr. *DRN* 4.26-44 and 4.45-53), support the position that *DRN* may, as a tradition since Jerome suggests, have been incompletely edited at the time of Lucretius' death: cf. p.143 n.207. On the state of the poem, cf. Sedley 1998a: xvi-xvii, 137-8, 148-65, but N.B. the comments of Gale against reading too much into aspects of incompleteness (particularly by comparison with the state of Virgil's *Aeneid* and Propertius' oeuvre), esp. that 'there is a great difference between a poem which, while virtually complete, has not yet received its final revision, and the collection of *disiecta membra* envisaged by Mewaldt'; Gale 1994a: 12. Further on the relationship between books two, three, and four, cf. p.166-7.

⁴⁴ Poetry was a well-established means of presenting philosophical thought about the nature of things, going back at least to Parmenides and Empedocles; cf. Most 2006. It was also alive and well with Aratus and among at least some of Lucretius' contemporaries, such as Cicero; cf. Gee 2013: esp. 51-80, ch.4, and appendix B. Nevertheless, Lucretius is working at least as much within other poetic traditions and presenting his work, as Gale persuasively argues, as the 'critique and culmination of the Graeco-Roman literary canon'; Gale 2007: 74. On this subject in general, cf. e.g. Gale 2007, Kenney 1970, Brown 1982, as well as Gale 1994b and Sedley 1998a: esp. 21-32 on both the philosophical and literary traditions within which Lucretius was operating. On how these traditions effected Lucretius' style and rhetoric, cf. Kenney 2007.

fairly be called superfluous, no merely ornamental epithets, nothing to fill out the line'. This is literary craftsmanship of a high order'.⁴⁵ This study therefore proceeds with its reconstruction of Lucretius' ideas, insofar as is possible, on his own terms - i.e. using his particular language and presentation. This approach presents its own challenges.

Much of Lucretius' language is overdetermined. Despite his complaints about the poverty of Latin, through the possibilities afforded him by his chosen form of poetry, Lucretius frequently capitalizes on the ambiguity of the language - at times turning it into a tool for philosophical disambiguation.⁴⁶ Lucretius sometimes uses the medium of the text to perform or embody the argument - for example, by inscribing the phenomenon which he is describing into the form of the text itself.⁴⁷ Lucretius often employs verbs in their reflexive or medial sense, recalling both the Greek middle voice and the lost Latin middle voice out of which the passive grew.⁴⁸ Such usage is generally coordinated with mechanisms which imply a middle meaning. Thus translations will stress this medial sense where it occurs. Lucretius also employs some words and expressions in a deliberately inclusive manner, emphasizing continuities and connections between meanings rather than making choices or creating sharp distinctions (at least within in the natural boundaries of things). He often uses the periphrasis in this way, or to emphasize the significant aspect of the thing in question.⁴⁹ By keeping multiple meanings in play, whether with a word or expression, Lucretius allows for multiple coordinate readings simultaneously and thereby

⁴⁵ Kenney 2007: 104.

⁴⁶ For instance, with respect to the relationship between Lucretius' linguistic imagery or 'live metaphors' (p. 38, 44 n.31), his Greek models (particularly for philosophical terminology), and his strategic deployment of Greek itself, cf. e.g., Sedley 1998a: 35-61.

⁴⁷ The classic examples of this include: (i) his pseudo-analogy between and coordination of *primordia* and letters in the formation of, respectively, assemblies on the one hand, and words, lines, and other units of meaning on the other, (ii) the *lignis/ignis* 'pun' (Lucretius *DRN* 1.109-14), (iii) the *amor/umor* 'pun' (cf. p.150). On such things, and their status as more than just analogies and puns, cf. e.g. Friedländer 1941, West 1969, Snyder 1978, Schiesaro 1994: 83-7. The 'syntactical onomatopoeia' ('syntactical shapes which correspond to logical patterns or intellectual concepts or emotional states') discussed by West and Sedley is another good example, cf. West 1975: 96, Sedley 1998a: 46-8; the relationship between sound and sense is too, cf. West 1969: 10-15. On the textualization of nature, cf. Kennedy 2002, and, on the performativity of Lucretius' use of language, cf. Shearin 2015. Cf. also West 1970: esp. 272-5 on Lucretius' pioneering use of the 'multiple correspondence simile', i.e. the multiple, various, and at times elaborate sorts of correspondences between Lucretius' similes and the context of his narrative (often symmetrically structured), which - he argues - both derive from and are used as proof of Lucretius' philosophical argument.

⁴⁸ Lucretius uses passive verbs with the Greek accusative of the body part affected, as well as reflexive passives and - as is more common in Latin - active verbs with medial meanings, sometimes with the accusative of the personal pronoun. With respect to such constructions and their history, cf. Menge 2000: 174-6, Kühner and Stegmann 1971: 104-11, Woodcock 1959: 13-14. Bailey refers to some of the active form instances at Bailey 1947, i: 105, but does not seem to consider there that their sense may serve a mechanistic function.

⁴⁹ On this aspect of Lucretius' use of periphrasis, cf. esp. West 1969: 23-30. As West notes well (p.29), Lucretius' 'periphrases are in the Epic style, but in using them Lucretius is putting the Epic style to vigorous and effective use' and every epithet is 'working wonders in its context at a logical, or emotional, or sensuous level'.

highlights the inherent underlying connection between those readings.⁵⁰ His use of alternative terms works similarly,⁵¹ as does his imagery more generally.⁵² This praxis is consistent with the way that poetic language generally works. Translating such things in one way or another would limit and prejudice their interpretation. Also, and particularly with what one might call ‘technical terminology’, there is frequently no neat English equivalent.

Therefore with, for example, technical terms and with concepts and words which Lucretius employs in at least one technical sense,⁵³ the general practice of this study will be to analyze the Latin word choice and, often, to preserve it in the discussion. In the process of analyzing the Latin, the spectrum or parameters within which to look for meaning will be clarified and umbrella terms disambiguated wherever and insofar as possible. Nevertheless, such terms are usually left untranslated unless (i) their precise meaning (or range of meanings at play) is clearly and consistently delimited, and (ii) translation would pose little risk of mischaracterization, anachronism, or other inappropriate connotations. Modern notions of political correctness are also not imposed onto the translation; so the likes of *homines* is translated as men, although Lucretius often seems to use this interchangeably with *genus humanum* or the human race. Similarly, expressions like ‘humans and other animals’ are only used, even in the text of the study, where the argument itself warrants it. Periphrases, when significant for the argument, are discussed.⁵⁴

The investigation thus focuses on Lucretius’ thought in its synchronic dialectical context, triangulating between the interdependent (and sometimes indistinguishable) philosophical, literary, and - to a lesser extent - historical aspects of his work. Ultimately,

⁵⁰ In this Lucretius’ poetic language takes to new levels the Epicurean praxis of making ordinary speech the basis for any special or technical usage - on which praxis, cf. Sedley 1973: 21-3, Schofield 1996: esp. 223-5. On the importance of the literal sense of his word choice, cf. West 1969: e.g. 5-10.

⁵¹ Bailey 1947, i: 140 notes that synonyms contribute a different nuance, enriching the underlying common meaning. Sedley expands on this idea; whether or not one agrees that Lucretius’ aim is capturing the meaning of a Greek word by collective accumulation of alternatives, one can take Sedley’s larger point that: ‘For Lucretius ... the range of alternative terms is no stopgap or compromise, but is intrinsically desirable’ and he is ‘keeping in play a whole set of mutually complementary live metaphors’ (Sedley 1998a: 44).

⁵² Cf. esp. the theory of coordinate levels of reality and how this relates to Lucretian imagery, as discussed by Hardie 1986: esp. 166-7, 219-33 and similarly by Schrijvers 1978; cf. Lehoux 2013, with respect to the imagery of seeing and that of *ratio* in Lucretius’ didactic strategy.

⁵³ This is a somewhat different approach (really amounting to terminology at least sometimes employed technically) than allowed for by the definition of Sedley 1998a: 35-6 and open to concrete relationships between the ordinary usage meaning(s) and the technical one(s). That said, Sedley is not restricted by his definition. For instance, his analyses of Lucretius’ vocabulary for atoms and for εἶδολα are illuminating, and he notes well that Lucretius is as capable of avoiding terminology as employing it; Sedley 1998a: 38-42, 44.

⁵⁴ This is done at least the first time a particular sort of periphrasis occurs in the study. Periphrases are sometimes given a relatively literal translation if more appropriate to the argument.

it seeks to establish the extent to which Lucretius believed animals share human psychological capacities. The analysis proceeds sequentially, with each chapter building upon the previous one(s), as follows:

Chapter one develops a methodology for reading Lucretius and examines the foundational material underpinning the larger analysis - particularly the physics underlying the ontology of living things. It argues for an emergentist interpretation of the properties of all created material entities and for a strongly emergentist reading of properties such as life and the abilities of living creatures. The chapter establishes where, on the spectrum of all material entities, Lucretius places 'the deeply fixed boundary' (*alte terminus haerens*)⁵⁵ between non-living things and living ones. It explains the fundamentally necessary conditions for life, the nature and relationships of the relevant structures, those entities which are excluded from the category of living things, and why.

Chapters two and three are devoted to redefining the Lucretian conception of feeling or perception (*sensus*); they function as a unit. Chapter two begins by treating theoretical considerations structuring the presentation of the topics. It then reconstructs the physiological mechanisms underlying the faculty of *sensus* as a whole, integrating evidence from Lucretius' account of sleep. It also establishes how pleasure and pain relate to the faculty and reconstructs the mechanisms of the traditional five senses of the body, contributing particularly to select problems regarding touch, taste, and so-called common sensibles. Finally, it elucidates the relationship between one's constitution and one's perceptions, drawing special attention to the relevance of the preceding analysis for Lucretius' views on animals.

Chapter three analyzes Lucretius' account of the nature of certain feelings and processes which are not universally recognized (then or now) as belonging to animals, or indeed to *sensus* - focusing upon the faculties of thought, the perception of time, and emotion. Challenging the ascription of labels like 'rational' and 'irrational', it establishes Lucretius' understanding of the nature of these faculties by reconstructing their mechanisms and the processes which link them - highlighting the evidence for each faculty's manifestation in animals. The analysis of pleasure and pain is furthered in this context. The chapter also reinterprets the so-called diatribe on love, justifying Lucretius' choice of *amor* for the finale of book four on theoretical grounds.

⁵⁵ Lucr. *DRN* 1.77, 1.596, 5.90, 6.70.

The epilogue to chapters two and three synthesizes the overall theory of Lucretian *sensus* developed in the preceding two chapters, situates the general Epicurean position within the relevant context in the history and philosophy of science, and investigates some further implications, particularly for Lucretius' accounts of epistemology and living creatures as dynamic systems.

Chapter four treats Lucretius' views on heredity and evolution and how these issues relate to the continuities and variations both between and within species. It considers the extent to which one's general physiological constitution is hereditary and its possibilities of development. It then investigates whether the same is true of the nature of one's *animus-anima* complex, providing further evidence for the complex's relationship to the rest of the living body. The case study of animals in warfare shows how the complex's nature affects other faculties and behaviors and explores whether groups of species might share a similar *natura animi*. Throughout, it asks both what it takes to exist and what it takes to survive, with respect to living creatures' nature and artifice; central to this are the issues of hybridity and social contracts, respectively.

Chapter five extends this analysis to ontologically higher processes and faculties, asking to what degree different creatures are responsible for certain aspects of their natures, as well as their actions. In other words, it analyzes the mechanisms by which Lucretius thinks that creatures exercise control over themselves, especially with respect to focus, free will, learning, and *ratio*. The chapter also treats the reciprocity between these faculties and related ones - including judgment, belief, foresight, idea-formation, and memory. Lucretius' accounts of dream-sleep and language provide important evidence. Imagery and linguistic evidence contribute as well.

The thesis concludes by summarizing the results of the analysis and discussing their significance, especially for our understanding of Lucretius' unique contribution to the debate on the kinship of humans and animals.

CHAPTER I: THE EMERGENCE OF LIFE

Introduction

Lucretius' philosophy of mind is firmly rooted in his account of Epicurean physics and metaphysics. This chapter will consider his paradigm with particular emphasis on how Lucretius' ontology and aetiological principles shape his understanding of life itself.¹ This analysis and methodology will serve as a foundation for the subsequent investigation of the psychological faculties of living things.

I. THE CONTINUUM OF ALL THINGS

Lucretius' representation of Epicurean physics builds on two fundamental principles; nothing comes from nothing and every generated thing comes from fixed seeds in fixed ways.² The key is to see in what order things have been arranged, with what they are mixed, and the motions that they give and receive within that arrangement.³

According to Lucretius, the nature of the universe consists of two primary things - namely, body (*corpus*) and void (*inane*).⁴ There are two general classes which all bodies fall into.⁵ The first is *primordia rerum* - the atoms or 'first-beginnings of things';⁶ like void, these persist eternally, irrespective of the cycle of creation and destruction which applies to all generated things. The second is *concilia* or assemblies; these are generated from the primordial building-blocks and contain void. Assemblies vary widely in many

¹ The core theory of the first two sections of this chapter were presented in a work-in-progress talk to the Power Structuralism in Ancient Ontologies Project, University of Oxford in May 2014; I am very grateful to the members of the Project team for their feedback.

² Lucr. *DRN* 1.146-214 (esp. 149-50, 159-60, 169-73), 1.225-9, 2.297-302, 2.707-17; Epic. *Ep. Hdt.* 38-9. On the history of this theory, cf. e.g. Long and Sedley 1987: i.26-7.

³ Lucr. *DRN* 2.884-5: '*in quali sint ordine quaeque locata | et commixta quibus dent motus accipiantque*'.

⁴ Cf. Epic. *Ep. Hdt.* 39-40, 67.

⁵ Lucr. *DRN* 1.483-4: '*corpora sunt porro partim primordia rerum, | partim concilio quae constant principiorum*'; cf. Epic. *Ep. Hdt.* 40: 'καὶ μὴν καὶ τῶν σωμάτια τὰ μὲν ἐστὶ συγκρίσεις, τὰ δ' ἐξ ὧν αἱ συγκρίσεις πεποιήνται' (That Epicurus is referring in the second instance to atoms is made clear by the context of 41.).

⁶ The *primordia* or first-beginnings are the things from which nature creates, increases and nourishes all things; nature also resolves these created things back into the *primordia*. The *primordia* are also called: matter (*materies*), bodies generative of things (*genitalia corpora rebus*), the seeds of things (*semina rerum*), and - because they are the first things from which all things exist - the first bodies (*corpora prima*); cf. Lucr. *DRN* 1.54-61. Other similar terms are also used. Most of these terms emphasize generativeness, rather than, for example, indivisibility, which is stressed by ἄτομοι. Lucretius also uses *materia* for matter in general. On Lucretius' atomic vocabulary, cf. Sedley 1998a: 38-9. To preserve Lucretius' own emphasis and terminology as much as possible, literal translation is generally used. In avoiding 'atom' (unless doing so would be absurd), one hopes - by extension - to avoid making Lucretius sound unduly like either Epicurus or, as Sharrock 2006: 254-5 n.2 notes, a modern scientist.

respects, not least in size and complexity - ranging, for example, from something like molecules, to living creatures, to the earth itself.⁷

The nature of any body, as well as of void, can be described in terms of its properties, but there is no nature which exists independent of either body or void.⁸ Since the seventeenth century, scholarly discussion has generally thought of properties as primary and secondary, with little consistency of meaning.⁹ Lucretius' own terminology makes far more sense out of his presentation of Epicurean physics (than these or even Epicurus' terms)¹⁰ and reveals the underlying continuum of all things. This analysis will henceforth proceed using his own terms and categories, and the paradigm which follows from them.

According to Lucretius, all things other than body and void are either *coniuncta* or *eventa* of bodies and void.¹¹

coniunctum est id quod nusquam sine perituali
discidio potis est seiungi seque gregari
DRN 1.451-2

A *coniunctum* is that which is never able to be
disjoined and severed without destructive
sundering, ...

... cetera quorum
adventu manet incolumis natura abituque,
haec soliti sumus, ut par est, eventa vocare
DRN 1.456-8

... we are accustomed, as is fitting, to call
eventa the remainder - things whose coming
and going leave intact the nature of the thing
itself.

These terms do not quite correspond to the *συμβεβηκότα* and *συμπτώματα*, respectively, of Epicurus.¹² As Sedley has shown, for Epicurus, *συμπτώματα* were a temporary type of *συμβεβηκότα*. There is no single term for permanent *συμβεβηκότα* in the surviving witnesses, although the concept is there. Furthermore, Epicurus explicitly attributes *συμβεβηκότα* and *συμπτώματα* to body only, whereas Lucretius - as we shall see -

⁷ A small assembly of matter, namely of the first-beginnings and containing at least some void, would seem to be the simplest sort of generated body or thing (*genita res*). Terms for these include *concilium materiai*, *nexus principiorum*, and *concilium principiorum*; Lucr. DRN 1.221-4, 1.244-9, 1.483-4, 1.511-19. If the assembly contained no void, it would be indestructible, which no generated body is. The *coniuncta* of assemblies will be treated below.

⁸ Lucr. DRN 1.418-48, esp. 1.445-6. Cf. Epic. *Ep. Hdt.* 39-40; *Ep. Pyth.* 86.

⁹ This is the case even as recently as Morel 2009. On these categories, cf. Nolan 2011: esp. 1-4. It has recently been argued, teleologically, that primary and secondary qualities were indeed being explored in some form by Presocratic and Hellenistic philosophers - especially by Democritus, Plato, Aristotle, and Epicurus; cf. Lee 2011: 15-40. But projecting this distinction onto Epicurean thought results in the primary qualities of atoms being secondary qualities of assemblies, which, as they result from arrangements of atoms, would have no primary qualities. Thus the distinction 'secondary' obscures the reality of both the assembly and its qualities. Indeed, it implies an ontology dangerously close to eliminative reductionism. Moreover, as we will see, some qualities of an assembly are ephemeral, others - though mutable - are concomitant, and a third group entirely coexists with the assembly itself.

¹⁰ Epicurus' terms and their relationship to Lucretius' will be treated below.

¹¹ Lucr. DRN 1.449-50: '*nam quaecumque cluent, aut his coniuncta duabus | rebus ea invenies aut horum eventa videbis*'; the antecedents of '*his duabus rebus*' and '*horum*' are '*inane et corpora*' (1.445).

¹² It is common to translate *συμβεβηκότα* (and, likewise, *ποιότητα*) as properties, qualities, or attributes. The term *συμπτώματα* is generally translated as accidents.

attributes *coniuncta* and *eventa* to both bodies and void.¹³ *Coniuncta* are essential to the nature of a thing. Lucretius thinks that these properties are permanent concomitants; these cannot be removed without the thing either ceasing to exist or being transformed into something else.¹⁴

nam quodcumque suis mutatum finibus exit,
continuo hoc mors est illius quod fuit ante
DRN 1.670-1

For whatever having been changed departs
from its own boundaries, immediately this is
the death of that which existed previously.

When it comes to assemblies, the particular manifestations of some *coniuncta* are *eventa*.¹⁵ Lucretius account of the faculties of living things is contingent upon his analysis of the *coniuncta* and *eventa* which relate and distinguish material entities.

Lucretius' account suggests that certain *coniuncta* are common to all bodies, both microscopic (*primordia* and certain *concilia*) and macroscopic.¹⁶ All matter has a finite size and shape, however large or small.¹⁷ Tangibility is likewise essential to body.¹⁸ Closely associated with size and tangibility is the capacity to act and to be acted upon,¹⁹ as well as the capacity to resist the movement of other bodies. Lucretius says that it is a function of body (*officium corporis*) to hinder and to obstruct.²⁰ He similarly labels weight, which presses all things - including the thing itself - downward.²¹ All bodies are eternally in motion; many things move in many ways for many reasons.²² Further on the *coniuncta* of size and shape, Lucretius claims that the variety is extremely vast, but ultimately limited,²³ and that an infinite number of each type exist. Therefore the number of similar assemblies is also potentially infinite; no generated body is unique - including

¹³ Lucr. DRN 1.449-82, Epic. Ep. Hdt. 40, 68-73. On the meaning of Epicurus' terms and comparison with those of Lucretius, cf. e.g. Long and Sedley 1987: i.36-7, ii.20, 26, Wardy 1988: 117-21, Sedley 1988, Morel 2009: 79-80. However, Bailey and Rouse and Smith, for example, follow the conventional equation of terms, cf. Bailey 1947, i: 140 and Rouse and Smith 1992: 38-9 (note on DRN 1.449-51, and translation thereof).

¹⁴ Cf. Lucr. DRN 1.792-3, 2.753-4, 3.519-20, De Lacy 1969: 109 n.23. Further on the notion that each thing has a limit or boundary, cf. DRN 1.584-98, esp. 592-6, and 1.72-7, 2.512-14, 718-92, 5.89-90, 6.65-66.

¹⁵ Cf. p.20.

¹⁶ Microscopic bodies will henceforth refer to bodies which the eye cannot perceive and macroscopic bodies to those bodies which can be seen by the eyes. The minimal parts of the first-beginnings are not bodies, but parts of bodies which do not have independent existence or motion. Minimal parts will be treated further below.

¹⁷ Size and shape will be treated further below. The universe, on the other hand, is infinite, as we shall see.

¹⁸ Lucr. DRN 1.304: '*tangere enim et tangi, nisi corpus, nulla potest res*', cf. 1.265-328, 1.433-6, 1.454, pp. 70-7.

¹⁹ Lucr. DRN 1.298-304, 1.440-4. Cf. Epicurus' argument for the corporeality of the ψυχή; Ep. Hdt. 67.

²⁰ Lucr. DRN 1.336-7.

²¹ Lucr. DRN 1.362. That said, 'down' only exists relative to the observer, as the universe is infinite and has no bottom; cf. DRN 1.984-97, 1.1052-82, Epic. Ep. Hdt. 60. Weight is thus conceptually as well as directly (at DRN 1.1077-80) linked to motion.

²² Lucr. DRN 1.341-2, cf. 1.418-29. On motion in general, cf. pp.22-31.

²³ Cf. De Lacy 1969: 106.

the earth itself.²⁴ Size, weight and shape vary from one body or sort of body to the next.²⁵ Tangibility, acting and being acted upon, resistance, and motion are relational.²⁶

Although all *corpora* have certain *coniuncta* in common, others are unique to each of the two classes of body.²⁷ As the first-beginnings do not contain void, they are completely solid.²⁸ Matter which is pure body is eternal,²⁹ as it cannot be dissolved - not by blows, divisive inward penetration, or any other means.³⁰ That which is solid and eternal, is likewise unable to be divided. In other words, the *primordia* are the limit beyond which things cannot be broken-up or reduced in any way; they are the smallest possible units of independent material existence.³¹ Finally, the first-beginnings are immutable;³² they are defined as ‘certain very fixed bodies which always preserve their same nature’.³³ Thus, as the first-beginnings are eternal, the aforementioned *coniuncta*, as they occur in the case of each first-beginning individually, are constant. They have another

²⁴ On the finite number of the sizes and shapes of infinitely many first-beginnings (including of each type) and the uniqueness of no thing, cf. Lucr. *DRN* 2.478-556, Epic. *Ep. Hdt.* 42, 55-6. Morel 2009: 71-2 notes that this was a crucial departure from Democritus. On the limited possibilities of assemblies, cf. below. On the infinity of worlds, cf. *DRN* 2.1048-89, Epic. *Ep. Hdt.* 45, 73-74, *Ep. Pyth.* 89-90, Diog. Oen. fr. 63 Smith, Usener 301-7. On the constant (but infinite total) of that which the universe consists of, cf. Lucr. *DRN* 3.303-7, Epic. *Ep. Hdt.* 39, 41-2. Lucretius argues these points largely by reasoning from perceivable phenomena. His evidence includes the differences between various living things at the level of both species and individuals; Lucr. *DRN* 2.333-80. Qualities of non-living matter, like differences in permeability, viscosity, hardness, and dispersibility, are likewise given as evidence for the variety of shapes, sizes, and connections of microscopic bodies; *DRN* 2.381-97, 2.444-77. The final set of evidence for the variety of shapes of bodies is the variety of feelings they generate when they interact with living creatures, such as tastes, sounds, smells, colors, and temperatures; cf. e.g. *DRN* 2.398-443, 4.615-721.

²⁵ Cf. Epic. *Ep. Hdt.* 54-55.

²⁶ Size, weight, and shape will be treated further below, with respect to *primordia* and assemblies specifically. Tangibility, the capacity to act and be acted upon, and resistance refer to the interaction of bodies with each other. Motion refers to the interactions of bodies and/or to the conduct of a body through a three-dimensional interval. The types of motion and the ontological status of each sort will also be dealt with shortly. Time and its relationship to motion will be treated in chapter three.

²⁷ The most coherent account of the *coniuncta* of *primordia* occurs at Lucr. *DRN* 1.483-634; the tightly interwoven nature of the discussion perhaps reflects how closely interrelated are these *coniuncta*. Cf. Epic. *Ep. Hdt.* 41, 54-55.

²⁸ Lucr. *DRN* esp. 1.483-539. Epicurus refers to the atoms, for example, as being πλήρη with respect to their nature, as μεστά, and as ‘τὶ ... στερεόν’. cf. *Ep. Hdt.* 41, 42, 54 (respectively).

²⁹ He had already introduced the idea that there are some bodies which are eternal or indestructible; Lucr. *DRN* 1.215-64, esp. 1.221, 1.234-6, 1.238-49, cf. Epic. *Ep. Hdt.* 39.

³⁰ Lucr. *DRN* esp. 1.485-6, 1.498-502, 1.518-19, 1.548-50, 1.951-2, and, specifically with respect to means of destruction, 1.528-39, cf. 1.219-24, 1.238-49.

³¹ Lucr. *DRN* esp. 1.540-64, cf. Epic. *Ep. Hdt.* 55. Though each of the *primordia* exists as a single unit, it does have parts. These minimal parts are conceptual - that is, distinguishable only in thought, not in practice - and related to the sizes and shapes which differentiate the various sorts of first-beginnings. *DRN* 1.599-634, 1.746-52, 2.157-9, 2.478-99, cf. Epic. *Ep. Hdt.* 56-59, p.18 n.35.

³² The *coniunctum* is introduced by reasoning from the fixity of species of living things; Lucr. *DRN* 1.584-98. It is revisited in the arguments against Heraclitus and those who believe that from one or more of the so-called ‘four elements’ (fire, water, earth, air), all things can be made. These immutable and eternal bodies, the *primordia*, are the first-beginnings of all things, including of these ‘four elements’. *DRN* 1.670-89, 1.789-802. N.B. These four do not completely correspond to the four elements which comprise the *animus-anima complex* - i.e. wind, fire, air, and the nameless fourth, as we shall see.

³³ Lucr. *DRN* 1.675-6: ‘... certissima corpora quaedam | sunt, quae conservant naturam semper eandem’, cf. Epic. *Ep. Hdt.* 54, esp. ‘αἱ δὲ ἄτομοι οὐδὲν μεταβάλλουσιν ... ὅθεν ἀναγκαῖον τὰ ... τὴν τοῦ μεταβάλλοντος φύσιν οὐκ ἔχοντα ...’.

relational *coniunctum*, namely fecundity. This is essential to their nature, as suggested by Lucretius' terminology,³⁴ but the potential only actualizes under specific circumstances. This is the capacity to aimlessly generate new bodies (assemblies) with natures distinct from the natures of their constituents.

Fecundity is distinct from augmentation, nutrition, and reproduction. Under the right conditions, any tangible thing has the potential to augment another body.³⁵ Successful augmentation is related to nutrition and thus to growth and preservation.³⁶ These presuppose some already extant thing which is being augmented without altering its nature. Moreover, the first-beginnings actually do the augmentation; food or water merely supply the *primordia*.³⁷ Similarly, Lucretius characterizes the Earth itself as generative because it supplied the first-beginnings from which the variety of things on it were produced.³⁸ For example, in debunking the Magna Mater myth, he states:

et quia multarum potitur primordia rerum,
multa modis multis effert in lumina solis
DRN 2.653-4

And because Earth contains the first-
beginnings of many things, it brings many
things forth in many ways into the lights of
the sun.

Only in this sense, for Lucretius, can the Earth be called the mother of all things. The reproductive capacity of living things is also different from the particular fecundity of the first-beginnings, as living things only reproduce after their own kind (*generatim*)³⁹ - which *primordia* cannot do. Birth also presupposes a parent.⁴⁰ There is no intelligent design guiding or determining the generative and nutritive interactions between the first-beginnings in the infinite void. These interactions occur without purpose, according to the

³⁴ Cf. Sedley 1998a: 38-9.

³⁵ This is at least theoretically true even of the minimal parts of the indivisible first-beginnings. Although the minimal parts account for the variety of shapes, sizes, and weights of the first-beginnings, Lucretius explicitly denies that they are generative; Lucr. *DRN* 1.433-6, 1.628-34. One reason may be their inability to move except as part of a first-beginning or atom; cf. Epicurus at *Ep. Hdt.* 59. On the apparent correspondence and possible development of the idea of that inability from Aristotle and Diodorus Cronos, cf. Long and Sedley 1987: i.43-4, 51-2, ii.38.

³⁶ Lucr. *DRN* 1.709-17.

³⁷ Cf. esp. pp.83-4.

³⁸ Lucr. *DRN* 1.225-37, 1.250-64, 1.803-16, 1.859-74, 1.1026-41, 2.589-99, 2.652-4, 2.661-72, 2.711-17, 2.991-1004, 2.1122-43, 3.703-4, 4.642-62, 4.858-76, 4.1091-3.

³⁹ In this way, species and breeds retain their characteristic natures and offspring resemble their parents; Lucr. *DRN* 1.584-98, 2.661-6. These issues and the Earth as mother will be treated in chapter four.

⁴⁰ It may be objected that a preexisting assembly is not required for the birth of spontaneously generated worms and the wombs which gave birth to the theoretical first creatures in the early days of the Earth; these, however, are examples in which the Earth itself supplied the first-beginnings, as we shall see.

laws of nature alone.⁴¹ For any thing to have ever been generated, the quantity of matter must be infinite and the motions of the first-beginnings perpetual.⁴²

Void is intangible extension - the place or otherwise empty space in which bodily things can be situated and move.⁴³ It is yielding and thus facilitates both the motion of bodies and the motion of certain bodies through other sorts of bodies.⁴⁴ In and of itself, void lacks size, shape, and motion; the semblance of such things only appears insofar as empty space exists in assemblies of matter. Void is also weightless.⁴⁵ The void - as the interval or sum of all space - is infinite.⁴⁶ As void, it lacks tangibility, resistance, size, shape, motion, weight, and the capacity to act and be acted upon. This set of *coniuncta* is evidence of the antithetical natures of void and of body in general.⁴⁷ The void is infinitely divisible; at whatever point one might theoretically divide, bound, or pass through it, infinite space would still extend in every direction. The void is thus eternal and immutable space, which is open to the motions of bodies. With respect to the void, then, these motions are *eventa*. An empty interval of space (an arbitrarily defined part of the void in which no bodies are moving at a given moment), cannot generate anything.⁴⁸ Furthermore, void does not link or combine with the first-beginnings in the formation of assemblies. Assemblies of matter only contain - or, perhaps better, involve - void insofar as their constituent *primordia* are spaced-out.⁴⁹ Thus the void is not fecund, but merely facilitates the generation of assemblies.

Because generated things contain both solid bodies and void, they are divisible and ephemeral, as well as of various consistencies - which can be understood as density, and

⁴¹ On this purposelessness, cf. esp. Long 1977, Sedley 2007: 133-66.

⁴² Lucr. *DRN* 1.951-2, 1.992-7, 1.1014-37, 2.294-307, 2.541-68, 5.187-94, 5.419-32, Epic. *Ep. Hdt.* 41-4, Diog. Oen. fr. 67 Smith. Further on cosmogony in chapter four.

⁴³ It is referred to it in different ways, depending on which *coniuncta* are being emphasized. Lucretius introduces the various terms for it by equating *locus*, *spatium*, and *inane*; Lucr. *DRN* 1.426. Cf. Epic. *Ep. Hdt.* 40: 'τόπος δὲ εἰ μὴ ἦν, ὃν κενὸν καὶ χώραν καὶ ἀναφῆ φύσιν ὀνομάζομεν ...'; the text here is that of Usener 6, and of Long and Sedley: ii.20 [5A]. On this reading of the text of Epicurus, in support of the conjecture of Usener, cf. Sedley 1982b: 183-4. In light of the explanation of the terms offered by Sextus Empiricus, *M.* 10.2 (Usener 272, misprinted as 'Usener 271' in Long and Sedley 1987 [5D]), Long and Sedley suggest that Epicurus developed these various terms for different contexts or ways of looking at void in response to Arist. *Phys.* 4; Long and Sedley 1987: i.29-31, ii.22-3.

⁴⁴ Lucr. *DRN* 1.329-429, 1.436-44, 1.451-4, 1.1077-80, 2.235-9; cf. Epic. *Ep. Hdt.* 40, 44, 61, and, esp. with *DRN* 1.440-4, cf. Epic. *Ep. Hdt.* 67: 'τὸ δὲ κενὸν οὔτε ποιῆσαι οὔτε παθεῖν δύναται, ἀλλὰ κίνησιν μόνον δι' ἑαυτοῦ τοῖς σώμασι παρέχεται'. On this precise formulation of the concept of void in Epicurus and Lucretius and its possible origins, see Sedley 1982b: esp. 188-91; cf. Long and Sedley 1987: 1.32. This understanding of void holds whether one agrees with Sedley (following Brieger's 1894 Teubner edition) in rejecting the transposition of *DRN* 1.434 and 1.435 or retains it following the editions of Bailey and of Rouse and Smith, among others. Compare the logic of Sedley 1982b: 190 and Bailey 1947, ii: 668-9.

⁴⁵ Lucr. *DRN* 1.363.

⁴⁶ Lucr. *DRN* 1.958-1020, 2.89-95; cf. Epic. *Ep. Hdt.* 41-2, 60, 67.

⁴⁷ They are explicitly construed as antithetical at Lucr. *DRN* 1.503-10, cf. 1.520-7, Epic. *Ep. Hdt.* 67.

⁴⁸ Further on the void as it relates to time, cf. esp. p.136.

⁴⁹ Lucr. *DRN* 2.97-108, Epic. *Ep. Hdt.* 44. On this point, cf. Sedley 1982b: 190-1 and below.

thus permeability and hardness. The relative instantiation of these *coniuncta* are at least partially explicable by the proportion of void contained within each assembly.⁵⁰ While the divisibility of an assembly is necessary for its destruction, it is not necessarily sufficient. Although no macroscopic assembly is homogenous,⁵¹ some can undergo some division without being entirely resolved into their constituent *primordia*.⁵² Conversely, augmenting an assembly does not necessarily change the initial assembly into something else.⁵³ In such cases, the size, shape, and weight of the initial assembly are somewhat mutable. An assembly is also somewhat mutable when some of its constituents (*primordia* or *concilia*) can change position without altering its nature or destroying the thing itself, as with the fluidity of water (*liquor aquai*).⁵⁴ Thus the sea can change shape (and, in the process, color) without becoming something else.⁵⁵ The motion of what this study calls the ‘*animus-anima* complex’, which also involves multiple constituents, is likened to that of water.⁵⁶ As we shall see, its constituents can move in many ways without altering the essential nature of the complex. The particular size, shape, and weight exhibited at a given moment by a somewhat mutable assembly are *eventa*, but the possession of size, weight, and shape themselves are *coniuncta*. An assembly of few enough *primordia* would not allow for division, augmentation, or mutation of its arrangement without consequently and simultaneously passing outside of its boundaries and thereby ceasing to exist.⁵⁷ Thus certain *coniuncta* may vary with the complexity of the assembly.

Finally, rather than being generative in the sense of the first-beginnings, assemblies of matter have the capacity to supply first-beginnings. By the death or destruction and the dissolution of an assembly, its former constituents can be recombined into new things or

⁵⁰ However tightly interlaced are the shapes of the first-beginnings, however tiny the intervals over which the first-beginnings move and collide within the assembly, the assembly will nevertheless contain some amount of void. Lucr. *DRN* 1.221-4, 1.238-49, 1.487-97, 1.511-37, 1.565-76, 1.581-3, 2.97-109.

⁵¹ Lucr. *DRN* 1.834-46, 2.581-8.

⁵² For example, cutting a square of purple cloth into smaller pieces does not alter its nature or color, but unraveling the thread undoes both; Lucr. *DRN* 2.826-33. Similarly, dividing a measure of water into droplets would not transform the water into any other thing; cf. pp.82-3. Even a living creature - as we shall see - can be cleaved up to a point without being destroyed altogether, such as when one loses limbs in battle; *DRN* 3.526-32, 3.642-56, Epic. *Ep. Hdt.* 65. The very idea of a macroscopic assembly is predicated on the idea of limited divisibility, as assemblies which we can see are those which emit *simulacra*; *DRN* 4.30-2, 4.104-7.

⁵³ Augmentation of an assembly, such as by taking food, maintains or preserves that assembly by means of adding first-beginnings.

⁵⁴ Lucretius explicitly offers this as an example of a *coniunctum* at Lucr. *DRN* 1.449-54.

⁵⁵ Filtering out the salt, on the other hand, fundamentally changes seawater by means of a loss of certain first-beginnings into drinking water. The resulting water is nevertheless still fluid because the first-beginnings which make it so remain; Lucr. *DRN* 2.464-77, cf. pp.86-7.

⁵⁶ Lucr. *DRN* 3.177-207. On the fundamental nature of the complex, cf. below.

⁵⁷ This is shown, for example, by Lucretius’ analogous use of letters as the *elementa* of words and verses. In these cases, which resemble the modern concept of molecules, no anagrams, additions, or subtractions, are possible without a change in meaning - ex. *lignis* becomes *ignis*; Lucr. *DRN* 1.092, cf. 1.817-29, 1.907-17 (foreshadowed by 902), 2.688-99, 2.1013-22, and p.10 n.42.

augment already extant unlike things.⁵⁸ Many illustrations could be given of this eternal cycle of creation and destruction, which recurs throughout the poem in many ways. For example, from the falling of the rain, the subsequent growth of crops, and the resulting nourishment and prosperity of the human and animal communities, Lucretius introduces the idea that:

haud igitur penitus pereunt quaecumque videntur,
quando alid ex alio refecit natura, nec ullam
rem gigni patitur nisi morte adiuta aliena
DRN 1.262-4

Therefore by no means does whatever is seen completely perish, since nature refashions one thing from another, nor does it allow anything to be generated unless it is aided by the 'death' of something else.

This is a cheerful approach to the cycle, as compared to the eternal war of the first-beginnings which mingles the cries of the newborn with the funeral dirge.⁵⁹ Assemblies can also be subsumed in and thereby augment already extant larger assemblies of like nature, as rivers and rain maintain the size of the seas.⁶⁰ Finally, certain extant assemblies can reappropriate some of their own first-beginnings for the reproduction of things with similar nature, as in procreation.

This chart is an overview of the *coniuncta* which Lucretius identifies as defining bodies and void, and, within bodies, first-beginnings and assemblies.⁶¹

⁵⁸ We will shortly see that living things are examples of this. Such processes also form assemblies within larger ones. Bones are no less an assembly within the larger than is the *animus-anima* complex, which in turn is comprised primarily of four constituents assemblies. Cf. *passim*.

⁵⁹ Lucr. DRN 2.569-80, cf. 2.112-24. The cycle of creation and destruction occurs throughout the poem in various ways and in various lights, raising ethical questions which are outside the scope of this study. For example, to what extent is possible to achieve the goal of ἀταραξία, since processes on the human level are to some extent coordinate with those on the level of the first-beginnings, which are at war? On Virgil's exploitation of this apparent paradox, cf. Gale 2000: 259-69. On the debate as to whether Lucretius was a pessimist, primitivist, or progressivist, cf. p.199 n.122. For a literary interpretation of the cycle and animals place in it, cf. Betensky 1972: esp. 23-61 and Camardese 2010: 51-75.

⁶⁰ Lucr. DRN 6.608-38. The formation of the earth from a primordial soup, for instance, was to some extent a process of the joining of alike things: '*paesque | cum paribus iungi res*'; 5.443-4.

⁶¹ The symbol '✓' indicates that the thing in question has the *coniunctum* of the corresponding column heading. If the entity has either the opposite or some other degree of the *coniunctum* in the column heading, it is listed in the row with the thing itself.

CONIUNCTA													
RES		S I Z E	T A N G I B I L I T Y	To ACT & be ACT -ED upon	R E S I S T A N C E	M A S S	M O T I O N	S H A P E	S O L I D I T Y	E T E R N I T Y	I N D I V I S I B I L I T Y	I M M U T A B I L I T Y	F E C U N D I T Y
	<i>INANE</i>	infinite -ness	intang- ibility	condu- ctivity	yieldin- gness	weight -less	still- ness	shape -less -ness	empti- ness	✓	infinite divisi- bility	✓	facili- tative- ness
	<i>CORPORA</i>	✓	✓	✓	✓	✓	✓	✓					
	<i>PRIMORDIA</i>								✓	✓	✓	✓	✓
	<i>CONCILIA</i>								densi- ty	epehe- meral- ity	limited divisi- bility	limited muta- bility	supply -ing- ness

Motion is crucial to understanding how many of these *coniuncta* and *eventa* come about. While all bodies are always in motion, a given body does not always exhibit the same sort of motion and different sorts of bodies are capable of different sorts of motion.⁶² Lucretius posits two main categories of motion: *per se* motion, where the body in question moves itself on its own, and not *per se* motion, where the body in question moves due to some external impetus, such as a collision. A not *per se* motion is necessitated, sometimes by multiple causes, at least to the point where, theoretically, the causal chain(s) can be traced back to some unfixed motion. However, non-living and living bodies exhibit these types of motion differently.

The motion of non-living *corpora* manifests in three ways: motion downward due to weight, motion in various directions due to some external force, and an unfixed motion

⁶² Again, the first-beginnings are constantly in motion, whether they are moving individually or have allied their motions in an assembly. Assemblies are also in constant motion, at least on some imperceptible level; Lucr. *DRN* 2.80-111, 2.125-41, 2.153-4, 2.308-23, Epic. *Ep. Hdt.* 43-4, 62.

known as the *clinamen* or swerve.⁶³ Lucretius uses the motion of the macroscopic as evidence or *vestigia* of the microscopic as well as the means by which one can understand the microscopic.⁶⁴ He introduces the idea that the first-beginnings can move on their own in his account of tiny bodies in a sunbeam.⁶⁵ Their motions originate with the motions of the first-beginnings.

scilicet hic a principiis est omnibus error:
prima moventur enim per se primordia rerum
DRN 2.132-3

Obviously all things have this wandering
from first-beginnings, for the first-beginnings
of things are moved firstly through
themselves.

In this context, '*per se*' suggests multiple coinciding interpretations of '*moventur*'. The first-beginnings both move 'on their own' and move 'each other'. With respect to the latter, the *primordia* collide with each other because of their individual motions. Smaller bodies then collide with and stir larger ones. The motions of dust motes thus show that motion ascends from the first-beginnings to progressively larger bodies. This cannot occur due to weight alone. A body's motion downward due to weight occurs *per se*; it is also a necessitated or fixed motion.⁶⁶ If a non-living body moves in a different direction, it is generally due to some force, such as a collision or blow. These are necessitated by their proximate cause or causes. However, given the natural motion of bodies and the yielding nature of the void, all bodies fall with equal speed.

haud igitur poterunt levioribus incidere umquam
ex supero graviora, neque ictus gignere per se
qui variant motus per quos natura gerat res
DRN 2.240-2

Therefore by no means can weightier bodies
ever fall upon lighter from above, nor
produce blows on their own to vary the
motions through which nature conducts
things.

Therefore, at least at some theoretical stage there had to have been another motion with another cause, capable of producing generative blows. The motion that Lucretius posits is the swerve.⁶⁷ Moreover, as Furley notes, the plural *corpora* in line 2.217 rules out the

⁶³ N.B. Lucr. DRN 2.83-88 on weight and blows with respect to the first-beginnings, 2.184-215 on motion upwards being the result of some force, and 2.216-93 on the swerve (with 216-50 also dealing with weight in relation to collisions) and that even macroscopic bodies cannot be proved to not swerve imperceptibly. The chains of motion which relate and convert between the first two types are at least partially dependent on the occurrence of a swerve, which motion begins a new chain and thereby alters the previous ones. Cf. Epic. *Ep. Hdt.* 43-4, 61-2 on the motions of atoms and assemblies which are caused by weights and blows.

⁶⁴ This methodological point applies to more than his discussion of motion, but with respect to motion, it is worth noting that Lucretius often uses terminology for discussing the macroscopic which shows that he is generalizing the point to all bodies, both philosophically and linguistically. For example, in Lucr. DRN 2.184-250, which is about all bodies, note the usage of *corpora* and like terms in 2.185-6 and 2.216-50 *passim*.

⁶⁵ Lucr. DRN 2.112-41.

⁶⁶ Cf. esp. Lucr. DRN 2.217-18, 2.247.

⁶⁷ Lucr. DRN 2.184-250. Cf. Epic. *Ep. Hdt.* 43-4, 61, Furley 1967: 173. The 'start' to the cosmogonical process is only a thought experiment, however, given the infinity of time, space, and matter; Sedley 1983: 13.

possibility that only one swerve ever occurred, which would have sufficed for cosmogony. Lucretius introduces the swerve⁶⁸ in the context of motion due to weight.

corpora cum deorsum rectum per inane feruntur
ponderibus propriis, incerto tempore ferme
incertisque locis spatio depellere paulum,
tantum quod momen mutatum dicere possis
DRN 2.217-20

When bodies are born straight down through
the void by their own weights, at an entirely
unfixed time and in unfixed places they divert
from their course a little, just so much as what
you may call a changed motion.

The necessitated and *per se* motion that is a body on a downward trajectory undergoes a slight change of motion. No external cause of that *momen mutatum* is mentioned, nor is the motion predictable; hence it occurs *per se* and is unfixed.

The swerve is not mentioned in any of the surviving witnesses of Epicurus, which is perhaps reflected by its omission from the beginning of Lucretius' account of motion.⁶⁹ Sedley suggests that the swerve was a later idea that Epicurus developed in the context of his thought on psychology and projected back onto his account of cosmology that had already been developed in earlier books of *On Nature* and epitomized in *Ep. Hdt.* and *Ep. Pyth.*⁷⁰ Englert similarly posits a two-stage development of Epicurus' account of atomic motion, wherein the swerve is part of the second stage.⁷¹ Englert - like many - builds on the landmark study of Furley, who argues that the invention of the swerve was a response to Aristotle's doctrine of the voluntary.⁷² Furley shows that the criticisms of Democritean atomism, for which Aristotle is one of our main sources, played a central role in the process of Epicurus' thought formation. However, if and when(ever) Epicurus was responding to Aristotle, as Morel aptly states, this 'does not mean that Aristotle's criticisms had, in the eyes of Epicurus, an absolutely constraining force'.⁷³ Nor would replying to Aristotle have been Epicurus' only concern - much less Lucretius'. On the basis of *On Nature* 25, Sedley persuasively argues that the doctrine of the swerve arose as

⁶⁸ In considering here the swerve as separately from *voluntas* and related issues as one can do, given their relationship in our evidence, this study follows the precedent of Sedley 1983: cf. 12 n.1 and Long and Sedley 1987: i.107.

⁶⁹ Lucr. DRN 2.80-5. Nowhere in the surviving evidence does Epicurus explicitly discuss the swerve, but *On Nature* 25 strongly indicates that the will and moral responsibility were among the principle contexts to which this doctrine was relevant (which topics we will return to in chapter five). As such it addresses one of the principle consequences of Democritean reductionism: the necessitation of human belief, volition, and action by atomic motion. On reductionism, cf. below.

⁷⁰ Sedley 1983: 13.

⁷¹ Englert's account of the philosophical background and development of Epicurus' theory of atomic motion, which he sees reflected in Lucretius, is in Englert 1987: esp. 27-63.

⁷² Furley 1967: 159-237, esp. ch.5.

⁷³ Morel 2009: 74, in the context of discussing Epicurus' doctrine of minimal parts; cf. Sedley 1983: 15 n.8.

a refutation of Democritean determinism directly.⁷⁴ Elsewhere he claims - not least with respect to the issues of physics related to the swerve - that Theophrastus, rather than Aristotle, was also a 'source and catalyst' for Epicurus' arguments.⁷⁵ That the swerve arose as a refutation of Democritean determinism is indeed reflected by the fact that Lucretius' account of the swerve is first and foremost part of his account of atomic motion (*DRN* 2.80-332).⁷⁶

The fact that Epicurus posited the *παρέγκλισις* is amply attested by other ancient authors, including Zeno of Sidon, Philodemus, Cicero, Plutarch, and, of course, Lucretius; the last four, at least, all mention the minimal nature of the movement.⁷⁷ This minimal motion is described by Lucretius as follows:

quare etiam atque etiam paulum inclinare necessest
 corpora; nec plus quam minimum, ne fingere motus
 obliquos videamur et id res vera refutet
DRN 2.240-5

Therefore again and again it is necessary that
 bodies incline a little, not more than the
 slightest possible, lest we are seen to invent
 oblique motions and the true situation refute
 this.

Taking 2.217-20 and 2.240-5 together, it is clear that the motion entails the least possible deviation from a body's previous trajectory, at an unfixed time and place. What, precisely, a swerve of the first-beginnings entails is the subject of much debate. Sedley and Fowler view it as a sideways shift by one spatial unit (the *minimum* or *ἐλάχιστον*) without a change in direction of motion.⁷⁸ Englert emphasizes that such a swerve can occur from any trajectory of motion, not just a perpendicular downward path. However, he supports the argument that motions are discontinuous 'jerks' from one spatial minimum to the next.⁷⁹ Thus, for Englert, swerves will only occur as a sideways shift in motion, at ninety-degree angles to the initial trajectory.⁸⁰ It seems more likely, that these *minima* are arbitrary points

⁷⁴ Sedley 1983: 15 n.8 and *passim*. For general discussion of the topic and central issues, cf. Long and Sedley 1987: i.107-12. Sedley's primary evidence, at that time thought to be book thirty-five of *On Nature*, and more often referred to as the *Liber incertus de libertate agendi* (= fr. [34] Arr.²; *PHerc.* 697, 1056, 1191), has since been shown to be *On Nature* 25, cf. Laursen 1987: 77-8. Sedley's point about the relationship of the swerve's invention to refuting determinism stands whether or not one agrees with the conclusion of Laursen - based on the summary concluding book twenty-five - that Epicurus had not yet formulated the notion of 'free will' by the time of the book's composition; cf. Laursen 1991: 154. Other than in the aforementioned Sedley 1983 and Arr.², recent publications of parts of book twenty-five include: Long and Sedley 1987: [20 B, C, j], Laursen 1991, Laursen 1995, Laursen 1997.

⁷⁵ On the relationship of Theophrastus to Epicurean physics and, through Epicurus, to *DRN*, cf. Sedley 1998a: esp. 166-85 and Sedley 1998b.

⁷⁶ In this context, *voluntas* is merely one piece of evidence for the swerve's existence. These points concur with the findings of Sedley 1983: 15.

⁷⁷ Cf. e.g. Cic. *Fat.* 21-5: esp. 22.

⁷⁸ Like a car driving on a straight motorway which changes lanes; cf. Sedley 1976: 25, incl. n.18-19, Sedley 1998a: esp. 183-185, Sedley 1998b: 353 and Fowler 1983: 329. In physics, however, that does involve change and restoration of vector. Moreover, this formulation seems to raise Zeno's paradox of half-distances.

⁷⁹ Englert 1987: 1, 14-16, 153 n.2-7, 158 n.4.

⁸⁰ Englert 1987: 13-26.

in space, with no more than the smallest conceivable extension. Just as the dust motes exist as points at the limits of our vision, spatial *minima* exist as points at the limits of conception. They are almost infinitely small, yet conceivably infinitely divisible.⁸¹ The idea of jerky discontinuous motion suggested by those who think of *minima* like squares on a sheet of graph paper would blatantly contradict what both Lucretius and Epicurus assert - namely the eternity of the motion of all bodies, including the *primordia*. Conceiving of *minima* like points in space, however, allows for continuous motion and puts no limitations on the direction in which one might swerve. The swerve, therefore, is not an oblique motion insofar as bodies do not suddenly run-off at an angle from their trajectory; they continue moving without interruption, on an ever-so slightly altered course.⁸² A useful analogy might be the shift of a train on a railway point.⁸³

The swerve is *incertus* or unfixed, insofar as it occurs at unfixed times and at unfixed places;⁸⁴ this does not mean that the motion is random, the result of chance, or uncaused. Such ways of understanding the swerve risk suggesting that the swerve operates outside of natural law with respect to cause, direction, and time. As Long shows, Lucretius - following Epicurus - understands the universe as stable and operating according to the pacts of nature (*foedera naturae*), which include natural laws. Hence there is no chance or spontaneity in the universe, in the sense of randomness. Rather, 'chance' refers to the absence of teleology and determinacy, as well as the purposelessness of all motion -

⁸¹ This way of thinking about *minima* would also work for minimal parts and minimal points in time; pp. 131-3. This view is not incongruous with Sedley's understanding of mathematically smallest or minimal magnitudes; cf. Sedley 2007: 160-3 (N.B. his qualifications of the diagram on p.162).

⁸² The only restriction which Lucretius may place on the direction of a *per se* motion is on motion upwards, but the examples suggest that it is permanent *per se* upward motion which he finds impossible: '*nullam rem posse sua vi | corpoream sursum ferri sursumque meare*'; Lucr. *DRN* 2.185-6 and following.

⁸³ Many thanks to Monica Gale for this analogy.

⁸⁴ Lucretius' use of the term *incertus* both at Lucr. *DRN* 2.251-93 and throughout the poem can plausibly if not best be understood to mean 'unfixed', with very few exceptions. This understanding of *incertus* opens up a broader range of possibilities for interpreting the swerve.

perhaps save certain voluntary ones. Thus the universe and everything in it follows a fixed order (*certus ordo*).⁸⁵ There are no miracles or erratic events.⁸⁶

Nothing lacks a natural cause or causes - even unfixed motions. With respect to some phenomena, there are many paths to the same place. There are various macroscopic phenomena for which Lucretius and Epicurus admit multiple possible physical causes, but do not decide between them. Some things, including many of the *coniuncta* and *eventa* of living things, also involve a confluence of causes.⁸⁷ For example, with respect to meteorological phenomena, Lucretius asserts:

cetera quae sursum crescunt sursumque creantur,
et quae concrescunt in nubibus, omnia, prorsum
omnia ...
perfacilest tamen haec reperire animoque videre
omnia quo pacto fiant quareve creentur,
cum bene cognoris elementis reddita quae sint
DRN 6.527-9, 532-4

The rest of the things which grow above and are created above, and which combine in the clouds, all, absolutely all ... it is nevertheless very easy to discover and to see with the *animus*⁸⁸ by what pact all these things are made and how they are created when you have learned well what sorts of things have been allotted to their constituents.

Lucretius thus believes that absolutely all things, '*omnia, prorsum | omnia*', including all these things, '*haec ... omnia*', which wrongly engender the fear of the gods in many through ignorance of causes,⁸⁹ can be explained in physical terms. *Concilia* and the processes by which they are generated can be explained by the *coniuncta* and *eventa* of

⁸⁵ Long 1977: esp. 85-6; cf. esp. Lucr. DRN 2.294-307. Johnson 2013 also argues that 'spontaneity' (*sponte sua*) in the poem actually reinforces the notion of the regularity of the universe, and - correctly - that there is no chance or randomness; however his notion of 'spontaneous' amounts to 'automatic', i.e. (to use the terminology of this study) *per se* and necessitated. On the surface, a better translation of *sponte sua* might be 'independently' in the sense of 'on its own' or '*per se*' (both necessitated and unfixed), but it turns out that *sponte sua* does not seem to occur in the context of Lucretius' discussions of unfixed motions at either the primordial or phenomenal levels (N.B. not in DRN 2.251-93, 4.877-80, or 4.881-97), which alone should give one pause in rendering the expression. It seems that it occurs only with respect to *per se* processes which are in some way necessitated by their proximate causes and either 'automatically' or 'of its own accord' captures the sense more accurately in most cases. As Long notes, '*Natura acts sua sponte* (II.1059, 1092)', being 'a causal system of things conforming to predictable patterns' and 'the object of rational understanding'; Long 1997: 131, 135. Lucretius generally uses the term *sua sponte* of spontaneous generation but not of matter which is or has become living. Of his twenty uses of the term, there are four potential exceptions to this picture: DRN 3.1041, 5.872, 5.961, and 5.1145-7; only the first of these presents a serious challenge, but it turns out to be an ironic pun (on Democritus' claim that all things, including human action, are necessitated). The others could all be rendered 'independently' (or 'of its own accord' at 5.1147; cf. 5.804) and relate to what is *per se* and necessitated by natural law for survival. The understanding of the term argued for here is broadly compatible with that of Gale 2009: 179. On Virgil's challenge to Lucretius with respect to *foedera* and the regularity of the natural world, cf. Gale 2000: ch.6. Campbell 2006: 10-12 does not see this '*certus ordo*' as being incompatible with randomness, particularly with respect to cosmogony.

⁸⁶ If the swerve were random and, as will be discussed in ch.5, playing a causal role in *voluntas*, then extremely unlikely events (almost miracles without divine intervention) over which we would seem to exert no control would theoretically be possible. But it is not random.

⁸⁷ Many examples are given throughout DRN, particularly in books five and six with respect to phenomena involving non-living things. But these do arise at least in part from their constituents, cf. Lucr. DRN 6.527-34; cf. Epic. *Ep. Hdt.* 77-80; *Ep. Pyth. passim*. With respect to living creatures, the remainder of this study should bear out the claim.

⁸⁸ Here the vision of the *animus* represents its use of reason; other evidence for this connection will be dealt with in later chapters; cf. esp. pp. 276, 294.

⁸⁹ Lucr. DRN 6.46-67, cf. 5.82-90.

their constituents and the pacts of nature which relate their interactions. Lucretius is at pains to state this for a reason. The more causes upon which something is contingent, and the more possible causes which could explain that result, the less fixed or predictable the result will seem. Consequently, people are likely to be ignorant of the causes and attribute the apparently unpredictable to divine intervention, which idea Lucretius is trying to fight. But the idea that every thing - even the relatively unpredictable ones - has a natural cause, which Lucretius does espouse, is different from the idea that any thing is identical to its cause (or to the sum of its causes), which is not generally the case.

When something is not determined by its causes, it is unfixed; it can still be explained in physical terms, but can neither be strictly predicted by its causes (whether or not we know them) nor be reductively understood by them. Modern quantum physics offers an analogy which may help us to understand how such a situation works. Electrons of a given atom move within certain clouds and between certain energy states. Such movements are not random in either the sense of uncaused or of indeterminate direction. These movements are predictable by the laws of physics, but only up to a point. We can predict the shape of an electron cloud and which energy state (and set of clouds within that state) a given electron is likely to move to, under various circumstances. But these so-called clouds and states are merely probability distributions of electron movement, not traces of particular or fixed movements like planetary orbits. We cannot determine which energy state or cloud a particular electron will necessarily move to or within, or for how long - much less follow its trajectory. As far as we know, the cause and direction of the particular movements of a given electron are thus, to an extent, unfixed and in itself - albeit within an almost inconceivably small spatial range. Thus the laws of physics can account for the possibilities and even predict probabilities, but the possibilities - although not unlimited - are themselves left open. This also seems to be true of the swerve.⁹⁰

Therefore, unfixed does not imply random or uncaused; rather, the result of the cause - and possibly also the cause itself - was not necessitated, thereby introducing a degree of indeterminism. What is unfixed is truly, rather than apparently, unpredictable -

⁹⁰ Cf. De Lacy 1969: 108-9. Long and Sedley suggest that volition is a non-physical property of atoms which affects said atoms by directing swerves - i.e. by choosing between the possibilities that physics leaves open; Long and Sedley 1987: i.111. This is one of the examples which Sedley uses elsewhere of emergent properties and downward causation; Sedley 1988: 321-2. Sharples and others take Sedley to mean that volition not only directs but also causes the swerves with which it is correlated (as opposed to those which happen 'at random'); Sharples 1991-3: 176-7. Sharples' interpretation of Sedley's removes both the *per se* and unfixed aspects of said swerves. Perhaps a more clear cut illustration of the possibilities that physics leaves open comes from the fixity of species, as we shall see in chapter four.

within a certain degree of probability. That probability distribution follows from the cause of the unfixed thing, whatever it is. As far as we know, neither Lucretius nor Epicurus ever explicitly stated the cause of the swerve, nor denied that it had one.⁹¹ This interpretation is consistent with the swerve preventing the universe from being deterministic - while remaining largely mechanical, or able to be described in physical terms. The existence of an unfixed motion thus saves the *foedera naturae* from being the *foedera fati*. Moreover, those things which are not determined by their causes cannot be reductively understood by them.

Lucretius suggests that an unfixed *per se* motion is, at least theoretically, the beginning of all new motions. For example, he famously argues that the swerve of the first-beginnings thus prevents the existence of a deterministic chain of motion and causation stretching back to infinity. The existence of '*fatis avolsa voluntas*' would not be possible, claims Lucretius:

... si semper motus conectitur omnis
 et vetere exoritur motu novus ordine certo,
 nec declinando faciunt primordia motus
 principium quoddam quod fati foedera rumpat,
 ex infinito ne causam causa sequatur, ...
 DRN 2.251-5

... if all motion is connected and if new motion arises from old motion in a fixed order, and if the first-beginnings do not by declining⁹² effect a certain beginning of motion to break the pacts of fate in order that cause may not follow cause from infinity ...

Lucretius thus implies that the existence of '*fatis avolsa voluntas*' proves three things: that this conditional must be false, that the swerve must exist, and that the swerve plays some causal role in this freedom.⁹³

This passage reinforces the claim that the swerve of the first-beginnings is a *per se* motion by means of which new chains of motion are initiated.⁹⁴ Not only the first-beginnings, but also assemblies are capable of a swerve motion. Much of Lucretius' account of the swerve is framed in terms of *corpora* in general. He explicitly states that it cannot be proved that macroscopic bodies⁹⁵ do not swerve imperceptibly while they are falling due to weight.

namque hoc in promptu manifestumque esse videmus,
 pondera, quantum in sest, non posse obliqua meare,
 ex supero cum praecipitant, quod cernere possis;

For indeed we see that this is clear and manifest: that weights, when they fall on their own from above, are not able to travel

⁹¹ Cic. *Fat.* 21-22, 46-7; Englert 1987: 55-62. Long and Sedley 1987: ii.110 note that the causelessness of the swerve is an inference by Epicurus' critics, but concur with respect to cosmogony and posit non-physical causes for it in the context of living creatures.

⁹² I.e. 'by swerving'. This further suggests that the term 'swerve' may exaggerate this least possible motion.

⁹³ We will return to the relationship between *voluntas* and the swerve in ch.5.

⁹⁴ Cf. *Lucr. DRN* 2.217-20, discussed above, cf. pp.24-5. Both passages establish the motion of the swerve as a cause of subsequent motions, but - again - neither rules out that the swerve may itself have a cause.

⁹⁵ In this context his examples are non-living *corpora*.

sed nil omnino recta regione viai
declinare quis est qui possit cernere sese
DRN 2.246-50

obliquely - as far as you can perceive. But
who is there who can perceive that they divert
themselves *not at all from the straight line of
their path?*

Line 2.249 has been italicized to reflect the importance of this possibility, also indicated by its spondaic scansion. The textual difficulties with this passage noted by Bailey and Fowler do not substantially affect its sense.⁹⁶ Also, in a somewhat tautological move, Lucretius (i) uses the ability of living creatures generally - and specifically of horses⁹⁷ and humans - to swerve their motions as proof that the swerve of the first-beginnings exists, and (ii) claims at the same time that this swerve plays a causal role in this ability of creatures.⁹⁸ The precise nature and extent of that role will be treated in chapter five. For now it will suffice that all *corpora - primordia* and both non-living and living *concordia* - are at least theoretically capable of a sort of unfixed *per se* motion on some level. Therefore, motions interconvert to some degree. In reply to the question raised by Sedley, motion is eternal and a *coniunctum* of all bodies, but the particular motions of a given body are thus *eventa*.⁹⁹

The motions of matter in living assemblies and the motions of the living things themselves can be classified - like those of non-living bodies - into *per se* and not *per se* motions, which are either necessitated or unfixed. They fall into three categories: involuntary motions proximately caused by interaction with external bodies, involuntary motions proximately caused by interaction with bodies within, and voluntary motions. Involuntary motions which are initiated by the movement of an external body are not *per se* and necessitated. Involuntary motions which are initiated by the movement of a constituent are *per se* and necessitated. Voluntary motions of living things, like the swerve of non-living bodies, are both *per se* - in that they are initiated by the movement of a constituent - and unfixed.¹⁰⁰ A summary of Lucretius' understanding of the analogous motions of different sorts of bodies could thus be represented as follows:

⁹⁶ Fowler 2002: 321-2, Bailey 1947, ii: 845-6.

⁹⁷ The generally accepted reading of '*equorum*' at Lucr. DRN 2.264 was questioned though not undermined by Huby 1969: 17-19.

⁹⁸ Lucr. DRN 2.251-93. The best discussion of (1) the tautological argument, and (2) the linguistic evidence that these are analogous motions, is Fowler 1983: esp. 331-8. Fowler's correctly argues that the swerve plays a causal role in this ability, but his solution as to how, precisely, is not as convincing. Cf. Fowler 1983: 331-2 for a survey of literature on Lucretius' use of this sort of argumentation.

⁹⁹ Lucr. DRN 2.292-307. The question about the ontological status of motion raised is by Sedley 1988: 313 n. 29. This answer aims also to contribute to the discussion of how, as aptly stated by Fowler 1983: 352, 'the theory of the *clinamen* as presented by Lucretius is a self-consistent, reasoned theory in itself, firmly embedded in the Epicurean system as a whole and designed to answer real philosophical problems, rather than merely an awkward embarrassment.' Again, this will be developed further in chapter five.

¹⁰⁰ Morel 2009: 78 poses also this, but as an hypothesis that the former is merely a rhetorical move to provide the inferential basis of the latter by analogy.

Motion		Non-living <i>Corpora</i> (<i>primordia</i> & <i>concilia</i>)	Living <i>Corpora</i> (<i>concilia</i>)
Not <i>per se</i>	necessitated	motion due to collision	involuntary motions proximately caused by interaction with external bodies
<i>Per se</i>		motion (downward) due to weight	involuntary motions proximately caused by interaction with constituent bodies
		unfixed	swerve

Motion is but one of the considerable continuities which Lucretius posits between the properties shared by all material entities, including some properties which are dispositional and could thus be called powers, capacities, or abilities.¹⁰¹ Even the properties of void can be understood in contradistinction. The other significant distinctions on the continuum are those between *primordia* and *concilia* on the one hand and non-living bodies and living assemblies on the other.

II. THE EMERGENCE OF LIFE

In order to form assemblies under a given set of circumstances, such as a collision, the *primordia* in question must be both suitable to be received by one another and able to combine or ally their motions.¹⁰² Many first-beginnings are unique to many things; many are also common to many things - including the sky, sea, lands, rivers, sun, as well as the crops, trees, and living creatures (*'animantis'*).¹⁰³ It is not purely through variety and proportions of *primordia*, but also through their relationships and interactions, that generative matter produces every created thing; these include the interactions of various shapes, positions, connections, weights, blows, collisions, motions, and - especially - order

¹⁰¹ For the purposes of this study this should be understood as the ability of either an entity or a system of entities to manifest a particular effect (or effects) under particular circumstances. O'Keefe 1997: esp. 124-9 suggests that allowing dispositional properties to be real properties of bodies was part of Epicurus' answer to the skeptical consequences of Democritus' ontology.

¹⁰² Lucr. *DRN* 2.109-11, 2.711-17, 2.939-42.

¹⁰³ Lucr. *DRN* 1.814-16, 1.820-21, 2.720-29, 2.1015-16. Further on the implicit distinctions here with respect to the category of *animantes* (or, here, in the alternative plural, *animantis*) in the next section. Here and in the rest of the study, macrons are given only when and where useful for the sake of clarity.

or arrangement.¹⁰⁴ As the nature of the first-beginnings is immutable, it is only by their combining, recombining, and otherwise changing configuration that any generated thing changes.¹⁰⁵ For example, with respect to the first-beginnings, Lucretius states:

.... certissima corpora quaedam
sunt ...
quorum abitu aut aditu mutatoque ordine mutant
naturam res et convertunt corpora sese
DRN 1.675-8

There are certain very fixed bodies ...
by whose coming or going and changed order
generated things change their nature and
generated bodies transform themselves.

The *primordia* thus constitute the underlying basis from which the properties of assemblies at least partly emerge. In other words, the *coniuncta* of an assembly arise partly from the interaction of the *coniuncta* and *eventa* of its constituents.¹⁰⁶ The ‘*abitu aut aditu*’ of the *primordia* (1.677) echoes ‘*adventu ... abituque*’ (1.457) in Lucretius’ definition of *eventa*. For these reasons, therefore, all assemblies of matter are *eventa* of the first-beginnings.¹⁰⁷

Bodies generated from the first-beginnings have a distinct nature.¹⁰⁸ The more first-beginnings an assembly possesses, the more properties it has.

nil esse, in promptu quorum natura videtur,
quod genere ex uno consistat principiorum,
....
et quodcumque magis vis multas possidet in se
atque potestates, ita plurima principiorum
in sese genera ac varias docet esse figuras
DRN 2.583-4, 586-88

... nothing exists, whose nature is plainly
seen, which is made from one sort of the first-
beginnings, ... And whatever in itself
possesses many more forces and powers, thus
teaches that in itself are very many sorts and
different shapes of first-beginnings.

Thus, every perceptible thing consists of mixed constituents and there is a direct correlation between the number and variety of first-beginnings and the faculties of an assembly. That said, the potential variety of generated things is limited by the variety of possible constituents. Their *coniuncta* influence the possibilities of interaction and therefore limit the possibilities of combination.¹⁰⁹ The nature of the generated body thus depends both on the *coniuncta* of the *primordia* and on the interactions between them. These things imply that the properties of assemblies and their constituents are related to

¹⁰⁴ Lucr. DRN 1.632-4, 1.675-89, 1.814-29, 1.907-14, 2.297-302, 2.720-29, 2.883-5, 2.891-6, 2.1013-22, 4.642-62, 5.432-48.

¹⁰⁵ N.B. Lucr. DRN 2.935: ‘*nec quicquam commutari sine conciliatu*’; cf. 1.911-14, 2.1002-9. That a change of atomic arrangement - by internal transposition, addition, or subtraction - makes change possible and accounts for the differences between assemblies, cf. Epic. Ep. Hdt. 54-5. Created things differ in a limited way; DRN 2.518.

¹⁰⁶ Cf. Lucr. DRN 1.631-4, 1.675-89 (in full), 1.814-29.

¹⁰⁷ This connection is reinforced by the subsequent lines, esp. Lucr. DRN 1.680-2. That all macroscopic things are *eventa*, including plants and living creatures, is implied elsewhere as well: for ex. DRN 2.67-79, 2.875-8, 2.991-1009, cf. Epic. Ep. Hdt. 54-5.

¹⁰⁸ Lucr. DRN 1.675-89, 1.834-46, 1.778-81, 1.915-20, 2.581-8, 2.920-4.

¹⁰⁹ Lucr. DRN 2.700-29, 4.642-62, 5.432-48.

one another by some sort of causal hierarchy - i.e. ontological levels are aetiologically connected. In Epicurean scholarship, these relationships are generally understood with respect to emergence and reductionism.¹¹⁰

There are various ways in which scholars of Epicureanism tend to use the term ‘emergence’. Drawing particularly on Asmis, Sedley, and Warren,¹¹¹ they can be summarized as follows. The first sense is when something simply does not exist at the atomic level, but can be explained by it. For Lucretius, color is an example of this. The first-beginnings lack color; the color of macroscopic objects emerges from a particular arrangement of atoms and their properties, as seen above with respect to the sea. The term emergence is also used to describe something which neither exists at the primordial (i.e. atomic) level nor can be fully explained by the primordial level. It is distinct from its constituents by more than just scale or distance of perception. Once constituted, such *coniuncta* and *eventa* are no longer strictly determined by their primordial causes; they are to some degree autonomous. This sort is called ‘epistemological non-reduction’. For Lucretius, as we will see below, life is an example of this. Finally, the term emergence can refer to what is sometimes called ‘emergent dualism’. This is when something operates independently of the primordial level and can even have causal influence over it. Sedley suggests that ‘mental states’ and other developments or ἀπογεγεννημένα might fit this last type. However, as we will see,¹¹² Lucretius seems to believe that even *coniuncta* and *eventa* which are not determined by their primordial causes and which have relatively independent and even downward causal efficacy still operate with respect to and by means of physical bodies and their interactions. The label of ‘dualism’ is thus misleading. For Lucretius, the phenomenal and the microscopic levels are to some extent two ways of looking at the same thing. One cannot be reductively understood in terms of the other, but they cannot be understood apart from one another either.

Lucretius is adamant that every assembly has a nature which is at least partly emergent, in at least one of the above senses.

at primordia gignundis in rebus oportet
naturam clandestinam caecamque adhibere,
emineat nequid quod contra pugnet et obstet

But it is necessary that the first-beginnings
employ a secret and hidden nature in
generating things, in order that nothing

¹¹⁰ As Morel 2009: 67 summarizes neatly, reductionism can be understood as ‘the thesis according to which (i) the properties of composites or macroscopic bodies are explicable in terms of the properties (both intrinsic and relative) of the atoms and (ii) composite bodies have only the causal powers given by the atoms by which they are constituted’.

¹¹¹ Warren 2002b: 196-7 n.13, following Asmis, in light of esp. Sedley 1983.

¹¹² Particularly in chapters three and five.

quominus esse queat proprie quodcumque creatur
DRN 1.778-81

stands-out which fights against and hinders
whatever is created from being able to exist
in its own right and with its own nature
(*propriē*).¹¹³

The immutable natures of the constituent *primordia* are not evident in the overall nature of the generated thing. This does not preclude the possibility that some constituents play a larger causal role in some *coniuncta* (and, in some cases, their manifestations) than in others. This seems to answer an interpretation of Democritus as a reductionist and eliminative materialist.

The debate on determinism and reductionism, for Lucretius and Epicurus, really begins with Democritus. As Warren points out, other than Epicurus and Democritus, who are named once and thrice, respectively, Lucretius only names three other philosophers: the Presocratics Heraclitus, Empedocles, and Anaxagoras. Warren argues that Lucretius names them as originators and/or exemplary representatives of the cosmologies and physical ontologies which Lucretius rejects at 1.635-920, in the context and rhetoric of his own presentation.¹¹⁴

Consider Democritus' famous dictum:

νόμῳ γλυκύ, νόμῳ πικρόν, νόμῳ θερμόν, νόμῳ
ψυχρόν, νόμῳ χροίη, ἔτεῃ δὲ ἄτομοι καὶ κενόν
Democritus B9 (SE M. 7.135), Diels-Kranz

Sweet, bitter, hot, cold, and color exist by
convention, but in reality there are atoms and
void.

Epicurus and his followers took Democritus to mean that only atoms and void are real.¹¹⁵ Rejecting that, Lucretius - following Epicurus - maintains that atoms and void have ontological and aetiological primacy, but not exclusivity.¹¹⁶ DRN 1.778-81 indicates that both the generated body and its nature (e.g. its *coniuncta*) exist in reality; they also have causal efficacy.

The *coniuncta* and *eventa* of a *concilium* stand in a variety of relationships both to each other and to its *primordia*; the *coniuncta* of a particular assembly can be understood relative to the duration of its existence. The aetiological analysis in this study owes much to Sedley's work on causal relationships between the various ontological levels; it remains

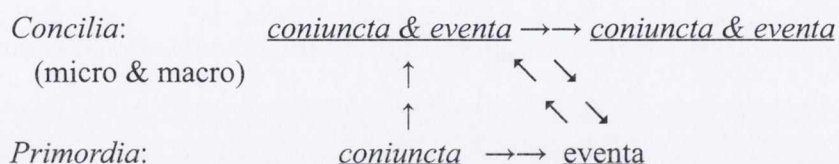
¹¹³ That *propriē* here carries both senses, cf. Bailey 1947, i: 215, ii: 735, Wardy 1988.

¹¹⁴ Warren 2007: 25-30. For a more detailed analysis of Lucr. DRN 1.635-920, cf. Montarese 2012. That Lucretius may rather generally employ a strategy of taking over Epicurus' targets along with his arguments, cf. Sedley 1998a: ch.3. This treatment of the Presocratics may also function as part of Lucretius' claim that poetry is a legitimate vehicle for philosophical discourse; cf. Tatum 1984.

¹¹⁵ Warren 2002b: 7-9, 193-4.

¹¹⁶ Sedley 1983: 33, Wardy 1988, Warren 2002b: 193-4, Long and Sedley 1987: i.37.

the most useful basis for understanding Lucretius' paradigm.¹¹⁷ As he notes, 'much of Lucretius' poem attests, events at the microscopic level are held to provide a comprehensive and economical causal explanation of numerous features of the macroscopic world', but not all.¹¹⁸ This diagram recasts Sedley's analysis of the possible aetiological relationships in light of Lucretius' terminology, with some minor modifications in light of the findings of this study, such as above with respect to motion:



The main sorts of causation are: vertical, horizontal, downward, and converging or co-caused (which can combine sorts of contributions). Upward or vertical causation occurs when the *coniuncta* and/or *eventa* of microscopic bodies (either the *primordia* or microscopic *concilia*) causally contribute to the *coniuncta* and/or *eventa* of a macroscopic *concilium*. Horizontal causation occurs when (1) the *coniuncta* of a microscopic body (or bodies) causally contribute to its *eventa* or to the *eventa* of other microscopic bodies, or (2) the *coniuncta* and/or *eventa* of a macroscopic body (or bodies) causally contribute to the *coniuncta* and/or *eventa* of other macroscopic bodies. Downward causation occurs when the *coniuncta* and/or *eventa* of a macroscopic body affect a microscopic body. In the case of affecting smaller *concilia*, this could theoretically influence both their *coniuncta* and *eventa*. In the case of affecting the *primordia*, only their *eventa* could theoretically be impacted. An example of co-causation with respect to non-living assemblies would be meteorological phenomena, as at 6.527-34.¹¹⁹

¹¹⁷ Sedley 1983: 39-40, 1988: 319-24. Further on the aetiological status of things with different ontological statuses as a reaction to the eliminative materialism of Democritus, especially with respect to the ethical consequences thereof, cf. Warren 2002b: 193-200. For a recent overview of the debate on whether all so-called secondary properties are reducible to atomic properties, cf. Morel 2009: 77-8, 80-1.

¹¹⁸ Sedley 1988: 316.

¹¹⁹ With respect to Lucr. *DRN* 6.527-34, cf. p.27. The evidence of Sextus Empiricus for Epicurus' stance on causation does not obviate the possibility of generated things having an emergent causal efficacy, including - *pace* Fowler 1983: 334 n.15 - a downward causal efficacy; Sext. Emp. *M.* 9.212: 'ὁ δ' Ἐπίκουρος καὶ σώματα σωμάτων καὶ ἀσώματα ἀσωμάτων φησὶν αἴτια τυγχάνειν, καὶ σώματα μὲν σωμάτων ὡς τὰ στοιχεῖα τῶν συγκριμάτων, ἀσώματα δὲ ἀσωμάτων ὡς τὰ τοῖς πρώτοις σώμασι συμβεβηκότα ἀσώματα τῶν τοῖς συγκρίμασι συμβεβηκότων ἀσωμάτων' (This could be taken to mean the following: And Epicurus says that bodies are the causes of bodies and incorporeal things are the causes of incorporeal things. Bodies on the one hand are the causes of bodies, in the sense that atoms are the causes of compounds. Incorporeals, on the other hand, are the causes of incorporeals, in the sense that the incorporeal attributes of the first bodies are the causes of those associated with compounds.). However accurate or not this may be as a representation of Epicurus' views, it should not be mapped on to Lucretius' - not least, as we have seen above, because Lucretius' paradigm is based on a different set of categories and terms from Epicurus'.

Sharples' schema, on the other hand, is influenced by Cicero's account of Carneades on Epicureanism. It favors a system which is 'determinist, and reductionist, but not eliminativist'. Sharples' account is in line with the general tenor of the recent work of O'Keefe and Purinton, particularly on the relationship of the swerve to the so-called faculties of the mind.¹²⁰ The Sedley-based diagram, however, has the advantage of better accounting for living creatures' psychological faculties (and their manifestations), and by the same universal relations which govern all bodies.

The first-beginnings lack both life and feeling,¹²¹ but certain assemblies generated by them possess both.¹²² Assemblies are generally formed when the first-beginnings collide in space, like billiard balls of various shapes and sizes, and result in an alliance of motion ('*consociare ... motus*').¹²³ These allied *primordia* move as one and, simultaneously, relative to one another - rather like a flock of birds flying in formation. In the cosmogonic primordial soup, for example, Lucretius represents assembling as the process by which *primordia* both remain joined and give joint motions amongst themselves ('*motus inter sese dare convenientis*').¹²⁴ He often and in similar language emphasizes the importance of the interactive motions within an assembly for its overall nature - i.e. what motions its constituents give and receive amongst each other ('*quos inter se dent motus accipiantque*').¹²⁵ Life only emerges in certain cases:

... quia corpora materialia
antiquis ex ordinibus permota nova re
conciliantur ita ut debent animalia gigni
DRN 2.899-901

... because the bodies of matter having been
thoroughly moved from their former arrange-
ments by a new situation are assembled in
such a way that living creatures must be
generated.

In other words, life emerges when the size, shape, motions, orders, and positions of the bodies of matter come together in such a way that they generate - spontaneously or not - what Lucretius calls vital motions (*vitalis motus*). Vital motions seem to be a special sort

¹²⁰ Sharples 1991-3: 184. Cf. for example, O'Keefe 1997, O'Keefe 2002, O'Keefe 2005, O'Keefe 2009: esp. 150-54 (followed, e.g., by Gill 2009: 133-4), and Purinton 1999, among others.

¹²¹ Lucr. DRN 2.865-1022, cf. Epic. Ep. Hdt. 54. *Simulacra* also lack *sensus*; cf. DRN 4.127-8: '*quin potius noscas rerum simulacra vagari | multa modis multis nulla vi cassa que sensu*'. Cf. Diog. Oen. fr. 10, 43. Smith.

¹²² For example, Lucr. DRN 2.870: '*ex insensibilibus ... animalia gigni*' and DRN 2.930: '*scire licet gigni posse ex non sensibu' sensus*'. Some examples which Lucretius gives of spontaneous generation include: living worms coming from putrid matter like excrement and rotten earth or wood, living chicks coming from eggs, the first living creatures coming from wombs on the surface of the young earth; DRN 2.871-3, 2.897-901, 2.926-31, 3.719-21, 5.795-836. On ancient theories of spontaneous generation, cf. Campbell 2006: esp. 23-8, 32-3.

¹²³ Cf. the dust motes, at Lucr. DRN 2.109-20; these eternally assembling and sundering '*multa minuta ... corpora*' both illustrate and are caused by the motions of *primordia* in the void. Assembling is here presented as the ability of the *primordia* to '*consociare ... motus*'.

¹²⁴ Lucr. DRN 5.445.

¹²⁵ Lucr. DRN 1.819, 1.910, 2.762, 2.1009.

of those mutual and sometimes harmonized internal motions of an assembly. They are specifically the sort which somehow give rise to joint feeling (*consentire*) - perhaps akin to consciousness - at the level of the assembly.¹²⁶ The process and causal relationships are most concisely demonstrated here:

principio nequeunt ullius corporis esse
sensus ante ipsam genitam naturam animantis,
nimirum quia materies disiecta tenetur
aere fluminibus terris terraque creatis,
nec congressa modo vitalis convenientes
contulit inter se motus, quibus omnituentes
accensi sensus animantem quamque tuentur
DRN 2.937-43

Firstly, the *sensus* of any body is not able to exist before the generated nature itself of the living creature, undoubtedly because the scattered matter is held by the air, rivers, lands, and things produced by the earth,¹²⁷ nor has the matter, not yet assembled, yet brought together the vital motions, which unite amongst themselves;¹²⁸ kindled by these vital motions, the all-seeing *sensūs* watch over every living creature.

Sensus is a technical term in Lucretius which encompasses an array of potential meanings - more than one of which is not infrequently in play at any one instance. The concept will be thoroughly explored by chapters two and three, as well as their epilogue. For that reason, it is left untranslated throughout this thesis. That said, in this chapter, most instances of the word could be rendered by 'feeling' (without substantially prejudicing one's interpretation of the Latin) and it will be taken that way in the discussion unless context suggests otherwise.

Vital motions have horizontal causes, vertically contribute to the emergence of life, and are this *coniunctum*'s micro-level manifestation. Life and feeling, as *coniuncta* of living things, come into being at effectively the same time by means of the purposeless coming together of a particular arrangement of matter under particular conditions. Matter does this through itself according to natural law, not through some providential agency. When life is generated, it becomes a property distinct from the sum of its constituents', as evinced by the dependence of feeling upon it and the absence of both with respect to the assembly's constituents.¹²⁹

¹²⁶ This feeling-together is emergent at least in the sense of not existing at the level of the first-beginnings. Compare the requirements for successful nutrition at Lucr. DRN 2.711-17 to DRN 2.109-11, where the former seems a more specific instance of the effort to '*consociare ... motus*' in the latter. The analogy between particles of spirit and of food at 3.698-712 also supports the emergence of life. Further on the ideas (1) that certain assemblies, in the process of coming into being, engender vital motions, and (2) that this feeling is vital, see the linguistic parallels between 2.711-17 and both 2.916 and 2.941-2. Regarding 2.916, there is some contention about the ordering of the lines, thus the antecedent of *possint* is not certain, but N.B. the expression *vitali sensu* (on which, cf. below). The idea is also relevant to the circle of nutrition described at 2.875-80, especially the last two lines: '*ergo omnes natura cibos in corpora viva | vertit et hinc sensus animantium procreat omnes*'.

¹²⁷ By '*terra ... creatis*' one may understand plants. The fact that plants exist before the generation of an assembly with vital motions and are a source of the first-beginnings of that assembly will be important later.

¹²⁸ Regarding Lucr. DRN 2.941-2, both '*vitalis*' and '*convenientes*' are epithets of '*motus*', following Bailey 1947, ii: 950-1.

¹²⁹ Further on these ideas, cf. pp.55-71.

The discussion of the kindling, extinguishing, and confounding of the vital motions and feeling in 2.937-62 is framed in terms of all living things, using, for example, *animans*, *corpus*, and adjectives like *ullus*, *quique* and *quivis*. Similarly, in the context of proving the divisibility of the *anima*, Lucretius states:

et quoniam toto sentimus corpore inesse
vitalem sensum et totum esse animale videmus
DRN 3.634-5

And since we feel with the whole body, we see that the vital *sensus* is present and that the whole is a living creature.

That he is referring to the *vitalis sensus* of all living creatures is made clear by the two subsequent examples: the warriors with severed limbs, and the cleaved but living serpent.¹³⁰ These lines further imply that these *coniuncta* emerge from more than just certain motions.

There are also other causes of life - namely other assemblies of or within one's body. These include, at minimum: flesh, sinews, and veins, and what we will shortly see is rightly understood as the *animus-anima* complex.¹³¹ Not all generated bodies have these minimum requirements, but all living ones do - and these assemblies exist more-or-less throughout the body of every living thing.¹³²

There is a partnership between the *animus-anima* complex and the rest of a living body from the beginning of their joint existence and development. The *animus-anima* complex is a corporeal assembly and a specific physical part of the larger body.¹³³ Like every part of the body, it is dependent on its context for its existence and abilities.¹³⁴ The complex and the rest of the body - and similarly their respective natures - are generated and born together; they also develop, decay, and die together.¹³⁵

sic animi atque animae naturam corpore toto
extrahere haud facile est, quin omnia dissoluantur:
inplexis ita principiis ab origine prima
inter se fiunt consorti praedita vita

Thus it is by no means easy¹³⁶ to remove the nature of the *animus* and *anima* from the whole body without destroying all of them; endowed in this way with a life in partner-

¹³⁰ Lucr. DRN 3.642-56 and 3.657-63 respectively; cf. DRN 2.1002-6 on death as the scattering of the *eventum* of a generated assembly, which passage seems to conflate life and feeling, and the conflation *vitalis sensus* at 2.890, 2.916, 3.215, 527, as well as the close association between life and feeling at 5.125 and 5.144-5.

¹³¹ Gee too uses this expression and Gill the equivalent (if his words are translated back into Latin according to his account of equivalents); cf. Gee 2013 and Gill 2009: 131.

¹³² These structures are not of equal consequence for life and feeling, as we shall see below.

¹³³ Lucr. DRN 3.94-176, 784-99, 5.126-45; cf. Epic. *Ep. Hdt.* 63.

¹³⁴ Lucr. DRN 2.910-13, 3.333-58, 624-33; cf. Epic. *Ep. Hdt.* 63-6, Cic. *Tusc.* 1.16.37. As Gill 2009: 127 aptly summarizes: 'Psychological functions such as sensation and thought, and indeed life itself, depend on the conjunction and co-operation of the psychic part and the rest of the body ... In more technical terms, the capacity for sensation and other psychological functions are accidental properties of the psyche which depend on the conjunction with the (rest of) the body.'

¹³⁵ Lucr. DRN 3.323-49, 3.445-58, 3.580-91, 3.670-712, 3.769-71.

¹³⁶ Litotes for 'it is not possible'.

Lucretius also emphasizes that this partnership exists from the beginning of their joint existence using the expression ‘*ex ineunte aevo*’ (3.444), which expression is used repeatedly and consistently throughout the poem. For example, he uses it to stress the fact that the complex and the rest of the body develop their powers together from the outset.¹³⁸ Similarly, the choice of *dissolvo* at line 3.330 stresses a uniform process of destruction; at the end they are all dissolved back into their constituent first-beginnings; nothing else persists.¹³⁹ The interdependency of these assemblies and their properties is also stressed in a passage recalling 2.583-88.¹⁴⁰

... in nostris membris et corpore toto
mixta latens animi vis est animaeque potestas
DRN 3.276-7

... in our members and whole body has been
mixed the hidden force of the *animus* and the
power of the *anima*.

Thus, the nature of the whole being cannot be understood apart from the nature and relationship of these assemblies.

Lucretius states that sometimes when he speaks of either the *animus* or the *anima* we are meant to understand both - i.e. the whole complex, which is really one joint assembly with a single nature.¹⁴¹ He inscribes this in the text, iconically mirroring the meaning of the words in the structure of the line.¹⁴²

nunc animum atque animam dico coniuncta teneri
inter se atque unam naturam conficere ex se
DRN 3.136-7

Now I say that the *animus* and *anima* are held
yoked together among themselves and from
themselves form one nature.

¹³⁷ The third person plural ‘*fiunt*’ takes as its antecedents the *animus-anima* complex, and the whole body. On ‘*animi atque animae naturam*’ and similar expressions, cf. p.40 n.143.

¹³⁸ Lucr. DRN 3.745-7. These two uses in book three help us to read the coordinate uses in book five, to the effect that the relationship between the Earth and the air is analogous to the relationship between the whole body and the *animus-anima* complex, with respect to joint origin, existence, and development; DRN 5.537, 5.555. On this analogy, cf. Gale 2009: 148. The two other uses of this expression occur at DRN 2.743 and 5.859.

¹³⁹ Cf. Lucr. DRN 3.580-91, 3.642-63, Epic. *Ep. Hdt.* 65, Epic. *KD* 2. On the various representations of the process and language of death, cf. Segal 1990: esp. 31, 46, 60-8.

¹⁴⁰ For instance, through echoing the conjoined use of *vis* and *potestas*, as well as the suggestion of emergence - particularly if in one sense *latens* modifies both rather than merely suggesting that the *animus* lurks (in the breast). If both *latens* and *mixta est* agree with both *vis* and *potestas*, as seems to be the case, this textual structure constitutes further evidence of the single nature of the complex, with differently located and concentrated portions giving rise to different faculties.

¹⁴¹ Lucr. DRN 3.136-7, 3.421-4 esp. ‘*atque animam verbi causa cum dicere pergam, | ... animum quoque dicere credas, | quatenus est unum inter se coniunctaque res est*’.

¹⁴² This point and its implications for the general interpretation of the meaning and usage of *animus* and *anima*, as well as of their relationship, concur with the interpretation of West 1975.

From this introduction of the idea of their joint nature through to the end of the poem, Lucretius links these two words with no less than nine instances of double elision.¹⁴³ There are other instances where the words occur in close proximity and their single nature is treated by the interplay of the structure of the line and the context of the passage.¹⁴⁴ The single nature of this alliance (*foedus*)¹⁴⁵ arises in part from the uniformity of its constitution. The primary constituents of the complex¹⁴⁶ are smooth round assemblies, specifically of fire,¹⁴⁷ wind, and air, and the so-called nameless fourth.¹⁴⁸ Lucretius likens the last to the *anima* of the *anima*.¹⁴⁹ They interpenetrate one another to form a single corporeal assembly.

inter enim cursant primordia principiorum
motibus inter se, nil ut secernier unum
possit nec spatio fieri divisa potestas,
sed quasi multae vis unius corporis extant
DRN 3.262-5

For in their motions the first-beginnings of
the primary constituents run together among
themselves, with the result that it not possible
separate any one of the four, nor can a power
of any one become divided by space, but they
are, so to speak, the many forces of one body.

¹⁴³ The nine identified are (quoted verbatim): Lucr. DRN 3.136 (*animum atque animam*), 3.161 (triple: *naturam animi atque animai*), 3.329 (*animi atque animae*), 3.416 (*anima atque animus*), 3.565 (*anima atque animus*), 3.705 (*anima atque animus*), 3.796 (triple: *sorsum anima atque animus*), 4.121 (triple: *unde anima atque animi*), 5.140 (triple: *seorsum anima atque animus*). In lines 3.794-7, 'quod ... corpus' = 5.138-41, possibly with minor variation; at 5.140, the editions of Rouse and Smith and Bailey read *seorsum*, while Gale 2009 reads *sorsum*. On Lucretius' use of different iterations of *seorsum*, cf. Kenney 2014: 18 n.73. Hitting the nail, as it were, on the head but apparently also his thumb in the process, Kenney says of '*naturam animi atque animai*' (3.161): 'a cumbersome periphrasis for ψυχή, but it serves as reminder of the fundamental points already established'; Kenney 1971: 97-8. He softens this comment in the second edition, cf. Kenney 2014: 100.

¹⁴⁴ For example, cf. Lucr. DRN 3.211, 3.277, 3.499, 3.844.

¹⁴⁵ Lucr. DRN 3.416.

¹⁴⁶ Indeed they may not even be the only constituents; cf. Lucr. DRN 3.317-18, Long and Sedley 1987: ii.71.

¹⁴⁷ Heat is a *coniunctum* of fire (cf. Lucr. DRN 1.453) and sometimes employed in metonymy; he also uses it in conjunction, cf. e.g. 1.647, 1.1088. Lucretius sometimes uses an aspect of something's nature as a periphrasis for the thing itself; cf. pp.10-11. For the possible motivation of using this metonymy here, cf. p. 40 n.147.

¹⁴⁸ Lucr. DRN 3.177-257, 3.266-71. Cf. Epic. *Ep. Hdt.* 63, which does not mention air, Aetius 4.3.11 (Usener 315), Plutarch, *Col.* 1118 D-E (Usener 314). Lucretius previously indicated that wind, fire, and air are assemblies, and thus contain their own first-beginnings; wind: DRN 1.271-97 (implied), fire: 1.635-704, fire and air: 1.705-15, air: 3.236. The nameless fourth is clearly indicated as an assembly by the fact that it is made from other bodies; 3.241-6. If in his account of the constituents Lucretius faithfully follows Epicurus, the fact that Lucretius mentions heat as having air mixed in (in with fire, probably) at DRN 3.234-6 may explain why Epicurus does not mention air as a distinct constituent and why in this context Lucretius chooses to use heat as a periphrasis for fire. Sedley 1998a: 71 n.47 offers the apparently plausible alternative that Epicurus intended 'προσεμφορέστατον δὲ πνεύματι' to encompass both wind and air, on the basis that they are made up of the same constituents. This is not the case, at least for Lucretius; otherwise - as we will see - they would not have different roles in the transmission of motion and causally contribute to different emotions and *naturae animorum*. Schrijvers 1997: 159-61 suggests that the Epicurean account of its composition draws on Aristotle's *HA*. On the shape and texture of the particles, cf. also the scholion on *Ep. Hdt.* 66 (Usener 311), which we will treat below, and Bailey 1947, ii: 1036-7.

¹⁴⁹ Lucr. DRN 3.275: '*anima est animae ... totius ipsa*'. Warren refers to the existence of the nameless fourth as a 'Democritean hangover', claiming that Epicurus overdetermined his psychology. Warren argues that Epicurus posits this as a physical basis for the soul which explains the difference between animate and inanimate things, for which difference he did not want to rely on emergence; Warren 2002b: 70-1. This investigation has not found any explicit statement that the nameless fourth is unique to living creatures, but its contribution to the complex's powers must be. Gill 2006: 49-52, on the other hand, sees the nameless fourth as having a cohesive relationship to the whole *animus-anima* complex which is comparable to the relationship between the complex and the body.

Although they form one assembly with its own emergent nature, the four constituent assemblies remain intact. They are able to spatially interpenetrate one another. This is possible because all assemblies involve void and what is void relative to one assembly can be occupied by another body, while the integrity of all assemblies is preserved. By extension, it also is possible for some of the constituents of the complex to lie at intervals throughout the rest of the frame.¹⁵⁰ It is not a physically contiguous organ.

The mixed constitution of the complex may well exemplify an Epicurean alternative to the Democritean theories of κρᾶσις or blending and - perhaps mediated through Theophrastus - of συμμετρία or symmetry. But the analysis of Long and Sedley and that of Warren conclude that these primary constituents are completely broken down into their first-beginnings and thereby recombine into something entirely new in generating the complex.¹⁵¹ However, if this were the case, then the constituents themselves would - by changing - pass outside of their own boundaries and cease to exist. In that case, the powers which each constituent contributes to the complex would also be lost, which is not the case. As we will see, e.g., fire, wind, and air - as well as their interactions - contribute to the emergence of emotion and what we would call character, and the nameless fourth to initiating motion and to thought.¹⁵² Indeed all four generally play distinct roles in the transmission of motion.¹⁵³ Therefore these four primary constituent assemblies must retain their integrity in the greater *animus-anima* complex (as well as in the living being itself). In these ways the single nature of the complex and its many potential forces or powers arise from its mixed constitution.¹⁵⁴

Horizontal factors also causally contribute to the emergent *coniuncta* of the *animus-anima* complex. The *anima* is distributed throughout the frame¹⁵⁵ - entwined explicitly in the limbs, as well as in the flesh, sinews, and veins.¹⁵⁶ These parts exist

¹⁵⁰ Lucr. *DRN* 3.370-95.

¹⁵¹ This interpretation is closer to that of Bailey 1947, ii: 1037-8 and of Gill 2009: 130. Cf. Long and Sedley 1987: i.71, ii.66, 68-9 and Warren 2002b: 63-4, 70 who are perhaps following Alexander of Aphrodisias (Us. 290), as Kerferd 1971: 90-2 does.

¹⁵² Cf. Epic. *Ep. Hdt.* 63: 'τοῦτο δὲ πᾶν αἰ δυνάμεις τῆς ψυχῆς δηλοῦσι καὶ τὰ πάθη καὶ αἰ εὐκινήσιαι καὶ αἰ διανοήσεις καὶ ὧν στερόμενοι θωήσκομεν'.

¹⁵³ Cf. pp.42-3.

¹⁵⁴ N.B. Lucr. *DRN* 3.231: '*nec tamen haec simplex nobis natura putanda est*'. In this context *simplex* seems to mean 'simple' in the sense of arising from only one source; cf. Gill 2006: 51-3.

¹⁵⁵ Lucr. *DRN* 3.370-97. Cf. Diog. Oen. fr. 37. 1.2-5 Smith.

¹⁵⁶ Lucr. *DRN* 3.216-17, 3.374-6, cf. 3.142-3, 3.150-1, 3.526-32, 3.566-9, 3.691-7.

throughout the bodily frame and are common to all living things.¹⁵⁷ The *animus*, which term is often (*'saepe'*) used interchangeably with *mens* (3.94-7), abides in a fixed place - namely the breast.¹⁵⁸ As locations, they can feel independently, jointly, or cause feeling in one another, according to the transmission of motion; the mechanisms of motion attest to the fundamental unity of the complex.

Lucretius seems to understand three mechanisms of motion involving the *animus-anima* complex. These are: motion localized in the *animus*, motion that proceeds from the *animus*, and motion that proceeds from the bodily frame. Certain movements can arise in the *animus/mens* without being communicated to or having corresponding motions in the rest of the *anima* or in the rest of the body.¹⁵⁹ The *animus/mens* is therefore capable of *per se* movements.¹⁶⁰ These movements generally follow a particular pattern. The movement of the complex (and particularly of the *animus*, due to its concentration in one location), also proceeds with extreme ease and swiftness. Lucretius likens this to the flowing of water, among other things.¹⁶¹ The nameless fourth is generally stirred first.¹⁶² It then imparts the beginning of motion from itself to the others, stirring first the heat and the wind, then the air.¹⁶³ This particular flowing or extreme fluidity seems to be a *coniunctum* of the complex. Some of its movements remain localized in the *animus*. Other movements of the *mens* are transmitted to the rest of the living creature, such as extreme *metus* and its affect on our entire body, which proves that the *animus* moves the *anima*, which then moves the rest of the body.¹⁶⁴ From the stirring of the nameless fourth constituent, the rest of the complex is set in motion and then distributes motion through the rest of the body.¹⁶⁵ First the blood, then all the flesh, and finally the bones and their marrow are mobilized.¹⁶⁶ The entire process seems to be a case of smaller and lighter progressively stirring larger

¹⁵⁷ Lucr. *DRN* 2.669-72. Presumably this extends even to creatures so small that one cannot perceive their third part, which Lucretius mentions at 4.116-22, as well as to worms, which he describes as alive, but boneless and bloodless; 3.713-40, esp. 719-21, cf. 2.871-3, 2.898-901, 2.928-9. The *calor* and *umor* mentioned at 2.670 and implied there as being common to all living things is not excepted elsewhere. The complex is also mentioned as being in the members at 3.150-1 and 3.437-9, in the bones, teeth, and joints at 3.691-7, and in the blood at 3.789.

¹⁵⁸ The location of the *mens/animus* given at 3.136-44 (on which lines and the issues they raise, cf. esp. ch.3 and ch.5), and described as fixed at 3.548-50, 3.615-23, 3.784-99.

¹⁵⁹ Lucr. *DRN* 3.145-6, 3.149-51.

¹⁶⁰ Lucr. *DRN* 3.109, 3.239-40.

¹⁶¹ Lucr. *DRN* 3.177-207, 3.425-39.

¹⁶² Cf. pp.57-62.

¹⁶³ Lucr. *DRN* 3.246-8, 3.269-71.

¹⁶⁴ Lucr. *DRN* 3.152-60; cf. p.145.

¹⁶⁵ Lucr. *DRN* 3.246-8, 269-71.

¹⁶⁶ Lucr. *DRN* 3.249-57. Presumably it is the same the process for the aforementioned living creatures which lack blood and bones, except that the absent parts would not require stirring in order for the worms to move their bodies.

and heavier - as with the dust-motes. Thus, despite the swiftness of the initial motion of the complex, it takes time for the transmission of that motion to stir the entirety of the body. A similarly slight delay might be expected in the reverse direction. Some movements that first stir the bodily frame eventually effect part or all of the whole, including the *animus*. Thus the complex can also be affected by (*fungor*) and feel-together (*consentio*) with the rest of the body.¹⁶⁷

As we shall see over the course of this study, the differences in concentration and context (i.e. location) partly account for the faculties of the *animus-anima* complex, as well as their manifestations.¹⁶⁸ That principle is further illustrated by the distinction which Lucretius draws regarding the relative importance of the constituent assemblies of a living thing to maintaining life. Neither the complex's physical constituents nor the powers which those assemblies contribute to the overall *animus-anima* complex can be separated from each other or from their physical context in the rest of the body without *perituali discidio*.¹⁶⁹ That said, limited divisibility is possible of most assemblies, including this one, without a fundamental change of nature. The full integrity of the bodily frame is less critical for life than that of the *anima*. The full integrity of the *anima*, in turn, is less critical than that of the *animus*.¹⁷⁰ Their roles in preserving the vital motions vary; however, no thing can exist as a living entity without at least a certain degree of integrity among all three, and no constituent assembly can exist on its own.¹⁷¹ Therefore, certain *coniuncta* of the whole, especially life, actually emerge from the entire body as an interdependent system,¹⁷² not from any one of the assemblies which comprise it.

¹⁶⁷ Lucr. *DRN* 3.168-9. Of the eight uses of *fungor* in the poem, at least one other also uses it almost as a passive for *facio*: cf. 1.443. Examples of this feeling-together, such as through severe blows, wine, and illness, are treated particularly at pp.66-9 and in the Epilogue to Chapters II & III.

¹⁶⁸ This interpretation of the *animus-anima* complex agrees broadly with that of Boyance 1958, West 1975, and Gill 2009: 131, who stress the fundamental unity of the *animus* and *anima* with one another and that of the whole complex with the body. On the relationship of the *animus* and *anima* to specific bodily contexts, cf. also the recent suggestions by, e.g., Gale 2009: 122-3 and, unconvincingly, by Mehl 1999: 276-7.

¹⁶⁹ Cf. Lucr. *DRN* 1.451-2, 3.262-5, 3.330. Warren suggests that some of the complex's first-beginnings may remain in corpses, facilitating the spontaneous generation of worms and the like; Warren 2002a: 204.

¹⁷⁰ Epicurus has a somewhat different but related presentation of the arising of feeling or perception (*αἰσθήσις*), and refers to it as one of the *συμπτώματα* of the *ψυχή* (primarily) and the rest of the body, jointly, which exists as long as the aggregate does; *Ep. Hdt.* 63-6, cf. Diog. Oen. fr. 37.1-4 Smith. As we have seen, Lucretius, however, seems to suggest that the *animus-anima* complex and the rest of the body have the capacity of feeling jointly insofar as the vital motions are preserved. Particular feelings, on the other hand, Lucretius seems to understand as *eventa*. Chapters two and three will deal further with feeling and feelings.

¹⁷¹ Lucr. *DRN* 3.117-29 (esp. 3.124-5), 3.396-416, 3.548-669 (esp. 3.558-79), and 3.634-63. With respect to 3.396-416, N.B. the further analogous example: the power of seeing and the relationship of the pupil to the rest of eye. Cf. *Epic. Ep. Hdt.* 63-6, Diog. Oen. fr. 37.1-4 Smith. Segal analyses Lucretius' account of the contributions of the various parts of the body to life from the perspective of the nature and process of death; Segal 1990: 46-73.

¹⁷² Gill 2006: 48-50.

Perhaps the biggest stumbling block for understanding the nature of the complex as Lucretius represents it is the assumption that he generally uses *anima* and *animus*¹⁷³ to render the Greek τὸ ἄλογον and τὸ λογικόν (τῆς ψυχῆς) - and thereby means the irrational and the rational parts or aspects of the soul, often translated as the spirit and mind.¹⁷⁴ The roots of these assumptions lies in an interpretation of Epicurus, which has been mapped onto Lucretius. Gill rightly expresses doubts about both ascriptions.¹⁷⁵ Despite the conventional position, exemplified by Bailey, Konstan and Mehl,¹⁷⁶ there seems to be no direct evidence that Epicurus ever distinguishes parts or portions of the ψυχή.¹⁷⁷ Moreover, as Long notes, ‘*logos* and its derivative words are not particularly common in Epicurus’ extant remains’.¹⁷⁸ Three pieces of indirect evidence are generally used as support for the claim that he did make the distinction: (1) the scholion on Epic. *Ep. Hdt.* 66 (Usener 311), (2) a fragment from the Epicurean inscription on the stoa of Oenoanda in Lycia - namely, Diog. Oen. fr. 37 Smith, and (3) the testimony of Aëtius.

The scholion is the most frequently cited; it and the letter are preserved in the tenth book of Diogenes Laertius’ *Lives of the Philosophers*, a biographical doxography written in approximately the first half of the third century C.E. The wording of the scholia suggest that they were incorporated into the manuscript tradition of Diogenes Laertius at a later stage, not incorporated into the manuscript tradition of the letters themselves and then copied by Laertius. Regardless of that chronology, scholia are often unreliable, of limited accuracy, and/or difficult to interpret.¹⁷⁹ The assumption that at *Ep. Hdt.* 66 the scholiast is to be trusted requires two primary considerations. First, does the scholiast faithfully report a lost text(s) of Epicurus himself, which is not mentioned (other than, imprecisely: λέγει ἐν ἄλλοις)? While this scholiast seems to have had better access to ancient sources than we do, he may also have simply been working from an earlier summary, anthology, or compendium of Epicurean writings - perhaps one organized topically. Second, is this scholiast and/or his source using the vocabulary of other schools to render Epicurus’

¹⁷³ And, by implication, also their equivalents.

¹⁷⁴ Sedley 1988: 308 n.24, cf. Long and Sedley 1987: i.74.

¹⁷⁵ Gill 2006: 49-50, 52-3, 62.

¹⁷⁶ Cf. esp. Bailey 1947, ii: 1005-6, Konstan 2008: ix, 7-10, Mehl 1999.

¹⁷⁷ In the letter to Herodotus, e.g., Epicurus consistently refers to as ψυχή what Lucretius sees as the *animus-anima* complex in doctrinally comparable contexts; cf. esp. Epic. *Ep. Hdt.* 63-7, Long and Sedley 1987: ii. 66.

¹⁷⁸ Long 1997: 130.

¹⁷⁹ Wilson 2007: esp. 50-4. Wilson encourages particular caution against mistaking synonyms or translations for the original reading of the text and notes well that the scholia which survive reflect both the preoccupations of the times in which they were written as well as of the times which preserved them.

ideas? It is entirely possible that this scholiast was importing terminology which Epicurus himself did not employ,¹⁸⁰ as we shall see.

A substantial and relatively coherent fragment from the second century C.E. inscription of Diogenes of Oenoanda - namely fr. 37, in particular 37.1.5-7 - seems to be commonly regarded as a witness of authority comparable to the scholion.¹⁸¹ This fragment discusses the interdependence of the ψυχή and the body; the terms τὸ ἄλογον and τὸ λογικόν occur.¹⁸² However, it only mentions them in passing and does not discuss their meaning or the distinction.¹⁸³ Fragment 37 focuses on the ψυχή¹⁸⁴ being more important for maintaining life and feeling than the body; this is closer to Epicurus than Lucretius.¹⁸⁵ On the basis of the dating and the surviving contents of the inscription, Smith concludes that although Diogenes may have heard of Lucretius, he did not know - or at least did not use - *DRN*; any similarities between their contents can be attributed to the use of common sources.¹⁸⁶ For these reasons, one cannot assume that Diogenes of Oenoanda's terminology necessarily corresponds to Lucretius'.

¹⁸⁰ Given the content of this scholion to *Ep. Hdt.* 66 as a whole, it is not implausible that the scholiast was relying (directly or indirectly, and possibly in translation) on Lucretius and mistakenly used τὸ ἄλογον and τὸ λογικόν (τῆς ψυχῆς) to render *animus* and *anima*.

¹⁸¹ The Epicurean's inscription is now usually dated to the first half of the second century C.E.; this follows Smith. Canfora, on the other hand, suggests that the inscription should be dated to the first-century B.C.E., largely on the basis of identifying the Κάρος of Diog. Oen. fr. 122 Smith with Lucretius, but also on contested epigraphic grounds. Both Smith and Canfora (and others), however, reject the long accepted dating of the inscription by Usener to the end of the second century or beginning of the third century C.E. Smith 1993a: 37-48, Smith 1993b, Canfora 1992, Canfora 1993. The arguments for the Smith's dating are more persuasive, in general. However, an earlier dating would not significantly affect the substance of this argument.

¹⁸² This may be one of the only examples we have of an Epicurean source making this distinction with respect to the ψυχή. Philodemus rarely discusses the nature of the ψυχή but sails fairly close to the wind of this distinction in his views of the differences between animals and humans as presented in book one of *On the Gods*. (Even if Philodemus would have accepted the distinction, there is nothing compelling one to equate his interpretation of the ψυχή with Lucretius', particularly, as we shall see, on points involving reason.) Konstan also notes this about the latter of the two terms; cf. p.141 n.188.

¹⁸³ It does not, for example, mention any distinct functions or even distinct locations of τὸ ἄλογον and τὸ λογικόν.

¹⁸⁴ The word ψυχή is here used repeatedly and, as in similar contexts with Epicurus, apparently with reference to what in Lucretius would be the whole *animus-anima* complex. This is true with the exception of the lower margin, quoting Epic. *KD* 13, which is not connected in sense to the rest of the fragment.

¹⁸⁵ Cf. Epic. *Ep. Hdt.* 65-6, whose context is physics. Lucretius, as we have seen, notes that the *animus* is of greater consequence for life and feeling than the rest of the *anima*, which in turn is more important than the rest of the body. For a coherent list of related passages with respect to Diogenes of Oenoanda and Lucretius, cf. Smith 1993a: 487-8. Here Smith, and others, assign this fragment 37 to Diogenes' epitome on ethics (not physics), and specifically to a discussion of the fear of death. Though this epitome contains direct quotations from Epicurus, notably from the *KD*, this study has seen no argument or evidence to suggest that the discussion of the ψυχή was 'penned' by anyone other than Diogenes himself.

¹⁸⁶ Smith 1993b, principally contra Canfora. Their debate on the matter centers to some extent on the figure of Κάρος, which Smith concludes cannot be Lucretius; cf. Smith 1986. According to Smith, 'All parallels between Lucretius and Diogenes - and there are many - can be accounted for by their loyal adherence to Epicurus' doctrines and by their use of common sources, above all the master's own writings'; Smith 1986: 195, cf. Smith 1997: 78, which essay also treats their differences in subject matter and focus. We may qualify this 'adherence to .. doctrines' with the caveat: as they understood them (leaving aside questions of interpolation and extrapolation).

The most tenuous commonly adduced evidence comes from the doxographical summary of Aëtius, namely from the fragments included in Usener 312. Aëtius 4.4.6 claims that both Democritus and Epicurus divided the ψυχή into τὸ ἄλογον and τὸ λογικόν, locating τὸ λογικόν in the chest, and scattering τὸ ἄλογον throughout the body; Aëtius 4.5.5 adds that Epicurus (and Parmenides) thinks that τὸ ἡγεμονικόν is likewise located in the chest.¹⁸⁷ Direct quotations in Aëtius are rare and these do not seem to be among them. It is likely that Aëtius' terminology actually derives from his source and not from Epicurus. Aëtius was probably compiling the *Placita* in the early second century C.E., thus roughly contemporary with Diogenes of Oenoanda. Insofar as the *Placita* has been reconstructed, it is based on an earlier work known as the *Vetusta Placita*. The *Vetusta Placita* was likely compiled around the same time as Lucretius and Philodemus were writing, but not in the Epicurean camp.¹⁸⁸ The work was probably produced in the first century B.C.E. by a member of the school of the Stoic Posidonius.¹⁸⁹ The *Vetusta Placita* was a summary of Theophrastus' *On Physical Opinions* (which included those from Thales to Plato, at least), supplemented by 'opinions' of the Stoics, Epicureans, and Peripatetics; Aëtius further supplemented these with respect to the Stoics and Epicureans.¹⁹⁰ As 'much that was derived from Theophrastus was subjected to Stoic reformulation' already at the time of the *Vetusta Placita*,¹⁹¹ the Epicurean and Peripatetic material may have been similarly recast. It also contains recognized inaccuracies and internal inconsistencies.¹⁹² Therefore the testimony of Aëtius should not supersede or be projected on to what we know to be genuine Epicurean accounts. It has limited use for

¹⁸⁷ Usener follows Diels in questioning the attribution to Democritus; Usener 1877: 217. Although Bailey acknowledges that Epicurus implicitly includes the νοῦς when speaking of the ψυχή, Bailey nevertheless posits that Lucretius' *consilium* of the *animus* or *mens* (3.95) should be equated with τὸ λογικόν and that *regimen* of the same (3.95) is the Stoic τὸ ἡγεμονικόν; Bailey 1947, ii: 1005-7. For a different interpretation of what Lucretius means by these terms, pp.262-4.

¹⁸⁸ Any similarities between *DRN* and the *Placita*, such as those ventured by Runia 1997 (i.e. dialectical distinctions), should take this into account.

¹⁸⁹ Posidonius was the head of the Stoic school in the mid first-century B.C.E. and a friend of Cicero (who may sometimes have worked from such compilations). Nevertheless, this study has found no evidence in Cicero's accounts of Epicureanism to the effect that Epicureans made the distinction. Although these are not uncolored by Cicero's adherence to the New Academy and by his Stoic sympathies, it is not unlikely that the distinction would have come up if they generally made it by this period.

¹⁹⁰ Kirk, Raven, Schofield 1983: 1-6. Regarding the dates of Aëtius, cf. also Long and Sedley 1987: i.492. Sedley, following Mansfeld, suggests further that Theophrastus' *On Physical Opinions* (likely in eighteen books), 'was not a history of physics, but a collection of materials for use in dialectical debate about physical issues, and included Theophrastus' own counter-arguments to the positions supported by others'; Sedley 1998a: 179. If that is true, it would thus have lent itself even more intuitively to the sort of commonplace-ing of or continued by the *Vetusta Placita* and Aëtius' *Placita*.

¹⁹¹ Kirk, Raven, Schofield 1983: 5.

¹⁹² For instance, cf. Sedley 1998a: 69 n.42 regarding certain sections relating to the Stoic ἡγεμονικόν.

corroborative purposes and extreme caution should be employed both then and in attempts to fill lacunae.

These three pieces of evidence suggest that a Stoicization of the Epicurean account of the ψυχή or *animus-anima* complex was probably introduced by the mid to late first century B.C.E., and generally appropriated by the Epicureans themselves within a century and a half.¹⁹³ This understanding then came into the scholia on the letters of Epicurus in Diogenes Laertius. Understanding the ψυχή of Epicurus and the *animus-anima* complex of Lucretius in such terms therefore seems both unwarranted and anachronistic.¹⁹⁴

Konstan agrees with the characterization of the *animus* and *anima* as rational and irrational parts of the soul,¹⁹⁵ but has argued repeatedly against the idea that Epicurean animals possess the former. He has difficulty reconciling these beliefs with his interpretation of emotions, desires, and fears in Epicurean psychology and proposes an Aristotelian solution: that animals do not share all of the same faculties as humans, but only at best the semblance of these things. So, for Konstan, animals have irrational feeling, but lack the functions of the rational soul such as ‘real’ emotion, ἀταραξία, memory and the like.¹⁹⁶ We will return to Konstan’s more specific arguments throughout this investigation, in their respective contexts. For now, if Lucretius’ *animus* were in fact a translation of τό λογικόν (τῆς ψυχῆς) and at least sometimes means ‘rational soul’, would it not follow that not just humans but also all living things have reason - with all the consequent ethical implications?¹⁹⁷

We have seen that the *animus-anima* complex is a single assembly of one nature and essential to the *coniunctum* of life. Lucretius attributes it to all living things - not just humans. For example, he does this linguistically though his choice of terminology. Among

¹⁹³ A not dissimilar trend seems to have also occurred with respect to emotion theory; cf. p.141. This suggestion about dating the influence of the Stoicization of Epicurean ideas with respect to Diogenes of Oenoanda would have to be somewhat modified if more persuasive evidence for Canfora’s dating of the inscription arises. Nevertheless, as discrepancies between the followers of Epicurus on doctrinal points suggest that Epicurus himself did not specify a position, then any discrepancy between Diogenes of Oenoanda (and possibly Philodemus) and Lucretius may be further evidence that Epicurus did not divide the ψυχή into parts.

¹⁹⁴ However, if Epicurus did use these terms, this would not obviate the possibility that he had his own interpretation of their meaning - such as, simply, a physical concentration of ψυχή in the chest or a scattering of some of the ψυχή throughout the rest of the frame, which would fit better with the understanding of the *animus-anima* complex in Lucretius. Furthermore, even if we accept that Epicurus held that ψυχή had ‘rational’ and ‘irrational’ components, that would not necessitate applying such labels to the *animus* and *anima* as Lucretius represents the terms.

¹⁹⁵ Cf. esp. Konstan 2008: 7-10.

¹⁹⁶ His views on these topics with respect to animals are most coherently set out in Konstan 2008: ch.1, esp. 18-22 (N.B. 19 n.27, 22 n.30). Philodemus takes a quite similar stance; cf. p.45 n.182. On this Aristotelian solution and one interpretation of its influence on Hellenistic philosophy of mind, cf. Sorabji 1993: part I *passim*.

¹⁹⁷ Of course, animals having reason would not necessitate the translation and interpretation of the protasis.

other words, Lucretius frequently uses terms etymologically related to the complex to denote all living creatures - both humans and animals; the most salient of these include the noun *animal*, the adjective *animalis*, and the word *animans* (both adjectivally and substantively).¹⁹⁸ At numerous points Lucretius also specifically attributes to animals (i) the terms *animus*, *anima*, and their equivalents (either terms which are synonymous or terms which denote the whole by emphasizing some aspect thereof), (ii) the parts of the body in which - insofar as it is a living body - the complex is integrally situated, and (iii) the faculties and their manifestations which, as we shall see, emerge partly from the complex. A few of the examples of explicit attribution will suffice to illustrate the point. The most frequently mentioned in scholarship include: *mens* to lions, deer, and cows,¹⁹⁹ *animus* to the mother of the *vitulus*,²⁰⁰ and, perhaps most (in)famously, *mens*, *animus*, and *voluntas* to horses.²⁰¹ As Sorabji notes, the fact that animals can dream is also evidence, as the process and activity is said to belong to the *mens/animus*.²⁰² We have already seen that Lucretius attributes vital motions and feeling to all living things, and the term *anima* to a snake who suffers pain (*dolor*).²⁰³ The terms *animus* and *anima* are even used of insects - literally living creatures so small that one cannot see their third part.²⁰⁴ Lucretius thus indicates that all living things possess the complex in its entirety.

If even insects are living assemblies, what criteria distinguishes living things from non-living ones? Where, for Lucretius, does the boundary lie?

III. THE BOUNDARIES OF LIFE²⁰⁵

The Slide Argument is based on the relationship between different kinds of living beings. It essentially goes like this: if one should not eat animals because they are living things like us, then one should really spare plants too. Campbell has argued that Epicureans were generally vegetarian - possibly including Lucretius. Campbell also argues

¹⁹⁸ West too makes this point: '*animantibus . . . animos animasque* [3.417-18], are etymologically connected and the implication is that they will be similar in other ways'; West 1975: 95.

¹⁹⁹ For instance, Lucr. *DRN* 3.288-306.

²⁰⁰ Lucr. *DRN* 2.365.

²⁰¹ Lucr. *DRN* 2.263-71.

²⁰² Lucr. *DRN* 4.984-1010. Sorabji 1993: 28-9.

²⁰³ Lucr. *DRN* 3.657-69.

²⁰⁴ Lucr. *DRN* 4.116-22.

²⁰⁵ Earlier versions of this material (and relevant context from the previous) were presented as papers in February 2013 for the Classical Association of Ireland - Dublin branch and in March 2013 for the Trinity College Dublin Postgraduate Interdisciplinary Classics Seminar Series; my thanks to the audiences for their feedback.

that Lucretius philosophically reconciles Epicurean and Empedoclean vegetarianism.²⁰⁶ But it is by no means clear whether Lucretius was a vegetarian, much less whether it was due to sympathy with the views of Empedocles. There is a variety of views on the nature of plants in ancient philosophy. Pythagoras expresses concern about justice towards plants and considers them alive; however, he believes that they lack a soul. Empedocles allots both life and a soul to plants. Plato thinks that plants have an appetitive soul and that they are capable of certain feelings, such as pleasure and pain. Aristotle denies plants a sensitive soul. He thinks that animals lack reason and only falsely seem to have other cognitive capacities, but he does allow them an irrational soul; to compensate for this move, then, Aristotle says that plants only have a nutritive soul. For Aristotle, some sort of soul is necessary for life, and he does think that plants are alive. The Stoics generally share the assumption that the soul is necessary for life. Depending on who one reads, the Stoics either deny both soul and life to plants, or give plants life but no soul.²⁰⁷ There is no explicit discussion of whether plants are alive or have a soul by any Epicurean source. There is only a brief and problematic bit of testimony from Aëtius. Despite the lack of coherent discussion, *DRN* offers a wealth of evidence.

First there are the arguments from omission. Lucretius never attributes to plants the *animus-anima* complex or associated parts of the rest of the body, such as flesh, sinews, and veins. We have seen that these are necessary conditions for the existence, generation, and preservation of both vital motions and feeling. Therefore, plants cannot be alive. Moreover, as plants are assemblies and never form the arrangements or motions necessary for the emergence of life, they must not be assembled in the appropriate way. As we have seen, when Lucretius wants to refer to ‘living things’ as a group, he frequently uses terms etymologically related to *animus* and *anima*. Simply put: Lucretius does not use these or related words to include plants. They mean either animals or all living things - both humans and animals, which suggests a kinship between them. Thus *animantes* and the like

²⁰⁶ Campbell 2008: esp. 13-16. On philosophical vegetarianism in Greco-Roman antiquity more generally, cf. esp. Sorabji 1993: esp. ch.13, Osborne 2007: esp. 224-38, and Dombrowski 2014.

²⁰⁷ Sorabji 1993: 97-103, 174, D.L. 8.23, 28, 30. Sorabji suggests that all of the Stoics (with the possible exception of Seneca) view plants as non-living. They do allow inanimate things some share of *pneuma*, although in insufficient tension for life (the Stoic soul being a certain degree of *pneumatic* tension); Annas 1992: 46. Annas, further, reads the Stoic *scala naturae* as allowing life but not soul to plants, perhaps an assumption on her part which is read back onto the schema? She also claims that the Epicureans did not hold with a scale of beings, but has difficulty reconciling this with her views on Epicurean animals; Annas 1992: esp. 53-4, 134.

should be taken more precisely as 'living creatures' unless context explicitly suggests otherwise.

Further evidence comes from Lucretius' treatment of metempsychosis, the idea that the soul, so to speak, is immortal and migrates to a new body upon the death of the previous - possibly spending some time in the afterlife in between. Lucretius represents death as the end of life and the end of existence.²⁰⁸ The *animus-anima* complex dissolves along with the rest of the body, and its *primordia* are dispersed. For these reasons, the transmigration of the soul is an anathema. Lucretius attacks it twice in his poem. In the first case, and possibly also the second, his criticism is directed at both Empedocles and the doctrine.²⁰⁹ Empedocles believed in the immortality of the soul. He also believed that a soul wanders among plant, animal, and human bodies - sometimes retaining the memory of past lives. Empedocles even thought that he was once reincarnated as a bush.²¹⁰ Now, despite the beliefs of Empedocles, when Lucretius treats and rejects metempsychosis, he does not even mention plants as candidates for transmigration. This omission is further evidence that Lucretius disagreed with Empedocles on the idea of plant life.

Lucretius also offers positive evidence about the nature of plants.²¹¹ First, plants are spoken of in the manner used of non-living assemblies. Plants are not born, nor do they die.²¹² Rather, Lucretius generally talks about their generation, growth, decay, and dissolution. Plants are generated by a supply of first-beginnings from the Earth or from their their own fruits. Those *primordia* then assemble under particular conditions, such as those fostered by cultivation.²¹³ Plants do require something like food for growth (by augmentation) and in order to stave off decay, but so do all assemblies - including Earth itself.²¹⁴ Moreover, plant 'food' is somewhat distinct from the food of living things; it consists of water, air, and - most notably - *primordia* directly from the land.²¹⁵ Lucretius further counters the argument that growth indicates life in his accounts of plant motion. Lucretius says that plants grow upwards in the same way that fire rises.²¹⁶ So, plants grow

²⁰⁸ Cf. esp. Lucr. *DRN* 3.830-69.

²⁰⁹ Lucretius admired Empedocles as a predecessor in philosophical poetry, but did not follow him here.

²¹⁰ Lucr. *DRN* 1.112-16, 3.360-783, Sorabji 1993: 97, 174, Osborne 2007: ch.3.

²¹¹ So far we have considered three arguments from omission: 1) Lucretius never attributes to plants what is required for the emergence of life. 2) He never refers to plants as living. 3) He does not mention plants as candidates for the transmigration of souls when rejecting metempsychosis.

²¹² By contrast, as we have seen: According to Lucretius, living creatures are mortal. They are born from a mother of like species, or from the Earth. When they die their bodies decompose back into first-beginnings.

²¹³ For example: Lucr. *DRN* 1.208-14, 5.206-17, 5.1361-78.

²¹⁴ As we have seen, the Earth is neither alive nor sensate; Lucr. *DRN* 2.1105-74.

²¹⁵ Lucr. *DRN* 1.803-29.

²¹⁶ Lucr. *DRN* 2.184-215.

due to the force of collisions with the external bodies which augment them. Thus plant growth is necessitated and not independent; it works just like any assembling process involving non-living bodies. The only *per se* movement which Lucretius explicitly says that plants are capable of is motion due to weight, which is also necessitated.²¹⁷ They also lack the analogous sort of motions which occur in living things. Above, at 2.937-43, Lucretius groups plants (*'terra ... creatis'*) with other non-living things - air, rivers, and land - and shows that these four things are sources of matter for the formation of assemblies which do have vital motions.²¹⁸

In Lucretius' creation narrative, plants also existed before life in general.

sic nova tum tellus herbas virgultaque primum
sustulit, inde loci mortalia saecla creavit
DRN 5.790-1

Thus the new earth first put-forth vegetation
and small trees; in the next place she created
the mortal generations.

The Earth generated plants from its own supply of *primordia*. It did so prior to generating the wombs of the first mortal creatures (here: *'mortalia saecla'*) - first birds, then land creatures, both human and animal. Vegetation was already there when these wombs broke. The first function of plants was to provide a bed for the first living creatures. At that time, living creatures were nursed by the Earth.²¹⁹ Ever since the infancy of the world, plants have provided food.

ex insensilibus, quod dico, animalia gigni.
...
vertunt se fluvii, frondes et pabula laeta,
in pecudes, vertunt pecudes in corpora nostra
naturam, et nostro de corpore saepe ferarum
augescunt vires et corpora pennipotentum.
ergo omnes natura cibos in corpora viva
vertit et hinc sensus animantium procreat omnes
DRN 2.866, 875-80

From things lacking feeling, as I say, living
creatures are generated. ... Rivers, leaves, and
rich pastures turn themselves into docile
herds, docile herds turn their nature into our
bodies, and often from a human body the
strength of beasts and bodies of powerfully
-winged birds augment. Therefore nature
turns all food into living bodies and from this
creates all the feelings of living creatures.

This circle of nutrition represents plants as nourishing the animals which humans typically eat. Elsewhere Lucretius explains that pastures are rich or fertile in that they contain many kinds of first-beginnings, which in turn nourish many different kinds of animals; the same is said of rivers.²²⁰ In both cases, plants (like rivers) are grouped with the things lacking life and feeling. They are food because they supply *primordia* useful for augmenting the creatures which eat them. While plants get their supply of *primordia* directly from the

²¹⁷ Lucr. DRN 1.184-205. Presumably, they have as much potential to swerve as any other body falling due to weight, but there is no suggestion that they ever move through *voluntas*.

²¹⁸ There is no mistaking that these things lacking feeling are classified together; N.B. esp. Lucr. DRN 2.940: *'aere fluminibus terris terraque creatis'*.

²¹⁹ Lucr. DRN 5.805-817.

²²⁰ Lucr. DRN 2.661-68. On relationship of the relevant components to one another and to an overall 'natural cycle', cf. e.g. Betensky 1972: esp. 23-61 and, more recently, Camardese 2010: 51-75.

Earth, living creatures replenish theirs indirectly. They ingest food, then break it down.²²¹ Thus certain animals nourish humans²²² and human bodies nourish other animals.²²³ Elsewhere, Lucretius makes it clear that humans are nourished by plants as well. In the infancy of the world, for example, the courting lover offers either acorns and arbutus berries or choice pears.²²⁴ These lines also emphasize the contrast between *insensiles* and *animalia*. The contrast is elaborated by the dichotomy between the non-living foods²²⁵ and the living bodies which are nourished by them; these ‘*corpora viva*’ are equivalent to the sensate *animantes* - and include both humans and various animals.

Lucretius makes similar contrasts elsewhere as well. In the context of his rejection of the idea that the world was generated from earth, wind, water and fire, Lucretius explains that these so-called four elements cannot be the fundamental building-blocks of things, because they can not produce anything by coming together: ‘neither anything living, nor anything with a non-living body, like a tree’.²²⁶ The final nail in the coffin, if such a pun may be permitted, anticipates the circle of nutrition. All things cannot be joined together in all ways, says Lucretius, otherwise, among other *adynata*, ‘at times tall branches would be generated from a living body’.²²⁷ Both of these examples indicate that trees and other plants which grow branches are not alive.

There is also Aëtius’ testimony:

Οἱ Στωικοὶ δὲ καὶ Ἐπικούρειοι οὐκ ἔμψυχα (τὰ φυτὰ). τινὰ γάρ ψυχῆς ὀρμητικῆς εἶναι καὶ ἐπιθυμητικῆς, τινὰ δὲ καὶ λογικῆς· τὰ δὲ φυτὰ αὐτομάτως πως κινεῖσθαι, οὐ δὴ ψυχῆς
Aëtius 5.26.3 (Usener 309)

The Stoics and the Epicureans think that plants are not alive. For they think that some things have an appetitive and desiring soul, and some things even a rational soul; but that although plants were moved in some way through themselves, they were not moved through a soul.

Although the terminology here used to render and include Epicurean ideas is problematic, Aëtius nevertheless makes three points which we have seen in Lucretius. Plants do not

²²¹ Further on this process, cf. esp. pp.104-5.

²²² Or perhaps, if Campbell is right, non-Epicurean humans. However, Lucretius does seem to imply here that eating animals is generally part of the natural order of things.

²²³ Presumably the humans who nourish animals do so because they were not buried or burned when they died, in which cases their first-beginnings would have returned to the earth and air; they may have been attacked. Only after the first-beginnings are returned to the earth do they then become available for the generation and augmentation of plants.

²²⁴ Lucr. *DRN* 5.962-6. In the context of growth, decay, and cultivation, cf. *DRN* 2.1144-74.

²²⁵ Non-living as in apposition to the rivers, leaves, and rich (in first-beginnings) pastures.

²²⁶ Lucr. *DRN* 1.774: ‘*non animans, non ex animo cum corpore, ut arbor*’.

²²⁷ Lucr. *DRN* 2.700-9, esp. 701-2: ‘... *altos | interdum ramos egigni corpore vivo*’; he may be using the spondaic line for emphasis.

move as living things do; they have never possessed a ψυχή (i.e. *animus-anima* complex) and, at least partly as a consequence of this, are not and have never been alive.²²⁸

As is often the case in *DRN*, one must pluck the various and disparate flowers of the pathless Pierides mountains to reach such conclusions. But, gathering these together, we see that the more overtly literary and linguistic evidence and the philosophical content are perfectly and consistently integrated. We today think that plants are alive, and our notion generally follows the Aristotelian conception of plant life. *Pace* Schrijvers, this is a point of comparative biology on which Aristotle and Lucretius clearly differ.²²⁹ Lucretius has obviated the assumption of plant life on which the Slide Argument rests and would seem to offer the following reply: If we humans should not eat animals because they are living creatures like us, then go on and eat plants, because they are not alive! Given these views on plants, Lucretius would have made a good vegetarian; perhaps then - as Campbell claims - he was.²³⁰ For Lucretius, insofar as a sharp dividing line exists among assemblies, the boundary does not fall between humans and animals, but rather between the entire animal kingdom and non-living things, including plants.

Conclusions

Lucretius depicts a continuum of all things, and particularly all material things. He unfolds the nature of things in terms of their *coniuncta* and *eventa*, which form the basis for the continuities and relative distinctions of that continuum. All ontological levels are equally real, and they stand in a variety of coordinate and causal relationships to one another; hence dust motes and - viewed from sufficient distance - sheep grazing on a hillside and military maneuvers exemplify their constituents.²³¹ Despite the relationship between the natures of the *primordia* and the assemblies, the entities created by the interactions of the first-beginnings have a nature of their own. In other words, the first-beginnings have the capacity to create an entity with its own emergent nature, a nature which is different from the nature of its source or constituents. The emergent nature of the *animus-anima* complex is one example of how the capacities of an assembly are

²²⁸ For Aëtius this is the meaning of ἐμψυχα or being ensouled.

²²⁹ Schrijvers 1997 stresses the argument that Lucretius' interest in comparative biology is derived from Aristotelian influence, either directly or indirectly.

²³⁰ That said, perhaps a better argument that Lucretius and other Epicureans were vegetarian is the historical association between meat-eating and *religio*, in the form of animal sacrifice. We will return to this and to other implicit arguments against animal sacrifice in later chapters.

²³¹ *Lucr. DRN* 2.112-41 and 2.308-32, respectively. On the theory of coordinate levels of reality and how this relates to Lucretian imagery, cf. esp. Hardie 1986: 166-7, 219-33.

proportional to the number and variety of its constituents and how the *coniuncta* and *eventa* of an assembly (living or not) arise at least partly from its constituents and their interactions - be they other assemblies or *primordia*. The logic of the relationships between the various levels is consistent, regardless of structural complexity. The complex is one thing with a single nature, concentrated or dispersed in various locations; it is not comprised of a rational part and an irrational part. The *animus-anima* complex exists as an assembly within the greater assembly of the living body, all parts of which contribute to the emergence of life and its vital motions. Plants lack these and are grouped with non-living *concilia*. Both humans and animals possess them, including the *animus-anima* complex in its entirety, and are understood to be living creatures. The implications of these fundamental continuities between all living creatures are significant indeed.

CHAPTER II: PERCEPTION AND THE *SENSUS CORPORIS*

Introduction

Sensory perception is the one faculty to which all others were related in the ancient debates on philosophy of mind and, as Sorabji's work indicates, on animals' place therein; the Epicureans were no exception.¹ The importance of the senses in Epicurean thought cannot be overstated. The alpha and omega of its empirical epistemology, a touchstone underlying various aspects of its linguistic theory as well as many of the more overtly literary features of Lucretius' *DRN*, and, more debatably, the basis of its ethical system, they have often been studied as such. Considerably less attention has been paid to the mechanisms by which the senses - particularly those other than sight and thought - operate. Notable exceptions to this trend include the work of Glidden, Koenen, Rosenmeyer, Schoenheim, and Sedley.² Lucretius' *DRN* contains by far the most detailed and complete of the surviving Epicurean accounts of the ontology and aetiology of sensory perception. The first half of this chapter considers what Lucretius means by *sensus* and the mechanisms underlying all of its manifestations; the second half extends this analysis with respect to what we today would call 'the five senses'.

I. *SENSUS* AS A FACULTY

Sensus, as we have seen, coexists with life itself, and death is described as the process of losing *vitalis sensus*.³ As a faculty, *sensus* is the ability to feel or perceive. The faculty is tied to certain more-or-less systemic body parts - namely, the flesh, sinews, and veins, and especially the *animus-anima* complex. Moreover, the poet asserts that no part of the body is able to feel independent of its context - i.e. without the rest of the body.⁴ *Sensus* is thus a *coniunctum* of the entire living creature (not just of one part) and to some extent emerges from its physiology. This chapter and the next will show that instances of *sensus* also arise in part from involuntary or necessitated motions, both non *per se* ones,

¹ Sorabji 1993: part I.

² Cf. e.g. Glidden 1979b, Koenen 1997, Koenen 1999, Rosenmeyer 1996, Schoenheim 1966, Sedley (forthcoming).

³ On the second point, cf. Lucr. *DRN* 3.526-47.

⁴ Lucr. *DRN* 2.904-62, 3.323-6, 3.548-669, p.43; cf. Epic. *Ep. Hdt.* 64-6, Diog. Oen. fr. 37.I.7-12 Smith.

proximately caused by the interaction of the living body with external bodies, and *per se* ones, proximately caused by interactions within the living body itself.⁵

Solmsen once argued that Plato's distinction between feeling and perception defined the subsequent philosophical discourse on αἴσθησις.⁶ Although Solmsen's analysis of αἴσθησις in Epicurus and Lucretius is less than convincing, his characterization of the general situation is rather apt. He states that 'The word αἴσθησις as used by the Greeks in technical as well as non-technical discourse has the advantage of comprehending a large number of sensory and physiological experiences but at the same time the disadvantage that the functions and processes denoted by it are only superficially alike.' He also notes that the Latin *sensus*, *sentire*, and some of the 'modern derivatives', like 'sensation' also have multiple meanings and perpetuate the ambiguity, of which both the Romans and Greeks were aware.⁷ However, what we have, at least in Lucretius, and possibly Epicurus, is really conceptual inclusivity, not linguistic ambiguity.

Lucretius does not substantially differentiate between the different meanings of *sensus*. His use of the word generally corresponds to at least one of three definitions, all of which could be loosely rendered by the English translation 'feeling'. This chapter will show that *sensus*, for Lucretius, includes: (i) the faculty or power of perceiving, (ii) corporeal sensations related to the five senses, as well as the physiological structures which correspond to the so-called sense-organs of these five; the next chapter will show that it also includes (iii) perceptions of the *animus-anima* complex itself. There are some grounds for believing that Epicurus' general conception of αἴσθησις was somewhat similar.⁸ This is perhaps behind the doubt expressed by Sedley that the precise rendering of the word αἴσθησις at each point substantially affects the overall argument.⁹ Indeed,

⁵ Certain phenomena - such as belief, judgment, and the like - which are to some degree consequent upon sensory perception and can also be causally involved in certain perceptions, will be touched upon in the context of these chapters, but, because they involve a significant voluntary or non-necessitated factor, they will be treated more fully in chapter five.

⁶ Solmsen 1961a: esp. 155, 157, 165-7.

⁷ Solmsen 1961a: 151, 154. Cf. Frede 1987 on the semantic range of αἴσθησις and associated terms in Plato's time and a possible motivation for Plato's use of it to approximate sense-perception in the later dialogues. My thanks to Tobias Reinhardt for pointing me to the essay.

⁸ Cf. esp. Epic. *KD* 24, but N.B. also the somewhat different picture gleaned from Epic. *Ep. Hdt.* 38, 63, 68. It is by no means clear that Epicurus used this or associated terms with consistent signification. Also, in the letter to Herodotus, he twice uses αἰσθητήριον to refer reasonably clearly to what we might call a 'sense-organ'; Epic. *Ep. Hdt.* 50 (here as something different from διανοία, but serving a similar perceptive function), 53. On the relationship between the terms αἴσθησις and πάθος, cf. pp.140-42, 166-7.

⁹ Sedley 1989a: 135 n.3. On the possibilities and difficulties inherent in Epicurus' use of terminology for sense-perception, also helpful are the treatments of Furley 1993, Striker 1977: esp. 125-6, and Taylor 1980: esp. 105-7.

precisely rendering instances of Lucretian *sensus* in translation would risk prejudicing the reader's interpretation and artificially limiting intratextual and philosophical connections.

Moreover, at various points in the poem, Lucretius indicates that feeling and perception are identical.¹⁰ According to Lucretius, under certain circumstances we may not feel that we have come into contact with exceedingly light things, including dust, spiderwebs, feathers and the footsteps of tiny insects which land upon us.¹¹ Thus we may not initially perceive that we have come into contact with such things, presumably until and unless we grasp this by some other means - e.g. until our eyes interact with stimuli from the object. Similarly, the soldier whose arm is suddenly shorn-off in battle may initially carry-on fighting, without feeling pain (*dolor*) or otherwise registering the loss in either his *mens* or the rest of his body. He is unable to feel the pain partly because he has not perceived it at the site of the blow and partly because his *mens* is entirely occupied with other perceptions.¹² For Lucretius, to feel - by one means or another - is therefore to perceive, and vice versa.

According to Lucretius, all specific instances of feeling arise from microscopic motions in the *animus-anima* complex which he calls 'feeling-bearing' (*sensifer*).¹³ Lucretius' justifies the existence of the nameless fourth constituent partly on the basis of its role in generating this *sensifer motus*, and thereby, *sensus*.¹⁴ The other primary constituents are not sufficient.

nec tamen haec sat sunt ad sensum cuncta creandum,
nil horum quoniam recipit mens posse creare
sensiferos motus et quaecumque ipsa volutat
DRN 3.238-40

Nevertheless, these all do not suffice for the production of *sensus*, because the *mens* accepts that none of these can create *sensus*-bearing motions and whatever the *mens* itself turns over.

The text of this passage is problematic, both with respect to the Latin and its interpretation.¹⁵ Although the particularly problematic second half of line 240 suggests thoughts, there is no need to hold with Bailey (and those he follows) that it refers exclusively to thoughts. Although *voluto* often is used of 'turning things [like thoughts]

¹⁰ He does not suggest that a phenomenal sense-impression or *φαντασία* occurs as a distinct step in the perceptual mechanism, as we shall see.

¹¹ Lucr. DRN 3.381-90.

¹² Lucr. DRN 3.642-51. The implication of 3.645-7 that the feeling of *dolor* is not exclusive to the bodily frame is also significant, and will be returned to later, as will be the importance of *studium mentis* in certain sorts of perception more generally. For a fuller analysis of this passage, cf. pp.234-7.

¹³ The term '*sensifer motus*' is only used six times in the poem, all of which occur in the third book. The first three occur within a thirty-two line interval, and can be taken together. The fourth and fifth occur within three-hundred thirty lines of the first and each contributes further points. The final mention, which occurs towards the end of book three, reinforces the overall picture and suggests further avenues of enquiry.

¹⁴ On the primacy of the nameless-fourth in initiating *sensifer motus*, cf. e.g. Kerferd 1971: 92.

¹⁵ For discussion of the problems, cf. Bailey 1947, ii: 1029-30 and Kenney 1971: 107.

over' in one's mind, these things may include motions, of which there are many which the *mens* turns over in itself, as we shall see in this chapter and the next. Indeed, 'quaecumque' may include motion due to its juxtaposition with 'sensiferos motūs' (i.e. take *motus* twice), and due to the context being a discussion of the nameless fourth's motions - with respect to cause, ease, and process of transmission. As we shall see especially in chapter three, when we treat *sensus*-bearing motions which occur with respect to the *mens* itself (at least in the first instance), there is a very real sense in which the *mens* does not initiate, e.g., thought.¹⁶ Thus from the very first mention of the term *sensifer motus*, its aetiological position in relation to *sensus* is clear and reflected by the etymology of the Lucretian compound adjective. The generation of *sensus* as a faculty is at least to some extent caused by the ability of the constituents of the *animus-anima* complex to create or move in both *sensiferi motus* and certain other motions of the *mens*.

Let us leave aside Lucretius' criterion of proof being what the *mens* accepts¹⁷ and look at the details of the physiological mechanism. Being itself composed of the smallest and smoothest constituents, the nameless fourth constituent is the most mobile and finest of all assemblies.¹⁸ The choice of 'volutat' suggests both turning something and the rolling motion which is characteristic of bodies with extreme smoothness, roundness, and ease of motion. The ambiguity can be understood as idea play. With one expression, Lucretius accounts for both the microscopic processes and the corresponding experience of the living creature, while stressing the fact that they are indeed related.¹⁹ The emphasis on rolling thus assumes a number of physical features which are related to the ease of the fourth's motion - which ease is further emphasized by stressing the smallness of its constituents. The smaller something is, in this paradigm, the less is generally required to move it. Lucretius has already set up the physics of the nameless fourth and its functions at

¹⁶ On motions which are initiated by the *mens* and how thought is related to such mechanisms, cf. esp. chapter five.

¹⁷ The expression 'recipit mens' also implies the processes by which certain stimuli enter us and by which beliefs are formed, on which cf. ch.5: esp. pp.238, 274ff. It is perhaps no coincidence that this process is alluded to in the very first mention of *sensifer motus*, as it is involved in the former.

¹⁸ Lucr. *DRN* 3.243-4. Perhaps cf. Epic. *Ep. Hdt.* 63.

¹⁹ Cf. ch.5: esp. pp.241-2 on turning one's *animus* and its influence on subsequent perceptions.

3.177-207 (esp. 3.199-205), building on 2.451-77.²⁰ His implication is that ease of the motion of the *animus-anima* complex in general is physically a result of the size, shape, texture, and weight - and thereby ease of (rolling) motion - of the nameless fourth.

These *coniuncta* of the nameless fourth do explain its primacy in initiating *sensifer motus* and, thereby, *sensus*:

sensiferos motus quae didit prima per artus.
prima cietur enim, parvis perfecta figuris
DRN 3.245-6

It first disseminates *sensus*-bearing motions through the limbs. For, being made from tiny shapes, this stirs and is stirred first.

This use of '*cietur*' should be taken as encompassing both the passive and middle voices.²¹ As we have seen, the *sensus*-bearing motion can be transmitted from the fourth and the *animus* until the whole complex and body comes to feel as one ('*persentiscunt*', 3.249) - down to the flesh, bones, and marrow.²² Pleasure and its opposite - presumably pain ('*voluptas ... contrarius ardor*', 3.251) are explicitly included as examples.²³ The role of the nameless fourth is stressed again a few lines later.

sic calor atque aer et venti caeca potestas
mixta creant unam naturam et mobilis illa
vis, initum motus ab se quae dividit ollis,
sensifer unde oritur primum per viscera motus
DRN 3.269-72

Thus mixed heat and air and the hidden power of wind and that mobile force create one nature. The fourth distributes the beginning of motion from itself to the others, and from it first *sensus*-bearing motion arises through the flesh.

These lines show that to some extent the nature of the complex emerges jointly from these constituents, and that instances of its motion generally begin from the nameless fourth. As a proximate cause of *sensifer motus*, the nameless fourth is essential to the faculty of *sensus*. Whether we feel or perceive an external object that comes into contact with our bodies, on the other hand, is partly due to the physiological arrangement of the first-

²⁰ Cf. the association between the degree of smoothness and roundness and the degree of fluidity or ease of motion at Lucr. DRN 2.451-77, esp. 2.452-5: the explanation of the *coniunctum* of the fluidity of liquid by the example of poppy seeds. These *glomeramina*, each of which is *levis* and *rutundus*, thus render the struck handfull *volubilis*. Nevertheless, the example here of salt in seawater clearly shows that smoothness is not necessary for fluidity, just lack of entangling hooks. Shortly before the passage at hand, at 3.177-207, Lucretius recalls a number of features of 2.451-77. For instance, he recalls - complete with the poppy seed illustration - the explanation of fluidity by overall shape and texture, adding size, weight, and rolling ability. He also recalls it through a number of intratextual echoes, most notably *volubilis* (here '*volubilibus parvisque ... figuris*', 3.190) '*papaveris*' (3.196), and '*levibus atque rutundis*' following a principal caesura (3.205).

²¹ Lucretius is thus employing both the passive sense and the original reflexive meaning retained particularly with verbs of motion; cf. Kühner and Stegman 1971: 104-6. This is implied by the nameless fourth's role in initiating motion on its own, so to speak; on which cf. below and pp.257-62. Kenney's interpretation of '*didit prima*' as 'initiates and distributes' would concur with the middle sense of '*cietur*'; Kenney 1971: 108. Sedley 1998a: 117-18 takes '*didit*' to render διαδίδωμι, as cognate with διάδοσις and thus a parallel with a fragment of Phld. *Piet.* 1077-89. If so, the idea therein that those transmissions 'κινεῖσθαι' partly 'παρ' αὐτοῦς' may support the connection.

²² Cf. pp.42-3.

²³ Cf. Epic. *Ep. Hdt.* 53 on the exciting of hearing and of smelling by chain reactions, sometimes disturbingly, sometimes pleasantly.

beginnings of the complex, in particular of the *anima*, and those of the rest of the body. *Contra Democritus*,²⁴ Lucretius presents the structure of that arrangement - and its proof - as follows:

nam cum multo sunt animae elementa minora
quam quibus e corpus nobis et viscera constant,
tum numero quoque concedunt et rara per artus
dissita sunt; dumtaxat ut hoc promittere possis,
quantula prima queant nobis iniecta ciere
corpora sensiferos motus in corpore, tanta
intervalla tenere exordia prima animai

DRN 3.374-80

For as the constituents of the *anima* are much smaller than those from which our body and flesh are made, likewise they yield in number and, are spread sparsely throughout the limbs - to the extent that you may claim this:²⁵ the primary constituents of the *anima* have as great intervals as the smallest bodies which when first applied to us are able to stir *sensus*-bearing motion in the body.

The distribution of the constituents of the *anima* can thus be measured by the magnitude of the bodies with which we perceive interaction by direct contact, which distribution will be seen to vary by bodily structure. This rests on the assumption that not all contact with potential stimuli will cause *sensifer motus*. Sometimes, we do not feel or perceive ('*sentimus*', 3.381, 3.383, 3.389) direct contact with certain very light things,²⁶ because they do not even indirectly stir the *anima* or do not thus stir it to the point where it transmits that motion to the rest.²⁷

usque adeo prius est in nobis multa ciendum
quam primordia sentiscant concussa animai
semina corporibus nostris inmixta per artus,
et tantis intervallis tuditantia possint
concursare coire et dissultare vicissim

DRN 3.391-5

Many first-beginnings must be stirred to such an extent in us before the seeds of the *anima*, mingled throughout the limbs, because they have been struck, begin to feel and buffeting one another across such great distances, they are able to collide, ally, and fly apart in turn.²⁸

So, motions which begin from contact with some external stimulus require two things in order to be *sensiferi*. First, the scattered constituents of the *animus-anima* complex must be stirred - either directly or indirectly - by the contact. They must also be stirred to such

²⁴ On the Epicureans' engagement with Democritus' theories about the soul, particularly as evinced by Dem. fr. B191 and Theophrastus *On the Senses* 58, cf. esp. Warren 2002b: 63-71.

²⁵ This rendering of '*dumtaxat ut hoc promittere possis*' follows with slight modification the interpretation of Kenney 1971: 127.

²⁶ Cf. Lucr. DRN 3.381-90. Presumably Lucretius is referring to the contact of external objects with the flesh, as he mentions the body itself, the limbs, and the head in this context. Further on *tactus* below.

²⁷ Kenney 1971: 129 suggests that the particles of the *anima* either lie (a) below the surface, or (b) at too great a distance to be stirred by the light objects. Kenney's (b) does not seem to fit all of the macroscopic objects mentioned, particularly '*plumas avium*' (Lucr. DRN 3.386). But cf. now Kenney 2014: 126-8.

²⁸ On the difficulties of these lines with respect to text and interpretation, cf. Bailey 1947, ii: 1059-60, Kenney 1971: 129-30, Kenney 2014: 128. This interpretation is generally in sympathy with that of Kenney, although - for example - there seems to be no compelling reason to make '*tantis intervallis*' an ablative absolute or to give it concessive force, as he seems to on 1971: 130 (though not so on p.129).

an extent that they interact with other constituents of the complex.²⁹ This process is comparable to that by which dust motes and their motions become perceptible.³⁰

It is possible to take this a step further.³¹ When the phrase '*semina animai*' functions as the subject of '*sentiscunt*', it can be taken as a synecdoche for the *animus-animia* complex (in the context of the living body). This inference is suggested by the fact that feeling is a *coniunctum* of the whole living creature and no individual part (much less its own constituents) can feel independently, as we have seen and as Lucretius has just restated a little before - at 3.350-8. '*Sentiscunt*', which is only used twice in the poem, perhaps recalls '*persentiscunt*', the only compound of *sentisco* which is used in the poem; perhaps not coincidentally the compound's one use (3.249) occurs - as we have seen - in a context upon which this passage builds. When '*semina animai*' functions as the antecedent of '*tuditantia*' and the subject of '*possint*' with its complementary infinitives, its literal meaning can be either the constituents of the *anima* or the first-beginnings of those constituents. Also, '*prius ... quam*' applies to all of the verbal actions - microscopic and macroscopic - initiated by the causal participle modifying '*semina animai*'. The *sensiferi motus* of the constituents and the particular *sensus* of the living creature thus coincide and what causes the former is also a cause of the latter.³²

The activation of *sensifer motus* is therefore a necessary vertical cause of *sensus*; *sensus*-bearing motion occurs when a sufficient number of the constituents of the *animus-animia* complex stir to such an extent that they interact with other constituents of the complex. *Pace* Bailey, then, instances of feeling and *sensiferi motūs* are not identical, but the former emerges at least in part from the latter - and to that extent they can be understood as two ways of looking at the same thing.³³ Solmsen's interpretation of these matters differs on a number of points, including his identification of *sensiferi motus* with pleasure and pain exclusively, rather than with all manifestations of *sensus* as a faculty,

²⁹ This key point concurs with Kenney 1971: 130 (unchanged in 2014).

³⁰ Lucr. *DRN* 2.133-41, esp. 138-9: '*sic a principiis ascendit motus et exit | paulatim nostros ad sensus*'. In this too, he claims that motion ascends to the level of perception from the motion of the first-beginnings. For example, as first-beginnings collect and strike larger bodies, the motions gradually progress towards the *sensūs* (plural), at which point both the dust mote assemblies and their motions become perceivable or macroscopic. Lucretius seems to believe that *sensus*-bearing motions arise in the body in a similar way - either by direct or indirect means - perhaps comparable to cloud formation, on which, cf. p.87.

³¹ With respect to the comments that follow, for another point of view, cf. esp. Kenney 2014: 128-9.

³² This contention is strengthened by the structure of the overall passage of Lucr. *DRN* 3.370-95; Lucretius places examples of what we do not perceive in the middle of a description of a mechanism of *sensifer motus*, and thrice repeats *sentimus* in the bracketed section.

³³ Cf. Bailey 1947, ii: 1028-9.

and his contention that the nameless fourth exists exclusively in the *mens*, which would contradict its role in initiating feeling from the body.³⁴

Although the *animus-anima* complex is the greater cause of life and the faculty of *sensus*, Lucretius tells us that the bodily frame is essential to the existence of *sensifer motus*. It mingles with and contains the first-beginnings of the complex, such that the motions of the said first-beginnings are restricted.³⁵

... ideo conclusa moventur
sensiferos motus quos extra corpus in auras
aeris haud possunt post mortem eiecta moveri,
propterea quia non simili ratione tenetur
DRN 3.569-72

For this reason, when enclosed, they make *sensus*-bearing motions, which motions are by no means able to occur after death, when they have been ejected into the breezes of the air, because they are not held in the same way.

With ‘*moventur*’ Lucretius is using the passive in the middle sense, with *motus* as an accusative of respect; more literally, this would be ‘move themselves in *sensus*-bearing motions’.³⁶ The bodily frame thus enables the mechanism by limiting the motions of the constituents to keep them allied, such that the assembly does not dissolve.³⁷ Thus, at the moment of the death of the whole, Lucretius states:

dissolui sensus animi fateare necessesst
atque animam ...
DRN 3.578-9

It is necessary to confess that the *sensus animi* and the *anima* are dissolved ...

As Warren notes, for the Epicureans (contra Democritus), dying is a transformative moment, not a process, and thus that no feeling remains to either the whole corpse or, if severed, its parts.³⁸ This is consistent with life being an emergent *coniunctum* of the assembly. Dying (i.e. death) can nevertheless be the culmination of a process, as we will see below.

Here Lucretius is using *sensus animi* as he often does *natura animi* and like expressions - overtly as a periphrasis meaning the *animus* itself,³⁹ but emphasizing a

³⁴ Other conclusions of Solmsen which will be disproved in due course are: that the *mens* is τὸ λογικόν, and that all *sensiferi motus* begin in the *mens*. His failure to recognize that the flesh is the exemplary ‘sense organ’ of touch-as-sense will also be challenged; Solmsen 1961a: esp.164-5.

³⁵ Lucr. DRN 3.566-79. The ethical implications of this metaphor for nature of the whole is developed throughout the poem, perhaps most notably at 3.935ff and in the proem to book six; cf. p.310 n.8.

³⁶ This fits better than a passive voice translation would with the doctrine that the inception of *sensus* occurs with the kindling of *vitalis motus*; the construction relating ‘*quos*’ and ‘*moveri*’ in the following clause is similar. Bailey on the other hand suggests that ‘*moventur ... motus*’ is an internal accusative and that *sensifer* is ‘as usual’ an epithet; but he also expresses cautious agreement with unnamed ‘editors’ that this construction shows ‘Greek influence’; Bailey 1947, ii: 1040. Kenney coincides with Bailey’s interpretation here at least as far as the grammar goes; cf. Kenney 1971: 155, Kenney 2014: 151.

³⁷ Cf. Lucr. DRN 3.252-7. Regarding this point and the aforementioned ones in this paragraph, cf. Epic. Ep. Hdt. 63-6.

³⁸ Cf. p.38 n.130 with Warren 2002a. On death in Epicurean thought more generally, cf. Warren 2004: esp. 41-50 on these issues.

³⁹ Cf. Kenney 1971: 155.

particular aspect of it. The poet's choice here to use *sensūs* is significant, not least as the potentially more obvious choice of *naturam* would have also fit the meter. This use of the accusative plural may be compared with 3.561-2, which juxtaposes the motions of the *natura animi* with the 'sensibus' of the body. This looks forward to the idea that not only the body, but the *animus* too has *sensūs* which are particular to it.⁴⁰

The overall passage, 3.558-79, thus accomplishes a few things for our purposes. First, it explains how the body enables the mechanism of *sensifer motus* in the *animus-anima* complex. Second, it explains their structural relationship, which was only described before. The dispersion of the complex throughout the overall structure is partly what contains the otherwise extremely mobile constituents, thus allowing them to have allied motions - i.e. to function as a unified assembly (rather than to exist as its constituent assemblies, which - with the exception of the nameless fourth - are themselves relatively loose and dispersed alliances of first-beginnings). Third, the passage suggests that both the body and the *animus-anima* complex have specific *sensūs* which comprise the overall faculty of *sensus*.⁴¹ Finally, it reaffirms that *sensiferi motūs* are causally linked to the faculty of *sensus* with respect to the *sensus corporis* and *sensus animi*.

The final mention of the term *sensifer motus* occurs in wake of Lucretius' famous claim '*nil igitur mors est ad nos neque pertinet hilum*' (3.830).⁴² As we will no longer exist, nothing will be able to happen to us nor will anything be able to cause *sensus* in us.⁴³ In other words, the matter which once comprised our sentient or conscious selves - i.e. living beings with the faculty of *sensus* - will be scattered, and with that scattering their *coniuncta* and *eventa* will cease to exist.⁴⁴ The matter will simply have the *coniuncta* and *eventa* (including motions) of non-living *corpora*. Between this claim and the speech of personified *Natura*⁴⁵ lie approximately one hundred lines dedicated to illustrating the logic, including with respect to various *sensus* of the body and complex. The section culminates in an analogy between death and sleep, on the basis of our mechanism.⁴⁶ When both body and *mens* have fallen asleep one does not crave life, says Lucretius:

⁴⁰ Cf. Kenney 2014: 151 who now suggests it should be rendered 'the mind's power to feel'.

⁴¹ On this point, cf. Asmis 2009: 90, 93.

⁴² Cf. Epic. *Ep. Men.* 124-5, Epic. *KD* 2. For testimonia, cf. Kenney 1971: 193. On aspects of what is meant by this, cf. e.g. Furley 1986.

⁴³ Lucr. *DRN* 3.838-41. Particular emphasis is placed on pleasure and pain; cf. Epic. *Ep. Men.* 124-5, esp: 'Συνέθιξε δὲ ἐν τῷ νομίζειν μηδὲν πρὸς εἶναι τὸν θάνατον· ἐπεὶ πᾶν ἀγαθὸν καὶ ἐν αἰσθήσει· στέρησις δὲ ἐστὶν αἰσθήσεως ὁ θάνατος.'

⁴⁴ Cf. Epic. *KD* 2.

⁴⁵ On which, cf. Reinhardt 2002.

⁴⁶ Lucr. *DRN* 3.919-30, esp. 928. Cf. Kenney 1971: 211.

et tamen haudquaquam nostros tunc illa per artus
longe ab sensiferis primordia motibus errant,
cum correptus homo ex somno se colligit ipse.
...
maior enim turbae disiectus materiai
consequitur leto ...

DRN 3.923-5, 928-9

and nevertheless throughout our limbs those
first-beginnings are not straying at all far
from their *sensus*-bearing motions when the
same man torn from sleep collects himself. ...
a greater scattering of the disturbed matter
follows at death ...

Sleep and death both involve a straying from *sensifer motus*, nicely embodied in the text itself (with respect to the former) by the physical separation between *haudquaquam* and *longe*. Similarly, the word order and double genitive⁴⁷ reflect both the disorder and scattering of the matter itself in death.⁴⁸ The straying from *sensifer motus* at the moment of death is complete and permanent (i.e. transformative); at the moment of sleep, incomplete and temporary. The difference is thus one of degree and duration. This passage reinforces the idea that the body enables *sensifer motus* and *sensus* by containing the matter of the complex. It also foreshadows the significance of Lucretius' account of sleep for the rest of this study. At present, we must delve further into it in order to more fully account for the ontological and aetiological status and relationship of *sensifer motus* and the faculty of *sensus*.

With respect to *sensus*, the case of sleep lies somewhere in between life and death. Lucretius describes two different sorts of sleep: dreamless sleep, which is represented as being quite similar to death, and dream-sleep, which in some ways resembles life. This corresponds to the relative degree - i.e. amount and spatial extent - of *sensifer motus* in the living body. The case of sleep demonstrates not only that the faculty of *sensus* manifests as the *sensus animi* and the *sensus corporis*, it also shows that *sensifer motus* corresponds to both, and that these things are common to all living creatures.

Lucretius offers a relatively clear and explicit account of the processes underlying sleep and dreams.⁴⁹ The longest account of this by far, 4.907-1036, has a bipartite structure. The first section, 4.907-61, is on sleep in general, but makes no mention of dreams; its content further suggest that its focus is on dreamless sleep. The second section, 4.962-1036, concerns dreams and dream-sleep in both humans and animals.

We introduced the similarity between sleep and death above at 3.923-9. Lucretius relates the two with respect to the absence of pleasure and pain,⁵⁰ as well as of

⁴⁷ Which have troubled some editors into the emendation '*turba et*' in 3.928; cf. Bailey 1947, ii: 1148.

⁴⁸ Pace Kenney 2014: 199.

⁴⁹ On the topic of sleep in Lucretius, cf. esp. Schrijvers 1976 and Schrijvers 1980.

⁵⁰ Lucr. DRN 3.894-911, N.B. '*leto sopitus*' (3.904) and 3.904-11 more generally, cf. esp. Segal 1990: 69-70, Warren 2004: 38.

'*desiderium*' (3.918, 3.922) - longing which can also entail grief - for ourselves or anything else.⁵¹

nec sibi enim quisquam tum se vitamque requirit,
cum pariter mens et corpus sopita quiescunt;
nam licet aeternum per nos sic esse soporem,
nec desiderium nostri nos adfcit ullum
DRN 3.919-22

For one does not miss oneself and life then,
when the sleeping⁵² *mens* and body lie quiet
equally. For as far as we are concerned under
such circumstances, deep sleep (*sopor*) could
last forever, nor does any longing for
ourselves affect us.

Here sleep is represented as occurring equally with respect to the *mens* and the rest of the body on the basis that they do not feel, indicating that they lack the faculty of *sensus*. This is true regardless of which precise rendering one gives to '*sopita*' and '*quiescunt*', as the use of the terms together both emphasizes the fact and makes the overall meaning clear. That this should be understood as deep sleep is suggested by *sopor*. *Somnum* is generally not as deep and in Lucretius usually refers either to sleep in general (e.g. 4.097) or to dream-sleep (e.g. 3.112).⁵³ For now, the important thing is that the *mens* can sleep in the same way as the rest of the body. And, immediately following these lines, Lucretius makes clear that this sleeping involves one's first-beginnings straying from *sensiferi motus*.

Further evidence that there is a sort of sleep in which there is essentially no *sensus* with respect to either the *mens* or the rest of the body introduces the treatment of the process by which sleep in general occurs.

nunc quibus ille modis somnus per membra quietem
inriget atque animi curas e pectore solvat,
suavidicis potius quam multis versibus edam
DRN 4.907-9

Now I will set-forth in verses sweet-spoken
rather than many in what ways that sleep
channels rest through the members and
loosens the *animus'* *curae* from the breast.

At other times, the *animus* can and does experience *cura* during sleep. By way of introducing his proof that the feelings in the heart are those of the *animus* and experienced there, Lucretius states:

praeterea molli cum somno dedita membra
effusumque iacet sine sensu corpus onustum,

Besides, when - its members yielded to soft
sleep - the prone heavy body lies without

⁵¹ Other than in this larger passage, in which it is repeated thrice (Lucretius, *DRN* 3.901, 3.918, 3.922), the term is only used once in the poem, with respect to the mother cow mourning the loss of the *vitulus* at 2.360 (cf. pp. 301-305); as we will see, the word there carries both meanings, and that of 'grief' is particularly relevant to this study.

⁵² Whether Bailey 1947, ii: 1147 and Kenney 1971: 211 are correct that '*sopita*' is neuter plural with substantives of mixed gender (*mens* and *corpus*) or whether it is nominative singular modifying *mens*, the meaning - i.e. that it applies to both - is the same, given the context. If it were modifying *mens* alone, that would more strongly emphasize that the sleep, so to speak, of the *mens* does occur in certain states of the living creature.

⁵³ Although Lucretius sometimes uses *sopor* (*OLD* §1a) interchangeably with potentially less emphatic words like *somnus* (*OLD* §1a) and *quies* (*OLD* §1), *sopor* seems to be his preferred word when discussing dreamless sleep; cf. *leto sopitus* (3.904), '*ad somnum ... quietem*' (3.910). *Somnus*, like ὕπνος, is more general, encompassing both dreamless and dream-sleep.

est aliud tamen in nobis quod tempore in illo
multimodis agitur et omnis accipit in se
laetitiae motus et curas cordis inanis
DRN 3.112-16

sensus there is nevertheless another thing in
us which at that time is agitated in many ways
and takes into itself all of the heart's empty
motions of joy and empty *curae*.

Here, the *mens* or *animus* has feeling in sleep, while the body does not.⁵⁴ It is stirred up, e.g. by interactions with stimuli of external origin and also feels something otherwise proper to the heart. The expression ‘*accipit in se*’ should not be taken to indicate that two different inner assemblies are at stake; rather, this seems to be an active reflexive construction with medial meaning. Empty motions of joy is in one sense a periphrasis for joy itself, since, as we will see, joy entails motion - but *curae* also entail motions, and both joy and *curae* occur with respect to the portion of the *animus-anima* complex concentrated in the heart. Lucretius here refers to the heart and not the *animus*, for he has not yet established that the heart is the location of the *animus*. Rather ‘*accipit in se*’ and ‘*inanis*’ should be taken as bracketing a chiasmus. Synchronic reading then reveals that not only these bracketing expressions, but also ‘*cordis*’, apply to both of the nouns of the chiasmus, which are somewhat pleonastic.⁵⁵ This context reinforces the claim that *somnum* refers to dream-sleep, while simultaneously encompassing sleep in general.⁵⁶

Returning to 4.907-61, the process by which sleep comes about is as follows. Generally speaking, insofar as a living body exists in this world, air buffets that body by blows against the skin and against the inside as one breathes and as it enters through small passages in the body. Food also buffets one's insides when ingested.⁵⁷ Such buffeting leads to a disordering of one's first-beginnings - both of the body and of the *animus-anima* complex.⁵⁸ With this disorder, the motions of the complex change. Some of the complex is ejected and some disintegrates within the body. In both cases the alliance of motion which kept the assembly coherent is lost, as are the paths and meetings of its constituents. Some of the complex, however, remains intact, draws together, and recedes deeply - likely into

⁵⁴ Cf. Lucr. DRN 3.145-6, pp.293-4.

⁵⁵ On joy as a motion, cf. particularly pp.137-8, 145-6. As we shall see in due course, these emotions are empty (in the sense of meaningless, as well as, fruitless) because they are caused, to some extent, by: perceptions of things which are not actually extant or occurring then, judgments that ‘what is not the case’ is in fact real, as well as additions to those perceptions. On the use of *cura* here, cf. Kenney 1971: 91. On the use of *cura* in DRN generally, Gale 2000: esp.147-54.

⁵⁶ The epithet *mollis* is also used of *somnum*, e.g., at Lucr. DRN 4.757.

⁵⁷ Lucr. DRN 4.932-42, 4.954-6. Compare the manner in which air enters a non-living assembly, such as the magnet at 6.1022-41.

⁵⁸ Lucr. DRN 4.943-4: ‘*conturbantur enim positurae principiorum | corporis atque animi*’. The overall context - *pace* Bailey 1947, iii:1294 - makes it clear that the use of *animi* here emphasizes that it is not just the *anima* which is disordered. In deep or dreamless sleep, at least, the *animus* too lacks *sensus*.

the breast or heart.⁵⁹ Thus the body relaxes.⁶⁰ The greater the disorder, the heavier the sleep. Correspondingly, more of the complex is ejected, more of it is dissolved within, and the remainder, which compacts and preserves its integrity - and thereby life, recedes more deeply.

nam dubium non est, animai quin opera sit
sensus hic in nobis, quem cum sopor inpedit esse,
tum nobis animam perturbatam esse putandumst
eiectam foras - non omnem ...

...
ergo sensus abit mutatus motibus alte
DRN 4.920-3, 949

For there is no doubt that this *sensus* is the set of activities of the *animus-anima* complex in us; when deep sleep prevents this from being, then it must be thought that our *animus-anima* complex has been thoroughly disturbed and ejected from the body - but not entirely ... Therefore, as the motions of the complex have been altered, *sensus* recedes very deeply.⁶¹

We experience this falling asleep as a loss of strength in the body,⁶² and in the case of dreamless sleep, as we have seen, as a loosening of *cura* from the *mens*. These lines also suggest that in deep sleep the entire body, including the complex, all but lacks not only those motions (and perhaps all motions save vital ones) but also the complex itself; only the last spark remains before it is fully extinguished.⁶³ Thus the faculty of *sensus* is also diminished - essentially to the brink of extinction. From there, like the last remnants of a fire which lay smoldering and hidden under ash, it can be rekindled.⁶⁴

The use of '*eiectam foras*' (4.923) echoes '*foras per caulas eiecit*' (2.951), recalling the process of losing *sensus* due to a blow, which, depending on its severity, may cause death. Lucretius describes this at 2.944-62.

praeterea quamvis animantem grandior ictus
quam patitur natura repente adfligit, et omnis
corporis atque animi pergit confundere sensus.
dissoluuntur enim positurae principiorum
et penitus motus vitales inpediuntur,
donec materies, omnis concussa per artus,
vitalis animae nodos a corpore solvit
dispersamque foras per caulas eiecit omnis
DRN 2.944-51

Besides, in any living thing, a blow greater than its nature endures suddenly strikes it down and proceeds to throw all the *sensus* of the body and of the *animus* into disorder. For the arrangements of the first-beginnings are dissolved and vital motions are completely impeded, until the matter, disrupted throughout all the limbs, loosens the vital nodes of the complex from the body, and ejects the dispersed material abroad through all the passages.

A blow affects *sensus* in this way by breaking up the arrangements of the first-beginnings and thus hindering the vital motions until the dispersed *animus-anima* complex departs.

⁵⁹ Lucr. DRN 4.916-28, 4.945-53. On this aspect of the process of sleep, and waking from it, cf. the brief comment in the scholion in Epic. *Ep. Hdt.* 66, bearing in mind our cautionary note about this scholion.

⁶⁰ Lucr. DRN 4.919, 4.950-4.

⁶¹ Line 4.949 refers to (i) the motions of the complex, and, with them (ii) *sensus* itself both receding very deeply with respect to the normal location of the *mens* and with respect to the rest of the body.

⁶² Lucr. DRN 4.950-3.

⁶³ Any further and there would be no waking, no collecting oneself or reconstituting one's complex - which process shall be treated shortly.

⁶⁴ Lucr. DRN 4.923-8, 4.956-61.

Death occurs, unless enough of the complex (and its vital motions) remains to bring things back to order. The final spark calls each thing back into its paths, collects or (re)assembles the *mens*, and (re)kindles *sensus*, which had nearly been lost, with respect to - explicitly - *sensus animi* and *sensus corporis*.⁶⁵ Therefore we can infer that in near-death blows, as in deep sleep, *sensifer motus* is effectively temporarily suspended. The process of restoring the complex and *sensus* after a near-death blow seems to be the same as waking from the sleep wherein the *mens* too rests.⁶⁶ Thus, *pace* Schrijvers, the relationship between (dreamless) sleep and death is far more than analogical.⁶⁷

Similar involuntary restoration of order occurs after the temporary onset of severe illnesses, such as epileptic fits, which throw the constitution into chaos such that one lacks the *sensus* of the body and complex.⁶⁸ There are also slightly less severe cases, such as a blow from a weapon which causes enough disruption to induce a sleep-like state, perhaps akin to fainting, but insufficient disorder to the *mens* or *animus* to entirely disable it. Thus the wounded man still has '*voluntas exurgendi*' (3.174).⁶⁹ *Voluntas* is involved in the deliberate restoration of order.⁷⁰ Presumably, there are also illnesses in which one could have relatively intact *sensus animi* but lack *sensus corporis*.⁷¹ This range of examples demonstrates that there are degrees of loss of the *sensus* as a faculty.

The feelings of pleasure and pain are also related to the integrity of the *animus-anima* complex in the context of the rest of the living body;⁷² these arise from the disorder (or not) of the complex. Lucretius understands pleasure and pain as feelings in-and-of themselves. They are also ways of characterizing other feelings - i.e. certain feelings are

⁶⁵ Lucr. *DRN* 2.944-62; cf. 2.1002-6, which presages many of the arguments about death in book three.

⁶⁶ This is perhaps not surprising given the role that blows from air generally play in causing sleep. The main difference between the blow and sleep processes seems to be that, in the former, part of the *animus-anima* complex remains because the disorder caused by the blow does not penetrate quite that far, whereas, in the onset of sleep, part of the complex remains because it recedes from the disorder and scattering of the rest of the complex.

⁶⁷ Schrijvers 1980: 138.

⁶⁸ Lucr. *DRN* 3.487-505. Further on such cases of sensory disruption, cf. Epilogue to Chapters II & III.

⁶⁹ Lucr. *DRN* 3.170-6. This is another case where, as Kenney notes, Lucretius may be mirroring the underlying mechanism of the phenomenon in the structure of the line. The elision of the *i* in '*quasi*' and the prodelision of the *i* in '*incerta*', seem to embody the choice inherent in the '*quasi ... incerta voluntas*'. Perhaps this is strengthened by the fact that, as Kenney states, the 'main caesura of the verse is what may be called a 'quasi-caesura', associated with elision (here, as chance would have it, of *quasi*)'; on this and further on the rhythm of 3.174, Kenney 1971: 99; cf. Kenney 2014: 101-2.

⁷⁰ Lucr. *DRN* 2.272-83. On *voluntas* and its role in initiating motion, cf. esp. pp.247-66.

⁷¹ Lucr. *DRN* 3.106-11.

⁷² The context of death-inducing and near-death blows discussed above, for example, suggests that the following passage also refers to the integrity of the *animus-anima* complex and its vital motions.

pleasurable or painful. Lucretius describes the underlying microscopic *eventa* which correspond to the experience of pleasure and pain in the bodily frame thus:⁷³

praeterea quoniam dolor est, ubi materiai
corpora vi quadam per viscera viva per artus
sollicitata suis trepidant in sedibus intus,
inque locum quando remigrant, fit blanda voluptas
DRN 2.963-6

Besides, since there is pain when - throughout
the living flesh and limbs - bodies of matter,
having been disturbed by some force, agitate
in their seats within, and since when they go
back into place, delightful pleasure occurs ...

Pain is thus felt when the disorder is not so great as to disrupt the complex, but just to disturb it. In this lesser degree of disturbance, the complex still undergoes *sensifer motus* and the living creature retains the faculty of *sensus*. Any process which involves such a disturbance is painful.⁷⁴ Pleasures are either kinetic, as seen here, or static. Kinetic pleasure is felt when there are motions which restore and otherwise contribute to the integrity of the vital motions. If their underlying motions neither disturb nor contribute to the integrity of the vital motions, the feelings are neither kinetically pleasurable nor painful.⁷⁵ Static or katestematic pleasure is felt with motions of the state of integrity.⁷⁶ This understanding of the processes which correspond to the experience of pleasure and pain applies to all parts of any living sensate body - including both the bodily frame and the *animus-anima* complex. Whatever lacks feeling can have disturbed internal motions without pain and restorative or tranquil ones without pleasure.⁷⁷ Similarly, when one dies, the vital motions are dispersed along with the *animus-anima* complex and, eventually, the rest of its body. Therefore feeling and, more specifically, the ability to experience pleasure and pain are likewise gone.⁷⁸

All living creatures feel pleasure and pain, not just humans. Lucretius explicitly mentions numerous instances with respect to animals. Here we consider only a few, emphasizing those particular to the bodily frame.⁷⁹ The lion experiences pain (*dolor*) at the

⁷³ On the dichotomy between pleasure and pain, and that the two can coexist in the same being, cf. Epic. *KD* 3-4, Cic. *Fin.* 1.37-9.

⁷⁴ Lucr. *DRN* 3.252-7.

⁷⁵ But these do not entail states of rest or something in between pleasure and pain; cf. Long and Sedley 1987: i.123. Certain instances of taste (cf. Lucr. *DRN* 2.426-30) and of the feeling of calmness might exemplify this - and those prone to calmness seem to be more than usually unsusceptible to disturbance and its opposite.

⁷⁶ On the difference between kinetic and katestematic pleasure, cf. the testimonium of Epicurus from *On Choices* in D.L. 10.136 and Cic. *Fin.* 1.37-9. Although Long and Sedley do not seem to consider *DRN* 2.963-6 in claiming that pleasure and pain 'are never *identified* with movements of atoms', they persuasively argue that 'Epicurus firmly subordinated kinetic to static pleasure, treating the former either as a stage on the way to the ultimate goal of absence of pain, or as a variation of that condition when achieved'; Long and Sedley 1987: i.122-3.

⁷⁷ Non-living things, be they *primordia* or assemblies, cannot feel pleasure or pain because they lack vital motions and therefore *sensus*. *Primordia*, however, do not have even the potential for internal motion as they do not contain void or parts (other than conceptually divisible ones), cf. esp. Lucr. *DRN* 2.967-90.

⁷⁸ Lucr. *DRN* 3.870-930; cf. 2.1002-6 (discussed above), 3.548-669.

⁷⁹ Examples of other sorts will be treated particularly in the next chapter.

sight of the rooster.⁸⁰ The snake which is cut up tries to assuage the pain of its wound.⁸¹ Every living creature feels pain when its body has become rarified from various losses of matter, and thus experiences the desire (*amor, cupido*) of eating and drinking, so as to augment or replenish its constitution.⁸² The pleasure (*voluptas*) caused by the consumption of nutritive matter, however, is limited to the restoration of integrity;⁸³ not only lack but also excess threatens life.⁸⁴ In these examples the lion reacts to its pain by thinking of flight, the snake by trying to bite its wound, and all living creatures by eating and drinking. There is no suggestion that the physiological process or experience of either pleasure or pain differs between various groups of living creatures, suggesting a fundamental physiological continuity. Indeed, with respect to the example of hunger and thirst, Lucretius explicitly represents all living creatures together. Animals too, then, like humans, have the ability to experience the very same pleasure and pain.⁸⁵

In light of the ebbs and flows of feeling in accordance with the state of the *animus-anima* complex in relation to the rest of the body, the relationship of *sensifer motus* to *sensus* as can be represented by the following chart:

<i>SENSIFER MOTUS</i>				
amount:	none	negligible	some	full
extent:	does not exist	deeply buried in <i>pectus</i>	limited to <i>animus</i>	pervasive in body
state:	death	dreamless sleep, near-death blows extreme illness	dream-sleep severe blows and illness	waking life
<i>sensus</i> :	does not exist	'paused'	<i>sensus animi</i>	<i>sensus animi corporisque</i>

⁸⁰ Lucr. *DRN* 4.714-18.

⁸¹ Lucr. *DRN* 3.657-69. According to Lazenby 1949: 248, snakes were sometimes kept as pets, among other things.

⁸² Lucr. *DRN* 4.858-76.

⁸³ Lucr. *DRN* 4.627-32.

⁸⁴ Lucr. *DRN* 5.1007-8.

⁸⁵ However, as we will see shortly, creatures do not always experience other instances of pleasure and pain, or indeed certain other feelings, on account of the same stimuli.

We will return to the case of sleep, especially dream-sleep, throughout this study. For the moment, let it suffice to note that the unified presentation of human and animal dream-sleep and its processes in the second half of the sleep account, 4.962-1036, indicates that the processes just analyzed and the conclusions reached from that analysis apply to all living creatures in the same way.

In sum, *sensus* is a faculty of *animus-anima* complex. Lucretius' account of the sleep, certain blows and illnesses, pleasure and pain, and death processes confirm that the faculty of *sensus* emerges from the *sensus*-bearing motions of the *animus-anima* complex. Although the faculty is a *coniunctum* of the individual, the degree to which one is capable of experiencing instances of feeling at a given moment is an *eventum*, contingent upon the relative integrity and prominence of the *animus-anima* complex with respect to the rest of the body. The case of sleep also shows that the presence of the constituents of the complex is necessary for *sensus corporis*. This is because - at least during waking life - as we shall see, the constituents of the intact complex are mixed in the microscopic structures of the so-called 'sense organs'.

II. SENSUS CORPORIS

The term *sensus corporis* encompasses a number of things. What we now call the 'five senses' of the body - being the faculties of touch, taste, sight, smell, and hearing - are included, as are the corresponding structures or 'sense-organs' of the bodily frame; it also includes each specific instance of feeling experienced through these five senses.⁸⁶ These five sorts of feelings represent epistemological spheres of discrimination at the macro or phenomenal level;⁸⁷ to at least a large extent they are mutually exclusive.⁸⁸ The *coniuncta* and *eventa* particular to each source-object⁸⁹ are perceived as aspects (permanent or temporary) of the nature of that thing, not as distinct things.⁹⁰

⁸⁶ Cf. for example, Lucr. *DRN* 3.624-33.

⁸⁷ Epic. *Ep. Hdt.* 69-70, cf. D.L. 10.32. Sedley 1989a: 125-6, cf. Furley 1993: 75.

⁸⁸ As we will see, they are at least mutually exclusive at the micro-level in that each of these *sensūs* operates by means of interaction with its own particular sort(s) of stimuli.

⁸⁹ In the case of perceptions which operate by direct contact with the source-object, that source-object should also be understood as the sense-object or stimulus.

⁹⁰ The examples of *coniuncta* and *eventa* given at the point of these terms' introduction, many of which are later discussed with respect to specific senses, and the use of *sensus* and *sentire* in that context with respect to time (which - as we will see - is an *eventum* of a higher order), make this clear from the outset of the poem; Lucr. *DRN* 1.449-82. The point is more explicitly made by Epic. *Ep. Hdt.* 68-70.

This picture fits particularly well with Furley's analysis of the tradition. According to Furley, the main difference between Democritus and Epicurus is not the aetiological mechanism of sensory perception, but rather the interpretation of their ontological status. Both Democritus and Epicurus seem to have considered sensible qualities to be emergent in the sense of not existing at the atomic level, but as explicable as the sum of atomic properties. In Furley's account, Democritus is reductionist but not eliminativist. The fact that we perceive sensible qualities is real, but the sensible qualities of perceptible objects are merely aggregates of the properties of their constituents and 'no more this than that' (οὐ μᾶλλον τοῖον ἢ τοῖον); these then are really the causes of one's feelings. The precise experience of such feelings may change relative to the disposition or constitution of the perceiver but they are not arbitrary. Epicurus, however, is neither reductionist nor eliminativist with respect to this matter. He differs insofar as he claims that the fact that we perceive sensible qualities is real, and these qualities - although emerging from the properties of their constituents, are nevertheless real qualities proper to the assembly, not just names we bestow upon our feelings.⁹¹

Lucretius will be seen to follow Epicurus in this, and perhaps also to take things a step further. Lucretius identifies feeling with perception and, as will be confirmed by analysis of the specific mechanisms, Lucretius does not admit sense-impressions - i.e. appearances or φαντασία - as any distinct thing or stage in the perceptual process. Thus, for Lucretius, the so-called sensible qualities of objects are real things,⁹² felt directly, and - regardless of the micro-level processes involved - perceived as inseparable from the nature of the objects themselves.

Lucretius also states that '*tactus ... corporis est sensus*' (2.434-5). This statement does not support the claim that *sensus* can be reduced to touch, which Schoenheim and Rosenmeyer have advanced, nor the eliminative reductionist model of perception which they implicitly favor;⁹³ rather, it suggests that there is a further distinction which needs to be made with respect to *tactus* and thus its relationship to the faculty. This will serve to begin the analysis of the five senses as Lucretius represents them.

⁹¹ Furley 1993, cf. Sedley 1988, Sedley 1989a, O'Keefe 1997, Rudolph 2011, Rudolph, 2012.

⁹² However, they do not exist independently of the the assembly itself.

⁹³ Schoenheim 1966, Rosenmeyer 1996 (who takes Schoenheim as his starting point, cf. p.141). According to Asmis 1984: 106 n.6, the view that Epicureans held this position originates with Aristotle's critique of Democritus, but this may have been the case with some later Epicureans as evinced by *PHerc.* 19/698 (cf. Monet 1996a). Schrijvers too advances such a view, but on very different grounds, such as expressions which create analogies between different sorts of perceptions; Schrijvers 1970: 87-91, Schrijvers 1978: 277-8.

A. Tactus⁹⁴

Lucretius has an inclusive concept of *tactus*. On the one hand, *tactus* is the contact between bodies; as established in chapter one, all bodies act upon each other by means of it and it is one of the defining *coniuncta* of all bodies, as distinct from void.⁹⁵ Let us call this touch-as-contact. In the context of proving that microscopic bodies exist, Lucretius states:⁹⁶

tum porro varios rerum sentimus odores
nec tamen ad naris venientis cernimus umquam,
nec calidos aestus tuimur nec frigora quimus
usurpare oculis nec voces cernere suemus;
quae tamen omnia corporea constare necessest
natura, quoniam sensus inpellere possunt;
tangere enim et tangi, nisi corpus, nulla potest res
DRN 1.298-304

Then further we perceive various smells;
nevertheless we do not ever discern them
coming towards the nostrils, nor do we
behold warming heat, nor are we able to
observe the cold, nor are we accustomed to
see voices. Nevertheless all these things must
have a corporeal nature, since they can affect
the *sensūs*; for nothing is able to touch and to
be touched, except body.

Here, Lucretius temporarily switches from the effects of non-living microscopic bodies on other non-living bodies, to those on living creatures. The expression '*sensūs inpellere*' has multiple meanings, which cannot be captured well in translation.⁹⁷ The sense-organs and stimuli come into contact by a kind of striking, and the latter possibly striking into the former. Such contact drives particular instances of feelings. Lucretius thus shows that touch-as-contact is involved in the sensory perception of the interaction of our bodies with external ones which we do not see, with respect to to at least four of these five senses.⁹⁸ His model of perception is neither active nor passive, but interactive. Lucretius suggests this here, for example, by the form of the first half of line 1.304.⁹⁹ There '*tangere*' and '*tangi*' nearly make contact by means of a double elision and an almost collapsible assonance of adjacent t sounds ('*et tangi*'). These lines also indicate that touch-as-contact

⁹⁴ My thanks to David Sedley for discussion.

⁹⁵ Cf. esp. Lucr. DRN 1.433-9, 1.454. The point that all bodies act upon one another by means of *tactus* is made by Schoenheim and Rosenmeyer; Schoenheim 1966: esp. 72-3, Rosenmeyer 1996: 142 (esp. his comment on Lucr. DRN 5.162). This, however, does not preclude the possibility that there are other ways in which bodies can act relative to one another which produce a result. The aforementioned account of pleasure and pain, for example, seems to include motions relative to arrangements, as well as collisions and other forms of contact. Other cases will be treated in chapter three.

⁹⁶ Cf. Epic. Ep. Hdt. 39.

⁹⁷ Cf. *impello*, OLD §1a-c. It is echoed, at Lucr. DRN 4.527; cf. Koenen 1999: 438-9 and Koenen 2004 for a discussion of the echo with respect to the mechanism of hearing.

⁹⁸ Hence the focus is on sight, smell, certain sorts of touch, and hearing. (Presumably due to the context, taste is not mentioned, nor is the touch of a macroscopic body.)

⁹⁹ I.e. up to the principle caesura in the third foot.

is related to but distinct from the other meaning of *tactus*, which we will call touch-as-sense.¹⁰⁰

As Asmis notes, neither Epicurus nor Lucretius provides a separate discussion of touch-as-sense;¹⁰¹ indeed it is the only one of the *sensūs corporis* which does not receive its own section in first two-thirds of book four. Nevertheless, it occurs in eight of the (at least) ten explicit references to three or more of these five, including twice in book four.¹⁰²

SENSUS CORPORIS LISTS	direct contact		indirect contact via emitted bodies			direct and indirect treated as groups
	touch	taste	smell	hearing	sight	
1) 1.298-304	✓		✓	✓	✓	
2) 2.398-443	✓	✓	✓	✓	✓	✓
3) 2.680-685		✓	✓		✓	
4) 2.834-864	✓	✓	✓	✓	✓	✓
5) 3.624-633	✓	✓	✓	✓	✓	
6) 4.217-238	✓	✓	✓	✓	✓	✓
7) 4.486-495	✓	✓	✓	✓	✓	
8) 6.777-780	✓	✓	✓	✓	✓	
9) 6.921-935	✓	✓	✓	✓	✓	✓
10) 6.979-97	✓	✓	✓	✓	✓	

In (7) of this table,¹⁰³ all of these senses except *tactus* are listed by sense-organ; in (8) all but touch and taste. Similarly, in the respective treatments of sight, hearing, taste, and smell in 4.26-468 and 524-721,¹⁰⁴ the exemplary sense-organs are mentioned as the

¹⁰⁰ Neither Schoenheim and Rosenmeyer make this crucial distinction. Schoenheim notes that the concept of *tactus* has many meanings, but she effectively treats it as contact and thus finds it to be the ‘Least Common Denominator’ of the senses, such that they are all ‘modifications’ of it, despite acknowledging that it is a sense in its own right; Schoenheim 1966: 71, 77, 81-2, 87. Although Furley does not make the distinction between the two sorts of *tactus* (perhaps because his primary focus was not Lucretius) and at times seems to verge on reducing sensory-perception in *DRN* to touch, he also posits an interactive model of sensory-perception, beginning in the tradition from Democritus; Furley 1993: esp. 79-82, 91-2.

¹⁰¹ Asmis 1984: 105 n.2.

¹⁰² Schoenheim also uses the fact that *tactus* occurs in certain lists of the traditional five or of body parts associated with the five as evidence that it is a distinct sense; Schoenheim 1966: esp. 82.

¹⁰³ N.B. There is considerable repetition between (6) and (9) - which are nearly identical and group the indirect ones together in their final lines - and some conceptual overlap between (7) and (10).

¹⁰⁴ Koenen 1997: 165-8 suggests that this is a ring composition, as Lucretius returns to sight briefly before passing on to what she calls ‘mental perception’ at *Lucretius DRN* 4.722f; cf. Brown 1987: 133.

structures of the body interacting in each sort of sensory perception with the relevant stimuli. The eyes (particularly the pupils) perceive by means of sight-causing bodies (*simulacra*), the ears hearing-causing bodies (sounds), the tongue taste-causing bodies (flavors), the nose or nostrils smell-causing bodies (odors). As Sedley states, 'That the special objects of hearing, taste and smell are, respectively, sound, flavour and odour is scarcely a matter of controversy in Greek thought ... All the real interest is focused on sight and touch. For these are the two senses most commonly held to conflict, most typically over questions of shape and size.'¹⁰⁵ This begs a few questions. What is the exemplary structure of touch-as-sense? What are its characteristic stimuli and sphere(s) of discrimination? More generally, what mechanism(s) underlies the five senses and how does that relate to their division of perceptual labour? The evidence of book two, too often undervalued in analyses of these senses, provides a key - in the first instance to touch-as-sense.

Account (2) falls within Lucretius' larger proof that the shapes of the first-beginnings differ. Lucretius explains the relationship between those shapes and the feelings which result when they come into contact with our sense-organs. The issue of contact features throughout this account, e.g. through the significance of stimulus-shape to the five sorts of perceptions. Generally those first-beginnings with which such contacts are pleasurable are smooth and round. On the other hand, those rough and hooked wound, and those with small projecting angles - being neither smooth nor hooked - merely stimulate.¹⁰⁶ The interactions involved are not limited to those resembling the colliding of billiard balls; they may occur as frictive contact between structures. Lucretius treats the five senses and some exemplary macroscopic external sense-objects in turn; at least three times he mentions the relevant sense-organ. He begins with the taste of the mouth, as we shall see a case of direct contact with the source-object. He then proceeds to hearing (the ears are not mentioned here), the smell of the nostrils, and the sight of the eyes; these three, as we shall see, are consistently cases of indirect contact with the perceived object. Lucretius then returns briefly to taste and thus segues into touch, indicating that the body

¹⁰⁵ Sedley 1989a: 126.

¹⁰⁶ Lucr. *DRN* 2.401-7, 2.422-33, 2.461-3. This goes against Bailey's contention that kinship or unlikeness of stimulus with respect to one's constitution is responsible for the perception of something as pleasurable or painful; Bailey 1947, iii: 1261.

in general is its sense-organ - here with respect to hot and cold.¹⁰⁷ This is the first full list of the *sensūs corporis*.

Touch-as-sense is distinct from the other four insofar as it alone perceives both certain contact-based interactions with external bodies and certain contact-based interactions involving constituent bodies. The conclusion to Lucretius' larger proof of the variety of shapes is of particular interest for refining our understanding of *tactus*.

tactus enim, tactus, pro divum numina sancta,
corporis est sensus,¹⁰⁸ vel cum res externa sese
insinuat, vel cum laedit quae in corpore natast
aut iuvat egrediens genitalis per Veneris res,
aut ex offensu cum turbant corpore in ipso
semina confunduntque inter se concita sensum
DRN 2.434-39

For touch, by the sacred powers of the gods, touch is the feeling of body, whether when external matter insinuates itself,¹⁰⁹ or when a thing which is generated within the body hurts, or when a thing issuing forth through the generative acts of Venus delights, or when when in the body itself, the seeds agitate from a blow¹¹⁰ and become disordered, having stirred-up *sensus* amongst themselves.

This statement refers specifically to touch-as-sense, and seems to crescendo from smaller to larger stimuli. To proceed point by point: this *tactus* includes the ability to feel contact with external bodies as they enter and interact with the passages of the body, such as microscopic external bodies involved in particular feelings, such as those of hot and cold mentioned slightly earlier in the passage.¹¹¹ The fact that the statement also holds for the other four corporeal senses simply reflects the continuity of the contact mechanism with respect to interactions with external stimuli.¹¹² Touch-as-sense also includes perception of certain *eventa* involving bodies within one's body.¹¹³ Although Lucretius does not provide one, an example of such a hurt-causing body generated within the body might be a kidney-stone. The internal thing causing pleasure by issuing forth likely refers to semen (both

¹⁰⁷ Lucretius considers heat and cold to be bodily, as we will see shortly; thus this does not detract from the claim that touch-as-sense operates by direct contact with the object of perception (i.e. sense-object). We will return shortly to the body as the exemplary sense-organ of touch-as-sense.

¹⁰⁸ Sedley has recently proposed that *Lucr. DRN 2.434-5* is modeled on an idiom of Epicurus, such that the second instance of *tactus* is not in apposition to the first but rather in the genitive case - i.e. *tactus tactūs*, or a touch of touching. The sense of touch therefore amounts to an awareness of what this study calls *tactus-as-contact* (cf. '*tactus uterque*', 2.433), whether from stimuli of internal or external origin (cf. '*vel ... vel*', 2.435-6). Sedley thus reaches the same conclusions as what follows (i.e. Lucretius two meanings of *tactus* and their relationship), but by a somewhat different route. My thanks to David Sedley both for discussion and for a copy of a pre-publication version of his forthcoming article 'The Duality of Touch'. A possible comparandum for the expression 'the touch of touching', albeit with respect to a different *sensus*, is '*sonitu .. sonanti*' (*DRN 1.826*).

¹⁰⁹ Here '*sese insinuat*' is an instance of an active verb with the accusative of the personal pronoun. Lucretius often uses such constructions when referring to something giving or checking its own motions; such constructions emphasize the motion, cf. Kühner and Stegman 1971: 106. For recent discussions of other uses of and constructions with this verb in *DRN*, cf. Farrell 1988 and Gale 2009: 114.

¹¹⁰ Here a blow to the bodily frame, i.e. a collective knock to the seeds.

¹¹¹ Wind is another example of this, as we will see shortly.

¹¹² Insofar as this statement applies to both meanings of *tactus*, it also applies to the *animus*' perception of very subtle *simulacra*, which we will treat in the next chapter.

¹¹³ On internal touch, cf. Sedley (forthcoming) and, in passing, Asmis 1984: 105 n.2.

male and female, according to Lucretius), and its emission. As this pleasurable copulation process is common to all living creatures we can further infer that the other aspects of touch-as-sense are too.¹¹⁴ It seems that the existence of such constituent bodies does not generate pain and pleasure, but their frictive interactions relative to the body do. Finally, touch-as-sensus also includes blows which, when they strike one's body, stir *sensifer motus* inside.¹¹⁵

The last example illustrates that the purview of touch-as-sense includes the perception of direct contact with external bodies of sufficient magnitude. Penetration into and interaction with the *foramina* seems not required for this; the surface, in fact, seems to be sensory.¹¹⁶ Certain light macroscopic objects, as we have seen, may or may not be felt by touch, depending on whether they happen to stir the *anima*; sometimes they are first perceived by sight. On the other hand, the blind and those in the dark can perceive and recognize objects through touch, demonstrating that, in certain cases, touch alone discerns not only an object's existence but also its macro-shape.¹¹⁷ Similarly, it feels the density, such as softness or hardness, of a sufficiently large body.¹¹⁸ It also feels contact with certain macro-assemblies which are unseen, perhaps due to the sheer quantity of space between particles, such as wind and *ignis, calor, frigus, pruina*, and the like.¹¹⁹

Although 'hot' and 'cold' are clearly among the sense-objects of touch, Brown's suggestion that they are 'independent atomic compounds, constantly passing from one body to another by permeation' is not convincing.¹²⁰ It is possible that such things are, rather, *coniuncta* of some assemblies and *eventa* of others. There seem to be multiple possible mechanisms by which touch perceives hot and cold: direct contact, contact through decay into smaller assemblies with the same nature, and contact with emissions

¹¹⁴ On the meaning of such expressions as '*Veneris res*' and the universality of the mechanism of feeling of which they are part, cf. esp. pp.152-6. On male and female semen and the universality of the processes involved in copulation with respect to the reproduction of all living creatures, cf. pp. 195-8.

¹¹⁵ Cf. esp. Lucr. *DRN* 2.438-41, where Lucretius gives the example of striking or hitting oneself as an experiment.

¹¹⁶ The use of impact language such as we have seen above (frictive and collision-like) both make sense when considering macroscopic objects, if one thinks of the size of stimulus relative to that of the passages in the constitution.

¹¹⁷ Lucr. *DRN* 2.741-7, 4.230-8.

¹¹⁸ Cf. Furley 1993: esp. 75. Sedley suggests, on the basis of *PHerc.* 19/698, that the perception of size and shape by touch represent inferences, and that the special object or sphere of touch's discrimination is simply the registering of 'body', though it also registers texture and temperature; Sedley 1989a: esp. 129-34. Cf. Long and Sedley 1987: i.84. Further on this, cf. esp. pp. 89-91.

¹¹⁹ That to discern what is '*molle et gelidum fervensve*' is the province of touch is indicated by Lucr. *DRN* 4.490-3. With respect to '*calidos ignis gelidam pruina*', cf. 2.431-3, discussed above. On the feeling of hardness of a stone, as well as the perception of particulate bodies of wind and of cold as whole entities, cf. 4.259-68. Also on wind as a body of unseen bodies, cf. 1.271-97, p.91 n.209, and Epic. *Ep. Pyth.* 106.

¹²⁰ Brown 1984: 97.

from assemblies containing them. Lucretius mentions assemblies consisting of hot and cold bodies, as here. He also mentions assemblies which contain bodies of fire, including: the *animus-anima* complex, fire, trees, clouds, lightning, and the sun. Similarly, others, such as rivers, contain bodies of cold or frost. Some things can contain either or both.¹²¹ Directly touching such a hot or cold containing assembly will discern temperature. Touch can also perceive those bodies of heat and cold which are sent forth from the initial assembly (either by decay or emission) and then pass through other assemblies, such as through air and metal cups.¹²² A detailed analysis of Lucretian thermodynamics and its relationship to perception - both being necessary for a full understanding of the nature of temperature - is beyond the scope of this investigation.

Thus, with the possible exception of these unseen macro-assemblies, such as such as wind, *ignis*, *calor*, *frigus*, and *pruina*, none of the objects of touch-as-sense could be described as effluences¹²³ - i.e. streams of bodies emitted from a source-object through entirely necessitated processes.¹²⁴ Nor could they be described as bodies emitted through unfixed *per se* processes.

The exemplary sense-organ of touch-as-sense must be the flesh (*viscera*) itself and not, as Schoenheim argues, the hands.¹²⁵ This inference follows from the fact that - as we have seen - sometimes Lucretius emphasizes the touch of the hands,¹²⁶ other times contact with the flesh, and still others perceptions such as shape and temperature, which can be felt either by a flesh-covered part or by the whole. The hands cannot feel anything which is not also the province of the flesh; moreover, not all creatures have hands. Flesh, on the other hand, is a more-or-less systemic structure of the bodily frame which, as we have seen, Lucretius believes common to all living creatures. He also believes that it is among the structures throughout which the *anima* is mingled. Thus flesh would fit well with the evidence from (2) that the bodily frame itself is actually the sense-organ of *tactus*.

¹²¹ On the emission of *frigus* from rivers and *calor* from the sun, cf. *DRN* 4.219, 6.925-6, and related *eventa* 6.840-905. On the various ways of releasing fire from clouds as lightning, cf. 6.160-378 and for cold comparanda 6.527-34; N.B. 6.206-10, 6.271-3 on the emissions of the sun's heat as the source.

¹²² With respect to the transmission of hot and cold from liquid through metal cups, cf. 1.494-6, 6.947-8.

¹²³ Contra Rosenmeyer, who argues that all contact is with effluences, including touch (which sense he does not distinguish from contact) and taste; cf. Rosenmeyer 1996: esp. 143.

¹²⁴ This definition of an effluence uses language consistent with the rest of this study, but draws on Koenen 1997: 165-6.

¹²⁵ Schoenheim 1966: 84-5. The Epicurean author of *PHerc.* 19/698 seems also to have suggested that flesh was the exemplary sense-organ of touch; cf. *PHerc.* 19/698 26.3-16 in Tsouna 1998: 19-20, [*Phld. Sens.*], *PHerc.* 19/698 29 in Monet 1996a: 112-13). For discussion see also Sedley 1989a: 130 and Sedley (forthcoming).

¹²⁶ *Lucr. DRN* 5.120-2, and, as per above, 1.494-6, 3.624-33, 6.947-8.

Schoenheim and Rosenmeyer's claim that *sensus* can be reduced to touch thus fails to take account of a number of crucial distinctions - particularly touch-as-sense vs touch-as-contact. With respect to living creatures, then, the statement *tactus ... corporis est sensus*, 'touch is the feeling of body', could be interpreted to mean both: 1) touch is the perception of bodily contact, common to these five senses,¹²⁷ and 2) touch is one of the five *sensūs corporis* - i.e. the ability of one's body to feel certain interactions with other bodies (externally oriented touch) and others within the body (internally oriented touch). This concurs with Sedley's views on the two dualities inherent in Lucretius' concept of touch.¹²⁸ Lucretius represents internal touch as a necessitated *per se* mechanism of *sensifer motus* which touch-as-sense does not share with the other four traditional senses. Instances of external touch are not merely experienced as the feeling of contact, but also - depending on the nature of the object - as the perception of its shape, density, and temperature. They involve *sensiferi motūs* of the *anima* which are necessitated and not *per se*; they are proximately caused by contact-based interactions of one's flesh with external bodies. The last point is common to the *sensūs corporis*,¹²⁹ although the relevant structure is not.

B. Taste¹³⁰

Lucretius often groups taste with touch-as-sense, as we saw in the table above. Rosenmeyer claims that Lucretian taste operates by means of effluences, like sight, hearing, and smell;¹³¹ his primary evidence is the passage in which Lucretius claims that one tastes salt at the seaside. Asmis and Bailey, on the other hand, claim that taste, like touch-as-sense, functions through direct contact with the object of perception.¹³² Lucretius' treatment of taste supports this more traditional model; like externally oriented touch, the underlying mechanism functions through direct contact with an external stimulus.¹³³

¹²⁷ It is also involved in thought, as we shall see.

¹²⁸ Again, these distinctions concur with the findings of Sedley (forthcoming). Asmis also makes these distinctions, but without substantive discussion of their basis, in Asmis 1984: 105 n.2, 107. For an alternative interpretation of Epicurean thought on internal touch and touch's sphere of discrimination, based primarily on *PHerc.* 19/698, cf. Tsouna 1998: 18-20.

¹²⁹ In other words, touch-as-contact is common to all five *sensūs corporis* and closely associated with the issue of stimulus-shape.

¹³⁰ Aspects of this section were presented as a paper in February 2014 at the 8th Annual London Ancient Science Conference, Institute for Classical Studies; my thanks to the audience for their feedback.

¹³¹ Rosenmeyer 1996: esp. 143.

¹³² Asmis 1984: 105, Asmis 2009: 102, Bailey 1947, iii: 1253.

¹³³ This more traditional theory of direct contact is not just supported by his account of the underlying mechanism, but also organizationally - in that Lucretius frequently groups taste with touch-as-sense in his discussions of the *sensūs corporis*, cf. the table above. But - as we shall see - Lucretius represents the process as interactive and reciprocal, not as an active-passive dichotomy.

Lucretius begins his account of its physiology by characterizing taste as the feeling or perception (*'sentimus'*) of *sūcus*, then describes the example of food or *cibus* and its 'processing' prior to incorporation.

nec, qui sentimus sucum, lingua atque palatum
 plusculum habent in se rationis plus operaeve.
 principio sucum sentimus in ore, cibum cum
 mandendo exprimimus, ceu plenam spongiam aquā
 siquis forte manu premere ac siccare coëpit.
 inde quod exprimimus per caulas omne palati
 diditur et rarae per flexa foramina linguae
 DRN 4.615-21

Nor do the tongue and palate, by which we perceive *sūcus*, require any more argument or effort to explain.¹³⁴ Firstly, we feel *sūcus* in the mouth, when - by chewing - we squeeze out the food, just as if it happens that someone begins to press and to drain a sponge full of water with their hand. Thence all which we squeeze out is distributed through the openings¹³⁵ of the palate and through the winding passages of the porous tongue.

The concentration of elisions in the introductory five lines of the passage embodies the direct contact of the interaction.¹³⁶ Bailey, following Robin, claims that chewing releases deep-seated particles of flavor.¹³⁷ Actually, chewing seems to break apart the food into smaller identical assemblies. As more void comes between the diminishing particles, some of the initially solid food is effectively liquified.¹³⁸ Partial liquifying is suggested in various ways. The sponge analogy indicates that something non-liquid remains, like the partially processed food which is swallowed and digested. Note also the repetition of *sūcus* in lines 4.615, 4.617, and 4.622. These three slightly different uses of the word in the context of the mechanism are no coincidence. Lucretius uses *sūcus* to refer to both the fluid and the flavor at once. They are the same assembly, as well as the nutritive substance.¹³⁹ The word also encompasses the faculty of taste itself. Thus, given the primary signification of fluid, the range of meanings of *sūcus* extends beyond those of

¹³⁴ Here *'in se'* suggests that the tongue and palate are giving an account of themselves, evoking their function in speech - on which, cf. esp. 282-3.

¹³⁵ This translation of 'openings' for *'caulas'* follows the sense of Bailey 1947, iii: 1255, who renders it 'pores'. The word simultaneously signifies the gates or entrances to passages (or inlets) and the passages themselves, but this is difficult to capture in translation.

¹³⁶ The following are quoted verbatim from the passage: *lingua atque* (4.615), *mandendo exprimimus* (4.618), *premere ac* (4.619) and, as Bailey notes *ad loc.*, *plusculum habent* (4.616) and *spongiam aquā* (4.618). On the physical embodiment of the mechanism in lines 4.620-1, cf. Godwin 1986: 130.

¹³⁷ Presumably this move is made by analogy with the deep-seated particles of odor, which have to work their way out of the body before they become effluences. Further on this cf. pp.93-4.

¹³⁸ Cf. pp.84-6 on the spray and evaporation of seawater.

¹³⁹ Bailey 1947, iii: 1253 suggests that *sūcus* is the 'direct cause of the taste' ... these juices 'are part of the essential structure of the object and not an emanation built up of special particles arranged in a particular way'; this is perhaps contradicted by his earlier statement about the salty taste of sea air. Nevertheless, Bailey, 1947 iii: 1255 suggests with respect to Lucr. DRN 4.617-18 that *'cibum'* is the object of *'mandendo'* and *'sūcum'* of *'exprimimus'* - effectively taking *sūcum* (4.617) twice.

sapor, with which it sometimes seems to be used interchangeably.¹⁴⁰ Therefore, food is initially felt in the mouth through touch-as-sense. Once the food is rendered partially fluid, the liquified portion seeps into our pores and we experience taste. Afterwards, the remaining food drops down the throat.

The interactions which give rise to taste occur explicitly with the passages of the tongue and the palate.¹⁴¹ For Lucretius, both are sense-organs of taste. Moreover, as ‘*rarae ... linguae*’ suggests, the distinction between the sense-organ’s apparent surface and its inner passages is largely spurious. All assemblies contain void, so all seemingly solid macroscopic objects are actually of a porous nature. Thus, both palate and tongue are riddled with passages - the ‘*caulas*’ (4.620) and the ‘*flexa foramina*’ (4.621). The precise shape of these passages influences which constituents of the *sūcus* one is open to sensing or interacting with. Thus different foods are suited to different sorts of creatures, as follows:

semina cum porro distent, differe necesses
 intervalla viasque, foramina quae perhibemus,
 omnibus in membris et in ore ipsoque palato.¹⁴³
 ...
 namque figurarum ratio ut motusque reposcunt,
 proinde foraminibus debent differre figurae,
 et variare viae proinde ac textura coercent.
 hoc ubi quod suave est aliis aliis fit amarum,¹⁴⁵
 illi, cui suave est, levissima corpora debent
 contractabiliter caulas intrare palati
 at contra quibus est eadem res intus acerba,¹⁴⁶

Furthermore, since the seeds¹⁴² differ, it is necessary that the gaps and paths, which we call passages,¹⁴⁴ differ in all of the members and in both the mouth and the palate itself ... For indeed as the configuration and motions of the seeds’ shapes require, the shapes of the passages ought to differ accordingly, and the paths ought to vary accordingly as their structure compels. Therefore, when what is sweet to some happens to be bitter to others: for the one to whom it is sweet, very smooth

¹⁴⁰ On *sūcus*, cf. also Lucr. *DRN* 2.845 and 3.223 according to Bailey, 1947 iii: 1254-5. Godwin 1986: 130 on 4.615-17 also suggests that *sūcum* in both 615 and 617 means ‘taste’ and that the repetition ‘*sentimus sūcum ... sūcum sentimus*’ is meant to stress *sentimus*, which he renders as ‘feel’, and concurs runs throughout ‘all the accounts of the different senses’. On the last point cf. Bailey 1947, iii: 1255. For a different interpretation of the meanings of *sūcus* and related terms, cf. Rosenmeyer 1996: 138.

¹⁴¹ With respect to the usage of *palatum*, cf. Cic. *ND* 2.18.49 comparing two meanings of the word - i.e. the discernment of metaphorical taste or pleasure to the vault of the heavens. Cf. also Bailey 1947, iii: 1255 on *templa* in Lucr. *DRN* 4.624.

¹⁴² I.e. the constituents of one’s constitution and the configuration thereof generally differ somewhat - e.g. from those of the next member of one’s species. This shall be borne out in the context of the thesis overall.

¹⁴³ Bailey suggests *ad loc.* that ‘*ore ipsoque palato*’ is an an hendiadys. However, as the *palatum* is a part of the *os*, *ipso* is emphasizing the truth of the statement with respect to the palate itself and should not be taken with both.

¹⁴⁴ Godwin 1986: 132 takes line 650 *intervalla*: gaps, *vias*: passages, *foramina*: channels. The overall effect seems the same.

¹⁴⁵ Godwin 1986: 131 notes the chiasmus here, ‘*suave est aliis aliis fit amarum*’, which highlights the contrasting tastes.

¹⁴⁶ Godwin 1986: 132 suggests that the four long words of Lucr. *DRN* 4.660 are in stark contrast to the short stabbing words of 4.661. Attractive as this suggestive is, nevertheless, line 4.660 is not spondaic, nor is 4.661 dactylic; were this the case, however, that would have been a stronger argument for the embodiment or inscription of these mechanisms in the physical form of the text.

aspera nimirum penetrant hamataque fauces¹⁴⁷
DRN 4.649-51, 655-62

bodies ought to enter the gates of the palate in a stroking manner, but, on the other hand, to those for whom the same thing is briny¹⁴⁸ inside, doubtless rough and hooked bodies penetrate the inlets.

Line 4.662 seems to recall the physical entry of *sapor* suggested in (3) at 2.684-5 '*sorsum sapor insinuat | sensibus*';¹⁴⁹ the enjambment of *sensibus* there perhaps reflects the process of insinuation. '*Contractabiliter*' indicates direct contact; Lucretius often uses *tracto* and its compounds for stimulation by stroking.¹⁵⁰ The overall structure of the sense-organs' passages is affected by two primary factors: (1) the shapes of their constituent *primordia*, and (2) the arrangements relating those shapes.¹⁵¹ The overall structure of each passage thus determines which bodies can enter its gates, and which of those it is prone to interacting with. Nevertheless, the use of *sum* at 4.658, 659 and 661 further suggests that bitter and sweet are not conventions, for Lucretius, but real properties.¹⁵² A comparandum is the sight of a rooster. Lucretius claims that both lions and humans see the same rooster. However, unlike lions, humans experience no pain at the sight. According to Lucretius, this is so either because certain constituents of the stimulus do not penetrate the passages of our eyes, or because those that do penetrate pass through without hurting.¹⁵³ We will return to this shortly. Therefore, the *sensus* of taste is contingent upon the structure of the sense-organs. That constitution affects the precise nature of the flavors we experience, as well as whether or not the food is beneficial.¹⁵⁴

¹⁴⁷ Rouse and Smith, on the other hand, disagree with e.g. Brieger and Bailey that *fauces* refers to *foramina* (Bailey 1947, iii: 1259 suggests that they are actually the entrances of the *foramina*) and translate the word as gullet (cf. *OLD* §1d). Comparanda in meaning are '*caulas ... palati*' (Lucr. DRN 4.660) and '*palati ... fauces*' (4.627-8). Godwin 1986: 130 notes that '*fauces*' (4.627) commonly refers, metaphorically, to 'the entrance to a cave ... esp. of the Underworld' (cf. *OLD* §3e) and offers parallels at DRN 1.724, 6.639. Nevertheless on p.132 he hesitatingly prefers 'throat'. The confusion comes from the fact that Lucretius uses *fauces* to render both passages (of various sorts) and their entrances; cf. *OLD* §1, 3, 4.

¹⁴⁸ The adjective also encompasses the meaning acerbic; the translation cannot capture both simultaneously.

¹⁴⁹ However (3) concerns particles which cause taste at all, rather than a specific taste.

¹⁵⁰ Cf. *tracto*, *OLD* §1, 2, p.154. Godwin 1986: 132 'caressingly'. The word is, according to Bailey, a *hapax legomenon*; Bailey 1947, iii: 1259.

¹⁵¹ Cf. Godwin 1986: 132 on 4.655-7, stating that the three determinants of the shape of the channels are: 1) arrangement of the shapes of the constituents, 2) movements of those constituents, 3) the shapes of the constituents themselves.

¹⁵² As opposed to, for instance, the passive of *video*; cf. Lucr. DRN 4.662 with 4.670 and 4.719, esp. with respect to '*penetrare*'.

¹⁵³ Lucr. DRN 4.706-21.

¹⁵⁴ As we will see, physiological constitution not only varies to some degree by species - but also by individual, and even health; cf. e.g. Lucr. DRN 4.642-72. Bailey 1947, iii: 1253-4 (following Giussani) says that this makes taste 'essentially subjective', rather than 'inherent', but back-tracks at pp.1256-7. The nature of the sense-object is inherent and extant, ontologically speaking, regardless of whether a constitution is available to taste it and indeed regardless of which constitution is available to taste it. Similarly, if a tree falls in the woods and no one is around to hear it, it still makes a sound; moreover it makes a particular sound regardless of which ear is around to hear it. On the epistemological implications of constitutional variation, cf. esp. Epilogue to Chapters II & III.

That said, these passages do more than serve as a filter, they also increase the surface area upon which interactions occur, thus dramatically increasing the tongue's sensitivity. The 'juicing' process we just discussed makes good sense in this context. Liquifying facilitates the interaction of a greater number of the food's constituents with the total surface area of the tongue.

The significance of stimulus-shape for the nature of the experience, indicated by the passage above, recalls the account of touch-as-contact, which was already activated in Lucretius' description of the moment of interaction:

hoc ubi levia sunt manantis corpora suci,
 suaviter attingunt et suaviter omnia tractant
 umida linguae circum sudantia templa.
 at contra pungunt sensum lacerantque coorta,
 quanto quaeque magis sunt asperitate repleta
 DRN 4.622-6

Therefore when the bodies of the flowing *sūcus* are smooth, they sweetly strike and sweetly stroke around all the moist dripping regions of the tongue. But, when other sorts of bodies have arisen, they prick and tear the *sensus* in proportion to their roughness.

The resonance of content and words occurs particularly with (2). Here, *levis* and *tracto* recall 2.398-403.¹⁵⁵ Line 4.625 shows that '*coorta*' refers to both the shapes which wound (cf. 2.404-7) and those which stimulate without giving rise to either pleasure or pain (cf. 2.426-30).¹⁵⁶ Thus the shapes of the constituents of the *sūcus* influence the nature of our interactions,¹⁵⁷ confirming that the liquid-food itself is taste-causing. Therefore, taste is the result of the direct interaction between food and the passages of the tongue. The particular flavor which one experiences varies - according to both our own structures and the shapes of the broken-down food. Contra Rosenmeyer, taste therefore does not operate by means of effluences.¹⁵⁸

Tasting drink is no different. Lucretius acknowledges throughout the poem that consumed liquid has flavor - including honey, milk, absinthe (i.e. wormwood), and wine. As we have seen, chewing processes food prior to taste. Liquifying renders moot the apparent difference between food and drink. The mechanism of tasting drink is therefore identical, and self-evidently contained in the account of tasting food.¹⁵⁹ At the point when

¹⁵⁵ Here *tracto* echoes Lucr. DRN 2.399 and similarly emphasizes the contrast between the various interaction possibilities, in the first instance in (2) between those '*iucundo sensu linguae*' (2.399) and '*quae amara atque aspera cumque*' (2.404). Godwin 1986: 130 notes the contrast between the verbs of 4.623 and those of 625.

¹⁵⁶ Cf. pp.75-6.

¹⁵⁷ Cf. Bailey 1947, iii: 1253-4.

¹⁵⁸ Again, contra Rosenmeyer 1996: *passim*; for further bibliography on this debate, N.B. pp.139-40 n.22. Cf. also Taylor 1980: 121.

¹⁵⁹ Therefore, Rosenmeyer's concerns about Lucretius' failure to mention drink in this passage and Bailey's translation of *sūcus* as 'juice' are unfounded. Likewise, their contention that chewing liberates flavor is patently false; cf. Rosenmeyer 1996: 138-40. The physiological mechanism of taste is identical for both.

that liquid-food drops down the throat its bodies begin interacting with a different structure, with different result. We no longer perceive flavor and the pleasure which comes from it. The matter is distributed throughout the body nutritively, a process which entails no kinetic pleasure.¹⁶⁰ The result of the process of nutrition - namely, a restored constitution absent the pain of hunger, is elsewhere construed as pleasurable.¹⁶¹

It now is possible to explain an apparent contradiction earlier in the text. Lines 4.217-21, contains a list of bodies which flow from their source-assemblies. They include:

- The intermediaries of sight, or *simulacra*
- Odors, which effect smell
- Wall-gnawing spray, off the waves of the sea¹⁶²
- Bodies of sound, which effect hearing

Immediately after the list, Lucretius introduces the controversial example of the salty taste of sea air.

denique in os salsi venit umor saepe saporis,¹⁶³
cum mare versamur propter, dilutaque contra
cum tuimur misceri absinthia, tangit amaror¹⁶⁴
DRN 4.222-4 = 6.928-30

Finally, moisture of salty flavor often comes
into the mouth when we are near the sea, and
when we watch diluted absinthe¹⁶⁵ being
mixed before us, its bitterness reaches us.

The lines are repeated exactly in book six.¹⁶⁶ Set in its immediate context, this apparent paradox may seem to contradict the direct-contact mechanism of taste which we have just established. There is a substantial lacuna before 4.217, considerable repetition between 4.217-229 and 6.923-35, and intratextual echoes between 4.222-4 and (2),¹⁶⁷ as well as the passages on taste discussed above. As best one can tell, in light of these lacunae and echoes, the overall focus of 4.217-229 is on emitted bodies causing sight, smell, and hearing.¹⁶⁸ Despite the allegations of Rosenmeyer and even Bailey,¹⁶⁹ the analogy here is

¹⁶⁰ Lucr. DRN 4.615-32.

¹⁶¹ For instance, by contrast with unnecessary desires which can never be fulfilled at Lucr. DRN 4.1091-3.

¹⁶² Lucr. DRN 4.220-1: '*aestus ab undis | aequoris exesor moerorum litora circum*'. For the interpretation of *aestus* here as 'spray', cf. Bailey 1947, iii: 1694, West 1969: 11-12, Godwin 1986: 107. Godwin also compares the spray with Lucr. DRN 1.311-21.

¹⁶³ Bailey's translation of both 4.222-4 and 6.928-30 concurs with this interpretation, cf. Bailey 1947, i: 373 and 563. On the other hand, Godwin 1991: 159, regarding 6.928-30, takes '*umor*' as saliva already present and the salty taste as something that enters the mouth; thus in his translation *ad loc.* (p.71) he seems to take '*saporis*' as an alternate plural with '*salsi*' as genitive, rather than taking both '*saporis*' and '*salsi*' as genitives modifying '*umor*', which is the way that he translates 4.222-4 at Godwin 1986: 25.

¹⁶⁴ Godwin 1986: 107 notes the sharp evocative contrast between the structure of '*diluta ... absinthia*' and the event suggested by '*tangit amaror*'. Again Lucretius seems to be embodying the nature and process in the structure of the lines for effect.

¹⁶⁵ I.e. wormwood.

¹⁶⁶ On the repetition, cf. Bailey 1947 *ad loc.*, Godwin 1986: 106.

¹⁶⁷ Cf. Lucr. DRN 2.400-04.

¹⁶⁸ Cf. esp. Lucr. DRN 4.228-9 on this point.

¹⁶⁹ Bailey 1947, iii: 1209-10. Rosenmeyer 1996: 136-7 actually takes the entire passage to refer to effluences.

not between effluences and taste-causing bodies, but rather between effluences and other airborne bodies, such as the wall-gnawing spray of the sea.¹⁷⁰ Indeed, the nexus of words related to bodies of liquid, great and small, within lines 4.220-24, suggests the way forward.

Lucretius' account of the water cycle and its underlying mechanisms is developed diachronically across the poem; this adds another dimension to the reading of our controversial passage.¹⁷¹ In his greater proof that there are unseen bodies in nature, Lucretius states:

denique fluctifrago suspensae in litore vestes
uvescunt, eadem dispansae in sole serescunt;
at neque quo pacto persederit umor aquai
visumst nec rursus quo pacto fugerit aestu.
in parvas igitur partis dispargitur umor,
quas oculi nulla possunt ratione videre
DRN 1.305-10¹⁷²

Again, clothes hung up on the wave-breaking shore grow damp; the same clothes spread out in the sun dry out. But we did not see in what way the moisture of water soaked through, nor how it fled away with the warmth. Liquid is therefore dispersed into small particles which the eyes are unable to see.

This demonstrates that Lucretius has a concept of evaporation and condensation.¹⁷³ Brown comments on the physical embodiment of the processes in these lines. However, *umor aquai* is not simply a periphrasis, as he suggests.¹⁷⁴ Lucretius and Epicurus believe that evaporation can occur with liquid in general, not just with water. Moreover, emanation is not the only mechanism proposed; for example, Lucretius states that lightning can cause the flash evaporation of wine.¹⁷⁵ In addition to absinthe, wine, and seawater, Lucretius also mentions that liquid freshwater can become airborne.¹⁷⁶ Thus the mechanism of evaporation as he understands it can presumably be extended to all bodies of liquid, great and small. Epicurus mentions it briefly and generally, with respect to water and to damp places.¹⁷⁷ In 1.305-10, both form and context confirm that the water is being dispersed into smaller bodies of water, not into parts which are unlike the whole. Like the broken-down

¹⁷⁰ Lucr. DRN 4.220-1. Hot and cold are also mentioned; the passage in book six is part of the recapitulation of previously made points necessary to then explain magnetism. We will return shortly to the effects of direct contact with other unseen airborne bodies identical in *coniuncta* to larger assemblies thereof.

¹⁷¹ On the meteorological aspects of the water cycle in Lucretius, cf. Montserrat and Navarro 1991. On the intertextual implications of Lucretius' account of the water cycle, particularly with respect to Ennius, Xenophanes, Callimachus, and Empedocles, cf. Nethercut (unpublished 2013), who reads these allusions as contrived to foster the function of the water cycle as an example of Epicurean *isonomia*. My thanks to Jason Nethercut for a copy of this work and permission to reference it.

¹⁷² Cf. Lucr. DRN 6.470-5.

¹⁷³ Cf. Lucr. DRN 5.383-91, Montserrat and Navarro 1991: 297-301.

¹⁷⁴ Brown 1984: 98.

¹⁷⁵ Lucr. DRN 6.231-8.

¹⁷⁶ Cf. also rivers at Lucr. DRN 6.506-7.

¹⁷⁷ Cf. Epic. *Ep. Pyth.* 99, 106, 108.

food discussed earlier, these are essentially smaller versions of the aforementioned *aestus* or spray of ocean water.¹⁷⁸

Therefore, Lucretius does not understand evaporation and condensation to occur as a change of state relative to the whole, nor as the generation and decay of emissions which only partially reflect the nature of the source. Rather, he sees these processes as the scattering and assembling of particles of liquid. This is not far off the mark, compared with the modern understanding of evaporation - relative to individual molecules of H₂O and of other evaporating liquids, like alcohol. Both Lucretius and Epicurus discuss other examples of this theory. They account for the formation of clouds and precipitation - by evaporation and condensation respectively. Epicurus even suggests that water is comprised of atoms of different shapes and that the formation of rainbows is contingent upon evaporation.¹⁷⁹ But this is where the modern parallels end.

Today we know that evaporation is a way of distilling clean drinking water from sea-water. According to Lucretius, however, from the time of world's formation, sea-water has existed as, inherently, a mix of salt and water. He believes that these two elements are not easily separated. Moreover, if separated, the assembly passes beyond the bounds of its nature and ceases to exist.¹⁸⁰

Consider his comments on desalination. In one case, Lucretius seems to be describing a practice of salt production, still used in the Mediterranean - where, through a sluice gate, brine is channeled into collection pits or terra-cotta pans. Rather than explaining the gathered salt as the result of evaporation, Lucretius suggests that it is the result of filtration. Like all assemblies, such vessels contain void and thus are porous.¹⁸¹ The hooks of the salt-bodies adhere to the earth or earthen pans, letting the smooth-bodied freshwater seep through to where it too can potentially be harvested.¹⁸² Aristotle has a

¹⁷⁸ This translation of *partīs* (< *pars*) follows Rouse and Smith's translation, as the context makes clear that the water is being dispersed into smaller bodies of water, not into parts which are unlike the whole; cf. Bailey 1947, ii: 649, Lucr. *DRN* 6.470-5.

¹⁷⁹ Lucr. *DRN* 5.261-72, 6.451-534; cf. Epic. *Ep. Pyth.* 99-100, 106-9. On the tactics used by Lucretius and Epicurus to explain meteorological phenomena related to the water cycle, cf. Taub 2009: esp. 120-1.

¹⁸⁰ Montserrat and Navarro neglect this possibility, as is evidenced by their hypothesis that clouds are like hung fleeces and used to collect fresh-water: it 'is clear that clouds do not pick up liquid water straight from the sea, since they would then pick up salty water'; Montserrat and Navarro 1991: 300, 308 n.72. For proof that clouds do so, according to Lucretius, cf. below.

¹⁸¹ Lucretius would have thought such pans contained void and thus were porous, as all assemblies are, including stone and iron, which he also describes as amongst the most dense and intertwined with respect to its constituents. Cf. esp. Lucr. *DRN* 2.444-50, 2.460, 6.979-82, 6.990, 6.1010-11, 6.1031-8.

¹⁸² Lucr. *DRN* 2.464-77, 5.480-500. The filtering he describes may be compared, perhaps, to the different results of filtering wine and olive oil at 2.391-7. On salt, other products harvested from salt pools in his contemporary Rome, and some of their methods and uses, cf. Pliny *HN* esp. 31.73-92, 98-105, Longhurst 2007.

similar account of filtration using a wax vessel.¹⁸³ On a larger scale, a similar desalination process supplies rivers with fresh water.¹⁸⁴ This seems to be the reverse of the process by which the seas were created. In the infancy of the world, according to Lucretius, they were squeezed out of the earth as the '*rara foramina terrae*' became '*magis inter se perplexa*'.¹⁸⁵ Now, the passages of the earth are sufficiently entangled that the same hooks of the salt-bodies which wound the passages of the tongue get caught.¹⁸⁶

Lucretius also believes that seawater is one of the primary sources of the *umor* contained in the clouds. In book six, Lucretius revisits the water-logged clothes of 1.305-10 in terms recalling salt-harvesting, the wall-gnawing *aestus*, and the salty taste of sea air. The sticky wetness of these garments is here explicitly due to seawater and explicitly taken as an indication that moisture of the same sort ('*consanguineae*', 6.475) is contained in the clouds.¹⁸⁷ Brackish rain was a recognized phenomenon in antiquity,¹⁸⁸ but if Lucretius knew that rain does not (always) taste salty, he might explain it either by dilution or by a filtration process, such that - on the way down - the aether serves an analogous function to the aforementioned earth filter. Lucretius therefore does not believe that evaporation separates seawater into salt and fresh water.

Let us now pull these threads together and bring them to bear on the salty taste of sea-air. We have seen that the sense of taste occurs when the structures of the tongue and palate interact with juiced-food, as well as with drink. The various shapes of their constituents are taste-causing. Moisture exists in the air near the sea. It exists in the form of the spray of the waves, which is barely visible to the naked eye. It also exists as microscopic bodies of water which make garments hung nearby grow damp - which tiny liquid assemblies have evaporated from the sea itself.

¹⁸³ Arist. *Mete.* 358b34-359a6; my thanks to Rebecca Taylor for this comparandum. However, Aristotle also acknowledges accounts of salt harvesting by evaporation; e.g. 359a22-b4. On such experiments, esp. by Aristotle, cf. Taub 2003: 102-3. These examples from Lucretius and Aristotle are among the precious few theoretical discussions of salt-harvesting processes to survive from antiquity. Those offered by Pliny *HN* as cited in the previous note differ.

¹⁸⁴ Lucr. *DRN* 5.268-72, 6.631-8. The latter example makes clear that the subterranean liquid in the former is seawater; cf. the use of *vīrus* (5.269, 6.635) as recalling the filtered '*taetri primordia viri*' (2.476). The earth-sources yield freshwater. On these points, cf. Montserrat and Navarro 1991: 295.

¹⁸⁵ Lucr. *DRN* 5.449-59, 5.480-89. Cf. Montserrat and Navarro 1991: 293.

¹⁸⁶ This selective filtering may be comparable to the hypothesized filtering out, by the passages of human eyes, of the bodies which wound the eyes of the lion.

¹⁸⁷ Contra, Montserrat and Navarro 1991: 300, 308 n.72, the sources of the clouds' moisture are many. The sea and rivers are the primary sources; others include lakes, streams, moisture from the earth, and bodies entering our sky and aether from the infinity beyond. N.B. esp. Lucr. *DRN* 5.463-66, 6.470-5, 6.503-5 (as well as 6.495-516 more generally). Cf. also in this context '*consanguineae*' (6.745) with '*cum sanguine*' (6.501) and the '*vestes suspensae*' (6.471-2) with '*pendentia vellera lanae*' (6.504).

¹⁸⁸ Arist. *Mete.* 358b2-6; my thanks to Rebecca Taylor for this reference. Lucretius thus might not be surprised by the modern problem of acid rain.

The apparent paradox of tasting salt at a distance from the sea can be explained by these tiny bodies of saltwater or '*salsi ... umor ... saporis*' (4.222). The tongue is coming into direct contact with unseen airborne moisture at the seaside. The tiny droplets which we taste are not effluences, but evaporated seawater - identical in composition to the larger body of brine, but smaller than the wall-gnawing spray. The bitter flavor which one tastes in the presence of diluted absinthe (i.e. wormwood) is also due to evaporation. Minuscule particles of liquid absinthe become airborne during the stirring of the mixture. Stirring, in fact, speeds up the process of evaporation. Lucretius' use of '*tangit*' (4.224) again indicates that taste occurs from the tongue's direct contact with the unseen particles of absinthe.

Therefore, contra Rosenmeyer and Schoenheim, the salty taste of sea-air and the bitter taste of air near the mixing of absinthe represent a red herring.¹⁸⁹ These phenomena are not exceptions which contradict the rule. Properly understood, they fit perfectly within the general account of the physiological mechanism of taste. They actually reveal complexities about both taste and the theory of the water cycle. Taste, for Lucretius, definitively works by means of direct contact with liquid and the unseen taste-causing bodies contained therein.¹⁹⁰ Moreover, the passage-riddled tongue is so sensitive that it will perceive the flavor of even the smallest drop of liquid. In other words, a drop of liquid so small as to be invisible will nevertheless suffice to effect taste. Finally, because evaporation does not distill pure water from liquids, we can taste evaporated liquids at a distance from a larger body of fluid - even without drinking it.¹⁹¹

C. The Indirect Perceptions of the Body: Sight, Smell, and Hearing¹⁹²

Of the so-called five senses, three operate by means of indirect contact with the object of their perception; these are sight, smell, and hearing. According to Lucretius' account, all living creatures perceive macroscopic bodies external to themselves with which they do not come into direct contact by means of contact with microscopic emitted bodies. These intermediaries preserve a significant degree of continuity with aspects of the

¹⁸⁹ Rosenmeyer 1996: 144, perhaps picking up on the suggestion of Schoenheim 1966: 80 that these might be an exceptional case in which taste works by effluences, which Rosenmeyer extends to taste in general.

¹⁹⁰ Diseases too can affect us as unseen airborne bodies, cf. Lucr. *DRN* 6.1128-30. Fire can also kindle at a distance this way, as does a candle; cf. 6.900-4 and perhaps Epic. *Ep. Pyth.* 93.

¹⁹¹ Presumably Lucretius would agree that the closer one is to the larger body of liquid from which the moisture has evaporated, the greater the concentration of moisture suffusing the air would be and the likelihood of tasting it.

¹⁹² Aspects of this section were presented in June 2013 at the Annual Meeting of Postgraduates in Ancient Literature, University of St Andrews; my thanks to the audience for their feedback.

sense-object and to that extent represent them accurately. The intermediaries are not identical in nature to the objects from which they emanate. They are also subject to some distortion by intervening circumstances.

Lucretius devotes the most attention by far to explaining sight, or the vision of the eyes. Sight involves the interaction of *simulacra* with the eyes, in particular with the pupils.¹⁹³ *Simulacra* are thin films or images of macroscopic assemblies,¹⁹⁴ continuously and rapidly emitted from their surfaces by a *per se* necessitated process.¹⁹⁵ They proceed in vector-like streams, directly radiating out in all directions,¹⁹⁶ which then move swiftly through the air.¹⁹⁷ The mechanism of effluence emission is probably decay, not - as Koenen and Rosenmeyer suggest - inner vibrations of atoms or other constituents.¹⁹⁸ Lucretius does not seem to discuss *πάλλσις* with respect to *simulacra*; although there is some speculation that this movement is alluded to in 4.193 by '*parvola causa*'.¹⁹⁹ These films, which Lucretius likens to skins shed by a snake,²⁰⁰ share the outward form and appearance of the source-assembly - i.e. the shape, color, and (at least upon emission) size of its surface. They lack all other aspects of its nature. According to Lucretius, *simulacra* thus enable perception of the source-object's shape, color, and size.²⁰¹ The eyes are also

¹⁹³ That it is the eyes alone which have sight, cf. Lucr. *DRN* 4.241. On the relationship of the pupils to the eyes with respect to seeing, cf. 3.408-15.

¹⁹⁴ Possibly they are also shed from microscopic assemblies, but are therefore also simply too small to be seen. On Lucretius' range of vocabulary for *εἶδωλα* and the functions served by the different terms; cf. Sedley 1998a: 38-42.

¹⁹⁵ Lucr. *DRN* 4.30-2 (cf. 4.50-3, whose content is relevant despite the possibility that this was meant to be deleted with the restructuring of the poem, on which cf. pp.166-7), 4.42-3, 4.63-4, 4.84-8, 4.95-7, 4.98-109. On their thinness, cf. esp. 4.110-15, Epic. *Ep. Hdt.* 46, 47. With respect to speed of travel and speed and frequency of emission: *DRN* 4.143-167, Epic. *Ep. Hdt.* 47-8.

¹⁹⁶ Lucr. *DRN* 4.161-7, 4.609-10, cf. 4.225-29, 4.239-40. On the point of their direct outward radiation, I concur with Rosenmeyer 1996: 137.

¹⁹⁷ Lucr. *DRN* 4.176-9, 4.191-216. With respect to their swiftness, cf. Epic. *Ep. Hdt.* 46-7, 48.

¹⁹⁸ Koenen 1997: 165-6, Rosenmeyer 1996: 133, 140, 146, 147-8, cf. Koenen 1999: 436. The way to interpret *πάλλσις* with respect to *simulacra* is not clear, cf. Epic. *Ep. Hdt.* 50; it may be taken as the cause of the uniformity of the emitted assemblies rather than the cause of their emission.

¹⁹⁹ As does, e.g., Rouse and Smith 1992: *ad loc.* It is possible that *πάλλσις* is among those necessitated *per se* motions of an assembly's constituents which are referenced by Lucr. *DRN* 2.99-104.

²⁰⁰ Among other things of which the following statement is also true.

²⁰¹ Lucr. *DRN* 4.42-3, 4.54-71, 4.155-8, 4.166-7, 4.242-3. Cf. Epic. *Ep. Hdt.*: at 46 he states 'οὔτε ... ἀδυνατοῦσιν ... ἀπόρροιαί τὴν ἐξῆν θέσιν καὶ βάσιν διατηροῦσαι, ἦνπερ καὶ ἐν στερμνίοις εἶχον', 48 emphasizes 'θέσιν καὶ τάξιν', 49 indicates that through the aforementioned preserved position, motion, and arrangement of the atoms from the external source-objects we perceive (by sight or thought) the color and form (ergo, perhaps, shape and size) shared by both the source and the intermediary *εἶδωλα*. Like the first-beginnings, *simulacra* lack - e.g. - the faculties, like *sensus*, which are *coniuncta* of living things; Lucr. *DRN* 4.127-8, cf. 2.865-990.

capable of other perceptions.²⁰²

Other Epicureans may have held different opinions about sight. Sedley is followed by Furley and Tsouna in reading *PHerc.* 19/698 as an attempt to eliminate shape and size as so-called 'common sensibles' of sight and touch by restricting sight to the perception of color.²⁰³ Sedley seems to read this into Lucretius' claim that different *sensūs corporis* cannot providing conflicting information and thereby contradict one another. This is true to the extent that no other *sensus corporis* perceives color, but color is merely the example which Lucretius uses to illustrate the general claim.²⁰⁴ Similarly, Lucretius chooses softness and temperature for touch, but - as we have seen - these are not the only things which *tactus* can perceive. Moreover, Monet argues that the author of *PHerc.* 19/698 - who she contends is Philodemus - was reacting to Aristotle.²⁰⁵ Lucretius, on the other hand, is probably drawing primarily on Epicurus' *On Nature*. Again, for Lucretius, color is not the only aspect of the nature of the original object which sight perceives directly;²⁰⁶ therefore, *pace* Sedley, size and shape are not inferences from color and body, respectively. This will be borne out further below. Because of such differences, the papyrus treatise is at best a point of comparison with Lucretius. One should not assume or attempt to force consistency between the two accounts of perception.

For Lucretius, when a given set or stream of *simulacra* does reach the pupil of the eye, some make contact with the pupil's surface structure, others enter and make contact with its passages. Direct contact with *simulacra* (in whole or part), not with the source-object itself, causes the *sensus* of sight. Sometimes pleasure or pain is also engendered in

²⁰² For example, the eyes can perceive light and dark (or shadow), which for Lucretius have a bodily nature, cf. 4.337-52, 4.364-78, 4.380-1, as well as distance, and - as we shall see shortly - pleasure and pain. Some of these may be related to touch-as-contact, but it is noteworthy that the eyes, as sense-organs, can feel as a result of interaction with more than one sort of stimulus and, as discernment of light, dark, and distance, suggest, have more than one sphere of discrimination.

²⁰³ Sedley 1989a, cf. Long and Sedley 1987: i.84; cf. Furley 1993: esp. 75, Tsouna 1998: 19-20.

²⁰⁴ Lucr. *DRN* 4.486-99 (cf. (7) in the table above), esp. 4.492-3: '*et seorsum varios rerum sentire colores | et quaecumque coloribus sint coniuncta videre*' (subordinated to '*necesse est*' in 4.490).

²⁰⁵ She also suggests that Philodemus likely had Arist. *de An.* or something similar at his disposal when writing (though neither is named, as was the school's convention; Monet 1996b: 741-4, 748, cf. also Monet 1996a).

²⁰⁶ If it were, why does he repeatedly stress the *forma* (and other aspects or words related to size and shape) of the *simulacra* and never - as far as this investigation has found - their color?

the process, as with the lion seeing the rooster.²⁰⁷ The eyes, like the tongue, are riddled with passages, which increase the eyes' sensitivity.²⁰⁸ Nevertheless, these thin bodies cannot be perceived individually by the *sensūs corporis*; rather it is their combined stream which is collectively perceptible.²⁰⁹ Like a spiderweb, a feather, or a bit of dandelion fluff which lands on the skin without being felt,²¹⁰ a single *simulacrum* is too thin and fine to cause *sensifer motus* in the eyes. In other words, interaction with a single *simulacrum* is insufficient to stir even the particles of the nameless fourth which are on the outside of the surface and passages of the eyes. If they are stirred, they do not stir to such an extent that they are able to transmit that motion to the other constituents of the complex, at which point these motions of the complex would have become *sensus*-bearing. Thus an entire stream of *simulacra* is required to collectively effect sight. The essentially simultaneous interaction of the pupils with both the stream of *simulacra* and the air driven by them produce the sight of the source-object and the perception of its distance together.²¹¹

The accuracy of one's perception of the source-object is due to the continuity of structural arrangement - and thus corresponding *coniuncta* and *eventa* - between that assembly and its *simulacra*.²¹² The structural arrangement of the surface of the source-assembly at the moment of emission is largely preserved in its *simulacra*.²¹³ However, nothing below or more substantial than the surface film is conveyed.²¹⁴ To return to the example of shape: the shape of the intermediary *simulacra* allows one to perceive the shape of their source. Touch-as-sense also allows us to perceive the shape of an object, as we have seen.²¹⁵ Thus shape can be perceived by either direct or indirect contact. Therefore, for Lucretius, unlike the author of *PHerc.* 19/698, a source-assembly's surface²¹⁶ sometimes enables perception of one *coniunctum* through different *sensūs* and of multiple things by the same *sensus*.²¹⁷

²⁰⁷ Cf esp. Lucr. *DRN* 4.249, 4.324-31, 4.706-21.

²⁰⁸ Presuming that the constitution of the pupil is consistent throughout (cf. Lucr. *DRN* 3.702 and context, that there are elements of the *anima* in our passages), the existence of these passages increases the surface area upon which interactions potentially occur, such that more of the structure comes into contact with constituents of the *simulacra*, thereby increasing the sensitivity of the eyes.

²⁰⁹ Lucr. *DRN* 4.89-90, 4.98-109, *Epic. Ep. Hdt.* 50. This is similar to how the streaming of invisible assemblies with a non-emitted particulate nature, like wind, cause the perception of touch in the flesh; *DRN* 4.256-69, cf. 1.271-97. It also recalls, again, the dust mote analogy.

²¹⁰ Lucr. *DRN* 3.381-90.

²¹¹ Lucr. *DRN* 4.244-55. With respect to the the perception of distance and the issue of apparent simultaneity, cf. esp. pp.133-5.

²¹² *Epic. Ep. Hdt.* 48-50.

²¹³ Lucr. *DRN* 4.67-9, 4.155-8.

²¹⁴ Cf. the analogy with animals that shed their skins: Lucr. *DRN* 4.57-71.

²¹⁵ Cf. p.77 and e.g. with respect to blind people and those in the dark; Lucr. *DRN* 2.741-7, 4.230-8.

²¹⁶ Presuming that this is the identity of the '*consimili causa*' in Lucr. *DRN* 4.230-3.

²¹⁷ Cf. Sedley 1989a: 131.

However, *simulacra* do not always preserve their structural arrangement; intervening circumstances can slightly alter *simulacra*,²¹⁸ affecting one's perception of the source-objects. This can happen in a variety of ways. *Simulacra* may change before reaching a perceiver by combining with other bodies, as in the case of jaundice.

lurida praetera fiunt quaecumque tuentur
 arquati, quia luroris de corpore eorum
 semina multa fluunt simulacris obvia rerum,
 multaue sunt oculis in eorum denique mixta,
 quae contage sua palloribus omnia pingunt
 DRN 4.332-6

Moreover, whatever the jaundiced behold becomes yellow, because many seeds of yellow flow from their bodies to meet the *simulacra* of things, and then because many are mixed in their eyes. By their own contagion, these seeds paint all things with their colors.

To tease out Lucretius' concise explanation of the condition: Jaundice involves an abundance of assemblies which give rise to the perception of yellow. They are mixed in the constitution of the whole individual. These particles are emitted from its surface.²¹⁹ Some of these come into contact with *simulacra* which are heading towards the eyes from external sources, combining with them individually. The incoming stream of *simulacra* thus changes slightly with respect to each of its members and hence, necessarily, its arrangements; it takes on some of the yellow assemblies. The tinged stream then continues to the eyes. This incoming stream interacts as it enters with more yellow-causing assemblies mingled in the eyes themselves. As Bailey notes, this two-fold cause results in the perception of the yellow color,²²⁰ along with the rest of the qualities of the *simulacra*. Therefore, yellow is apparently but not actually one of the qualities of the external source-object visible to the jaundiced individual. Lucretius' use of '*contage*' (for *contagione*)²²¹ emphasizes that jaundice is an illness; sight usually does not work this way. It also connotes both contact and connection, obviating the possibility that the incoming *simulacra* merely drive the yellow-causing particles back towards the eyes, in the manner in which they drive air. The singular form, despite the neuter plural antecedent, further suggests that these particles are collectively causing this tinged-sight. In a word Lucretius thus reinforces his presentation of the underlying mechanism. Combination with other bodies is therefore one way in which *simulacra* may alter in structural arrangement during the interim between emission and perception.²²²

²¹⁸ Cf. perhaps 'γινόμενη ... τοῦ εἰδώλου', Epic. Ep. Hdt. 50.

²¹⁹ The mechanism of their emission is not clear. Perhaps the emission of an aura of such particles is a condition of the disease or perhaps the particles are emitted as parts of the *simulacra* emanating from the whole individual.

²²⁰ Bailey 1947, iii: 1222. On the jaundice passage, cf. also Schoenheim 1966: 79.

²²¹ Cf. Bailey 1947, iii: 1222.

²²² The occasional combination of two unlike *simulacra* also occurs, as we will see in the next chapter, but here we are concerned with streams of *simulacra* perceptible by the *sensūs corporis*.

Another way is by passing through other assemblies. As suggested e.g. by Bailey and Taylor, when *simulacra* stream through the air and flit about, they can be buffeted by its particles - which both compresses the size of the *simulacra* and wears at their edges.²²³ Therefore, the longer they are airborne prior to interaction with the eyes, the less accurately *simulacra* represent their source. Hence objects at a distance generally appear smaller than they actually are, and the precise outline of a distant tower may appear poorly defined and even seem rounded when the edifice is really square. The exceptional cases of the sun and moon, however, show that - for Lucretius - the precision of intermediary stimuli is really determined by the amount of structural intervention, not by distance itself.²²⁴ Passing through other assemblies can diffuse the constituents of *simulacra*, with various results; these are best understood in relation to the processes underlying smell and hearing.

The perception of odors and sounds, again, occurs when the appropriate stimuli, distinct from their source-object, interact with the inner structures of the nostrils and ears respectively.²²⁵ Emissions of odor and of voice (being one type of hearing-causing body), come from deep within the source-object, not from the surface as *simulacra* do. Also, all assemblies do not emit odors and sound, much less all of the time.²²⁶ Odors well up and seep out through passages of the body. This *per se* necessitated process divides each assembly - presumably into smaller assemblies of otherwise identical nature; these bodies are thus emitted diffusely, not as a coherent radiating stream.²²⁷ Once emitted, smell-causing bodies move relatively slowly and in a wandering manner through the air before either reaching nostrils or dissolving altogether.²²⁸ Voice is emitted in a similar manner

²²³ Bailey 1947, iii: 1207-8 notes that a fragment of Epicurus *On Nature* 2 (= Arr.² 24.43.11-15; my thanks to Stephen McCarthy for pointing me to the corresponding reference and for discussion) suggests diminution in transit. Bailey fails to realize that the radiating streams of virtually identical simulacra solve the problem of the apparently simultaneous perception of the same source-object (or, for that matter, that it does not appear exactly the same to both eyes, as covering them in turn while staring at a single nearby fixed object will show, e.g. one's finger held ca six inches in front of one's nose). That *simulacra* of the distant tower are reduced and rounded by friction with the air, cf. Taylor 1980: 116. That this buffeting and its consequences does not often occur, cf. Epic. *Ep. Hdt.* 47-8. For different views, in light of Alexander of Aphrodisias, cf. e.g. Avotins 1980: esp. 440, and Sharples 2002.

²²⁴ The exceptions which prove the rule about distance are the sun and moon, whose *simulacra* apparently reach us so quickly that there is no opportunity for diminution; Lucr. *DRN* 5.564-91, Epic. *Ep. Pyth.* 91. Regarding their speed, cf. pp.133-5. These examples show that the real issue for the precision of stimuli and accuracy of perception with respect to the near view *versus* the distant view is the amount of intervention with respect to the stimulus, not the amount of distance. Cf. in general: Asmis 2009: 97, on the tower: *DRN* 4.353-63, on the deployment of the tower example and the issue of distance: Sedley 1989a: 124-5.

²²⁵ Aspects of the hearing and smelling process and their stimuli described below are also treated by Epic. *Ep. Hdt.* 52-3, who seems to conceive of some aspects of voice and wind in a similar manner. On smell, cf. Koenen 1997. On hearing, cf. Koenen 1999 and Koenen 2004.

²²⁶ Lucr. *DRN* 2.834-6, 2.850-3, 3.221-3. Cf. Koenen 1997: 168 on '*multas*' in 4.674.

²²⁷ Lucr. *DRN* 4.90-4; this point will be taken up again shortly.

²²⁸ Lucr. *DRN* 4.692-8, 4.703.

from the depths, with some differences. The emission process is *per se*, but it is generally unfixed, as in the case of deliberate speech, rather than necessitated, such as crying out during an epileptic fit. Also it advances forth through the narrow passage of the throat and is given the shape of particular words by the tongue and lips.²²⁹ Hearing-causing bodies more generally are emitted from both living and non-living assemblies under certain circumstances. Once emitted, assemblies of sound which are of sufficient magnitude also disperse into many identical assemblies; this is evident by the fact that one word is heard by many ears.²³⁰ Those which do not interact with any ears may carry on.²³¹ They can pass through many other sorts of assemblies, from air to walls. However, long enough passing through another substance eventually disturbs the original order of the sounds and blunts their shape, such that, e.g., a sound is heard but not necessarily the original word.²³² Yet, encountering relatively solid assemblies like stone, such as in the mountains, may cause a hearing-causing particle to bounce back, in the form of an echo.²³³ These mechanisms show that the nature of the passages through which a stimulus passes both during and after emission can affect the perception of original thing.

Although all emitted stimuli are therefore affected by the substances through which they pass, *simulacra* are generally affected more so than other sorts. We can hear voices through walls, says Lucretius:

nimirum quia vox per flexa foramina rerum
incolumis transire potest, simulacra renutant;
perscinduntur enim, nisi recta foramina tranant,
qualia sunt vitri, species qua travolat omnis
DRN 4.599-602

... undoubtedly because the *vox* is able to pass intact through the winding passages of things; *simulacra* do not, for they are completely rent unless they pass through straight passages, passages like those of glass - through which every sight flies.

These lines show that, unlike assemblies of sound and odor, *simulacra* do not split up into smaller - but otherwise identical - assemblies at various stages of the emission or transmission process. A stream of hearing-causing particles can be broken-up and scatter, yet a single assembly of sound still effects hearing. Likewise with smell. *Simulacra*, on the other hand, must remain intact - both individually and as a stream in order to effect

²²⁹ Lucr. DRN 4.528-32, 4.549-52; cf. Epic. *Ep. Hdt.* 75-6. This process will be treated in greater detail in chapter five.

²³⁰ Lucr. DRN 4.563-7, cf. 4.603-8.

²³¹ Lucr. DRN 4.568-9.

²³² On the blunting and confusing of sound by passing through air, cf. Lucr. DRN 4.557-62, and through a more solid assembly, such as doors and walls, cf. 4.595-600, 4.610-14 (on which, cf. Koenen 2004). Presumably more solid intervening assemblies blunt and confuse sounds more quickly. On the ability of sound to pass through other substances in general, cf. 1.354-5, 1.489-90, 6.951-2. Lucretius does not come down firmly on the ability of smell to pass through walls; cf. 4.688-700 and 6.951-2.

²³³ Lucr. DRN 4.570-9, and perhaps 4.607-8.

sight.²³⁴ Glass is one of the few cases, for Lucretius, where a stream of *simulacra* is able to pass largely intact through an assembly other than air. Air contains much void and, it seems, thus generally affords straight passage. Glass also has straight passages. Taking this together with an earlier example, which we will discuss next, indicate that the passages of the glass also have an orientation consistent with the original vector of the stream. For these reasons, the constituents of the *simulacra* pass through glass and emerge in the same arrangement on the other side - before continuing their straight course. Through glass, both the structural integrity of the *simulacra* and the direction of their vector are preserved. Hence one is able to see the source-object accurately.

The case of the apparently bent oar is an exceptional example along similar lines. Imagine you are unacquainted with the sea and looking down on it, perhaps from the deck of a trireme. There is an oar, partially submerged below the waterline. Nevertheless, the whole is visible. Lucretius tells us that:

nam quaeque supra rorem salis edita pars est
remorum, recta est, et recta superne gubernata;
quae demersa liquore obeunt, refracta videntur
omnia converti sursumque supina reverti
et reflexa prope in summo fluitare liquore
DRN 4.438-42

... whatever part of the oars is above the salty dew is straight, and the rudder too is straight above. However, the parts which set,²³⁵ having been sunk in the water, all these refracted things seem turned about and bent back supine and almost to float broken upon the water's surface.

This is no trick of the eyes; it can be explained in terms of the mechanism of sight we have been considering and add further nuance to our understanding. According to Lucretius, we perceive both the sea and the oar by means of their respective *simulacra*.²³⁶ The oar, as a whole, emits whole *simulacra*, and all *simulacra* radiate directly from their source. The submerged part of the oar is visible, so the submerged parts of the *simulacra* must pass through the water. Also, the underwater parts of each *simulacrum* must pass through at virtually the same speed as the unsubmerged parts for us to see the oar as a whole. The part of the oar which lies above the water appears as it truly is - namely, straight. The part lying below the water appears in a distorted manner; it retains its shape, but that shape appears at an angle relative to its actual position. It follows that the first-beginnings of the

²³⁴ Perhaps this is due to the fact that they are images with a very fine structure of a whole macroscopic object, rather than microscopic bodies that well up within one. Perhaps also owing to their delicate structure, it is contact with the stream which is required to stir the *sensus*-bearing motion needed for sight, as opposed to, for example, with the odd voice-particle from the original stream, which breaks-up and scatters but into particles which are relatively large and still effect hearing.

²³⁵ Here Lucretius is comparing the somewhat analogous plunging of an oar below the water-line with the apparent setting of the sun in the sea as seen by sailors, for which the same word is used just above at *Lucr. DRN 4.433*.

²³⁶ These interact at essentially the same time with our eyes. We do not perceive a stream of *simulacra* off of the sea and oar together as a set of juxtaposed colors. On apparent simultaneity, cf. pp.133-5.

submerged part of each *simulacrum* emerge at an angle relative to the original vector, before continuing straight through the air. The passages of the seawater are thus probably straight - like those of glass and air, but - unlike those of glass - the passages are probably not oriented parallel to the initial trajectory. Thus the straight oar, viewed as a whole, appears bent-back at the point of submersion. The eyes accurately see the oar - not as itself, but as mediated by the intervening circumstances.

The three cases of *simulacra* passing through other assemblies and the consequences for perception can be represented as follows:

<i>Simulacra</i> of	<u>Tower</u> via Air	Anything via <u>Glass</u>	Nearby <u>Oar</u> partially via Sea
Structure	changes (at distance)	persists	part persists, part changes
Vector	persists	persists	part persists, part changes
Appearance of Object	fuzzy at distance	unchanged	refracted (or bent)

In sum, the senses of sight, smell, and hearing perceive their source-objects by means of interaction with emitted bodies. These assemblies are limited representations of their source, as each sort embodies and transmits only select aspects of its nature. Moreover, they are open to a degree of distortion (and eventually decay) at the level of their constitution and structure. The other assemblies with which these intermediaries interact in the process of emission and/or transmission do, therefore, influence the ultimate perception of the source-object by whichever sense. Due to the limited representation of the source-object by the stimulus and due to the potential for the latter's distortion, the distinction between a source and its emissions cannot be overlooked.²³⁷ We will return to the epistemological implications of this analysis in the Epilogue to Chapters II & III.

Having examined these processes to the point of interaction with the perceiver, it is now possible to treat Lucretius' account of what the perceiver contributes. As implied by the jaundice example, the respective constitutions of the sense-organs are also causally involved in and thus make a difference to the larger mechanisms of perception. This

²³⁷ Cf. Taylor 1980: 119-21. Contra, for example, Rosenmeyer, who claims that the distinction between source and effluence is moot; Rosenmeyer 1996: 144-9, esp 147.

analysis will further reveal that these processes and conditions, as well as the *sensus corporis* themselves, are common to all living creatures in the same way.

III. CONSTITUTION

The constitution of each individual, both in whole and in part, plays a role in the mechanisms underlying the five *sensūs corporis*, influencing which interactions will take place, where they will occur, and whether they will stir *sensiferi motus*.

Stimuli particular to each of these five are microscopic assemblies, and much finer and lighter than a spider-web or feather. It is thus unlikely that their contact would suffice to stir *sensifer motus* by indirect means. Therefore *sensus* generating interactions generally occur by means of direct contact between stimuli and the *animus-anima* complex. This confirms what we have seen with sleep and like cases: with Konstan and *contra* Solmsen, for example, the sense-organs are sensory insofar as the constituents of the complex are distributed throughout them and participate in their interactions.²³⁸ These constituents must be located both on the outer surface and the surface of the passages of the sense-organs, as these are sites at which contacts with the stimuli occur. Therefore, also, the distinction between penetration and impact is of limited relevance to the mechanisms; indeed Lucretius chooses words evoking both.²³⁹ The contributions of the portion of the *animus-anima complex* distributed throughout the bodily frame to the mechanisms notwithstanding, Lucretius makes it imminently clear that it is the body itself as a whole, not the *anima* or the *animus-anima* complex alone, which has this faculty and undertakes its motions.²⁴⁰ This structural and functional continuity coexists with the constitutional variation responsible for the differentiation of the *sensus corporis* and perhaps for different sorts of *sensiferi motus*.

The *sensūs corporis* are separate but equal faculties and distinct types or manifestations of the greater faculty of *sensus* also in that instances of their feelings have

²³⁸ Solmsen thinks that neither the *animus* nor the *anima* participates in the perceptions (or functions in general) of the sense-organs; cf. esp. Solmsen 1961a: 165-8. These findings concur with Konstan about the role of the *anima* in what he calls 'sensation', but not with his consequent interpretation of the nature of what he calls 'soul'; cf. Konstan 2008: 10.

²³⁹ Rosenmeyer 1996: 143 claims both Lucretius and Epicurus waver between the language of impact and of penetration. The use of both makes perfect sense if one thinks of the size, shape, and fineness of the stimulus relative to that of the passages in the constitution, as well as of contact which does not directly stir the complex, in a world of radiating stimuli.

²⁴⁰ Lucr. *DRN* 3.350-8, cf. 3.359-69. Cf. Bailey 1947, ii: 1050-5, Kenney 1971: esp. 123-4, Rist 1972: 81-2, Kenney 2014: 122-5.

equal epistemological validity. For Lucretius, following Epicurus, an instance of perception by one faculty cannot refute one by another:²⁴¹

... nam seorsum cuique potestas
divisast, sua vis cuiquest, ideoque necesse est
et quod molle sit et gelidum fervensve seorsum
et seorsum varios rerum sentire colores
et quaecumque coloribu' sint coniuncta videre.
seorsus item sapor oris habet vim, seorsus odores
nascuntur, sorsus sonitus ...

DRN 4.489-95

For ability has been divided to each separately; each has its own power. Therefore, it is necessary to feel both what is soft and what is cold and hot separately and separately to perceive both various colors and whatever is joined to colors. Similarly, the taste of the mouth has power distinctly, odors come about for another, sounds for another still.

The combination of brachylogy with repetition of forms of *seorsum* (once with each of the *sensūs corporis*) emphasizes that the situation of having a distinct ability (or sphere of discrimination) and type of stimulus is the same for all five. The expression '*quaecumque coloribu' sint coniuncta*' is probably a periphrasis' for size and shape, chosen to emphasize the perception exclusive to vision.²⁴² This passage, according to Sedley, is part of a larger one in which Lucretius argues against Scepticism, reflecting Epicurus' argument against this as well as - with respect to structure - his self-refutation argument against determinism from book twenty-five of *On Nature*.²⁴³ For our purposes, it is worth juxtaposing another passage, from one of Lucretius' more extensive proofs of the porous nature of apparently solid structures.

huc accedit uti non omnia, quae iaciuntur
corpora cumque ab rebus, eodem praedita sensu
atque eodem pacto rebus sint omnibus apta.

...
multa foramina cum variis sint reddita rebus,
dissimili inter se natura praedita debent
esse et habere suam naturam quaeque viasque.
quippe etenim varii sensus animantibus insunt,
quorum quisque suam proprie rem percipit in se;
nam penetrare alio sonitus alioque saporem
cernimus e succis, alio nidoris odores.
praeterea manare aliud per saxa videtur,
atque aliud lignis, aliud transire per aurum,
argentoque foras aliud vitroque meare.
nam fluere hac species, illac calor ire videtur,
atque aliis aliud citius transmittere eadem.
scilicet id fieri cogit natura viarum
multimodis varians, ut paulo ostendimus ante,
propter dissimilem naturam textaque rerum

DRN 6.959-61, 979-97

Add to this that all things, whatever bodies are cast from things, are not endowed with the same *sensus* and in the same way are not suited to all things.²⁴⁴ ... Because many passages are allotted to different things, they ought to be endowed with different natures and each ought to have its own nature and passages. For indeed living creatures have different *sensūs*, each of which takes into itself its very own stimulus. For we observe that sounds enter by one *sensus*, the flavor from liquid by another, by another the perfumes of scent. Moreover, one thing is seen to seep through stones and another through wood. Another thing passes through gold; another goes out from silver and another via glass. For sights are seen to flow via the latter, heat to go via the former, and one thing is seen to travel more swiftly than others by the same path. Obviously the nature of the paths - which varies in many ways - compels that this happens, as we saw a little earlier,

²⁴¹ D.L. 10.32. Cf. Sedley 1989a. Furley 1993.

²⁴² Colors, as we have seen with respect to the changing colors of the sea, are *eventa* of the arrangement of an assembly's constituents. Arrangement of constituents is also responsible for the size and shape of a *concilium*. In the case of the sea's waves, its color, shape, and size (due to evaporation and *aestus*) are in flux.

²⁴³ Sedley 1983: 18-31, Sedley 1989a: 124-5, 135, Sedley 1998: 46, 85-9.

²⁴⁴ Or, perhaps here *rebus* may refer instead to creatures.

due to the different nature and structures of things.

Taking 4.489-95 together with these lines, we see the logic of previous examples in extended application, accounting for differentiation of the *sensūs corporis*. The separation of powers into five distinct faculties follows from the diversity of structural arrangements of both the living and the non-living assemblies involved in the respective interactions. Different things (including different parts of a given individual) consist of many diversely shaped first-beginnings.²⁴⁵ Whenever the constituents of two things differ, so must their structures, including the shapes of their passages, and their internal motions.²⁴⁶ It follows that specific parts of the body, and specific passages of those particular to each part, are literally more open to interacting with *corpora* with a given range of sizes and shapes. Different emitted bodies - even if from a single source-object - consist of many and diverse sorts of first-beginnings;²⁴⁷ therefore sight-causing bodies will have sizes and shapes distinct from those of smell-causing bodies. These various sorts of emitted bodies differ with respect to speed of emission and travel. They also reach the respective sense-organs separately, affecting the body by means of diverse passages and coordinating with generally distinct spheres of discrimination.²⁴⁸ Similarly, because of the interaction between the shape of the emitted body and the structure of the passages, differently shaped assemblies of a single sort of emitted body have different effects on a particular sense-organ of a given individual. For example, saffron and corpses both emit odors, but these will be distinguishable to the smell of a given nose.²⁴⁹

The same logic of interaction between the shape of the stimulus and the physiological structure of the individual also explains why certain stimuli will affect different constitutions differently.²⁵⁰ Let us return to the example of how the sight of a rooster affects the eyes of lions and of humans:

... sed item species rerum atque colores
non ita conveniunt ad sensus omnibus omnes,
ut non sint aliis quaedam magis acris visu.
...
nimirum quia sunt gallorum in corpore quaedam
semina, quae cum sunt oculis inmissa leonum,
pupillas interfodiunt acremque dolorem
praebent, ut nequeant contra durare feroces;

... but also the appearances and colors of things are not all so suited to the *sensūs* of all that certain things are not more sharp than others to see. ... doubtless because certain seeds are in the body of roosters, which, when they have been sent forth into the eyes of a lion, pierce the pupils and furnish sharp pain, with the result that the fierce lions are unable

²⁴⁵ Lucr. *DRN* 2.669-72.

²⁴⁶ Lucr. *DRN* 2.720-7.

²⁴⁷ Lucr. *DRN* 2.226-7.

²⁴⁸ Lucr. *DRN* 2.680-7, 4.687-705, 6.164-72.

²⁴⁹ Lucr. *DRN* 2.398-477, esp. 2.442-3.

²⁵⁰ Lucr. *DRN* 4.633-721.

cum tamen haec nostras acies nil laedere possint
DRN 4.707-9, 14-18

to endure facing this; although these seeds
nevertheless cannot hurt our eyes at all, ...

The lions are unable to endure the sight of the roosters, the corresponding pain, and the seeds involved. The expression '*sunt oculis inmissa*' also suggests 'have been admitted by the eyes' as well as a middle sense 'have assailed the eyes', for which we will see parallels in the next chapter. Lucretius expresses both the experience and the underlying process as inextricable aspects of the same event, which aspects are causally linked without being identical and without one being reductively comprehensible in terms of another. Both the lions and the humans see the same sight by means of the same emitted bodies. The lions experience pain as a result of that sight, due to the interaction of the *simulacra* of the rooster with the physiological constitution of the lions' eyes. This sight is not painful to humans. Lucretius offers two possible explanations for this. Either the seeds which are painful to lions do not penetrate our eyes, or they pass through without hurt; in either case, this would be due to the structural arrangement of the passages in human eyes differing from those of the lion's.²⁵¹ Therefore, there must be enough continuity between the physiological structures of the lion and human eyes for both creatures to see the same sight. There must also be enough constitutional variation between the species for the human eyes to either reject some of constituents of the *simulacra* emitted from the rooster or to admit these bodies without disrupting their own configurations.

Let us return to another passage which we already considered briefly,²⁵² where, in the context of demonstrating how fine *simulacra* are, Lucretius discusses insects.

primum animalia sunt iam partim tantula, quorum
tertia pars nulla possit ratione videri.
horum intestinum quodvis quale esse putandumst
quid cordis globus aut oculi? quid membra? quid artus?
quantula sunt? quid praeterea primordia quaeque
unde anima atque animi constet natura necessumst?
nonne vides quam sint subtilia quamque minuta?
DRN 4.116-22

First, there are now animals so small that their third part is in no way able to be seen. What must any intestine of theirs be supposed to be like? What the globe of the heart or the eyes? What the members? What the limbs? And how small? What, moreover, must each first-beginning be like, from which is constituted its *anima* and the nature of its *animus*? Do you not see how subtle the first-beginnings are, and how tiny?

²⁵¹ Lucr. DRN 4.710-21. Cf. A possible parallel are the pigs who flee from *amaracinum unguentum*; Lucr. DRN 6.973-4. Konstan 2008: 20-21 is correct that the lion is a case of pain, not fear. He does not note the example of the pigs. However, contra Konstan, the lion's flight from the sight of the rooster does not obviate the fact that fleeing the pain is predicated on judgment. Similarly it does not require by extension, as Konstan argues, that all animal flight is predicated on pain. Konstan 2008: 21. Sometimes, as we shall see throughout chapter four, it is a survival mechanism.

²⁵² Cf. p.48, when proving that even the smallest living creature possesses an *animus-anima* complex.

These parts are so very small that we cannot see them, but they do exist. The *simulacra* which they emit are also small. Although there is probably a large lacuna after 4.126,²⁵³ the logic of the overall discussion seems to be that the microscopic eyes of insects are capable of seeing *simulacra*; thus *simulacra* in general must consist of structures of even finer magnitude than the eyes of these tiny creatures and likewise cannot be seen by humans as source-objects. The first-beginnings which constitute both the *simulacra* and these unseen structures of the insects must, in turn, be even smaller and more subtle. This logic also supports the contention that *simulacra* of macroscopic source-objects undergo eventual compression. The primary significance of the passage for our present purposes is, however, this: all living creatures have, e.g., eyes and, presuming that the eyes are structurally intact,²⁵⁴ the faculty of sight. Coupled with the claim that these insects possess an *animus-anima* complex and its characteristic loci,²⁵⁵ this fact further indicates that the mechanism of seeing and those of the faculty of *sensus* more generally are the same across all living creatures, of whatever size.

The fact that both humans and animals perceive the same source-objects indicates some fundamental continuity of *sensus* across the species. The fact that the process of interacting with a particular stimulus may coincide for some (but not all) with the feeling of pleasure or pain, also indicates some variation of the constitution of the bodily frame. Pleasure and pain are *eventa* also, therefore, of one's physiology and, where relevant, its interaction with whatever stimulus.

The relevance of constitution is not limited to indirect perceptions; as we have seen, for example, with taste, it also extends to those which involve direct contact with the source-object. Again, this is so because the diverse bodily structures - and particularly the passages - of different sorts of creatures admit bodies of different shapes from the same object.²⁵⁶ It is the same with smell, which Lucretius explicitly links with the pursuit and avoidance of suitable food. Regarding smell, Lucretius says that:

verum aliis alius magis est animantibus aptus
dissimilis propter formas. ideoque per auras

... one odor is more suited to some creatures
and another to others on account of the odors'

²⁵³ On this lacuna, cf. the conjecture and note in Rouse and Smith 1992: *ad loc.* and the more substantial discussion of Bailey 1947, iii: 1195, including a survey of previous editors'.

²⁵⁴ Lucr. *DRN* 3.408-15.

²⁵⁵ I.e. the *cor*, *membra*, and *artūs*. Note also that *intestinum* suggests that insects have a functional digestive tract, evoking the nutritive processes common to all living creatures.

²⁵⁶ As we have seen, if the passages of the tongue and palate are open to smooth constituents, they soothe and taste sweet; rough ones tear the passages, disturb our body, and taste bitter. One sort thus causes pleasure, the other pain. Hence different foods are better suited to different creatures; Lucr. *DRN* 2.398-443, 4.617-26, 4.633-62. Cf. Epilogue to Chapters II & III: esp. pp.174-5.

mellis apes quamvis longe ducuntur odore,
 volturisque cadaveribus. ...
 ...
 sic aliis alius nidor datus ad sua quemque
 pabula ducit et a taetro resillire veneno
 cogit, eoque modo servantur saecula ferarum
 DRN 4.677-80, 684-6

different shapes. For that reason, both bees
 are drawn - through the air from however far -
 by the odor of honey and vultures by
 corpses. ... Thus one perfume is granted to
 some, another to others, which leads each to
 its food and compels that each recoil from
 noxious poison, and in this way the
 generations of animals are preserved.

This is but one instance in Lucretius of living creatures naturally pursuing pleasure and avoiding pain. The different shapes here refer to the shapes of the smell-causing bodies themselves; however, the overall implication of the passage is about their shape relative to different physiological constitutions.²⁵⁷ The separation between ‘*mellis apes*’ and ‘*odore*’, as Koenen notes, mirrors the physical reality of the phenomenon; the bees are drawn to the perfume of honey over distance.²⁵⁸ The case of the vultures being drawn to their food by means of its smell is parallel to the activity of the bees, and - if one pushes the point about iconic mirroring - the proximity of ‘*volturii*’ and ‘*cadaveribus*’,²⁵⁹ enjambed in the next line, embody both the result of the pursuit and perhaps, by contrast with the relatively leisurely pursuit of the bees, even the vulture’s swooping motion.²⁶⁰ For the same reason, he continues, hunting dogs are drawn to the tracks of their prey, and geese to people.²⁶¹ All of his examples are not only taken from the animal world, they are also animals known in antiquity to have a particularly keen sense of smell.²⁶² Therefore, with his iconic mirroring of the phenomenon in words, Lucretius represents behaviors coordinate across species and

²⁵⁷ This is not a compressed statement referring to the shapes of both; *pace* Bailey 1947, iii: 1261. As we have seen and will continue to do, there is much more than just shape involved in constitution.

²⁵⁸ Koenen 1997: 170-1.

²⁵⁹ Either ‘*cadaveribus*’ is a case of synecdoche for the odor which they emit or an anacoluthon in the dative case; the general meaning is not affected.

²⁶⁰ The ‘*-que ... -que*’ conjunction and the ellipse of the understood second instance of ‘*quamvis longe ducuntur*’, indicate that Lucretius is referring to both sorts of creatures and that a single mechanism is at work.

²⁶¹ *Lucr. DRN 4.677-86*; in the case of dogs, the scent of the tracks, not the thing itself, is leading them on. The example of geese, on the other hand, does not seem to be one of pursuing nutrition, but alludes to their role in warning Rome of invasion by the Gauls; cf. *Livy 5.47.4*. Given his range of examples, the expression ‘*saecula ferarum*’ here (4.678-83) includes both untamed (predators as well as prey) and docile animals, i.e. those ‘living primarily outside of communities with humans’ and those ‘generally living in interspecies communities with humans’, respectively. On the predator/prey point: with ‘*ferarum*’ at 4.680, cf. 4.994, where it is equated with deer (‘*cervorum*’, 4.996). The issue of inter and intraspecies communities and its relation to animal nature will be treated throughout chapter four. For analysis of what Lucretius means by specific words for animals and about animal life, cf. *Betensky 1972: 31-61* and, more recently, *Camarrese 2010: esp. 136-44*. In the course of this study, alternatives to some of these interpretations (and their implications in *Betensky 1972: ch.3.*) will become clear, but are not presented in systematic counterpoint.

²⁶² On these animals’ keenness of smell, cf. *Koenen 1997: 170-1*. Anyone visiting certain parts of Africa will learn quickly the truth of such statements, should they bring an orange within the substantial range of an elephant’s sense of smell. On the keenness of the smell of bees as recognized in antiquity, cf. e.g. *Arist. HA 534b18-19*, and as confirmed by modern science, cf. *Kloepfel 2006* (my thanks to Angela Tinney for the reference).

thus indicates that continuities persist in variation and variation exists in continuities.²⁶³ Physiology thus at least partly explains why different creatures pursue different things, although all encounter the same stimuli. Physical compatibility here seems to result in choice, suggesting the feeling of pleasure, the guide of life, which all creatures pursue from birth without having been taught. That both humans and animals do so is the so-called Cradle Argument.²⁶⁴

The *sensūs* will not always lead one to something which is ultimately beneficial to the whole constitution. Alone they cannot perform the calculus which would seek long-term pleasure as a result of short-term discomfort. For this reason, amongst others, Lucretius poses the famous metaphor likening the honey-rimmed cup administering bitter absinthe to children to poetry administering Epicurean philosophy.²⁶⁵ Conversely, the *sensūs* will sometimes not deter one from something which is ultimately harmful to the constitution. In the youth of the Earth, creatures only had whatever else the Earth had itself created. Humans then lived in the nomadic way of animals (*‘volgivago more ferarum’*), none of whom had yet formed a community with humans, nor had humans done so amongst themselves.²⁶⁶ At this time, according to Lucretius:

illi imprudentes ipsi sibi saepe venenum
vergebant, nunc se perdunt sollertius ipsi
DRN 5.1009-10

men were often turning poison on themselves,
because they were unaware; now they destroy
themselves with it more skillfully.

²⁶³ As members even of a given species are not entirely alike (cf. esp. Lucr. *DRN* 2.342-70), as we shall see esp. in chapters four and five, one may assume that Lucretius would claim that the feelings experienced from interaction with a particular stimulus will also vary at least slightly by breed and by individual, according to their respective physiological structures.

²⁶⁴ On pleasure as the *dux vitae*, cf. Lucr. *DRN* 2.172 and, on pleasure and pain as the basis of choice and avoidance, esp. 4.684-6 above, D.L. 10.34, and pp.181, 257-8. That there are some precedents for this doctrine in Eudoxus and Aristotle, cf. Long and Sedley 1987: i.122. The ‘Cradle Argument’ in Epicureanism is explicitly attested, e.g. by Cicero in *Fin.* 1.29-30 and by D.L. 10.137 and analyzed in detail by Brunschwig 1986, who interestingly relates this to children’s fear of the dark. Both Cicero and D.L. report that this untaught pursuit of pleasure and avoidance of pain is not the work of reason: *‘negat opus est ratione neque disputatione’* and *‘χωρίς λόγου’*, respectively. Cf. D.L. 10.31, quoting Epicurus: *‘πᾶσα γὰρ, φησίν, “αἰσθησις ἄλογός ἐστι”*. This is primarily true, but, as we will see in chapter five, *ratio* does play a role in the seeking and avoiding actions which generally follow upon the feelings. Moreover, Cicero’s *‘omne animal’* and Laertius’ *‘τὰ ζῷα’* refer to all living creatures (although they are not always translated that way); Dierauer 1977: 194 indeed perceptively renders the former instance *‘Jedes Lebewesen’*, which excludes plants. Now, Epic. *Ep. Men.* 128, which perhaps alludes to the Cradle Argument, could be translated as either the animal or the living creature. The Cradle Argument’s potential generality was thus not exclusive to Lucretius. On the greater philosophical discourse in which the Cradle Argument was situated, cf. Warren 2002b: 129-42, who, following Polystratus and Philodemus, takes animals to be without *ratio*. On its more immediate function in Epicurus’ argumentative strategy for his ethical program, cf. Sedley 1998c; however, this reading stresses the generality of the argument even more than Sedley’s reading, and may thus help to explain why it was not Epicurus, but only some of his followers, who interpreted such statements to mean exclusively that human infants pursue kinetic pleasure (cf. Sedley 1998c: 138-9).

²⁶⁵ Lucr. *DRN* 4.11-17, 4.664-70.

²⁶⁶ Lucr. *DRN* 5.932, 5.937-8; cf. esp. Campbell 2003 and Gale 2009 *ad loc.* At this time all animals were technically wild, as communities with humans had not yet come about.

This implies that, in the first case, humans sometimes died then because they were not fully informed of the danger of a particular food by their perceptions. But the second instance in the passage above also implies that now humans deliberately use poison or the like to do away with themselves and others, both of which could be encompassed by *se* at 5.1010, if *se* refers to the human race.²⁶⁷ The latter instance is not represented as the result of inexperience or even of the misinterpretation of perception; rather, acting in spite of knowledge and perception.²⁶⁸ Lucretius confirms this elsewhere, observing that sometimes men fear death so much that they grow to hate life, ‘with the result that they inflict death upon themselves’.²⁶⁹ The act of suicide opposes the tendency towards self-preservation which, according to Lucretius, as we have seen, *sensus* naturally compels in all creatures.²⁷⁰ Similarly, the act of murder opposes the tendency towards the survival of the race, which is also natural. But ultimately, like all faculties-as-tools, the *sensūs* can be used for purposes conducive to the survival and happiness of oneself and others, or not.²⁷¹

According to Lucretius, perceptions also vary depending on whether an individual is in a state of sickness, health, or the like, and what they have ingested or otherwise taken in.²⁷² For example, certain odors vary in effect depending on temporary or permanent aspects of one’s constitution - for example: if one is prone to epileptic fits, if a woman is menstruating, if one has eaten too much or failed to consume water, and if one has a fever.²⁷³ One’s constitution also influences the fate of the stimuli with which one interacts, which can in turn alter the constitution itself. We have already seen that taste ceases once the food or drink descends into the gullet. The matter of the food, containing many different sorts of first-beginnings, is then broken down and either distributed through the body or passed through,²⁷⁴ depending on whether the *corpora* once of the food are fitting to ally with the assembly - to some extent through like finding like, as well as through

²⁶⁷ Other conjectures for line 5.1010 suggest that the poison is being turned on others; cf. Gale 2009 *ad loc.* Extending the sense of *sibi* in 5.1009 to *se* in 5.1010 rather than contrasting the two seems to make more sense because initially humans lived alone.

²⁶⁸ Other cases of acting contrary to the *sensūs*, recalling the errant pursuits in the proem to book two, are given by the description of the inversion of values of early man, at Lucr. *DRN* 5.1120-35; N.B. esp. 1133-4: ‘*quandoquidem sapiunt alieno ex ore petuntque | res ex auditis potius quam sensibus ipsis*’. On the word-play, cf. Gale 2009 *ad loc.*

²⁶⁹ Lucr. *DRN* 3.79-82, esp. 81. Cf. Epic. *Ep. Men.* 125 (‘ἀλλ’ οἱ ... αἰροῦνται’).

²⁷⁰ The behavior of humans in warfare, particularly with predatory animals, could be seen as a similar act of suicide; cf. pp.219-28.

²⁷¹ Further on the survival of individuals and species, cf. chapter four, and on learning, cf. esp. chapter five.

²⁷² We shall see that physical illness is characterized as a disordering of the constitution with respect to its structural arrangement and the motions of its constituents; cf. esp. pp.174-6.

²⁷³ Lucr. *DRN* 6.791-805.

²⁷⁴ Cf. Lucr. *DRN* 4.720: ‘*exitus ex oculis*’.

complementary arrangements of shapes.²⁷⁵ Some of the stimuli or their first-beginnings - after the initial interaction - are involuntarily incorporated. Others do not become part of its constitution. Those which are integrated and distributed may not necessarily be beneficial. The fact that the constitution of the whole individual or of the particular sense-organ²⁷⁶ influences the way in which interaction with a stimulus is perceived does not, however, support the inference that Lucretian perception is generally relative or subjective.²⁷⁷ A number of these topics will be expanded upon in the Epilogue to Chapters II & III.

Conclusions

In conclusion, both humans and animals possess the faculty of *sensus*, which manifests with respect to their bodily frames by means of the same sense-organs and their respective underlying mechanisms. Thus, all living creatures perceive the same source-objects by means of the same stimuli interacting with fundamentally similar physiological structures.

The *sensus corporis* thus involves involuntary or necessitated *sensiferi motus* of the constituents of the *animus-anima* complex caused by the interaction between certain bodily structures and specific stimuli - largely of external origin, but, in certain cases of touch-as-sense, also internal. The perceptions of these faculties are causally connected to, yet irreducible to, the relevant contact-based interactions - i.e. to touch-as-contact - between the micro-natures of the assemblies in question. The *coniunctum* most influential to these interactions at the micro-level is shape. The continuity of the interaction mechanism reflects the relatively consistent dispersal of the primary constituents of the *anima* throughout the sense-organs. Moreover, both the stimuli and the structures of the creatures' physiological constitutions contribute to perception to such a degree that the

²⁷⁵ Lucr. *DRN* 2.711-17, 2.1112-1143, 4.858-76, 6.1084-89. This is perhaps what is alluded to in Epicurus' discussion of the stimulation of smell by 'ὄγχοι ... οἱ μὲν τοῖσι τετραγαμένως καὶ οἰκείως ἔχοντες'; Epic. *Ep. Hdt.* 53.

²⁷⁶ Whole or partial illness will also make a difference. That localized illness is possible, cf. Lucr. *DRN* 3.106-11. What the nature of a given source-object generally produces is not limited to one sort of sensory stimulus; 2.680-7. But not all assemblies affect all of the senses all of the time; 2.834-6, 2.850-3, 3.221-3.

²⁷⁷ Cf. Bailey 1947: iii. 1261, Koenen 1997: 169, perhaps also Furley 1993: 77-8, although he does differentiate between 'arbitrary' and 'relative'. On the correspondence between perception, stimuli, and source-object as an answer to the challenge of relativity, cf. recently, Asmis 2009: esp. 85, 102-4. Further on the issue of subjectivity, cf. esp. pp.170-74.

model must be understood as interactive, rather than as an active-passive dichotomy, as often reflected in the constructions by which Lucretius portrays interactions.²⁷⁸

This continuity across the species coexists with a certain amount of variation. Variation of feeling at the perception of a given stimulus - particularly with respect to any coinciding experience of pleasure and/or pain - occurs with and according to the physiological variation of the bodily frame between species, breeds, individuals, health, and anything else which represents an altered state of the constitution of the living body. Nevertheless, these continuities, and those between the stimuli and source-object (if not the same thing), guarantee that - generally speaking - the perceptions of the five *sensūs corporis* are at most minimally subjective, and only insofar as under different circumstances they may perceive different aspects of a thing's nature.

²⁷⁸ Contra, for example, Taylor who likens Epicurean αἰσθησις to a camera on the understanding that it passively records what is before it without contributing to it; Taylor 1980: 119-20. Of course, any photographer knows that a camera does indeed influence the picture in many ways.

CHAPTER III: *SENSUS ANIMI*

Introduction

In chapter two, the analysis of sleep and analogous cases of the *animus-anima* complex straying from *sensiferi motus* established that the faculty of *sensus* is contingent upon the coherence of the *animus-anima* complex of each living creature, as well as upon certain relative motions of the complex as a whole. It also established that the faculty includes the *sensus corporis* and the *sensus animi*. The manifestations of the so-called five senses, as well as certain pleasures and pains, were shown to be perceptions generally necessitated by one's interaction with external stimuli. Their processes primarily involve the *anima* portion of the complex, together with the sense organs of the body. However, as we have seen, Lucretius indicates that feeling is also possible when nothing stirs those - i.e. when the *sensūs corporis* are not involved - and refers to such instances of perception as *sensūs animi*.¹

This chapter focuses on the nature, scope, and physiology of the *sensūs animi* - i.e. feelings of the portion of the *animus-anima* complex which is concentrated in the breast (*pectus*). This concentration is sometimes also called the *mens* and, less often, *pectus* and *cor*. These are feelings whose proximate cause is, generally, internal interaction; to that extent they are necessitated, but there is also some opportunity for unfixed processes to influence them.² Their mechanisms either occur or begin in the *animus*. These feelings of the *animus* can be grouped into two types on the basis of their micro-level causal mechanisms. The first involves contact-based interactions with internalized stimuli of external origin, such as what we might call 'thought'. The second type is subjective insofar as it involves interactions of the complex's constituents which are proximately caused by other internal interactions. Of this type, Lucretius emphasizes the perception of time, which is a second-order perception, and the emotions. These respective faculties and their underlying processes are treated in turn and shown to exist, for Lucretius, in all living creatures in the same way. This constitutes further evidence that, for Lucretius, the full *animus-anima* complex is a fundamental continuity across the species. It also supports the claim that, contrary to the scholion to Epic. *Ep. Hdt* 66, there are not rational and irrational

¹ The expression *sensus animi*, or something approximating it in meaning, occurs at least six times in the poem: Lucr. *DRN* 2.946, 3.98, 3.104, 3.112-16, 3.136-60, 3.578-9, 5.149.

² The role of unfixed processes in the causal mechanisms of the *sensūs* will be touched on briefly in this chapter and treated more fully in ch.5: esp. pp.230-47.

parts of the soul, so to speak; indeed the *animus* performs many functions which are not proximately caused by the operations of *ratio*.³

I. THOUGHT, OR THE VISION OF THE *ANIMUS*

Lucretius represents what one might call ‘thought’⁴ as a kind of vision. He does this in various ways, including through word choice. Lucretius not only uses verbs like *cogito* and *cerno* of the process or feelings, but also verbs of seeing, like *video*.⁵ Lucretius also characterizes thought in analogous terms, right from the outset of the poem. Lucretius describes himself as:

quaerentem dictis quibus et quo carmine demum
clara tuae possim praepandere lumina menti,
res quibus occultas penitus convisere possis
DRN 1.143-5

... seeking the words and the song by which I
may finally be able to unfold bright lights for
for your *mens*, by which you may be able to
see hidden things perfectly.

This passage foreshadows the later language of thought. Lucretius’ waking (‘*vigilare*’, 1.142) activity implies that he sees with his own *mens* despite the dark. Compare 4.1142-4: ‘*sunt | prendere quae possis oculorum lumine aperto, | innumerabilia*’. Similarly, the lover is told that with his *animus* he may drag into the light (images of) what his Venus hides, meaning that he can perceive those inside.⁶ Although not a periphrasis, ‘*lumina menti*’ evokes ‘*lumina oculorum*’,⁷ which Lucretius uses to emphasize the role of the ‘*lumina solis*’⁸ in the vision of the eyes. He applies the same idea of seeing to the *animus* here. Lucretius also refers to the *animus* as being blind (and to that extent *miser*), for example, in the programmatic proem to book two; ‘*o miseras hominum mentes, o pectora caeca! ... nonne videre*’ (2.14-16); its failure to correctly understand what it perceives is akin to its not seeing at all. We will return in chapter five to the connection between thought, seeing,

³ Cf. Asmis, who notes that thought does not imply the use of reason and ‘rationality is only one of the functions performed by the concentration of soul atoms in the chest’; Asmis 1984: 105-6 (quote taken from 106 n.3).

⁴ ‘Thought’ is the nearest English equivalent for what Lucretius describes, but English often uses the noun interchangeably with ‘idea’ or ‘concept’; similarly, ‘to think’ is often used to connote belief, supposition, opinion, or judgment - i.e. ‘to think (that) something ...’. However, it should not be understood that way here. When this study uses the word ‘thought’ or ‘thinking’ to refer to this particular *sensus animi* in *DRN*, it refer specifically to the *animus*’ interaction with *simulacra* and the corresponding vision (of the *animus*) which arises from the interaction. Particularly noteworthy scholarship on ‘thought’ in Epicureanism includes Asmis 1984, Glidden 1985, Glidden 1992, and others which are more pertinent to the relationship between thought and *voluntas*, with which we will engage primarily in that context; cf. ch.5: esp. pp.247-66.

⁵ For example, in the section of the poem most focused on explaining such perceptions, *Lucr. DRN* 4.724-822, he uses *cogito* in this way twice (4.780, 4.787), *cerno* four times (4.789, 803, 809, 810), and *video* thus seven times (4.732, 4.750, 4.755, 4.760, 4.770, 4.801, 806).

⁶ *Lucr. DRN* 4.1185-9.

⁷ Cf. the following verbatim quotations: *lumina oculorum clara* (*Lucr. DRN* 4.825), *oculorum lumina* (4.836), *oculorum lumine* (4.1143), *oculorum ad lumina nostra* (6.184), *lumina oculorum* (6.1181).

⁸ This expression first appears at *Lucr. DRN* 1.5; cf. also forms of *lumina radiorum*.

and reasoning alluded to by these examples. For now, let it suffice that Lucretius represents certain perceptions of the *animus* as a sort of vision. His account of the physiological processes confirms that this depiction is more than metaphor.

The mechanism of the vision of the *animus* is generally similar to that of the vision of the eyes, as is its sense-object - i.e. *simulacra*. As Lucretius states:

quatenus hoc simile est illi, quod mente videmus
 atque oculis, simili fieri ratione necesse est.
 nunc igitur docui quoniam me forte leonem
 cernere per simulacra, oculos quaecumque lacessunt,
 scire licet mentem simili ratione moveri
 per simulacra leonum et cetera quae videt aequae
 nec minus atque oculi, nisi quod magis tenuia cernit
 DRN 4.750-6

Insofar as this is similar to that (what we see with the *mens* and with eyes), it is necessary that it occur in a similar way. Now, therefore, since I have taught that I, perchance, perceive a lion through whichever *simulacra* stimulate⁹ the eyes, it is possible to know that the *mens* is moved in the same way: through *simulacra* of lions and of the other things¹⁰ which it sees - equally and not less than the eye, except that the *mens* discerns finer *simulacra*.

Following the precedent of Asmis, this analysis will therefore adopt Lucretius' and Epicurus' strategy of understanding the one by analogy with the other.¹¹ The basic mechanism is this. Relatively fine *simulacra* enter the body and make their way through its passages to the *pectus*. Contingent upon the focus of the *animus*, which is related to the contemporaneous configuration of its constitution,¹² it comes into contact and thereby interacts with these *simulacra*. The interactions stir *sensifer motus* and thus result in perception of the source-object (as mediated by the *simulacra* and intervening circumstances). Each of these perceptions is experienced as an image.¹³

There are a few significant distinctions, however, between these aspects of the mechanisms of sight and thought, namely: when they occur, how the *simulacra* interact with the sense-organ, and both the quantity and quality of *simulacra* required to effect perception. They also seem to be subject to different means of distortion. The result is that Lucretius places dreams on a continuum between what we would call optical illusions, like the apparently bent oar, and thought illusions, like a centaur.¹⁴

⁹ Further on Lucretius' use of *laccio*, cf. below.

¹⁰ This translation follows Bailey that *cetera* = *ceterorum* attracted into the case of *quae*; Bailey 1947, ii: 1271-2.

¹¹ Lucr. DRN esp. book four, Epic. Ep. Hdt. 49, Asmis 1984: esp. chs. 7-8.

¹² Lucr. DRN 4.802-17. On the relationship between thought and focus, and the nature of the latter, cf. esp. ch.5.

¹³ This image may be an equivalent of Epicurus' φαντασία, but Lucretius does not distinguish it as a separate step, as we have seen.

¹⁴ Cf. Brown 1987: esp. 3-46.

The vision of the eyes only occurs when one is awake; the vision of the *animus* occurs both when one is awake and when one is in a state of soft or dream-sleep.¹⁵

According to Lucretius:

nec ratione alia, cum somnus membra profudit,
mens animi vigilat, nisi quod simulacra lacessunt
haec eadem nostros animos quae cum vigilamus
DRN 4.757-9

When soft sleep relaxes the members, the
mens animi is watchful for no other reason
than because these same *simulacra*
stimulate¹⁶ our *animi* as do so when we are
awake.

Stretched or sprawled-out prostrate in sleep, the bodily frame is depicted as relaxed and off-duty.¹⁷ By contrast,¹⁸ with the juxtaposition of *vigilo* and *laccio*, Lucretius represents the *animus* as an sentry on night watch, vigilantly looking out to catch sight of an attacking force - albeit one of incoming *simulacra*. The expression *mens animi* emphasizes that Lucretius is referring to the *animus/mens* portion of the complex and, simultaneously, reminds the reader that this is just a localized concentration of the whole assembly.

The expression *mens animi* occurs at 3.615, 4.758, 5.149, and 6.1183. Here, as throughout the poem, this expression is a periphrasis; also unlike, e.g., *ratio animi*, it does not refer to a distinct faculty of the *animus-anima* complex. Lucretius uses it as one means of referring clearly to the *animus* portion of the *animus-anima* complex. Such clear distinctions are at times necessary, as the word *animus* can in theory be used interchangeably with *anima* and sometimes refer to the entirety of the complex. Use of the word *mens* on its own serves to make the distinction as well, and does not refer to any other assembly within the complex or any portion thereof.¹⁹ Nevertheless, the periphrasis emphasizes that the *animus* is part of the one assembly (which itself is within and an inseparable part of the whole living being) with its single nature.²⁰

Therefore, as *sensiferi motus* are limited to the *animus* in dream-sleep, the *animus'* alertness and ability to stir - no less than while waking - through interaction with

¹⁵ We today might term the experiences of such waking and/or sleeping 'vision of the *animus*': thoughts, visualizations, visions, hallucinations (vs. illusions), imagination, and dreams.

¹⁶ Notwithstanding the discussion of this passage, the appropriateness of this translation of *laccio* follows from the preceding context, particularly Lucr. DRN 4.724-31, on which, cf. below.

¹⁷ Cf. *profundo*, OLD §7, 'mollis somno' (3.112), p.64.

¹⁸ A similar contrast occurs at Lucr. DRN 3.112-16, which, as we will see below, is evidence that the emotions too are a *sensus animi* and felt during dream-sleep.

¹⁹ Cf. West 1975: esp. 96.

²⁰ The instances of the expression *mens animi* at 5.149 and 6.1183 will be discussed below. At 3.615, Lucretius is affirming that this concentration of the complex has a fixed place of generation (i.e. in the breast) and therefore cannot exist, be generated, or be concentrated in another part of the body. This is by way of proving that it certainly cannot exist or be generated independently of the body, and is therefore not immortal. The fact that 3.615-23 (i) recalls 3.94-7 and the generation of *vitalis motus*, and (ii) looks forward to 3.784-97 and 5.126-45, support this interpretation.

simulacra evince that the vision of the *animus* is a *sensus animi*.²¹ In modern parlance, dreams are thus a kind of thought; they have natural causes and are not sent by the gods.²² In sleep, however, one lacks the reference point of the *sensus corporis* (among other things) by which to check whether or not one perceives, for example, a dead person because one is actually seeing him or her.²³

Simulacra interact with the eyes directly; before *simulacra* can interact with the *animus*, they must first pass through the body - presumably through the flesh of the breast and other matter surrounding the heart. Not all *simulacra* have the potential to do so.

principio hoc dico, rerum simulacra vagari
 multa modis multis in cunctas undique partis
 tenvia, quae facile inter se iunguntur in auris,
 obvia cum veniunt, ut aranea bratteaque auri.
 quippe etenim multo magis haec sunt tenvia textu
 quam quae percipiunt oculos visumque lacessunt,
 corporis haec quoniam penetrant per rara cientque
 tenvem animi naturam intus sensumque lacessunt
 DRN 4.724-31

Firstly, I say this: that many fine *simulacra* of things wander in many ways and in all directions everywhere,²⁴ which - when they meet - are easily joined amongst themselves in the breezes, like spider-webs and like a leaf of gold. For indeed, with respect to structure, these are much finer than those which occupy the eyes and stimulate sight;²⁵ since these penetrate through the rare places of the body and stir the the fine nature of the *animus* and excite *sensus* within.

Placing ‘*principio*’, ‘*multa*’, and ‘*tenvia*’ in the first position of these first three lines foregrounds the omnipresence of the sort of *simulacra* particular to the perception of the *animus*.²⁶ Using the analogy of the spiderweb (*araneum*) in conjunction with the repetition of *tenvis*, Lucretius simultaneously presents these especially subtle *simulacra* as malleable and recalls the discussion of *tactus* - particularly at 3.383, where the ‘*aranei tenvia fila*’ serve as an exemplar of the things which are too slight to effect the *sensus* of touch by

²¹ Cf. pp.70-1.

²² This will be reaffirmed in ch.5: esp. pp.230-47 with respect to aspects of the mechanism by which the relevant stimuli enter and interact with the body. Like thoughts of the torments of mythical Underworld, the contents of dreams have their origins and explanations in events of this life (*in vita sunt omnia nobis*, Lucr. DRN 3.979); compare the dream of the thirsty man (4.1024-5) to the alternative myth of Tantalus (3.981-3), on which cf. Rouse and Smith 1992: 265 n.c. Cf. Gale 1994b: esp. 26-50 and 129-38 on Lucretius’ strategies for undermining myth. For now, this identification should suffice to caution against Schrijvers’ argument that some dreams are caused by emotions, fullness, and want; Schrijvers 1980: 144-51.

²³ Lucr. DRN 4.757-64.

²⁴ I.e. They flit about, moving in all directions, and are present in all of the places of the world.

²⁵ Lucr. DRN 4.729 should perhaps be compared to 4.217 (= 6.923): ‘*corpora quae feriant oculos visumque lacessant*’; 6.921-2 clarifies (beyond the lacuna preceding 4.217) that 4.217 indeed refers to *simulacra* (the *corpora*) originating by emission from actual source-objects. It perhaps strengthens the contention that ‘*percipiunt oculos*’ at 4.729 means to ‘occupy the eyes’, which is reminiscent of an invading army occupying the space that it captured. By using this with respect to the sight of the eyes (and, by extension, to thought), Lucretius may be illustrating the mechanism of vision by playing on the common meaning of the word *percipio*, ‘to percieve’. The idea of occupying is strengthened by the association with and repetition of *laccio* (4.729, 4.731), which often means ‘to attack’ or ‘assail’. The meanings of stimulate, excite, or otherwise arouse fit better here and elsewhere, with the understanding that the arousal occurs by attack or striking - as implied by 4.746-8, and 4.758. Further on such uses of *percipio* and like terms, cf. below.

²⁶ On the omnipresence of the *simulacra* of every conceivable macroscopic thing, N.B. Lucr. DRN 4.735: ‘*omne genus quoniam passim simulacra feruntur*’; cf. p.126ff on 4.768-801.

contact with the flesh.²⁷ Lucretius thus indicates that the *simulacra* reaching the *animus* do so without stirring feeling in the medium through which they pass; they only stimulate (*laccio*) the *intus sensus*. But, as sight-*simulacra* do not generally pass intact through an assembly in this manner,²⁸ it seems likely that far fewer finer *simulacra* reach the *animus* than penetrate the interstices of the bodily frame.

With respect to the eyes, a stream of *simulacra* is required to effect vision; with respect to the *animus*, a single *simulacrum* - even of a much finer nature - will suffice. Intratextual echoes may provide a key to explaining this difference. The point itself is made thus:

quae cum mobiliter summa levitate feruntur,
 ut prius ostendi, facile uno commovet ictu
 quaelibet una animum nobis subtilis imago;
 tenuis enim mens est et mire mobilis ipsa
 DRN 4.746-8

When these *simulacra* are borne rapidly due to their great lightness (as I showed before), one subtle image²⁹ - any one at all - easily stirs our *animus* by a single blow, for the *mens* itself is remarkably fine and mobile.

The physical structure of the *animus-anima* complex is here concentrated to such a degree that the *mens*' interaction with as slight a stimulus as a thought-*simulacrum* will stir motion sufficient for *sensus*.³⁰ The use of *mobilis* and *tenuis* - used with respect to both thought-*simulacra* and the *animus* itself - in the two preceding passages recalls Lucretius' description of the nameless fourth constituent of the *animus-anima* complex.

qua neque mobilis quicquam neque tenuis exstat,
 nec magis e parvis et levibus ex elementis
 DRN 3.243-4

Nothing finer nor more mobile exists than the nameless fourth, nor made from constituents more small and smooth.

This description is thus reactivated when reading lines 4.746-8, suggesting that the nameless fourth is the most likely sort of constituent to be stirred first by an incoming thought-*simulacrum*.³¹ Now, as we have seen, the *simulacra* which interact with the eyes are the slightest of the sense-objects of the *sensūs corporis*, with consequences for their relative speed, ability to travel over distance, and dispersibility. The finer *simulacra* which interact with the *animus* are thus the most mobile and subtle of all the intermediary

²⁷ The use of *laccio* (Lucr. DRN 4.729, 4.731, cf. 4.753, 4.758) perhaps also suggests that contact takes place in the mechanisms of both sight and thought at their respective sense-organs. Cf. below on 4.746-8 which indicates that the contact in question between the stimulus and the *animus* is specifically a blow or collision.

²⁸ As we have seen, they do not pass through walls, for they are rent by the passages of stone or wood, and they are open to distortion when passing through assemblies of less density, such as sea-water and air; Lucr. DRN 4.143-154, 4.595-602.

²⁹ Here *imago* is taken as equivalent to *simulacrum*.

³⁰ I.e. effect interaction with other constituents of the complex (specifically here of the *animus*).

³¹ On the relationship between the fourth's nature and the ease of its stirring, cf. pp.58-9.

emitted stimuli - apparently with similar consequences, to a greater degree.³² In sum, with respect to the vision of the *animus*, the smallest stirring able to be generated by a single interaction with the smallest and finest of all intermediary emitted stimuli effects *sensus*. This sensitivity has profound implications for the *animus*' potential to perceive the unreal (so to speak),³³ and suggests that any apparent imperative to think, e.g., of a sound or smell is answered by another mechanism.³⁴

Most of the individual *simulacra* with which the *animus* interacts probably originate by scattering from the streams of *simulacra* discussed in chapter two. The circumstances which cause its dispersal are unclear,³⁵ but after some time *simulacra* emanating from source-objects do wander individually. A stream's dispersal may begin immediately or nearly so, for one can think of what one has recently seen.³⁶ Often, according to Lucretius, we think and dream of the games and their attendant diversions for a few days after we have watched them. Lucretius thus shows that, both while waking and sleeping, one is able to perceive - by interacting with these wandering thought-*simulacra* - things that one cannot see with the eyes because they have ceased (either to exist as such or to occur).³⁷ Most importantly for our purposes, animals do the same thing in the same way. Horses, for example, both think of racing and dream of it.³⁸ Similarly, we think and dream of the dead - even long after they are gone.³⁹ Gale rightly notes that this shows that at least some such individual *simulacra* can persist with integrity for quite a long time after the stream has dispersed and its source-object broken-down.⁴⁰

Thoughts are not memories; according to Lucretius, the *animus* has waking and sleeping perceptions of real assemblies of which one has no experience or memory based

³² Lucr. *DRN* 4.745-6 above, cf. 4.176-215. This is further suggested by Lucretius' explanation of why we are able to think of whatever we wish to, on which cf. esp. ch.5: p.259ff.

³³ This is not to say that these stimuli do not exist; they do and stir *sensifer motus* (cf. D.L. 10.32). Rather, they do not begin from and accurately reflect a single objectively extant thing, as we will see.

³⁴ Probably memory or *opinatūs animi* added to the perception of thought-*simulacra*; on which, cf. ch.5. This is a topic worthy of further investigation, e.g. through the language which Lucretius uses in such cases.

³⁵ Thus far this study has emphasized perceptions involving *simulacra* which originate by emanating in streams from objectively extant source-objects as part of the process by which all macroscopic *concordia* decay. It is unclear for how long or far a stream will travel before dispersing, or what causes the dispersal.

³⁶ On the relative speeds at which different types of *simulacra* travel, and the implications for the speed of thought, cf. the next section.

³⁷ On thinking and dreaming of the games, among other things, cf. Lucr. *DRN* 4.973-83. Further on this phenomenon, cf. pp.242-8.

³⁸ On horses thinking of racing: Lucr. *DRN* 2.263-71 and dreaming of racing: 4.984-90. N.B. the considerable verbal echoes between these two passages will be treated at further length with respect *voluntas* and *studium* in chapter five; for the moment let suffice as evidence for this point: (i) the fact that they exist and, particularly, (ii) the similarity with respect to words and things between 2.264 and 4.990.

³⁹ On thinking (while awake) of the dead: Lucr. *DRN* 3.904-8, dreaming of the dead: 4.760-7, both: 1.131-5, 4.33-45.

⁴⁰ Gale 2009: 116. On the persistence of εἶδωλα, cf. Epic. *Ep. Hdt.* 48, Cic. *ND* 1.106-8, Cic. *Div.* 2.136-9.

on the *sensus corporis*, such as dreams of falling from tall mountains and perceptions of the gods.⁴¹ The latter case is more revealing in this context. Like each *simulacrum* individually, the nature of the gods is too fine for the limitations of the *sensus corporis*.⁴² Unlike other assemblies which exist in the *tegmen caeli*, we have and will never see them with our eyes.⁴³

tenvis enim natura deum longeque remota
sensibus ab nostris animi vix mente videtur
DRN 5.148-9

For the nature of the gods, being fine and far removed from our *sensūs corporis*, is scarcely seen by the *animus*.⁴⁴

The gods only emanate thought-*simulacra*. *Vix* suggests that a *simulacrum* of the gods constitutes the lower limit of how fine a *simulacrum* can effect the vision of the *animus* by interaction - i.e. exciting the smallest requisite stirring of the nameless fourth. Given that distance alone has little effect on the *simulacra* of heavenly bodies involved in sight,⁴⁵ Lucretius presents the extreme fineness of the *simulacra* of the gods as an artifact of the extreme fineness of their own constitutions. Moreover, we have always been able to perceive the gods thus. In the early days of the world, before the advent of *religio*:

quippe etenim iam tum divom mortalia saecla
egregias animo facies vigilante videbant,
et magis in somnis mirando corporibus auctu
DRN 5.1169-71

For indeed already then the mortal generations were seeing the distinguished forms⁴⁶ of gods with the conscious *animus*, and more in dreams,⁴⁷ with their marvelous bodily stature.

Context indicates that '*mortalia saecla*' at least primarily refers to humans here, but the term is often used to include all living creatures. Thus nothing here rules out the possibility

⁴¹ For Lucretius, these are not products of the *mens* or the result of memory, but perceptions of externals - generally with *opinatus animi* added; cf. ch.5, e.g. p.273 n.223. According to Schrijvers 1980: 144-50, on the other hand, the former are examples of emotional or 'psychological dreams' (*psychischen Träume*) caused by fear which is amplified through concentration, but he has difficulty reconciling this Artemidoran paradigm with Lucretius' contention that dreams are generally related to the events of the day.

⁴² On their fine nature and with respect to the following lines, cf. p.114 n.56 and Gale 2009: 123.

⁴³ Dust motes represent the limit of the sight of the eyes, and then only when aided by a sunbeam at the right angle of impact; Lucr. DRN 2.112-143. On the perception of the gods, cf. also the scholion on Epic. KD 1.

⁴⁴ Here *vix* may also imply 'with difficulty'. If so, it would further suggest the importance of the configuration of one's *animus* to taking up (*suscipio*) their *simulacra* and thereby to such perceptions - cf. Lucr. DRN 6.76-8 and ch.5. Moreover, the periphrasis '*mens animi*' perhaps here recalls one used metaphorically of the nameless fourth at 3.275, 280-1: '*anima animae*'; that periphrasis indicates that the nameless fourth is the metaphorical 'motor force' of the complex - i.e. the nameless fourth is to the complex as the complex is to the whole assembly of the living being.

⁴⁵ On what does cause *simulacra* to become more subtle (i.e. to change from sight-*simulacra* to thought-*simulacra*) cf. below.

⁴⁶ Pace, e.g. Gale 2009: 198, the mechanism of thought discussed thus far suggests that *facies* refers not to the *simulacra*, but to the perceptions themselves.

⁴⁷ This roughly follows Rouse and Smith and Gale 2009 *ad loc.* in translating '*animo vigilante*' with the idea of being awake itself - such that it is clear that the *animus-anima* complex has full functionality. A more literal translation would here be inconsistent with the fact that, as we have already seen - that the *animus* is awake or alert during soft-sleep (usually *somnus*) despite the inhibition of some of its faculties; cf. e.g. '*mens animi vigilat*' (Lucr. DRN 4.757-9) and '*eadem nobis vigilantibus obvia mentes | terrificant atque in somnis*' (4.33-4).

that animals too perceive the gods.⁴⁸ The account which Lucretius goes on to give only alludes to gods with human form.

Lucretius does not deal with the idea of human-animal hybrid or mixanthropic deities, much less animal or theriomorphic ones, as well as deities of mixed animal form. That said, he was certainly aware of mixanthropic deities, as is shown by the expression through which he names Athens at the beginning of his account of the plague: the periphrasis '*finibus in Cecropis*' (6.1139). Cecrops was an earthborn deity whose lower half was serpent, as well as the first monarch of Athens, and who allegedly introduced the institution of human marriage.⁴⁹ Perhaps Lucretius neglects them because he could not have explained them in the same way as he explains the thought of a centaur unless he posited animal deities, which was not a widespread belief in Greco-Roman antiquity,⁵⁰ although the belief in mixanthropic deities was.⁵¹ If asked, Lucretius might venture that the belief in hybrid gods is a false belief about perceptions of compound *simulacra* of earthly creatures, like centaurs. The implications of such a statement for humans belief in the gods in general, however, would approach an atheism which would conflict with Epicurean doctrine.⁵²

The idea that one is better able to perceive the gods in sleep looks forward to the fact that - as we shall see - the configuration of one's *animus-anima* complex has bearing on what *simulacra* it will interact with and when.⁵³ These lines in their context also affirm that - for Lucretius - the nature of the *animus* and the mechanisms of its waking and sleeping vision have not changed significantly since the dawn of the human race. In other words, their consistency is evidence of the species' fixity.⁵⁴ The relative consistency of

⁴⁸ Cf. the larger passage: Lucr. *DRN* 5.1161-82. On the belief in antiquity that animals actually have privileged access to knowledge of the divine, cf. Struck 2014. Given that Lucretius does not describe animals exhibiting the same ritual practices and other behaviors which he associates with *religio*, one might venture that if they do perceive the gods, they do so without the false attributions (or at least without the same ones) with which Lucretius is here concerned. Dierauer suggests that Philodemus included a discussion of animals in his work *On the Gods* because he needed to explain why animals do not fear the gods, but Philodemus contended that it is because they have no knowledge of the gods' existence (*Gotteserkenntnis*); Dierauer 1997: 197. The option suggested here for Lucretius is unavailable to Philodemus because, as we shall see, Philodemus does not attribute belief to animals.

⁴⁹ As we will see, Lucretius hints that marriage is a key early step towards bringing human-kind into communities.

⁵⁰ The gods only took such forms through metamorphosis.

⁵¹ On mixanthropic deities, cf. Aston 2011: *passim*, regarding Cecrops e.g. p. 341, and regarding these beliefs, e.g., pp.11-12, 43.

⁵² Further on the impossibility of hybrids according to Lucretius, cf. pp.191-5 and on the nature of the gods, p.116 n.56.

⁵³ Cf. Lucr. *DRN* 6.76-8, p.114-15, below in mechanism of *amor*; and ch.5. That it was easier to perceive the gods in dreams was not an uncommon theory in antiquity, cf. Struck 2014: esp. 319-20. Also, on dreams of the gods, cf. Cic. *ND* 1.42-9 and Schrijvers 1980: 133-5.

⁵⁴ A topic to which we shall return in chapter four.

these visions themselves - with respect to the perceptions of individuals⁵⁵ as well as of the species across time - likewise indicate that the source-objects, their *simulacra*, or both persist (at least relative to most earthly *concilia*). Thus these gods have existed as such for at least as long as living creatures have walked the Earth.⁵⁶

Waking and sleeping thoughts of recent things, the long dead, and possibly also the gods therefore indicate that some quantity of individual *simulacra* originating from an objectively extant source-object and capable of stirring the vision of the *animus* persist for some time and with some degree of durability after their stream disperses. It is not clear to what degree persistence with integrity is also true of individual *simulacra* of other origins.

Lucretius tells us that a thought-*simulacrum* can arise in two other ways; these also represent normal processes of the formation and change of non-living *concilia*. Such *simulacra* may be generated *sponte sua* in the air, in the manner of clouds or of assemblies in the primordial soup of the infancy of the world.⁵⁷ Similarly, they can arise from the combination of multiple *simulacra*. This sort is associated, among other things, with images of centaurs - combinations of the *simulacrum* of a real man with that of a real horse.⁵⁸ Because the *animus* can be stirred by interaction with a single *simulacrum*, these

⁵⁵ Lucr. *DRN* 5.1175-6. Their *notitiae* of the gods and the *opinatūs animi* attached to perceptions of the gods - both correct and incorrect ones - have also been relatively consistent.

⁵⁶ The nature of the gods and how one comes to knowledge of them are among the more controversial topics in Epicurean scholarship and full discussion is beyond the scope of this study. One certainly wishes that Lucretius had made good on his promise to tell us more (Lucr. *DRN* 5.155). It seems likely, however, that in his view the gods are not immortal in the sense that the *primordia* are, but rather bodies of a fine nature which are subject to creation and destruction. Thus what Long and Sedley 1987: ii.153 call 'Lucretius' naive reading of Epicurus' theology' (cf. Epic. *Ep. Men.* 123-4 and Epic. *KD* 1) may simply be an alternative interpretation consistent with Epicurus' physics and epistemology. Just because the gods are located in the space outside of the world - i.e. in the *intermundia* or μετακόσμια (cf. *DRN* 3.18-24, 5.146-7), this does not mean that they are not subject to the laws of physics. When Lucretius speaks of them enjoying '*immortali aevo*' (*DRN* 1.45, 2.647), this may simply be relative to *mortalia saecla* in the manner suggested above. The most probable means of accounting for their relative persistence, evinced by the fixed species consistent perceptions of them across time (according to the laws of physics set out in books one and two) seems as follows. The equilibrium of input and output of matter renders the relative endurance of these assemblies and their *coniuncta*. The constant nature of the perceptions thus contributes to humans attributing to these perceptions the false belief that the source-assemblies are immortal ('*aeternamque dabant vitam*', 5.1175). (On the various *opinatūs animi* added to perceptions of the gods, with perhaps decreasing potential for accuracy, cf. the kuklos highlighted by the repetition of *tribuo*: 5.1172-95.) In reality they are constantly changing at constant rate and thus apparently unchanging via state of equilibrium. However, like the Earth itself, which some deify, they are subject to the cycle of growth, maturity, then aging or decay - albeit at an inconceivably slower rate than humans are. For the so-called 'idealist interpretation' of the gods as thought-constructs or Feuerbachian projections, cf. e.g. Long and Sedley 1987: i.144-9 and Sedley 2011; for the so-called 'realist' interpretation, Konstan 2011. Both sides assume the gods' indestructibility.

⁵⁷ In other words, there were no proximate causes external to the bodies in question, like blows or (cf. Fowler 2002: 280) divine providence, which explain their assembling - i.e. the spontaneous generation of these non-living assemblies; cf. Johnson 2013: 109-10.

⁵⁸ On the three-fold origin of all *simulacra* of both kinds, cf. esp. Lucr. *DRN* 4.129-44, 4.332-6, 4.724-7, 4.735-8.

latter two 'one-off' or singleton types are relevant to the perceptual model; the issue of potential distortion prior to interaction with the sense-organ also is pressing.⁵⁹

Chapter two showed that streams of *simulacra* are subject to two primary sources of distortion before reaching the eyes; combination with other bodies and passing through certain substances can alter their color, shape, and size. Passing through other assemblies can also alter - in whole or part - the trajectory of their vector (or destroy the bodies altogether). These changes are then experienced in the perceptions which arise from interaction of the eyes with these *concordia*.

Similarly, the *simulacra* capable of interacting with the *animus* are subject to change - and thereby to distortion - due to combination with other bodies. The above example of centaurs and the analogy of spiderwebs and gold leaf are evidence that a *simulacrum* of an unreal thing can be generated by *simulacra* emanating from multiple real source-objects. However, with the exception of jaundice in the previous chapter, combinations of emitted bodies do not seem to generate streams of inaccurate *simulacra*, much less streams of *simulacra* of non-existent things. Therefore, according to the logic of Lucretius' account, the eyes should never see any unreal thing or watch something happen which does not occur, but the *animus* can do.⁶⁰ Because - as we shall see below - a single perceivable moment of time encompasses many such interactions, one's *animus* takes up a vast number of singleton (or one-off) *simulacra* from the omnipresent abundance in the environs. Contingent upon its focus, these individual *simulacra* may be nearly identical to one another and functionally constitute a stream analogous to the sort by which the eyes see. This implies that one interaction with one distorted *simulacrum* may potentially prompt the *animus* to focus on many distorted ones.⁶¹

Passing through other assemblies, however, does not seem to readily alter thought-*simulacra*. For example, there is no suggestion that passing through the bodily frame en route to the *animus* affects the configuration of these assemblies. Moreover, thought-*simulacra* are carried by the air, not distorted by it - nor do they drive it.⁶² The air's buffeting may have made the *simulacra* in question especially fine.⁶³ However, these

⁵⁹ N.B. the amount of space Lucretius devotes to explaining the general reliability of the *sensūs*; on the extent of their reliability, cf. Epilogue to Chapters II & III.

⁶⁰ Cf. pp.167-70.

⁶¹ Cf. on the role of focus, cf. esp. pp.230-47.

⁶² Unlike the eyes, the *animus* does not seem to simultaneously perceive the distance at which the source-object is positioned - a result of the driven air and *simulacra* reaching the eye at effectively the same time. Nor is the presence of light or darkness relevant to its sight. Further on the perception of distance, cf. below.

⁶³ Cf. Lucr. *DRN* 4.353-63 on the round/square tower example; *hebesco* (4.359) can refer to becoming blunt or faint.

perceptions of the *animus* are experienced as clear images; they are not fuzzy like the outline of a distant tower.⁶⁴ The lack of distortion with respect to thought-*simulacra* originating from a single real source-object suggests, rather, that their fineness is the result of normal structural decay;⁶⁵ they may approach the minimum possible structure which can still be called 'a *simulacrum* of x' - i.e. before the assembly is dissolved or otherwise passes outside of its boundaries and ceases to exist.⁶⁶ That said, as suggested above, at least some must persist for a good while before either interacting or completely disintegrating.

The passing of a thought-*simulacrum* through another assembly does not seem to result in a perception-altering change of vector. Each singleton *simulacrum* is able to wander in all directions everywhere.⁶⁷ One is still able to think of the oar of the previous chapter; its partly-bent *simulacra* may still be floating about individually, enabling our thoughts.

The relative compactness of thought-*simulacra* may also make less likely their distortion during transmission through the body. Compare the case of smell. Lucretius tells us that smell is emitted in particulate form from the depths of the flesh because of the elaborate windy nature of the passages. He describes these *foramina* in the same way as he describes the intricate passages of stone or wood through which *simulacra* capable of interacting with the eyes cannot pass (much less pass intact). Indeed, the adjective *flexus* is used of both.⁶⁸ If a thought-*simulacrum* is sufficiently compact - to at least the smallness of a single smell-causing assembly⁶⁹ - so as to pass intact through a single passage of the body, then it does not matter (to perception) whether the *foramina* are *flexa* or *recta*. Hence the *simulacrum* of the apparently bent-*oar* is not rent before it reaches the *animus*, as a stream of the *simulacra* capable of interacting with the eyes would be by an intervening wall. Therefore, because thought-*simulacra* do reach the *animus* intact, they probably do not ooze piecemeal through the body in an interpenetrating manner as through

⁶⁴ In both cases, the clarity is contingent upon the focus of the sense-organ in question; Lucr. *DRN* 4.807-13.

⁶⁵ For example, any *primordia* not essential to maintaining the *coniuncta* of that *simulacrum* may eventually disperse. Moreover, and perhaps consequently, the void between its *primordia* may reduce over time. Such processes would result in increased fineness and compactness.

⁶⁶ If so, further decay would not be a source of distortion but amount to dissolution.

⁶⁷ Lucr. *DRN* 4.724-6.

⁶⁸ Lucr. *DRN* 3.586-8, 4.90-4, 4.595-614, 4.621, 4.688-700.

⁶⁹ Although air too is capable of seeping through the *foramina corporis*, cf. Lucr. *DRN* 4.881-97, 4.907-61, 6.1022-41, that seems rather to be because of the amount of void between its particles (the equivalent of molecules). Therefore that is a less useful analogy.

glass or sea-water; rather they are compact enough to pass through altogether - i.e. at once and as a whole.

In sum, there is some potential for a thought-*simulacrum* to undergo a certain degree of distortion before interacting with the *animus* - both before and after it has achieved the degree of fineness and compactness required for that interaction. The distortion most relevant for the after-scenario is not wearing-down, decay, or partial-bending, but combination.⁷⁰ Moreover, insofar as Lucretius presents it, this distortion potential is not species specific; one's constitution in no way affects a *simulacrum* during the process of its transmission to the *animus*. The constitution is thus no obstacle to humans and animals being able to think of the same thing.

The mechanism of the vision of the *animus*, similarly and crucially, is not species specific. Although Lucretius' account emphasizes humans, it is clear that all living creatures experience these perceptions. As we saw specifically with respect to horses, animals think and dream in the same manner and according to the same mechanism as humans. The integrated presentation and identity of the mechanism of animal and human dreams - which we will treat further below and in chapter five - would alone demonstrate this, because, for Lucretius, dreams are a type of thought. In other words, the fact that animals explicitly dream according to the same mechanism and by means of the same stimuli as humans is quite clear evidence that Lucretius believes them to share this *sensus animi* in full.

Indeed, thought is not the only *sensus animi* which Lucretius understands to be common to all living creatures. There are others which arise through rather different mechanisms. Lucretius does not describe (or describe exclusively) as contact-based interactions certain *sensus*-bearing motions of the constituent bodies of a living creature. Nor do these necessarily require the addition or subtraction of matter to one's constitution; rather, they involve rearrangements or changes in the relative motions of the constituents of the *animus-anima* complex. The motions of change and the new patterns of motion are *sensiferi*. The corresponding perceptions constitute a particular category of *sensus animi*. They are effectively perceptions of one's own constitution. Some occur with apparent continuity, such as the perception of time. Others only occur under particular circumstances, such as the emotions. In light of the previous chapter and section, it may

⁷⁰ This distortion potential has implications for concept formation, which are beyond the scope of this study. On concept formation, cf. esp. pp.270-5.

not seem immediately intuitive that interactions proximately caused by one's internal relative motions of bodies, rather than by contact,⁷¹ could be *sensus*-bearing.⁷² Therefore, establishing that these are in fact *sensus animi* will be a point of discussion along with the analysis of the mechanisms in question.

II. SENSUS TEMPORIS

Another of the *sensūs animi* which Lucretius emphasizes is the perception of time. Lucretius' references to time reveal more about the physiological mechanisms of the vision of the *animus*, and of the *sensus* of all living creatures more generally.

Time does not exist on its own.⁷³ As Berns notes, Lucretius often represents time using metaphorical language related to spatial intervals, movement, and the compelling of change by natural law.⁷⁴ This corresponds to how one is aware of time and why. For Lucretius, time is not some third nature (in addition to matter and void), nor a concept constructed by one's *ratio*. It is a property which one perceives.

tempus item per se non est, sed rebus ab ipsis
consequitur sensus, transactum quid sit in aevo,
tum quae res instet, quid porro deinde sequatur;
nec per se quemquam tempus sentire fatendumst
semotum ab rerum motu placidaque quiete
DRN 1.459-63

Time likewise does not exist *per se*, but the *sensus* arises from things themselves - namely from what has been in the past, then what thing is present, further what follows next.⁷⁵ Nor must it be confessed that anyone perceives time *per se*, separated from the motion and calm rest of things.

Lucretius here contrasts *tempus* with *per se* entities, both ontologically and with respect to perception. The ontological contrast suggests that '*rebus ab ipsis*' refers to (and is in apposition to) '*transactum ... sequatur*', what has existed in the past, what does exist in the present, and what will come into being in the future. Since Lucretius is discussing these categories with reference to what is perceivable, and since eternal *per se* entities are

⁷¹ This is not to say that contact is not involved at some point in the causal mechanism or that the constituents are temporarily incapable of collisions.

⁷² A relatively modern analogy may help clarify the possibility of such an interaction. The gravity relating the sun and the planets in their orbits is an example of bodies interacting through relative motion alone. Although a reader of Lucretius, Sir Isaac Newton nevertheless took this situation as proof of the existence of G/d-as-creator and intelligent design. Newton believed that these heavenly bodies would have needed to exist in such relationships from the moment of creation, otherwise the gravity between them would have caused the system to collapse on itself; Newton, *Optiks: Query 28* in Cohen and Westfall 1995: 184-9.

⁷³ Cf. Epic. *Ep. Hdt.* 72. Barigazzi suggests that *PHerc.* 1413 fr.81 col.53 may be a comparandum on the issue of time not existing *per se* or καθ' αὐτό; Barigazzi 1959: 49-50. Warren's cautionary remarks on drawing any precise conclusions from *PHerc.* 1413 are well noted and should be borne in mind in any evaluation of the references to it below; cf. Warren 2006: 365. On the interpretation of *Lucr. DRN* 1.459-82, cf. esp. Warren 2006: 368-77 and Long and Sedley 1987: i.33, 37, ii. 25-6.

⁷⁴ Berns 1976: esp. 477-484; N.B. her observation that 'three metaphors of time: force of time, motion of time, and space of time, correspond to the three aspects of nature: matter, motion, and space' (p.484).

⁷⁵ This reading of *Lucr. DRN* 1.459-61 falls in between that of Warren 2006: 369 and that of Long and Sedley 1987: i.33.

not, he likely means ephemeral things - namely *concordia* (which are themselves *eventa* of first-beginnings and void) and their *coniuncta* and *eventa*.⁷⁶ These lines indicate that the *sensus* of the property of time⁷⁷ arises from these things and from their relative motions, rest, and sequence - any experience of which, as we have seen, also entails perception.⁷⁸ Moreover, the judgment of motion - e.g. that the sun is higher in the sky at noon than it was at sunrise - is predicated on one's ability to remember the relative positions which one has perceived. Similarly to note that any given *sensus* continues, stops, starts, or otherwise changes, one must recall what came before it. The perception of time is thus to some degree contingent upon other *sensūs*, memory, and the comparative function which memory at least partially enables.

To elaborate slightly: contingent upon some degree of memory, the perception of time operates by perceiving the relational sequences of other *sensūs* - specifically that other *sensūs* change relative to one another or are maintained. For instance, one perceives that the sun changes position in the sky - i.e. that it moves across the heavens - and calls that interval of time 'one day'. One also perceives that, as it goes about its daily motions, the sun changes angle with respect to the Earth over the course of a longer interval before coming back to its apparent starting point; that is called 'one year'. Without a degree of memory, this would not be possible, as one would not be able to compare the perception of the sun's present position to the one of five minutes ago, much less five months ago.⁷⁹

Lucretius' claim that the deeds of human beings are *eventa*⁸⁰ follows from this logic. He represents them as the specific movements of assemblies, i.e. as examples of the very *eventa* upon which the *sensus* of time is based.

namque aliud terris, aliud regionibus ipsis
 eventum dici poterit quodcumque erit actum.
 denique materies si rerum nulla fuisset
 nec locus ac spatium, res in quo quaeque geruntur

For whatever will have been done in the past
 will thereafter be able to be called an *eventum*
 - of the world on the one hand and of its
 regions themselves on the other. Furthermore,

⁷⁶ Brown's emphasis would render the *eventa* to which the expression '*rebus ab ipsis*' refers 'occurrences', seemingly in the sense of 'events'; Brown 1984: 118-21. Cf. Verde 2008: 108, 'solo a partire dai fenomeni risulta comprensibile la temporalità di quanto si genera e diviene nel presente, nel passato e nel futuro. ... dall'evento passato, presente o futuro deriva il *sensus*, la coscienza dell' temporalità'.

⁷⁷ Lucretius does not outright use the term *sensus temporis*, but the concept is clearly present in these lines; cf. Konstan 2008: 36 n.18 who also uses the expression 'sense of time'. There is no convenient parallel. By contrast, as we have seen, the perception of sound-causing particles, for example, is called 'hearing' and the perception of *simulacra* (be it by the eyes or *animus*) 'vision'.

⁷⁸ Cf. Warren 2006: 370. The relationship between Lucretius' account and the fragmentary definition of *PHerc.* 1413 fr.55 col.34 1ff, 'φαντασία τις ἐστὶν ὁ χρόνος κινήσεως πάσης καταμετρική' (Barigazzi 1959: 42), may turn on the relationship between φαντασία and *sensus*. On Epicurus' use of φαντασία with reference to time, cf. Morel 2002: 201-2.

⁷⁹ On memory and judgment, cf. pp.266-78. For a recent interpretation of the various faculties and processes involved in the perception of time, cf. Gæury 2012.

⁸⁰ The claim is made at *Lucr. DRN* 1.464-82, which is quoted selectively below.

... never would the feelings, deeds, or wars of men have taken place.

perspicere ut possis res gestas funditus omnis
...
... meritis possis eventa vocare
corporis atque loci, in quo quaeque gerantur
DRN 1.478, 81-2

with the result that you are able to observe that absolutely all things done ... you may justly, call *eventa* of body and the place in which each thing is conducted.

Whether one is speaking of the deeds or *res gestae* of *primordia* in the void or those of creatures in some place on the Earth, one is still speaking of *eventa*.⁸¹ The latter deeds, being *eventa* of *concilia* (including creatures and place, as well as, by analogy, the effective grouping of these), are by definition *eventa* of *eventa*.⁸² One's perceptions of these things are likewise *eventa* of *eventa*. Therefore, contra Bailey, this is no special ontological category.⁸³ Moreover, as Verde rightly emphasizes in relation to the ontology of time, *eventa* do not have a lesser claim on reality.⁸⁴ Time itself, however, is not an *eventum* of *eventa* or σύμπτωμα of συμπτώματα, as some testimonia suggest;⁸⁵ only the perception of time is. Lucretius implicitly represents time as a *coniunctum* of matter and motion.⁸⁶ To that extent, Asmis is correct that 'time is ... the relative duration of properties'.⁸⁷ It is therefore eternal (and often referred to as such by Lucretius), although it lacks independent existence. Whether anyone is around to perceive it is a moot point.

⁸¹ Warren 2006: 374 seems correct that Lucretius is generalizing to all *res gestae*, at whatever temporal period, in DRN 1.478-82.

⁸² Deeds are *eventa* of *eventa* in this sense whether one is talking about the motions of a particular body or the motions of a group of bodies relative to one another, such as the internal motions of an actual *concilium* or of an effective assembly (e.g. those fighting the war at Troy (Lucr. DRN 1.464-82), or members of a herd watching their well-fed young frolic (1.257-61) - in both cases the group of bodies involved includes the physical location of the creatures). On the possibility that some *eventa* can involve the relationships among or between *concilia*, cf. Konstan 2008: 136 n.17.

⁸³ Bailey argues that time and occurrences are special types of *eventa*, and that Lucretius' target in DRN 1.459-82 is particularly the Stoics; cf. Bailey 1947, ii: 675-80.

⁸⁴ Verde 2008: 96, 106, cf. also p.96 n.12 in relation to Polystratus on this issue.

⁸⁵ E.g. Demetrius of Laconia in Sext. Emp. *M.* 10.219 and the report of Aëtius 1.22,5. Both fragments = Usener 294, but in the latter case συμπτώμάτων is a conjecture. Cf. Verde: 'Il tempo, dunque, è accidente di accidenti perché è relativo ai fenomeni che a loro volta sono accidenti degli atomi e del vuoto;' Verde 2008: 112. For a fuller account of the argument, preserved in Sext. Emp. *M.* 10.219-27, cf. Long and Sedley 1987: ii.28-9, who argue that this idea constitutes Demetrius' interpretation and exegesis of Epicurus.

⁸⁶ Recall that motion itself is a *coniunctum* (of body) whose particular manifestations are *eventa*. The conditions of matter's motion are place and space. Place simply refers to a particular location in space; it has the dimensions of whatever occupies the interval of space. This point should perhaps be compared to the fragments of *PHerc.* 1413 quoted at Barigazzi 1959: 53, in light of Sedley's insight that the term συμβεβηκότα encompasses both *coniuncta* and *eventa*; cf. Sedley 1988.

⁸⁷ Asmis 1984: 33; cf. Warren 2006: 364-5, who notes in a similar vein that reference to time's measurement (e.g. in Epic. *Ep. Hdt.* 72) 'is meant to show how, from this primary and earliest impression of temporal change and duration, we come to be able to evaluate other temporal change by using days and nights as some sort of comparative measure' (p.364).

Warren notes that, for an Epicurean, the nature of time was intimately bound up with concerns about truth and the avoidance of determinism.⁸⁸ Time itself must exist, otherwise the *sensus temporis* would otherwise constitute an error of perception.⁸⁹ The reality of the past and future have been called into question.⁹⁰ Of the past, and particularly the distant past (e.g. prior to one's own existence and thus memory), one has at best *vestigia* of their existence, by which the past may be known - to the extent that it can be.⁹¹ These traces include the songs of the poets, writing, and - of time before their advent - traces scrutable by *(ali)qua ratio*;⁹² places, such as those involved in the deeds of humans mentioned above, are an example of the last sort,⁹³ as are the results of long-term causal processes to which past *eventa* contributed - i.e. the cosmos, and each creature as a descendent of its ancestors and the Earth itself.⁹⁴ Of the future, one can only expect that things will persist or not in accordance with one's experience of the current state of the world and natural law,⁹⁵ as was initially the case with the first humans and their experience of the alternation of days and nights.⁹⁶ That said, lack of subjective experience of past and

⁸⁸ Warren 2006: esp. 263, 377-84.

⁸⁹ Such errors generally do not occur, as we will see in the Epilogue to Chapters II & III. Warren 2006: esp. 263, 377-84.

⁹⁰ On both sides of the 'past presentism' debate, cf. Warren 2006, who comes down persuasively against it. Verde follows his lead but ultimately suggests an intermediate position, namely that the present existence of the past is relative to the evidence of presently existing bodies and their properties, but that the past may have existed relative to a different collocation of entities previously; cf. esp. Verde 2008: 112-13, 116-17.

⁹¹ Only to the extent that these *vestigia* are present and to-hand does one have evidence by which one can infer things about the past and judge whether those inferences are true or false; cf. the concern of Warren 2006: 373 n.23 about the reading of Long and Sedley 1987: i.37, ii.26.

⁹² Lucr. *DRN* 5.1440-7. My thanks to Gordon Campbell for drawing my attention to this connection. Cf. *DRN* 5.324-9, where Lucretius also suggest that the works of the poets are among the traces which the *facta virum* (cf. *res gestae* 5.1444) would have left behind - specifically the *bellum Thebanum* and the *funera Troiae*. Lucretius' reference to the human quest for immortal glory here seems ironic in that it alludes to the quest's futility. Just as no assembly is eternal, the wars would have left behind many dead, of whom the war was in part an *eventum*, and their bodies would have provided matter for worms and plants. Taking the two passages together: material traces remain, but - absent verse - they are not generally in any recognizably traceable fashion. Such ideas may contribute to his argument for the value of poetry in that Lucretius is tracing and setting to verse the *res gestae* of the cosmos, immortalizing them at least relative to the existence of that system of assemblies.

⁹³ This does not mean, for example, that Helen's kidnapping remains extant as an *eventum* of a place. It happened and thus can thereafter be called an *eventum* of the place in which it occurred. This move does not give what happened in the past a detached *per se* existence; it simply acknowledges that it did exist once, however ephemerally, as an *eventum* of the body and void with respect to which it occurred. This concurs with Warren 2006: 373 'charitable interpretation' of 'Reading (A)', and support for (A) on p.374, incl. n.24.

⁹⁴ We will treat the survival of those descended from the earthborn creatures in chapter four.

⁹⁵ This precludes the foreknowledge of future contingents, and thereby determinism. Cf. also, perhaps, Epic. *Ep. Men.* 127. For a clear and plausible account of the Epicurean 'temporally-relativized view of truth', particularly with respect to claims about the future, which also takes into account the evidence from Cic. *Fat.*, cf. Warren 2006: 377-84, 385.

⁹⁶ Early humans initially perceived the regular alternation of days and nights and thus experienced no fear that day would not return; rather their concerns were about legitimate threats to survival. Later, their perception of certain celestial phenomena and their regularity led to the postulation that they must be controlled and ordered by divinities - and hence to the further false belief that such movements might be suddenly changed, to human disadvantage. Lucr. *DRN* 5.970-87, 5.1183-93. Nevertheless, as Lucretius is aware that the length of days and nights vary, the early humans too would not have an entirely precise notion of their respective lengths; *DRN* 5.680-95 (cf. Epic. *Ep. Pyth.* 98).

future *eventa* is no bar to their objective reality during some period of time, only to our potential awareness and knowledge of them now.⁹⁷ Finally, as our knowledge of the existence of *primordia* (among other things) shows, what one cannot perceive is not necessarily unreal.⁹⁸

Both Lucretius and Epicurus discuss time in the context of the ephemeral properties of *per se* entities. Whereas Epicurus focuses the discussion on atoms and their movements,⁹⁹ Lucretius focuses on the *res gestae* of living creatures,¹⁰⁰ indicating that his concern lies as much with the perception of time as it does with the nature of time.¹⁰¹ That said, Lucretius uses similar language when describing *primordia* and dust-motes, including their wars and contests¹⁰² - suggesting that if one could perceive *primordia*, the same perceptual mechanism would apply and, regardless, time itself does exist relative to the motions of all *corpora*.¹⁰³

It also follows from 1.459-82 that the sense-objects, so to speak, of the *sensus temporis* are not bodies and their motions; they are the other types of *sensūs* which arise from the interaction of these moving bodies either with or within the perceiver. Its scope, limits, and rising/setting are defined accordingly. It is also somewhat subjective. The perception of time is the perception of (i) other perceptions - be they internally or externally relative, and of (ii) the relations between them - such as sequence and

⁹⁷ We will turn shortly to the meaning of 'now' or 'the present'.

⁹⁸ On seeing the invisible by analogy and deduction, e.g. from the visible, cf. Schrijvers 1978: esp. 276ff with respect to the 'soul'.

⁹⁹ E.g. Epic. *Ep. Hdt.* 72-3. But, cf. also Epic. *Ep. Hdt.* 47-8.

¹⁰⁰ Cf. Barigazzi 1959: 56. For example, Paris' abduction of Helen occurred before the sack of Troy and both things took place long ago relative to the present. Both events are phrased as perfect passives infinitives in indirect statement, substituting for original perfect passive indicatives: '*Tyndaridem raptam belloque subactas | Troiigenas gentis cum dicunt esse*' (Lucr. *DRN* 1.464-5). This emphasizes the fact that these motions occurred with respect to particular bodies - and, as Lucretius goes on to say at 1.466, they were *eventa* of the people (as bodies). On both points, cf. Warren 2006: 370; for another point of view, cf. Bollack 1983. We will return to the Trojan war passage shortly.

¹⁰¹ Warren 2006: 365-6 notes this tendency is also true of the other ancient evidence on Epicurus' ideas, for a summary of which, cf. below.

¹⁰² E.g. Lucr. *DRN* 2.573-4: '*geritur principiorum bellum*', 2.118: '*proelia*', 2.118 and 2.573: '*certamine*'. The greater passage at 2.573-80 on the war of the first-beginnings (for generation and destruction of non-living *concilia*) conducted from infinite time is compared to the birth and death of human *concilia* which follows upon the alternation of days and nights; this further suggests that time itself exists with respect to the *res gestae* of all bodies - i.e. living creatures, non-living *concilia*, and *primordia* - in the same way. The battle language of the dust-motes is also emphatic and explicitly analogous to the *primordia*; 2.118-21.

¹⁰³ It is therefore possible that Lucretius' relatively compressed account is not offering a simplified account of Epicurus' letter to Herodotus, as Bailey 1947, ii: 675-6 seems to suggest, but rather drawing on a different account(s) from Epicurus, such as that which *PHerc.* 1413 suggests. Alternatively, he may be presenting his own synthesis of scattered but related content in Epicurus, representing things with different emphasis from Epicurus, or bringing in original analysis - such as by taking the ideas of Epicurus to their logical conclusion, or some combination of the above.

arrangement. The *sensus temporis* is, therefore, a second order or complex perception.¹⁰⁴ Thus, *pace* Verde, the perception of time should be understood in tandem with its relationship to the physiological structures and mechanisms from which it emerges.¹⁰⁵

Lucretius does not mention whether one can have a concept of time itself. Epicurus rules out the *πρόληψις* of time;¹⁰⁶ but, as we have seen, both suggest that one can conceive of measures or units of time (e.g. the day, much, less). Insofar as instances of the perception of time (as opposed to instances of time itself) arise from other particular feelings, those instances can be called *eventa* of *eventa*. These ideas of measures of time are common across individuals and - as we shall see - species, suggesting that the subjective factors involved in the underlying perceptions do not skew the objective reality which the idea, e.g. of a day, reflects.¹⁰⁷ Moreover, the *sensus temporis* should be counted among the *sensūs animi* because it requires some involvement of memory and can occur during dream-sleep. Some of these points bear elaboration.

The *sensus temporis* can arise from either the *sensus corporis* or the *sensus animi* or, indeed, from both.¹⁰⁸ Because it arises from all other perceptions, an instance of this feeling is not contingent upon one's interaction with a specific sort of sort of external or internal sense-object (or stimulus). If one does not encounter smell-causing particles, one does not experience smell, and, if one does not eat food, one does not experience its taste; nevertheless, the faculties or abilities are present. The *sensus temporis*, on the other hand, is coextensive with the faculty of *sensus* itself; not only the ability but also the actual perception of time are *coniuncta* of this faculty. While awake, one never lacks some *sensifer motus* giving rise to the other *sensūs*. Even if one touches no object directly, a

¹⁰⁴ Lucretius seems to assume other second order perceptions as well, such as the perceptions of self, other, and - perhaps - kin, as well as of space or extension. Unfortunately the full exploration of these is outside of the scope of the present study, but it seems likely that these too - for Lucretius - are common to all living creatures. On the possibility of self-awareness or self-perception, cf. Glidden 1979a, Asmis 1984: 105 n.2. With respect to the perception of self/other/kin, examples worth considering include the sacrifice of Iphianassa/Iphigenia, the mother of the *vitulus*, the 'Symmetry Argument' with respect to death in book three, and the process of falling asleep. With respect to space/extension, it is worth considering, among other things, the perception of distance, the deduction of minimal parts, perceptions of shape and size by touch (directly) and sight (indirectly), and the proof of the idea of void. As the outset of this section suggests, the perception of time has been chosen, as opposed to other complex perceptions, because Lucretius explicitly terms it a *sensus* and because it can shed light on the physiological mechanisms of other *sensūs*, particularly - according to Lucretius' emphasis - on those of sight and thought.

¹⁰⁵ Verde 2008: esp. 91-93.

¹⁰⁶ Epic. *Ep. Hdt.* 72. On this point, cf. esp. Gæury 2012 and Glidden 1985: 210-11; contra Glidden, cf. Morel 2002: 204 n.1.

¹⁰⁷ Regarding the question of the objective or subjective perception of time, cf. e.g. Konstan 2008: 136 n.18, who comes down on the side of 'subjective recognition' and Morel 2002: 197-203, who regards time as being equally or indifferently objective and subjective, albeit by agreeing with the thesis of time-atoms.

¹⁰⁸ In this respect it is like the *sensus* of pleasure and pain. In support of the claim that the perception of time occurs also with regards to *any* motion that one can perceive with the *mens*, cf. *PHerc.* 1413 fr.84 col.55 and its interpretation by Barigazzi 1959: 40.

flow of those stimuli through which external objects affect the *sensūs* is always present, as are ongoing internally relative *sensus*.¹⁰⁹ In dreamless sleep, by contrast, when the *animus-anima* complex has receded and the faculty of *sensus* has thus diminished to the point of being all-but extinguished, one should lack the *sensus* of time. Similarly, one has no perception of time before *vitalis motus sensusque*¹¹⁰ have been generated at birth nor from the point where they fail, with the dispersing of the *animus-anima* complex, at death.

Lucretius indicates in a few ways that he believes that all living creatures possess this *sensus*. The best evidence comes from animals' tracking abilities. The strategy by which the mother cow searches for the *vitulus*, for example, suggests a sense of before, now, later, and the amount of time passing during her search.¹¹¹ The pursuit of pleasure and avoidance of pain similarly implies that animals are purposive agents and sense time.¹¹²

Lucretius' references to the *sensus temporis* in the context of other sensory mechanisms, particularly in book four, shed further light on all of the faculties there. His treatments of dreams about dancers, for example, rely on both the perception of thought-*simulacra* and the perception of time for their explanatory power. Through the vision of the *animus* we seem to see dancers moving while we sleep, just as one does with the eyes while waking.¹¹³ A *simulacrum*, not being a living creature, is incapable of moving its own limbs.

quod superest, non est mirum simulacra moveri
bracchiaque in numerum iactare et cetera membra;
nam fit in somnis facere hoc videatur imago;
quippe ubi prima perit alioque est altera nata
inde statu, prior hic gestum mutasse videtur.
scilicet id fieri celeri ratione putandumst:
tanta est mobilitas et rerum copia tanta,
tantaque sensibili quovis est tempore in uno

What is more, it is not marvelous that the *simulacra* apparently move themselves¹¹⁴ and wave about their arms and their other members in rhythm - for it happens that an image does seem to do this in dreams. In fact, of course,¹¹⁵ when the first *simulacra* have been absorbed¹¹⁶ and others then have arisen in another position, this earlier image seems

¹⁰⁹ Lucr. *DRN* 4.229-30, 6.934-5. We will turn to such *sensūs* shortly.

¹¹⁰ Cf. Lucr. *DRN* 5.125.

¹¹¹ Lucr. *DRN* 2.352-66; we will return to this passage as well as to animals' tracking abilities and their implications in chapter five. On before, now, later, like terms and the conceptions of time which they imply, cf. Sorabji 1983: 33.

¹¹² Cf. p.103 esp. n.264 on the Cradle Argument. Sorabji's logic seems to hold that 'any purposive agent must have a rudimentary idea of the difference between the future desired state of affairs and the present actual state; in other words, he must have some crude awareness of time, and any being capable of considering the existence of time is likely to be a purposive agent'; Sorabji 1983: 1.

¹¹³ Lucr. *DRN* 4.770, 4.789: '*in somnis*', 4.791: '[*simulacra*] *repetunt oculis gestum*', 4.769, 4.788: '*in numerum*'. With respect to the idea that these are dancers, cf. below.

¹¹⁴ This takes '*moveri*' as passive for middle, on the strength of its clear meaning, the parallel with '*iactare*' in the next line, and the echoes between Lucr. *DRN* 4.768-9 and 4.788-90, in which the verb is active and transitive: '*simulacra ... mollia membra movere*'.

¹¹⁵ Here '*quippe*' relates back to the '*non est mirum*' of Lucr. *DRN* 4.768; it also carries the sense that it is introducing the obvious explanation as well as the truth.

¹¹⁶ On this interpretation of *perio*, cf. pp.104-5 on the fate of external stimuli.

copia particularum, ut possit suppeditare
DRN 4.768-76

to have changed posture.¹¹⁷ Obviously this must be thought to occur in a swift manner: so great is the mobility and so great the supply of these things - and the abundance of particles present in any single perceptible moment is so great that they can be fully supplied.¹¹⁸

The language here bears some discussion. The adjective *sensibilis* is a hapax with respect to Lucretius, but indicates that time is something which one perceives. The phrase '*sensibili quovis ... tempore in uno*' seems in this context to mean 'in any given moment'; this is the smallest possible interval of time which one can perceive and the lower limit of the speed of this faculty (in conjunction with memory).¹¹⁹ This, if anything, would be the shortest interval of time which one might call 'the now' or 'an instant'. Relative to perception, it has no past or future extension.¹²⁰ Now, so construed, is fleeting, gone as soon as it is grasped.

If Lucretius did not acknowledge the reality of the past and future, i.e. if there was quite literally no time but the present, such a definition of the present moment would have profound epistemological consequences, as well as deny the reality of longer-term causal processes. For example, distant source-objects would no longer be real by the time their emitted stimuli reached a perceiver. Source-objects would lose or gain reality as they lost or gained a perceiver. Would their different numbers of perceivers make two source-objects, simultaneously perceived, more and less real relative to one another? Such a position might also imply, by analogy from the perceivable, that only the smallest unit of time on the primordial level was real, thus denying the reality of the perceivable instant.¹²¹ However, as we shall see, Lucretius does not hold with such theses.

¹¹⁷ Here '*simulacra*' (Lucr. DRN 4.768) is taken as the antecedent of '*prima*' and '*altera*', such that they are neuter plural subjects with the singular verbs '*perit*' and '*est ... nata*' respectively; if the second point is correct, then Lucretius may be following a Greek model. Similarly, '*simulacra*' is also taken as the antecedent of '*rerum*'. It would be more natural to take the adjectives as attracted into the gender and number of '*imago*' (4.770); regardless, *imago* seems less likely to be their antecedent for mechanistic reasons which will become clear shortly.

¹¹⁸ We will return shortly to the relationship between this passage and Lucr. DRN 4.794-801.

¹¹⁹ Cf. Epic. *Ep. Hdt.* 47. As Bailey 1947, iii: 1273 notes, Lucretius elsewhere seems to express this idea with '*puncto tempore*' and the like, as well as other expressions that indicate, in effect, instantaneousness, suddenness, or simultaneity.

¹²⁰ Contrary to 'now' meaning something like 'today'. On the historical debates about the nature of time and the units by which it can be measured, cf. Sorabji 1983. Sorabji suggests that Epicurean thought on time was particularly shaped by the reactions of Aristotle and Diodorus Cronus to the paradoxes of Zeno of Elea, but his conclusions about Epicurean time-atoms, as we shall see, do not fit with the evidence for Lucretius' views on time. On the debates relevant to and including the Epicurean account(s) of time, cf. Sorabji 1983: esp. chs. 1-2, 7, 12, 21-24.

¹²¹ According to Sorabji, only in Diodorus Cronus and not in Epicurus (or, apparently by implication, his followers) do we find the argument that the present is a time-atom; Sorabji 1983: 371.

Thus *imago* at 4.770 stands for two things at once. Firstly, *imago* refers to the *sensus* or perceived image, at a perceptible moment, which arises from the series of interactions - here, of the *animus* with individual *simulacra* - and the resulting *sensiferi motus*. Secondly, *imago* refers to the continuous but shifting image summing up the phenomenological perceptions across those moments. In 4.772 (and in 4.801 below), ‘*gestum*’ carries the implication that this posture, gesture, or position is a snapshot of a larger movement.¹²² The speed at which one’s interactions with *simulacra* occur is therefore far greater than the speed at which one perceives time.

The subsequent twenty-five lines contain no shortage of verbal echoes and in some cases outright repetition.¹²³ Returning to the apparent movement of dancers in dreams, Lucretius further clarifies how the two *sensūs* relate and operate:

an magis illud erit verum? quia tempore in uno,
quod sentimus,¹²⁴ id est, cum vox emittitur una,
tempora multa latent, ratio quae comperit esse,
propterea fit uti quovis in tempore quaeque
praesto sint simulacra locis in quisque parata:
tanta est mobilitas et rerum copia tanta.
hoc, ubi prima perit alioque est altera nata
inde statu, prior hic gestum mutasse videtur
DRN 4.794-801

Or will the truth rather be that: because in a single moment which we perceive, i.e., when one sound is emitted, many times lie hidden - whose existence *ratio* discloses. Therefore it happens that, in any moment of time, every every sort of *simulacra* are present, supplied in all places - so great is the mobility and so great the abundance of these things. For this reason, when the first *simulacra* have been absorbed and others then have arisen in another position, this earlier image seems to have changed posture.

Taking these lines together with 4.768-76 shows that we experience one continuous image, rather than a series of images, because of the limit of the perception of time. Classical animation works similarly.¹²⁵ The eye processes more images per second than can be individually distinguished, so the succession of snapshots (or the pictures on cells) of

¹²² The word *gestus* is often used of an artful gesture, as would seem to fit the movements of the dancers here, but cf. also Lucr. DRN 4.365 and 4.367, where it seems to refer to the larger movement itself, and of the very mundane general sort. In 5.1022 it could refer to either and 5.1031 more likely refers to gesture; in neither of these cases would it be artful, but at least deliberate and purposeful. Cf. *gestus*, OLD §1, 3.

¹²³ Bailey 1947, iii: 1277 notes that Lucr. DRN 4.799-801 = 4.774, 4.771, 4.772 (except that *hoc* replaces *quippe*) and takes this as evidence for a view of the state of the text not unlike that expressed esp. by Asmis 1981. The variation makes sense in the context of the respective constructions.

¹²⁴ The reading ‘*quod sentimus*’ here follows the text of Bailey. Bailey, following Lachmann, reads this rather than *cum sentimus* (Munro, Naugerius, &c) which the edition of Rouse and Smith adopts; each reading claims different parallels in *Ep. Hdt.* However, according to Bailey i: 306, iii: 1276-7, OQ and at least some of the *Itali* read *consentimus*. Bailey’s reading seems to make the best doctrinal sense of the whole passage, not just by comparison with Epicurus, but also when comparing this passage with Lucr. DRN 4.768-76, especially in light of ‘*sensibili quovis ... tempore in uno*’ (4.775) and ‘*quovis in tempore*’ (4.797). With respect to the systematic theory of *sensus* we have been tracing in Lucretius, the reading of OQ, *consentimus*, seems less likely than that of Bailey et al. It would yield no intelligible construction. Moreover, as we have seen, Lucretius seems to use *consentio* consistently throughout the poem to refer to the body feeling as a whole, perhaps akin to consciousness (cf. OLD esp. §1); but here Lucretius is discussing dream-sleep, in which that is not possible.

¹²⁵ Rouse and Smith 1992: 337 n.b also use the analogy of how cinematographic pictures function with respect to this process and phenomenon. Bailey 1947, iii: 1273 is dubious of the analogy.

Mickey Mouse appears as a continuous image - which image then seems either stationary or moving, relative to: its own position, the placement and shape of its body-parts relative to one another, and the background against which it is set. The eye seems to see both Mickey Mouse and the background objects at the same time. This is the very sort of process which Lucretius is describing, with the qualification that the objects in the background which one seems to see 'at the same time' would instead be perceived individually by means of their own particular *simulacra*.

Two aspects of the process of vision (here the vision of the *animus*) thus highlight the speed of the perception of time. There is some negligible amount of time during which each interaction between the *animus* and a single *simulacrum* takes place. There is a similarly minuscule interval of time between when one *simulacrum* is absorbed and the next comes up for interaction. The interactions thus occur in effectively immediate succession, resulting in the experience of a continuous feeling.¹²⁶ Therefore, there are far more intervals of time within an 'instant' than one can perceive.¹²⁷ Lucretius' repetition of the ablative of time within which, three times across these two passages and using very similar words, is emphatic. Such intervals can only be conceived of as distinct by *ratio* (4.796); in other words, they are conceptually divisible.¹²⁸ This does not mean that these intervals have - like bodies - an actual limit of division.¹²⁹

The order of 4.722-822, and particularly the considerable overlap between the two passages above, has been the source of some scholarly contention.¹³⁰ Regardless of whether it is true that Lucretius had not finished editing this, the overlap provides us with more information. However, the structure and echoes here are logical given the philosophical content and context in the poem. Lucretius' primary topic in these hundred lines is how the speed of the interactions and the thin, fine nature of the stimuli affect the vision of the *animus*, by analogy with the physiological mechanisms of the vision of the eyes. Such is his explanation from nature for why one seems to see the dead and other 'unreal' things during sleep and can think of them while awake.¹³¹ But an integral part of

¹²⁶ For a different explanation, cf. Sharples 2002.

¹²⁷ Cf. Bailey 1947, iii: 1277, Asmis 1984: esp. 107, 109, 120.

¹²⁸ Cf. Epic. *Ep. Hdt.* 62. We will return shortly to the issue of divisibility.

¹²⁹ On reasoning from the perceivably indivisible to the imperceptible indivisible in this way, cf. Lucr. *DRN* 1.746-52; this an argument made specifically about *corpora* and should not be taken to apply to time or space.

¹³⁰ Bailey 1947, iii: 1274, Asmis 1981, Asmis 1984: 121-2 n.4.

¹³¹ Cf. esp. Lucr. *DRN* 4.732-48, 757-67. With the latter, cf. Diog. Oen. fr.9 IV.7-VI.3 Smith.

this explanation is relativity - i.e. the speed of the vision of the *animus* relative to the speed of the perception of time. The need to bring out this detail justifies the structure.

The considerable verbal and conceptual echoes, particularly between 4.768-76 and 4.794-801, thus allow the latter arrangement to serve as a deliberate point of expansion of the former's ideas, but with different emphasis. This interpretation also helps to make sense of the otherwise 'dangly' lines, 4.818-22, about the shape-shifting of dream images.¹³² They constitute the last section of the return to the topic of *simulacra* and *sensūs* which are primarily externally relative, before Lucretius offers us the explanation that none of these *sensūs* came about teleologically. In the later sections of book four, all of which treat or expand on the implications of one's interactions with, especially, *simulacra*, this explanation is already in place and, periodically, assumed. For example, in the section devoted to dream-sleep, the image of the dancers and this explanation is reactivated by the repetition, in a similar context and metrical position, of *mollia membra*.¹³³

The relative slowness at which one perceives time has other implications for our understanding of certain mechanisms. There are numerous successive interactions in an instant, each interaction being with a distinct *simulacrum*, and corresponding *sensifer motus* occurs indescribably fast. Partly for this reason, the *mens* is apparently able to think of whatever it desires to 'instantly', even if it cannot move the whole body quite that fast.¹³⁴ Moreover, the potential number of interactions occurring within any interval of time - moments, days, seasons, years, a lifetime - quickly becomes beyond reckoning. For this reason, Lucretius needs to mention, as he does immediately following the above lines,

¹³² A further advantage of this alternative, e.g. to the interpretation posed by Asmis (in Asmis 1981 and Asmis 1984: 121-2 n.4), is that it explains the structure of the text as it stands without recourse to some textual emendation - either in an unfinished form by Lucretius or somewhere relatively early in the history of the work's transmission (i.e. at latest in the archetype of the 9th century MSS).

¹³³ The echoes here are particularly strong with *Lucr. DRN* 4.794-801 and - partly through those - recall 4.768-76 as well. In addition to the idea that the *animus* has these perceptions both while waking and in dream-sleep, see: '*mollia membra movere*' (4.789), '*mollia membra moventis*' (4.980), cf. also '*bracchia ... membra*' (4.769) with '*mollia membra ... mollia ... bracchia*' (4.789-90). Also, it is only at 4.980 that we are explicitly told those moving their members thus are also '*saltantis*' or dancing (a hapax with respect to Lucretius), although the aforementioned passages certainly suggest it, e.g. by '*in numerum*' (4.769, cf. 2.631) among other aspects of the figures' description.

¹³⁴ *Lucr. DRN* 4.779-87 (N.B. '*extemplo*', '*simul ac volumus*', '*sub verbone*'); cf. *Epic. Ep. Hdt.* 48 that their genesis occurs (at least) at the speed of thought, but this may be a figure of speech, as he also uses it of the motion of atoms in the void but then goes on (at *Ep. Hdt.* 61-2) to say that atomic movements happen at a speed which only reason can fathom. The *mens* cannot move the body at the speed of the perception of time, as one seems to perceive some lapse between *voluntas* and stirring or curbing of the whole body's motion; *Lucr. DRN* 2.263-83. We will return to the relationship of thought, *voluntas*, and action and the processes that relate them; cf. esp. pp. 247-66.

why the *animus* - or indeed any 'sense-organ' - interacts with the particular ones which it does (out of the infinite possible interactions available to it) within a given space of time. Similarly, the process which shapes that selection occurs indescribably fast.

Lines 4.794-801 also clarify that the now or the smallest perceptible moment of time is equivalent to the time it takes to emit one sound ('*cum vox emittitur una*').¹³⁵ Circumscribing apparent simultaneity, this interval is equivalent to the smallest perceptible change in the relations of things: e.g. with respect to their positions, order, arrangement, motions, interactions, and the rest. Lucretius measures it in the same way.¹³⁶ Elsewhere, Lucretius describes the emission of a sound as a gathering of first-beginnings of sounds ('*primordia vocum*', 4.531) proceeding through passages from deep within the body, scraping those passages in the process, and shaped by the tongue and lips as they are sent forth through the mouth.¹³⁷ As rapidly as one emits one hearing-causing assembly, even the smallest possible, the steps of that physiological process occur far more swiftly.

One can reason by analogy from the movements of the smallest perceptible body, i.e. a dust-mote, to those of the smallest extant bodies, namely the first-beginnings of things. Nevertheless, Lucretius' case for the existence of the first-beginnings is made on different grounds. Thus it is implausible, at least with respect to Lucretius, to reason from the existence of perceivable instances to minimal units of time and space and their implications for atomic motion¹³⁸ - in other words, to so-called time-atoms, space-atoms,

¹³⁵ Bailey, Asmis, and Morel, for example, also observe this; cf. Bailey 1947, iii: 1273, Asmis 1984: 120, Morel 2002: 198. On the signification of the word *vox*, cf. esp. pp.282-6 and Koenen 1999.

¹³⁶ Cf. above pp.120-1 on Lucr. *DRN* 1.459-63.

¹³⁷ On this, also cf. esp. pp.282-6.

¹³⁸ Long and Sedley 1987: i.50-2 are somewhat more sympathetic to the theses against which this paragraph argues with respect to Lucretius.

and minimal parts of those units.¹³⁹ For Lucretius, space itself is both infinite and infinitely divisible. There is no physical or conceptual limit to the number of divisions which would divide any particular measure of it (i.e. place), however arbitrarily defined, because no measure of it would lack extension. Time itself is infinite and infinitely divisible in the same way.¹⁴⁰ Thus there is no need for the movements of any *primordium* to occur in a ‘jerky’ manner with respect to either its spatial or temporal trajectory.¹⁴¹ The term ‘swerve’ thus exaggerates the nature of the movement involved in the *clinamen*; as we have seen, Lucretius actually describes it as approximating the slightest inclining which one could call a changed motion. Moreover, (i) as speed is simply the measure of an interval of space (i.e. distance) traveled over an interval of time, and (ii) as any account of direction in the void is arbitrary, the result is that (a) the smallest conceivable distance which one *primordium* could travel at any angle and (b) the correspondingly smallest conceivable fraction of time which that could require, would both still be infinitely divisible. For this reason Lucretius can claim, as he does, that *primordia* move continuously and motion is a *coniunctum* of body. The most concise evidence that he believes time, space, and motion (in the void) to be continuous is this:

est igitur natura loci spatiumque profundi,

Therefore the nature of space and the space of

¹³⁹ The most pertinent ancient evidence concerning the possibility of a belief in time-atoms by Epicurus, and Epicurus’ ideas about time more generally, includes: Sext. Emp. *M.* 10.142-54, 181-8, 238-47, Simp. *In Ph.* 934,26, a possible attribution by Demetrius of Laconia in *PHerc.* 1012 col.31, 4-8, *PHerc.* 698 fr.23N, and, of course, both Epic. *Ep. Hdt.* 56-9, 72-3 and *PHerc.* 1413 [= Arr.² 37]. Barigazzi 1959: 30-32 and Arr.²: 650 attribute *PHerc.* 1413 to Epicurus’ *On Nature* 2; Sedley 1998a: 118-19 on the other hand, attributes it to book ten. While testimonia are the main-stay of Sorabji’s evidence for such a belief, these authors had their own interpretation, agenda and, sometimes, vocabulary; cf. e.g. Barigazzi 1959: 42-3 challenging Sextus’ rendering of Epicurus’ ideas on time. Warren observes that despite the testimonial evidence, the Epicurean references to the times conceivable by *ratio* and λόγος ‘need not be atomic’; Warren 2006: 368 n.16. Had Epicurus actually posited time-atoms, or - for that matter - space-atoms, Lucretius would probably have not - on the reading of our investigation - veered so far in the other direction. Moreover, Epicurus’ claim that atoms in the void move at the speed of thought (*Ep. Hdt.* 61) seems to be mere figurative language, as he also uses this comparison for speed at which *simulacra* are generated (*Ep. Hdt.* 48), which cannot occur as quickly, and as he goes on to state that the speed of atomic movement occurs at a pace which only reason can fathom (cf *Ep. Hdt.* 62). On the side of the time-atom thesis, cf. e.g. Bailey 1947, iii: 1277, Sorabji 1983: 371-7 (esp: 375-7), Asmis 1984: 283, Morel 2002: 198 (although he acknowledges that Lucretius does not speak of this), and, more recently, Gœury 2013 (although she acknowledges that, with the possible exception of some Herculaneum papyri, Epicurus does not explicitly endorse this thesis and that ‘la notion de durée indivisible risque de suggérer, du point de vue d’Épicure, une substantialisation du temps qui va contre sa caractérisation insistante du temps comme accident’; Gœury 2013: 552). On the side of infinite divisibility of time, cf. e.g. Caujolle-Zaslavsky 1980, Berns 1976: 478 n.4. For discussion of select points with regard to the time-atom thesis, my thanks to Gordon Campbell.

¹⁴⁰ The smallest conceivable measure of time would probably be the time required for a *primordium* to move a distance equal to its own size through the void; but that measure too would be infinitely divisible without lacking duration. On duration being one of the criteria for motion, cf. Sorabji 1983: 333. With respect to the issue of succession: the ‘now’ never actually stops or starts, with no boundary in between one perceptible moment and the next. Presumably perceivers could be staggered in the same manner as clocks, so as to show that time itself has no limit of division, even if a given individual’s perception of it does; cf. Sorabji 1983: 367, 383.

¹⁴¹ Cf. Epic. *Ep. Hdt.* 62.

quod neque clara suo percurrere fulmina cursu
perpetuo possint aevi labentia tractu
nec prorsum facere ut restet minus ire meando
DRN 1.1002-5

the vastness exists; the bright lightning bolts,
gliding the perpetual extent of time, cannot
run its full course, nor can they make one
dent in the journey left to travel onwards.

Here, *perpetuus* seems to mean both continuous and without end, and *labor* suggests continual motion; if the infinite void were not continuous, such motion would not be possible and perhaps progress might be.¹⁴² Thus, *pace* Morel, regardless of what modality one considers, time itself is continuous.¹⁴³ The past and future, as the ‘Symmetry Argument’ shows, are also infinite.¹⁴⁴

Cases of apparent simultaneity are useful for clarifying the relative speeds of the processes underlying our experiences. One seems to hear a nearby other at the same time as that individual emits a sound; so speaking and hearing oneself should also occur simultaneously.¹⁴⁵ This suggests how swiftly sound-causing bodies move through the air, as well as how swiftly the mechanism of hearing works. Sound-causing bodies are transmitted through the air more rapidly than smell-causing bodies are, but far less so than *simulacra* which interact with the eyes.¹⁴⁶ This last, in turn, is much less rapid than the aerial transmission of *simulacra* which interact with the *animus*, whose transmission seems generally to occur faster than the speed of light through the heavens.¹⁴⁷ The consequent speed of thought is indescribably fast on this reading, particularly given that

¹⁴² Similarly, for Lucretius, the infinity of the void guarantees that the motion of the spear, once thrown and if unobstructed, will continue without end - either spatially or temporally; Lucr. DRN 1.968-83. Compare Lucretius’ lightning bolts and flying spear to Zeno’s paradox of the flying arrow. For Zeno, the infinite divisibility of time leads to an arrow’s lack of motion at any and every conceivable instant; cf. Sorabji 1983: 332-4.

¹⁴³ Morel plausibly identifies three modalities of time: time which can be represented by reason alone, perceivable time, and eternity. The first of these, however, he seems to equate with atomic time, which he finds to have at best ‘une unité éminemment friable’, as though it were a succession of time-atoms of the sort towards which Sorabji leans; Morel 2002: 205-6.

¹⁴⁴ Lucr. DRN 3.832-42, 3.862-9, 3.972-7, 3.1073-5, 3.1087-94. Cf. Cic. ND 1.21. For discussion, cf. esp. Warren 2001, Warren 2004: 57-108.

¹⁴⁵ Lucr. DRN 4.553-71. One emitted sound often, as we have seen, then immediately splits up and diffuses into many identical assemblies - a single one of which suffices to effect one’s hearing of the initial emitted sound through interaction with the ear. One seems to hear a speaker at the same time as the speaker emits a word (by contrast to the delay one sometimes experiences between seeing distant lightning and hearing its thunder; on which cf. 6.174-72); cf. esp. Koenen 1999 and Koenen 2004. So it would seem that when one hears oneself emit a single hearing-causing particle (one incapable of being divided further without passing outside of its boundaries and ceasing to exist), the time between emission and hearing is the limit of the perception of sound with respect to both the speed and the quantity of stimulus. Analogously, under the optimal conditions of light, the limits of sight occur at the level of the dust-motes; cf. Lucr. DRN 2.112-41. These are the smallest bodies which the vision of the eyes is able to perceive as distinct entities. There is no indication that the vision of the *animus* is able to perceive smaller ones. Our ability to conceive of them occurs by analogy and is not directly a function of *sensus* but of *ratio*.

¹⁴⁶ Lucr. DRN 4.687-705, 6.164-72; cf. p.99.

¹⁴⁷ The nearest *comparanda*, for the *simulacra* which interact with the eyes, seem to be the speed at which heat and light travel from the sun to the earth through the air (not through the void, as the heavens are part of the system of the cosmos). Asmis too notes this comparison; Asmis 1984:110 n.17. There is no speed faster than that of the first-beginnings moving through the void, which seems both constant and so swift as to be virtually infinite; cf. Lucr. DRN 2.142-64, 4.183-216.

interaction with but one *simulacrum* may effect it.¹⁴⁸ Nevertheless, due to the limits of the perception of time, the vision of the eyes seems to occur as swiftly as thought does.

The whole process of seeing - from the shedding of *simulacra* by the source-object, to their interaction with the eyes, to the emergence of the *sensus* of sight itself - takes place within a perceptible moment. According to Lucretius, we see ourselves reflected in the mirror as soon as it is placed before us - apparently instantly and continuously:

et quamvis subito quovis in tempore quamque
rem contra speculum ponas, apparet imago;
perpetuo fluere ut noscas e corpore summo
texturas rerum tenuis tenuisque figuras.
ergo multa brevis spatio simulacra genuntur,
ut merito celer his rebus dicatur origo
DRN 4.155-60

And at any moment, however suddenly you may place any thing before the mirror, the image is visible - so that you learn that fine structures and fine shapes of things constantly flow from the surface of body. Therefore many *simulacra* are generated in a brief time, with the result the origin of these things is justly called swift.

The succession of *simulacra* which are involved in this sight are both produced and transmitted with extreme rapidity. The constant flow suggests that there is no interval of time, however small, separating the emission of one *simulacrum* and generation of the next;¹⁴⁹ they are continually coming into being, with the corresponding loss of matter for the source object in however brief a period of perceptible time. Hence an indescribably vast number of *simulacra* make up a stream, each of which interacts with the eye in one moment of sight. Indeed, the *simulacra* in question can travel to a much farther mirror without delaying the experience.

hoc etiam in primis specimen verum esse videtur
quam celeri motu rerum simulacra ferantur,
quod simul ac primum sub diu splendor aquai
ponitur, extemplo caelo stellante serena
sidera respondent in aqua radiantia mundi.
iamne vides igitur quam puncto tempore imago
aetheris ex oris in terrarum accidat oras
DRN 4.209-215

This above all seems also to be true evidence of with how swift a motion the *simulacra* of things are borne: the fact that at the same time as a sheen of water is first placed beneath the heavens, immediately the serene shining stars in the glittering sky of the world¹⁵⁰ are reflected in the water. Do you now see, therefore, how the image falls instantly from the far reaches of the aether to the boundaries of the earth?

One's agreement with this proof that the stars' reflection occurs as the puddle comes into being relies upon one's simultaneous perception of that reflection. The speed at which *simulacra* travel and the physiological mechanism underlying sight are both so fast that

¹⁴⁸ Asmis too notes that the relative speeds of *simulacra* would suggest that (the speed of internal mechanisms being equal) thought should occur faster than vision; Asmis 1984: 111. This is not dissimilar from the idea of racing thoughts, or from the idea that in an instant we perceive many things of which we are not consciously aware. The latter has become the basis of a memory retrieval exercise used in forensic science, known as a 'cognitive interview'.

¹⁴⁹ This is perhaps further evidence against the thesis of actual minimal units of time.

¹⁵⁰ I.e. the cosmos.

the entire process of seeing these reflected heavenly bodies occurs within a single perceptible moment.

Similar considerations explain the experience of simultaneous perceptions.

et quantum quaeque ab nobis res absit, imago
efficit ut videamus et internoscere curat;
nam cum mittitur, extemplo protrudit agitque
aera qui inter se cumque est oculosque locatus,
isque ita per nostras acies perlabitur omnis
et quasi perterget pupillas atque ita transit.
propterea fit uti videamus quam procul absit
res quaeque; et quanto plus aeris ante agitur¹⁵²
et nostros oculos perterget longior aura,
tam procul esse magis res quaeque remota videtur.
scilicet haec summe celeri ratione geruntur,
quale sit ut videamus et una quam procul absit
DRN 4.244-55

And an image¹⁵¹ effects that we see to what extent each thing is withdrawn from us and helps us to distinguish. For, when the image is sent, it immediately thrusts and drives forward the air - whatever is located between itself and the eyes. And this all slips through our eyes thus: it both brushes, as it were, the pupils and passes through in this way.¹⁵³ For this reason it happens that we see how far withdrawn each thing is. And by how much more of air is tossed before it and the longer the breeze brushes our eyes, so much more distant does each removed object seem to be. Obviously these things are conducted in an extremely swift manner, such that at one and the same time¹⁵⁴ we see what sort of thing it is and how far it is withdrawn.

The respective interactions that give rise to the perceptions of the source-object and its distance from the perceiver must occur in succession, however rapidly.¹⁵⁵ These interactions culminate in the perception of one image and its distance for one moment. It is the same moment because the eye interacts with both the stream of *simulacra* and the air driven by the constituents of that stream at a speed which is extremely rapid relative to the perception of time. Finally death and the permanent cessation of one's faculties should occur with precise simultaneity, even at the micro-level, to the reaching a critical sundering of the psycho-physiological arrangement of constituents which is integral to a creature's existence as such.¹⁵⁶

¹⁵¹ Here *imago* seems to refer to each member of a stream of *simulacra*, taken individually.

¹⁵² What are here Lucr. DRN 4.250 and 4.251 were transposed from the reverse order by Marullus; cf. Bailey 1947, iii: 1213.

¹⁵³ In this context, 'is' is modified by 'omnis' and therefore refers to both the air and the *simulacra*, taken individually; cf. Bailey i: 374 and iii: 1213, contra Rouse and Smith 1992 *ad loc.* The juxtaposition of 'perterget' and 'transit' suggests at once contact (i.e. collision) and frictive interaction - during an assembly's contact with and entrance into the passages of the eyes. The claim that this passage is referring to those processes is perhaps strengthened by the fact that there are a number of verbal echoes with DRN 4.714-18, which also concerns *simulacra* entering eyes: sc. the repetition of 'acies' (which in both cases means eyes) and 'pupillas', as well as, perhaps, 'mittitur'/'inmissa'; on said passage cf. pp.99-100. *Transeo* is also used in similar contexts later, at DRN 4.600 and 4.987, where it seems to mean quite clearly 'to pass through', as we have seen. Otherwise it may be tempting to take 'transit' here in the sense of passing away or ceasing, in the manner of the absorption of food. Given importance of time and its perception in this passage, one also might wonder whether the choice of 'geruntur' here perhaps recalls 'geruntur' (1.472) and 'gerantur' (1.482).

¹⁵⁴ Here the adverb 'ūnā' seems to be stronger than 'tempore in uno' (4.775, 4.794), at least by virtue of expressing the idea in a single word, if not also by obviating the potential ambiguity in *tempore* of perceivable time.

¹⁵⁵ Unless one would posit that two stimuli (of whatever sort(s)) can occupy precisely the same place at exactly the same time.

¹⁵⁶ The twitching and so forth of suddenly severed parts, cf. Lucr. DRN 3.642-69, are still in the process of giving up their equivalent of the metaphorical dying breath.

Lucretius' account of cosmogony and the plurality of all created things is also clarified by this reading of the *sensus temporis* as a second-order *sensus*. In the case of, especially, sight and thought, we have seen that an immense number of interactions take place within a perceptible moment, despite the vast distances which the *simulacra* may also travel during that moment.¹⁵⁷ *Primordia* in the void move swiftest of all. Therefore, the possibilities of interaction - and indeed their probability - become quite plausible, given infinite matter (moving constantly at incredible speed) and infinite time. Infinite space is thus no bar to the formation of assemblies of whatever size and complexity, including identical worlds. On this scale it is physically probable that every living creature, as an assembly, has existed and will exist again (with equal claim to reality), albeit with no memory or knowledge of any former lives.¹⁵⁸

Insofar as the *sensus temporis* is a perception of other perceptions, and all *sensūs* entail *sensiferi motus*, its proximate cause could be said to be internal relative motions. To this degree, then, this perception is a perception of one's own constitution. Nevertheless, as the motions of the *sensūs* upon which the *sensus temporis* is based very often begin from interaction with external stimuli, it is perhaps better characterized as both internally and externally relative. Both animals and humans can perceive time. This shows, among other things, that swiftness of the underlying physiological mechanisms is true of all living creatures. That same swiftness also applies to the workings of the *sensūs animi* whose proximate micro-level cause is internal, involving certain motions of one's constituents relative to the rest of the constitution, such as the emotions.

III. EMOTION

Lucretius' proof that the *animus* or *mens* is a physical part of a human being¹⁵⁹ is the fact that the *sensus animi* (3.98, 104), as a faculty, exists and is localized in a fixed part of the body - namely, in the middle of the breast around the heart.¹⁶⁰ The first examples

¹⁵⁷ Cf. Epic. *Ep. Hdt.* 46-7. This interpretation is in general agreement with that of Asmis 1984: 107-11.

¹⁵⁸ Lucr. *DRN* 3.670-78. Proof of the infinity of matter, e.g. in the analogy of the creation of a ship from wrecks, assumes infinite time and space and motion, cf. 2.547-68. For other implications of the postulation of these infinities by Lucretius, cf. e.g. Kennedy 2013.

¹⁵⁹ Some aspect of the larger passage were already treated and others will be treated further in ch.5. Discussions which have been particularly useful with respect to the issues presently at hand include: Annas 1989, Procopé 1993, Sedley 1998: 68-72, Sanders 2008.

¹⁶⁰ That the locus of the *sensus animi* is the heart is already indicated by the use of '*cordis*' at Lucr. *DRN* 3.116, as we have seen.

which he cites to this effect are *laetitia*, *miseria*, and *cura*.¹⁶¹ He next proves that the *anima* is also a physical part of a person, affirms the joint being and nature of the complex, and emphasizes that the *mens* or *animus* is the proverbial ruler of the whole.¹⁶² Lucretius then returns to the location of the *animus*, proving this from its feelings.

idque situm media regione in pectoris haeret.
hic exultat enim pavor et metus, haec loca circum
laetitiae mulcent: hic ergo mens animusquest
DRN 3.140-2

And this is firmly fixed in the middle region
of the *pectus*, for here terror and fear spring
up; around this region joys delight.¹⁶³ Here,
therefore, is the *mens* and *animus*.

As *laetitia* was already identified as a feeling of the *animus*,¹⁶⁴ it is, on the basis of these lines, also possible to label *pavor* and *metus* as such.¹⁶⁵ By thus using the examples of *laetitia* and *miseria* in 3.94-160, Lucretius indicates that certain feelings which can be understood as pleasures and pains are among the *sensus animi*. With the examples of *cura*, *metus*, and *pavor*, he shows that feelings more clearly distinguished as emotions are as well. As we saw in chapter two, the *sensus animi* entail *sensifer motus* - including, explicitly, *cura* experienced during dream-sleep.¹⁶⁶ This is true of all emotions. Other emotions explicitly mentioned with reference to dream-sleep include terror and horror; love, joy, and grief are more implicitly suggested.¹⁶⁷ The nature of these feelings bears further nuancing.

Laetitia and *miseria* can be construed as both (a) examples of psychological pleasure and pain, and (b) emotions characterized by pleasure and pain - almost by definition. So, a particular use of *laetitia* could mean something like (a) delight, or (b) joy, which is pleasurable; likewise, *miseria* could render (a) affliction, or (b) misery, which is

¹⁶¹ Respectively, and quoted verbatim: *laetor* (Lucr. DRN 3.106), *laetitiae motus* (3.116), *miser [esse] ex animo* (3.109), *cura* (3.116). Lucretius also indicates by the periphrasis '*laetitiae motus*' that at least this particular feeling involves movement, perhaps suggesting the idea of *sensifer motus*.

¹⁶² A point to which we shall return at esp. pp.262-4.

¹⁶³ Implied: delight by soothing.

¹⁶⁴ *Laetitia* (Lucr. DRN 3.150), and *gaudeo* (3.145).

¹⁶⁵ This is swiftly affirmed with respect to *metus* and *pavor* in Lucr. DRN 3.152-60. There, as have seen, Lucretius states that a particularly vehement *metus* or *terror animi* can be transmitted from the *mens* to the *anima* and body, such that the whole feels as one (*consentio*). The possibility that such motions can be transmitted is perhaps implied already in 3.143-4. Contra Konstan 2008: 21-2, these instances of both *pavor* and *metus* apply to all living creatures, as does *metus* at 2.19; this alone suffices to undermine his characterization of these terms as generally indicating the fear of animals and humans respectively. Of *metus* and animals specifically, cf. e.g. 5.1061. *Pavor* is used of the whole human race, including kings, at 5.1219. Konstan's example of *paveo* with respect to the fear of children at 2.376 is incorrect. That line reads '*pavit aequor*' with *pavit* < *pavio* and has naught to do with fear.

¹⁶⁶ As we have seen, *curae* and other emotions experienced during dream-sleep are *inanis* (3.116); cf. p.66.

¹⁶⁷ The following are quoted verbatim. Terror: *terrificet* (1.133), *terrificant* (4.34), *exterruntur* (4.1022). Joy: *laetitiae motus* (3.116). Horror: *horrifice* (4.36). Pain/grief: *dolor*: 4.1015. Cf. terrors, fears, and other emotions which are related - as we shall see - also to false beliefs: 1.102f, 1.146-8, 2.55-61, 3.87-93, 4.1097-1100, 6.35-41.

painful.¹⁶⁸ Such terms can thus be both feelings (in and of themselves) and ways of characterizing other feelings.¹⁶⁹ Certain terms for pleasure and pain may refer to what we might call the psychological, the physical (i.e. the rest of the body), or the whole. For example, in common Latin usage and Lucretius, *dolor* can mean both pain and grief, which itself can be painful; similarly, *voluptas* may mean pleasure of many kinds, which do not seem to be mutually exclusive. Because such terms are inherently inclusive and because, for Lucretius, that often signifies an underlying relationship, one should not preferentially assume one meaning of such words over another unless indicated by context. Indeed, for Lucretius, *dolor* renders both the experience of a certain type of disturbance in the bodily frame and the experience of a certain type of disturbance in the *animus*.¹⁷⁰ Moreover, *voluptas* and *dolor* are explicit cases of *sensiferi motus* which can either (1) begin from *mens*, specifically from the movement of the nameless fourth, and potentially be transmitted to the whole, or (2) begin from the body and potentially penetrate to the *animus*.¹⁷¹ Lexical flexibility (with respect to the part of the body in which these feelings occur) further suggest that, contra Konstan, considerations of ‘rational’ and ‘irrational’ do not apply - even as a means of designating location - to the more specific terms.¹⁷² Indeed, as Warren shows, there are pleasures and pains related specifically to *ratio*.¹⁷³

Lucretius’ account of the origins of language further evinces that pleasure and pain are *sensūs animi* and demonstrates that they are common to both humans and animals.¹⁷⁴ The account of language will be treated further in chapter five. For now, let it suffice that the development of language exemplifies this:

¹⁶⁸ Thus the adjective *laetus* would approximate ‘glad’ or ‘feeling joy’, and *miser* ‘wretched’ or ‘feeling afflicted’.

¹⁶⁹ This is consistent with the concept and mechanics of pleasure and pain discussed at pp.68-70 with particular emphasis on the *sensus corporis*, as well as with the inclusive nature of such terms in general.

¹⁷⁰ With respect to the latter, cf. the dichotomy between *ταραχή* and *γαλήνη* in Epicurean thought, on which cf. p.181 (incl. n.48).

¹⁷¹ Lucr. *DRN* 3.245-57, esp. 251-2.

¹⁷² Konstan 2006b: 199-204. Konstan also denies that any kind of pleasure or pain could be felt in what he considers τὸ λογικόν, only what he considers their cognitive counterparts (i.e. joy and fear); Konstan 2008: 10-18. The above findings Konstan gets around by accusing Lucretius of speaking imprecisely; cf. Konstan 2008: 11.

¹⁷³ Warren 2014: e.g. 80-2 on the pleasures of learning and knowing, according to the Epicureans; cf. 4-7 on the three primary categories to which the ‘pleasures of reason’ fall into across the thinkers considered by Warren, namely (p.4): ‘(I) pleasures and pains of learning, knowing, and understanding; (II) pleasures and pains involved in planning and prudential reasoning; (III) pleasures and pains from anticipating and remembering’, and 9-12 on the issue of the relationship between reason and the emotions - ultimately but cautiously expressing, at n.15, agreement with Konstan 2008: 18-22 on the possibility of animal emotion. Konstan’s views will be treated throughout this section.

¹⁷⁴ According to Konstan, any such attributions to animals by Lucretius are merely analogical; cf. e.g. Konstan 2008: 22n.30. By Konstan’s logic (cf. p.274 n.226) this would constitute a false belief on the part of the poet (or an attempt to inculcate one), but Konstan does not think that Lucretius held this belief.

sentit enim vis quisque suas quoad possit abuti
DRN 5.1033

For each creature feels to what extent it can
make use of its powers.

The context of these lines shows that Lucretius is talking about living creatures in general - at least those of the land and air (vs of the sea). These are human and animal, young and grown, male and female, generally untamed predators and docile animals of the pastures and home whose species are generally in a symbiotic relationship with humans: 'pueros' (5.1031), 'vitulo' (5.1034), 'catuli pantherarum' (5.1036), 'scymni ... leonum' (5.1036), 'alituum ... genus' (5.1039), grown humans (5.1041-58, 5.1089), 'canum ... Molossum' (5.1063), male and female horses at the reproductive age (5.1074), and a named variety of birds (5.1078-86). Animals at least have some means of expression by which they communicate with one another (if not also with humans)¹⁷⁵ and, like humans, they make various sounds under various circumstances in accordance with their feelings.¹⁷⁶

postremo quid in hac mirabile tantoperest re,
si genus humanum, cui vox et lingua vigeret,
pro vario sensu varia res voce notaret?
cum pecudes mutae, cum denique saecla ferarum
dissimilis soleant voces variasque ciere,
cum metus aut dolor est et cum iam gaudia gliscunt.

...
ergo si varii sensus animalia cogunt
muta tamen cum sint, varias emittere voces
quanto mortalis magis aequumst tum potuisse
dissimilis alia atque alia res voce notare
DRN 5.1056-61, 1087-90¹⁷⁹

Finally, what in this situation is so very marvelous if the human race, for whom the *vox* and tongue are lively, were marking things with a different sound for a different *sensus*, when *mutae* herds - when even generations of wild animals¹⁷⁷ - are accustomed to produce different and various sounds when there is *metus* or *dolor* and when now *gaudia* swell up. ... Therefore, if various *sensūs* compel animals,¹⁷⁸ although they are nevertheless *muta*, to emit various sounds, how much more fitting is it that humans were able to mark different things by means of different sounds?

In these lines, *sensus* seems to mean feeling in general, as it includes at least *metus*, *dolor*, and *gaudia*. Now *dolor* and *gaudium* can potentially refer either to bodily pain and pleasure or to grief and joy, as noted above. For reasons which will shortly become clear, *gliscunt* suggests the latter interpretation at least with respect to *gaudia*; *metus* almost certainly means fear in this context. This is thus a list of emotions or a list including emotions.¹⁸⁰ Other feelings linked to animal language in the larger context of the account

¹⁷⁵ Cf. esp. Lucr. DRN 5.1063-86.

¹⁷⁶ On this parallel between animals and humans from the point of view of underlying mechanisms, cf. Koenen 1999.

¹⁷⁷ Here '*saecla ferarum*', because of its opposition to *pecudes*, seems to refer specifically to wild animals (in the sense of existing outside of interspecies communities with humans).

¹⁷⁸ It is clear from context that '*animalia*' here refers specifically to animals, and not to all living creatures.

¹⁷⁹ Content, context, and the strong verbal echoes encourage this juxtaposition of Lucr. DRN 5.1056-61 and 5.1087-90. On the verbal echoes, cf. Gale 2009: 190.

¹⁸⁰ Gale suggests that these feelings are both emotions and sensations and that Lucretius is using *metus* and *dolor* as the 'psychological and physical opposites' of pleasure or *gaudium*, thus 'the three most basic emotions/sensations' instinctively motivating the animals' actions of articulation; Gale 2009: 189.

include anger (5.1035, 5.1063-6) and *amor* (5.1075) - a topic to which we will return shortly. In either case these lines are further evidence that the emotions are a type of *sensus*, affirming the contention of Boyancé that ‘en réalité cette distinction est moderne et ne correspond à rien dans le texte de Lucrèce’.¹⁸¹

Lucretius thus represents the emotions as feelings and the capacity to feel emotions as another sort of sixth sense common to all living creatures. It may come as a surprise to some that the emotions fall under the umbrella of *sensus*. Fowler suggests that in looking at ancient theories of the emotions, one often focuses on either the physiological aspect or the cognitive aspect. With respect to the example of anger, then, an analysis could focus either on the boiling of blood and heat around the heart or on the desire for retribution - based, in part, on one’s beliefs.¹⁸² The current understanding of the emotions in Epicureanism is primarily founded on analysis of their phenomenology and the so-called therapeutic approach. Scholarly focus has been on the influence of emotion - especially of anger, love, fear, anxiety, and grief - on one’s ability to achieve ἀταραξία.¹⁸³ But that is not a complete picture. It does not adequately explain, for example, why or how the *sensus corporis* and other faculties of the *animus-anima* complex play a crucial role in at least some emotions.

This remainder of this section reconstructs Lucretius’ account of the ontology and aetiology of the emotions in general, and with particular emphasis on the finale of book four. It shows that this finale represents the most developed case study in the underlying physiological mechanisms of an emotion offered by the poem - or indeed by any extant Epicurean text. In the process, it sheds new light on Lucretius’ conception of *amor* and his choice to conclude book four on this note. It also further challenges - at least with respect to Lucretius - the scholarly claims that emotions are irrational and exclusive to humans. Before proceeding with the rest of this analysis some discussion of the concept of emotion and terminology is in order.

¹⁸¹ But ‘in reality this distinction [between sensations and emotions] is modern and does not correspond to anything in the text of Lucretius’; Boyancé 1958: 138.

¹⁸² As we will see, the beliefs themselves also involve certain physiological, ‘cognitive’, and context-driven factors; cf. D. Fowler 1997: 16-17 and *passim*.

¹⁸³ The work of Annas (1989, 1992), Asmis (2011), Konstan (e.g. 2006a, 2006b, 2008: esp. ch.1, 2013a, 2013b), Nussbaum (1994: esp. chs.4-7), Segal (1990), Sanders (2007, 2008, 2009, 2011), and Tsouna (2007, 2009, 2011), among others, is noteworthy in this respect and the figure of Philodemus has rightly loomed large, particularly his treatise *On Anger*. On Epicurean therapeutics in general, cf. e.g. Nussbaum 1994, and Tsouna 2007.

Insofar as the modern concept of emotion existed in ancient thought, it lacked a precise or consistent term. Sometimes what we would probably call emotions are classified as *πάθη*, at other times as *αἰσθήσεις*. The boundaries and complementarities between these terms were not well defined. For example, *πάθη* sometimes included the feelings of pleasure and pain, and/or appetites and desires, among other things which might not be considered emotions today, and which are at times called *αἰσθήσεις* even then.¹⁸⁴

Terminology has loomed large in discussion of the emotions in Epicureanism. Some of the discussion revolves around the testimony of Diogenes Laertius. In D.L. 10.31-4, a discussion of epistemology, Laertius claims that Epicurus believed that it is through *αἰσθήσεις*, *προλήψεις*, and *πάθη* that we empirically know and experience the world.¹⁸⁵ It is by no means clear from Epicurus' own words just how he used the term *πάθη*. Konstan and Knuuttila take it to mean 'irrational' pleasures and pains, which they find more closely associated with corporeal sensations, and do not take it to refer to the emotions at all.¹⁸⁶ Konstan further argues that the 'real' emotions, for example joy and fear, are complex psychological affects of the 'rational soul', and that some, like anger, also involve the 'irrational soul',¹⁸⁷ a theory which we have already discounted with respect to Lucretius. Konstan explains the fact that Philodemus describes anger as a *πάθος* by a later Stoicized evolution in terminology.¹⁸⁸

There may well have been some Stoic influence on the broader language of philosophical discourse by the end of the first century B.C.E.¹⁸⁹ Konstan does not seem to consider the possibility that a similar evolution in the discourse may have influenced his own measuring stick - i.e. Laertius' choice of terminology - centuries later. Regardless,

¹⁸⁴ On the ambiguous and potentially inclusive nature of *αἰσθήσεις*, cf. e.g. p.56, Frede 1987, and Clements 2014. This is probably even more true of *πάθος*. With respect to *παθήματα* and the like, cf. esp. Solmsen 1961a: 165, Konstan 2006a. For another interpretation of the history of these terms and their relationship in various ancient and contemporary discussions, cf. also Konstan 2008: 1-8.

¹⁸⁵ Cf. esp. D.L. 10.31 and p.166-7.

¹⁸⁶ Konstan 2006b: esp. 194, 199-201, 205, Konstan 2008: 10-18, 23-4. Knuuttila, for example, likewise concurs that in Epicurus' theory, emotions involve beliefs and that some also involve feelings (by which he means corporeal sensations), and suggests that pleasure and pain are like perceptions; Knuuttila 2004: 86.

¹⁸⁷ Konstan 2006b: 199-204. Cf. esp. Konstan 2008: 10-18 and Konstan 2013a.

¹⁸⁸ Konstan 2006b: 203-4, Konstan 2008: 11-12n.15, 22. However, Konstan does not seem to consider the possibility that if there was a change in terminology among Epicureans by the first century, it might also apply to Lucretius - who, Konstan argues, is using *animus*, *mens*, and *consilium* to translate τὸ λογικόν. nevertheless, he acknowledges that, at least according to Usener 1977 and, presumably, his own research, the term τὸ λογικόν appears nowhere in Epicurean writings other than in the scholion to D.L. 10.66; Konstan 2006b: 198-9, Konstan 2008: 7-9, cf. Bailey 1947, ii. 1005-6. (That scholion is of debatable merit, as we have seen.) Consulting Usener 1977 confirms this and this investigation has found no evidence to the contrary.

¹⁸⁹ Cf. esp. p.47.

such a thing is not necessary to explain Philodemus' usage here. For example, D.L. 10.34 could just as easily be interpreted simply to state that the *πάθη* of pleasure and pain are the basis of choice and avoidance in all living creatures, and not that they are the only *πάθη*. If indeed D.L. 10.34 accurately reflects Epicurus, then an interpretation of *πάθη* as an umbrella term - including pleasure and pain, as well as the emotions¹⁹⁰ - would not require Philodemus to be inconsistent with the use of the term in D.L. 10.¹⁹¹

Given the well-documented veneration of the Epicureans for their founder and consequent philosophical praxis,¹⁹² any such explicit distinctions as Konstan suggests, if actually made by Epicurus himself, would likely have been respected; the findings of Annas thus seem more plausible. Annas also suggests that Philodemus' *On Anger* may have been influenced to some degree by Stoic ideas, but she concludes that that the treatise is an answer to rival Epicurean interpretations of the Master's words on points left unspecified. She also concludes that Philodemus' discussion of natural and empty anger suggests that Epicureans are neither following common usage of terms nor inventing new ones, but rather involved in 'persuasive redefinition'.¹⁹³ Thus it seems that neither Epicurus nor Philodemus had a single term to refer specifically to the emotions but may have used *πάθος* as an umbrella term which included emotion. Lucretius, likewise, does not use a single term to refer to the emotions specifically. Some of his affective vocabulary is perhaps deliberately ambiguous; such inclusivity is itself revealing, as we will see. But lack of a single term for 'emotion' is no hindrance to analyzing the manifestations of the concept or its relationship to other concepts, including broader ones, like feeling.

This study employs the English term 'emotions' rather than 'passions' throughout the analysis. The two have been used synonymously in the past, e.g. by Nussbaum. However, emotion is a less loaded term in modern parlance. The term passion has connotations of desire and irrationality in English usage which could influence the interpretation. Moreover, as stated by Braund and Gill, passion is 'mostly used in modern English to denote an overpowering emotion to which one is, or feels oneself to be, subject or "passive", and which is to this degree problematic'. This usage essentially coincides

¹⁹⁰ Cf. e.g. Annas 1992: ch.9 takes the term to include feelings of pleasure and pain as well as the emotions, which she finds necessarily involve rational belief. Nussbaum 1994: 13, 319 n.4 implicitly includes pleasure and pain, but is otherwise in broad agreement with Annas' interpretation.

¹⁹¹ On Epicurus' own usage of *πάθη* in the works preserved by Diogenes Laertius, Konstan mentions in particular the following instances: Epic. *Ep. Hdt.* 37-8, 55, 63, 82; *Ep. Pyth.* 137; *Ep. KD* 24 (= D.L. 10.147). cf. Konstan 2006a: 146-7. Konstan 2006b: 195-6. Demetrius of Laconia also uses *πάθη* to include pleasure and pain; cf. the testimonium of Sext. Emp. *M.* 10.219-27 in Long and Sedley 1987: ii.29.

¹⁹² Cf. pp.5-6 (incl. n.30).

¹⁹³ Annas 1989: 147 (incl. n.6), 164.

with the Stoic conception of *πάθη* as sicknesses.¹⁹⁴ That is not necessarily appropriate to the Lucretian conception of emotion, as will be clear through the analysis of the physiological mechanism and its consequences.¹⁹⁵

For Lucretius, the physiology of the emotions arises from interactions ‘within’, so to speak, the *animus-anima* complex. Recall that the four primary constituents of the *animus-anima* complex in all living creatures are fire, wind, and air, and the nameless fourth; a degree of structural integrity among them coexists with life and enables *sensus*.¹⁹⁶ The arrangement of the constituents is always in flux, in part due to their constant motions. Constituents can move in various ways. As we saw in chapter two, they can move singly relative to one another, as in the case of pleasure and pain, and collectively as a complex, as in the mechanism of falling asleep and waking. Analogously to the latter, constituents can also move as groups.¹⁹⁷ Lucretius states:

consimili ratione necessest ventus et aer
et calor inter se vigeant commixta per artus
atque aliis aliud subsit magis emineatque,
...
est etiam calor ille animo, quem sumit,¹⁹⁸ in ira

In a similar way, it is necessary that wind and air and heat thrive amongst themselves, mixed throughout the limbs, and that one recedes and another stands-out more than the others ... Also, the *animus* possesses¹⁹⁹ that

¹⁹⁴ Braund and Gill 1997b: 1, 5. Cicero accordingly translates *πάθος* by *morbus*, from which comes the English ‘morbid’; cf. Cic. *Tusc.* 3.14-25, 3.55-6, 4.23-4, 4.79-84. Indeed the modern medical term ‘pathology’ is derived from *πάθος*, seemingly on the Stoic model. (Middle Stoicism opened the therapeutic approach from the goal of extirpation to include that of moderation.) Although the Stoic interpretation of the emotions may well have been very influential, it was far from the only one. Also, it seems that Lucretius generally uses the term *morbus* to mean ‘sickness’ or ‘disease’, and does not use it to include the emotions. The only instance in the poem where *morbus* may allude to something including emotions is at Lucr. *DRN* 3.1070.

¹⁹⁵ Lucretius treats analogously to illnesses instances where emotions are primarily caused by false beliefs; cases of emotions which are in accordance with what is natural, appropriate (i.e. not excessive or lacking in proportion), and useful are presented in a different manner altogether, as we shall see.

¹⁹⁶ They do not necessarily constitute a contiguous, discreet ‘sense organ’ in the same way that a nose is one.

¹⁹⁷ Receding and surging motions - in the larger context - make better sense of ‘*subsit*’ and ‘*emineat*’ in the following passage than do the interpretations of Bailey 1947, Kenney 1971 and Brown 1997 *ad loc.*

¹⁹⁸ For comparanda on this use of *sumo*, cf. Bailey 1947, ii: 1041-2; e.g. Lucr. *DRN* 2.188, 5.820, (cf 5.895), and 6.326.

¹⁹⁹ This dative of the possessor (*animo*) is assumed to be ellipsed in the two subsequent cola of the argument; N.B. the anaphora of *est* in the first position of each of the three cola, and of *est etiam* in the first and third, bracketing the argument; cf. Bailey 1947, ii: 1041.

cum fervescit et ex oculis micat acrius²⁰⁰ ardor;
 est et frigida multa comes formidinis aura,
 quae ciet horrorem membris et concitat artus;
 est etiam quoque pacati status aeris ille,
 pectore tranquillo qui fit voltuque sereno²⁰³
DRN 3.282-4, 288-93

heat,²⁰¹ which it assumes when it grows hot²⁰²
 in anger and relatively fiercer fire gleams
 from the eyes. It also has much cold wind,
 fear's companion, which stirs horror in the
 members and incites the limbs. It also has that
 condition of calm air,²⁰⁴ which occurs with a
 tranquil *pectus* and serene face.

Context makes it clear, as we shall see below, that Lucretius is here referring to the *animus* of any living creature. These lines show that a given *animus* has the capacity for a range of emotions. Different types of constituents have the potential to collectively surge and recede relative to one another. When one type of constituent is surging (and the others subsiding), the *animus* temporarily assumes aspects of its nature.²⁰⁵ This process is experienced as an emotion. Emotions are therefore an example of one way in which the

²⁰⁰ Kenney 1971: 114 suggests that *acribus* might be preferable to '*acrius*' on the basis of Virg. *Aen.* 12.102 and at Kenney 2014: 115 says that '*acrius*' 'is not to the point'. It is precisely to the point. If it is an imitation, moreover, there is nothing illogical about the comparative '*acrius*' modifying '*ardor*', as the *animus-anima* complex always contains fiery constituents. Even if a transferred epithet, it is the surging fire which would have caused the eyes to appear fierce to an observer. Brown 1997: 129 also rightly notes that Virgil is perfectly capable of adapting his models.

²⁰¹ Heat is a *coninuctum* of and metonymy for fire. A surging fire would entail an increase in heat, according to Lucretius' representation, which corresponds to our experience of such emotions.

²⁰² Bailey here suggests a stronger interpretation for '*fervescit*', on the basis of comparison with '*effervescit*' (Lucr. *DRN* 3.295) and '*fervescunt*' (3.494). But only '*effervescit*' entails 'boiling over' into an angry display (cf. pp.222-3, 5.1335, on which West 1969: 20 and) and '*fervescunt*' there refers to the disruption or turbulence of the *mens* during an epileptic fit by analogy with the sea, not to heating. Bailey's general emphasis on the emotions as 'disturbances' seems to lean towards the Stoic sense of them as afflictions. He fails to note that even *DRN* 3.292-3 (on which cf. below) would contradict that characterization as disturbance, including by his own analysis; Bailey 1947, ii: 1041-2.

²⁰³ If one is going to take '*pectore tranquillo*' and '*voltu sereno*' as ablative absolutes, as Bailey does (Bailey 1947, ii: 1042 *ad loc.*), then it is necessary to give them temporal force, if any, due to the underlying mechanism. That said, one wonders whether they are not sufficiently integrated into the idea of the clause to simply be ablatives of attendant circumstance, which - in light of the ontology and aetiological mechanism - is the most plausible of the possibilities suggested by Kenney 1971: 114. Kenney 2014: 116 rather suggests that tranquility is causing the emotion, giving the ablative a more instrumental sense.

²⁰⁴ Here '*pacati status aeris*' is unlikely to mean something like 'state of stillness' (with emphasis on the etymological link with *stare*), cf. *OLD* §1, in contrast to '*fervescit*'. Given (i) the context, and (ii) the fact that the constituents of air - like all bodies - are always moving, however imperceptibly, *status* should be taken as referring to a physical state or condition with allusion to the underlying arrangement; N.B. *OLD* §5, cf. also §8. E.g. equilibrium is one example of a condition or state where continuous underlying motions manifest in an unchanging manner. Other sorts of balanced motions might also suggest peacefulness. The point is this: a surging motion of this kind does not involve agitation or disturbance. Elsewhere Lucretius also talks about how swiftly moving the particles of air are, including in the *animus-anima* complex, due to factors like size. Other abundances of air in a creature are involved in other things, e.g. the mechanisms of falling asleep, large-scale voluntary motion, and the motion of magnet filaments.

²⁰⁵ Although this list is exemplary, not exclusive, it is noteworthy that one of the primary constituents of the complex is absent. Does the group comprised of the so-called nameless fourth constituents lack an emotion which corresponds to its relative surge? This group may remain relatively 'hidden' because it is comprised of the smallest constituent in the complex, cf. Lucr. *DRN* 3.273-81, or - more likely - because its members play a different role in the mechanism of emotions, such as the initiation of the new motions of other constituents - perhaps including their surging and receding.

properties of the distinct types of constituents may persist individually while simultaneously contributing to the emergence of the properties of the whole assembly.²⁰⁶

These lines illustrate the causal link of the relative surges and recessions with the experience of an emotion, as well as with manifestations which would be perceivable by an observer. For example, *aura stirs horror*. Now, *horror* can mean either the emotion horror or the trembling of the body associated with it. Here it seems to refer to both, given that the causal surge of wind is also associated with the kindred emotion of fear and said to affect the limbs. This mechanistically recalls 3.152 (and following): '*verum ubi vementi magis est commota metu mens*'. The use of *commoveo* - as passive for middle - with the ablative, particularly in this context, stresses that the experience of fear involves the motion of the *mens* before the transmission of that motion to the rest of the body.²⁰⁷ Similarly, one can see fire gleaming from the eyes of the creature when it is angry or the calmness of its face when air is dominant. Thus, a temporary surge and the associated feelings, of which a surge is a necessary (but not necessarily sufficient) cause, may remain localized in the *pectus*, where they begin and can occur without affecting the rest.²⁰⁸ However, the surge may potentially spread from the *animus* to the whole *animus-anima* complex and to the rest of the body, with observable consequences.

Lucretius often uses the language of motion, and indeed of surging motions, when referring to the emotions themselves - perhaps by extension from the motions of the constituents of the complex. Sometimes, as with *horror* above, he uses one word or expression to suggest both motion and the feeling experienced. The expression '*laetitiae motus*' (3.116) is a periphrasis emphasizing an aspect which is significant for the context and to overall interpretation of the term. The surging motion which is explicit in '*in ira | cum fervercit*' (3.288-9) above is evoked by the parallel example '*irarum fluctus in pectore*' (3.297), which the lion is unable to contain. Similarly, '*gaudia gliscunt*' (5.1061) suggests that with joy one should understand a motion which swells up until bursting or

²⁰⁶ Recall that bodies generated from the first-beginnings have a distinct nature and that the immutable natures of the constituent *primordia* are not evident in the nature of the generated thing; compare e.g. *Lucr. DRN* 1.778-81 with 3.282-4. This answers Bailey 1947, ii: 1040-2 with respect to 1.778-81 and 3.282-93, esp. 3.286-93. For Lucretius, what we today might call the character of animals and humans are also related to particular constituents, as we shall see in chapter four.

²⁰⁷ Bailey also suggests that there is a transmission of motion from the *animus* to the *anima* in what is here called emotion (and what he calls 'a disturbance of the mind'); Bailey 1947, ii: 1043 at 3.291. Brown 1997: 129 at 3.294-5 also hints at this idea.

²⁰⁸ Cf. esp. *Lucr. DRN* 3.140-4.

otherwise becoming apparent.²⁰⁹ As we shall see below, *surgo*, and *inrito*, in addition to such incohesive verbs as *glisco*, are all used of *amor*.

These relative motions or fluctuations are *sensus*-bearing; they constitute the micro-level manifestation of emotions. *Pace* Fowler and others, then, Lucretian emotions are not a variation in the relative proportions of the constituents; as Kenney suggests, they are a change in the sort of constituent which is temporarily predominant.²¹⁰

The list at 3.282-93 of emotions associated with surges of a particular constituent is exemplary, not exclusive. Multiple emotions may be caused by the surge of a single sort. *Ardor*, for example, can connote both fire and desire. Lucretius not only associates it with *ira* but also with *amor*.²¹¹

Few still take seriously enough to mention it Jerome's tale that Lucretius went mad as the result of drinking a love potion, writing the poem during moments of clarity, and committed suicide.²¹² Nevertheless, Lucretius' extended treatment of *amor* in the finale of book four²¹³ - lines 4.1037-1287 (or 4.1030-1287, if one includes the account of wet dreams²¹⁴) - tends to be regarded as a vehement attack on the emotion, aiming to cure the reader of it.²¹⁵ It has also been taken as an illustration of Lucretian pessimism and as a case of focused literary engagement.²¹⁶ In what follows, this study will analyze the so-called

²⁰⁹ Similar uses of *glisco* will be seen below, e.g. with respect to Lucr. *DRN* 1.474 and 4.1069 '*gliscit furor [amoris]*'. On *glisco* with respect to the waxing of 'the passions' in Lucretius and in Latin literature more generally, cf. Brown's discussion of 4.1069 in Brown 1987: 211.

²¹⁰ N.B. Kenney 1971: 114. There is nothing here which is analogous to the ejection of constituents in sleep; cf. D. Fowler 1997: 20, Brown 1997: 129 'temporary quantitative superiority'.

²¹¹ Earlier versions of the following section and select points of the previous one were presented at the Classical Association Conference at the University of Nottingham (2014), Society for Classical Studies Meeting in New Orleans (2015), and Research Seminar Series of the Department of Classics Trinity College Dublin (2015). My thanks to the audiences for their questions and feedback.

²¹² Found in the *Chronicle* of Eusebius, for the year 94/93 C.E.: '*Titus Lucretius poeta nascitur, qui postea amatorio poculo in furorem versus, cum aliquot libros per intervalla insaniae conscripsisset, quos postea Cicero emendavit, propria se manu interfecit anno aetatis XLIIII*' in Brown 1987: 70 n.39, cf. Caston 2006: 279 n.25. For a plausible explanation of how this tale may have arisen and the relevant scholarship, cf. Betensky 1980: 291 n.1.

²¹³ On the characterization of the end of book four as a finale and on the finales in general, cf. Müller 1978, Brown 1987: esp. 47-62 and the bibliography on p.47 n.2.

²¹⁴ Lucr. *DRN* 4.1030-6. Like Brown 1987: 61, this study regards these lines as a 'bridge passage' segueing between the treatment of dreams and of *amor*. Bailey 1947, iii:1301, on the other hand, places the beginning of the finale at 4.1058 and the bridge from 4.1037-57. Schrijvers has difficulty reconciling what he regards as lust dreams (and other dreams of lack and fullness), with the rest of Lucretius' account of dreams. He thus resorts to precedents in medical traditions and concludes that Lucretius is not interested in coherence but presents us with a 'bric-à-brac' subservient to ethical aims; Schrijvers 1980: 149-51.

²¹⁵ Cf. e.g. Kenney 1970, Brown 1987, Annas 1992, Nussbaum 1994, Landolfi 2013.

²¹⁶ For an exemplary list of those who interpret it as an instance of Lucretius pessimism, cf. Brown 1987: 70 n.40. On Lucretius' engagement in the finale of book four with the Neoterics, Alexandrians, and New Comedy, cf. Kenney 1970: 380-92, with Platonic theories, cf. De Lacy 1983: 301-4, with Catullus 64 (in *DRN* 4 and in general), cf. Bailey 1947, iii: 1753-4, with Catullus more generally, cf. Betensky 1980: 296-7, Gale 2007: 69-70, with all of the above and other (primarily) literary traditions, cf. Brown 1987: 127-43.

‘diatribe’ as a developed case study of a specific emotion.²¹⁷ As a case study it is somewhat analogous to Philodemus’ *On Anger*, but the finale of four goes beyond describing phenomenological causes and consequences to shock its audience out of their false beliefs.²¹⁸ Lucretius here offers considerable evidence for the mechanism underlying *amor*, sheds further light on the mechanism underlying the emotions more generally, and offers the reader a way forward.²¹⁹

Lucretius tends to treat *amor* as the equivalent of what some might call romantic love,²²⁰ as opposed to - for example - familial love or Platonic love. Of the twenty-six uses of *amor* in *DRN*, only five seem likely to mean something else.²²¹ All four uses of the verb *amo* also refer to romantic love. He often represents *amor* and its synonyms²²² as tidal motions of fire in the *pectus*. This is at least as much mechanism as it is metaphor:²²³

etenim potiundi tempore in ipso
fluctuat incertis erroribus ardor amantum²²⁴
...
namque in eo spes est, unde est ardoris origo,
restingui quoque posse ab eodem corpore flammam.

For indeed at the very time of *amor*’s
dominance the *ardor* of lovers²²⁵ undulates in
unfixed wanderings. ... For in this²²⁶ is the
hope that the flame too can be extinguished
by the same body from which is the origin of

²¹⁷ By using this label, scholars generally seem to imply an invective quasi-rhetorical performance, tantamount to a sermon using shock tactics, satire, and popular philosophy, on a moral point - usually aimed at ‘the deflation of folly and the destruction of error’; Kenney 2014: 15. On diatribe as a genre and particularly with respect to Lucretius, who is thought to elevate this to a higher form, cf. Kenney 2014: 14-16 (N.B. n.55), who (p.197) calls this ‘the great diatribe of Book IV’. Nussbaum also sees the finale of book four as a case study in an emotion, but approaches it phenomenologically, which colors her therapeutic conclusions; cf. Nussbaum 1994: esp. chs 5, 7. Annas, on the other hand, discounts the finale of book four as ‘a set piece’ which does not express Lucretius’ own views; Annas 1992: 196 n.25.

²¹⁸ On the use of the latter strategy by Epicurean authors, cf. e.g. Annas 1992: 196-9, Nussbaum 1994: esp. chs 4-5. With respect to Lucretius, Gale intriguingly suggests that such rhetorical ‘shock tactics’ may include the accounts of graphic violence in *DRN*; Gale (forthcoming a).

²¹⁹ This thus supports Gale’s contention that Lucretius’ therapy is primarily concerned with explaining the root of the problem, rather than the consequences of it; cf. Gale (forthcoming a). Even those treatments of the finale of book four which do deal with the underlying mechanism, such as that of Brown 1987: 62-87: esp. 62-9, fall short of the mark in that they fail to take account of the evidence for the mechanism of emotions in general.

²²⁰ As this section will bear out, the English expression ‘romantic love’ is preferable to ‘erotic love’ for rendering *amor*. In modern parlance, ‘erotic love’ is too easily confused with sexual desire or lust, which is but one aspect - however important - of romantic love.

²²¹ They are, quoted verbatim: *suavem ... amorem* | *Musarum* (Lucr. *DRN* 1.924-5), *amorem* [of Epicurus] (3.5), *amorem ... edendi* (4.869), *novitatis amorem* (5.173), *vitae ... amorem* (5.177). The first two examples may mean something like devotion, cf. *OLD* §3d. The other three seem to refer to desires of a non-sexual nature; cf. *OLD* §7 and 6 respectively. 4.869 has parallels in the uses of ἔρωϛ as far back as Homer, on which cf. Dover 1978: 43.

²²² For an analysis of *amo*, *libido*, and *venus*, as well as related terms, from the perspective of historical linguistics with respect to Latin sexual usage writ large, cf. Adams 1982: esp. 57, 188-9. On the historical range of meanings of related Greek terms, most notably ἔρωϛ, φιλία, and their derivatives, cf. Dover 1973: 59, Dover 1978: 43-54.

²²³ Arguing for metaphor are, e.g., Bailey 1947, iii: 1306, Landolfi 2013: 52.

²²⁴ Bailey 1947, iii: 1306 suggests Lucr. *DRN* 3.1052 and 6.267 as comparanda.

²²⁵ By ‘lovers’ (*amantum*) it should be understood: both those engaged in sexual activity, as suggested by the immediate context, and those experiencing the emotion *amor* more generally.

²²⁶ Brown 1987: 228 *ad loc.* suggests that ‘*eo*’ refers either back to ‘*amorem*’ or forward to the next thought; the latter reading he prefers and offers some precedents for. It may also refer to the ‘*blanda voluptas*’ (Lucr. *DRN* 4.1085) mixed into the activity (as context suggests) of *amor* (i.e. love-making), such that the ensuing hope reflects a judgment of the *animus* added to the confluence of feelings.

...
unaque res haec est, cuius quam plurima habemus,
tam magis ardescit dira cuppedine pectus.²²⁷

...
tandem ubi se erupit nervis conlecta cupido,²²⁸
parva fit ardoris violenti pausa parumper.
inde redit rabies eadem et furor ille revisit²³⁰
DRN 4.1077, 1086-7, 1089-90, 1115-17

the *ardor*. ... And this is the one thing which,
the more that we have of it, the more our
pectus burns with intense desire. ... At
last, when the gathered *cupido* has burst itself
forth from the sinews,²²⁹ a brief cessation of
the violent *ardor* occurs for a short while;
then that same frenzy returns and that fury
comes back.

Here, both the experience of *amor* and its underlying fire are surging and receding. Lucretius seems to collapse any apparent difference between *ardor* and *amor*, between intense desire, sexual drive, and love as meanings of *amor*, and between pleasurable and painful *amor*.²³¹

The association of erotic love with '*rabiēs ... et furor*' reflects the conventional rhetoric of love as a disease and as some kind of irrational madness.²³² Bailey, Godwin, Caston, and Landolfi, to name but a few, agree with one or both of these as general interpretations of Lucretian *amor*.²³³ However, Lucretius uses the words with surges of both *amor* and *ira*.²³⁴ He also uses *furor* with intense disturbances of motion in general - including drunkenness, war, storms, and the eruption of Aetna.²³⁵ Therefore, his use of *rabiēs* and *furor* actually indicates a particularly violent state of motion and an extreme instance of emotion.

Lucretius actually suggests the nature of *amor* and its closeness, so to speak, to emotions like *ira* almost at the outset of the poem, specifically in his account of *eventa*.

²²⁷ Cf. Lucr. DRN 4.1046: '*dira lubido*'. Brown 1987: 231 offers a richer set of explanations for the form *cuppedine* than does Bailey. *Dirus* here not only signifies something so intense as to be awe-inspiring, but also that this desire is a harbinger of things to come.

²²⁸ Brown 1987: 245 draws the parallel between '*conlecta cupido*' and '*conlectus umor*' (Lucr. DRN 4.1065).

²²⁹ I.e. orgasm occurs.

²³⁰ Brown 1987: 246 notes the triple alliteration of 'p' in Lucr. DRN 4.1116 and of 'r' in 4.1117.

²³¹ Pleasure and pain, as we saw, can be felt with certain (e)motions - e.g. pleasure with *gaudium*, pain with *dolor*-as-grief; this will be developed further with respect to *amor* below. The above quotation omits the lines contrasting the consumption of images of the beloved with the consumption of food and drink, which recalls Lucr. DRN 4.869-76. There, taking in food quells the '*amorem edendi*', cf. *cupido* (4.876); *amor/cupido* (albeit of the sort related to hunger and thirst) is similarly associated with heat and fire, and the consumption of food and drink is likened to their extinguishing.

²³² Cf. e.g. Cic. *Tusc.* 4.75.

²³³ On the madness interpretation, e.g. of the *miseri vs sani* dichotomy, cf. esp. Bailey 1947, iii: 1305 and on emotions in general as 'a disturbance of the mind' or 'mental disorder', cf. respectively, Bailey 1947, ii: 1043 and Brown 1987: 85-7. On both sickness and madness as characterizations, cf. e.g. Godwin 1986: 152 and Landolfi 2013: 17, 51, ch.3. Emphasizing the sickness interpretation is, e.g. Caston 2006: esp. 272, 280-82, who attempts to force consistency between the views on love of Cicero, Lucretius, and the elegists. For an alternative overview of the relevant terminology, cf. Landolfi 2013: 18. The *miseri vs sani* dichotomy at 4.1073-5 will be answered below.

²³⁴ With respect to the surging of *amor*, cf. Lucr. DRN 4.1117, '*gliscit furor [amoris]*' (4.1069) and '*rabies [amoris] ... germina surgunt*' (4.1083). With respect to the surging of *ira*, cf. below on the example of *rabies* in 5.1063-6.

²³⁵ With the *ardor* of wine (Lucr. DRN 4.476-83) and certain illnesses (3.828, cf. 3.463-9, cf. 3.499-501). Cf. Brown 1987: 212, 217 that Lucretius may be using it as a medical term in the finale. Of other intense or violent motions: with the fires of Aetna's volcanic eruption (DRN 2.593), of the fury associated with war (2.621), of storms (6.49), of an awning caught up in winds (6.111), of the actions of a hot wind (6.687), of the motions of bits of iron under the influence of a magnet (6.1045).

numquam Tyndaridis forma conflatus amore
ignis, Alexandri Phrygio sub pectore gliscens,
clara accendisset saevi certamina belli
DRN 1.473-5

... nor would the fire, kindled in love at the
beauty of Tyndareus' daughter,²³⁶ blazing up
beneath the Phrygian *pectus* of Alexander,²³⁷
have inflamed the famous contests of cruel
war.²³⁸

The subject-matter and concentration of Greek words in 1.473-7, according to Sedley, highlight the remoteness - with respect to location and time - of the Trojan war generally (1.464-82).²³⁹ Thus, although the capacity for emotions and their underlying motions is a *coniunctum* of - as we will see - all living creatures, particular instances of emotion are *eventa* of body, place, and space - just as the deeds of men are.²⁴⁰ Here, Lucretius combines both, implying that emotion can influence one's actions. Through the crescendo of these lines, the reader essentially sees the surging fire manifest. When first kindled, *ignis* is associated with *amor*. The fire swells in the breast of Paris, perhaps liminally between *amor* and *ira*.²⁴¹ It then inflames the works of war, implying the spreading or eruption of an emotion like *ira*.²⁴² This is more than just 'concretization' of a carefully chosen metaphor. In some sense, the *ignis* experienced by Paris and the *ignis* burning-down Troy are the same thing.²⁴³ *Pace* Hardie, Lucretius here offers a physiological

²³⁶ I.e. Helen of Troy.

²³⁷ I.e. Paris.

²³⁸ Bailey remarks on the awkwardness of the double ablative but argues for its retention. He also suggests that *clara* below may also allude somehow to the *ignis* in capturing the sense of 'blazing' (which translation Rouse and Smith adopt) or 'bright'; Bailey 1947, ii: 679, cf. Brown *ad loc.* Both Bailey's rendering of the double ablative and that of Rouse and Smith's edition suggest a slightly stronger causal role for *amor* than does this translation. As this passage relates to the mechanism: *amore* seems to be an ablative of respect and *forma* either of means or attendant circumstances, depending on the weight one wants to place on Paris' judgment and on the focus of his *animus* as co-causes; encountering Helen's *simulacra* is a necessary but not sufficient condition. *Forma* can frequently mean form, figure, or beauty - all of which are at play here (cf. esp. pp.89-90 on the properties which *simulacra* share with their source-object). It is rendered as 'beauty' in the translation because the subjective judgment that Helen is beautiful (and thus desirable) seems to be instrumental in the inception and growth of the particular fiery emotion; cf. the look of the source-object whose *simulacra* are involved in the youth's wet dream at 4.1033. The so-called 'delusion list' indicates similarly that beauty is in the eye of the beholder; contra Dover 1973: 59 who treats beauty as a fact and both sexual desire and ἔρωϛ as automatic responses caused by it, with respect to Greek thought. This and further elucidation of the process of *amor* below warrant retention of the double ablative at 1.473; it makes perfect sense in light of the mechanism. The ambiguity is wonderfully rich. The kindling, as it were, of the already present *ignis* is a manifestation and cause of *amor*; the surge occurs in the *pectus*, and the emotion is felt there too.

²³⁹ Sedley 1998a: 50-1. Nevertheless, Lucretius often emphasizes the continuities between the past and present. These are crucial for understanding the nature of things, since - as we shall see in chapter four - the fundamental nature of e.g. living things, does not change; cf. Clay 1983: 262-3, Gale (forthcoming a).

²⁴⁰ Again, motion is a *coniunctum* of all bodies, but each instance of a particular motion is an *eventum*.

²⁴¹ Philodemus too notes that the experience of anger is sometimes related to that of love; cf. Phld. *Ir* 7.7-24.

²⁴² We have already seen that *ira* is associated with fire (*ignis*, *ardor*), as well as with *calor* - cf. Lucr. *DRN* 3.288-9. Warfare is also associated with all three, cf. below on *inrito*.

²⁴³ Cf. Bailey 1947, ii: 679, Godwin 1986: 157 (who also notes the connection between Lucr. *DRN* 4.1077 and 1.473-7).

explanation for the destructive potential of these emotions and for the trope that they are ‘fiery’.²⁴⁴

The related nature of emotions like *amor* and *ira* is perhaps also suggested by another example of surging language. At 4.1045-57, *amor* is likened both to a spear which is hurled and (consequently) wounds, as well to the desire to spring up and rush forth (cf. esp. ‘*emicat*’, 4.1050) back towards the source of wounding blow, albeit with an *umor* rather different from blood.²⁴⁵ The initial process of the motion or feeling’s stirring-up is there rendered by *inrito*,²⁴⁶ which is consistently used throughout the poem with the exciting of fiery things, including Aetna’s flames (6.680). *Inrito* is also used of *ira* or its frenzy (5.1063-6, 5.1318, cf. ‘*calentes*’, 5.1313); in these examples Lucretius explicitly attributes the emotion and mechanism to animals.²⁴⁷ *Inrito* is similarly used of *virtus* (1.70). Lucretius generally uses *virtus* to mean ‘courage’ and attributes it to both humans and animals.²⁴⁸ Thus, as Lucretius associates a surge in fire with both *ira* and *amor*, as well as with *virtus* (as courage), they should all be characterized as ‘fiery’.²⁴⁹

Because multiple emotions can be related to the relative surge of a particular sort of constituent of the *animus-anima* complex, a surge therefore cannot be a sufficient vertical cause and micro-level manifestation of the associated feelings, but it is a necessary one. Thus far this analysis supports Fowler’s contention that, according to ancient moralists, there was no physiological essence of an emotion, but rather loose bundles of physiological responses to a given stimulus - which responses were then open to interpretation.²⁵⁰

²⁴⁴ Hardie 1986: 232-3 suggests that, here and in book four, the ‘repeated examination of the ‘fire’ of love constantly verges on the brink of becoming a fully physiological explanation of mental processes’; it is not meant to be full, but it is explanatory. Brown 1984: 122 does note well that both *amor* and *ira*, as epic values, have equal potential for destruction in Lucretius’ view. This passage foreshadows the idea that *amor* has the potential to lead to destructive *curae* and aggression; cf. Lucr. *DRN* 4.1058-60. In this context it seems that *simulacra* caused *amor* and *amor* caused *cura*. That said, these are not necessarily the only causes involved in the aetiological chain. Laying waste to a city clearly goes beyond lovers’ attempts to hurt one another with their kisses. In highlighting the connection between the *amor* and *ira*, Lucretius also implies that there is a physiological explanation for why desire - be it with reference to *amor*, *ardor*, *lubido*, or *cupido* - easily leads to war. On the common tropes of ἔρωξ (as sexual desire), cf. Landolfi 2013: ch.3.

²⁴⁵ On the word play, idea play, and imagery in these lines, cf. e.g. West 1969: 95-6 and Kenney 1970: 383-5. Further on the *Veneris tela* below.

²⁴⁶ Lucr. *DRN* 4.1045, cf. 4.1034.

²⁴⁷ As we have seen with respect to the surge of *ira* in the *animus* in general and in lions specifically.

²⁴⁸ Lucr. *DRN* 2.642, 5.858, 5.863. Possible exceptions to this, where something like ‘excellence’ seems to be preferable as a rendering in context, occur at 1.140, 5.966.

²⁴⁹ Similarly, as we have seen, fear and horror are both windy emotions.

²⁵⁰ D. Fowler 1997: 17.

Belief and judgment are co-causes of the emotions, thus animal emotions are evidence that they have both.²⁵¹ However, belief and judgment do not play as extensive a role as Nussbaum claims.²⁵² According to Lucretius, mistaken beliefs and judgments contribute to unnatural²⁵³ and unnecessary fears and anxieties, such as fear of the dark, the gods, and death, as well as to nightmares²⁵⁴ and the concern that one cannot live without the requited love of a particular beloved; they cause disturbance in us.²⁵⁵ Take, for example, the case of perceptions of the dead. Referring to *simulacra*, he states:

atque eadem nobis vigilantibus obvia mentes
 terrificant atque in somnis, cum saepe figuras
 contuimur miras simulacraque luce carentum,
 quae nos horrifice languentis saepe sopore
 excierunt; ne forte animas Acherunte reamur
 effugere aut umbras inter vivos volitare
 neve aliquid nostri post mortem posse relinqui
 cum corpus simul atque animi natura perempta
 in sua discessum dederint primordia quaeque
 DRN 4.33-41

And the same things terrify us when they meet our *mentes*, both when we are awake and in dreams - when, often, we perceive marvelous shapes and likenesses²⁵⁶ of those absent from the light. These often awaken us with horror when we are languid in sleep. Therefore let us not, by chance, suppose that spirits (*animas*) escape from Acheron, or that shades fly about among the living, or that anything of us remains after death, when the body and the nature of the *animus*, simultaneously destroyed, each disperse into their own first-beginnings.²⁵⁷

The inaccurate belief that one's *animus-anima* complex persists after death is causally involved in the fear which one experiences upon perceiving a *simulacrum* of a dead individual. Through 4.37 Lucretius implies that if we do not suppose these things, then we will not misinterpret those perceptions and experience fear. For Konstan, the

²⁵¹ On their causal role as given in Phld. *Ir.*, cf. e.g. Annas 1989, 1992: ch.9. Cf. esp. Phld. *D.* 1.13.5-7 (in Diels 1915), on which, cf. p.297 n.342, and 1.14.24-8 (in Wurster unpublished 2015) where Philodemus connects *ταραχή* to the possession of *δόξαι*, denies *δόξαι* to animals, and claims that *ταραχή* cannot follow from *πάθη* and bad things only, since some *ἄλογον ζῷον* will experience similar causes of *ταραχή*. Thus, as Sorabji notes with respect to Phld. *D.* 1.11.4-15.4 more generally, according to Philodemus, animals will have at most analogues of our emotions, but this is contingent upon analogues of belief; Sorabji 1993: 58.

²⁵² Nussbaum overplays the role of belief in the aetiology of the emotions and largely neglects the physiological contribution to both belief and emotion. For example, she places the cause of love, which she generally reads as approximating *ἔρωσ* (as lust), and its behaviors squarely on the shoulders of the false-belief (primarily of men) that sexual fusion will restore self-sufficiency, a value which she ascribes (less than persuasively) to Lucretius' diagnosis of his readers; cf. esp. Nussbaum 1994: chs. 5, 7. Epicurus stresses it more, e.g. at Epic. *KD* 6-7, 13-14. Konstan's views on the importance of belief to emotion, and especially of false belief to empty fears and desires, are not dissimilar to Nussbaum's; cf. Konstan 2008: esp. chs 2-4.

²⁵³ In the sense of not being in accordance with the natural order of things.

²⁵⁴ E.g. the man dreaming of falling off a mountain (Lucr. *DRN* 4.1020-3) and waking and sleeping 'visions' of the dead (e.g. 4.33-41, on which, cf. below). On the mechanism by which beliefs are related to perceptions, cf. ch.5.

²⁵⁵ Cf. Epic. *KD* 10-13 on some main categories of false belief. Warren 2009: esp. 235-8 gives a useful summary.

²⁵⁶ This translation is appropriate to the context and employed to distinguish the experienced perception from the thing, but the use of *simulacra* here emphasizes the connection between the sense-objects and the perceptions which they enable.

²⁵⁷ Both '*animas*' and '*natura animi*' refer to the entire complex, but their juxtaposition, especially in context of the pairing of *natura animi* with *corpus*, perhaps indicate that Lucretius wants to explicitly mention the non-existence of all three in order to re-emphasize the complete dissolution of the whole, such that the reader is reminded of the ethically relevant conclusions of book three and introduced to the relationship between those conclusions and the subject-matter of book four.

distinguishing factor between what he calls higher order emotions and lower order ones (which he takes to be mere ‘affects’) is the involvement of λόγος or reason - the hallmarks of which he takes to be judgment and belief.²⁵⁸ Annas, on the other hand, thinks that in Epicureanism all emotions require belief.²⁵⁹ By extension from these accounts, proof that a creature could experience an emotion, or in Konstan’s case, a ‘higher order emotion’ like ἔρωσ, would be proof that this creature was capable of belief and possessed λόγος. This will be seen to be the case with respect to animals and *amor*. One’s emotions, conversely, can influence one’s beliefs - such as when *amor* leads one to fool oneself into overlooking all the faults of one’s beloved and attributing to them qualities which they do not have.²⁶⁰ Thus, for Lucretius, beliefs are perhaps not quite as rational as we today tend to suppose. Moreover, further physiological factors are also involved in the emotions - and these require us to qualify Fowler’s notion of a ‘complex syndrome’.

In the finale to book four, Lucretius treats the physiological mechanism relating *amor* to other perceptions. They too are necessary but non-sufficient causes. The *Veneris tela* upon which he focuses are *simulacra*.²⁶¹ With respect to individuals who have reached sexual maturity, Lucretius relates:

conveniunt simulacra foris e corpore quoque,
nuntia praeclari voltus pulchrique coloris,
qui ciet iritans loca turgida semine multo,
...
iritata tument loca semine, fitque voluntas
eicere id quo se contendit dira libido,
idque petit corpus, mens unde est saucia amore

... the *simulacra* from any body abroad
meet²⁶² with them, messengers of a radiant
face and beautiful complexion, which²⁶³ stirs
the places turgid with much seed - inflaming
them. ... The places inflamed with seed swell,
and a *voluntas* occurs to cast this forth to
where the fateful *libido*²⁶⁴ exerts itself,

²⁵⁸ Cf. Konstan 2008: 10-18. Konstan 2013a. Konstan 2013b.

²⁵⁹ Cf. Annas 1989 and Annas 1992, and Usener 221 on philosophy as a cure for (negative) πάθη.

²⁶⁰ Cf. Lucr. *DRN* 4.1151-6, esp. 4.1151-2: ‘*praetermittas animi vitia omnia primum | aut quae corpori sunt eius*’ and 4.1154: ‘*et tribuunt ea quae non sunt his commoda vere*’. Lucretius characterizes those doing this as ‘*cuppedine caeci*’ (4.1153). *Amor* thus seems to require a judgment that the creature *qua* source-object is desirable, as well as the belief in that judgment. The belief then influences further perceptions and their interpretation. Belief and judgment will be treated further in ch.5: esp. pp. 266-78.

²⁶¹ Cf. Lucr. *DRN* 4.1052: ‘*sic igitur Veneris qui telis accipit ictus*’.

²⁶² *Convenio* has two further connotations of relevance here: the interactions of assembling, and - more importantly - of coupling or coitus. Brown 1987: 175 suggests that this is a stream of *simulacra* assembling to form a continuous dream, rather than encountering. This is also plausible, although his argument seems weak not least in that Lucretius elsewhere indicates that it takes but one *simulacrum* to stir the *mens* (including into focusing on similar *simulacra*, which are always present) and that one often dreams of shape-shifting entities.

²⁶³ I.e. which meeting and the interaction that belies.

²⁶⁴ *Libido* here may be intended to imply the penis and semen, not least in light of its juxtaposition with ‘*tument loca semine*’, as well as refer to the intense desire which partly causes their movement; cf. Adams 1982: 57. Cf. pp.150-59 on the relationship between *voluntas*, *libido*, and *voluptas*, which occur paired in the same positions in their lines at Lucr. *DRN* 4.1045-6 (*voluntas/libido*, cf. the similar pairing between *cupido* and *libido* at 5.963-4) and at 2.256-7 (*voluntas/voluptas*).

The idea that these *simulacra* which stimulate *amor* are the shafts of Venus (or the arrows of Cupid/*Ἐρως*, shot on her command) is a pun as well as a multivalent representation of related mechanisms, undermining the belief that *amor* is sent by the gods.²⁶⁷ Taking in their blows suggests the act of being penetrated by the penis of another²⁶⁸ - which, as we will see, Lucretius construes as interactive, rather than passive. These lines make clear that *amor* also arises in the *animus-anima* complex partly as a result of the interaction of the *mens* with stimuli from a desirable partner.²⁶⁹ These lines also suggest that sexual maturity is a prerequisite for experiencing love, implying that there is no such thing as non-sexual *amor*. The mechanism requires a certain presence of seed in the genitals, which is generated throughout the bodily frame of both males and females.²⁷⁰ Interactions with *simulacra* and the surge of fire underlying *amor* jointly cause both (1) further migration of seed to the genitals, and (2) the ensuing stimulation of those parts - stimulation to the point where swelling up is capable of bursting forth. There is no orgasm or even attempt to achieve it without a certain level of *amor*, as well as *voluntas*. The subject of *voluntas* will be treated in chapter five; in the meantime, this fact not only indicates that procreation

²⁶⁵ According to Rouse and Smith 1992 *ad loc*, Lucr. DRN 4.1047 = '1034, with incitat for qui ciet, excluded by Naugerius'.

²⁶⁶ Bailey 1947, iii: 1302 prefers *corpus* as nominative or, alternatively, that '*id corpus*' together is the accusative direct object of *petit*. If so the subject of *petit* would seem to be not vague, as Bailey says, but either the '*inritata loca*' or, if not referring to an erection, the '*voluntas*'. But elsewhere the description which Lucretius gives of the groping and painful kisses, etc, of lovers implies that it is in fact the whole body which seeks. This translation concurs exactly with that of Brown 1987: 190. So, given that - as we will see shortly - animals experience *amor* by means of the same mechanism and behave in the same way, this is further evidence that animals have a *mens* whose faculties are no different from those of humans.

²⁶⁷ Cf. The testimonium of D.L. 10.118: 'οὐδὲ θεόπεμπτον εἶναι τὸν ἔρωτα, ὡς Διογένης ἐν τῷ δωδεκάτῳ φησὶν'.

²⁶⁸ Venus was not only the goddess of love and interchangeable with both *amor* and the act of sexual intercourse (as above), but also a euphemism for penis, to which we will turn shortly. On a *telum* and other sharp objects (particularly weapons) as the most common metaphors for the penis, cf. Adams 1982: esp. 14-22. On *ictus* in relation to the male sexual act and of the blows specifically of semen in Lucretius, cf. Adams 1982: 148-9.

²⁶⁹ Pleasure and judgment are implied by such interactions and their results, viewed across the poem - cf. e.g. *forma* of Helen, hearing the sweetly sounding name of one's beloved.

²⁷⁰ Cf. Lucr. DRN 4.1030, 4.1041-2, 4.1209-17, 4.1257-9; cf. Aëtius 5.5.1 in Bailey 1947, iii: 1312 n.1. When stirred in this way, seed recedes from its points of origin and immediately migrates to the genitals. In the genitals, then, the seed gathers, assembles, and stirs the genitals. Bailey 1947, iii: 1301 notes that Democritus and Epicurus also believed that seed came from the body as a whole, not just from the head and spine (cf. Plato *Timaeus* 91ab). Godwin 1986: 153-4 concurs and adds Hippocrates (*De gen.* 8). According to Bailey (following Robin), Aristotle followed Plato. For fuller discussion of the seed issues and precedents, cf. Brown 1987: 180-4.

requires *voluntas*, but also that anything less than mutual *amor* would lack female orgasm and thus not lead to conception.²⁷¹

Lucretius uses a number of verbs which illustrate the tidal motions of seed. In 4.1037-40, *sollicito*, *roboro*, *commoveo*, *laccio*, *ci(e)o* all potentially associate (not least by their juxtaposition and context) the idea of stimulation of seed with stirring up, surging, or otherwise moving in a concerted, welling-up, or growing manner. This is followed in 4.1041-2 by a number of verbs suggesting a departing or subsiding motion, such as *exeo*, *decedo*; with these the reader sees that the seed is receding relative to the body as a whole prior and in order to then surge in the genitals,²⁷² as indicated by *convenio* and *ci(e)o* in 4.1043-3. His use of '*inritata loca*' (4.1045) also evokes the surging of *ignis* or *calor*, suggesting that this too is occurring in the genitals²⁷³ - somehow transmitted there from the *mens* after its interaction with the *simulacra*. The surging and receding of seed is therefore both physiologically similar to and causally involved in the surge of fire and manifest *amor*. This process is species specific; so only humans are able to stir the seed of other humans, and we only feel *amor* for members of our own species.²⁷⁴

Most scholars attempting to analyze these lines neglect their place in the greater account of the emotions in the poem. They thus fail to recognize that Lucretius' references to *amor* as fiery in the finale of book four refer to far more than a trope. Brown, for example, thinks that the mechanism (as he understands it) refers to sexual arousal alone - whatever name one might give it.²⁷⁵

We have seen that the eyes and *animus* are capable of interacting with *simulacra* and the *animus* can do so both when one is awake and in dream-sleep; for this reason, not

²⁷¹ Mutual *amor* will be treated below. On Lucretius' account of heredity, cf. esp. pp.195-203. If the level of *amor* is directly proportional to the release of seed, this would play into why sometimes the seed of one partner or the other dominates and is more reflected in the appearance of the offspring and at other times are reflected equally. It may also fit with Lucretius' explanation of how whores and the like ('*scorta*') avoid conception, cf. *Lucr. DRN* 4.1268-77.

²⁷² On '*loca*' as a euphemism for genitalia, cf. Adams 1982: 94-5. The Latin equivalent of the modern English euphemism 'bits' may well include in this context e.g. the testicles (as well as, as Adams notes, the penis) and the female genitalia.

²⁷³ On *inrito* vs *cieo* and the former as a medical term, suggesting the stimulation of sensitive parts vs just generic arousal, cf. Brown 1987: 176-7. On *inrito* with the stirring up of fiery emotions, cf. e.g. p.150.

²⁷⁴ *Lucr. DRN* 4.1039-40. Further implications of this point will be taken up at pp.197-8. On a possible linguistic and doctrinal Democritean parallel (with DK 68 B 32), cf. Landolfi 2013: 30. Lucretius seems to exclude the possibility of interspecies sexual relations and, by extension, *amor* between species. However, he is not attempting to explain all phenomena that one might encounter, only to give one what one needs to do so. If asked to explain how bestiality might occur, he would likely do so in the manner by which he explains the existence of the idea of hybrid creatures - i.e. by a process that operated according to natural law; cf. pp. 116-18, 270-5. Given the mechanism, as discussed thus far and below, one might venture an explanation rather like the deliberate redirecting of seed (cf. 4.1065) into a '*volgivaga Venus*' (cf. 4.1071), generally taken to be something like a prostitute. Lucretius only uses the adjective *volgivagus* on one other occasion, likening of the behavior of early humans to that of animals (5.932).

²⁷⁵ Brown 1987: esp. 62-5.

only fear, but also *amor* can thus occur equally through their respective visions.²⁷⁶ Indeed, any and all of the *sensūs* can potentially be a contributing cause of *amor* and - by extension - of all emotions.

nam si abest quod ames, praesto simulacra tamen sunt
illius, et nomen dulce obversatur ad auris.
sed fugitare decet simulacra et pabula amoris
absterrere sibi atque alio convertere mentem
DRN 4.1061-4

For if what you love should be absent, its *simulacra* are nevertheless at hand, and the name of the beloved presents itself sweetly to the ears.²⁷⁷ But it is fitting to flee *simulacra* and to remove the food of *amor* and to turn the *mens* in another direction for one's own good.

Lucretius also tells us that not even the actual presence of the beloved - i.e. interaction of *simulacra* with the eyes - can sate the heart (*cor*) with looking.²⁷⁸ Here we see that sight, thought, and even hearing can contribute to the inception and maintenance of *amor*, as does the repetition (or not) of certain pleasurable interactions.²⁷⁹ Elsewhere Lucretius suggests this of touch.²⁸⁰ Smell, on the other hand, is cited as a potential cause of *amor*'s undoing.²⁸¹ Similarly, one emotion can be a partial cause of another with which it is then covalent, as when *amor* leads to *frigida cura*;²⁸² the adjective *frigida* suggests that this sort of care (probably akin to anxiety), like *formido* and *horror* (3.290-1), is associated with wind (*aura*). Thus *amor* must lead to *cura* in a different way than it leads to *ira* and other fiery emotions. Lines 4.1061-4 also indicate that one's experience of an emotion is to some extent a matter of choice. We direct the focus of our sense-organs (including the *mens*, in that capacity) according to our pleasure-pain calculus, selecting with which stimuli we interact and/or continue to interact.²⁸³ Because the growth of *amor* is a process, it is plausible that one might have sexual arousal and activity without experiencing the emotion

²⁷⁶ Lucr. DRN 4.1037-72, 4.1094-1102, cf. the case of fear at 4.33-41 above, wherein the perception of *simulacra* and the experience of the emotion occur in dreams, as well as while awake. Although in *amor* these events leads to ejaculation rather than waking from sleep, such continuities support Lucretius' choice of wet dreams as the bridge from his account of dream sleep to the finale of book four. Ejaculation is a result of the processes associated with *amor* (cf. the result clause 4.1035-6). Sensory experience of the specific act of ejaculation is the province of touch-as-sense, as we have seen, cf. pp.76-7. The involvement of *voluntas* in ejaculation, even during wet dreams, will be treated further at esp. pp.248-51.

²⁷⁷ Bailey 1947, iii:1304 at 4.1061 suggests that here Lucr. is 'at variance with Epicurus, who says 'remove sight, association and contact, and the passion of love is at an end''; cf. Epic. SV 18. Regarding *obverso*, he suggests cf. DRN 4.978 but translates the same as above (cf. Bailey 1947, i: 417), and with *simulacra* cf. 4.1032.

²⁷⁸ Lucr. DRN 4.1102. On the analogy between *simulacra* and food, cf. also 4.1084-1104.

²⁷⁹ Further on this point, cf. below on Lucr. DRN 4.1278-87.

²⁸⁰ Cf. Lucr. DRN 4.1192-6 that *tactus* can be related to the stirring up of *amor*.

²⁸¹ Cf. Lucr. DRN 4.1180-4, which implies that the smell of the beloved's home, if the lover entered an inopportune moment, would put an end to the feeling motivating his '*alte sumpta querella*'.

²⁸² Lucr. DRN 4.1058-60. In this context it seems that *simulacra* caused *amor* and *amor* - in conjunction, e.g., with false beliefs - caused *frigida cura*; cf. 4.1137-40 on jealousy. That said, these are not necessarily the only causes involved in that process.

²⁸³ Brown too makes this point in his commentary section, Brown 1987: 205-6; however, he fails to note its implications for the analysis in his prolegomena. Choice, focus, and control will be treated in chapter five.

palpably - and certainly without the emotion reaching extremes.²⁸⁴ We thus have control over our experience of *amor*; it is not necessarily an affliction (e.g. *ulcus*, 4.1068) which one is doomed to suffer.

Amor which is excessive and contrary to *utilitas* seems to be an aberration specific to humans. The invective aspects of the finale are found in lines 4.1076-1191. There Lucretius concentrates his attack on false beliefs and the consequent behaviors which his society and various milieux commonly associated with *amor*. The list of delusions about women²⁸⁵ and a man's tendency to regard and treat his lover as a goddess,²⁸⁶ highlight the extent to which the *amor* of 4.1076-1191 is out of touch, so to speak, with reality. The *amor* depicted here is extreme, impractical, and subverts one's peace of mind. Lucretius' attempt to disillusion the reader indicates that the false beliefs facilitate these excesses. This invective is neither cast in general terms nor does it reference animals, perhaps implying that they do not share these false beliefs. Konstan has recently warmed to the idea that Lucretian animals might be able to experience grief - but takes this as evidence that grief is not a 'proper' emotion; he also denies that they are capable of ἔρωζ.²⁸⁷ Animals do experience *amor*; according to Lucretius - and this shows how it can occur in a way which is both natural and necessary.

We know that the nature and experience of *amor* are common to all living creatures because their physiological processes and consequent activities are identical. Betensky too notes that lines 4.1192-1200 evince this.²⁸⁸ There, Lucretius assures the reader - whom context clearly indicates is male²⁸⁹ - that love and pleasure are mutual.²⁹⁰

²⁸⁴ If so, this would explain how it would be physiologically possible to avoid intense (and potentially counterproductive) *amor* but still enjoy the delights of, in all its sexual valences, 'Venus'; cf. Lucr. *DRN* 4.1073-5, esp. 4.1073: '*nec Veneris fructu caret is qui vitat amorem*'. On the sexual valences of *venus*, cf. Adams 1982: esp. 188-9.

²⁸⁵ Lucr. *DRN* 4.1141-89.

²⁸⁶ On the effective apotheosis of the lover, cf. e.g. '*Veneres nostras*' (4.1185), 4.1182-5 more generally, and the *exclusus amator* treating the house of his beloved like a temple. On similarly counter-productive behaviors, with parallels in Cicero's defense of Caelius as well as in Comedy, cf. esp. 4.1121-32. On these topics, cf. e.g. Nussbaum 1994, Brown 1987.

²⁸⁷ Konstan 2013b focuses on the *dolor* and (to a lesser extent) the *curae* experienced by mother of the *vitulus* in book two, interacting with Betensky 1972. Konstan 2013a focuses on Greek thought and recapitulates his ideas that animals cannot have emotion - particularly ἔρωζ, taking Lucretius as an example illustrating his argument. Nevertheless, Konstan allows them what he calls 'lower order emotion' like affection (φιλία) and sexual drive and calls *laetitia* (something Lucretius does ascribe to animals!) a cognitive or higher order emotion. Nussbaum 1994: esp. ch.5 largely shares Konstan's interpretation of emotion and animals' capacity for it; she also has a very different reading of the two passages quoted below.

²⁸⁸ Betensky 1980: 293.

²⁸⁹ That the reader of the finale of book four is male is indicated not only by the need to be informed about the emotions, motivations, and behaviors of women, but also by expressions like 'our wives' ('*coniugibus nostris*', 4.1276, referring back to '*uxores*' at 4.1266).

²⁹⁰ For discussion of the following lines, with particular emphasis on some of the same terminology and similarly stressing the mutuality, cf. also Landolfi 2013: 135-45.

nec mulier semper ficto suspirat amore
 quae complexa viri corpus cum corpore iungit
 et tenet adstrictis umectans oscula labris;
 nam facit ex animo saepe et, communia quaerens
 gaudia, sollicitat spatium decurrere amoris.
 nec ratione alia volucres armenta feraeque
 et pecudes et equae maribus subsidere possent,
 si non, ipsa quod illarum subat ardet abundans
 natura et Venerem salientum laeta retractat
 DRN 4.1192-1200

A woman does not always sigh with feigned *amor* - who, when she has embraced the body of her man, joins it and holds it with her own, - moistening kisses with sucked lips.²⁹¹ For she often does this sincerely, and, seeking shared joys, incites him to 'go the distance' of *amor*. It is the same with birds, cattle, and wild animals, and herds and horses; the females would be unable to submit to males, unless their very nature - because it is on fire - blazes up, overflowing and glad, and draws in and out of herself the Venus of the mounting ones.

Lucretius here shows that women and a universalizing list of animals experience the very same *amor* that men do, according to the same underlying mechanisms ('*nec ratione alia*').²⁹² Bailey's observation of the racing metaphor '*spatium decurrere*' is well noted, but, as it is subordinated to *sollicito*, the expression may also reinforce the idea that the one's *amor* needs to be stirred to a critical point for sexual activity to take place. The use of the racing metaphor in conjunction with *salio* (4.1200), generally of mounting by male animals, suggests that Lucretius is thinking of a position where the male is riding the female during coitus - like one would ride a horse.²⁹³ The expression '*sollicitat spatium decurrere*' also looks forward to '*Venerem retractat*' (4.1200); both here refer to coupling. *Sollicito* can be used of sexual stimulation as well as stimulation in general²⁹⁴ and *tracto* and its compounds are used for the masturbation (or stimulation by stroking) of a sexual organ during sexual activity; *Venus*, here, is probably a euphemism for penis.²⁹⁵ Finally, metaphors of reaching goals, such as '*spatium decurrere amoris*', were frequently used of achieving orgasm.²⁹⁶ That Lucretius is talking about the females among all of these groups of creatures is indicated by '*mulier*', '*equae*', and especially '*illarum*'.²⁹⁷ This is reinforced by the references to the traditional role of the female during sex in Roman society - i.e.

²⁹¹ For this interpretation of *Lucr. DRN* 4.1194, cf. also Brown 1987: 309-10.

²⁹² On the *amor* of horses, cf. also *Lucr. DRN* 5.1074-5. There is some ambiguity in 4.1197-8 as to what animals specifically *armenta* and *pecudes* refer, not least in juxtaposition to *ferae*. Generally, Lucretius' use of one in contrast to *ferae* may suggest wild vs domestic animals, as in those that have not vs have formed interspecies communities with humans; on these categories in *DRN*, cf. esp. pp.203-19. Lucretius also commonly uses both *armenta* and *pecudes* to refer to cattle, but also refer to sheep and/or goats or herd animals of the land in general. Dogs (both male and female, *canes* 4.1203) are also specifically mentioned in the context of the larger passage 4.1192-1208.

²⁹³ Indeed, Lucretius thinks that this is the best position for conception, cf. *Lucr. DRN* 4.1264-7.

²⁹⁴ Cf. *Lucr. DRN* 4.1037, where it seems to encompass both.

²⁹⁵ Cf. Adams 1982: 186. Bailey 1947, iii: 1313 has quite another interpretation for '*retractat*' which neglects the euphemisms of line 4.1200 and indeed of 4.1270: '*clunibus ipsa viri Venerem si laeta retractat*'. The interpretation presented above is consistent with *OLD* §1. On *Venus* as a euphemism for penis generally and with respect to the comparandum of 4.1270, cf. Adams 1982: 57. For further discussion of 4.1197-1200, cf. Brown 1987: 311ff.

²⁹⁶ Cf. Bailey 1947 *ad loc*, Adams 1982: 144, 166, 184-5, 206.

²⁹⁷ The inclusion of a single male in the list would have rendered this '*illorum*'.

being in a submissive position with respect to the male (cf. 'maribus') and being penetrated by his penis. Nevertheless, the overall passage, the description of the female's burning nature, and particularly the use of *retracto* to render the motion of the female during sex, stress that a female is a willing participant in coitus. This recalls the role of *voluntas* (4.1045) and suggests that *retracto* be interpreted in a medial sense. The female here is acting, not passive, and doing so on the basis of her sincere feelings ('*nec ficto amore*', '*ex animo*').²⁹⁸ The mutuality of the sexual act and feelings in the context of the larger passage, lines 4.1192-1208, coincide neatly with the reciprocal penetration of the lovers by one another's *simulacra*, seed, and other emitted stimuli.

Echoes of subject-matter and specific words suggest that 4.1192-1200 should be read against the proem to book one, specifically lines 1.12-20.²⁹⁹ There, the springtime arrival of Venus³⁰⁰ in their dwelling places strikes ('*incutiens*', 1.19) and thereby excites charming *amor* throughout the *pectora* of all creatures ('*omnibus*', 1.19),³⁰¹ which effects that they propagate *generatim*. Lucretius explicitly mentions *volucres*, *ferae*, and *pecudes*, as well as the places in which they might be found: for birds, in the air and plants; for land animals, in the pastures, plains, and mountains; and for the herds of fish, in the rivers and seas. This suggests that 4.1297-8 is meant to be comparably universal or comprehensive (cf. '*genus omne animantum*', 1.4);³⁰² the singling out of horses there may be a function of

²⁹⁸ Cf. Lucr. *DRN* 3.57: '*pectore ab imo*'. With that and the expression '*ex animo*', cf. the English expression 'from the heart' or 'sincerely', which pleonastic and colloquial meaning is likely at play (cf. Catullus 109.4, Brown 1987: 311) - i.e. her feelings, beliefs about them, and chosen behaviors are consistent, thus her lover is not deceived in the beliefs which he has formed on the basis of her actions. The literal translation 'from the *animus*' is also intended, indicating the physiological mechanism by which the *amor* is transmitted and translated into action.

²⁹⁹ The fact that Virgil appropriates this connection and does so particularly with respect to animal *amor* (cf. Gale 1991: 419-21) may constitute further evidence that we should juxtapose them. Also on potential connections between the proem to book one and the finale of book four, cf. e.g. Betensky 1980, Clay 1983: 232-4, Brown 1987: 91-9, Nussbaum 1994: 157-64 (contra Clay), Konstan 2008: 146-51, Gale 1994b: 208-23.

³⁰⁰ There is considerable debate as to what Venus represents in the proem (but none of the likely meanings are what one might call sexually explicit). Those of relevance for further investigation in relation to the themes of this study included the following. Asmis argues that at least one of the valences of this Venus is as a symbol of pleasure and spontaneity (or free will), as a counter to the divine providence and fate of the Stoic's Zeus; cf. Asmis 1982. On the proem's dialogue with Empedoclean ideas and particularly the Love-Strife dichotomy, cf. e.g. Sedley 1998a: 1-34, esp. 15-34, who argues that the proem was meant to be recognized as an imitation of Empedocles' proem to *On the Nature of the Things There Are* (p.22ff). On related aspects of *DRN*'s proem, cf. also Furley 1966, Clay 1983: 82-110 (emphasizing Venus-*Natura*) and Gale 1994b: ch.6.

³⁰¹ This looks forward to the blows of *simulacra* and wound imagery at Lucr. *DRN* 4.1045-56; cf. Mars' state of being conquered by his '*vulnere amoris*' and his feeding his eyes with *amor* by looking up at Venus, 1.34-7. Brown thinks that '*omnibus*' (1.19) only refers to animals; Brown 1987: 88.

³⁰² Lucretius is here covering creatures from the three main regions of the earth - i.e. the land, sea or waters, and sky, cf. Lucr. *DRN* 5.91ff. Between *ferae* and *pecudes* are covered those that live as predatory, prey, docile, groups, and individuals. On mountains as a typical dwelling places of land animals which are dangerous to humans, cf. Lucr. *DRN* 5.39-42. Pastures may be a typical dwelling place of land animals who are docile and/or domesticated. Plains may be liminal. On fish as a type creature which lives in groups, cf. '*squamigerum pecudes*' (2.343). At 5.218ff, *ferae* seems to include creatures of both land and sea.

their relevance to the imagery, typical of Lucretius' use of the horse as an exemplary animal, or both. The liminality of *amor* and *ira* may also be a dimension of the poem's dichotomy between Venus and Mars.³⁰³ Together lines 4.1192-1208 and *DRN*'s poem show that all living creatures, when experiencing *amor*, are literally 'in heat'.³⁰⁴ The entire constitution of each has temporarily taken on the nature of the fire surging in and transmitted from the *animus*.

Book five further elucidates the significance of these universal processes. In 5.849-54, Lucretius tells us that all creatures - both human and animal - which still exist, survived from the infancy of the world in part because of their ability to procreate, a necessary condition of which is the ability to exchange these *mutua gaudia*.³⁰⁵ Thus it seems no coincidence that in the larger seventeen-line passage 4.1192-1208, the idea is introduced with an emphatic enjambment, as well as repeated three times with a rather specific vocabulary: '*communia ... | gaudia*' (4.1195-6), '*mutua voluptas*' (4.1201), '*mutua gaudia*' (4.1206), '*communi' voluptas*' (4.1208). The importance of such mutuality for Lucretius' ensuing account of heredity will be treated in chapter four. For now let it suffice that the connection between *amor*, *gaudium*, and procreation which lines 4.1192-1208 establish shows that Lucretius' account of heredity can be extended to all living creatures. Physiological variation does not seem to coincide with variation in the essential causes, mechanisms, experience, or phenomenal manifestation of the emotion. It only matters insofar as the stirring of *amor* and seed occurs on a species-specific basis. For both humans and animals, the stakes of correct *amor* - and the rest of the emotions - are high: the survival of one's species.³⁰⁶

There are other circumstances in which our emotions are not only appropriate but also useful. Lucretius tells us that the world is yet full of real dangers and,

³⁰³ Many thanks to Donncha O'Rourke for first drawing my attention to this as a possibility and for discussion of it. The point will be developed further at pp.217-18.

³⁰⁴ Cf. Bailey 1947, ii: 1041-2 on anger as a state of heat coming over the *animus*. On this point, cf. also Konstan 2013a.

³⁰⁵ Cf. *Lucr. DRN* 2.172-4; '*mortalis*' here may refer to both humans and animals, but '*genus humanum*' indicates that Lucretius is here thinking chiefly about human survival. His account of early human coupling exemplifies living '*sponte sua sibi*' (5.961), here: 'independently and for his/her own advantage', contra Johnson 2013: 121. Coitus took place through '*mutua cupido*' (5.963), the man's force and '*libido*' (5.964), or the exchange of goods ('*pretium*', 5.965) for services, so to speak. These instances and ideas recall the '*voluntas ... lubidine*' of 4.1045-6 and reinforce the point that such things are deliberate - here on the part of one or both of the partners. Of these three at 5.963-5, only mutual desire should consistently lead to procreation according to the mechanism of *amor* established above, perhaps accounting its priority and proximity to '*amantum*' (5.962) in the list.

³⁰⁶ On the potential for anger to be useful for one's security (and, by implication, for the survival of one's species), cf. *Ep. KD* 7, *Phld. Ir.* 40.32 - 41.8, Procopé 1993: 374. On the individual level, however, sex itself is more like food and drink insofar as a certain satisfaction is natural and necessary to avoid pain, but beyond that merely offers variation of pleasures; cf. Landolfi 2013: 60.

correspondingly, terror, but we, unlike early humans, are able to avoid the sorts of places in which these things are generally found.³⁰⁷ The implication here is that the emotion of terror is legitimate, insofar as these things threaten our survival, and thus linked to our avoidance of the places where these dangers abound. The first humans also experienced other legitimate emotions. The food and drink which nature provided was all that they had access to, but it was sufficient for their needs and gave them a pleasure specific to the *mens* ('*placabat pectora*', 5.938), as well as - presumably - the more corporeal one. They did not fear the darkness or night, unlike children and others with un-Epicurean fears resulting from not understanding the nature of things.³⁰⁸ Rather, their *curae* were being preyed upon by *saecla ferarum* such as lions and boars while they slept. Often, thus, they would flee their leafy beds if such a beast approached.³⁰⁹ These emotions were useful in that they contributed to the survival of the individual and race.³¹⁰

From 4.1192 to the end of book four, as Bailey notes *ad loc*, Lucretius returns focus to the physiological processes which are not only natural and consistent with ἀταραξία, but also necessary for the propagation of all species *generatim*. The fact that Lucretius' explicit treatment of animal *amor* occurs within this specific context evinces that animal *amor* involves neither excess nor false beliefs. Contra Bailey, however, 4.1192-1208 is not so much a return to the physiology of *amor* as it is the culmination of one set of physiological concerns and the transition to another related set - namely the mechanics of propagation itself. Lines 4.1192-1277 thus represent a kuklos. In the final lines of book four, 4.1278-87, Lucretius returns to where he left off at 4.1190-1. This allows Lucretius to conclude the finale of book four with an account of how natural and necessary *amor* arises,³¹¹ as a corrective to the excessive *amor* of 4.1076-1191 (and particularly 4.1141-89) specific to humans.³¹² Juxtaposing the bookends of the kuklos³¹³ shows conclusively that there can be causes of *amor* other than one's interactions with some shapely *simulacra* - or self-deception about one's beloved. Therefore, contra particularly Brown and Nussbaum,

³⁰⁷ Lucr. *DRN* 5.39-41.

³⁰⁸ Lucr. *DRN* 5.970-81, 2.47-61, esp. 2.55-61; cf. 1.146-8, 3.87-93, 6.35-41.

³⁰⁹ Lucr. *DRN* 5.982-98.

³¹⁰ This will be borne out by chapter four; cf. esp. pp.211-15.

³¹¹ Again, this is natural and necessary with respect to procreation and the survival of species; it is also lacks the excesses which Lucretius previously described as painful.

³¹² Brown 1987: 305-6 and 371-2 hints at this as well, but without discarding the ideas of the diatribe and non-passionate love. He also brings in ideas of *amicitia* which are not persuasively applied. Objections to such ideas will be treated shortly.

³¹³ For the echoes of words and ideas which further justify the juxtaposition, cf. p.161 n.317.

the concluding lines of book four are no mere ‘postscript’ or ‘footnote’ on ‘non-passionate love’;³¹⁴ they add a final nuance to our understanding of the mechanism.

Beauty may lead to love, according to Lucretius, but relative lack is no bar. Moreover, one can still love a woman after one’s *animus* sees that, no matter how lovely she looks, she will be as ‘all too human’ as the ugly woman behind closed doors.³¹⁵

et, si bello animos et non odiosa, vicissim
praetermittere et humanis concedere rebus.
...
nec divinitus interdum Venerisque sagittis
deteriore fit ut forma muliercula ametur;
nam facit ipsa suis interdum femina factis
morigerisque modis et munde corpore culto,
ut facile insuescat te secum degere vitam.
quod superest, consuetudo concinnat amorem;
nam leviter quamvis quod crebro tunditur ictu,
vincitur in longo spatio tamen atque labascit.
nonne vides etiam guttas in saxa cadentis
umoris longo in spatio pertundere saxa
DRN 4.1190-1, 1278-87

And, if she has a pleasant *animus*³¹⁶ and is not annoying, you can in turn overlook her quirks and pardon the human condition.³¹⁷ ... Nor does it happen by divine influence and the arrows of Venus³¹⁸ that, sometimes, a mere woman of lesser beauty is loved.³¹⁹ For a woman sometimes causes this herself, by her actions and obliging ways and elegantly cultivated body such that she easily accustoms you to pass your life with her. What is more, habituation inculcates *amor*; for what is buffeted by a repeated blow - however lightly, nevertheless is conquered and gives way in the long run. Do you not see that even drops of liquid falling upon stones in the long run bore through them?

By the process described here one creature literally grows or learns to love another, romantically (e.g. with both strong affection and an erotic element), over time and absent

³¹⁴ There is a range of views on Lucr. DRN 4.1278-87. Scholars usually assume that it is about marriage, which may be encompassed but is not necessitated by either the language or mechanism; similarly, it is usually taken to refer to something lacking with respect to the sexual. Nussbaum, for example, would have the reader believe that it is actually about *φιλία* (further on which, cf. p.201 n.141); Nussbaum 1994: esp. 185-7, cf. Müller 1978: 246-8. Brown similarly sees it as a kind of postscript on ‘non-passionate love’, Brown 1987: 100; cf. Brown 1987: 45 n.90: ‘[t]he final paragraph, 1278-87, is conveniently included with the diatribe because it returns to the subject of love, but is not so detached from its context as this implies and might more accurately be described as a coda or postscript to the whole sexual discourse’ and Brown 1987: 89: ‘a footnote to the discussion of love’. Betensky 1980 is more positive in her assessment but still suggests that 4.1278-87 represents a non-romantic love and Lucretius’ reconciliation between (what Betensky sees as) the Epicurean ideal of love, embodied by Venus in the proem to book one, and the bleak reality of romantic love in Roman society and literary tropes, as the subject of his attack.

³¹⁵ Although a lover cannot see this with his eyes (because such things as doors and walls block the *simulacra* which interact with the eyes), he can do with his *animus*, once it is open to interacting with *simulacra* of actual unflattering events; Lucr. DRN 4.1149-89. On the precise nature of these unflattering events, involving smell, cf. the various interpretations of Bailey 1947, iii: 1311, Brown 1987: 296-7, Nussbaum 1994: 179-81 (who also surveys a broader range of previous views).

³¹⁶ The ablative of quality has been smoothed over for the sake of readable English translation, but the idea that she is someone with a ‘*bello animo*’ implies what we today would call character, among other things. For Lucretius, it implies both the constitution of the *animus* which we are born with and the developments of it - particularly - over which one has control. These will be treated in chapters four and five respectively.

³¹⁷ The complementary infinitives are dependent on *possis* in Lucr. DRN 4.1188. The implied quirks and her human condition refer back to the statement of the previous lines that in fact that the goddess-like woman does - and hides - all of the same ‘all-too-human’ activities as the ugly woman does; cf. 4.1174-89. The use of ‘*praetermittere*’ here (not least in conjunction with ‘*bello animo*’) correctively answers the ill-advised ‘*praetermittas animi vitia omnia primum | aut quae corpori sunt eius*’ of 4.1151-2. Brown 1987: 306-7 also picks up on this echo.

³¹⁸ Cf. pp.152-4 regarding *Veneris tela*; here Lucretius is clarifying that correct *amor* is in no way related to the mythological allusion of the initial pun, despite the fact that *simulacra* and other stimuli are still involved in the process - probably, indeed, to an even greater degree than in examples of the preceding *kuklos*.

³¹⁹ The diminutive ‘*muliercula*’ is translated ‘mere woman’ because the derogatory force implies a contrast between she and the goddess-like or delusional versions of women (which men judge to be true); Lucretius undermines the unfavorable comparison in the subsequent lines.

false beliefs. This emotion is twice referred to as *amor* ('*ametur*', 4.1279, '*amorem*', 4.1283), which Lucretius never uses in his treatments of friendship or familial affection (which are potential meanings of *amicitia* and φιλία, respectively),³²⁰ and there is nothing here or in his other discussions of natural and necessary love to suggest that the sexual aspect can be lacking from it. Indeed, *morigerus*, although probably in this period still alluding to a married relationship or something analogous to one, could also have sexual connotations.³²¹

This description of the process by which such *amor* arises reinforces the claim that repeated interactions not only lead to the maintenance but also to the inception of an emotion.³²² *Concinno* conveys the idea of inculcation or instilling by (re)structuring the arrangement and thus projects a role in *amor*'s 'formation' back onto *consuetudo* and *insuesco*. The repeating blows of *simulacra* and other *sensus*-bearing interactions are made pleasant (or not) by the woman's ways; these interactions and one's subsequent judgments eventually inculcate or undo the emotion.³²³ This correct *amor* seems to lack the potential for boiling over into war, self-deception, and the squandering of time and money; therefore, there is no need to direct one's focus elsewhere.³²⁴ The eventual surge of fire may not burn as hot as that which quickly swells at superficial beauty - as did the *ignis* of *amor* in Paris at the *forma* of Helen.³²⁵ Nevertheless, it may both burn and benefit over a

³²⁰ Epicurus does use ἔρωσ of such things, cf. p.163 n.330. Further on *amicitia* and φιλία, cf. esp. p.201 n. 141.

³²¹ Adams 1982: 164. The adjective was used in a more general sense as part of the Roman discourse of 'good' marriage; on its evolution, probably from a marriage ritual, cf. Williams 1958: 19-22, N.B. p.20 where he concludes that in the earlier period the allusion to female sexual behavior was a secondary meaning. The textually contentious statement regarding whether Epicurus advocated that the wise man would sometimes marry and have children (cf. D.L. 10.119) is irrelevant to whether either Epicurus or Lucretius believed that this correct sort of *amor* was possible, as well as to whether this passage necessarily refers to the context of a married relationship. Marriage in Greco-Roman society was generally an alliance between families, on e.g. social, political, or economic grounds; it was not, at least in the first instance, due to mutual feeling between the couple, who may not have even known each other beforehand and were often of considerable difference in age. On the passage in Diogenes Laertius, related ancient evidence, and for secondary bibliography on this subject, cf. Brown 1987: esp. 118-20.

³²² Cf. Lucr. *DRN* 4.1061-4.

³²³ By habituation, familiarity could as easily breed contempt as affection, but that it can breed love, including of humans for animals ('*consuetudine adamare solemus*'), cf. Cic. *Fin.* 1.66-70. For a very different but not necessarily uncomplementary interpretation of *consuetudo*, cf. Betensky 1980: 294.

³²⁴ E.g. by averting one's *animus* or eyes from her *simulacra*.

³²⁵ If one takes the Paris passage to its logical conclusion along the lines of this mechanism and various metaphors which Lucretius associates with *simulacra* during the finale, the alleged mythological intervention of Venus might simply be a personification of his interaction with Helen's *simulacra*, with respect to his eyes, *animus*, or both. If so, this would contribute to one of Lucretius' more general aims, namely the dispelling of false belief with respect to *religio*. Clay, e.g., argues that through the Venus of book four's finale, Lucretius shows the true nature of what humans have deified and thus paves the way for his account of true divine nature in book five; Clay 1983: 232-4.

longer term.³²⁶ Therefore, for Lucretius, *amor* - as romantic love - is not intrinsically harmful.³²⁷

In this Lucretius may differ from Epicurus and Philodemus. We lack Epicurus' treaty on ἔρωσ and the surviving works of Epicurus do not seem to discuss it, but there are testimonia. Epicurus is said to have called ἔρωσ: σύντονον ὄρεξιν ἀφροδίστων μετὰ οἴστρου καὶ ἀδημονίας, 'an intense desire for sex - coupled with agony and distress'.³²⁸ Οἴστρος can also mean or carry connotations of passion, madness, and frenzy as well as intense pain. Philodemus characterizes ἔρωσ as: βλαβ[ερωτ]άτου καὶ παραχωδεστάτου - and <σ>ύν[εργ]υς ... τῆ πα[ρανοία], 'very harmful', 'very disturbing', and 'near to madness'.³²⁹ Both of these fragments coincide with Lucretius' characterization of excessive *amor*.³³⁰ It is possible that Lucretius' version of correct *amor* is an instance where Lucretius is following out the physics of Epicurus to its logical implications, with respect to a point left unspecified by Epicurus (or by whatever of Epicurus' works were available to him), but commensurate with Lucretius' own emphasis on universal processes and species, alongside concern for the individual. Alternatively, we may simply lack corroborating evidence. However, given that Philodemus is among the ancient thinkers who consider animals to have mere semblances of emotions, not emotions themselves, it is probable that Lucretius' representation of correct *amor*, at least, is original for the school.

Pace Annas, then, there is an account of the Epicurean theory of the structure of the emotions,³³¹ and it occurs in Lucretius' *DRN*. Emotions in general have been seen to entail the surge of a particular sort of constituent of the *animus-anima* complex relative to the others. The subjective experience of *amor* and the interactions of the *mens* from which it emerges effectively refer to two sides of the same coin, ontologically speaking. The fiery class of emotions can transform into one another, but they are generally differentiated by the aetiological chain. *Amor* is also contingent upon factors like the focus of the sense-

³²⁶ Cf. esp. p.181 n.48 and p.296 n.341. on the Epicurean pleasure-pain calculus, whereby short-term pleasures are not preferable if they might lead to pain in the longer term and conversely that short-term pains can be endured for the sake of long-term pleasures.

³²⁷ Cf. Phld. *Ir.* 37.24-7 that anger is not necessarily an evil.

³²⁸ Usener 483 from Hermias' commentary on Plato's *Phaedrus*. Bailey 1947, iii: 1303 translates it as 'a vehement desire for sexual pleasure accompanied by a goad of restlessness'. Rist 1980: 126 and Brown 1987: 217 also quote the fragment; Rist does so to distinguish it from friendship. That Epicurus and the other founders did not necessarily consider sex itself to be a problem, N.B. the testimonium of Epic. *On the End* in Cic. *Tusc.* 3.41 (= Usener 67) and of Metrodorus in *SV* 51 (cf. Usener 464).

³²⁹ Phld. *D.* 3.76.6ff in Brown 1987: 217. This translation concurs exactly with that of Brown.

³³⁰ That said, there is evidence that this is not a complete picture. Demetrius of Laconia attests that Epicurus used ἔρωσ with reference to children, cf. Procopé 1993: 372-3. Lucretius does not do this of *amor*.

³³¹ Annas 1992: 192.

organs and the swell of seed, as well as choice. Thus the emotions do not arise in isolation from the rest of the faculties and processes of living creatures.

Approaching Lucretius' account of *amor* as a case study in the psychophysiological mechanism of a feeling has demonstrated that the finale of book four is no cynical diatribe (contra, for example, Brown and Landolfi).³³² It follows logically from the place of emotion in the overall theory of *sensus*. The emotions do not arise in the *animus* in isolation from the rest of the faculties and processes of any living creature. The importance of the other *sensūs*, and particularly of those involving *simulacra*, to the physiological mechanism of this *sensus animi* explains Lucretius' choice of this case study or 'discourse on *amor*' as the book's finale.³³³ Moreover, for Lucretius, there is a sort of *amor*, exhibited by both humans and animals (and perhaps more common among the latter), which is not 'empty'³³⁴ - but consistent with *utilitas* and ἀταραξία. It is conducive to long-term pleasure as well as to the procreation and survival of species. It also involves accurate beliefs about the nature of things. Finally, because *amor* emerges from the physiological constitution of the *animus-anima* complex, our capacity for the emotion is ineradicable.³³⁵ Indeed, in the finale of book four, Lucretius indicates that there is no need for its extirpation, just for the reader's education.³³⁶

Conclusions

This chapter has demonstrated that, for Lucretius, the *sensus animi* - like the *sensus corporis* - is a differentiated cluster of faculties, encompassing a number of distinct perceptions and their corresponding mechanisms and sense-objects, which are shared by all living creatures. Whereas the perception of time and, especially, thought - at least insofar as they have been explored thus far - seem, for Lucretius, far less rational and

³³² Brown 1987 and Landolfi 2013, e.g., refer to it as a diatribe *passim*; Brown is particularly adamant on this point.

³³³ Pace Nussbaum, who argues that all of book four is subservient to this finale, rather than seeing the finale as being one aspect of a larger topic; Nussbaum 1994: ch.5. Brown, on the other hand, think that it is an extension of the topic of illusion; Brown 1987: Introduction.

³³⁴ Cf. Phld. *Ir.* e.g. 37.24-7 on 'empty' emotions (i.e. emotions based on false beliefs) and, e.g. Annas 1989, Asmis 2011.

³³⁵ In other words, it is a *coniunctum* of one's nature. As we will see, it is impossible to entirely uproot one's inherent *natura animi* (and thus its partially consequent behaviors) and certain related emotions. The ineradicability of the emotions stemming from emotion as a consequence of one's physiological nature is also noted by Procopé 1993: e.g. pp.365-6, 373. Annas, on the other hand, argues that Epicurus, at least, intended for certain emotions - and, specifically, ἔρωξ - to be eliminated; Annas 1992: 196. This list corresponds with three of the four senses of 'natural' which Demetrius of Laconia claimed that Epicurus distinguished, excepting what is proximately caused by a force external to the entity in question (such as being shoved by a colliding body); cf. Procopé 1993: 372-3.

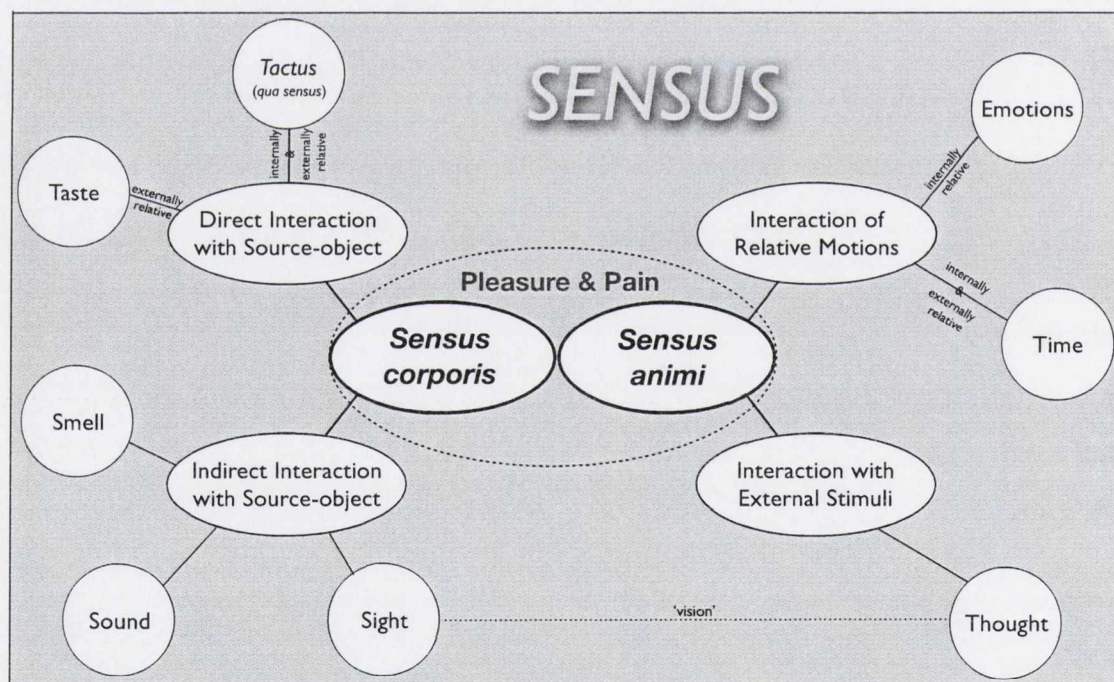
³³⁶ Cf. The testimonium that Epicurus (or his school) thinks that the σοφός man will have more πάθη but that this will not impede his wisdom; D.L. 10.117.

voluntary, so to speak, than western thought traditionally supposes these so-called cognitive processes to be; other feelings, which are less conventionally characterized in this way nowadays are perhaps more so according to Lucretius. For example, chapters two and three together evince that, for Lucretius, pleasure and pain are as much cognitive (to highlight the terminology of, e.g., Konstan) as bodily, or as much applicable to the *mens* as to the rest of the body, and perhaps best considered psychophysiological *eventa*. Moreover, certain pleasures and pains - as we have seen here - are actually particular to the *mens*. Emotions too are psychophysiological - in that they are among the *sensus animi*, arise from the fluctuating motions of the *mens*' constituents, and the workings of *ratio* are somehow involved. This chapter has also shown the fundamental significance of one's constitution to these *sensus animi* and their mechanisms, just as to the *sensus corporis*. It is now possible to present the overall theory of *sensus* in *DRN* and to explore some of its implications.

EPILOGUE TO CHAPTERS II & III

This epilogue serves as a conclusion to chapters two and three; it synthesizes the overall theory which they developed and argues for its validity by demonstrating its explanatory value.

Chapters two and three reconstructed Lucretius' account of the overall theory of *sensus*-as-faculty, examining in turn the types of perception which it encompasses, as well as the processes and structures which explain how these faculties work and relate to one another. The analysis demonstrated that, for Lucretius, the *sensūs corporis*, the *sensūs animi*, and pleasure and pain, are all feelings of one kind or another and common to all living creatures. The faculty and its respective types, thus taken together, constitute a continuum of all feeling or perception. This continuum can be represented by the following diagram:



This paradigm is also reinforced by Lucretius' ordering of the material in books three and, particularly four. Many of the difficulties which modern scholars have with the structure of book four may simply arise from the misleading distinction that we ourselves make between what we generally call sensation, thought, and emotion. By placing the material of book three before that of book four, Lucretius is able to present the primary

manifestations of the faculty of *sensus* - i.e. the '*corporis atque animi ... sensus*' (2.946) - together, and thus to bring out the relationships between them. Thus, the double syllabus at the beginning of book four (4.26-44 and 4.45-53) is probably an artifact which arose from developments in Lucretius' thinking about the contents of books three and four.¹ In sum, therefore, *sensus*, in Lucretius, encompasses and refers to a number of related things, eliding, as Glidden notes, αἴσθησις, παθή, and αἰσθητηρία.² *Sensus* can refer to feeling or perception in general. At other times it signifies particular instantiations of feeling, experienced through what we call 'sense-organs'. It also can refer collectively to the sense-organs themselves or to their specific faculties. In this way, *sensus* includes: pleasure and pain, the so-called five senses - touch, taste, sight, hearing, smell - as well as thought, emotion, and other perceptions, such as that of time.

We have also seen that, for Lucretius, *sensifer motus* is a necessary vertical cause from which all feeling emerges. This occurs when a sufficient number of the constituents of the *animus-anima* complex stir to such an extent that they interact with other constituents of the complex, either those concentrated in the breast or those distributed throughout the body. These interactions generally are one of two sorts. Some interactions involve the collision or friction of constituents, and operate rather like the transmission of impulses across a nerve synapse. Others interactions involve the surging and receding of particular sorts of constituents relative to one another. If a modern comparison could be illustrative: such fluctuations resemble the ebbs and flows of neurochemicals like testosterone, dopamine, and serotonin which we now know to be involved in the feeling of certain emotions. *Mutatis mutandis*, the structures and mechanisms underlying *sensus* thus strongly resemble a central nervous system - centered at the heart.

Epicurus was likely writing before the Alexandrians discovered the role of the brain in cognition and feeling, or at least before their discoveries were disseminated. As scholars such as Solmsen and Holmes have shown, developments in medical science were

¹ A fuller investigation into the implications of this analysis of *sensus* for our understanding of the poem's composition is a desideratum but outside the scope of the present study. Sedley also thinks that such artifacts and the overall order reflect developments in Lucretius' thinking, which led to a departure in organization from that of Epicurus'; Sedley 1998a: esp. 137-8, 148-52. With respect to the so-called 'doublet' in the poem to book four (Lucr. *DRN* 4.1-25, with minor variations, echoes 1.926-50) and its relationship to the structure and composition of the book, cf. also Gale 1994a (contra particularly Mewaldt), which doublet Schiesaro 1994: 101 takes as exemplifying the poem's palingenesis, and Müller 1978: 248, who takes it as 'an impossible iteration' which someone other than Lucretius must have inserted to fill a lacuna. For others views about the structure and placement of book four on the basis of different evidence, cf. Schrijvers 1976, who argues that Lucretius' structure in book four can be explained by the convention of his times, namely by analogy with structures used by near contemporaries like Pseudo-Galen, and Brown 1987 on the finale of book four in relation to the poem's structure.

² Glidden 1979b: 155.

not irrelevant to the evolution of philosophical thought about such things.³ It is generally agreed that the Hellenistic medical discoveries most significant for this debate were those of Praxagoras, Herophilus, and Erasistratus. Praxagoras distinguished between the veins and arteries, the latter of which he thought responsible for the circulation of *pneuma*⁴ and thus to some extent for what many considered the soul's functions - like the communication of motion. The Alexandrian anatomists Herophilus and Erasistratus discovered and conducted the key work on the nerves, and eventually advanced the idea that the brain is the central organ of consciousness. But Epicurus probably worked out his ideas when empirical knowledge of anatomy in the Greek world was still largely restricted to the dissection of animals and medical treatment of human wounds. At that time many of the best authorities on anatomy thought that the heart was the center of cognition and that the blood - or at least the circulatory system - carried what we might call 'soul' and 'sensation' throughout the body.⁵ The degree to which Epicurus drew on such theories from Diocles and possibly Praxagoras, on the one hand, along with some very different competing ones from the likes of Democritus and, perhaps, Empedocles, among others, is difficult to determine, not least given the state of the evidence.⁶

The discovery of the central nervous system was not a watershed moment that immediately and irrevocably changed philosophy. At least some later Epicureans engaged with the scholarly debates of their day, and Demetrius of Laconia did so explicitly with respect to medicine.⁷ But, like the Stoics, they rejected the Alexandrians' claims,

³ Solmsen 1961b, Holmes 2010. With particular emphasis on the development of ideas on the nature and epistemic value of the senses in relation to these concerns, cf. Clements 2014.

⁴ Here: the matter of the soul.

⁵ The difficulties in establishing a chronology result partly from incomplete understanding of when Epicurus developed certain ideas and partly from uncertainty about precisely when certain medical discoveries were made and became known. If Solmsen 1961b: 195 is correct, the 'best' medical authority around by the last decade of Epicurus's life would have been Praxagoras. However, it is questionable whether Praxagoras had fully worked out his theories by that point, even more unlikely thus that they would have been readily available to Epicurus. The somewhat earlier chronology offered by Annas 1992: 20-23 and accepted by Gill 2009: 132 makes the availability more likely, but it still places Epicurus' death before the work of Herophilus and Erasistratus. Cambiano 1999: 600-2 has yet another chronology, but it is closer to Annas' than to Solmsen's. Cambiano places Praxagoras at the end of the fourth century and Herophilus and Erasistratus some time in the first half of the third. Cambiano also implies (p.602) that Epicurus knew the theories of these Alexandrians and suggests that he or at least his school may have responded to them.

⁶ Solmsen suggests that Epicurus appropriated a version of the concept of *pneuma* - a concept historically constructed and shaped by both philosophers and medical thinkers - and thus modified the Democritean understanding of the soul, thereby quite literally incorporating the soul, especially with respect to its function in the communication of motion into systemic parts like sinews and veins; Solmsen 1961b. His understanding of its function in sensory-perception, as set out in Solmsen 1961a, as we shall see, is less convincing.

⁷ On the attempt of the late second to early first century B.C.E. Epicurean, Demetrius of Laconia, to address the current state of medical opinion, cf. Sedley 1998a: 70.

preferring to keep the heart as the body's command center, as their founder had done.⁸ Sanders attributes this lack of paradigm shift to philosophical allegiance rather than to medical ignorance.⁹ Nevertheless, it is hard to believe that someone as attuned to Epicurean physics and physiology as was Lucretius failed to notice the sympathy between the medical discoveries and his own allegiance. Thus, it is plausible that - as Bailey, Cambiano, and to a lesser extent Sedley, have suggested - Lucretius' particular synthesis and reworking of Epicurus' ideas did in part constitute, or at least reflect, some dialogue with the later developments in medicine, while still maintaining Epicurus' general theory. For instance, Lucretius may be showing awareness of (though not accord with) such ideas when he calls the *mens* 'the head, so to speak' ('*caput ... quasi*', 3.138) whose '*numen ... momenque*' moves the rest (3.144).¹⁰ Gill stresses the similarities between the models, and suggests they reflect converging thinking rather than direct influence.¹¹

Sensus also completely transcends any alleged divide between humans and animals. This is true of the greater faculty of perception, the constellation of faculties which it encompasses, and the underlying mechanisms. It suggests that animals not only dream, as we have seen, but also, like humans, seem to perceive other things which do not exist as such, for example: bent-oars and centaurs. Does Lucretius believe that animals empirically know the world - both external and internal to oneself - in the same way as humans do?¹²

The reliability of perception is a major problem in Epicurean epistemology. The famous dictum of Epicurus, that all αἰσθήσεις are ἀληθείς,¹³ is the cornerstone of scholarly

⁸ Innovators within the Stoic school who lived at a time when they might have known of the discoveries of the Alexandrians seem to prefer sympathy with the medical authority of Praxagoras and his predecessors; cf. e.g. Annas 1992: ch.1.

⁹ Sanders 2008: 362-3.

¹⁰ This passage will be treated in ch.5. The point picks up the suggestion of Cambiano 1999: 602 mentioned above; cf. Bailey 1947, ii: 1011-13 and Sedley 1998a: 71 n.46, who nevertheless prefers to explain *Lucretius DRN* 3.138 as a metaphor for the source of a river on the strength of 5.601. The inclination here is with Bailey, following Heinze; i.e. in light of the divergence between Hellenistic medical and philosophical theories, Lucretius' use of *quasi* may suggest that he is alert to the contentious nature of the metaphor *caput*. His general practice is to qualify those metaphors which conflict with doctrine, rather than those which illuminate it. Nevertheless, he lists the head emphatically among the places where the *vis animi* cannot exist and seems to think that the head can die while the torso still, temporarily, remains alive; cf. *DRN* 3.788 (= 5.132-7) and 3.655-6, respectively. On the argument for Lucretius' 'fundamentalism', cf. esp. Sedley 1998a: 62-93, esp. 68-72 with respect to the location of the body's so-called 'command centre'.

¹¹ Gill 2006: 55.

¹² Aspects of the following material were presented variously at the Annual Meeting of Postgraduates in Ancient Literature, St Andrews in June 2013, at the American Philological Association Annual Meeting, Chicago in January 2014, and at the Classical Association (UK) Annual Conference, University of Bristol in April 2015. My thanks to the audiences for their feedback.

¹³ Both the statement and its ancient interpretations seem to have been colored by evolutions in the language of philosophical discourse.

discussions, such as those of Striker, Taylor, and Asmis.¹⁴ It has also been linked to Lucretius' rationalization of myth and his general challenge to *religio*, for example by Gale.¹⁵ Such scholarship notes well that, according to the Epicurean paradigm, when one seems to perceive the unreal, so to speak, it is not actually perception which errs, but judgment.

This section asks: Why not perception; can *sensus* ever lie? It reconsiders Lucretius' account of the relationship between what we perceive, what we think we perceive, and what one might call 'objective reality'. Many studies have approached this from the perspective of the historical debate between the Sceptics and the Epicureans on the possibilities of knowledge; these include works by Fowler, Sedley, Furley, O'Keefe, and Vogt.¹⁶ Other studies, such as those of Konstan,¹⁷ have approached it phenomenologically. Few have begun from the mechanisms of perception themselves. Having already taken this more ground-up approach by reconstructing the mechanisms with particular emphasis on ontology and aetiology, we are now in a position to show mechanistically why it is impossible for the *sensus* of any living creature to be deceived, when the creature's physiological systems are operating normally. We will then treat the manner in which *sensus* is affected when these conditions break down.

In his discussion of the mechanisms of perception, Lucretius argues that the *sensūs* cannot be deceived and are the source of our idea of truth.¹⁸ (Elsewhere he warns against the dangers which one can fall into if one prefers to believe what others say.¹⁹) Sedley has persuasively claimed that the immediate context reflects Epicurus' charge that Scepticism, like determinism, is self-refuting.²⁰ To that extent, it may constitute Lucretius' interpretation of the dictum all αἰσθήσεις are ἀληθές. To recapitulate in brief and thereby present coherently the relevant details which we have already demonstrated separately:

(i) Lucretius primarily raises the issue of distortion with respect to those *sensūs* which operate by means of indirect interaction with their sense-objects. The perception of the source-objects by these *sensūs* are generally as accurate as the stimuli themselves. In other words, the accuracy of these perceptions is contingent upon the extent to which the

¹⁴ Striker 1977, Taylor 1980, Asmis 1984: 153-4, Asmis 1999, Asmis 2009.

¹⁵ Gale 1994b: esp. ch.4. On the relationship of Greek philosophy to Roman religious belief and practice more generally, cf. Brunt 1989.

¹⁶ Fowler 1984, Sedley 1989a, Furley 1993, O'Keefe 1997: esp. 131-4, Vogt (forthcoming).

¹⁷ E.g. Konstan 2008.

¹⁸ Lucr. *DRN* 4.478-9, D.L. 10.32.

¹⁹ Cf. esp. Lucr. *DRN* 5.1133-4 and preceding.

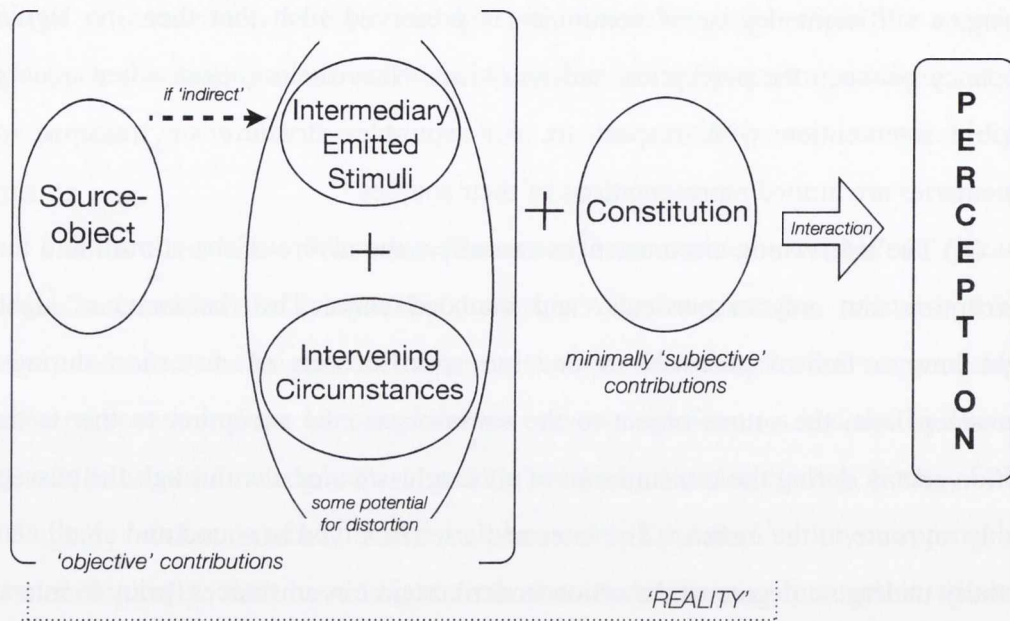
²⁰ Sedley 1983: esp. 33-4, cf. Sedley 1989a: 135n.2.

stimuli preserve the relevant *coniuncta* and *eventa* of the source-object. Generally speaking, a sufficient degree of continuity is preserved such that there no significant discrepancy between the perception and its object. Nevertheless, even when undergoing negligible intervention with respect to, for example, structure or trajectory, these intermediaries are limited representations of their sources.

(ii) The intervening circumstances can affect the nature of the stimuli and thereby of perception, but only in particular and bounded ways. The *simulacra* of sight and thought have a limited potential to undergo specific sorts of distortion during their transmission from the source-object to the sense-organ; the exception to this is that no distortion occurs during the transmission of a thought-*simulacrum* through the passages of the body en route to the *animus*. The intermediaries involved in sound and smell can also potentially undergo a degree of distortion under certain circumstances, prior to interaction with their respective sense-organs. The sense-organ in question thus accurately perceives the source-object(s) - not as itself, but as mediated by the intervening circumstances. The distinction between a source and its emissions therefore cannot be overlooked. Moreover, if one understands the causal mechanisms, perceptions of the unreal can be explained without recourse to discussion of the sensory structures themselves.

(iii) The constitution of the sensory structures also influences perception, but usually negligibly. When the aforementioned mechanisms are operating normally one's perceptions are minimally subjective. They only vary in select ways, as follows. One's constitution can affect whether such interactions entail or coincide with pleasure or pain. The constitution can also, under different circumstances, affect which constituents of a given sense-object interact and thereby allow one to perceive different aspects of the source-object's nature. It can select which of the available sense-objects interact. All of these factors pertain to the question of whether interactions are suited to the individual living creature in question. In these respects, as we have seen, experiences vary to a small degree by constitution. Nevertheless, the constitution itself does not generally contribute to any perceptual distortion of the source-object, whether by direct or indirect interaction. Only to this extent and in these ways can one say that perception occurs according to one's nature or constitution.

On the basis of this analysis, the following model of perception in Lucretius can be proposed:



The sight of all living creatures is a useful test case. Insofar as the mechanism has been reconstructed, sight is the sum of the causal contributions of four factors: the source-object, the intermediary *simulacra*, the intervening circumstances, and one's constitution. The bent-oar, for example, is what we believe that we see. What we really see is a straight oar partially submerged in water. Its *simulacra* are partially bent by passing through that water before they interact with the pupils of the eyes. The contribution of the external factors is objective. The contribution of the eyes is somewhat subjective in that no two individuals are constituted identically. The vision of the eyes emerges from the source-object, the sense-object, the intervening circumstances, and the constitution; together they constitute the 'reality' which we accurately perceive.

Of the specific *sensūs* which we have explored: Touch, taste, sight, hearing, smell, and thought are necessarily perceptions of a source-object. Of these, all but touch and taste are subject to the effect of intervening circumstances upon the intermediary stimuli during the process of transmission. The interaction between one's constitution and the source-object or (when different) the sense-object gives rise to perception. Others which we have treated - namely the perception of time, pleasure and pain, and the emotions - are either relative to or measures of the constitution alone, at least in the first instance.

Reality is thus a combination of subjective and objective factors. To say that all perceptions are 'true' or 'real' is to say that they accurately reflect this reality, properly understood. Indeed, because the perceptions are involuntary necessitated processes which

generally bear accurate witness to objective reality and because the *sensūs* do not interpret, these things constitute the primary criterion of truth. Other criteria include *προλήψεις* and the strategy of *ἐπιμαρτύρησις* or *οὐκ ἀντιμαρτύρησις*.²¹ These would not be necessary if *sensus* alone sufficed for learning the nature of things; this ability is the province of *ratio*.²²

The issue of the propositional content of language actually bears on how one describes one's perceptions; to speak or communicate and to be understood clearly and precisely are essential to Epicurean epistemology. For example, the question of the actual shape of the apparently bent oar could simply be settled by further evidence, through the aforementioned Epicurean epistemological strategy of witnessing and not-counter-witnessing. It is therefore more accurate to say: 'I perceive an oar partially submerged in water' than it is to say 'I perceive a bent oar', until one (especially one unaccustomed to the sea) has a chance to draw it out of the water and see whether it then appears straight. The first is a statement about the oar's circumstances, the second is a belief about or an interpretation of its nature. Similarly, as Asmis notes, it is more accurate to say 'I perceive a tower at-a-distance', rather than to say (much less to believe) 'I perceive a round tower', until one has a chance to approach it and determine whether the outline is really round or square.²³

Thus, as we have seen with respect to vision, Lucretius' representation of the mechanisms of *sensus* fully accounts for perceptions of the apparently unreal. The implication is this: when perception does not seem to accurately reflect reality, this is only because we do not understand what reality is being perceived, or how. This corresponds to Lucretius' general claim that things which seem to contradict the *sensūs* are not unreal or marvelous; all things have natural causes - whether we understand them yet or not.²⁴ The evidence of the *sensūs*, properly understood, does represent solid epistemological ground for understanding the true nature of things. The Sceptic distrust of the senses is therefore not only self-refuting, as Sedley has shown, it is also unfounded.

It is one thing to argue that Lucretius thinks that optical illusions and the like are failures of ill-trained *ratio*, not failures of *sensus*. But then how can this be reconciled with the classic example that, according to Lucretius, when we are beset by fever, honey really

²¹ On this point and the relationship between the two, cf. D.L. 10.31, 33-4, Epic. *Ep. Hdt.* 39, 50-1.

²² Lucr. *DRN* 4.379-86, 4.464-8, Epic. *KD* 24; cf. e.g. pp.277-8.

²³ Asmis 2009: esp. 96-104, cf. D.L. 10.34.

²⁴ Lucr. *DRN* 1.146-58, 4.478-521.

tastes bitter, not sweet?²⁵ If indeed, contra Democritus, honey is sweet by nature, not convention, the example begs explanation.

Lucretius regards each living creature as a generally stable system. As we have seen, this system is comprised of the *animus-anima* complex, the rest of the body, and a network of emergent faculties, including *sensus*. This system is also subject to disruption. Minor disruptions are experienced as pain. Total disruption causes death. Significant disruptions may not destroy us, but they do lead us to perceive the world differently.

When the physiological system underlying the faculty of *sensus* is functioning normally, the constellation of faculties encompassed by it provides us with reliable information about ourselves and the environment with which we interact. Partly emerging from *vitalis motūs*,²⁶ these faculties serve to some extent as a survival mechanism.

vitalis ...
motus, quibus omnituentes
accensi sensus animantem quamque tuentur
DRN 2.941-3

... the vital motions, by which the all-seeing
sensūs are kindled - these *sensūs* watch over
every living creature.

With pleasure and pain as guide, the *sensūs* lead humans and other animals to chose suitable food²⁷ and mates, and to flee danger. They also enable learning through experience.

Illnesses affect *sensus*. Lucretius characterizes illness as a more extreme version of pain - that is, as a disordering of the normal structural arrangements and motions of our physiological constitution. Lucretius tells us this explicitly in the honey example.

quippe ubi cui febris bili superante coorta est
aut alia ratione aliquast vis excita morbi,
perturbantur ibi iam totum corpus, et omnes
commutantur ibi positurae principiorum;
fit prius ad sensum ut quae corpora conveniebant
nunc non convenient, et cetera sint magis apta
DRN 4.664-9

For when a fever, with surging bile, has arisen
in someone, or when the power of another
illness has been stirred up in another way,
already then the entire body is perturbed - and
the arrangements of the first-beginnings are
then altered. It happens that the bodies which
were previously tailored to causing *sensus* are
no longer, and other bodies are more suited
to do so.

The repetition of *convenio* and use of *aptus* indicate that stimuli's suitability for interaction is a matter of their literal fit with the constitution of the perceiver's sense-organs,²⁸ which is not stable. As we have seen, all assemblies are comprised of many and various sorts of constituents and interaction with different *primordia* results in different feelings; similarly

²⁵ This passage will be treated below. Further support for the claim that this an actual change in perception comes from the fact that the example occurs in the context of why different foods are suited to different creatures, not in the discussion of apparent perceptual illusions.

²⁶ Cf. pp.36-8.

²⁷ Cf. pp.101-5.

²⁸ Cf. respectively *convenio*, OLD §5, 6c, and *aptus*, OLD §7.

passages of different sorts admit different shapes from the same object.²⁹ These lines show that the configuration of our physical constitution is partly responsible for selecting the constituents with which we interact;³⁰ health or illness thus influences the selection by changing the configuration. In other words, the manner in which we perceive a given stimulus varies with our health. When we are sick, the normal relations and operations of our constitution are stretched to their limit. Being sick temporarily reconfigures our constitution - here including the passages of the tongue - to such a degree that we almost resemble a different creature, as the bitter taste of honey shows.³¹

Book three contains a series of interlocking examples related to sensory disruption, at lines 3.459-525.³² Consistent with their introduction in 3.459-462, these examples are among the first of Lucretius' proofs of the mortality of the *animus-anima* complex, along with the rest of the body. The content is structured as follows:

Lucr. DRN 3.459-3.525

3.459-462: Both the body and the *animus-anima complex* are mortal.

3.463-476: Pervasive illness in general

3.476-486: Wine

3.487-509: Epilepsy

3.510-525: Medicine

The first and third examples concern illnesses which affect both the *animus-anima* complex and the body as a whole. Lines 3.463-476 concerns pervasive illness in general, with particular emphasis on those with a particular aetiological mechanism. Lucretius here tells us that a *morbis* which begins in the body often is transmitted to the *animus*, affecting it and rendering the death of the whole; this proves that the *animus-anima* complex too is dissolved upon death. Lines 3.487-509 seem to describe the *morbis comitialis* - that is to say, the so-called 'sacred' disease or epilepsy. The symptoms of this disease are explained by the inner turmoil which gives rise to them, with respect to chaos in the bodily frame and in the *animus-anima* complex. The turning back of the disease yields a return to order and thus to *sensus*. But the proneness of the system to such turmoil is further proof of the mortality of the complex. These two examples show that different sicknesses affect *sensus* in different but related ways.

²⁹ Cf. hellebore, pp.193-4, and the case of the lion and rooster, pp.70, 91, 99-100.

³⁰ Lucr. DRN 4.633-62, cf. 4.706-21.

³¹ Cf. Bailey 1947, iii: 1257 and Godwin 1986: 131, who claims that Lucr. DRN 4.638ff is Lucretius dealing with this sort of variation as a pillar of the Sceptic case.

³² On which, cf. West 1975: esp. 101-7.

The language of these passages, as well as the analysis of the course and natural underlying causal mechanisms of the *morbi*, would be familiar to the reader - because in both respects the examples recall Lucretius' description of severe blows in book two. As we saw in chapter two, severe blows break up the arrangements of the first-beginnings and hinder the motions of the *animus-anima* complex. This physiological trauma causes effectively complete disruption of the faculty of *sensus*. Death occurs, unless enough of the complex remains to bring the arrangement and motions back to order. Like severe blows, then, pervasive illnesses effect extreme disorder of both the *animus-anima* complex and the rest of the body. The creature still lives - barely. It still interacts with the outside world. But, during the illness, it experiences nothing - nothing of that world or of itself. In other words, from a phenomenological point of view, pervasive illnesses completely impair perception.

Many of the other illnesses with which Lucretius is concerned proceed from interaction with some external stimulus. That stimulus becomes incorporated through the interaction, in the manner of drink or food once it has been broken down into *sucus*. These foreign bodies poison the creature by disordering the constitution over time. Like the fever mentioned a few moments ago, such physiological transformation corresponds directly to change in the faculty of *sensus*, and thus in the particular feelings we experience. A number of examples, wherein *sensus* alters in this way prior to death, occur in book six. These include mine workers - condemned to inhale subterranean odors, birds which fly over the Avernian lakes - breathing in their fumes, and the human and animal victims of the descended cloud of plague.³³

The fourth example from this section of book three, at 3.510-525, is medicine. Lucretius states that both the *animus-anima* complex and the rest of the body can be healed by medicine; the mechanism by which the antidotes work is further proof of their mortality. These lines effectively show the process of disease by reversing it. Consider Lucretius' discussion of the mechanism by which medicine heals:

et quoniam mentem sanari, corpus ut aegrum,
cernimus et flecti medicina posse videmus,

And since we discern and see that the *mens*,
like a sick body, is able to be healed and

³³ Respectively, Lucr. *DRN* 6.806-17, 6.818-39, 6.1090-1286. The fact that Lucretius conflates the physiological symptoms of the plague with psychological disturbance may not be due simply to the victims not being Epicurean or to Lucretius' test to see if the reader has become one (on which thesis, cf. esp. Clay 1983: 262-3); it may also be due to the unity of the *animus-anima* complex and the transmission of severe disturbance in the bodily frame to the *mens* (cf. pp.67-9), affecting the *sensūs animi* and the faculties which draw upon them. On the end of *DRN*, cf. also e.g. Friedländer 1941, Commager 1957, Müller 1978: 253-4, P. Fowler 1997, Sedley 1998a: 157-65, Walters 2013, Gale (forthcoming a).

id quoque praesagit mortalem vivere mentem.
addere enim partis aut ordine traicere aequumst
aut aliquid prorsum de summa detrahere hilum,
commutare animum quicumque adoritur et infit
aut aliam quamvis naturam flectere quaerit
DRN 3.510-17

turned by medicine, this too indicates that the *mens* is mortal. For it is necessary to add parts or transpose their order or to draw some tiny bit away from the total - anyone who attempts and begins to alter the *animus* or seeks to change any other nature.

Medicine thus proceeds to heal the constitution by restoring the number and balance of its constituents, and their arrangements. This applies equally to healing the nature of the *animus-anima* complex and the rest of the body. A further implication of this passage arises from its function in the larger context of the section; that is, as medicine successfully reconstitutes our nature, *sensus* too is revived and restored.

We have already suggested a number of mechanistic parallels between digested food or drink and certain stimuli whose incorporation either directly contributes to or detracts from the fullness of *sensus*. Now, although nutritive, food and drink are potentially as disruptive to the normal patterns of sensory experience as are illnesses. The second case in our section demonstrates this, using an example to which Lucretius' readers, then as now, are likely to personally relate - namely, wine.

denique cur, hominem cum vini vis penetravit
acris et in venas discessit diditus ardor,
consequitur gravitas membrorum, praepediuntur
crura vacillanti, tardescit lingua, madet mens,
nant oculi, clamor singultus iurgia gliscunt,
et iam cetera de genere hoc quaecumque sequuntur,
cur ea sunt, nisi quod vemens violentia vini
conturbare animam consuevit corpore in ipso
DRN 3.476-83

Next, why is it, when the piercing power of wine has penetrated a man and its disseminated fire has dispersed into his veins, why then does heaviness of the members follow; why are the staggering man's legs shackled? Why does the tongue grow sluggish, the *mens* soak, the eyes swim? Why do shouting, hiccups, and altercations blaze up, and whatever other things of this sort follow at such a time? Why do these exist, if not because the vehement violence of the wine has been wont to thoroughly disturb the *anima* within the body itself?

The effects of wine on the body and the *animus-anima* complex can thus be explained by the disorder it causes. The fact that we are thus disturbed and impaired by wine, Lucretius continues, indicates that a cause only slightly stronger would have caused greater internal chaos and thereby death.

Lucretius believes that wine contains an abundance of fiery constituents. When we drink wine, these fiery constituents do not pass through us, at least not initially. Rather, they are disseminated through our veins and permeate our whole body, adding matter and wreaking havoc on the normal patterns of motion. The fact that this includes the entire *animus-anima* complex is highlighted by the poet's use of both *mens* (3.479) and *anima* (3.483). Through the temporary integration of these fiery constituents, wine affects both the *sensus corporis* and the *sensus animi*, and exemplifies this, respectively by the

impairment of the vision of the eyes and the disruption of emotion. Other faculties, such as voluntary motion, are also affected, as indicated by the increased propensity to get into fights. This relationship adds another dimension to the reading of this passage as well as to our understanding of the mechanism underlying the experience of emotion.

Imbibing wine imbues our *animus-anima* complex with a superabundance of the *ardor* which is already among its four primary constituents.³⁴ This induces a surge of fire or heat relative to the other constituents of the complex, similar to that which we have seen underlies *ira*, *amor*, and *virtus*. A sufficient surge, whatever its proximate cause, will manifest in observable ways. It can also shade over into the emotions themselves.

The passage contains a nexus of intratextual echoes - namely with passages across the poem which, as we have seen, develop the theory of the emergence of the emotions. Take '*clamor singultus iurgia gliscunt*' in line 3.480;³⁵ the three actions which the nouns imply all blaze up as a direct result of the intake of *ardor*. The man's shouting thus recalls and is represented as analogous to the lion's roaring, which Lucretius explained a little before as a manifestation of anger, caused by surging fire.³⁶ In book five, Lucretius renders a similar blazing up with respect to both man and beast in the actions of battle, just as here we have altercations. Similarly, as we have seen, Lucretius uses such ideas to represent the cause and course of the Trojan war.³⁷ The *iurgia* thus also reflect anger.³⁸

Therefore, because we are already naturally primed by the constitution of our *animus-anima* complex to experience fiery emotions, drinking wine heightens our capacity for these emotions. In these lines specifically, Lucretius represents it as making us more likely to feel anger and to (mis)behave accordingly.

It is no coincidence that this passage serves to segue between pervasive illnesses in general and the specific case of epilepsy, such that the three together explore different sources of similar systemic disruption, before concluding with the workings of antidotes. This passage illustrates the physiological mechanism by which any incorporated cause of constitutional disorder proceeds to disrupt the normal structure and processes of both the bodily frame and the *animus-anima* complex. It thereby explains wine's disruptive effect on our *sensūs*. So wine, particularly in excess, can render us comatose, gives us booze-

³⁴ That Epicurus might not have concurred, cf. Bailey 1947, ii: 1077.

³⁵ Bailey 1947, ii: 1078 likens these to expressions of the three stages of drunkenness.

³⁶ Lucr. *DRN* 3.288-306.

³⁷ Lucr. *DRN* 1.471-7.

³⁸ Foolish courage seems less likely, and would conflict with Lucretius' use of *virtus* as courage.

googles, and inclines us to anger and brawling; trust Lucretius to provide a cautionary note against sensual hedonism!

The constitutional variation which accounts for why certain stimuli are more suited to certain creatures is not the same thing as the physiological transformation which occurs when the constitution and its systems break down.³⁹ Rather, the ontological and aetiological commonality of *sensus* to all living creatures, indicates that for animals too, despite some apparent contradictions between perception and reality, the *sensūs* are the source and primary criterion of truth. Similarly it indicates that they experience the same world that we do in the same way.

The relative stability of our constitution as a dynamic system thus helps to assure the general continuity and validity of sensory perception across time, species, and individuals. The truth (properly understood) of sensory perception notwithstanding, physiological transformation can disrupt the normal operations of the system. Such ruptures occur only through significant changes to the basis from which *sensus* emerges. Genuine failures of *sensus* are thus exceptional. They can occur through illness, because a thoroughly disordered constitution causes us to perceive things differently, or not at all. Medicine affects *sensus* by restoring the normal balance, order, and motions of our nature. Similarly, food and drink are normally salutary. However, the nature and quantity of certain examples, like wine, can also cause perceptual distortion. These conclusions are further evidence for the limits of variation, supporting De Lacy.⁴⁰

These examples of sensory disruption further highlight Lucretius' belief in the psychophysiological holism of all living creatures. The relationship of the physical system to its feelings shows that there is no room whatsoever for a mind-body dualism in *DRN* - not ontologically, not functionally. As our feelings tell us in both sickness and health, that is simply not part of the nature of things.

Moreover the theory of *sensus* reconstructed in chapters two and three and its epistemological implications show why Lucretius does not say that the *sensūs* are truth, but rather the source and primary criterion of it. The *sensūs* grasp objective reality with precision and accuracy. Exceptions to this only occur when they themselves are impaired or the intermediary stimulus has been distorted, in which case one can use other information (already or yet-to-be gleaned) in order to discern that reality. The faculty is

³⁹ Such issues will be treated further from a different angle at pp.191-5.

⁴⁰ De Lacy 1969.

certainly the best source of information about our interactions with the so-called outside world; nevertheless, it is merely necessary, not sufficient, for one's complete understanding of the nature of things. Other factors are also involved, but the *sensūs* are the foundation of a number of these, including the higher order faculties like *ratio*. Moreover, when the foundation crumbles - as it can do - so does the rest.⁴¹

The *utilitas* of *sensus* thus includes the usefulness of and need for the greater faculty of feeling, as well the particular sorts of perception it encompasses and their specific manifestations. With respect to survival and happiness, this is reflected by the proem to the second book of *DRN*.⁴² In its vast and multivalent theoretical content, the second proem functions almost as a succinct introduction to and epitome of the entire poem.⁴³ It begins with a series of philosophical images that contrast the pleasure or sweetness of calm, appropriate, contemplative motions of the body and *animus-anima complex* of an Epicurean with the pain and disturbed erring motions of the seaman, the soldier, and the man striving for riches and power.⁴⁴ Lucretius makes clear that the root of that contrast lies in feeling.

... nonne videre
 nil aliud sibi naturam latrare, nisi utqui
 corpore seiunctus dolor absit, mensque fruatur
 iucundo sensu cura semota metuque?
 ergo corpoream ad naturam pauca videmus
 esse opus omnino, quae demant cumque dolorem,
 delicias quoque uti multas substernere possint;
 DRN 2.16-22

... Not to see that nature demands nothing else for one, unless that pain, separated from the body, should be absent, and that the *mens* removed from care and fear, should enjoy delightful *sensus*?!⁴⁵ Therefore we see that few things are necessary at all to bodily nature: namely whatever removes pain, with the result that they can also spread forth many delights.⁴⁶

⁴¹ Lucr. *DRN* 4.478-521, esp. 4.513-21, cf. p.276.

⁴² On this, cf. esp. Fowler 2002 *ad loc*.

⁴³ A compelling but weaker version of this claim is made for the relationship of the second proem to book two by De Lacy 1964, but for a thought-provoking critique of his thesis of the ethical value of the distant view of the natural world, particularly as set out in De Lacy 1957, cf. Long 1997: esp. 126-8.

⁴⁴ Lucr. *DRN* 2.1-19; cf. Fowler 2002: 61-66 that, among other things, the last may allude to such striving in the political arena.

⁴⁵ For discussion of this, cf. Fowler 2002: 72-80.

⁴⁶ The full sense of '*substernere*' - i.e. 'to spread out beneath', cf. esp. *substerno*, *OLD* §2 - cannot quite be captured in translation. Fowler discusses the interpretation of these lines at length, including nine possibilities for the meaning of these two phrases taken together; Fowler 2002: 80-90, esp. 85-8. This interpretation lies somewhere between his two preferences, which take '*uti*' as consecutive (i.e. introducing a result clause). The 'epexegetis' of the '*quae ... cumque*' clause is not necessarily redundant. Taking the '*quae ... cumque*' clause as epexegetical of '*pauca*' (in apposition to it) and as the subject of '*possint*' makes the best sense of the passage in light of both grammatical and philosophical considerations. Regarding the last: in the lines that follow (esp. Lucr. *DRN* 2.23-39) and throughout the poem Lucretius limits true pleasures to the natural and necessary - i.e. the delights caused by the removal of pain and/or disturbance. This interpretation of these lines emphasizes their relevance to the doctrine which they both summarize and preface. Fowler perhaps better captures this essence in the schema of his prologue; Fowler 2002: 16-17.

Our natural and necessary desires correspond to the exchange of turbulence at sea for *γαληνισμός*, and equanimity, alluded to earlier in this proem.⁴⁷ They are therefore desires for whatever will remove disturbed motions from the body and - as the spondaic line 2.19 emphasizes - from the *animus* or *mens*, as well as for the pleasures which follow from the absence of disturbed motions.⁴⁸ The proem thus foreshadows the significance of the subsequent discussions of motion and *sensus* in books two, three, and four. It also underscores the Epicurean ethical doctrine, whose physical basis these chapters have teased out, that pleasure is the guide to life for all living creatures; hence they pursue it untaught from birth.⁴⁹ But Lucretius does not consider living creatures to be automatons determined by their *sensūs* as survival mechanisms. Other factors and faculties - to which we shall now turn - also influence their actions.⁵⁰

⁴⁷ Cf. Epic. *Ep. Hdt.* 83.

⁴⁸ Cf. also Lucr. *DRN* 2.1-61 more generally. In more general Epicurean terms, the state of the absence of pain or disturbance from the body is *ἀπονία* and, from the *ψυχή*, *ἀταραξία* (cf. the dichotomy between *ταραχή* and *γαλήνη*, suggested above). Lucretius never uses these terms, even when discussing them or related matters. On the hierarchy of needs and desires and the pleasure-pain calculus, cf. Epic. *Ep. Men.* 127-32, Epic. *KD* 8-10, 15-21, 25-6, 29-30, Long and Sedley 1987: i.122-5, Purinton 1993, whose interpretation relies on the *-que* of *mensque* in *DRN* 2.18, assuming the reading of Marullus over *mente* (p. 314). De Lacy argues that this discrimination among pleasures is a rational calculus involving inference from accumulated experience and thus that the faculty in question is *ἐπιλογισμός*; De Lacy 1958: 179-80. Further on this faculty and calculus, cf. esp. p.296 n.341.

⁴⁹ On what is meant by this ethical doctrine, cf. the excellent recent summary of Woolf 2009, as well as the opening of Sedley 1998c. As Sedley argues in the remainder of that article, however, there may also be some structural parallels at least between Epicurus' ethical doctrine and his account of physics and metaphysics. On the Cradle Argument, cf. p.103 esp. n.264.

⁵⁰ Cf. both chapter four and esp. chapter five.

CHAPTER IV: EACH ACCORDING TO ITS OWN KIND

Introduction

The previous chapters have demonstrated the significance of one's physiological constitution for the faculties of the *animus-anima* complex across the species. There are aspects of the constitution which all living creatures have in common. A degree of constitutional variation exists and that certain types of variation have implications for the way that the specific instances and manifestations of the faculties occur. This chapter explores the extent to which the constitutions of living creatures are fixed and hereditary, as well as how these natures contribute to psychophysiological continuities and differences both between and within species.

I. THE NATURE OF A SPECIES

Lucretius' cosmogony is, in one sense, a case study in the formation of the ontologically clear and distinct natures of assemblies - including of living things.¹ Among the first principles of his study of the nature of things, as we have seen, is that fixed things come from fixed seeds, and that all things - including living ones - proceed *generatim*.² At the end of the proem to book five, through a partially verbatim verbal echo, Lucretius reactivates a key idea of his ontology and ethical program. He aims to show:

... quid queat esse,
quid nequeat, finita potestas denique cuique
quanam sit ratione atque alte terminus haerens
DRN 5.88-90

... what is able to exist, what cannot exist,
and then in what way each thing has a finite
power and a deeply fixed boundary.

This is the third of the four instances of these lines;³ three of these occur in a proem, suggesting - as De Lacy has argued⁴ - their programmatic significance and that understanding this aspect of the nature of things is an essential part of liberating oneself from false beliefs and the unnecessary consequent fears which inhibit or undermine one's

¹ For an overview of the various mythological and philosophical theories about the origins of life and species, cf. esp. Campbell 2014, and of cosmogonical theories, cf. esp. Sedley 2007. These represent possibilities with which Lucretius may have been interacting.

² Cf. e.g. Lucr. DRN 1.20, 1.159-264 (esp. 1.159-73, 1.187-91, 1.194-5, 1.225-9), 1.562-4, 1.584-98, 2.300-2, 2.661-6, 2.707-22, 4.645-7, 6.1112-13, Epic. *Ep. Hdt.* 38.

³ As noted by Rouse and Smith 1992 *ad loc.*: 5.89-90 = 1.76-7, 1.595-6, 6.65-6, and more generally 5.82-90 = 6.58-66 (6.67 equates believing *religio*'s version of this to being driven astray by *caeca ratione*).

⁴ De Lacy 1969.

tranquility.⁵ The preceding instance, which these lines reactivate, connects Lucretius' ontology with his cosmogony and phylogeny.⁶

denique iam quoniam generatim reddita finis
crescendi rebus constat vitamque tenendi,
et quid quaeque queant per foedera naturai,
quid porro nequeant, sancitum quandoquidem extat,
nec commutatur quicquam, quin omnia constat
usque adeo variae volucres ut in ordine cunctae
ostendant maculas generalis corpore inesse,
inmutabili⁷ materiae quoque corpus habere
debent nimirum; nam si primordia rerum
commutari aliqua possent ratione revicta,
incertum quoque iam constet quid possit oriri,
quid nequeat, finita potestas denique cuique
quanam sit ratione atque alte terminus haerens,
nec totiens possent generatim saecula referre
naturam mores victum motusque parentum
DRN 1.584-98

Now then since a limit of growth has been allotted and a limit of holding life exists for things - each after their own kind, and since what each is capable of and further what each is not able to do stands established through the pacts of nature, and since nothing changes but all in their natures are constant to such a degree that each and every different sort of bird shows that markings of its kind are present on its body - since this is the case, doubtless they ought also to possess unchanging bodies of matter. For if the first-beginnings of things, having been conquered in any way, were able to be altered, then the following would also now be unfixed: what is able to arise, what cannot, next in what way each thing has a finite power and a deeply fixed boundary - nor would the generations so often be able to reproduce, each according to their own kind, the nature, practices, ways, and movements of their parents.

This passage establishes that the fixity of the first-beginnings and the possibilities of their combination allotted by the laws of nature are responsible for the fixity of species. The contrary to fact conditional sentence, '*nam si ... parentum*' (1.592-8), emphasizes that all things cannot emerge from all things. The fixed *coniuncta* of the *primordia* patently fix what can arise, what cannot, the potential powers of each generated thing, and its boundaries. The examples of living creatures' constancy are presented as cases of the more general constancy of all sorts of generated things, both non-living and living *concilia*.⁷ The immutability of *primordia* is thus linked to the limits of growth and existence, the abilities, and the form of all things, as well as to the nature, practices, ways, and movements, of living ones. The essential nature of a species does not change, and the nature of its creatures is constant to a very high degree, as exemplified by the markings specific to various sorts of birds and the reproduction of living creatures *generatim*.⁸ The references to markings ('*maculas*', 1.590) and *natura* (1.598) confirm that creatures inherit not only a set of constituents, but also a configuration thereof. With respect to living things, the '*finita potestas*' (1.595) seems to refer to the limited set of abilities which a creature's

⁵ Lucr. *DRN* 6.65-6 reactivates the idea again for further development with respect to meteorology, disease, etc.

⁶ There are also small but revealing differences of word choice which set apart the partial echoes, to which we shall return.

⁷ Similarly, '*vitam*' (Lucr. *DRN* 1.585) seems to encompass both 'life' (in the narrow sense) and 'existence' more broadly. The ambiguity may be deliberate; cf. Lucretius' exploitation of the dual sense of *semen* throughout the poem.

⁸ Respectively, Lucr. *DRN* 1.588: '*nec commutatur quicquam*', 1.588-92: '*quin ... usque adeo*', 1.597-8.

fundamental nature entails. Lines 1.595-6 also refer to the fact that there are limits to the possible variations on the theme of a species' fundamental nature.⁹ Thus 5.88-90 reactivates 1.584-98, where Lucretius introduces the fixity of species, with each species having its own nature,¹⁰ as it relates to the fecundity of the *primordia*.

In book two Lucretius develops a number of these ideas. Reinforcing his claim that the nature and ways of living creatures are inherent in a species and inherited according to natural law, he states:

lanigerae pecudes et equorum dvellica proles
buceriaeque greges ...
dissimili vivont¹¹ specie retinentque parentum
naturam et mores generatim quaeque imitantur
DRN 2.662-3, 665-6

Fleecy flocks and the warlike offspring of
horses and ox-horned herds ... pass life - each
sort with its own distinctive appearance, and
each sort retains the nature of its parents and
reproduces the practices of its own kind.

The intratextual echoes between 1.597-8 and 2.665-6 prompt us to juxtapose them; similarly, the apparent meaning of '*dissimili specie*' here recalls the consistent markings of each species at 1.588-92. Together 1.584-98 and 2.662-6 confirm that *natura*, *mores*, and typical appearance are hereditary.¹² That said, we are not all cookie-cutter reproductions of our ancestors; every single creature differs from the others.¹³

praeterea genus humanum mutaeque natantes
squamigerum pecudes et laeta armenta feraeque
et variae volucres, laetantia quae loca aquarum
concelebrant circum ripas fontisque lacusque,
et quae pervolgant nemora avia pervolitantes -
quorum unum quidvis generatim sumere perge:
invenies tamen inter se differre figuris.
DRN 2.342-8

Besides, the human race and the mute swim-
ming herds of scaly creatures and the fruitful
docile and wild land animals and the various
birds, which fill the fertile regions of water
around the river-banks and springs and lakes,
and which frequent the pathless woods as
they fly about: proceed to take any one of
these, species by species, nevertheless you
will find that amongst themselves individuals
differ in shape.¹⁴

⁹ On the ideas that every sort of thing is created from its own fixed seeds (*certa semina*) and has its own distinct abilities, cf. Lucr. DRN 1.169-73, 1.188-91, 2.707-9. That generated things have their own emergent nature, cf. esp. pp. 31-5. The idea that species are fixed was not uncommon in antiquity, but the explanations for the origins of species were nevertheless various; cf. Campbell 2006: esp. 26-32.

¹⁰ Fixity of species cannot mean that there is no variation within the species or change with respect to the entities which are its members. As we have seen, *primordia* are always moving. Macro-assemblies which do not seem to either grow or decay are actually in a state of equilibrium. Fixity of species refers to the fundamental nature which defines the group, such that adding, subtracting, or transposing any aspect thereof would cause a transformation, i.e. passing outside of the boundaries and ceasing to exist as such.

¹¹ The form *vivont* follows Rouse and Smith 1992 *ad loc.* Bailey 1947, i: 270; ii: 911 uses the later form *vivunt*. Neither comments on the MS justification for their orthography.

¹² These ideas are largely assumed throughout books two through four, with some qualification. As we shall see, Lucretius develops these ideas further in book five, building - among other things - on his account of the mechanics of heredity in the finale of book four. The expression '*dissimili specie*' also implies that *natura* is not identical to appearance (which itself would include shape, size, and coloring) or *mores*; cf. Lucr. DRN 3.321.

¹³ The scope of the possible variation within a given species is developed at Lucr. DRN 2.342-51 in general.

¹⁴ Here '*figuris*' seems to encompass both the small variations in one's overall shape or appearance as well as the different constituents and/or configurations which underlie this.

Thus there is at least a small degree of physiological variation among all living things, not just between species, but also among members of the same species. In this way, both humans and the various sorts of animals are able to recognize their offspring, and offspring their parents.¹⁵ Similar variety exists among the shapes of non-living things, like bits of corn, seashells, and even the first-beginnings themselves.¹⁶ For Lucretius, every generated thing is therefore both unique and of a kind; each creature has certain *coniuncta* which are fixed relative to its species and certain *coniuncta* whose particular instantiations are *eventa* relative to its species, the limits of which are also fixed in a species-specific manner.

Lucretius' word choice, indicates that the possibilities of combination (i.e. permutations) are not endless,¹⁷ nor are the potential abilities of generated things. He uses the language of possibility, rather than of absolute fact.¹⁸ In 1.75-7 and 1.594-6, using a combination of anaphora, elipsis, and antonyms, Lucretius sets up an antithesis between what is able to arise ('*quid possit oriri*') and what cannot ('*quid nequeat [oriri]*'). In 5.88-90 and 6.64-6, he creates further anaphoras and couples the aforementioned devices with alliteration to set up an antithesis between what is able to exist ('*quid queat esse*') and what cannot ('*quid nequeat [esse]*'). In light of this partial echo preceding the verbatim repetition of '*finita ... haerens*', the alliteration of *qu-*, the repetition of '*quid ... (ne)queat*' (5.88-9), and book five's concern with cosmogony, it is perhaps no coincidence that the partial echo in the proem to book five takes a form which links it back to 1.584-98 specifically. This form recalls the antithesis between '*quid ... queant*' and '*quid ... nequeant*' at 1.594-5, a not dissimilar repetition including further alliteration of *qu-*.¹⁹ Lucretius thus does not claim comprehensive knowledge of every generated thing which one may or may not ever have experience of; instead he presents the set of universal explanatory principles which could account for both these things and their limits.²⁰ Acknowledging that multiple explanations for extant phenomena may be possible, and that one must be the the case,²¹ he states:

¹⁵ Lucr. *DRN* 2.349-51, 2.367-70.

¹⁶ Lucr. *DRN* 2.371-80, cf. ch.1.

¹⁷ Lucr. *DRN* 2.700-11.

¹⁸ I.e. what can and cannot arise and what can and cannot exist, rather than what does and does not arise and what does and does not exist.

¹⁹ In Lucr. *DRN* 1.586-7, from the initial *quid* to *nequeant*, *qu-* occurs five times.

²⁰ This is consistent with a statement early in the poem to Memmius, his exemplary reader or at least addressee, that the practice of the poem is to set out the traces or *vestigia* necessary for one to work out the rest on one's own; Lucr. *DRN* 1.400-17, cf. e.g. p.5 n.26, pp.267-8.

²¹ Lucr. *DRN* 5.526-33, 6.703-11; cf. Epic. *Ep. Hdt.* 79-80 and *Ep. Pyth.* esp. 86-7. At Epic. *Ep. Pyth.* 96, Epicurus states that a confluence of explanations may also occur. Multiple explanation theory is exemplified throughout books five and six and in Epic. *Ep. Pyth.* 92-115; cf. esp. Hankinson 2013: esp. 96-7. On the theory, cf. also Diogenes of Oen. fr. 13.II.12-III.13 Smith.

... sed quid possit fiatque per omne
in variis mundis varia ratione creatis
id doceo ...

DRN 5.527-9

But what is possible and what happens
throughout the universe, in the different
worlds, each created in their own way - this
is what I teach.

Thus the language of the four iterations is consistent with Lucretius' larger stated practice of distinguishing what can be from what does occur. Also, by shifting emphasis in the poem to book five from what can arise (1.75-7, 1.594-6) to what can exist (5.88-90, 6.64-6), Lucretius marks a change in focus from the universal to the specific. The poem has moved on from what is able to be generated in general, according to the possibilities of physics writ large, to what is able to exist in the particular circumstances of this cosmos,²² which is both unique and of a kind. Lucretius also distinguishes what can exist from what can survive.

A. Cosmogony and Phylogenesis

In book five, Lucretius (re)inscribes living creatures within their cosmological and social context; their constitutions and their possibilities of heredity are rooted in the world. Lucretius' account of the generation of our world²³ begins from the point when its constituent *primordia* first came together in a kind of cosmogonic primordial soup. The process was spontaneous in that it was not teleological or otherwise driven by purpose or providence. Infinite time, space, and matter in motion brought it together through natural law - when compatible first-beginnings were brought together suddenly.²⁴ Others were added and lost over time; the world is not a closed system.²⁵ Lucretius does not regard this primordial soup as a *concilium* since such motions of matter are perpetually at war, not harmonized.²⁶ He refers to it as a conglomeration of matter.²⁷ That said, this soup consisted of such an immense variety of first-beginnings that it had the potential to generate a vast variety of entities and natures.²⁸

²² With respect to the former, cf. esp. Lucr. *DRN* books 1-2, to the latter, cf. esp. book 5-6.

²³ Lucr. *DRN* 2.1048-1089, esp. 2.1077-89, 5.526-30.

²⁴ For his anti-teleological account of that process, N.B. Lucr. *DRN* 2.167-83, 5.187-234, 5.416-31, and 5.416-508 more generally. Cf. Campbell 2006: 10-12. On natural law being fixed but not deterministic, cf. pp.27-30. On the processes by which compatible *primordia* - i.e. those capable of forming assemblies with each other - harmonize or ally their motions in the formation of assemblies, cf. esp. 36-9.

²⁵ Cf. Lucr. *DRN* 2.1105-74.

²⁶ Lucr. *DRN* 5.436-42. Cf. 2.725-9, where the factors which are discordant in the soup are, by contrast, working together to form assemblies with distinct natures. This bears on the analogy between the world and a living creature, and specifically a mother; cf. below. For example, the war of the first-beginnings is responsible for both the eternal cycle of the creation and destruction of all things and the mingling of the cries of new-born infants with the sounds of funerals: 2.569-80, cf. 2.112-122 and p.21.

²⁷ Specifically: '*congressus materiai*', Lucr. *DRN* 5.67 and '*coniectus materiai*', 5.417.

²⁸ On the relationship of the powers of a generated thing to the variety of its constituents, cf. pp.32-4, 53-4.

Lucretius explains the initial formation of assemblies therein by a few factors - namely the joining of like with like, compatible shapes, and motions such as those caused by weight and external blows; such things resulted in the separation of land, sea, air, and fiery aether from both the primordial soup and one another.²⁹ By this synecdoche, Lucretius makes the so-called four elements into the first assemblies, using his narrative to recall and reinforce his arguments from book one against ontologies which claim that the four elements were the first-beginnings.³⁰

In the proem to book five, Lucretius reminds the reader that generation goes hand-in-glove with destruction,³¹ and presents a compressed version of his creation narrative.

... nunc huc rationis detulit ordo,
 ut mihi mortali consistere corpore mundum
 nativomque simul ratio reddunda sit esse;
 et quibus ille modis congressus materiai
 fundarit terram caelum mare sidera solem
 lunaique globum; tum quae tellure animantes
 extiterint, et quae nullo sint tempore natae
 DRN 5.64-70

Now logical order has brought me here, with
 the result that I must explain that the world
 consists of a mortal body and that - by the
 same logic - it is something which has birth.
 And I must explain in what ways that
 conglomeration of matter constituted the
 foundations of the land, sky, sea, stars, sun,
 and the globe of the moon. Then I must
 explain which living creatures emerged from
 the earth and which were never born.³²

Two sorts of entities are worth noting here: (i) various assemblies which form in the primordial soup,³³ (ii) the assembly which comprises those assemblies, such that they coexist as a unit (at least for a time) in relation to the rest of the infinite universe. In other words, for Lucretius, the world or cosmos (*mundus*) comprises what we would call 'planet Earth', the surrounding heavens, and the celestial bodies which the heavens contain.³⁴ The nature of each of the assemblies in (i) is distinct but related. Their order - as one later discovers - coincides with what is generated from what. The Earth and the rest of the cosmos are interdependent.

principio maria ac terras caelumque tuere:
 quorum naturam triplicem, tria corpora, Memmi,
 tris species tam dissimilis, tria talia texta,
 una dies dabit exitio, multosque per annos

Firstly, consider the seas and lands and sky.
 The nature of these is three-fold. Three
 bodies, Memmius, three forms so dissimilar,
 the three so interwoven - one day will give

²⁹ Lucr. DRN 5.443-508; cf. 2.95-111, 2.1105-17.

³⁰ Against the monist ontologies: Lucr. DRN 1.635-711. Against the pluralist ontologies: 1.712-829, esp. 1.763-802.

³¹ His use here of *mortalis* and *nativus* stress the similarity between the cosmos and living creatures, by making the world seem like a living creature; nevertheless the first living creatures were really more like a cosmos with respect to their origins and end.

³² This translation takes '*mihi ... ratio reddunda sit*' with the subsequent indirect questions as well as in its immediate context; with Lucr. DRN 5.67-9, cf. 5.416-19.

³³ These are squeezed out (*exprimo*) from the Earth (*terra, tellus*); Lucr. DRN 5.449-508.

³⁴ N.B. Lucr. DRN 5.471-9, where the '*partes ... mundi totius*' include *terra*, [*ignifer*, cf. 5.458-9] *aether, sol, luna*, and *aurae*; cf. Epic. *Ep. Pyth.* 88-90. As we shall see, in his account of the infancy of the world Lucretius consistently renders Earth by *tellus* and, more often, by *terra*; however he also frequently uses the latter to refer specifically to the land.

sustentata ruet moles et machina mundi
DRN 5.91-6

them over to destruction, and the vast edifice
of the cosmos, sustained through many years,
will go to ruin.³⁵

The three-fold nature of this system of assemblies is highlighted by both the subsequent tricolon, each colon of which begins with forms of *tres*, and the address to Memmius; together they comprise Earth.³⁶ The existence and nature of these constituent assemblies (taken individually) and the world or cosmos are interdependent. This interdependence ensures that all are generated and destroyed effectively at once; the cosmos is thus analogous to a living creature.³⁷

Lucretius then shifts the analogy from the cosmos to the Earth. Although the analogies are coordinate, Lucretius does not call the cosmos 'Mother'; he reserves that title for Earth itself, because living creatures are born of and nourished by the land³⁸ after Earth's coherent formation and the relative individuation of its main parts.³⁹ In this context and others, Lucretius consistently uses *terra* and *tellus* for their origin and nurse, suggesting both land and the Earth through metonymy and occasionally through points of

³⁵ The possible use of '*ruet*' and '*sustentata*' with both '*moles*' and '*machina*' individually, the effective identity of what these nouns refer to, the sense they convey in conjunction (of a vast and massive structure as well as its workings as an apparatus), and the alliteration of '*moles ... machina mundi*', all suggest that '*moles et machina*' is a hendiadys with '*mundi*' dependent on the idea conveyed by the construction rather than on either '*moles*' or '*machina*'. Thus the possible use of '*ruet*' and '*sustentata*' with both individually are not actually ἀπὸ κοινοῦ constructions, but highlight the idea that it is the whole thing to which the hendiadys refers which comes crashing down.

³⁶ This way of conceptualizing the relationship between the main assemblies which constitute the cosmos is not incompatible with the more detailed treatment of cosmogony, where the such assemblies are coordinated with the so-called four elements. The celestial bodies at Lucr. DRN 5.68-9 may be something of a metonymy for the aether wherein they are located. At 5.91-6 the cosmos is not necessarily represented as coextensive with the system of the sea, land, and sky; if it were, then the sky could conceivably include the aether. Regardless, the so-called four elements are not in fact elemental and Lucretius is not here alluding back to his arguments against competing ontologies, but rather focusing on the interdependence of the Earth, its main constituents, and the rest of the cosmos, so one's interpretation should not be unduly shaped by such considerations.

³⁷ These ideas are developed further at Lucr. DRN 5.534-63. With respect to the living creature analogy, cf. also p.187 n.31 and Schrijvers 1978: 266-76, who explores the Earth as Mother and as '*makranthropos*'. Although it is not spelled-out in book five, the cosmos is also analogous to the *animus-anima* complex, which too is initially discussed with respect to a threefold nature (before the nameless fourth is added and allusion made to the other constituents). The three structures thus seem ontologically coordinate; again, the logic is the same regardless of structural complexity.

³⁸ Perhaps because his focus is terrestrial creatures (cf. Lucr. DRN 5.793-4, 5.797ff), it is the land itself which he focuses on for the maternal role, e.g. at 5.795-6: '*lingitur ut merito maternum nomen adepta | terra sit, e terra quoniam sunt cuncta creata*'; cf. 2.1153-9 and pp.18, 51 on the motherhood of the Earth.

³⁹ Cf. Gale 2009: 167, who notes on the basis of Lucr. DRN 5.806-8 that the individuation of its parts was not yet complete; thus wombs grew. We will turn to this below.

contrast.⁴⁰ At this time, the Earth was particularly fecund, as it contained many seeds of many things; its fruits evince this.⁴¹

... inde loci mortalia saecula creavit
multa modis multis varia ratione coorta
DRN 5.791-2

Next the new Earth⁴² created the mortal
races⁴³ - many sorts arose in many ways with
diverse structure.

Lucretius reactivates his promise of 5.69-70 in the context of the larger purposes of dispelling false beliefs about what is able to exist - perhaps, as Gale and Campbell suggest, recalling and correcting Empedocles.⁴⁴ Lucretius then develops the image of the Earth as mother and concludes his narrative of its successes by passing the torch of motherhood on to the earthborn generation of living creatures.⁴⁵ Here, '*multa modis multis*' echoes many instances of identical or similar expression across the poem,⁴⁶ evoking the particular fecundity of the first-beginnings and their variety in all macroscopic *concilia*. Lucretius thus indicates that the emergence of the first living things and their initial diversity was all part of the greater process of bringing together many and different bodies of generative matter. By structuring his content in this way, Lucretius represents anything generated within the world as part of the system, regardless of its mother. A key factor in any such process is the fitness or suitability of constituents for assembling with one another. By extension, for a creature and its environment to coexist - that is to say, for the creature to survive - a sufficient degree of compatibility must exist between them. In other words, a creature within the system who is unable to ally its motions with those of the cosmos

⁴⁰ *Terra* (thirteen times): Lucr. DRN 5.777, 5.780 (vs *mundus*), 5.784, 5.796 (twice), 5.797, 5.805, 5.808, 5.811, 5.816 (vs *mundus*, 5.818), 5.822 (vs *mundi natura totius* 5.828), 5.835 (vs *mundi natura totius* 5.834), 5.920; *tellus* (seven times): 5.69, 5.790, 5.800 (vs *aether*), 5.837, 5.907 (vs *caelum*), 5.917, 5.926. This language is consistent with that of 2.589-660.

⁴¹ As we have seen, really only the first-beginnings are fecund, but at this time Earth contained the first-beginnings of *calor* and *umor* (cf. Lucr. DRN 5.806) and was able to produce them, perhaps thereby obviating the need for the whole system of the cosmos to be involved in the generation of living creatures. Now the Earth is a bit worn out, like an old woman, and no longer able to produce what it used to with respect to living creatures (cf. 5.826-36), or plants; cf. 2.1144-74. Compare 2.937-43 and 5.797-800, which suggest that at the present time spontaneous generation happens from the whole system, albeit with more limited results; other passages such as 2.872ff are also relevant. That said, the Earth must still be relatively young as certain things are on the upswing.

⁴² Afterward, the '*nova tellus*' created plants, Lucr. DRN 5.790. On the expression '*inde loci*', cf. Gale 2009: 141. On the generation of plants before living creatures, cf. DRN 5.783-94 and p.51.

⁴³ Both humans and animals, as the subsequent lines show.

⁴⁴ Cf. Campbell 2003: 57, Gale 2009: 166. Gale also suggests that these lines look forward to 'earth's 'failed experiments'' - i.e. the generation of creatures unfit for survival; cf. Campbell 2006: 32-5 on the 'improvements' of Lucretius' theory over that of Empedocles.

⁴⁵ Lucr. DRN 5.795-836 is an elaboration of the story told at 5.783-92; the first living creatures become the first parents in line 5.836. On the motherhood of the Earth, cf. DRN 2.589-660, West 1969: 104-14, Schrijvers 1978: 266-76, Campbell 2006: 24-6, Gale 2009: 166-7. On the torch of life with respect to the interdependence of species and generations, cf. DRN 2.75-9, 3.965-71.

⁴⁶ Cf. esp. Lucr. DRN 1.341, 1.814-15, 1.1024, 2.116, 2.654, 4.1220, 5.187, 5.422, 6.508, 6.789; the expression is also often used of *simulacra* in book four.

cannot function within it and thus will be rejected from a more lasting combination.⁴⁷ This amounts to a theory of natural selection.

In the first round of survival of the fittest, certain creatures who were among the earthborn did not make the cut because of their constitutions.⁴⁸

multaque tum tellus etiam portenta creare
conatast mira facie membrisque coorta.
...
nequiquam, quoniam natura absterruit auctum,
nec potuere cupitum aetatis tangere florem
nec reperire cibum nec iungi per Veneris res
DRN 5.837-8, 846-8

And at that time the earth also tried to create many strange creatures, which arose with surprising form and members.⁴⁹ ... in vain - since their nature discouraged their growth, they were neither able to reach the desired prime of life, nor to find food, nor to unite through the deeds of Venus.⁵⁰

These lines bookend a small *kuklos* on creatures which are strange in that we do not have much, if any, experience of them. Such creatures are one-offs; any born then were unable to survive or reproduce.⁵¹ There is no reason to suppose that Lucretius is referring only to humans here, rather than to the entire earthborn generation. His exemplary list of the creatures whose nature discouraged their growth⁵² - and thus the activities which aid and are consequent upon growth - includes: androgynous creatures,⁵³ creatures lacking limbs like feet or hands, creatures lacking sense-organs like eyes, and creatures whose limbs are fixed to their bodies in such a way as to inhibit movement.⁵⁴ The concluding tricolon (5.846-8) establishes the requirements for survival which they did not meet, namely: growth (to maturity), nutrition, and - with respect to the survival of the species - procreation.⁵⁵ Lucretius then elaborates upon these requirements. Propagation of one's species requires the existence of food, a way for the reproductive seed to be released from the body, and the ability of the female and male to couple and thus exchange *mutua*

⁴⁷ Cf. Lucr. DRN 2.95-111, 2.711-19.

⁴⁸ Campbell rightly notes that this is the first round of extinction, but perhaps exaggerates the variety of creatures possible then; Campbell 2006: 33.

⁴⁹ This takes '*mira facie membrisque*' as a *zeugma*.

⁵⁰ Joining through the deeds or acts of Venus refers to coupling or having sexual intercourse; cf. pp.152-6.

⁵¹ Cf. Lucr. DRN 5.837: '*portenta*', 5.845: '*monstra ac portenta*'. These are the only uses of these words in the poem which do not seem to necessarily refer to *adynata*; cf. below and Gale 2009: 171 on similar phenomena being labeled thus by Cicero and Livy. On Lucretius' dialogue here with the not-quite parallel theory of Empedocles, cf. esp. Campbell 2003: 98-116, Campbell 2006: 32-3, Sedley 2003: 4-5, Sedley 2007: 150-55, Gale 2009: 171-2.

⁵² The context of this list suggests that '*natura*' in Lucr. DRN 5.846 refers to the constitution of the creatures, and not to *Natura* as a quasi-deity.

⁵³ The androgynous creatures of Lucr. DRN 5.839 do not qualify as hybrids since they either lack sexual organs or have both male and female sexual organs. Either way the sexual nature is indeterminate, rather than the parts being of incompatible natures; cf. 2.1082 where the genders are likened to twins, by way of an 'Empedoclean import' (Sedley 2003: 7).

⁵⁴ Lucr. DRN 5.839-45.

⁵⁵ Campbell characterizes these as stages and the second and third extinction filters; Campbell 2006: 34-5, cf. Campbell 2003: 137.

gaudia.⁵⁶ By implication, male and female members of the same species were among all of the earthborn generations which successfully procreated. This recalls Lucretius' earlier contention that there is nothing unique in the universe, which he initially proves by recourse to examples of various living creatures, including humans of both genders.⁵⁷ The greater passage of 5.837-54 thus establishes that the future of a species is contingent upon its individuals surviving long enough to procreate.

These criteria for survival are necessary but not sufficient, particularly for the survival of the species.⁵⁸ In 5.855-877 and 5.925ff, Lucretius develops further criteria for survival through illustrations of creatures whose inherent natures were conducive to a critical number of individuals affording themselves sufficient protection to reach maturation, reproduce, and ensure the same for their offspring.

B. Natural Boundaries

After treating the earthborn abnormal creatures, whose natures were sufficient for existence but not for survival, Lucretius turns to the issue of existence itself: what constitutes the boundary of possibility for a living creature's being *per se*. At the heart of this issue is internal compatibility. The entire earthborn generation of living creatures met this set of criteria. Lucretius presents this partial fulfillment of his promise's second part - 'what is not able to exist [and/or, to be generated]' - as Gale notes, by way of undermining the verisimilitude of mythical creatures and thus contributing to the reader's liberation from *religio*.⁵⁹

According to Lucretius, some creatures which we can think of⁶⁰ could not have existed at any time; i.e. these *portenta* are also *adynata*. 5.878-924 is replete with

⁵⁶ Lucr. *DRN* 5.849-54; on which, cf. Campbell 2003: 115-19, Gale 2009: 171 (both following Winterbottom). Campbell's claim that we are all descended from *portenta* seems questionable. Interestingly, the female is here depicted as having multiple male partners. On the exchange of '*mutua gaudia*' and the mechanics of procreation more generally, cf. esp. pp.156-9.

⁵⁷ Lucr. *DRN* 2.1048-1089 esp. 2.1077-89, 5.526-30.

⁵⁸ For instance, we have already seen that *sensus* is required in the pursuit of natural and necessary needs and in the avoidance of harm.

⁵⁹ Gale 1994b: 61-2. This is consistent with the ethical bent of the three instances which occur in the proems to books one, five, and six.

⁶⁰ On process by which we can think of these through the distortion of *simulacra* prior to their interactions with our *mens*, cf. e.g. pp.116-17.

intratextual references to hybrids.⁶¹ Lucretius explains their non-existence⁶² and hence why no *simulacrum* of a hybrid creature could have come from an real living creature thus:⁶³

sed neque centauri fuerunt, nec tempore in ullo
 esse queunt duplici natura et corpore bino
 ex alienigenis membris compacta, potestas
 hinc illinc †partis ut sat par†⁶⁴ esse potissit.
 ...
 ne forte ex homine et veterino semine equorum
 confieri credas centauros posse neque esse,
 ...
 inter se quorum discordia membra videmus;
 quae neque florescunt pariter nec robora sumunt
 corporibus neque prociunt aetate senecta,
 nec simili Venere ardescunt nec moribus unis
 conveniunt, neque sunt eadem iucunda per artus.
 ...
 nam quod multa fuere in terris semina rerum
 tempore quo primum tellus animalia fudit
 nil tamen est signi mixtas potuisse creari
 inter se pecudes compactaque membra animantium,
 ...
 sed res quaeque suo ritu procedit, et omnes
 foedere naturae certo discrimina servant
 DRN 5.878-81, 890-1, 894-8, 916-19, 923-24

But neither did centaurs exist, nor are any creatures of two-fold nature and a double body able to exist at any time - being fastened together from body-parts of different species, with the result that the power of the part here gains mastery sufficient to equal the power of that part there.⁶⁵ ... Lest, by chance, you believe that centaurs can be produced (from a man and the burden-drawing race of horses) or exist ...⁶⁶ - whose members we see are incongruous with each other; which do not begin to bloom at the same rate, nor come to maturity in their bodies at the same time, nor shed this strength in old age together,⁶⁷ nor do they begin to burn because of the same Venus, nor do they converge in identical practices, and the same things are not delightful throughout their limbs. ... For the fact that many seeds of things existed in the lands at the time when the Earth first cast forth living creatures is nevertheless no indication that creatures could have been created which were mixed amongst each other and had put together the body-parts of different sorts of living creatures.⁶⁸ ... But each thing follows on according to its own kind and all things preserve their distinctions according to the fixed law of nature.

Hybrid creatures were omnipresent in Greek and Roman myth and art.⁶⁹ Undermining such *fabulae*, as Gale notes, was a primary focus of the criticism of myth in antiquity and,

⁶¹ To centaurs: Lucr. *DRN* 5.878, 5.891; to Scylla: 5.893; to satyrs (by periphrasis): 5.899-900; to chimeras: 5.904-5.

⁶² He calls these '*portenta*' at Lucr. *DRN* 2.701, and first claims that they are adynata in 2.700-29 more generally, mentioning centaurs, Scylla, and chimeras; cf. 4.590ff. regarding satyrs and the like and 5.37ff. regarding Geryon and other mythical monsters of incompatible constitutions and/or powers. Cf. esp. Campbell 2003: 109-10 on the possible resonances of the term *portenta*, which as Gale 2009: 171 notes suggests anti-religious polemic. This passage also looks forward to the following lines with respect to the motherhood of the Earth ('*per terras omniparentis*', 2.706).

⁶³ Lucr. *DRN* 4.732-44, which mentions centaurs and Scylla, and esp. 4.739-40: '*nam certe ex vivo Centauri non fit imago, | nulla fuit quoniam talis natura animalis*'.

⁶⁴ The text here is corrupt and this version follows the conjecture of Bailey 1947, i: 478; ii: 1469 (concurring with that of Martin) on the grounds that it corresponds best with the relevant philosophical doctrine as rendered in the passage as a whole. The sense of the sentence is roughly the same as that of Giussani's earlier conjecture, '*par, vis ut sat par*', followed by Bailey in the second edition of his OCT (1922) and Gale 2009: 72.

⁶⁵ Considerable brachylogy is presumed here.

⁶⁶ It is similar with other mythical hybrid creatures.

⁶⁷ As we will see, the key idea here is wrapped up in the negation of '*pariter*' (Lucr. *DRN* 5.895), which word is understood with each of the three references to the unequal physical development of the constitutions.

⁶⁸ Cf. Lucr. *DRN* 5.580: '*ex alienigenis membris compacta*'.

⁶⁹ On which omnipresence, cf. Aston 2011: esp. ch.1.

with Empedocles, Lucretius' probable target here.⁷⁰ The passage claims that the Earth did not generate certain creatures (hybrids) because they would have been a mix or union of incompatible natures.⁷¹ Similarly, neither humans nor horses can give birth to a hybrid, specifically a centaur, as implied at 5.890-1. Although on one reading Lucretius is here using hypallage with respect to '*veterino*' and synecdoche with respect to '*homine*',⁷² a more literal translation (with *semen* as metonymy for species or breed) both foregrounds the idea of bringing together unlike things and perhaps better suggests the mythical origins of the race of centaurs against which Lucretius argues;⁷³ the ambiguity seems intended to encompass these related interpretations. The body-parts of hybrids would be aetiologically discordant or incongruous relative to one another. Lucretius elsewhere claims that one cannot just mix and match the various parts of living creatures and expect to produce anything new, just as men, cattle, and untamed animals cannot produce any thing but a gathering of themselves by coming together.⁷⁴ Similarly, we see here that certain faculties belonging to one's whole nature occur somewhat differently in different creatures. Thus whatever the various parts would contribute to such abilities must be incompatible. Therefore, neither incompatible parts nor what the parts contribute to faculties could coexist in the same body. Lucretius elaborates upon this at 5.894-8.

The first part of the double tricolon traces the ontogenesis of all things in the manner of their own kind through the major stages of development: growth, maturity or the full possession of one's powers, and decay. Assuming ellipsis of *pariter* (5.895) in the second and third cola, incongruous parts would develop at different rates, such that they would not reach these stages of life together. In the second part of the double tricolon, Lucretius refers elliptically to three other abilities which he extends to all extant creatures: procreation,⁷⁵ engaging in a characteristic set of practices, and experiencing pleasure (or not) in their bodily frames. 5.899-900 then illustrates the last. Hellebore is food for goats

⁷⁰ Gale 1994b: 8, 61, 161-3. Empedocles' cosmogony was dangerous in that it posited a natural explanation for some of the prevalent ideas of hybrid forms and by extension perhaps for their corresponding deities. The prevalent forms and their corresponding deities are neatly summarized by Aston 2014: 367. Sedley 2003: 4-5 allows the possibility that Lucretius may be correctively answering Empedocles B57 and B61; cf. Sedley 2007: 152.

⁷¹ As Campbell notes, the possibilities of combination on the atomic level accounts for this; Campbell 2003: 109 and Campbell 2006: 33.

⁷² Suggesting a translation of: 'created from the seed of a man and the seed of burden-drawing horses'; cf. '*veterino semine*', Lucr. *DRN* 5.865, to which we will turn shortly.

⁷³ Lucretius seems to be closest to the version recorded by Pindar wherein the race of centaurs (by others sometimes called the hippocentaurs) were the progeny sired by Centaurus, the son of Ixion and the cloud Nephelē, who mated with the Magnesian mares on Mount Pelion in Thessaly.

⁷⁴ Lucr. *DRN* 2.921-3, perhaps contra Empedocles.

⁷⁵ E.g. Lucr. *DRN* 5.897 seems to refer back to the idea that only one's species can stir one's seed (4.1039-40), to which we will return below.

but tastes bitter and is poisonous to humans;⁷⁶ thus satyrs cannot exist.⁷⁷ This alludes to another criterion: one's parts should be nourished by the same food. Nourishing occurs through the intake of bodies suitable for combining with the nature of the extant assembly, such that the creature conserves its overall nature as it grows.

nam sua cuique cibis ex omnibus intus in artus
 corpora discedunt conexaque convenientes
 efficiunt motus; at contra aliena videmus
 ...
 quae neque coniecti quoquam potuere neque intus
 vitalis motus consentire atque imitari
 DRN 2.711-13, 716-17

For in each creature from all its food its own bodies scatter inside, into the limbs,⁷⁸ and when the bodies have been connected they produce joint motions; but on the other hand we see that foreign bodies ... [are rejected]⁷⁹ which are neither able to be joined to anything nor to reproduce and feel together the vital motions inside.⁸⁰

Because each constitution consists of a distinct set of first-beginnings in distinct sorts of structural relations,⁸¹ different bodies are compatible with the nature of creatures of different sorts. Thus, as we have seen, different food is better suited to different creatures, even though various sorts of animals - each comprised of many unlike parts - feed on some similar things.⁸² Creatures consisting of multiple natures would not find the same foods compatible with those natures. Proper nutrition (a precondition of growth) is therefore species-specific.

Having already treated Earth's generation of plants,⁸³ Lucretius does not discuss them here, despite considering 'living plants' to be hybrid *adynata*.⁸⁴ But rather than reiterating '*generatim saecula propagent*',⁸⁵ which is specific to living creatures, Lucretius concludes his argument against the possibility of hybrid natures with 5.923-4,⁸⁶ which shows that what is true of living things is true of all *concordia*.

The criteria for the existence of a particular creature can thus be summed up as follows. What comprises the nature of the creature must be sufficiently compatible to

⁷⁶ Lucr. DRN 4.640-1.

⁷⁷ Cf. Rouse and Smith 1992 *ad loc.*

⁷⁸ Lucretius mirrors the phenomenon of internally dispersing one's own proper particles from the food by the hyperpaton '*sua ... corpora*' just within the bracketing words of the thought unit.

⁷⁹ This bracketed interjection sums up the essence of the omitted lines for sake of the idea's completeness.

⁸⁰ The expression '*corpora ... aliena*' at Lucr. DRN 2.712-13 perhaps looks forward to '*alienigenis membris*' at 5.881. For other intratextual links between the greater argument of which these lines are part, cf. 2.700-29, and 5.878-924, some of which are discussed above. On the mechanism by which nutrition occurs, cf. 2.1112-17, 4.858-76, 6.1084-88.

⁸¹ Lucr. DRN 2.718-29.

⁸² Lucr. DRN 2.661-72.

⁸³ Lucr. DRN 5.783-91.

⁸⁴ In the first account of such *portenta*, Lucretius' list of *adynata* also suggested that a living body with plants parts would constitute a case of hybridity, and - as we have seen, cf. esp. p.52 - plants are not living things. Lucr. DRN 2.702-3.

⁸⁵ E.g. Lucr. DRN 1.20; cf. the logical extension from living creatures to all things at 2.718-29.

⁸⁶ As above, Lucr. DRN 5.923-4: '*sed res quaeque suo ritu procedit, et omnes | foedere naturae certo discrimina servant*'.

effect one coherent overall nature which: (i) finds nutritive one set of food, (ii) grows and develops with respect to both its whole body and faculties at a unified rate according to its own kind, and (iii) has the capacity to be stirred to procreation by and with a member of its own species. These criteria are related to survival criteria. Moreover, in order to constitute a species, the way in which a set of individuals meet these criteria must be largely consistent; i.e. phylogenesis is somewhat contingent upon largely consistent ontogenesis. Species are thus fixed insofar as the whole nature of each of its individuals must be internally compatible in a manner which is sufficiently consistent across the group; neither the part nor the whole of any individual within the species can (i) be born or generated with, (ii) take on, or (iii) procreate with another of a foreign nature.⁸⁷ A further implication, as we have seen above, is that all of these aspects of an individual's nature are to an extent innate or hereditary with respect to each species - including the behaviors which usually follow from them. Hybridity thus represents a boundary beyond which a species cannot naturally vary.⁸⁸ By establishing this boundary, *DRN* provides another example of Aston's case that in antiquity not only animals (as per Lévi-Struass) but also hybrids were 'good to think with'.⁸⁹ The logic behind Lucretius' account of what can survive and what can exist constitutes the theoretical underpinning of his belief in the fixity of species.⁹⁰

C. Heredity and Natural Selection

Ever since the earthborn generation became parents, the constitutional variation which has manifested within each species occurred largely through hereditary means. Lucretius' account of the mechanics of procreation, 4.1209-1277, is divided into two parts.⁹¹ Lines 4.1209-32 treat the mingling of seed and its consequences for heredity. Lines 4.1233-77 treat the physiological obstacles to successful procreation, none of which, he emphasizes, are divinely caused. The entire account is subsequent to Lucretius' description

⁸⁷ By providing a natural explanation for the impossibility of generating hybrid creatures by breeding, Lucretius is thus undermining myths of giving birth to hybrids (e.g. centaurs, the Minotaur) and by extension the idea that such unnatural births were, as often thought, divine-sent punishments or portents - e.g. of imminent divine wrath; cf. Aston 2011: 19-20, 33.

⁸⁸ These findings are in accordance with the position of De Lacy 1969: 110.

⁸⁹ Aston 2011: 16, 20-1, 43 and *passim*.

⁹⁰ Lucretius' rejection of *monstra* is part of his argument that natural law has always been fixed as it is now; cf. Schiesaro 1990: 143.

⁹¹ This evidence for Lucretius' 'genetic theory' is fuller than and should be seen as necessary complement to the hints noted by Campbell 2006: 35 (regarding *Lucr. DRN* 2.661-72, 2.700-29, which passages are discussed above with different emphasis).

of the proper coupling engaged in by both humans and animals, at 4.1192-1208.⁹² Having explicitly shown that they are no different in this respect, his subsequent explanation of the hereditary causes of physiological variation is couched in a manner which encompasses all living creatures.

Throughout 4.1209-32 Lucretius avoids species-specific words which he uses in many other contexts, such as - in the case of people - human (*humanus*) and man or human (*homo*), and instead chooses words which can be species-neutral: *avus* (grandfather or grandsire)⁹³ and by extension *proavus* (great-grandfather/sire, ancestor),⁹⁴ *femina* (female or woman),⁹⁵ *maior* (ancestor),⁹⁶ *mas* (male, masculine),⁹⁷ *mater* (mother),⁹⁸ *maternus* (maternal),⁹⁹ *muliebris* (female, feminine, womanly),¹⁰⁰ *parens* (parent),¹⁰¹ *partus* (offspring),¹⁰² *pater* (father, ancestor),¹⁰³ *patrius* (paternal, ancestral),¹⁰⁴ *stirps* (lineage; descendant, offspring),¹⁰⁵ *suboles* (offspring; lineage),¹⁰⁶ *vir* (man, husband, a male),¹⁰⁷ *virilis* (manly, virile, masculine).¹⁰⁸ Although there are not always Lucretian comparanda confirming that these words include animals, the weight of the examples taken together as well as the overall tone and context indicate that this section applies to heredity writ large. Moreover, Virgil takes this further, using human language for animal breeding.¹⁰⁹

The universal mechanics of heredity proceed as follows. The mingling of seed occurs during coupling. Both parents' seeds are always involved, but, frequently, one parent's seed will predominate in the resulting mixture. Predominance does not determine the gender of the offspring, but it does cause other physiological similarities. One

⁹² Cf. pp.156-62.

⁹³ Lucr. *DRN* 4.1218, used by Virgil of animals at *Geo.* 4.209.

⁹⁴ Lucr. *DRN* 4.1219.

⁹⁵ Lucr. *DRN* 4.1210, used at 5.813 and 5.853 (as shown by its juxtaposition with '*maribus*', echoing 4.1198, in comparable context) of all creatures.

⁹⁶ Lucr. *DRN* 4.1244.

⁹⁷ Lucr. *DRN* 4.1228, used specifically with reference to animals at 4.1198 and of all creatures at 5.853.

⁹⁸ Lucr. *DRN* 4.1211, used specifically with reference to animals at: 2.349, 2.350, 2.355, 2.368.

⁹⁹ Lucr. *DRN* 4.1211, 4.1214, 4.1228, used of all creatures at 3.346.

¹⁰⁰ Lucr. *DRN* 4.1227, 4.1232, perhaps used similarly at 4.1053. Elsewhere it is clearly used of women. *Mulier*, on the other hand, seems to be used exclusively of women, with the possible exception of 4.1054.

¹⁰¹ Lucr. *DRN* 4.1213, 1221, used specifically with reference to animals at 2.664 and of all creatures at 1.599.

¹⁰² Lucr. *DRN* 4.1229; it is possibly used specifically with reference to animals at 3.776 and of all creatures at 1.164 (by contrast with the *fructus* of plants) With respect to this and other words for offspring, cf. the use of *puer* with respect to all creatures at e.g. 5.816 and possibly at 2.577, 3.447, 4.1053.

¹⁰³ Lucr. *DRN* 4.1212, 1222 (twice), used specifically with reference to animals at 3.743.

¹⁰⁴ Lucr. *DRN* 4.1212, 1214, 1227, used specifically with reference to animals at 3.743.

¹⁰⁵ Lucr. *DRN* 4.1223, used specifically with reference to humans at 1.733 but elsewhere of plants, according to the more typical meaning of the word.

¹⁰⁶ Lucr. *DRN* 4.1232; this is a hapax with respect to Lucretius.

¹⁰⁷ Lucr. *DRN* 4.1232.

¹⁰⁸ Lucr. *DRN* 4.1209.

¹⁰⁹ Cf. Gale 1991: 417.

generally resembles the parent whose seed conquered the other's in the mingling process - and thus represents more than half of one's initial seeds. The offspring resemble both parents when neither parent conquers or is conquered.¹¹⁰ Also, progeny will sometimes resemble their more distant ancestors.

propterea quia multa modis primordia multis
mixta suo celant in corpore saepe parentes,
quae patribus patres tradunt a stirpe profecta;
inde Venus varia producit sorte figuras
maiorum refert voltus vocesque comasque,
quandoquidem nilo minus haec de semine certo
fiunt quam facies et corpora membraque nobis
DRN 4.1220-6

Therefore, because parents often hide many kinds of first-beginnings mixed in many ways in their bodies, which, as they come from one's stock, one father passes down to the next - from this Venus¹¹¹ produces shapes with diverse lot, and brings back the countenances, voices,¹¹² and hair of ancestors - since these things are made for us from a fixed seed no less than our appearances, and bodies and members.

Lucretius depicts specific aspects of one's constitution as following from a fixed seed in the same way that each species proceeds from a fixed seed and - since the infancy of the Earth - a fixed mother. This recalls his claim that different seeds facilitate different combinations and structural arrangements relative to one another. Although the transmission and combination of fixed seeds and what follows from them are not the only factors which influence the outcome of the mingling process,¹¹³ these are the ones which account for the hereditary continuities and differences between an offspring and its parents.

This variation occurs within a degree of probability and limits, as De Lacy notes.¹¹⁴ With respect to probability, children most likely resemble one or both of their parents, or at least their own ancestors. It is unlikely that a child will resemble someone from another family.¹¹⁵ A further limit is that of species. As we have seen, one species cannot breed with another; for example, humans can only procreate with other humans:

namque alias aliud res commovet atque lacessit;
ex homine humanum semen ciet una hominis vis
DRN 4.1039-40

For one thing moves and excites some things,
another other things, but only the force of
a person rouses human seed from a person.

Therefore, though all living things possess certain physiological structures, such as an *animus-anima* complex, a far greater degree of physiological commonality (as well as compatibility) is required for procreation; the resulting offspring will have a nature which

¹¹⁰ Lucr. DRN. 4.1209-17.

¹¹¹ Here Lucretius seems to be playing on the conventional meaning of *Venus* as the goddess of Love even as he undermines it; here the word is probably either a euphemism for 'sex' or a deification of Nature and natural law playing out in the result of sex. On the potential connotations of Venus, cf. esp. p.146 n.222.

¹¹² On the signification of *vox*, cf. esp. pp.282-87.

¹¹³ Lucr. DRN 4.1233-77.

¹¹⁴ De Lacy 1969: 109.

¹¹⁵ Although this could theoretically happen, as there is nothing unique in the universe, as we have seen.

is consistent within correspondingly probable limits. Thus this degree of variation does not undermine but indeed supports Lucretius' contention that species proceed *generatim*.

Pace Campbell and Long and Sedley,¹¹⁶ humans are no exception to the fixity of species. Lucretius' account of the first generation of the human race follows immediately upon the non-existence of hybridity, which concludes with the general rule that all things, not just living ones, proceed in the way proper to their kind.¹¹⁷ This establishes the framework within which the human race and its development take place. Individual humans grew up, developing their bodies, faculties, and knowledge. However, individuals' developments were not transmitted; the species itself did not evolve. In other words, what could be generated or exist remained constant, but what could survive changed.

The constitutions of the earthborn generation of human beings developed over the course of their lives. They were not sprung from the ground fully-grown, like the Cadmian and Colchian Sparti. Rather they were born from the wombs on the surface of the earth as infants ('*infantes*', 5.810). First suckled by the earth, they became children ('*pueri*', 5.816) and found food. They and the Earth grew and gained strength together ('*omnia enim pariter crescunt et robora sumunt*', 5.820). This is the last we hear of the earthborn generation until 5.925, where Lucretius picks up the narrative of the development of human's constitutions during the period of Earth's infancy.

et genus humanum multo fuit illud in arvis
durius, ut decuit, tellus quod dura creasset,
et maioribus et solidis magis ossibus intus
fundatum, validis aptum per viscera nervis,
nec facile ex aestu nec frigore quod caperetur
nec novitate cibi nec labi corporis ulla.
multaque per caelum solis volventia lustra
volgivago vitam tractabant more ferarum
DRN 5.925-32

And during that time on the fertile plains the
human race was much hardier, as was fitting,
since the hardy Earth had created it. And the
race was founded with larger and more solid
bones inside, and fitted with strong sinews
throughout the flesh. It was not easily
conquered by either heat or cold, or
strangeness of food or any illness of the body.
And for many periods of the sun,¹¹⁸ rolling
through the sky, the humans conducted life
nomadically, in the manner of undomesticated
animals.

¹¹⁶ Campbell 2002 and 2003: 260-2. Campbell bases part of his claim to human evolution on a reading that the first humans lacked *ratio*. The aspects of his interpretation which are not addressed by the fixity of species argument developed by this chapter will be dealt with in the treatment of *ratio* in chapter five. Long and Sedley base their claim on technological progress in response to the external environment; cf. Long and Sedley 1987: i.134. This will be treated shortly.

¹¹⁷ Cf. pp.192-5 with respect to Lucr. *DRN* 5.923-4.

¹¹⁸ On the precise meaning of '*lustra*'; cf. Gale 2009 *ad loc.* This translation suggests that '*volventia*' modifies '*lustra*', but it could also be a case of hypallage, such that it would modify '*solis*'. The sense would not be substantially altered.

The phrase ‘*illud in arvis*’ sets this when creatures were springing from the earth.¹¹⁹ At this time, all creatures - both human and animal - lived without fellowship or settled communities and were thus, in a sense, wild (*‘ferae’*, 5.932).¹²⁰ It was quite literally every creature for itself, as Lucretius goes on to describe (5.933-1110). Hobbes, likely drawing on *DRN*, characterizes this ‘state of nature’ as ‘the war of all against all’ - wherein the life of man was ‘solitary, poor, nasty, brutish, and short’.¹²¹ For Lucretius this was neither a nightmare scenario nor a Golden Age,¹²² but an era where only the fittest individuals¹²³ survived. These first humans found nourishment from the produce of the Earth - including plants, rivers, and even animals. Although some died in the jaws of predatory animals and from lack of food,¹²⁴ other earthborn humans grew to maturity, such that some managed to mate and reproduce.¹²⁵ Shelton claims that Lucretius represents human contracts with animals as the way out of this stage.¹²⁶

Further ontogenesis of members of the earthborn generation eventually took place. After the introduction of huts, skins, fire, mating, cohabitation, and the birth of the first human-born offspring:

tum genus humanum primum mollescere coepit.
ignis enim curavit ut alsia corpora frigus
non ita iam possent caeli sub tegmine ferre,

... then the human race first began to grow
soft. For fire took care that their bodies,
shivering¹²⁷ beneath the vault of heaven, were

¹¹⁹ Not just because of ‘*tellus ... creasset*’, but also (and perhaps more so) because ‘*arvum*’ is generally used of a cultivated or sown field - here sown by organic processes, so to speak, with *primordia rerum*, rather than by human artifice. On the process by which these produce assemblies and particularly living creatures, by spontaneous generation, cf. esp. pp.36-9. Nussbaum, on the other hand, takes ‘*illud*’ as modifying ‘*genus*’ and on that basis argues for the evolution of the nature of species; Nussbaum 1994: 265. Not only is the species fixed, as we will see, but doing so results in ‘*in arvis*’ makes far less sense in the context and logic of the passage; e.g. humans do not live in the sky or the water.

¹²⁰ Cf. Lucr. *DRN* 5.39-42. Cf. Schiesaro 1990: 122-33.

¹²¹ Hobbes *Leviathan* ch.13 in Flathman and Johnston 1997: 70.

¹²² Lucretius offers little to support the claim that he believes in either a past or future Golden Age, so to speak, common to the human race or all species, particularly by comparison e.g. to Diog. Oen. fr. 21.1.4-14 Smith. The debate on Lucretius as primitivist or progressivist is long-standing and somewhat outmoded. Furley 1978 offers an overview; his solution, that the history of civilization represents amoral progression, is compatible with the interpretation of species argued for in this chapter. Campbell takes a ‘both and’ approach; Campbell 2006: 53-60. Konstan rejects these categories, but reads the history of civilization as a narrative about the moral corruption of human nature through the development of language and laws, somewhat ameliorated by technological developments. What he here calls ‘irrational’ fears and desires seem to mean ‘baseless’, not absent the involvement of what he generally calls ‘the rational soul’; Konstan 2008: ch.3 esp. 79-83, 120. For an account of Lucretius’ dialogue with the mythic narrative of devolution (with respect to both the Earth and the humans who walked it) from a Hesiodic Golden Age and recent bibliography on the subject, N.B. Gale 1994b: esp. 164-71, Campbell 2003: 337-53, Gale 2009: 177ff, Gale 2013: 40-44.

¹²³ Cf. the comparatives in Lucr. *DRN* 5.926-7.

¹²⁴ Rather than from gluttony or the arts of man, as now.

¹²⁵ Lucr. *DRN* 5.933-1013.

¹²⁶ According to Shelton, agriculture and human progress more generally in *DRN* are contingent upon these contracts; Shelton 1995: 116, Shelton 1996: esp. 49-55. The formation of interspecies communities will be treated below.

¹²⁷ More precisely, ‘*alsia corpora*’ suggests vulnerable to temperature, particularly to cold. This seems to be their state even prior to their softening by fire.

et Venus imminuit viris, puerique parentum
blanditiis facile ingenium fregere superbum
DRN 5.1014-18

already unable to bear cold in the same way
as before; and Venus diminished their
strength, and children easily broke down the
proud¹²⁸ *ingenium*¹²⁹ of their parents with
their ingratiating ways.

Technology and fellowship resulted in psychophysiological changes. The initial relative hardiness of these individuals is softening, diminishing, and being broken down. The earthborn have reached maturity and what should be the peak of their powers, as shown by their successful procreation. Thus any weakening is not yet due to the progression into old age.¹³⁰ It occurs through physical conditioning, whether due to external circumstances or ones activities.

When Lucretius returns to the advent, so to speak, of fire, he claims that fire was not a gift from the gods, and explains our knowledge of how to use it:

inde cibum coquere ac flammae mollire vapore
sol docuit, quoniam mitescere multa videbant
verberibus radiorum atque aestu victa per agros
DRN 5.1103-5

Then the sun taught them to cook and soften
food by the heat of a flame, since they were
seeing¹³¹ that many things throughout the
fields became soft, conquered by the lashing
blows and warmth of its rays.

Fire penetrates openings in other things¹³² and its heat, like that of the the sun, rarifies things¹³³ - thus allowing for further penetration, heating, and rarification. The more void something contains, the more yielding it is; hence cooking is a softening process. Proximity to fire exposes a thing to its heat, which thus has an effect on the human constitution similar to its effect on food.¹³⁴ Similarly, hard labor - such as farming - has a hardening effect on the bodily frame.¹³⁵ It is also possible that such conditioning was not completely responsible for humans' difficulty with cold; because Earth too was maturing, excessive heat and cold, which did not exist when the earthborn were children, may well

¹²⁸ Perhaps in the sense of self-reliant.

¹²⁹ In *DRN*, '*ingenium*' is a perplexing word; it occurs seven times: *Lucr. DRN* 2.11, 3.453, 3.745, 3.1043, 5.1018, 5.1107, 5.1111. Overall it seems to mean something like 'intelligence' or 'intellect', as an innate but developmental aspect of one's *natura animi*, perhaps akin to one's aptitude for understanding as well as the sum of one's understanding. As we will see, some individuals are born with more than others; animals are also born with it. It also develops over time; one has less in youth, more in maturity, and less in old age. The one time that Epicurus is named in *DRN*, he is described as having surpassed whole human race in it (3.1042-3). Finally, it may relate to the degree to which one's *animus* is *sagax*. Further investigation seems a promising avenue for future research. The word will remain untranslated in the remainder of the thesis.

¹³⁰ Inherently an overall process of decay and decline, which goes beyond what nutrition can prop up; cf. *Lucr. DRN* 2.1122-43, 3.447-54. Even the development of tools such as huts and fire would not have prevented this.

¹³¹ The literal translation of the imperfect is retained to emphasize that this perceiving happened over time, as did the process it observed (indicated the inchoative infinitive which depends upon it).

¹³² *Lucr. DRN* 2.381-7.

¹³³ Cold, on the other hand, compresses them. *Lucr. DRN* 6.840-73.

¹³⁴ The echo between '*mollire*' here and '*mollescere*' at *Lucr. DRN* 5.1014 reinforces the connection between the two passages treating the impact of fire's introduction to the daily realities of human life; cf. Gale 2009: 191-2.

¹³⁵ *Lucr. DRN* 5.1354-60, esp. 5.1360: '*atque opere in duro durarent membra manusque*'.

have developed by this time.¹³⁶ The reference to Venus' diminution of their strength or abilities (5.1017) suggests a more ephemeral weakening - such as that which occurs in one's limbs at orgasm.¹³⁷ It may also allude to the self-delusion which can accompany *amor* and lead to certain sorts of sexual partnership. Either way, such weakening conceivably occurred more often with settled couples than in opportunistic mating. The precise weakening induced by the children depends on one's interpretation of *ingenium* here, but context suggests that the result was a change in belief which amounted to concern for ensuring the survival of more than just the fittest.¹³⁸ These are all reversible, non-heritable developments of individuals.

Having shown that the earthborn humans met the minimum conditions (with respect to their natures) for survival, which presuppose those for existence, Lucretius explains that this was not sufficient for them to last.

tunc et amicitiam coeperunt iungere aventes
 finitimi inter se nec laedere nec violari,
 et pueros commendarunt muliebreque saeculum,
 vocibus et gestu cum balbe significarent
 imbecillorum esse aequum misererier omnis.

And then neighbors desiring¹³⁹ neither to harm each other nor to be harmed¹⁴⁰ began to join in alliance.¹⁴¹ And they commended to protection their children and the female race, when they imprecisely indicated with their

¹³⁶ Lucr. *DRN* 5.817-20.

¹³⁷ Lucr. *DRN* 4.1113-22.

¹³⁸ Campbell, on the other hand, suggests that fire leads to a 'physical softening' and that 'their new domestic life of marriage, love, sex, and childcare causes a 'psychological softening'; Campbell 2006: 58. Similar views are expressed by, e.g. Long and Sedley 1987: i.134, Nussbaum 1994: 266. Further against the ideas of 'psychological' or 'mental' softening and that any softening is phylogenetic, rather than ontogenic, cf. pp. 199-202.

¹³⁹ For desire (*aveo*) in this way as a precursor to willing an action, and what that desiring itself requires, cf. esp. pp.251-2.

¹⁴⁰ Cf. Epic. *KD* 31-33, 35. It should be stressed that this neither harming nor being harmed, while the essence of justice, is the minimal condition for the formation of a community, not the only purpose for which one might exist; for an overview of theories about the purposes of community formation, which are often conflated with theories about the nature of justice, cf. Holmes 2013: esp. 176-80.

¹⁴¹ To Lucretius' mid first-century BCE readership, *amicitia* would have signified a social compact (or formal but effectively unwritten contract) between individuals and/or families based on reciprocal but not necessarily equal utility and obligation, as well as the language of literary patronage. This was a different concept of friendship than is common today, which is more akin to the friendship at the heart of the Garden. Any connotation of affection is at best a secondary meaning here; cf. the equation with *foedera* (5.1025), furthering the analogy between the first communities and the generation of *concordia*. This reading is largely consistent with the interpretation of Epicurean friendship in Rist 1980. On the resonances of the term in Lucretius' proem (Lucr. *DRN* 1.141), cf. Clay 1983: 216-20. Konstan, on the other hand, thinks it here encompasses both meanings and stresses its potential equation with *φιλία*; Konstan 2008: 90-3, (but cf. Konstan 1996: 392-3). He may be partially right, but any development of affection between the respective allying parties would have developed after the formation of the first communities, not as a precondition of the parties' association. As we have seen, familiarity can help to breed love as well as the opposite. The testimonium of D.L. 10.120 suggests that, according to the Epicureans, *φιλία* exists on account of (mutual) needs, one party must initiate it, and mutual benefit maintains it. On *φιλία* as a means of ensuring security (*ἀσφάλεια*), cf. Epic. *KD* 28. Taken with Epic. *KD* 27, 14, 40 and *SV* 34, 39, thus *KD* 28 shows that it is through security that *φιλία* leads to the pleasant life. Epic. *SV* 39 also stresses utility over sentiment. Historically, the interpretations and praxis of Epicurean friendship were many; that is beyond the scope of this study, but cf. e.g. Momigliano 1941, Nichols 1976: 29, 32, 41-5, Rist 1980, Rawson 1985: 3, Fowler 1989: 122-33, Hutchinson 2001: 158-9, Konstan 1996, Sedley 1997.

nec tamen omnimodis poterat concordia gigni,
sed bona magnaue pars servabat foedera caste;
aut genus humanum iam tum foret omne peremptum,
nec potuisset adhuc perducere saecula propago
DRN 5.1019-27

voces and gesture¹⁴² that it was right to pity all of the feebler ones. Nevertheless, concord¹⁴³ was unable to be created in all ways but the better part kept preserving the pacts uprightly; otherwise the human race would have entirely perished back then, nor would its progeny have been able to prolong the generations until the present.

The formation of communities permitted the continued survival of the human race. Given the softening of their individual natures and the dangers which threatened to curtail their lifespans,¹⁴⁴ there may not have been many hardier individuals who could protect themselves or others.¹⁴⁵ Contra Armstrong and others, the appeal to pity does not reflect an ‘emotional softening’;¹⁴⁶ the capacity for the emotion is innate and common to these individuals. Pity’s manifestation here is about the personal utility of having those for whom we care survive, preventing one’s grief and preserving both pleasure and the expectation thereof. Without these pacts, the children and weaker women would not have survived, nor would the stronger adults once they became weakened by age; much less would enough children have survived to the age of reproduction, such that they too might perpetuate *generatim*. The utility for the species is incidental to these individuals, but otherwise the species would have perished then and there.

Moreover, according to Lucretius, it was not only humans who survived at least in part because of the formation of such pacts and fellowships. Some animals species survived by forming communities with humans; others, although Lucretius does not mention it explicitly, by forming alliances amongst themselves. For now, let it suffice that humans were not alone in their ‘cooperative ability’, which Campbell takes to be the definitive feature of the race.¹⁴⁷ We shall return shortly to these things.

Although this survival of the fittest is still theoretically at work, a degree of equilibrium has been struck, such that the number of members of each species rises and

¹⁴² E.g. a kind of gesturing with the bodily bearing, like a parent protectively huddling over their child upon intervening between the child and some threat; cf. *gestus*, *OLD* §1, 3. We will treat glossogenesis in the next chapter.

¹⁴³ The etymological meaning of ‘agreement’ is likely also at work here.

¹⁴⁴ *Lucr. DRN* 5.982-1010.

¹⁴⁵ E.g. those with ‘*manuum mira ... virtute pedumque*’ *Lucr. DRN* 5.966; cf. below on 5.1105-16. On the importance of security against one’s fellow man as a precondition for prosperity and the detached life, cf. *Epic. KD* 14, 40.

¹⁴⁶ Armstrong 1997: 326-7 posess this in a normative, rather than a mechanistic sense - on the basis of *Lucr. DRN* 5.1017-18; both senses seem wrong.

¹⁴⁷ Cf. e.g. Campbell 2002: esp. 12. While Campbell too notes that humans were not alone in this ‘cooperative ability’, he seems to neglect the implications of conflating this with the development of human reason - i.e. animals with this ability would also have *ratio* such that the faculty is neither unique to the human race nor a phylogenetic evolutionary development of it.

falls, but the number of species itself is relatively stable and one race benefits at the expense of another or by their cooperation, resembling the war of the first-beginnings.¹⁴⁸

Evolution requires a gradual shift of the population towards those with certain characteristics at the expense of those that lack them or have them to a lesser extent until the latter group no longer passes on its non-preferential traits (e.g. through not procreating) and dies out. Although initially only the hardier humans survived the cull of natural selection - and only some at that, the advent of tools and, particularly, community formation permitted more of the constitutionally weaker members of the species to survive and, in due course, to reproduce. Now, once survival was assumed, the social structure, values, and technology changed.¹⁴⁹ Certain inherent abilities of the species taken individually, like that of speech, were also further cultivated.¹⁵⁰ Contra Campbell, none of these developments were transmitted through procreation itself.¹⁵¹ The survival of a broader range of individuals from a species is not the same thing as its evolution. While the later human race as a whole could be characterized as weaker than its original members, its hardier members continued to be born and survive.¹⁵² Therefore, the fundamental nature of the species persisted. In other words, the criteria for survival did not change; the net of natural selection simply widened. It became possible for a greater variety of those natures which met the criteria for existence to also meet the criteria of survival. Despite this, for Lucretius, the boundaries of the nature of the human race, just as with all species, are - and always were - fixed.¹⁵³

II. NATURA ANIMI

Animals have also been subject to natural selection from the infancy of the world. As Lucretius represents it, some aspect of each animal species' *natura* - beyond those

¹⁴⁸ Lucr. *DRN* 2.67-79 (reading '*saecla*' (2.78) as generations), 2.569-80.

¹⁴⁹ The natural and necessary desires of the individual and group were generally met and protection from danger was reasonably well assured; Lucr. *DRN* 5.1105-16, 5.1136-50, 5.1161-93, 5.1241-75, 5.1283-57, cf. Konstan 2008: 92-6.

¹⁵⁰ Lucr. *DRN* 5.1028-90. Speech will be discussed in chapter five.

¹⁵¹ On learning, cf. ch.5: esp. pp. 277-8 on the fact that it is not inherited. Campbell 2002 argues that Lucretius believed in a sort of Lamarckian evolutionary process.

¹⁵² Lucr. *DRN* 5.1105-16 in particular shows that: (i) there is some variation among the human species with respect to their faculties of mind, so to speak, and (ii) individuals with natures like those of the earthborn (cf. 5.966) - including strength and (particularly good) *ingenium* - did not disappear, thus undermining any claim to evolution. Indeed, such individuals led the race with respect to certain innovations which advanced human security; cf. 5.1143-50 and Hermarchus in Porph. *Abst.* 1.10.1-12.7 in Long and Sedley 1987: ii.138-9.

¹⁵³ On the fixity of species and natural selection without evolution, including with respect to humans, cf. e.g. Kennedy 2000: 392 and Gale 2009: 171, contra Campbell 2003 and Long and Sedley 1987 as discussed above.

discussed above - contributed to the survival of the races which still roam the Earth. These concern the specific *natura animi* of each.¹⁵⁴

Not only did *portenta* of all species fail to make the cut,¹⁵⁵ so did animal species who could neither survive on their own nor form communities with humans.

multaque tum interisse animantium saecla necessest
nec potuisse propagando procudere prolem.
nam quaecumque vides vesci vitalibus auris,
aut dolus aut virtus aut denique mobilitas est
ex ineunte aevo genus id tutata reservans;
multaque sunt, nobis ex utilitate sua quae
commendata manent, tutelae tradita nostrae.
principio genus acre leonum saevaue saecla
tutatast virtus, volpes dolus et fuga cervos.
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;
nam cupide fugere feras pacemque secuta
sunt et larga suo sine pabula parta labore,
quae damus utilitatis eorum praemia causa.
at quis nil horum tribuit natura, nec ipsa
sponte sua possent ut vivere nec dare nobis
utilitatem aliquam quare pateremur eorum
praesidio nostro pasci genus esseque tutum,
scilicet haec aliis praedae lucroque iacebant,
indupedita suis fatalibus omnia vinclis,
donec ad interitum genus id natura redegit

DRN 5.855-77

And many races of living creatures must have perished¹⁵⁶ then and were not able to forge out a lineage by propagating. For you see that whatever is sustained by vital breath - either craftiness or courage or even swiftness has protected that race from the beginning of its existence, preserving it. And many exist which remain because they commended themselves to us from their utility, entrusted to our protection. Firstly, courage protected the fierce race of lions and the other violent species; guile protected foxes and swift flight¹⁵⁷ deer. But the light-sleeping *mentes* of dogs with loyal heart,¹⁵⁸ and every species which has been spawned from burden-drawing stock,¹⁵⁹ and the herds of fleecy creatures as well as the horned races of oxen¹⁶⁰ - all these species have entrusted themselves to men's protection, Memmius. For they eagerly fled predators¹⁶¹ and pursued peace and abundant fodder, acquired without their labor,¹⁶² which reward we give for their usefulness. But for those species upon which their nature bestowed none of these things, so that they themselves¹⁶³ were neither able to live independently nor to offer some utility to us, on account of which we would allow the race of these to feed and be safe under our

¹⁵⁴ As this section will bear out, particularly with respect to the analysis of animals in warfare, the *natura animi* specifically plays the decisive role.

¹⁵⁵ As in Lucr. DRN 5.837-54 discussed above.

¹⁵⁶ The expression '*necessesst*' here refers to logical necessity.

¹⁵⁷ 'Other' because Lucretius often uses *saevus* of lions, as well as others, as we will see. The juxtaposition of '*genus acre*' and '*saeva saecla*' is also somewhat pleonastic.

¹⁵⁸ Here *cor* seems to be a synecdoche for the *mens/animus*, as *pectus* and *cor* often are; on the relative wakefulness and watchfulness of the *animus* during dream-sleep, cf. pp.65-6, 110. The interplay of the quantity of these nouns and the adjectives modifying them suggests that this is not a case of transferred epithet referring to a characteristic trait of all dogs, but rather through metonymy emphasizes certain dogs, like those suggested in book four to be useful in the house for guarding. We will return to the implied issue of breeds below.

¹⁵⁹ This translation emphasizes the idea that fixed species are born from fixed seeds - i.e. from a limited range of possible combinations of extremely similar assemblies. Here '*veterino semine*' is metonymic for 'the seed of burden-drawing creatures' and looks forward to 5.890 (discussed above)

¹⁶⁰ The interlocking word order and the expression '*simul ... et*' perhaps allude to the fact that oxen also are herd animals.

¹⁶¹ All animals were necessarily wild in a sense, at least until interspecies communities were established; cf. the following discussion of the passage.

¹⁶² On *labor* in Lucretius as part of the ethical discourse of what constitutes the ideal life, cf. esp. Gale 2000: 147-54, as well as Gale 2013: 33-4 with respect to Lucretius' dialogue with Hesiodic and Roman ideals on the subject.

¹⁶³ Referring to the species (pl.), perhaps as opposed to their individual members, assuming '*ipsa*' refers to '*saecla*' (sic *genera*).

protection¹⁶⁴ - these obviously were lying vulnerable to others for prey and profit, all of them hampered by their own fatal fetters¹⁶⁵ until their nature reduced that race to destruction.

The perishing or survival of certain species was not the result of necessity, but of the interaction of the characteristic nature of its members with the circumstances in which they found themselves, as well as the choices which they and others made.¹⁶⁶ These extinct '*saecula animantum*' (5.855) were distinct from the preceding '*portenta*' (5.837) in that these were actual races, physically capable of finding food, reaching maturity, and propagating.¹⁶⁷ Nevertheless, because they were unable to survive either on their own or by securing human protection, the result was the same; they failed to procreate - at least in sufficient numbers - and were thus also reduced to extinction.¹⁶⁸ Until these communities, all animals were wild, in the sense of not living in a symbiotic interspecies community with humans.¹⁶⁹ Some species which survived remained this way. Some were courageous¹⁷⁰ and fierce themselves (5.862-3) and likely predators ('*ferae*', 5.868). Others possessed some other useful trait; the craftiness of foxes likely allowed them to prey on smaller creatures and to escape larger predators, while the swiftness of herbivores like deer simply allowed them to escape. The qualities of *virtus*, *dolus*, and *mobilitas* are initially presented together in line 5.858, and again in 5.862. Line 5.858 presents them as typical traits which lead to ability of any species to protect itself and hence ensure its survival.¹⁷¹ The second case associates these with particular creatures,¹⁷² shows that lions exemplify a group of *saeva* creatures, and relates *fuga* to *mobilitas*; Lucretius thus shifts emphasis from the exemplary traits to related typical behaviors.¹⁷³ Ultimately, the consequent behaviors,

¹⁶⁴ The positions of '*praesidio*' and '*tutum*' relative to '*genus*' illustrate the phenomenon described.

¹⁶⁵ This interpretation of Lucr. *DRN* 5.876, *pace* Bailey and Campbell, follows the logic and emphasis of Gale 2009: 174.

¹⁶⁶ Cf. Gale 2009: 174, Campbell 2014: 242-3. On the relationship between Lucretian survival of the fittest and Empedoclean survival of the fittest (vs stage one and what Sedley calls 'non-survival of the unfittest'), cf. Campbell 2003: 131-8, Sedley 2003: esp. 10-12, Campbell 2008: with respect to these lines esp. 11-13.

¹⁶⁷ The *portenta*, however, as we have seen above, either could not meet the criteria for individual survival, didn't have the body parts for successful procreation, or both.

¹⁶⁸ This is highlighted by the echoes between Lucr. *DRN* 5.850 and 5.856; cf. Bailey 1947, iii: 1466.

¹⁶⁹ Domestication may not be an appropriate way of describing this, as it suggests human dominance over and subjugation of animals. This is not the case for Lucretius, as we shall see.

¹⁷⁰ On 'courageous' as the appropriate rendering of *virtus* in this context, cf. p. 150.

¹⁷¹ *Mobilitas* has previously been used of the motions of the *mens* itself, e.g. of thought, as well as of its constituents, e.g. of the nameless fourth in initiating motion. Descriptions such as *dolus* (craftiness, guile) and *saevus* (cruel, violent) may also, *pace* Konstan 2008: ch.1, indicate 'cognitive' functioning, as they involve calculation about future contingents and deliberate action taken on the basis of such calculation; such issues will be revisited below and treated more fully in chapter five.

¹⁷² Although Lucretius already used *dolus* of foxes earlier in the poem; cf. p. 211.

¹⁷³ According to this interpretation, *dolus* is more likely to mean 'guile' as a manifestation of 'craftiness' and perhaps *saevus* 'violent' as a manifestation of 'cruelty'.

not each respective *natura animi* which they reflect, led to these species' ability to protect themselves.

The '*multa*' (5.860) which survived through the protection of humans are represented at 5.863-6 in terms of their respective uses,¹⁷⁴ before associating them with the characteristic behavior of all creatures which entered into such pacts - namely, the pursuit of safety, peace, and food.¹⁷⁵ Dogs are depicted through the loyal kind which often guarded the house.¹⁷⁶ The races which are good for drawing burdens are unspecified; horses may be among them.¹⁷⁷ Sheep are depicted by their wool. The uses of oxen may be self-evident or too many to name. These creatures share some similar goals with the first humans who founded human-human communities,¹⁷⁸ perhaps evincing natures which are inherently docile or at least similar to innate human nature.¹⁷⁹ Both in foregrounding dogs and in the contents of this list more generally, Lucretius comes remarkably close to the history of domestication as we understand it today.¹⁸⁰ However, it is perhaps no

¹⁷⁴ Sedley and Campbell suggest this list specifically belies Empedoclean influence. Sedley 2003: 10-11 notes well that it is specifically the compound adjectives which serve the function of identifying their usefulness and argues more generally that 5.864-7 passes the 'Empedoclean fingerprint test' (on which cf. Sedley 1998a 24-5), thereby linking the Lucretian and Empedoclean doctrines of survival of the fittest; cf. Campbell 2003: 131-5, Campbell 2008: 13.

¹⁷⁵ The '*multa*' would not have been fleeing from non-predatory herbivores, such as swiftly running deer, which also flee from fierce predators. Even some of the carnivorous predators from which they would have been fleeing also had their own predators, from which they might well have considered seeking protection, such as the *urus*; cf. the unlikely alliances involving animals in warfare, discussed below. Cf. Goldschmidt 1977: 51-2, N.B. 'Cet intérêt est mutuel. ... Cette réciprocité de services, fondée sur l'intérêt et la sécurité, donne naissance, entre les hommes et les bêtes, à une relation juridique.'

¹⁷⁶ Perhaps Lucretius exemplifies dogs with the particularly loyal kind, of the sort who often guard the house, in contrast to the lions. According to Lazenby 1949: 245-6, dogs have always symbolized fidelity, but Kitchell 2014: esp. 47-8 paints a more complex picture which fits better with Lucretius' language. Moreover, elsewhere Lucretius describes different breeds as suited for different activities (or human purposes). Thus here we have at least two exemplary subtypes: house-dogs of dogs in general, and lions of savage creatures. As we will see below, lions are subsequently shown to be the antithesis of a docile creature, much more - perhaps - of a loyal one.

¹⁷⁷ Cf. p.204. According to Kitchell 2014: 88-9: '[t]he horse was the last of the major animals to be domesticated' but was by the end of the Iron Age at least, and its 'importance for the Greeks and Romans lay almost exclusively as a conveyor of humans and their products', either as mounts or by drawing-burdens'. Howe 2014: 101-3 confirms their late domestication, relative to the Neolithic phase that saw the domestication of 'cattle, sheep, goats, pigs, and dogs', as it was a hunted wild animal for over twenty-thousand years (and depicted as such in Paleolithic art, in which it appears frequently). He also notes that the fully domesticated horse arrived in Italy and the Greek peninsula between 2100 and 1900 BCE. On horses and their many uses in Roman life, including as beasts of burden, racehorses, mounts in peace and war, and in the gladiatorial arena, cf. Toynbee 1973: 167-85.

¹⁷⁸ Cf. '*concordia*' (Lucr. *DRN* 5.1024) with '*pacem*' (5.867).

¹⁷⁹ This will be explored in further detail below.

¹⁸⁰ 'The earliest domesticated species was the dog and the domestication of cattle first occurred around the middle of the seventh millennium BC in the Near East ... Herding caught on quickly, and the practice reached Greece by no later than 6300 BC ... At this time the bones of domesticated sheep, goats, and cattle all make their appearance in the archaeological record at Argissa Magoula in Thessaly.' McInerney 2010: 21. Cf. McInerney 2010: 26: 'By the beginning of the seventh millennium BC, only dogs had been habituated to human company ... By no later than 6000 BC, however, first sheep and goats and then cattle had begun the transformation of human societies, making it possible for the people of the Neolithic period to practice a mixture of farming and herding, and in some places to rely almost exclusively on herding.' For a more detailed overview of domestication; cf. Howe 2014.

coincidence that here Lucretius does not even allude to one of humans' primary objectives: easy meat.¹⁸¹

Lucretius represents these animals as willingly choosing to enter into these pacts and interspecies communities.¹⁸² This translation takes '*commendata*' (5.861) as passive for middle, indicating that the agency of the animals was involved in this arrangement.¹⁸³ The reflexive personal pronoun is understood, being identical to the antecedent of the causal participle. The same is true of '*tradita*' (5.861); '*cupide fugere*' and '*secuta | sunt*' at 5.868-9 also imply their agency.¹⁸⁴ If '*tradita*' should be taken with '*sunt*' in 5.860, then the bracketing effect could embody the act of protection; that said, the position of *sunt* and the context of lines 5.860-1 suggests that *sunt* is functioning at least as much as a reference to species' sheer existence, like '*manent*'. As *commendo* more fully means 'to commend to one's protection',¹⁸⁵ 5.860-1 can be understood as something of a pleonasm, stressing both the social contract and human responsibility to these animals. Sorabji and Clark suggests that *commendo* may be a partial translation of οἰκειῶσις, as in Cicero.¹⁸⁶ Its use here looks forward to 5.1021, discussed above; the echo emphasizes the purpose of the alliance, such that the relationship between men with respect to their wives and children is somewhat analogous to the one between humans and animals. But it is not the same. According to Lucretius' syntactical representation the wives and children did not enter into the contract but were merely subject to it;¹⁸⁷ moreover, not utility but the relative concept of right

¹⁸¹ As we will see, if he did, it would have rendered humans 'unjust'. Meat-eating in Greco-Roman society, was often (for the greater population at least) associated with religious ritual and sacrifice, as well as - ironically here - the self-definition of community identity. It was also a prevalent theme in ancient epic, where the ability, e.g. in Homer to slaughter hundreds of cattle at once, was a status symbol; cf. McNerney 2014. For more detailed discussion of these things and the relationship between domestication and meat-eating, cf. McNerney 2010. On animal sacrifice, cf. also Ekroth 2014: esp. 342-4 on the consumption of sacrificial meat.

¹⁸² Cf. Campbell 2008: 18 and 16-21 more generally.

¹⁸³ On agency itself, cf. ch.5: esp. pp.247-66.

¹⁸⁴ Gale (forthcoming b) also notes that '*cupide*' implies that animals entered the 'contractual arrangements' 'voluntarily'.

¹⁸⁵ Cf. Bailey 1947, iii: 1466, Gale 2009: 173.

¹⁸⁶ E.g. Cic. *Fin.* 3.16; cf. Sorabji 1993: 164, Clark 2000: 126 n.33, 128 n.52, and for a survey of literature on the possible meanings of οἰκειῶσις, Clark 2000: 124 n.17. An etymological reading of the sort which Lucretius tends to be attuned to would suggest 'the process of extending one's household to'; this could occur on some sort of shared basis beyond similarity or kinship of nature (but without excluding that possibility), such as similarity of goals and/or mutual utility. Algra, on the other hand, thinks that the key idea at stake is one of gradual 'appropriation' (existing in degrees) and - largely on the basis of 5.1011-27 and 4.1278-87 - argues for an interpretation of οἰκειῶσις in Lucretius which is, as he puts it 'independent of any hedonistic or utilitarian moves', and amounts to what he reads as 'non-passionate love' through habituation; Algra 1997: 143, 145. On the issue of familiarity and alliance formation, cf. p.201 n.141, and on familiarity and the emotions, as well as contra the idea of non-passionate love in the finale of book four, cf. esp. p.162 n.323.

¹⁸⁷ Cf. Campbell 2008: 18, Shelton 1995: 121 n.12.

(‘*aequum*’, 5.1023) is the justification.¹⁸⁸ At least with respect to protecting the children, the men - unaware that these actions would ensure the survival of the species - had been influenced by their blandishments. Animals, like men, entered the alliances by themselves, deliberately, and on the basis of mutual utility; this too is thus a pact between equals and considerations of justice do apply.¹⁸⁹ Both society and justice thus arose non-teleologically.¹⁹⁰

Perhaps in an attempt to refute Empedocles on the natural οικειότης between humans and animals, and, by implication, the Stoic theory of οικειῶσις,¹⁹¹ Hermarchus excludes animals (‘τά λοιπὰ τῶν ζώων’) from justice for lack of λόγος.¹⁹² His views, or perhaps continued perceived need to refute the Stoics by attacking an earlier instantiation of their ideas, seem influential. Polystratus, although allowing certain similarities with humans, denies animals the calculating ability or λογισμός which would have allowed them to enter such pacts.¹⁹³ For Philodemus too, man is the rational creature.¹⁹⁴

¹⁸⁸ That said, *utilitas* is clearly implied in the agreement between equals to do no harm and not be harmed. On the progression of society from this point, cf. Lucr. *DRN* 5.1105-16, 5.1136-60.

¹⁸⁹ For other comparisons of the two, cf. e.g. Shelton 1995: 117 and Konstan 2008: 91. Konstan argues that the *amicities* of Lucr. *DRN* 5.1019, which we are taking as parallel and of similar nature, reflects a relationship between equals, whereas pity reflects one between stronger and weaker. Pity nowhere enters the interspecies pacts; cf. Epic. *KD* 33 that justice is created by contracts and Epic. *Ep. Hdt.* 37-8 and *KD* 31-8 more generally. On the concept of justice - defined by Brown 2009: 192 as ‘things which are beneficial to a reciprocal community’ and dependent on the pact to not harm or be harmed - as an *eventum*; cf. p.272 and Epic. *KD* 31, 36. On the dialogue with Hesiod’s *Works and Days* 213-73 in Lucretius’ account of human-animal pacts and justice owed to (at least certain) animals, cf. Gale 2013: 44-6.

¹⁹⁰ The aim of refuting Hesiod may have influenced the joint presentation of these ideas; cf. e.g. Gale 2013 on Lucretius’ refutation of Hesiodic divine intervention and, esp. pp.34-8, on justice and animals. Lucretius may have been drawing on Epicurus’ own culture history (from which *KD* 31-40 may be drawn) as a source, but this is but one instance of where Gale has shown that Lucretius’ was likely also responding directly to other intertexts.

¹⁹¹ Vander Waerdt 1988: 90 and *passim* with respect to more contemporary opponents (as well as possibly Theophrastus), Campbell 2008: 10, following Obbink. Stoics nevertheless denied λόγος to animals and allowed for humans to kill them on that basis; cf. Cic. *Fin.* 3.67, and more generally on theories of οικειῶσις, Sorabji 1993: ch.10: esp. 130-1, Gilhus 2006: ch.2.

¹⁹² Hermarchus does this through a sleight of hand, equating pacts with justice, but also taking the further step of conflating these with human law (νόμος). Animals have no natural need to fear human law, which fear of punishment generally keeps in check those humans who would otherwise violate pacts; Lucr. *DRN* 3.1013-23, 5.1143-55, Hermarchus, likely from his treatise *Against Empedocles*, as reported in Porph. *Abst.* 1.7.1-9.4 in Long and Sedley 1987, ii.135-7 and Clark 2000: 33-4. On the relationship of Epicurean doctrine to issues of law and justice more generally, cf. Goldschmidt 1977. For Hermarchus, the threats which animals pose are of killing (‘κτείνειν’) specifically and of inadvertent harm through excess numbers, both of which - for him - justify humans’ killing them, even those who are not in any way harmful towards humans (‘... ἔνια τῶν ζώων οὐ φθαρτικά τῆς ἀνθρωπίνης ὄντα φύσεως οὐδὲ καθ’ ἕτερον οὐδένα τρόπον λυμαινόμενα τοὺς βίους’; Hermarchus in Porph. *Abst.* 1.10.1-12.7 (with respect to λόγος esp. 12.5-6), in Long and Sedley 1987: ii.138-9 and Clark 2000: 34-5. For discussion of this Hermarchus text, cf. e.g. Long and Sedley 1987: i.135-6 and Clark 2000: 126-9, as well as Vander Waerdt 1988 and Goldschmidt 1977: esp. 53-7, 176-80 more generally, and Campbell 2008: 9-10.

¹⁹³ Polystr. *On Irrational Contempt* 1-7 in Indelli 1978: 109-11, cf. De Lacy 1958, Goldschmidt 1977: esp. 180-6, Annas 1992: 135-6.

¹⁹⁴ Cf. p.297 n.342.

Nevertheless, as noted for example by Goldschmidt, Long and Sedley, and Gale,¹⁹⁵ Epicurus does not need to be read in a manner which precludes animals from these things.

ὅσα τῶν ζῴων μὴ ἐδύνατο συνθήκας ποιῆσθαι τὰς
ὑπὲρ τοῦ μὴ βλάπτειν ἄλληλα μηδὲ βλάπτεσθαι,
πρὸς ταῦτα οὐθὲν ἦν δίκαιον οὐδὲ ἄδικον. ὡσαύτως
δὲ καὶ τῶν ἔθνῶν ὅσα μὴ ἐδύνατο ἢ μὴ ἐβούλετο
τὰς συνθήκας ποιῆσθαι τὰς ὑπὲρ τοῦ μὴ βλάπτειν
μηδὲ βλάπτεσθαι.

Epic. *KD* 32¹⁹⁶

For the creatures which were not able to make pacts for neither harming one another nor being harmed, to these nothing is just or unjust. But it is also the same with the peoples who were not able or not wishing to make the pacts for not harming and not being harmed.

This maxim assumes that some ζῴα are able to make such pacts.¹⁹⁷ Moreover, some human ἔθνη are unable to make pacts. Those humans and animals which are unable to make pacts may not necessarily be prevented by some lack in their nature (such as lack of *ratio* or of sufficient *ratio*¹⁹⁸), but by circumstances - such as not being able to find a partner for whom the arrangement would be mutual useful. The ἔθνη who are not wishing or willing (implying *ratio*) to make such pacts are reminiscent of the animals species for whom it was not advantageous form interspecies communities, as they were capable of surviving without human aid.¹⁹⁹ Moreover, as Clark notes, ‘not making a contract does not prove non-rationality’.²⁰⁰ Thus this evidence from Epicurus does not exclude any animals from having *ratio* and implicates him in the camp of Democritus, who thought that justice applies in the case of animals and that they are morally responsible.²⁰¹ Finally, as the

¹⁹⁵ Goldschmidt 1977: 43-57, Long and Sedley 1987: i.134-5, ii.130, Gale 2009 (but she backs down from this in Gale (forthcoming b)); cf. also Vander Waerdt 1988: 98 n.44, Sorabji 1993: 162, Clark 2000: 128 n. 52, Gilhus 2006: 23. Shelton and Gale see human-animal contracts in Lucretius as a point on which he diverges from both Epicurus and Hermarchus; cf. Shelton 1996: 51-2, Gale (forthcoming b). Other points of view include: Annas 1992: 135-6 (who sees animals as included in ‘ὅσα τῶν ζῴων’ but uses this to deny them and certain humans reason (or at least a full share thereof) and justice), Warren 2002b: 137-40, Newmyer 2007: 165-6, Konstan 2008: 20, Campbell 2008: 9, 19-20, Brown 2009: 192.

¹⁹⁶ In Long and Sedley 1987: ii.129.

¹⁹⁷ The phrasing is such that ζῴα and ἄλληλα allow for animals forming both inter- and intraspecies communities. Sorabji 1993: 161-6 and, with less conviction, Gilhus 2006: 24-5 have raised the possibility that the sort of συνθήκη discussed by Epicurus and Lucretius represent something weaker than a contract, i.e. as ‘natural’ agreements, not ‘artificial’ ones, but Sorabji does not believe that Epicurus’ potential extension of justice to contract-animals is based on animal reason. However, Epicurus and Lucretius apply the same vocabulary to interspecies and human-human pacts. Moreover, ‘artificial’ agreements would not have been possible, even between humans, until the advent of written language whose writing was mutually comprehensible. Lucretius’ account of community formation predates this. Gilhus concludes that at the very least ‘there was in some cases a notion of the natural agreement between animals and animals and between humans and animals’; Gilhus 2006: 25.

¹⁹⁸ Contra, e.g., Annas 1992: 136, Shelton 1995. Given that Lucretius represents the human race as one race with one fundamental nature, it seems unlikely that Epicurus would have subscribed to a concept tantamount to the one rationalizing, e.g., natural slavery, such as Aristotle had.

¹⁹⁹ That said, land animals of all kinds are far better better suited to survival on their own or at least without human artifice than humans are - and thus do not need things like clothes, weapons, or walls to protect their own; cf. Lucr. *DRN* 5.222-34. Holmes 2013 takes 5.222-34 as evidence that humans are a negative exception to the general account of survival of the fittest - i.e. ‘he sees our need to become social creatures as in part arising from the lack of care provided to us by nature’; Holmes 2013: 180. While her interpretation creates more problems than it constructively addresses, the questions which it raises deserve fuller treatment.

²⁰⁰ Clark 2000: 129 n.52; this is noted on the basis of Porphyry’s comments, but with respect to the Epicurean evidence.

²⁰¹ Cf. Newmyer 2007: 157.

general consensus seems to take *ratio* as a prerequisite for making such pacts, we may therefore take the larger point of animal contract-making in *DRN*, as well as the specific content of his account, as evidence that Lucretius believes that animals possess *ratio*.²⁰² It may also represent one of the ways in which Lucretius was influenced by Empedocles, despite some important differences, as Campbell notes.²⁰³ The continuities we are tracing between all living creatures are also not incompatible with some form of reciprocal *οικειῶσις*²⁰⁴ and seem to explain why Lucretius represents animals as equal partners in forming communities on the Epicurean basis of mutual utility.

'*Tutelae tradita*' (5.861) looks forward to the close intratextual echo at 5.867, which stresses again the mutuality of the social contract and humans' responsibility towards animals. The address to Memmius there, which has surprised some commentators,²⁰⁵ may be intended to emphasize to the poem's reader that this responsibility to protect and feed the animals under human care also applies specifically to him.²⁰⁶ This possibility is not precluded by Campbell and Sedley's suggestion that Lucretius may be following a similar invocation in Empedocles.²⁰⁷ Both 5.855-77 and 5.1019-27 indicate that the contracts and communities are survival mechanisms.²⁰⁸

²⁰² They can also chose to exit from contracts, particularly if humans do not uphold their end of the bargain, as we will see shortly.

²⁰³ Campbell argues it constitutes a 'rapprochement' of Epicurus and Empedocles, but rightly notes that Lucretius does not hold with metempsychosis and thus his sympathies with the Empedoclean view of human-animal society cannot have the same basis - namely, a 'friendship' of souls which are literally identical across the species; Campbell 2008: 9, 21 and 9-21. Indeed, it seems likely, from Lucretius' overall treatment of animal philosophy of mind, that - whether or not he was engaging directly or indirectly with Stoic theories - he would not have been unsympathetic to Stoic *οικειῶσις* theory, although he would have disagreed with aspects of its basis; cf. Furley 1970.

²⁰⁴ This extends to protection, e.g. in the case of guard dogs. The reciprocity is but one way in which this seems different from the sort of *οικειῶσις* which may be at work in the protection of children. Sorabji suggests that these pacts extend justice to dependents like women and children, perhaps on the basis of *οικειῶσις*, although they themselves did not make the pact of not harming and not being harmed; Sorabji 1993: 164.

²⁰⁵ E.g. Bailey 1947, iii: 1466 and Gale 2009: 173.

²⁰⁶ Note that in describing the formation of the interspecies community, Lucretius lays far greater emphasis upon the protective role than in describing the formation of the human intraspecies community. For instance, although *commendo* is echoed, the human intraspecies community is missing anything like '*tutelae tradita*' (5.861, 5.867) and '*praesidio nostro ... tutum*' (5.874); on this vocabulary, cf. e.g. Gale 2009: 173. That said, the protective emphasis may be implicit by extension: i.e. if it is our duty to protect animals thus, should we not also afford each other the same level of protection? Cf. Shelton, who attractively suggests that the proper understanding of our relationship to other species can aid in humans achieving a tranquil existence; Shelton 1995: 116.

²⁰⁷ Campbell 2003: 135, Sedley 2003: 11.

²⁰⁸ Campbell terms them 'an effective extinction avoidance strategy'; Campbell 2003: 135, cf. Campbell 2002: 10-11, Campbell 2014: 242-3. Similarly, Shelton notes that the contracts with animals enabled human agriculture and thereby security (and that thus humans reached the closest to what she thinks of as a Golden Age ideal). Shelton also suggests that the difference between 'contract animals' and 'non-contract animals' is that the latter (like lions, boars, foxes and deer) 'devour human food (or humans!) without offering compensation', while the former 'fulfill their obligations to provide labor, food and wool' - thereby aiding human survival; Shelton 1995: 118, Shelton 1996: 48-55, esp. 54-5. Goldschmidt 1977: 51-2, as we have seen, also stresses the mutual utility.

The particular aspect of the *natura* which contributes to a certain animal species²⁰⁹ inability to survive, either on its own or in interspecies communities with humans, coexisted with each species from the beginning of its existence ('*ex ineunte aevo*', 5.869) to its extinction ('*interisse*', 5.855, '*ad interitum*' 5.877). The same is true of what allowed other species to survive. Therefore this particular aspect of *natura* is a *coniunctum* shared by every member of a species.

Surviving independently ('*sponte sua*', 5.872) requires a species to meet the criteria for survival on its own, without the aid of another species. Such criteria, as we have seen, are - excepting the threat of predators - *per se* and necessitated by the species' characteristic *natura*. At 5.1145-7, for example, Lucretius suggests that the human race ('*genus humanum*') was nearly wiped out from infighting. The use of '*inimicitiiis*' here also suggests that Lucretius is still regarding the human race as one species. For this reason it all the more readily fell under law on its own ('*sponte sua*') - by implication, as opposed to by imposition from the gods. *Pace* Gale and Johnson, this seems to not be represented as a collective deliberate choice, but as something which happened in the way that a body falls due to its own weight. In other words, the proximate cause of the human race falling under the rule of law was *per se* and, with respect to the survival of the species, necessitated by the threat to survival posed by individuals within the community who were choosing to violate its social contract. For such reasons, this development is not some Xenocratean (or Kantian, for that matter) exemplar, as Johnson would have it, wherein the goal of learning is to will in accordance with what is required by (human) law.²¹⁰

In an earlier passage, with which 5.855-77 has strong intratextual echoes, Lucretius claims that this characteristic aspect is hereditary and associated specifically with one's *animus-anima* complex.

denique cur acris violentia triste leonum
 seminium sequitur, volpes dolus, et fuga cervis
 patribus datur et patrius pavor incitat artus?
 et iam cetera de genere hoc cur omnia membris
 ex ineunte aevo generascunt ingenioque,
 si non certa suo quia semine seminioque
 vis animi pariter crescit cum corpore quoque
 DRN 3.741-47

Moreover, why does fierce violence follow the line of ill-tempered lions,²¹¹ why does guile follow the fox, and why is flight given to deer from their forebears and why does ancestral fear incite their limbs? And why now do all other things of this sort begin to generate in one's members and *ingenium* from the beginning of life, if not because in

²⁰⁹ Lucr. DRN 5.855: '*animantum saecla*', 5.871: '*quis ... ipsa*'.

²¹⁰ Cf. Gale 2009: 147 and Johnson 2013: 122.

²¹¹ Although this is translated as hypallage, the transfer of the epithet '*triste*' to '*seminium*' emphasizes the innateness of this quality.

the race and lineage²¹² a fixed *vis animi*
grows equally with each body?

Recalling the mechanism of heredity, these lines show that the essential *natura* of a species is passed down to each member from its ancestors. Lucretius communicates this partly through his stress on *semen*, its derivatives (linguistic and practical), and their multivalent meanings.²¹³ These lines also demonstrate that the fixity and heritability of a species' essential nature is a further application of the ideas that (i) fixed things are generated from fixed seeds (be they *primordia* or other *concordia*), and (ii) each of sort of generated assembly has an emergent nature. Here Lucretius places particular emphasis on a fixed *vis animi* ('*certa ... vis animi*', 3.746-7). Although such language could be conventional epic periphrasis for the *animus* and thereby stand for the complex as a whole, Lucretius often uses such periphrases to emphasize the particular aspect of the thing which is at stake. Thus the expression here should be taken to refer to both the complex itself and this particular aspect of its emergent nature. The fixity of this *vis* with respect to the species is confirmed by the consistent characteristic behaviors which tend to follow from (*sequitur*; taken twice) and evince it. That *vis animi* develops over the course of each creature's life ('*ex ineunte aevo*', 3.745; cf. 5.869); this is consistent with the *animus-anima* complex being co-extant and coextensive with the creature as a living entity.²¹⁴ That claim and certain echoes reactivate a more detailed account of such development at 3.445-58, particularly:

nam velut infirmo pueri teneroque vagantur
corpore, sic animi sequitur sententia tenvis;
inde ubi robustis adolevit viribus aetas,
consilium quoque maius et auctior est animi vis;
post ubi iam validis quassatum est viribus aevi
corpus et obtusis ceciderunt viribus artus
claudicat ingenium, delirat lingua, labat mens,
omnia deficiunt atque uno tempore desunt.

DRN 3.447-54

For just as children²¹⁵ are unsteady because the body is weak and youthful, likewise the *animus*' feeble judgment follows. Then, when their age has matured into robust strength, there is also greater *consilium*²¹⁶ and a more developed *vis animi*. Later, when now the body has been enfeebled by the mighty strength of time and, with *vires* dulled, the the limbs have declined, then *ingenium* falters, the tongue speaks nonsense, the *mens*

²¹² It is hard to capture the word play here in a single translation. If *semen* is taken as 'seed', then '*seminium*' becomes something like 'procreation' or 'a begetting from seed', rather than 'that which is begotten from (fixed) seed'; cf. *seminium*, OLD §1 the 'action of begetting, procreation' and §2 'breed, stock, or family' (stock interpreted as line of descent or lineage). Given the context, if, as per the translation, these words are taken metonymically, the more literal meaning is not lost.

²¹³ E.g. in his emphatic repetition of *seminium*, the word play of '*semine seminio*', the structural parallel of '*ingenioque*' and '*seminioque*', and the equation of '*seminium sequitur*' with '*a patribus datur*'.

²¹⁴ It is also consistent with the idea that all things (at least of a given assembly's nature) grow and gain strength together.

²¹⁵ There is nothing here or in the context, particular in light of ch.5, to suggest that '*pueri*' might not apply to all living creatures.

²¹⁶ On the meaning of '*consilium*', cf. pp.262-4.

loosens,²¹⁷ everything falls apart and fails at the same time.²¹⁸

Therefore, 'ex ineunte aevo' (3.745) applies to the individual and is coordinate with the existence of its species; the expression - not least as a condensed account of 3.445-58 - confirms that the *vis animi* is a *coniunctum* of both. A particular *vis animi* (and the essential nature of the complex more generally) is therefore a *coniunctum* of each species and its instantiation at a given time is - at least to some degree - an *eventum*.²¹⁹

A number of the exemplary creatures of 5.855-77 and 3.741-47 are included in an earlier passage, where Lucretius treats more explicitly the ontology and aetiology of a species' characteristic *natura animi* and its associated *vis*.²²⁰

sed calidi plus est illis quibus acria corda
iracundaque mens facile effervescit in ira.
quo genere in primis vis est violenta leonum,
pectora qui fremitu rumpunt plerumque gementes
nec capere irarum fluctus in pectore possunt.
at ventosa magis cervorum frigida mens est
et gelidas citius per viscera concitat auras,
quae tremulum faciunt membris existere motum.
at natura boum placido magis aere vivit,
nec nimis irai fax umquam subdita percit
fumida, suffundens caecae calignis umbram,
nec gelidis torpet telis perfixa vaporis:
interutrasque sitast cervos saevosque leones.
sic hominum genus est ...

DRN 3.294-307

But there is a greater quantity of fire²²¹ in those whose fierce heart and irascible *mens* easily boil up in anger. Of this sort, in the first place is the violent *vis* of lions,²²² who mostly burst their breasts with a roar and growling, nor are they able to contain their surges of anger in the *pectus*. But the cold *mens* of deer is more windy and rather swiftly drives frosty breezes throughout the flesh, which makes a tremulous motion arise in the members. But the nature of cows lives more by the placid air,²²³ neither does the smoky torch of anger ever exceedingly excite it, which torch, when applied, spews a shadow of blind fog,²²⁴ nor is their nature sluggish because it has been pierced by the frosty shafts of fear.²²⁵ And their nature is situated between the others: the deer and the cruel lions. The race of men is the same way.

²¹⁷ The choice of 'labat' simultaneously suggests: a kind of slipping of the faculties, a sinking or receding with respect to the body (as in sleep, particularly dreamless sleep), a loosening of the concentration of its constituents - and thereby its integrity - as a prelude to the dying process.

²¹⁸ On this translation of 'uno tempore', cf. 'simul' at Lucr. DRN 3.548.

²¹⁹ This will be developed further in the next chapter. Cf. Gill 2009: 137 on 'natural kinds' and survival.

²²⁰ Lucretius uses this expression in many ways, but there are comparanda suggesting it is at least sometimes used thus: cf. e.g. Lucr. DRN 3.309, and perhaps 3.1003.

²²¹ Recall that heat is a *coniunctum* of fire and sometimes used in metonymy.

²²² The translation is left literal in order to emphasize, as Lucretius does, that it is this particular *vis* which leads to the lions being violent.

²²³ Meaning the cows tend to be placid and behave accordingly because their nature contains an abundance of air; the literal translation is used for the sake of retaining Lucretius' consistent emphasis on: firstly, the constituents secondly, their relationship to the overall *natura animi*, and thirdly, the typical behaviors which tend to follow.

²²⁴ Implied: over creatures with a relatively fiery *natura animi*.

²²⁵ As we have seen, such metaphors are more appropriate to *amor*, a fiery emotion; moreover, both fear and cold are related to swift motion.

Not coincidentally, these lines follow immediately upon Lucretius' treatment of the physiological mechanism of emotion.²²⁶ All creatures have temporary surges of particular constituents relative to the others, but certain creatures have a permanent relative abundance of one constituent or another in their *animus-anima* complexes.²²⁷ The three exemplars include one predator, one creature of prey, and another which forms communities with humans. This passage suggests that the abundance of fire in lion's *mens* is directly related to both his tendency towards the emotion of anger and the corresponding behaviors of roaring and growling. Nevertheless, '*plerum*' indicates that such behaviors are typical - i.e. most lions do this - but not necessarily true of the lot; thus certain characteristic behaviors can evince the *vis* which contributes to it, but absence or change of a behavior does not evince change of *vis*.²²⁸ These qualifications apply to the subsequent examples as well.²²⁹

An abundance of wind has already been related to fear, trembling, and running away at 3.290-1; it is also described there as '*frigida*'.²³⁰ The idea that *mens* of deer is typically cold and windy, and that this wind causes trembling, thus implies that their characteristic emotion is fear. This hereditary penchant is linked to their typical behavior - namely, fleeing ('*patrius pavor incitat artus*', 3.742-3).²³¹ Finally the cow has a surfeit of air and is implied thus to be placid and not prone to anger or fear. Moreover, cows can become angry, but do not become exceedingly so;²³² similarly, it is implied that they can feel fear, but not extreme fear. The abundance of air thus prevents extremes of emotions

²²⁶ Lucr. *DRN* 3.288-93; cf. pp.143-6. Schrijvers, followed by Tutrone 2012a: 90, suggest that this is drawn from Aristotle's humoral theory, particularly in *HA* 488b12-27. Tutrone 2012a: 85-95 particularly sees this and Epicurean physiology in Lucretius as an adaptation of it, but the crux of his theory is based on an interpretation of the term *principia* as, effectively, molecules; it does not seem to have this meaning (at least not consistently, cf. book one). On the possibility of Epicurean emotion theory's dependence on Aristotle, the standard work remains Diano 1974.

²²⁷ This interpretation is compatible with the general picture painted by Gill 2009: 129-30, 137, but not with the reductionism he favors.

²²⁸ One of the fullest depictions Lucretius gives of the *natura animi* of a single species is of lions. To give but a few examples and instances, lions are: wild (*ferae*, 2.604, 5.1338), irascible (*iracunda*, 3.295-6, *irritata*, 5.1318), ill-tempered (*tristis*, 3.741), violent (*violentia*, 3.296), rabid (*rabidus*, 3.712), fierce (*acer*, 3.294, 5.862, *ferox*, 3.717), cruel or savage (*saevus*, 5.862, 5.1314) and courageous (*virtus*, 5.863). He also claims that dogs in general are loyal, which is perhaps is the reason why they are among the first animals to die from the plague (which first took root in humans); Lucr. *DRN* 5.864, 6.1222. On lions in ancient Rome, cf. esp. Toynbee 1973: 61-9.

²²⁹ Not least in light of how education can influence one's behaviors, as Lucretius explains in the lines immediately subsequent to this passage; these ideas will be developed further in ch.5: esp. pp. 292-301.

²³⁰ Perhaps not coincidentally, *frigida* can also mean 'fearful'; cf. *frigidus*, *OLD* § 6b.

²³¹ According to Kitchell 2014: 46: 'In imagery, the deer most commonly stood for swiftness, fearfulness and defenselessness.' But, as we have seen above, Lucretius renders the first two as their defense mechanism.

²³² This has important implications for our understanding of animals in warfare; cf. below.

associated with other sorts of constituents, even while facilitating the type of emotions associated with itself.²³³

This penchant for particular emotional states and certain behaviors which generally follow from them amounts to at least part of what we today call 'character'. The idea that one's *natura animi* has an hereditary physical basis - including the the relative proportion of the constituents of the *animus* - constitutes further evidence for the argument that their surges are the micro-level physiological manifestation of an emotion and in some way an underlying cause of the experienced feeling. It may be that Lucretius uses *natura animi* in certain cases to emphasize the physiology of the *mens* and *vis animi* when emphasizing the behaviors to which that emergent nature causally contributes.²³⁴

Lines 3.307-22 are crucial for our purposes; they demonstrate that this state of affairs holds true no less for humans than for animals. We will treat the passage in brief here and return to it in chapter five. Certain members of the human species, like certain species of animals, are more prone to anger, fear, and calmness than others are, and behave accordingly. This sort of variation exists within a given animal species as well. The logic behind this variation is this: there are more types of *naturae animorum*, emotion, and constituents than he explicitly covers here. Thus the lion, deer, cow, and corresponding types of humans are exemplars. Because Lucretius states that the sorts of *naturae* are as numerous as there are different sorts of first-beginnings, the physiological constitution of one's *animus-anima* complex must be a causal component of one's emotions and behaviors.²³⁵ For this reason²³⁶ humans and animals can have similar *naturae animorum* and are capable of the same emotions, which manifest according to the same underlying mechanisms; Lucretius also strongly states here that physical constituents do not completely account for, determine, or describe one's *natura animi*, emotions, and behaviors.²³⁷ Therefore, although the essential *natura animi* of a species is fixed, there are also aspects which vary for different reasons. Beyond the physiological considerations mentioned, there are other factors involved as well - in this case, *doctrina* and *ratio*. Similarly, behaviors which typically follow from one's *natura animi* can vary and have other (co-)causes.

²³³ Excess is relative to circumstances, as we will see shortly.

²³⁴ More systematic study of the terminology would be needed to evaluate this.

²³⁵ This follows, as each sort would contribute different properties from its nature to the nature and powers of the whole.

²³⁶ Having the same constituents is a necessary but not sufficient condition, as we will see.

²³⁷ Thus one's *natura animi* is emergent; cf. Gill 2009: 130.

This materialist account of the relationship between the physiology of the complex, its emergent nature, and emotion is relatively consistent with Annas' reading of Philodemus' *On Anger*.²³⁸ Annas concludes - to use her language - that Philodemus believes that some anger is natural, inevitable, and a part of human nature. Other anger is empty in the sense that it is based on false beliefs, which can in turn be tied to one's disposition. Thus, when one gets rid of false or empty beliefs, the corresponding angry feelings will be restructured or trained and directed.²³⁹ In other words, one's anger will become appropriate to the circumstances, but anger itself will not be eliminated from one's emotional repertoire. Annas further suggests that Philodemus' unangry person (ἀόργητος) is not a person who never feels anger but rather one who is not angry by disposition - i.e. prone to anger (ὀργίλος) - just capable of it from time to time.²⁴⁰ This is reminiscent of Lucretius' person who is '*clementius aequo*' (3.313) and suggests a consensus among Epicureans that there were appropriate degrees of emotion according to the circumstances. Hence, one's beliefs about one's circumstances are relevant. This nicely complements Lucretius' claim that for those whose constitutions have been polished by (presumably true) *doctrina*, traces of one's nature still remain - with the corresponding propensity to rush into the emotions relevant to that nature. But, absent false beliefs - which, as we have seen, help to inappropriately activate or intensify these emotions - there is nothing which hinders us from leading a life worthy of the gods. It also corroborates the idea that what is malleable or a non-hereditary *eventum* in one's *natura animi* is actually constituted by learning - hence the ability of *ratio* to reform it by, on another level, ridding one of false beliefs. These ideas will be further developed in chapter five.

Although one's *natura animi* entails a proneness to feel certain emotions, it does not strictly determine one's emotions or emotional range.²⁴¹ This is confirmed by Lucretius' account of Molossian dogs under various circumstances; as a group, these dogs from eastern Epirus are shown to express anger, care (including affection), sadness, and fear through their vocalizations and behaviors.²⁴² Their common appearance similarly indicates that they have an essentially consistent physiology; for example, as Lucretius

²³⁸ According to Annas, the desire to retaliate is at least as much the target issue as anger itself.

²³⁹ Annas 1989: esp 161-3.

²⁴⁰ Annas 1989: 163.

²⁴¹ We saw above that a given *animus-anima* complex contains many different sorts of first-beginnings and in chapter three that, at minimum, surges of the three exemplary or primary constituents should be possible.

²⁴² Lucr. *DRN* 5.1063-72. On the relationship between vocalizations and emotion and indeed what should be meant by vocalization, cf. pp.278-92.

mentions, they have large soft or flexible jaws and harsh teeth.²⁴³ It seems that consistency of appearance and *natura animi* which goes beyond a family but is narrower than a species represents a particular breed. Breeds are groups within a species which share characteristic natures and behavioral traits; they can be cross-bred with members of the same species from different breeds. Different sorts of birds cannot cross-breed and are referred to by different names or characteristic behaviors.²⁴⁴ In *DRN* breeds are generally identified by adjectives which indicate place of origin;²⁴⁵ this may imply that different places contributed some different *primordia* to breeds' respective earthborn ancestors. Similarly, some specific humans in the poem are referred to by patronymics, such as '*Aeneadum genetrix*' (1.1) and '*Tyndaridis forma*' (1.473).²⁴⁶

This brings us back to the Venus/Mars dichotomy of *DRN*'s proem. The gods of love and war are allegedly the two divine parents of the Roman race, begetting its two founding fathers - Venus being the mother of Aeneas ('*Aeneadum genetrix*' are the first two words of the poem) and Mars being the father of Romulus. By opening *DRN* with a patronymic, a scene of procreation, and the figures of Venus and Mars, Lucretius in a sense begins by addressing the Romans as a people with a common lineage. It also suggests that the nature of its members is inherently and hereditarily on the more fiery side of the spectrum, with respect to quantitative variation of the proportions of primary constituents of the *animus-anima* complex within the human race, predisposing the Romans to the fiery emotions. The ineradicable potential for these emotions in one's nature, similarly suggests that there is a natural explanation for the Romans' alleged mythological divine lineage.²⁴⁷ Lucretius' preference for '*hominum divumque voluptas* |

²⁴³ Lucr. *DRN* 5.1063-4. According to Kitchell 2014: 49-50, 52, it was the 'most famous breed of guard dog in antiquity', generally used of the house, and allegedly descended from Lelaps, a canine divinity. We can thereby assume that Lucretius' readers would have recognized a 'guard dog' upon encountering the name. Their alleged divine descent may also be significant, as there are few examples of animal divinities in Greco-Roman mythology; Aston 2011: 11-12.

²⁴⁴ Cf. e.g. Lucr. *DRN* 5.1079-86. For an overview of birds in Roman life and art, cf. Toynbee 1973: 237-82.

²⁴⁵ Cf. Kitchell 2014: 52. Zoologically-based Latin first-degree animal names fall into three major categories: body, behavior, and location; Bodson 2014: 566-7. Lucretius seems to use the first when discussing groups of species, e.g. fish: '*squamigerum ... pecudes*' (Lucr. *DRN* 1.162-3) and four-footed and winged creatures: '*quadripedum membris et corpore pennipotentum*', (5.798). He seems to use the second when discussing specific species, e.g. hawks and bearded vultures: '*accipitres atque ossifragae*' (5.1079). Location-based adjective names seem to be generally reserved for breeds. This may be a promising avenue for further research.

²⁴⁶ The Roman race and Helen of Troy, respectively. Such names perhaps further the contention that living *concordia*, as well as their deeds, are *eventa* of place and space.

²⁴⁷ Cf. Gale 1994b: esp. 26-50 and 129-38 on Lucretius' approaches to the subversion of myth. Recall also that at least early humans are treated as one species (*genus*) and ἔθνος; variation between peoples in *DRN* may be tantamount to the idea of breeds.

alma Venus' (1.1-2), bringer of peace and fertility, over '*Mavors | armipotens*' (1.32-3) teaches the Roman reader how to best manage his emotional proclivities.

Other accounts of behavior support and nuance Lucretius' belief in the innateness of at least a certain portion of one's *natura animi*. For example, he implies that certain creatures exhibit certain fixed behaviors consequent upon their *vis animi*.

quod si immortalis foret et mutare soleret
corpora, permixtis animantes moribus essent:
effugeret canis Hyrcano de semine saepe
cornigeri incursum cervi, tremereque per auras
aeris accipiter fugiens veniente columba;
desiperent homines, saperent fera saecla ferarum
DRN 3.748-53

... but if it were immortal and accustomed to change bodies, then living creatures would have been thoroughly mixed-up in their behaviors: a dog from Hyrcanian seed²⁴⁸ would flee from the incursion of a horned deer and the hawk would tremble while fleeing through the breezes of the air from the approaching dove. Men would lack understanding; the wild races of animals would have theoretical wisdom.²⁴⁹

Reversing the adynata reveals the actual behaviors. Hyrcanian dogs attack deer, even stags. Deer flee from attackers. Similarly, hawks are really the attacking predators and doves the fearful fleeing prey. Lucretius tells us that for such mix-ups in behavior as these adynata to occur, a creature of one species would have to be born with the *animus-anima* complex of another. It is not possible for this to occur because the complex is born and dies with the rest of the body, and thus cannot undergo metempsychosis. He thus represents behavior as consistent with and indicative of a particular sort of *animus-anima* complex. These line of reasoning confirms that not just behavior but also the nature of the complex and one's *vis animi* are all typical of a species and can vary with respect to smaller groups within that species.

In his account of dreams, Lucretius gives further evidence that some variation of *natura animi* occurs within a given animal species, according to breeds and groups of breeds. The example of dogs provides the clearest evidence. Lucretius states that the dogs of hunters ('*venantum ... canes*', 4.991) dream about certain activities, as indicated by their

²⁴⁸ Periphrasis for a dog of the Hyrcanian breed (which would come from a particular set of seeds), or a Hyrcanian hound. The importance of seed cannot be overstated, as fixed things come from fixed seeds.

²⁴⁹ On *Lucr. DRN 3.753*, cf. pp.295-6.

behaviors while sleeping and when first awakened; the dogs accustomed to the house - namely, guard dogs - dream about other activities²⁵⁰ ...

et quo quaeque magis sunt aspera seminiorum,
tam magis in somnis eadem saevire necessust
DRN 4.1005-6

and the more fierce each of the breeds is, the
more savage the same breeds must²⁵¹ be in
their dreams.

Therefore there is something about the nature of the breed - not just the species - which at least coincides with, if not contributes to, the content of its dreams.

The limits of variation of one's inherent *natura animi*, then, is this. One cannot develop a *natura* or *vis* which is inconsistent or incompatible with what is inherent in one's *animus-anima* complex (relative to one's maturity as *per se* necessitated constitutional development). What is inherent is typical of the groups to which one belongs by virtue of underlying physiological commonalities.

A. Warfare

Near the outset of book three, Lucretius claims that it is more useful to observe a man in the face of adversity to find out what sort of a person he is, for only then are his words and deeds completely sincere.²⁵² Examples of this in *DRN* include Agamemnon's sacrifice of his daughter and the mother cow's reaction to the loss of her calf.²⁵³ This is not only true of individuals but also of each species as a whole. Nowhere is this more clear of the human race than in the poem's finale, the plague. Lucretius' treatment of interspecies warfare at 5.1297-1349, however, offers a unique opportunity to compare how various species behave under quite similar circumstances. Both the *saevi* animals and the horses had formed alliances with humans; *suus* and *socius* are used of humans in relation to the

²⁵⁰ Lucr. *DRN* 4.991-999. Other dogs accustomed to the house were kept mainly for pleasure or as pets; this distinction goes back to Homer (*Od.* 17.306-10). For this and an overview of dogs in antiquity, including breeds, jobs, literary and symbolic representations, cf. Kitchell 2014: 47-53, MacKinnon 2014: 270-4, and with respect to the Roman context, esp. Toynbee 1973: 102-24. Kitchell notes also the enduring nature of this distinction (p.48), as a result of which it 'is best to view the dogs of antiquity as forming three basic groups: guard dogs, hunting dogs, and pet dogs' (p.52). (Toynbee and MacKinnon, however, offer a more nuanced picture, including sheep dogs, draught-dogs, performing dogs, and dogs of death and healing). Perhaps Lucretius does not mention pet dogs for lack of any concrete usefulness which they might exchange with humans, but, as we have seen, Lucretius gives examples hunting dogs, e.g. Hyrcanian dogs (*DRN* 3.750-1), and guard dogs, such as those mentioned here and the Molossian hound (5.1071). Further on canine dreams, cf. pp.249-50, 269-70.

²⁵¹ Here '*necessust*' seems to refer to logical necessity.

²⁵² Lucr. *DRN* 3.55-8. With respect to '*pectore ab imo*' cf. p.158 (incl. n.298).

²⁵³ We will return to these esp. at pp.301-305.

saevi.²⁵⁴ Humans had the potential to be dangerous to both.²⁵⁵ The *saevi* animals in turn were dangerous for both humans and horses.²⁵⁶

According to Saylor 'the most complex instance of animal nature' in *DRN*,²⁵⁷ this passage forms part of a larger account of Lucretius' history of civilization, and has been a focal point of scholarly contention. The view, exemplified by Bailey, that 5.1308-40 represents a flight of fancy on the part of the poet,²⁵⁸ has long since been challenged - in general terms, e.g. by Kenney, Costa, and Feeney.²⁵⁹ Some scholars, such as McKay, Schrijvers, and Courtney, have posited possible literary or historical sources for this superficially strange passage.²⁶⁰ Shelton concentrates on its ethical implications.²⁶¹ Schiesaro, Segal, and Gale, for example, have examined its rhetorical function within the poem's overarching didactic strategy.²⁶² But it has not been sufficiently studied in relation to Lucretius' account of animal nature elsewhere in the poem.²⁶³ Reactivating key ideas through careful choice of words, Lucretius offers a systematic and comprehensive explanation of the experience and actions of both humans and animals during battle.

²⁵⁴ The humans are described as '*suos*' (Lucr. *DRN* 5.1323) and '*socios*' (5.1326), with relation to the bulls and boars, respectively. With respect to the elephants, which - as we will see - fall somewhere in between such animals and horses, the humans are '*suis*' (5.1340). Bulls, boars, and lions are all described as '*domi domitos*' (5.1334), however inadequately.

²⁵⁵ In the case of the former, cf. e.g. Lucr. *DRN* 5.966-9. In the case of the latter, horses could be killed in warfare even if lions and the rest were not present.

²⁵⁶ Cf. e.g. Lucr. *DRN* 5.982-99. The danger that certain animals (generally collectively labeled *ferae*) pose to humans comes up repeatedly throughout *DRN*, e.g. 5.199-203, 5.218-20, cf. Feeney 1978, Nussbaum 1994: 254. However, again, as we have seen e.g. with respect to deer, *ferus* is not exclusively used of animals which tend to live outside of communities with humans and which pose a threat to humans. On these animals as a potential danger to horses, cf. esp. Lucr. *DRN* 5.1330-3

²⁵⁷ Saylor 1972: 310.

²⁵⁸ Bailey 1947, iii: 1528-31. It is sometimes taken as evidence that Jerome was correct that Lucretius was subject to the equivalent of bouts of temporary insanity, but this is now generally (and, as we will see, rightly) taken to be ridiculous; for other's surveys of such views as eccentricity, temporary insanity, and everything in between, cf. e.g. Costa 1984: 143, Segal 1990: 190.

²⁵⁹ Kenney 1972: 19-24, Costa 1984: 142-5, Feeney 1978: 20-21 suggests that the passage constitutes the best way of illustrating primitive man's greatest fear, being devoured alive by beasts, as well as his contemporaries' greatest fear, namely 'uncontrollable violence'; while this is intriguing and may be an aspect of Lucretius' motivation, the passage serves too many other functions to limit its *raison d'être* to this.

²⁶⁰ McKay 1964 posits *venationes*. Schrijvers 1970: 296-305 posits accounts of elephants in battle; against which, cf. Kenney 1972: 21. Courtney 2006 considers the bulk of the account an eccentricity based on the Alexander Romances. Gale (forthcoming a) has shown that McKay's thesis is considerably more plausible than, e.g., Courtney supposed, but only as part of a larger motif of the Epicurean and reader as spectator, including with respect to gladiatorial *mumera* in the arena; cf. Gale 2009: 206-7.

²⁶¹ Shelton 1995 and Shelton 1996: esp. 57-64.

²⁶² Schiesaro 1990: 159-68, Segal 1990: 188-95, esp. 191-5 (where it is convincingly shown to not be a digression, whether or not one agrees that it is an 'emblematic account' of the destructive bent of the human psyche), Gale 2009: 206-8, and esp. Gale (forthcoming a). Cf. also Schrijvers 1970: 296-308 esp. 303.

²⁶³ This was the case in 1972 and remains so, but treatments such as those of Saylor 1972 and Tutrone 2010, which focus on animals in *DRN* from a relatively literary perspective have certainly helped to pave the way.

Lucretius states that when bulls, boars, and lions²⁶⁴ were - apparently - tried in warfare, mayhem ensued. The behaviors of these animals beforehand had presumably indicated that they were sufficiently trained so as to be of use in battle - albeit with some precautions.²⁶⁵ This suggests that such animals are indeed capable of learning. Elephants (*'boves lucae'*) were also trained for battle.²⁶⁶ In all of these cases the teaching had limited success.²⁶⁷ Lucretius shows that they are also capable of ignoring or rejecting what they have been taught; the characteristic *natura animi* of the species may play a role in that choice. This is foreshadowed by an indication that the training process had been difficult and the outcome not entirely predictable. Lucretius tells us that the trainers whose purpose in the battle was controlling the lions were not only cruel (*saevus*) - an adjective also used of the lions and boars - but also armed: *'cum doctoribus armatis saevisque magistris'* (5.1311).²⁶⁸

Lucretius explains that the trainers' efforts were, however

nequiquam, quoniam permixta caede calentes
turbabant saevi nullo discrimine turmas,
terrificas capitum quatientes undique cristas,
nec poterant equites fremitu perterrita equorum
pectora mulcere et frenis convertere in hostis.
irritata leae iacebant corpora saltu
undique, et adversum venientibus ora petebant,
et nec opinantis a tergo deripiebant

DRN 5.1313-20

in vain, since the cruel lions²⁶⁹ - as they were heated by the joining of the slaughter²⁷⁰ - threw both hosts into disarray without discrimination, while shaking the frightening crests on all sides of their heads.²⁷¹ The calvary were unable to soothe the horses' *pectora*, which were thoroughly terrified by lions' roaring, and unable to turn the horses back against the enemies with the reins. With a bound, the lionesses launched their enraged

²⁶⁴ Perhaps not coincidentally, these three are also the first examples mentioned by Lucretius in his catalogue of the deeds of Hercules surpassed by Epicurus; *Lucr. DRN* 5.22-6. On Lucretius' comparison of Epicurus with Hercules, both here and at 1.62-79, cf. e.g. Buchheit 1971.

²⁶⁵ For instance, taking their trainers into battle and holding the animals on a lead.

²⁶⁶ *Lucr. DRN* 5.1302-4, 5.1339-40. Jennison 1937: 44 and Kitchell 2014: 65 mention that elephants got the name 'Lucanian oxen' because the Romans first encountered them in Lucania in 280 BCE, when Pyrrhus of Epirus invaded Italy. This makes theirs another of the sort of names with an adjective indicating origin. Bailey 1947, iii: 1527 makes a similar suggestion. On elephants in Roman antiquity, cf. esp. Toynbee 1973: 32-60. Further on elephants in *DRN* and this passage below.

²⁶⁷ On examples of both training and the range of results in relation to the Roman arena, cf. Toynbee 1973: 62-3.

²⁶⁸ *Lucr. DRN* 5.1308-12; the quoted expression may be an hendiadys. The point about the cruelty of the trainers has also been made by, e.g. Shelton 1995: 119, Shelton 1996: 62, Gale 2009: 206.

²⁶⁹ Cf. *Lucr. DRN* 5.1310.

²⁷⁰ Cf. *Lucr. DRN* 3.643, discussed particularly in pp.234-7. While *permixta* might also mean 'confused', this translation suggests that the heating of the lions occurred due to the start of the battle, after which they caused the confusion which Lucretius goes on to describe; Bailey 1947: i.501, iii.1531 (following Giussani) and Costa 1984: 144 also interpret the phrase in this way. Segal 1990 does too at p.189, but at p.122 takes the line followed by Nussbaum 1994: 273, namely that *'permixta caede calentes'* means 'warmed by mingled blood', which seems to emphasize a manifestation of the slaughter, rather than the circumstances of the battle, which, as we will see, are what actually contribute causally to the surge of emotion in these animals and their consequent behavior.

²⁷¹ I.e. their manes. This word choice however evokes the crests which often topped helmets, making them more like their human counterparts in the battle. Further on this line below.

bodies everywhere. They both sought the faces of the approaching enemy and tore down the unsuspecting²⁷² from behind.

In this context, '*calentes*' seems to have both a temporal and causal force. In other words, the circumstances of the humans' battle caused the heating of the naturally fiery lions and seems to have triggered their actions, from which point the account begins. The heating by battle seems connected to the use of '*inritata*' - which can mean both enraged and inflamed; these meanings are inextricable.²⁷³

Lucretius is suggesting an explanation for the behavior of the lions only in the first instance. The use of bulls (*tauri*) and boars (*sues*) is initially mentioned before the use of lions; the boars, like the lions, are described as '*saevos*'.²⁷⁴ Following the account of the lions, the bulls and boars are represented as exhibiting similar behaviors under similar circumstances on the battlefield.²⁷⁵ This suggests psychophysiological similarity across these species, namely a similarly fiery *natura animi*.

siquos ante domi domitos satis esse putabant,
effervescere cernebant in rebus agundis
volneribus clamore fuga terrore tumultu,
nec poterant ullam partem reducere eorum;
diffugiebat enim varium genus omne ferarum
DRN 5.1334-8

If the men supposed that any of these had been sufficiently tamed at home, they then discerned that the beasts boiled up during the action²⁷⁶ due to their wounds, the clamor, flight, terror, and tumult, nor were they able to bring any part of them back, for every single kind of wild beast was scattering.

Effervesco again has the meaning of to boil over as well as to grow violent or rage; moreover, *effervesco*, in combination with the use of '*fremitu*' (5.1316), recalls 3.294-8, perhaps suggesting that the entire account of animals in warfare be read together with it.²⁷⁷ As we have seen there, the lion is the archetypal angry animal. The preponderance of fire in the *animus-anima* complex of lions makes it more likely that lions will experience surges of that constituent and, thus, corresponding (and to some degree consequent) emotions, such as anger, as well as exhibit related behaviors, such as roaring. In 5.1334-8 Lucretius seems to extend the explanation from the lions' behavior on the battlefield to that of bulls and boars as well. The circumstances of battle somehow incited a surge of

²⁷² I.e. of their own ranks.

²⁷³ Similarly, the behavior of roaring ('*fremitu*') was earlier associated with surges of fire in lions, and with anger; Lucr. DRN 3.294-8.

²⁷⁴ Lucr. DRN 5.1308-9.

²⁷⁵ Lucr. DRN 5.1323-33.

²⁷⁶ On the mirroring of the events in the structure of lines at Lucr. DRN 5.1334-6, cf. Gale 2009: 207 and with respect to 5.1308-49 more generally, cf. Costa 1984: 143.

²⁷⁷ West also notes the imagery of 'trained animals boiling up' here and suggests that the *fremitus* of the caged winds, which '*ferarum more minantur*' at Lucr. DRN 6.194-200, is meant to recall this passage and perhaps to suggest the behavior of beasts caged before battles, which one could have witnessed at the arena; West 1969: 20, 54-5. This is strengthened by the echo, shortly below, in the description of the *tauri* attacking their allies, the horses, and even the ground '*minitanti mente*' (DRN 5.1325).

fire, and certain corresponding emotions and behaviors, in three sorts of animals which were already prone to such things. Thus certain experiences may trigger an emotion associated with a surge of fire, particularly if one is already predisposed to it. Although the horses were also scattering, in attempted flight, or at least refusing to charge,²⁷⁸ '*varium genus omne ferarum*' must here refer only to the creatures wreaking havoc (and thus can here be rendered 'wild'), because Lucretius goes on to compare the actions of this passage to those of elephants,²⁷⁹ which one can also still witness ('*ut nunc*', 5.1339).

This claim lends greater plausibility to the idea that Lucretius' primary aims in 5.1341-9 are: (i) to render plausible the preceding account, (ii) to discuss human's probable motivation for bringing such creatures into battle, and thereby (iii) as both the action and - as Gale notes - the motivation are still occurring at the present of Lucretius' contemporary reader (e.g. in the arena), to show that 'Lucretius' contemporaries are no more able to escape the cycle of violence than were their distant forebears' due to 'the inevitable failure of technological progress to free us from pain and suffering'.²⁸⁰ Indeed, the reference to *isonomia* occurs for the sake of making that point, as '*ut nunc*' indicates. These are further evidence against Courtney, who is among the more recent to support the contention that *DRN* 5.1341-9 is an interpolation which should be omitted.²⁸¹

Lucretius' description of the consequences of bringing *ferae* into warfare, as McKay, West, and Gale argue, may be at least partly based on watching *venationes* in the arena.²⁸² Lucretius claims to find it hard to believe that anyone could suppose that, under

²⁷⁸ Lucr. *DRN* 5.1317.

²⁷⁹ Lucr. *DRN* 5.1339-40.

²⁸⁰ Gale (forthcoming a).

²⁸¹ Courtney 2006: 152. For a range of interpretations of Lucr. *DRN* 5.1341-9, cf. also Bailey 1947, iii: 1529-30, McKay 1964, Kenney 1972: 23, Feeney 1978: 20, Costa 1984: 143

²⁸² The authoritative work on this subject and one of those on animals in antiquity, remains Jennison 1937; on animal spectacles in Greco-Roman antiquity, with particular emphasis on the *venatio*, cf. also Shelton 2014. Regarding the claim for Lucretius, cf. McKay 1964: esp. 125-7, West 1969: 20, Gale 2009: 206-7, and now Gale (forthcoming a). Their claim is strengthened by - as noted by Gale (forthcoming a), cf. Jennison 1937: 42-59 - the popularity and increasing scale of the *venatio* from 93 BCE and particularly during 65-55 BCE. It may also be strengthened by the popularity of the *venatio* and *bestiarii* (at least by the second century CE) as subjects of artwork; cf. also McKay 1964: 125. Lucr. *DRN* 5.1308-49 does read a bit like an ekphrasis. But life and art are not mutually exclusive possibilities. Moreover, the passage's relation to the *venatio* may be particularly significant with respect to the elephants' behavior. When Pompey dedicated his great theater in 55 BCE in Rome, the elephants famously evoked the audience's sympathy by seeming to beg for aid through trumpeting and gesture. The spectacle thus backfired on Pompey; cf. Cic. *Fam.* 7.1. (= 24), Pliny *HN* 8.7.20-22, Jennison 1937: 51-2 (who notes that Pompey also used both maned and unmaned lions, both of which Lucretius mentions too), and, with respect to its implications for philosophy of mind, Sorabji 1993: 124, 126. This is likely to have been contemporary with the poem's composition and Lucretius may well have been aiming to capitalize on the experience of his readership. On the date of the poem's composition, cf. the reply of Volk 2010 to Hutchinson 2001. By undermining Hutchinson, Volk supports the retention of its dating to the mid 50s, and thus prior to Cicero's acknowledgement of having read the poem in the letter to his brother Quintus of February 54 BCE (*Q. fr.* 2.9.4). On the dating of *DRN*, cf. also Nichols 1976: 29, 32, 41-5, Minyard 1985, Castner 1988: 36, and Fowler 1989: 121-2, 127-8, 133.

the circumstances, such animals might act otherwise. People must have been able to foresee that the beasts would behave this way, and used them for vindictive purposes or mutually assured destruction, knowing that they would be at least as dangerous to the opposing army as to their own.²⁸³ Now, if these were the first instances of such experiments, *simulacra* of such things would probably not be readily to hand. Therefore people must have been able to foresee this by some other means. These might include *simulacra* which emanated from prior actions in comparable circumstances and thereby inference. Regardless, Lucretius' claims rest on the implicit assumption that these animals' actions followed from their respective inherent natures.²⁸⁴

As we have seen, lions' nature allows them to survive on their own; they may simply have been in the temporary alliance with humans for the sake of fodder, since they generally have no need of human protection.²⁸⁵ The cases of *sues*, *tauri*, and *boves lucae* are somewhat more complicated. The interpretation 'boars' has been maintained due to the epithet *saevus*, but Lucretius does not use *sues* consistently; elsewhere it means pigs.²⁸⁶ Bulls are male stud cattle - neither castrated for use as draft animals (oxen), butchered for food, or slaughtered in sacrifice.²⁸⁷ Cows (including oxen), as we have seen, are placid by nature, possess an abundance of air, and termed '*boves*' and '*bucera saecla*'. While bulls were used in the arena,²⁸⁸ *pace* Jennison and Shelton, by *tauri*²⁸⁹ Lucretius seems actually to refer to what today we call 'wild oxen' or 'aurochs'.²⁹⁰ Their nomenclature in antiquity was a bit muddled but included *uri*, which are mentioned by Caesar, Virgil, and Pliny, and ταῦρος ἄγριος.²⁹¹ *Uri* were very large, strong, and swift, hyper bull-like, and fierce predators. They coexisted with the domestic cow in Europe until the 17th century CE and

²⁸³ Lucr. *DRN*. 5.1341-9. Shelton 1996: 64 attractively concludes that 'the abuse of animals for war or religion is an indication of human failure to comprehend the basis of true pleasure' and that the 'promoters of religion and war were motivated by a desire for security, but, being ignorant or scornful of the patterns of nature, they violated these arrangements and thus only increased human distress'.

²⁸⁴ Cf. Shelton 1996: 62-3.

²⁸⁵ They do not generally need human protection from other animals, and only from humans in the rare instance, such as Lucr. *DRN* 5.966-7.

²⁸⁶ Cf. esp. Lucr. *DRN* 6.974-8 in contrast with 5.25, 5.985, 5.1309, and possibly 5.970. On boars and pigs in ancient Rome, cf. Toynbee 1973: 131-6.

²⁸⁷ These were the typical fates available to a domestic male cow; cf. McNerney 2010, Shelton 2014: 462, who suggest that bulls were left in a quasi-wild state.

²⁸⁸ Cf. e.g. Toynbee 1973: 149-51.

²⁸⁹ Other than at Lucr. *DRN* 5.1308 and 5.1323 it is only used at 5.26.

²⁹⁰ Jennison 1937: 167 suggests that the two terms refer to different animals, but this is a passing impressionistic remark, not intended to be comprehensive; elsewhere he records (relatively late) evidence of aurochs' use in the arena. This obviates Shelton's point that the use of bulls in warfare entails what she calls 'contract animals' acting like 'non-contract animals'; Shelton 1995: 120.

²⁹¹ The similarity between the terms *taurus*, *urus*, and ταῦρος ἄγριος would hardly have gone unnoticed by Lucretius and may well be at work in his own word choice as well as his representation of these fiery animals and their behavior.

were sometimes cross-bred to reinvigorate the line of the latter.²⁹² Thus with Lucretius' boars and 'bulls' we have creatures so fiery as to very nearly be a different species from their docile counterparts - indeed lion-like.²⁹³ Using '*boves lucae*' here, rather than '*elephanti*',²⁹⁴ stresses that elephants too should be placid, like cows.²⁹⁵ However, 'Lucanian oxen' can behave as though experiencing excessive anger, like the other fiery-natured beasts, which an abundance of air alone would likely thwart;²⁹⁶ here they are represented as liminal creatures somewhere between those likely and unlikely to be in interspecies communities with humans.

Lucretius may well have found some correlation between an innately fiery *animus-anima* complex and which species (or breeds) were predatory and generally survived without interspecies communities. Nevertheless, there is more to the rejection of teaching, or selective resistance to it, than nature alone. The predominantly fiery animals were not alone in casting-off their training during battle; the elephants and horses did so as well and are still used. The former were taught to endure wounds, and occasionally throw off their training when sufficiently wounded.²⁹⁷ Horses had already been proven in battle - both as mounts and in drawing chariots.²⁹⁸ However, when battle was joined and fiery predators began to run amuck, the horses too reject their training. They refuse to obey their riders or drivers and charge the enemy (5.1317). They swerve and rear (5.1330-1). Yet the concept of their usefulness in warfare was unaffected, nor are their actions criticized. In fact, the complementarity between the lions' '*terrificas ... cristas*' (5.1315) and the '*perterrita ... pectora*' of the horses (5.1316-17) may suggest a certain sympathy between the emotion of

²⁹² Caesar *B Gall.* 6.28 is the clearest case, with a remarkable description which also happens to be consistent with Lucretius' depiction of the *tauri*. Caesar not only mentions killing them, but also capturing them. Perhaps they were captured for such uses as the games? Virgil *Geo.* 2.374, 3.532 (for which reference, my thanks to Monica Gale). Pliny *HN* 8.15.38. On the aurochs, particularly in antiquity, cf. esp. McInerney 2010: 21-4 and Kitchell 2014: 140-5. Toynbee 1973: 148-9 basically recapitulates Caesar and Pliny.

²⁹³ McInerney 2010: 40 notes, in tracing the relationship between human and cattle during the period where only some were domesticated, that 'of all comestible domesticates, none except perhaps the pig has a wild cousin that can so powerfully threaten human life. Wild sheep and goats are bigger and more aggressive than their domesticated cousins, no doubt, but only the wild bull has the size and ferocity to match predators such as lions.' As such, the symbolic ambiguity became appropriated in the discourse and ideology of kingship from the Neolithic period on and was likely also involved in the Minoan practice of bull-leaping; McInerney 2010: 40-7, 54-60, cf. Shelton 2014: 462-3.

²⁹⁴ Cf. Lucr. *DRN* 2.537, 5.1228.

²⁹⁵ Contra Segal 1990: 204-5, it thus does not stress their ferocity. N.B. the epithet *anguimanus* is used of the first instantiation of each term: '*anguimanus elephantos*' (2.537) and '*boves lucas ... anguimanus*' (5.1302), facilitating their equation. Schrijvers thinks that this characterization of the trunk is borrowed from Aristotle's *HA*, upon which he thinks most of Lucretius' knowledge of elephants is drawn; Schrijvers 1997: 159. The employment of *boves lucae* cannot simply stress their use in warfare, as the first instance of *elephanti* also refers to their use in the defense of India. In this context it implies that, from a certain point of view (e.g. their *natura animi*), they represent a breed of oxen, whether or not from Lucanian seed.

²⁹⁶ Perhaps they have an abundance of both. There is nothing in *DRN* to indicate that this is impossible.

²⁹⁷ Lucr. *DRN* 5.1302-4, N.B. *docuerunt*, cf. 5.1339-40.

²⁹⁸ Lucr. *DRN* 5.1297-1301.

the humans and the horses faced with such a sight as attacking lions - indeed both those humans involved in the battle and those involved in the composition and reading of the poem.²⁹⁹ The emotions common to the horses and to certain humans under their shared circumstances indicate that the horses and those humans have a similarly constituted *animus-anima* complex, or at least a *natura animi* which is more similar to one another's than to their attackers'; nevertheless, the *saevi* humans and those who continue to pursue slaughter perhaps are closer in nature to the *ferae*.³⁰⁰ Thus the boundaries between humans and animals do not collapse, as Schiesaro suggests,³⁰¹ but are redefined according to their natures, choices, and the actions which follow from them. Moreover, by failing to protect their charges, humans have not upheld their end of the social contract;³⁰² the horses and elephants are thus no longer bound by their respective interspecies social contracts and on this occasion choose to exit.³⁰³ That this is a willing choice for the horses is suggested particularly by '*frenis*' (5.1317).³⁰⁴

Presumably the boars, bulls, and lions are perceiving the same *simulacra*, smells sounds, etc., of the human battle as the horses do. The former, untried in battle, once they heat sufficiently - and at least partly as a result of that heating - react by running amuck and attacking. The horses, at least in previous battles, did not react to the external stimuli either in the manner of those animals, or by attempting to avoid the fray as they do here.

²⁹⁹ As Costa 1984: 144 and Segal 1990: 200-1 suggest, these '*terrificas capitum quatientes ... cristas*' (Lucr. *DRN* 5.1315) echo and evoke those of the Curetes (2.633) in the Magna Mater passage (2.600-43), in which rite lions were also harnessed by people (2.601). What prevents the entire line from being a verbatim echo is the variation '*undique*' for '*numine*'. The echo and consequent comparison strengthens and nuances this argument. The Curetes were terrifying their human audience by the same means that the lions in war initially terrified the humans, suggesting certain humans (like the lions' trainers) have a nature closer to these *ferae*, while those frightened would be closer to the horses. Interestingly, in the Magna Mater ritual, the lions draw the chariot, and, in warfare, chariots were drawn by horses.

³⁰⁰ Horses generally seem to be the preferred choice for stressing the closeness of human and animal natures and here, as will be suggested below, may be ethical exemplars. *Sues*, on the other hand and despite their symbolic conflation with the Epicurean school, are here depicted as quite different indeed; on this association and some implications, cf. e.g. the discussion of Warren 2002b: 129-36.

³⁰¹ Cf. e.g. Schiesaro 2007: 53.

³⁰² With respect to the elephants, this may be strengthened by the expression '*boves lucae ferro male mactae*' (Lucr. *DRN* 5.1339). As Segal 1990: 205-6 notes, this recalls Iphigenia '*mactatu maesta parentis*' (1.99) and the '*vitulus ... mactatus*' (2.352-3), both slaughtered for the sake of *religio* (ergo false beliefs). Saylor 1972: 313, Tutrone 2010: 69, and Tutrone 2012b: 61 also note the parallel, which holds regardless of whether one agrees that *mactus*, a rare word, was derived from *mactatus* (on which possibility cf. e.g. Costa 1984: 144). Massaro 2011 similarly connects the three passages. As we shall see, both of these deaths, like the severe harm to elephants (which harm risks their death), also violate pacts. Thus the elephants are justified in fleeing a broken social contract.

³⁰³ Recall that these two species were those with which the greater account of experimentation with animals in warfare began; cf. Lucr. *DRN* 5.1297-1307.

³⁰⁴ By using '*frenis*' in the context of horses refusing to be steered toward danger, Lucretius seems to reactivate *refreno* (Lucr. *DRN* 2.276, 2.283) a verb often used of steering horses and employed in book two specifically in reference to the *voluntas* of the *mens* turning back some compelled motion, a context which also mentions horses. Such topics will be discussed in the next chapter. For the moment, suffice it to say that these echoes confirm that the horses' refusal of the command and their fighting against the motion compelled by the steering of their reins indicate a deliberate willing choice.

The constitution of their *animus-anima* complex may not heat as easily under the circumstances of human battle. Many *simulacra* of all things are floating around at all times. In this battle the difference is perhaps the quantity and perceived proximity of the *simulacra* and other stimuli from the threatening and attacking animals, and thus the focus of the horses is upon these. The humans are presumably perceiving and focusing on the same stimuli as the horses, but react differently. Regardless, the horses' ability to foresee danger (even dangers which they would not have remembered) and their deliberate attempt to flee evince the very kind of foresight and anticipatory pleasure-pain calculus which Polystratus would deny them.³⁰⁵ Thus the actions of the horses and elephants evince both 'prudential concepts like "healthy" and "expedient"', or *utilitas*, and the ability to 'take precautions before suffering something',³⁰⁶ which are among the so-called higher criteria used by O'Keefe to deny animals free will, moral responsibility, reason, and control over their own beliefs and development.³⁰⁷ Further evidence that they possess these things will be presented in the next chapter.

One might argue to the contrary that the *equites*, if they did experience the same fear under the same circumstances, did not exhibit the same behaviors; but many other factors also contribute to behavior, as we will see. The humans did not attempt to run from the danger as their horses did. Rather, they attempted to pursue the danger of the attacking enemy, despite the additional threat of the attacking animals. Is this something for which the calvary should be applauded? Is there some fundamental difference that contributes to humans seeking threats to their survival which animals avoid - or some learned alternative to the basis of the Cradle Argument? For example, are humans trained to value the success of the battle or country or glory above one's own survival and peace of mind? Primitive man, at least, did flee such animals. Such issues will be revisited in chapter five and the Conclusion. For now it will suffice to raise them and to suggest that - for Lucretius - at least one crucial difference between humans and certain relatively 'human-like' animals, like horses, occurs between emotions and the behaviors which to some extent follow.

Some essential nature is therefore fixed with respect to individuals, across a given breed and species, and perhaps across certain species, as well as across time. It must

³⁰⁵ Polystr. *On Irrational Contempt* 1-7 in Indelli 1978: 109-11; cf. also Warren 2002b: 137-8, Sorabji 1993: 52, and, on ἐπιλογισμός in this sense, De Lacy 1958: 179-80. Cf. esp. p.267.

³⁰⁶ Other examples include entering into interspecies pacts and - as we will see in chapter five - the development of language.

³⁰⁷ Contra e.g. O'Keefe 2009: 149-50. Indeed, as we will see, the actions of the horses are on par with those of the mother of the *vitulus*, in terms of their significance for Lucretius' views about animals' psychological capacities.

persist through and by means of heredity. Moreover, this must reside to some extent in the deeply receding portion of the *animus-anima* complex which persists during even dreamless sleep and like states. It could not be preserved by that which is scattered or that which temporarily loses its coherence - as this (at least temporarily) passes beyond the boundaries of its nature and ceases to exist as such until we regain consciousness. In dream-sleep itself - i.e. when the complex has only receded into the breast - dreams remain consistent with (among other things) one's inherent *natura animi*. This further suggests some sort of concrete relationship between one's *natura animi*, thought, and memory, which is where we will begin in chapter five.

Conclusions

One's nature and abilities - including those of one's *animus-anima* complex - are to a significant degree hereditary, according to the nature of the species. They evolve to some extent during the life of a given creature. Notwithstanding individual variation, what is hereditary is a *coniunctum* of the species. More specifically, some aspects of one's *natura* are coextensive with the life of all creatures of that group; they are fixed. Other aspects are *coniuncta* whose particular manifestation are *eventa*. That said, the fact that all members of the species generally develop an overwhelmingly consistent or characteristic nature and consequent behaviors at a consistent rate indicates that the ontogenical process in-and-of itself is also a *coniunctum* of the species. These conclusions are also true of smaller groups to which an individual creature could be said to belong, such as breeds and families. The possibilities of generation and the extent to which one can evolve, even temporarily, are limited by that which would effect hybridity, a constitution and overall nature which is internally incompatible and thus not only incapable of survival but also of existence - i.e. unnatural.

Ever since the Earth produced the first living creatures, there has been no phylogenesis with respect to the possibilities of existence, only survival. In other words, all species are fixed. Their fixed natures have been transmitted through heredity. No two individuals of a given species are exactly alike, yet the vast majority of the nature of that species is fixed and shared in common. Moreover, as there is no evolution in Lucretius' cosmogony, what is fixed and held in common enabled that species' fitness for survival. Thus, as Gale observes, 'Lucretius calls on the kaleidoscopic variety of living things to exemplify a general rule: variation itself can serve to support the notion of regularity and

natural law'.³⁰⁸ Supporting Long, the fixity of species thus illustrates the possibilities that physics leaves open.³⁰⁹ Those species which survived to the present have been subject to natural selection, but not evolution. Community formation, both within and between species, is among the strategies which allowed a broader range of certain species' members to survive.

The extent to and ways in which each proceeds according to its own kind also reflects back on the connection between illness and sensory disruption discussed in the Epilogue to Chapters II & III. In illness one's sense-organs are temporarily reconfigured to such an extent that one's sensory experiences seem to approach those of another sort of creature. Such cases of systemic disruption entail a constitution pushing the '*alte terminus haerens*' which represents the bounds beyond which that particular nature (or creature with that nature) ceases to exist as such and is transformed into something else.

Therefore each viable living creature of a particular group falls within a spectrum of possibilities with respect to the necessitated aspects of its own nature, both those aspects which occur *per se* and those which are proximately caused by external circumstances. The next and final chapter will treat the aspects of one's nature which are both *per se* and unfixated, i.e. those for which the creature itself is responsible. In other words, it will explore what faculties Lucretius believed to be under one's own control, the mechanisms involved, and the extent to which they are common to both humans and animals.

³⁰⁸ Gale 2000: 224, specifically with respect to Lucr. *DRN* 2.342-80 and 2.1081-92, which concern both humans and animals.

³⁰⁹ Long 1977.

CHAPTER V: EACH THROUGH ITSELF

Introduction

The previous chapter explained the extent to which Lucretius views the constitution and faculties of each living creature as fixed - with respect to both generation and hereditary development. This chapter treats variations which are possible for each living creature individually and that over which one has a degree of control, with particular emphasis on the underlying mechanisms.

It demonstrates that, as Annas notes, 'for the Epicureans rationality is not a single kind of thing but a cluster of capacities', but challenges her contention 'some of which animals share with us and some not'.¹ According to Sorabji, for Aristotelians and Stoics reason is unique to man, but the Platonists and Pythagoreans allow animals at least a share of it; moral issues began as a secondary concern.² The Epicurean picture is more complicated.³ The case for animal reason in antiquity included 'many capacities', not least 'perception, memory, preparation, ... emotion ... speech, skills' and others.⁴ Of these, the ones which have not already been treated with respect to Lucretius will be here.

I. STUDIUM MENTIS

According to Lucretius, one cannot choose or alter the particular patterns of markings on one's skin, but under most circumstances one can control, for example, what

¹ Annas 1992: 136.

² Sorabji 1993: esp. 1-3 and 103: 'I have maintained that a single decision in Aristotle, the denial to animals of reason and belief, led in Aristotle and the Stoics to a massive re-analysis of psychological capacities: of perception, of perceptual appearance, of belief, of concept-possession, of memory, of intention and preparation, of anger and other emotions, and of speech. On independent grounds, the concept of reason was itself repeatedly transformed. But the denial of reason to animals was contested, especially by Pythagoreans and certain Platonists and even by Aristotle's own immediate successors'. For a summary of more generous views on Aristotle's interpretation of the faculties of animals, cf. Newmyer 2007: 152. The zoological works certainly paint a more generous picture of animals than the ethical ones do, as e.g. the beginning of the *HA* illustrates, esp. 486a-488b; cf. Newmyer 2007: esp. 160-3. For an alternative overview (alternative, i.e. to Sorabji's, albeit less judicious, evidentially-based, or convincing) of ancient thought on the intellectual capacities of animals, cf. esp. Newmyer 2014 (building on Newmyer 2007 and Newmyer 2011).

³ Hermarchus, Polystratus, and Philodemus deny reason and reasoning to animals, and capacities which are related to them. For example, Philodemus claims that animals lack thinking, except for a certain kind of awareness of their own impulses, and lack both belief and false belief, but have a semblance of emotion and expectation. Some of this evidence has and will be dealt with in context. For the rest, cf. Sorabji 1993: 28-9, 52-8, 76.

⁴ Sorabji 1993: 78-9, 103 (cf. n.2 above) as demonstrated esp. throughout part I and in the first two chapters of part II. On the range of capacities and activities commonly associated (implicitly or explicitly) with reason in ancient philosophy, cf. also Warren 2014: ch.1. Differentia between humans and animals for those who do allow animals reason include (without necessarily implying reason): the ability to distinguish good/bad, just/unjust, and expedient/inexpedient, the abilities to be happy, achieve technical knowledge, be political, the exhibition of emotion and character, introspective understanding, deliberation, deliberate action, competitiveness, reflection, grief, sex, luxury, ambition, avarice, anxiety about life and death, and jealousy; Sorabji 1993: 90-93.

one sees and when - i.e. with which *simulacra* one interacts - whether it be with with the vision of the eyes or that of the *animus*.⁵ The first key concept for understanding this process - by uniting its underlying physiological mechanisms with its phenomenological psychological manifestations - is that of *studium*.

The term *studium* occurs six times in the poem, at lines: 1.52, 2.268, 3.647, 4.962, 4.971, 4.984.⁶ The first instance is the only one in which the word is not explicitly used in some sort of construction (e.g. joint expression, sentence) with *mens*. However, as we shall see, ‘focus’, ‘attention’, or a meaning transferred from the application thereof to a task, such as ‘studies’, would fit the context well, as this is what the troubled times are inhibiting through interfering with tranquility.⁷ The three instances in book four occur in the passage on dream-sleep and include various intratextual echoes of the first three instances. The final instance introduces the idea that this is shared consistently by all living creatures. Taken together, these instances strongly link *studium* to both *voluntas* and habituation. They also show that the underlying mechanism involves a temporary reconfiguration of at least some of the structure of the *mens*.

According to Lucretius, the configuration of one’s *animus* is somewhat malleable and affects with which thought-*simulacra* it is capable of interacting.⁸

et quia tenvia sunt, nisi quae contendit, acute
cernere non potis est animus; proinde omnia quae sunt
praeterea pereunt, nisi <si ad> quae se ipse paravit.¹⁰
ipse parat sese porro speratque futurum
ut videat quod consequitur rem quamque; fit ergo.
nonne vides oculos etiam, cum tenvia quae sunt
cernere coeperunt, contendere se atque parare,
nec sine eo fieri posse ut cernamus acute?
et tamen in rebus quoque apertis noscere possis,
si non advertas animum, proinde esse quasi omni
tempore semotum fuerit longeque remotum.
cur igitur mirumst, animus si cetera perdit
praeterquam quibus est in rebus deditus ipse

And because these *simulacra*⁹ are fine, the *animus* is unable to perceive clearly any save those to which it is attuned. Accordingly, all other *simulacra* which exist pass by and come to nothing¹¹, except any for which the *animus* itself has prepared itself. The *animus* does prepare itself, moreover, and anticipates seeing¹² what succeeds each thing; therefore this occurs. Do you not see that the eyes also strain and prepare themselves, when they begin to perceive things which are subtle, and that it is impossible for us to perceive clearly without this? And in readily obvious things

⁵ Further on this and related issues below.

⁶ This section covers all but Lucr. *DRN* 2.268 and 4.984, which shall be treated in the next.

⁷ Cf. below on Lucretius dreaming about writing *DRN* (Lucr. *DRN* 4.969-70), which is introduced, at 4.962 as being a (partial at least) consequence of *studium*.

⁸ This is true with respect to both waking and sleeping perceptions of thought-*simulacra*; cf. Lucr. *DRN* 4.779-87 and 4.788-93, respectively, for the ideas which the following lines explain.

⁹ Cf. Lucr. *DRN* 4.798.

¹⁰ Here Bailey is followed; Rouse and Smith 1992 does not bracket ‘*si ad*’. On the difficulties of the reading of Lucr. *DRN* 4.804, cf. Bailey 1947, iii: 1277.

¹¹ In this context ‘*pereunt*’ signifies ‘pass by’ and ‘come to nothing’, rather than ‘perish’ or ‘pass through’; cf. *pereo*, *OLD* §1 and §2 (esp. c). It cannot mean ‘to be absorbed’, in this context because the *animus* can be stirred by interaction with a single *simulacrum*.

¹² Cf. *spero*, *OLD* §2, ‘to hope (that)’, with the sense of §5 ‘to anticipate, apprehend’; it is anticipating in a physiological sense, i.e. by its configuration. Literally, ‘hopes that it will be that it sees what ...’. (*futurum esse ut*). Cf. esp. pp.154-6.

too you may nevertheless be able to learn that if you do not turn your *animus*, it is just as though it¹⁴ was excluded and far removed the whole time. Therefore, why is it surprising if the *animus* misses¹⁵ the rest - save the things to which it has applied itself?¹⁶

Lucretius here develops the idea of the contingency of thought as well as its confirmation bias. He stresses that instances of the *animus*' perception are contingent upon the particular configuration of its passages firstly by the nexus and repetition of conditional expressions; note six in the first thirteen lines: '*nisi*' (4.802), '*nisi*' (4.804), '*si*' (4.804), '*nec sine eo fieri posse ut*' (4.810), '*si non*' (4.812), '*si*' (4.814). The economy and assonance of '*nisi si se ipse paravit*' (4.804) is particularly emphatic. For perception to occur, the passages must literally be open to interaction with *simulacra* of certain shapes, as we have seen. They must also be properly attuned to those shapes in order for the *simulacra* to be discerned sharply ('*acute | cernere* [4.802] ... *cernamus acute*' [4.810]) - i.e. for clear and distinct perception of the *simulacra* to occur.¹⁷ If the *animus* is not attuned with precise specificity, those *simulacra* are not selected from the virtual infinity of possibilities. They are filtered out; the interactions simply do not happen. Although the *animus* alone can be stirred by interaction with a single *simulacrum*, it misses whatever *simulacra* it is not attuned to, or, experientially, whatever things its attention is not applied to. The variable configuration of the constitution of the *animus* is therefore essential to all processes which are contingent upon the *animus*' perceptions.

The focus of the *animus* also reinforces the perceptions of the eyes and, by extension, of other sense-organs. The configuration of the passages of the eyes is less precise than that of the *animus*, in that the eyes can take in stimuli with which they do not necessarily interact, as well as those which have been blunted by interactions over the intervening distance and time.¹⁸ But, as Lucretius here implies, even if they are interacting

¹³ According to Rouse and Smith 1992 *ad loc*, the deletion was made by Avancius in the first Aldine edition of *DRN* (Venice 1500).

¹⁴ The source-object in question.

¹⁵ Cf. *perdo*, *OLD* §4, but also with a sense of 'to lose', which reinforces the interpretation of *pereo*.

¹⁶ For *dedo*, cf. *OLD* §3. Both the reflexive meaning and context (including the complementarity with '*se ipse paravit*') suggests a passive for middle translation which is consistent, as we shall see, with both the doctrine and subsequent uses of the verb.

¹⁷ Contra *OLD* §3, in both instances in this passage, *acute* (4.802, 4.810) seems to mean 'sharply' in the sense of 'clearly and distinctly' or 'in focus'; that said, according to the argument in chapter three, Lucretius would equate *OLD* §2 and §3. Cf. *temuis*, *OLD* §1,11.

¹⁸ As we have seen, unlike the lion, we do not feel pain at the sight of the rooster either because they (certain *simulacra* or seeds thereof) do not penetrate our eyes and cause hurt, or because they do penetrate but without causing hurt; *Lucr. DRN* 4.706-21. Certain constituents of food also just pass through. As opposed to clear and distinct perceptions, shadowy or hazy perceptions, as we have seen e.g. in the case of the square towers appearing round (4.353-63), result from other mechanisms entirely.

with well-defined *simulacra* for which their passages are appropriately configured, a source-object will seem '*semotum ... longeque remotum*' (4.813) unless the focus of the *animus* corresponds.

The *animus*' straining or constraining of itself to particular *simulacra* is best expressed by the hendiadys '*contendere se atque parare*' (4.809), with *se* being ἀπὸ κοινοῦ. This is attested to by the analogy between the perception (*cerno*) of the eyes and that of the *animus* (4.807, 808-10),¹⁹ as well as by the language chosen. Both verbs are used of the *animus* in the preceding lines ('*contendit*', 4.802; '*se ... paravit*', 4.804, '*parat sese*', 4.805). Lucretius uses *contendo*, the verb introducing the process at 4.802, to simultaneously evoke a number of meanings. These encompass the nature of the *animus*' self-preparation, including: the tuning of a stringed instrument by stretching, the exertion of one's physical or mental powers, one's striving or effort as a whole, and the fitting of multiple entities (no square pegs in round holes!).²⁰ Lucretius also stresses that this constraining is a *per se* activity of the *animus*. He accomplishes this by associating the reflexive pronouns and the intensive adjective *ipse*, used substantively, with those verbs. The expressions '*si non advertas animum*' (4.812) and '*animus si ... deditus ipse*' (4.815) encompass both the micro-level and our experience and are used more-or-less synonymously. The former is a typical way of saying 'to pay heed' or 'to pay attention', the latter stresses the agency of the *animus* acting upon itself. By the time that the reader encounters these, Lucretius has established well that the turning or application of the *animus* occurs through a physiological mechanism of the *animus* and that this is a contingent *per se* process. Indeed, the configuring of the *animus* is not dissimilar from tuning a radio to a specific frequency or adjusting the focus on a 35mm Nikon camera - except that the instrument, so to speak, is tuning itself.²¹

Finally, what is this expectation of the *animus* and how does it influence the succession of perceptions ('*sperat ... ergo*', 4.805-6)? As we have seen, by its focus or configuration, the *animus* creates a physiological selectivity for interacting with particular sorts of *simulacra*. The interaction with a *simulacrum* X₁, for which the *animus* prepares ('*ipse parat sese*', 4.805), also primes the constitution for interacting with either an identical *simulacrum*, X₂, or one which is nearly so (X+1)₁. Thus one's thoughts revolve

¹⁹ Recall the analogy between the vision of the eyes and of the *animus*, e.g. Lucr. *DRN* 4.749-67.

²⁰ Cf. *contendo*, *OLD* §1, 3, 4, 9.

²¹ Cf. Long and Sedley 1987: i.145 that 'Any process of imagination is achieved by the mind's admitting from the surrounding air ('tuning in to', as it were) those of the countless available images ...'.

with a certain degree of continuity and it is not surprising that images, e.g. of dancers, seem to move in our dream-sleep, which Lucretius describes immediately prior to these lines,²² or that images seem to morph slightly in other ways, like shifting gender, as he describes immediately after.²³ Lines 4.788-822 thus constitute a tightly coherent structure, interwoven within the larger account of the *animus*' faculty of 'vision'. Furthermore, as we will see, the focus and priming of the *animus* bears on why one tends to think and dream about customary things and activities, as well as recent ones to which one has been exposed progressively and repeatedly.

The focus of the *animus*, in its capacity as a sense-organ, is important to the other sense-organs' perceptions. We have seen that they can reinforce one another and that when their respective foci do not correspond, the clearness and distinctness of the other's perceptions is affected. Extreme divergence of foci has more profound effects upon the perceptions of both the *animus-anima* complex and the other physiological structure(s) in question. This is evinced by fuller consideration of Lucretius' account of the soldier whose arm is severed in battle by a scythed chariot.²⁴

falciferos memorant currus abscidere membra
 saepe ita de subito permixta caede calentis,
 ut tremere in terra videatur ab artubus id quod
 decidit abscisum, cum mens tamen atque hominis vis
 mobilitate mali non quit sentire dolorem
 et simul in pugnae studio quod dedita mens est;
 corpore relicuo pugnam caedesque petessit,
 nec tenet amissam laevam cum tegmine saepe
 inter equos abstraxe rotas falcesque rapaces,
 nec cecidisse alius dextram, cum scandit et instat
 DRN 3.642-51

They recall that scythed chariots, heated by the joining of the slaughter, often cleave the members so suddenly that that which, as it has been shorn from the limbs, falls down is seen to tremble upon the ground - when the man's *mens* and *vis* nevertheless are unable to feel *dolor*²⁵ due to the swiftness of the injury and because at the same time the *mens* has applied itself to the *studium*²⁶ of battle. With the remainder of his body he strives for the clash and the killing, and does not grasp that his lost left arm (often lost along with the shield)²⁷ - the wheels and their rapacious scythes have dragged it away amongst the horses; nor does another grasp that his right arm has fallen, when he mounts the chariot and attacks.

Lucretius links these lines by the phrase '*permixta caede calentis*' to his description of experimentation with animals in battle,²⁸ where at 5.1313 it is echoed verbatim except for

²² Lucr. DRN 4.788-801; '*perit*' in 4.800 seems to mean 'perish by absorption'; on the fate of *simulacra*, as discussed in ch.2, cf. 4.768-76.

²³ Lucr. DRN 4.818-22.

²⁴ This was touched upon earlier in relation to Lucretius' identity of feeling and perception; cf. p.57. In his treatment of the passage, Walters 2013: 119-20 attempts to explain the soldier's inability to feel pain as a product of Lucretius' experience of the proscriptions and civil wars, as a further step towards removing fear of death in the reader. This is not sufficiently argued to be convincing; cf. Segal 1990: 118-45. Moreover, Walters does not treat why the mutilated individual does not feel pain in what remains.

²⁵ As we have seen, *dolor* has a range of meanings which could be alluded to here.

²⁶ The meanings of *studium* will be addressed below.

²⁷ That it is the left arm which generally bears the shield, cf. Lucr. DRN 4.847.

²⁸ Segal 1990: 122 also makes this point, following Bonelli.

the form of the accusative plural and introduces the account of the havoc wreaked by the unleashed bulls/aurochs, boars, and lions. Gale notes numerous striking parallels and complementarities between the two battle accounts,²⁹ to which the following adds.

In that battle, animals are seen to share numerous psychological faculties with humans. In this battle, however, the chariots take on the faculties of living creatures and the soldiers are to some extent dehumanized. There, grammatically, '*permixta caede calentis*' modifies the lions; here, the chariots.³⁰ The phrase, as we have seen, refers to the psychophysiological mechanism of emotion and specifically in the context of the book five battle to the phenomenal manifestation of certain animals' rising *ira*. This lends greater weight to here reading '*currus*' metonymically for their human drivers and passengers, which metonymy strengthens the similarity between the human and animal attackers in the respective passages.³¹ The choice of '*currus calentis*', however, initiates a dehumanization which continues throughout this passage.

Overall, men seeking the loss of one another's life and limb is anything but conducive to either individual equanimity or the survival of the race; there is no honor in this and no glory to be had, not temporary or everlasting - particularly in light of its place in the context of Lucretius' larger proof of the mortality of the *animus-anima* complex.³² The dehumanization progressively escalates from identifying the charioteers with their chariots, to describing soldiers who are so intent upon the battle that they no longer perceive their own mutilated bodies, to the head severed from the living torso which preserves the appearance of life ('*voltum vitalem*') until it disperses the remainder of the *anima*.³³ On a synchronic reading, or a rereading of the poem, the warring humans of both

²⁹ Gale (forthcoming a).

³⁰ Segal 1990: 122 also makes this point.

³¹ Note also the '*calido ... trunco*', Lucr. *DRN* 4.654, of the decapitated soldier.

³² On the attitude towards war in Roman society and the system of values which supported it in general, cf. Gale 2000: esp. 240-2, and specifically with respect to this passage, Gale (forthcoming a). On the sorts of warfare (or at least military metaphors) condoned by *DRN*, i.e. that of the atoms, that of Epicurus or Epicurean philosophy against *religio*, and the war against philosophical rivals, cf. Gale 1994b: 117-19, Gale 2000: esp. 232-40.

³³ On the last, cf. Lucr. *DRN* 3.654-6, omitted above. This is not to say that the head was still alive. Moreover, it gives up bits of the *anima*, suggesting again that the head is just another *membrum*. On this and Epicurean treatments of limb-by-limb death as engagement with Democritus' theories on dying as a process, cf. Warren 2002a: esp. 197-205. Walters, less convincingly, reads this limb-by-limb death as part of a topos in Roman literature following the murder by mutilation of Marius Gratidianus by Catiline, who carried the warm and living head across the city to Sulla. Sallust describes his body as dying one limb at a time, in a manner comparable perhaps also to Lucr. *DRN* 3.526-30 (which Walters 2013: 121 suggests turns the individual into a spectator of his own death), the passage at hand, and the cleaved snake 3.657-63. Walters suggests that this murder forced Romans, such as Cicero, to 'reflect on the nebulous divide between life and death, and what happened within this space to the senses'; Walters 2013: esp. 116-18. If hacking the head off the torso causes death, then on severing only two choices remain for the source of life and *sensus*. We have seen Lucretius' choice.

sides are initially depicted like the *ferae* of 5.1297-1349, who act unjustly and destructively. They then become progressively less like living creatures altogether - with respect to their physiology, faculties, and actions. Once severed, the head and other limbs revert to non-living *concilia*.³⁴ Warfare thus dehumanizes us and subverts the very individuals and society whose security it allegedly aims to ensure - as part of a proof of our ultimate mortality.

Lucretius further undermines the ideal of the Roman soldier in showing that those who fight do not even notice their losses.³⁵ The expression '*in pugnae studio ... dedita mens est*' (3.647) is echoed by '*animus ... quibus est in rebus deditus ipse*' (4.814-15), and thus suggests that 3.642-56 should be juxtaposed to 4.802-17. As the latter asserts that the *animus* misses the things to which it has not applied itself, the former indicates that the *mens* has applied itself exclusively to the *studium* of battle - i.e. it has configured its own passages such that they are only open to interaction with certain stimuli coming from the battle.³⁶ Thus 3.642-51 constitutes a particularly extreme instance of *studium mentis*, with respect to both its attuned configuration and the experience of intently focused attention. The speed at which one would usually feel things through the *sensūs corporis* is, as we have seen, infinitely faster than the '*mobilitate mali*' here. The loss of a substantial number of one's constituents may take a certain amount of time to throw into disorder those which were proximate at the moment prior to the scything, such that these constituents would be sufficiently stirred to cause the interaction of the remaining constituents of the *animus-anima* complex and thus effect feeling.³⁷ But the fact that the complex is distracted, both experientially and with respect to its configuration, inhibits the relevant perceptions for a significant period of time.³⁸

The soldier continues fighting, '*nec tenet ...*' (3.649)! Perhaps a reader may initially have been tempted to attribute the soldier's lack of notice or concern to the

³⁴ On this aspect of the impersonalization, or as argued here, depersonalization of the soldier and his lost bits - e.g. '*membra*' and '*id quod | decidit abscisum*' - cf. Gale (forthcoming a), to which it may be added that among the '*amissam*' bits characterized thus is the head: '*caput abscisum*', Lucr. DRN 3.654.

³⁵ On the ideal of the Roman soldier, cf. Milne 2009: ch.1 and esp. 182-3 with respect to Valerius Maximus on the exemplarity of the discipline of Caesar's soldiers as indicated by their fighting-on despite loss of the right hand and eyes, such as Scaeva (on whom, cf. also Walters 2013: 124-5). On the possible Ennian intertext, as well as the exemplarity of the gladiator (*bestiarius*), which Lucretius may also be exploiting here, cf. Gale (forthcoming a). Similar combat skills were required of gladiators, many of whom were soldiers who had committed criminal action.

³⁶ *Studium* here could be taken to mean simply 'pursuit', but this context suggests that its signification is actually much richer, as we shall see shortly.

³⁷ Cf. Epic. Ep. Hdt. 65 that the loss of a portion of the ψυχή will not entail loss of αἴσθησις in the rest.

³⁸ My thanks to Ashley Clements for discussion of the question of the soldier's delayed experience of pain.

common belief that a person's *virtus*³⁹ is localized in his right hand, the hand grasping the sword (rather than the shield) and the hand by which oaths are sworn.⁴⁰ But Lucretius immediately says that it is the same with the soldier who has lost his right!⁴¹ The reader, as spectator of the battle on the page, having seen similar scenes on the field and/or in the arena,⁴² is thus on the edge of his seat, watching the right-handless soldier mount a chariot and attack its driver, when the poet abruptly averts the reader's *animus* - which narrative choice further reinforces the centrality of focus to the interpretation of the passage. Thus it cannot be that the soldier takes no notice because of which part is lost. '*Nec tenet*' is a bit ironic, as well as mechanistically relevant. The soldier would literally be unable to grasp a physical object with the hand that he has just lost, but he also fails to grasp the relevant stimuli with his *animus* because its configuration has been primed for other ones. In other words, because his attention is intensely devoted to other things, he does not observe that the loss has occurred. By implication from this passage in juxtaposition with 4.802-15, once there is a bit of a break in the battle and the soldier's *animus* is open to more things, he will eventually turn it to his own well-being; no longer detached from certain obvious things, he will look down and see that his hand and arm are gone. Thus the consequent *dolor* will immediately flood him. Therefore, as shown by 4.802-17 (esp. 4.811-15) and 3.642-51 unless the *animus-anima* complex (and particularly the concentration thereof in the *pectus*) is configured in such a way that its perceptions correspond with and reinforce those of the other sense-organs, the perceptions beginning from the other sense-organs will be inhibited. Particularly in the case of extreme divergence of the foci, one only perceives that for which one's *animus* is already primed, unless a reconfiguration takes place.

The importance of the focus of the *animus* also sheds light on the manner in which Lucretius phrases certain addresses to the reader. Introducing the perception of the *animus* as the main subject of the second half of book four, Lucretius says:

³⁹ As 'excellence', perhaps including 'courage'.

⁴⁰ Cf. Livy's account of the exemplary Roman hero Mucius Scaevola, who held his own right hand in the fire when brought before the Etruscan king Lars Porsenna in order to demonstrate the *virtus* of the Roman youth and their determination to assassinate him; the king was so impressed by this that he surrendered without a fight, despite having the upper hand in the siege, and Mucius earned his honorific name; Livy 2.12.1-2.13.6.

⁴¹ Probably the right hand, rather than the right arm.

⁴² Cf. Gale (forthcoming a) on Lucretius' strategy of engagement and alienation with respect to this passage and to violence in *DRN* more generally, as well as Segal 1990: 118-43 on the relationship of this passage to the theme of mutilation in the poem more generally. Walters 2013: 118-19 suggests that Lucretius must have witnessed such horrors during the proscriptions and that this prompted his treatment of such things. On this biographical element cf. Bailey 1947, i: 14. Morrison 2013, although it does not treat this passage, nicely complements Gale's discussion of Lucretius' strategy. According to Morrison, the emotional force of such scenes (e.g. the sacrifice of Iphigenia, the mourners of the dead in book three, and the Athenian plague) derives from the description itself. For Morrison, vivid description in the poem creates *simulacra* of what it describes, which the reader can then experience, form his own judgements upon, and be tested by.

nunc age, quae moveant animum res accipe, et unde
quae veniunt veniant in mentem percipe paucis
DRN 4.722-3

Come now, accept the things which move the
animus, and by means of a few things take
into the *mens* where the things which come
into it come from.

Lucretius intends this passage to be understood in a number of ways simultaneously, which a single translation - even a rather literal one - cannot quite capture. The imperatives ‘*accipe*’ and ‘*percipe*’ conventionally mean ‘hear’ and ‘observe’, respectively. In this context ‘*quae ... accipe*’ signifies both physically ‘accept into the *animus* the things which move it’⁴³ and ‘hear about the things which move the *animus*’. Similarly, ‘*unde ... percipe*’ signifies both physically ‘take into the *mens* the source of the things which come into it’, on which reading ‘*in mentem*’ is sylleptic, and ‘observe where the things which come into the *mens* come from’.⁴⁴ This multiplicity of readings only becomes apparent in hindsight, once the underlying mechanisms have been understood through reading the rest of book four; by the same token, it anticipates the information which it introduces and thus primes the reader for it.

Lucretius employs a similar strategy at the end of the introduction to the main account of sleep.

tu mihi da tenuis aures animumque sagacem,
ne fieri negites quae dicam posse, retroque
vera repulsanti discedas pectore dicta,
tutemet in culpa cum sis neque cernere possis
DRN 4.912-15

You, grant me finely attuned ears and a keen
animus, in order that you may not deny that
the things which I will discuss can happen
and in order that you may not depart because
your *pectus* is repelling true sayings, although
you are to blame and not able⁴⁵ to perceive
them.⁴⁶

Emphasizing the ears and the true statements (‘*vera dicta*’) which he will say (‘*dicam*’), Lucretius here employs the slippage between recited and read poetry.⁴⁷ He commands that the ears and the *animus* be finely attuned (‘*tenuis*’ and ‘*sagax*’, respectively) to those

⁴³ In this, an instrumental *animo* is understood with ‘*accipe*’, on the basis of ‘*animum*’.

⁴⁴ Cf. Lucr. DRN 4.880: ‘*tu percipe dicta*’. On Lucretius’ use of the vocabulary of sense perception in such didactic contexts, cf. Lehoux 2013.

⁴⁵ I.e. because your *animus* has repelled the relevant stimuli.

⁴⁶ It is also possible that the *cum* clause is causal rather than concessive.

⁴⁷ That said, reading silently is a fairly late practice. For much of history, it was generally the case that, even when reading to oneself, one read aloud - and, prior to word-breaks in the text, punctuated to some extent by ear. Thus, in the very act of ‘reading’ DRN, particularly with respect to such addresses and injunctions, one is effectively ‘becoming Lucretius’.

statements - i.e. ready to hear the truth in all of its nuance.⁴⁸ He represents this successful hearing as at least a partial consequence of the coordination of their foci, with respect to both physiological configuration (and thus the stimuli with which they are open to interaction) and the experience of attention. The coordination of the foci of the ears and the *animus* can be quite effective; thus the thought-*simulacra* and name of one's lover together are among the '*pabula amoris*'.⁴⁹ Lines 4.912-15 suggests that if the focus of the *pectus*, seat of the *animus*, is not coordinated with that of the ears, the stimuli reaching the ears will have little effect, as though the *animus* has repelled them. Of course the *dicta* take the form of written words here, so *simulacra* of these *dicta* exist - presumably including those which can potentially be perceived directly by the *animus*.

This is consistent with the didactic rhetoric of the poem as a whole and perhaps related to the need to write down Epicurean teachings.⁵⁰ The *animus*' perception of *simulacra* and the false beliefs and consequent tranquility-inhibiting cares and fears which are related to those perceptions are the primary subjects of the latter half of book four. *Vera dicta* - in a sense metonymy for the truths which they express - prove these to be empty perceptions, false inferences, and unnecessary fears.⁵¹ Moreover, as Lucretius emphasizes throughout the poem, the *dicta* of himself and of Epicurus will inculcate the truth about the nature of things, as does the perception of the natural world - which their *dicta* ensure the correct interpretation of.⁵² Perhaps not coincidentally, the poem's other

⁴⁸ With '*tenuis aures*', cf. *tenuis*, OLD §11. With *sagax*, Lucretius intends both (i) 'keen-scented' or 'keen [with respect to the senses]' and (ii) 'keen' or 'acute' as in 'perceptive' and 'discerning'. The adjective *sagax* occurs eight times in *DRN*: '*animum ... sagacem*' (1.50), '*ratione sagaci*' (1.130), '*ratione sagaci*' (1.368), '*animo ... sagaci*' (1.402), '*sagaci mente*' (1.1022), '*animum ... sagacem*' (2.840), '*animum ... sagacem*' (4.912, cf. 1.50), '*sagaci mente*' (5.420, cf. 1.1022). Thus it is consistently used of either the *animus/mens* or the *ratio* thereof; moreover, with the possible exception of 1.1022 and 5.420 (which are a verbatim echo) these expressions are used in contexts of or connoting learning. We will return to the significance of this below.

⁴⁹ *Lucr. DRN* 4.1061-4.

⁵⁰ As opposed to passing down the doctrines solely by oral transmission (i.e. repetition in recitation), like the Pythagoreans and, initially, the Homeric epics.

⁵¹ Cf. p.237 n.42 with respect to Morrison 2013, who takes such ideas farther. The answer to the question 'for how long do *simulacra* persist' would be necessary to evaluate his claim with respect to events in the distant past. At least for more recent events, it seems more likely that the *simulacra* of events in Lucretius' descriptions prime the reader to be open to interacting with *simulacra* of the actual events flitting about.

⁵² Indeed, the veracity of *dicta* derives from the perception of the natural world. The precise relationship of *dicta* to objectively extant things and to ideas is beyond the scope of this investigation. The process by which the *dicta* with which one interacts are converted into beliefs and *doctrina* seems a promising avenue for further research. These ideas will be touched on again in other contexts below.

use of *tutemet* occurs in a proleptic warning against being conquered by the ‘*terriquois ... dictis*’ of priests.⁵³

In 4.912-15, Lucretius’ emphatic use of ‘*tu*’ and ‘*tutemet in culpa*’,⁵⁴ in conjunction with the imperative ‘*da*’ and four second person singular subjunctives, also evince that the poet believes the reader’s focus to be within the reader’s control - otherwise there would be no need for - or point in - such didactic injunctions. Compare the remarkably similar address to the reader in the proem to book one:

quod superest, vacuas auris animumque sagacem
semotum a curis adhibe veram ad rationem,
ne mea dona tibi studio disposta fideli,
intellecta prius quam sint, contempta relinquo
DRN 1.50-3

What is more, apply your empty ears and
keen *animus*, removed from cares, to true
ratio, in order that you may not abandon my
gifts, arrayed for you with constant⁵⁵ *studium*,
having scorned them before they were
understood.

If the reconstruction is correct,⁵⁶ then with the exception of the form of the accusative, ‘*auris animumque sagacem*’ is a verbatim intratextual echo between 1.50 and 4.912; in both lines, the phrase contains the accusative direct objects of an imperative (‘*adhibe*’, 1.51; ‘*da*’, 4.912). Regardless, Lucretius’ ‘*dona*’ are tantamount to *vera ratio* rather than simply *vera dicta*; nevertheless, again, the latter is a product of and meant to inculcate the former - perhaps by correcting or reconfiguring certain variable aspects of one’s *natura animi*.⁵⁷ Again, what Lucretius is setting out before his reader or listener should literally ‘sink in’. Hence the foci of the ears and *animus* should be coordinated and keen. Moreover, here neither the ears nor the *animus* should be in any way preoccupied, with respect to both attention and other stimuli or movements.⁵⁸ Similarly, ‘*disposta*’, ‘*intellecta sint*’, ‘*contempta*’, ‘*relinquo*’ and the like have both a phenomenological and a psychophysiological meaning. With the exception of *intellego*, these or similar verbs have already been treated. *Intellego* should be mechanistically interpreted through its root *lego*;

⁵³ Lucr. *DRN* 1.102-3; cf. 6.68-84 and the various indications of the importance of using ‘*ratio verissima*’ (6.80) taught by ‘*politus | versibus*’ (6.83-4) for repelling and ejecting the teachings of *caeca ratio* (6.67) - e.g. to prevent you yourself ‘*tute tibi*’ (6.73) from forming false beliefs which would inhibit certain perceptions and lead to a different sort of life than that envisaged by Lucretius for his reader. Further on these ideas shortly.

⁵⁴ On Lucretius’ use of the emphatic terminations *-tē* and *-met*, and the two instances of the double termination, cf. Bailey 1947, i: 81.

⁵⁵ Cf. *fidelis*, *OLD* §2b (and by extension §3). The physical counterpart of constancy (and thus faithful, loyal, reliable, trustworthy) is ‘marked by adherence’ or firm. The word seems to be a hapax in *DRN* but *fides*, *fidus*, and *fido* are generally, and - mechanistically speaking - perhaps not coincidentally, used with respect to belief and the nature of dogs.

⁵⁶ On which, cf. Bailey 1947, ii: 605-6. Brown 1984: 52 is more dubious of it.

⁵⁷ In other words, phenomenally and thereby at the underlying levels, learning - particularly Epicurean doctrine - can undo false beliefs tantamount to *perversa ratio*.

⁵⁸ The dangers of preoccupation with false beliefs include preventing one from being open to perception of things as they really are; cf. the case of the gods: Lucr. *DRN* 6.68-9 with 6.75-8 - ‘*putare*’ (6.71) meaning ‘thinking’ in the sense of ‘beliefs’, which here are false.

in other words, understanding occurs by inference through what one reads as well as through what one otherwise chooses or selects to take in for perception. The process entails gathering these up amongst themselves - a kind of putting-together of the bits of Lucretius' argument, ideally along with one's own perceptions of the world.⁵⁹

Lucretius also introduces the idea that the reader needs to coordinate his or her *studium* with his own. The faithful, loyal, firm, or constant *studium* of the poet can be read as his pursuit, his study, his task, and even his zeal. These are all actions which follow from his *studium mentis*, are in a sense manifestations thereof, and reinforce it. Both the physiological and phenomenological meanings should thus be understood here.⁶⁰

The other four instances of *studium* in the poem⁶¹ are best understood as a shorthand for '*studium mentis*' (2.268) and best translated as 'the focus of the *mens*', encompassing both the underlying (re)configuration and the corresponding experience of paying attention or one's *animus* being turned to something. Mechanistically, *studium mentis* is the result of the *animus*' process of focusing or attuning itself⁶² to facilitate its interaction with particular stimuli. Lucretius consistently indicates that we somehow control our own focus, even as he manipulates it - priming it for what follows.

Barring distraction (either *per se* or not *per se*), one's *studium* will remain approximately constant for a certain period of time; it is thus primed for interaction with similar *stimuli*, which generally serve to reinforce and prolong it. This attention span, so to speak, is illustrated by a process by which *amor* intensifies. When one's lover is absent, the remaining '*simulacra ... et nomen*' will continue to inculcate and feed *amor* unless and until something is done.⁶³

ulcus enim vivescit et inveterascit alendo,
inque dies gliscit furor atque aerumna gravescit,
si non prima novis conturbes volnera plagis
volvivagaque vagus Venere ante recentia cures
aut alio possis animi traducere motus

DRN 4.1069-72

For a sore grows stronger and more
entrenched by feeding, and day by day the
fury surges and tribulation grows worse, if
you should not (i) disorder the initial wounds
with new blows and, being inconstant, cure
them while still fresh with a wide-wandering
Venus,⁶⁴ or (ii) transfer the motions of your
animus elsewhere.

⁵⁹ My thanks to Monica Gale for suggesting this bit of the mechanism.

⁶⁰ As we have seen above, this is true in the context of the soldier who, having applied his *mens* '*in pugnae studio*' (Lucr. DRN 3.647), does not immediately feel *dolor* at the loss of his arm. These ideas may be usefully related to the narratological analysis of DRN in Gale 2004.

⁶¹ All of which will be treated in due course.

⁶² Cf. '*contendere se*', '*parare se*', and '*deditus se*'.

⁶³ Lucr. DRN 4.1061-72.

⁶⁴ Probably a euphemism for a prostitute, as presumably not any Venus-as-woman would be both so readily available and socially acceptable.

Lucretius emphasizes the time-sensitive nature of avoiding counterproductive *amor* here with the cluster of time-related expressions. That said, as the inchoative verbs indicate, this inculcation and intensification is much slower than the speed of perception itself.⁶⁵ Nevertheless one must take action - namely averting the *studium* and motions of the *animus* - 'in time', i.e. before false beliefs set in or the metaphorical droplets bore through stone. That action is within one's control.

Lucretius' account of dream-sleep provides further evidence for the general persistence of *studium*. Schrijvers approaches Lucretian dream theory largely through phenomenological causes and potential parallels in other ancient sources. This approach conditions his interpretation that it constitutes a bric-à-brac with a veneer of science - comprised of elements from Aristotle and medical traditions, as well as Roman themes and even quasi-Freudian ideas like those of the later thinker Artemidorus - whose theoretical and structural incoherence can best be explained by its ethical aims: i.e. dispelling the ideas that dreams are sent by the gods and that the dead persist in Acheron.⁶⁶ While Schrijvers is correct about the ethical aims, and perhaps also about parallel themes, approaching Lucretius' treatment of dreams and dream-sleep from mechanistic point of view obviates his general and specific criticisms.

Our dreams, according to Lucretius, are often consistent with our waking *studia* and at least partially a consequence thereof.⁶⁷

et quo quisque fere studio devinctus adhaeret,
aut quibus in rebus multum sumus ante morati,
atque in ea ratione fuit contenta magis mens,
in somnis eadem plerumque videmur obire:
...
nos agere hoc autem et naturam quaerere rerum
semper et inventam patriis exponere chartis.

And whichever *studium* each fastens upon,
constrained for the most part,⁶⁸ or whatever
things we have lingered on for a while before,
because the *mens* was more attuned in this
way⁶⁹ - we generally seem to encounter these
same things in our dreams. ... I, moreover, do
this: always both seeking the nature of things

⁶⁵ This furthers the points made in chapter three about inchoative verbs, the speed of perception, and the issue of habituation. The traditional notion that distraction is a cure for love, which figures e.g. in Cic. *Tusc* 4 and Ovid's *Remedia Amoris*, thus is also literally true on the micro-level for Lucretius, given the role of *simulacra* in the mechanism.

⁶⁶ Schrijvers comes to these conclusions despite his avowed aim of merely reading the parallels as background; Schrijvers 1980: esp. 133 on his aim.

⁶⁷ Schrijvers allows that these are the one upon which Lucretius' focuses and that his explanation for them, although typically (both for Lucretius and for the interpretation of dreams in antiquity more generally) 'naturalistic', differs to some extent from that of Aristotle; Schrijvers 1980: 140, cf. Tutrone 2012b: 98-105.

⁶⁸ This translation of Lucr. *DRN* 4.962 is more consistent with the philosophical doctrine in question than that of Bailey 1947, iii: *ad loc.*

⁶⁹ The difficulty of rendering Lucr. *DRN* 4.964 in a manner consistent with the doctrine is considerable and hinges both upon 'atque' and 'in ea ratione'. Bailey 1947, Rouse and Smith, and Godwin 1986 *ad loc* take it as a continuation of the relative clause (and thus do not translate *atque*) but give it various degrees of resultant force. However the attuning of the *mens* is both cause and effect; this suggests a translation of the line which is almost in apposition to the previous and recommends something tantamount to 'accordingly' as a translation of 'in ea ratione'. Many thanks to Monica Gale for the suggestion that one could take 'atque' epexegetically, which has been followed here.

cetera sic studia atque artes plerumque videntur
in somnis animos hominum frustrata tenere
DRN 4.962-5, 969-72

and, having discovered it, setting this forth on
on rolls in our own tongue.⁷⁰ Likewise, all the
other *studia* and arts, having deceived the
animi of men during their dreams, generally
seem to hold them fast.⁷¹

Studium here seems to refer to a pursuit or activity which one is habitually focused upon, with '*fere ... devinctus adhaeret*' also suggesting a relatively fixed configuration,⁷² but not one entirely closed off to other interactions ('*fere*', 4.962, '*plerumque*', 4.971). The representation of what one has just recently ('*ante*') been focusing on, but for some length of time ('*multum*'), as a state of relative attunement of the *animus* ('*magis contenta mens*') suggests that this lingering (*moror*) is a lesser degree of *studium mentis*.⁷³ This is supported by the consequence: similarly dreaming about whatever one has been focused upon, either habitually or recently but progressively and repeatedly. This distinction is borne out by the interlocking structure which lines 4.962-5 introduce.

Lines 4.966-72, and likewise 4.984-1010, treat the perception of the habitual in one's dreams. Lines 4.973-83 and 4.1011-36 treat the perception of more ephemeral foci. Crucially for the purposes of this study, 4.984-1010 generalizes the faculty, mechanism, and general manifestation from humans to all living creatures. It explicitly discusses these with reference to a number of animal examples, as we shall see, before going on in 4.1011-36 to continue developing the idea through further human examples. The discussion of animal dreams thus occupies a central place within this interlocked structure. Moreover, Lucretius' slippage between human and animal does not require any qualification of underlying differences.⁷⁴ These things, as well as the specific doctrines expressed at 4.984-1010, all support the general claim that animals possess the same relevant faculties which operate in the same ways.

⁷⁰ Literally, 'by means of native rolls' - i.e. literary works written on papyrus rolls in our native tongue or language.

⁷¹ The use of *teneo* in the context of a discussion of *studium* is not surprising at this stage, but here it has more the sense of 'to hold (fast)' and seems also to allude to the mechanistic meaning of *studium*. The expression '*in somnis animos hominum*' is ἀπὸ κοινοῦ with '*teneo*' and '*frustrata*'.

⁷² The variable aspects of one's *natura animi* must also vary within the '*alte terminus haerens*' discussed in the previous chapter, but even these can become relatively entrenched by habituation through repeated interaction.

⁷³ Cf. The use of *contendo* in 4.802 and 4.809 and discussion above. Schrijvers too notes that concentration or focusing, rather than memory, plays a role in dreams, but does not develop the point as this study has. In particular, he neglects the importance of that concentration for one's interaction with *simulacra* and the implications of this for the thought-content of dreams; Schrijvers 1980: 140-1, 143.

⁷⁴ Schrijvers suggests that this is because animal dreams would certainly not be sent by the gods and thus would confirm that dreams occur by a 'natural' process; Schrijvers 1980: 143. This explanation does not follow. From the oracular pronouncements of Achilles' horses in Homer to augury and other divination practices (including the pecking or not of the sacred chickens of the Roman military, the disregard of which was said to have brought woe upon Publius Clodius Pulcher), animals were indeed often believed to be messengers of the gods - a belief which Lucretius uses to rhetorical effect in the account of glossogenesis. On animal divination and access to knowledge of the divine, cf. Struck 2014.

A further implication of 4.962-5 is that the perceptions of dream-sleep occur in a manner directly proportional to one's *studium*; in other words, the greater the attunement of the *mens* to certain things or the more intense the focus, the more likely one is to meet with ('*obire*', 4.965) those things in one's dreams - i.e. to select and interact with *simulacra* from those sorts of things.⁷⁵ This is echoed, as we will see, at the beginning of the section on animal dreams. These sleeping perceptions of the *animus* are, nevertheless, empty or deceiving ('*frustrata*', 4.972) in that they generally do not correspond to an external objective reality in which one is currently engaged or to which one is then bearing witness.⁷⁶ The emotions which the *animus* feels in dream-sleep are likewise *inanis*,⁷⁷ because they are (in part) a response to empty stimuli.⁷⁸

In 4.966-72, four examples illustrate the 'each person' ('*quisque*') of 4.962. Each example is the first word of its respective line (4.966-9); they are: lawyers, generals, sailors, and Lucretius himself.⁷⁹ These represent those whose pursuits fall on land and on sea, those who pursue the *vita activa* - both at home and abroad, and those whose seeking falls within the *vita contemplativa*, like Lucretius and perhaps by extension the reader. By these choices Lucretius shows the relevance of focus to the dreams of all people. Thus not the particular occupation but rather the condition of having a *studium* affects dreams. Moreover, Lucretius claims to dream of writing in Latin,⁸⁰ thereby stressing the relevance of the discovered⁸¹ nature of things specifically to his Roman readership.⁸²

Immediately subsequent, Lucretius develops the claim of 4.962-5 regarding the *mens*' lingering on and attunement to certain things.

et quicumque dies multos ex ordine ludis
adsiduas dederunt operas, plerumque videmus,
cum iam destiterunt ea sensibus usurpare,

And whichever individuals have for many
days applied constant attention to the line up
of public games - we generally see that, when

⁷⁵ While this is related to memory, as we shall see below, *studium*, therefore, and not '*memoria*' itself could be characterized as the *mens*' capacity of repeating habitual acts of apprehension; *pace* Diano 1974 and Kerferd 1971: 88.

⁷⁶ Cf. below on dreaming of the dead. One partial exception to this is dreams of the gods; in dreams we are better able to perceive them as they are, but - as we have seen - we are still unable to bear witness to them by means of the *sensūs corporis*.

⁷⁷ Lucr. *DRN* 3.112-16.

⁷⁸ Other causes - as we will again discuss - include judgment and belief about those perceptions.

⁷⁹ Respectively: '*causidici*', '*induperatores*', '*nautae*', '*nos*'.

⁸⁰ Lucr. *DRN* 4.970: '*patriis exponere chartis*'.

⁸¹ Lucr. *DRN* 4.970: '*inventam*', perhaps mechanistically recalls '*obire*', 4.965.

⁸² Schrijvers intriguingly suggests that Lucretius here is offering a naturalistic explanation for Ennius' dream of Homer, as mentioned in proem of *DRN*, having turned illustration into *illustrandum*; Schrijvers 1980: 141-2. Emphasizing the composition of his poem at 4.969-70 also allows Lucretius to create a marvelous (and potentially infinite) regress. Perhaps he dreamed of writing this very passage about dreaming of writing about the nature of dreams. If he can dream of writing about dreaming of writing about the nature of things, then can the reader dream of reading about dreaming of reading about the nature of things? If so, is he or she at this moment in fact dreaming? A thought experiment (so to speak) worthy of the *vita contemplativa*!

relicuas tamen esse vias in mente patentis,
qua possint eadem rerum simulacra venire
DRN 4.973-7

these things have already ceased to possess
our *sensūs corporis*, open passages nevertheless remain in the *mens*, by which way the same *simulacra* of things are able to enter.

Among the things which this passage accomplishes is explaining the nature of what occurs when people ‘*adsiduas dederunt operas*’. This is the last of three instances of the term *opera* in the poem. *Operam dare* frequently means ‘to devote one’s attention, apply oneself (to an activity or task)’; *opera* also carries the sense of an intentional or purposeful task-oriented activity - with which sense it is used at 1.155.⁸³ The reader would also have just encountered a not dissimilar use of *opera*; at 4.920-1, as we have seen, Lucretius there equates the *opera animai* with our *sensūs*.⁸⁴ Lucretius’ subsequent allusion to *studium mentis* using a nexus of expressions which echo other treatments of it (such as ‘*plerumque*’, ‘*videmus*’, ‘*relicuas*’, and ‘*vias in mente*’) suggest that *dedo* is again being used of a reflexive action of the *mens* - at once its application and self-configuration.⁸⁵ In light of the necessity of coordinated focus with the *animus* for the *sensūs corporis* to perceive well, Lucretius therefore uses ‘*dederunt operas*’ here as a shorthand for the activities of the entire *animus-anima* complex (in conjunction with the other sense-organs) and specifically the self-attuning process by which it applies itself to particular perceptions.⁸⁶ Thus, Lucretius typically intends the multiple valences of the overdetermined expression as an argument that the underlying mechanisms and the experience are different ways of looking at the same thing.

These lines also indicate that this persistent attuning and attention has consequences for our thoughts, which can be understood through the underlying mechanism. They entail repeated interaction with particular sorts of external stimuli over a period of time, which reinforces the configuration of the *mens*, such that it remains open or receptive to interacting with identical stimuli (‘*eadem rerum simulacra*’). In other words, repeated interaction can be both a cause and an effect of the persistence of one’s *studium*; thus one is primed to think of the same things, even once absent, also while awake.⁸⁷

⁸³ Cf. *opera*, OLD §1 and esp. §2.

⁸⁴ Lucr. DRN 4.920-1: ‘*nam dubium non est, animai quin opera sit | sensus hic in nobis*’; cf. p.67.

⁸⁵ Cf. above with respect to Lucr. DRN 3.647, 4.815.

⁸⁶ This process may be related to what is termed an ‘ἐπιβολὴ τῆς διανοίας’, cf. D.L. 10.31, Epic. *Ep. Hdt.* 38, 51, which seems to encompass an application of thought and apprehension by that which thinks. Cf. Fowler 2002: 353-4 on *studium mentis* in Lucr. DRN 2.268 in parallel with 4.984-6. He seems to be alluding to the same at Fowler 1983: 341 in saying ‘[s]imulacra are striking our mind all the time, but we do not ‘see’ them unless we concentrate on them in an ἐπιβολὴ τῆς διανοίας’.

⁸⁷ At Lucr. DRN 4.978-80, ‘*per multos dies*’ picks up ‘*dies multos*’, ‘*illa eadem*’ recalls both ‘*ea*’ and ‘*eadem simulacra*’; note also the result clause ‘*etiam vigilantes ut videantur | cernere*’ which makes clear that the sense intended at the anacoluthon between ‘*operas*’ and ‘*plerumque*’ is one of cause and effect.

Dancers and their movements are the first example offered - as this recalls his introduction of the attuning of the *mens* and its consequences for dreams.⁸⁸

Lucretius also implies that we continue to perceive sounds and the various adornments of the stage,⁸⁹ among which would be the smell of saffron.⁹⁰ The lover can use his *animus* to see his Venus emitting less than divine smells.⁹¹ People also seem to think - at least in dreams - of taste and touch, as well as of pleasure and pain; but taste and touch would require the *animus* to come into direct contact with the source-objects. This lends weight to the argument that dreaming of such things probably requires some sort of addition of the *animus* to its interaction with *simulacra*.⁹²

Just as deliberately averting the *studium mentis* can lead to the avoidance of *amor* and its coordination with the perception of a foul odor can lead to *amor*'s undoing, repeated interactions with a particular set of *simulacra* can inculcate it. The language and imagery of those final lines of book four is of relevance. The woman '*insuescat te*' (4.1282) and '*consuetudo concinnat amorem*' (4.1283); anything gradually gives way to a repeated blow ('*crebro ictu*', 4.1284), however light, like those of droplets boring through stone, among the hardest of generated assemblies, over a long period of time. As we have seen, Lucretius characterizes the procession of this learned emotion as a kind of habituation. That habituation occurs through repeated interaction, albeit of a pleasant sort, and the corresponding progressive restructuring of the *mens*' constitution.⁹³

Thus a single interaction primes the *mens* for the subsequent *simulacrum* which is identical or very similar to itself, as in the case of the dreamed-of dancer. Short term repeated interactions facilitate a temporary configuration which lends itself to further repeated interactions, as in the case of watching the games and then thinking of them while awake and in dream-sleep. Sufficiently repeated interactions of a very similar sort can shape the passages of the *mens* in a more permanent fashion, such that it remains open to such interactions and, generally, excludes others, such as in the cases of one's general pursuit and related thoughts (including dreams), as well as this healthy form of *amor*. This may also explain why at least some passages remain open even to *simulacra* of the long

⁸⁸ Cf. above and Lucr. *DRN* 4.768-76, 4.788-801.

⁸⁹ Lucr. *DRN* 4.981-3.

⁹⁰ Lucr. *DRN* 2.416.

⁹¹ Lucr. *DRN* 4.1175-1192.

⁹² Lucr. *DRN* 4.1024-36. Note that the pleasure and touch may be additions to the perception of *simulacra* at 4.1032, but cf. the role of *simulacra* in ejaculation, discussed at e.g. pp.152-54. For *dolor*, cf. 4.1015.

⁹³ Lucr. *DRN* 4.1278-87, esp. 4.1282-3.

dead.⁹⁴ Finally, it is possible to perceive virtually the same *simulacra* even for a time after waking, which indicates that *studium* can persist through either side of the sleep cycle.⁹⁵

The general continuity of one's thoughts between waking life and dream-sleep also shows that the relevant structural configuration and certain faculties of the *mens* remain essentially constant between these two states.⁹⁶ As we have seen, during sleep's onset, there is a systemic disordering of the portion of the *animus-anima* complex which is dispersed throughout the frame.⁹⁷ The fact that the concentration in the *pectus* remains largely unaffected during dream-sleep is consistent with the short-term continuities between the waking and sleeping perceptions of the *animus*, presuming no intervening period of dreamless sleep. The deep subsidence of the *animus* during dreamless sleep involves considerable structural alteration, as we have seen, and would seem to undermine the long-term persistence of configuration suggested by habituation, as well as memory.⁹⁸ It therefore seems likely that the recession of the *animus* is purely a compacting process. Lucretius elsewhere describes its high concentration of constituent assemblies as being responsible for its swiftness. This compression process disrupts its customary configuration and interactions, perhaps by eliminating the void necessary for movement, and, with that, certain properties of the whole (both *coniuncta* and *eventa*). The metaphorical last spark of *vitalis motus* within the recessed and compacted assembly would, in waking, restore the previous configuration and, with it, the potential for its customary interactions and internal motions. From there the motions could then be transmitted in the usual fashion to the rest of the complex, reconfiguring it and thereby restoring the five *sensūs corporis*. The length of time it takes to recover one's *sensūs* after sleep, epileptic fits, severe blows, and the like would support the idea that waking is a more elaborate process than is even, e.g., the initiation of voluntary motion. Lucretius does not explain where the matter comes from which replaces the *primordia* lost during the process of falling asleep, but one might conjecture that the dullness of our wits and senses until after breakfast results from the need to replenish such things. Then again, the weight of the entire complex is so small as to be imperceivable and immeasurable, so relatively little matter (of the correct sorts) would be required to restore its numbers.

⁹⁴ Lucr. *DRN* 4.762-7

⁹⁵ Lucr. *DRN* 4.995-7. We will return to this shortly.

⁹⁶ Cf. Epic. *Ep. Men.* 135, that holding and exercising correct beliefs will prevent disturbances by waking or sleeping vision, and D.L. 10.120, that, according to Epicurus or his school, the σοφός man: 'καὶ καθ' ὕπνου δὲ ὅμοιον ἔσεσθαι'.

⁹⁷ Some of it is cast forth and some withdraws into the *pectus*; cf. pp.66-7.

⁹⁸ Memory will be treated below.

In sum, the *studium mentis* is, physiologically, the malleable configuration of the concentration of the *animus-anima* complex which is centralized in the *pectus* or *cor*; phenomenologically, it is one's focus or attention - and can become quite intense. One's thoughts, including the waking and sleeping perceptions of the *animus*, are thus partly contingent upon the objects and activities, or the particular *simulacra* to which the *animus* has applied or attuned itself. One's *studium* can assume a degree of general stability through repeated interactions with identical or similar stimuli. These interactions, over a long enough period of time, amount to habituation. Whatever degree of stability is established, sleep and like states notwithstanding, *studium* remains unfixed and an *eventum*. As Lucretius stresses, one's focus is within one's control and to some extent contingent upon it. *Studium mentis* is thus a step further out on the spectrum from the developmental aspects of one's *natura animi*. The application or attuning of the *mens* is a *per se* process whereby the *animus* acts by and upon itself. Having explored what the process accomplishes, the next step is to work out how the *animus* initiates and controls it.

II. VOLUNTAS AND AGENCY

In the interlocking structure of his main treatment of dream-sleep, Lucretius reintroduces the consistency of one's general pursuits with the content of one's dreams and broadens the spectrum of creatures under consideration. He also sheds further light on the larger process of thought.

usque adeo magni refert studium atque voluntas
et quibus in rebus consuerint esse operati
non homines solum, sed vero animalia cuncta⁹⁹
DRN 4.984-6

It is so important: one's *studium* and *voluntas* and the things with which not only men but indeed all living creatures are accustomed to have been busy.

In its immediate context of the relationship between waking and sleeping thoughts, '*usque adeo magni refert*' with '*quibus in rebus*' may recall '*quibus in rebus ... fuit contenta magis mens*' (4.962-5). Both suggest that the correlation between the objects of waking attention and that which one encounters in dreams is directly proportional. *Consuesco* here perhaps foreshadows the use of '*insuescat*' and '*consuetudo*' at 4.1282-3. *Operor* is a hapax legomenon in the poem, but it is closely related to Lucretius' use of *opera*,

⁹⁹ The reading '*voluntas*' (Lucr. DRN 4.984), is preferable to Lachmann's conjecture '*voluptas*' also on two counts: (i) It fits better the doctrine introduced at 4.881-4, which, as we will see, this passage develops, (ii) It sets up a crucial intratextual echo with 2.263-71 which confirms that this passage is meant to be read alongside it as well as in relation to 4.881-4ff. That said, given that pleasure is the guide of life, the readings *voluptas* and *voluntas* may not be all that different phenomenologically.

particularly at 4.974. These intratextual allusions suggest that ‘*quibus in rebus consuerint esse operati*’ should express the things with which the *mens* of each living creature customarily engages. Physiologically, these things are the stimuli with which the *studium mentis* is accustomed to interact by virtue of its configuration as established by repetition. Phenomenologically, these things are the objects and activities upon which one generally focuses - i.e. that which one pursues. The use of *operor* supports the claim that the more established configuration can manifest in one’s typical pursuits. Into this, and making this passage particularly noteworthy, Lucretius integrates *voluntas*. *Voluntas* also affects one’s dreams; it is part of the mechanism of thought.

Of the eleven uses of the term *voluntas*,¹⁰⁰ there are only two passages in the poem which explicitly coordinate the term with *studium*, and this second is surely meant to recall and reactivate the first. In both, racing horses and their bursting from the gates are the first example of the two things working together. Immediately subsequent to 4.984-6 above, Lucretius continues:

quippe videbis equos fortis, cum membra iacebunt,
in somnis sudare tamen spirareque semper
et quasi de palma summas contendere viris,
aut quasi carceribus patefactis rumpere sese
DRN 4.987-90¹⁰¹

In fact you will see that strong horses, when they lay down their members, will nevertheless always exert themselves and pant in dreams, even as though straining with their utmost strength for the victory-palm or as though breaking themselves out when the barriers are thrown open.

This is the first in a series of descriptions of observable actions taken by a sleeping creature.¹⁰² Lucretius is specifically concerned with those actions which are consistent with those taken by the creature - be it animal or human - while awake. Lucretius’ assumption that the subject of its dreams can be inferred from these consistent actions¹⁰³ suggests not only that persistence of *studium* creates consistency of waking and sleeping thought, but also that actions generally follow from thoughts in a predictable manner. For this reason, ‘*sudare*’ is unlikely to simply mean ‘sweat’ in this context, but rather takes the transferred meaning of some sort of exertion which causes sweat¹⁰⁴ - and likely panting too. Lucretius seems to suggest¹⁰⁵ that hunting dogs suddenly speed their legs and bark

¹⁰⁰ Lucr. DRN 2.257, 2.261, 2.270, 2.276, 3.44, 3.174, 4.781, 4.883, 4.984, 4.1045, 6.389.

¹⁰¹ The conjecture ‘*rumpere sese*’ is by M. F. Smith, by analogy with Lucr. DRN 2.263-4. Bailey prints ‘†*saepe quiete*†’ which does not logically follow from the preceding ideas. On the MS issues with 4.990-1003, cf. Bailey 1947, iii: 1298. Rouse and Smith 1992 also omit 4.1000-3.

¹⁰² Lucr. DRN 4.987-1036.

¹⁰³ Lucretius’ account of animal dreams relies on inference from the observable manifestations or symptoms of dreams to what cannot be observed and occasions them; on this point, cf. Schrijvers 1980: 144.

¹⁰⁴ Cf. *sudo*, OLD §2.

¹⁰⁵ Again, there is some dispute about the ordering of the lines in Lucr. DRN 4.991-9 about canines’ dreams.

and repeatedly sniff the air as though tracking their quarry, apparently deer, and continue to do so for a time even when awakened because they still perceive the deer-*simulacra*. Grammatically and accurately the images of the deer, rather than the deer itself, flee when the dog awakens, but the expression '*fugae dedita*' (4.996) evokes the deer's characteristic *vis animi*. Dogs accustomed to the house leap up, reacting as though they, guarding it, were seeing someone unfamiliar. Various birds also suddenly fly off through the forest as though they have dreamed of being pursued by attacking birds of prey.¹⁰⁶ The fact that it takes hunting dogs and, seemingly, certain birds a while to return to themselves and cease to see these images¹⁰⁷ is further evidence for the persistence of *studium mentis* between waking and dream-sleep.¹⁰⁸

Humans too, according to Lucretius, take actions in their sleep, some of which are observable.¹⁰⁹ Covering the various walks of society - from kings, to the many, to children and those going through puberty - Lucretius says:

porro hominum mentes, magnis quae motibus edunt
magna, itidem saepe in somnis faciuntque geruntque:
...
multi de magnis per somnum rebu' loquuntur
indicioque sui facti persaepe fuere
DRN 4.1011-12, 1018-19

Further, the *mentes* of men, which bring about great deeds with great motions, often do and wage things in the same way in dreams. ... Many speak about great affairs during dream-sleep and very often have borne witness to their own deeds.

Speech is one of the exemplary actions which men can take in dream-sleep, a fact to which we will shortly return. Moreover, men are able to recall and articulate their deeds, including bearing witness to their own crimes.¹¹⁰ This further evinces that a substantial degree of memory is preserved in dream-sleep and thus that the structural integrity or configuration of the *animus* is at most minimally altered (from its waking state). Other observable exemplary actions which men carry out in dream-sleep, which Lucretius takes to be consistent with and evidence of their thoughts, include: thrashing about in fight,

¹⁰⁶ Lucr. DRN 4.1007-10.

¹⁰⁷ Cf. esp. Lucr. DRN 4.997, with respect to hunting dogs: '*donec discussis redeant erroribus ad se*'.

¹⁰⁸ One wonders whether Lucretius chose these animal exemplars because he believed them to be the most likely for his audience to have experience of. Although birds of the forest are do not live in interspecies communities, these may well represent ones most likely for his readership to have encountered. That said, horses can sleep both when standing on all fours with knees locked and when lying down. The construction of Lucr. DRN 4.987 - i.e. a circumstantial cum clause with the future indicative, in an indirect statement subordinated by a future indicative - suggests that horses sleeping while lying down is a fact, but one which Lucretius expects that the reader may not yet have witnessed. This slight nuance implies that Lucretius may have been (or at least perceived himself to be) more familiar with the range of animal behaviors than a number of his contemporary peers. All other examples of animal dreams, and those human ones which come subsequently in 4.984-1036, use main verbs indicating present time. Lucretius may be assuming that the reader already has witnessed them.

¹⁰⁹ Lucr. DRN 4.1011-36; cf. 5.1158-60.

¹¹⁰ Schrijvers argues that a guilty conscience itself is the cause of such dreams; Schrijvers 1980: 146-7. However, a mechanistic approach suggests rather that it is the habitual focus of the *animus* on *simulacra* of the crime itself and on potential consequences which is then carried over into dream-sleep.

groaning, and crying out. *Pace* Feeney and Schrijvers, these are not products of anxiety but reflections of what we have been habitually focused upon, such as, as Gale notes, the aforementioned games.¹¹¹ The bed-wetting of children is taken to be deliberate and coincide with dreaming of a chamber pot. The wet-dreams of youth are attributed to their dreaming of having intercourse.¹¹² In 4.1011-12, Lucretius claims that all such actions in waking life are somehow contingent upon the motions of the *mens* and that the actions take place during dream-sleep according to the same mechanism ('*itidem*'). The persistence of *studium* in dream-sleep, the implications of that *studium* for the selection of *simulacra*, and its coordination with *voluntas* further indicate - contra Schrijvers - that such dreams are not purely 'illusions of our creative imagination' and there is no need to resort to the theories of (i) psychological dreams motivated by fear and hope, or (ii) fullness and want, to explain the causes of human and animal dreams, their content, or the associated behaviors.¹¹³

Lines 2.263-71 similarly link *studium*, *voluntas*, and action, as well as represent the mechanism as being common to all living creatures, also beginning with race horses at the starting gate.

nonne vides etiam patefactis tempore puncto
 carceribus non posse tamen prorumpere equorum
 vim cupidam tam de subito quam mens avet ipsa?
 omnis enim totum per corpus material
 copia conciri debet, concita per artus
 omnis ut studium mentis conixa sequatur;
 ut videas initium motus a corde creari
 ex animique voluntate id procedere primum,
 inde dari porro per totum corpus et artus
 DRN 2.263-71

Do you not see that even in the moment when the barriers are thrown open, the *vis* of the eager horses¹¹⁴ is nevertheless unable to burst forth as suddenly as the *mens* itself desires? For the entire supply of matter must be stirred through the whole body, in order that all the supply, excited through the limbs and striving as one, may follow the *studium* of the *mens*; with the result that you see that (1) the beginning of the motion is created from the heart and (2) this beginning of motion proceeds first from the *voluntas* of the *animus*, and (3) thence spreads itself¹¹⁵ further - through the whole body and limbs.

This passage is the second use of the term *studium*¹¹⁶ and the third of *voluntas*, which itself has only just been introduced (2.257, 2.261). Horses, not humans, are thus the first creatures to which *voluntas* is explicitly attributed. Again Lucretius foregrounds animals, perhaps by way of emphasizing that these faculties and mechanisms are common to all.

¹¹¹ Feeney 1978: esp. 16-17, Schrijvers 1980, Gale (forthcoming a).

¹¹² Lucr. DRN 4.1013-36.

¹¹³ Schrijvers 1980: esp. 144-51, 'Wahnbilder der kreative Phantasie' (145).

¹¹⁴ Huby 1969 challenges the the reading '*equorum*' (2.264). In the context of '*mens ipsa avet*', '*cupidam*' is translated as a transferred epithet. Nevertheless the actual phrasing '*vis cupidam*' emphasizes the horse's *vis animi* which is clearly related in this passage to its ability to initiate the behavior of pursuing its desire.

¹¹⁵ The reading of passive reflexive is implied by the motion's initiation by *voluntas*, which the previous lines established to be related to the unfixated *per se* motion of the swerve; cf. pp.22-31, 76 n.109, and below.

¹¹⁶ The first being Lucr. DRN 1.52.

Voluntas is here described as something proper to the *animus* which initiates motion; this motion begins in the breast and then - in this case - transmits to other parts of the body. The whole assembly of matter is thus eventually stirred up in such a way that it can take action as one, as we have seen. Action is here represented as consequent upon and consistent with both the *studium* and the desire of the *mens*, as well as contingent upon its *vis*. By ‘*non ... tam de subito quam mens avet ipsa*’ Lucretius implies that the desire is experienced in the same perceivable instant (*‘tempore puncto’*) as the barriers open. Nevertheless, as we saw in chapter three, a plethora of interactions take place within such an instant - such as the horses’ eyes interacting with the stream of *simulacra* from the suddenly barrier-free path. The delay between this moment and the one when the horses are actually able to burst forth thus attests to the existence of a significant process underlying the action.

Lines 4.1045-8, as we have seen, also relate the striving of the body as one to both *voluntas* and desire. The individual (*id*) who has wounded the *mens* of the lover is, like Helen of Troy, s/he from which the relevant *simulacra* or *Veneris tela* emanate. Moreover, in light of what we have seen above, this wound imagery further indicates that the lover has already interacted with a relatively extensive series of *simulacra*, suggesting a more than superficially disposed configuration. The lover’s *studium mentis* has been attuned to this particular individual for a while;¹¹⁷ this is further suggested by applying language typical of *studium* to one’s desire: ‘*se contendit ... libido*’. Here the *voluntas* which initiates ejaculation thus follows *libido*; both occur subsequent to *studium*.

That sequence is consistent with that in the introduction of the concept of *voluntas* in book two and with the account of motion at 4.877-906; these are best treated in tandem. The broader context of lines 2.251-93 is about the swerve as a type of motion of the *primordia* and of bodies in general,¹¹⁸ as well as about the deliberate movement of a living creature’s body - i.e. the actions which a creature, as agent, chooses to take.

In 2.251-6 Lucretius introduces the concept of *voluntas* and its relationship to the swerve. Although we cannot observe the swerving of macroscopic non-living bodies,¹¹⁹ we can do with respect to living ones. *Voluntas* evinces the existence of the swerve, which is somehow involved in its aetiology.

¹¹⁷ But not yet long enough to amount to habituation.

¹¹⁸ Lucr. *DRN* 2.216-93.

¹¹⁹ Lucr. *DRN* 2.243-50.

... si semper motus conectitur omnis
 et vetere exoritur motu novus ordine certo,
 nec declinando faciunt primordia motus
 principium quoddam quod fati foedera rumpat,
 ex infinito ne causam causa sequatur,
 libera per terras unde haec animantibus exstat,
 unde est haec, inquam, fatis avolsa voluntas,¹²¹
 per quam progredimur quo ducit quemque voluptas,
 declinamus item motus nec tempore certo
 nec regione loci certa, sed ubi ipsa tulit mens?
 nam dubio procul his rebus sua cuique voluntas
 principium dat et hinc motus per membra rigantur
 DRN 2.251-62

... if all motion is always connected and if
 new arises from old motion in a fixed order
 and if by swerving the first-beginnings do not
 make a certain beginning of motion that¹²⁰
 breaks the pacts of fate in order that cause
 may not follow cause from infinity, then from
 what emerges this free *voluntas* which all
 creatures throughout the Earth¹²² possess?
 Then from what, I ask, exists this free
voluntas, torn from the fates, through which
 we advance to where *voluptas* leads each of
 us, as well as swerve our motions - neither at
 a fixed time, nor in a fixed region of space,
 but when and where¹²³ the *mens* itself has
 brought us? For, beyond doubt, in these
 things one's own *voluntas* imparts the
 beginning to each motion, and from this
 motions are channeled through the members.

These lines contain the first two of the poem's eleven uses of the word *voluntas*. Lucretius introduces it as '*libera ... voluntas*'. This expression is inscribed in the text in such a way that it physically encompasses two key ideas. First, whatever *voluntas* is and whatever causes it, all living creatures ('*animantibus*') definitively possess it; as Fowler notes, its existence is presented as a given, but one which Lucretius is at pains to demonstrate.¹²⁴ Second, by '*libera*', Lucretius here means '*fatis avolsa*'; the two expressions modifying *voluntas* are in apposition. *Voluntas*, like the *clinamen*, is something which is not determined or otherwise necessitated. The adjective *liber* itself indicates self-determination, in contrast, for example, with slavery, being ruled, and physical compulsion,¹²⁵ indicating that *voluntas* occurs in a *per se* and not determined manner. The existence of these two things is proof that the conditions of the compound protasis are false. In other words, there are 'new motions' and thus new sequences of motion;¹²⁶ all motion is not determined in a causal chain going back to infinity.

As we saw in chapter one, the *clinamen* or swerve of a body is a new motion which is not necessitated, occurs entirely *per se*, and whose potential trajectory can be predicted

¹²⁰ The '*quod*' at Lucr. DRN 2.254 introduces a relative clause of purpose.

¹²¹ The main ninth century MSS of Lucr. DRN, O and Q, have the reverse order of *voluntas* and *voluptas* in the sixth foot of 2.257 and 2.258 respectively. The correction of Lambinus, supported by Virgil, *Ecl.* 2.65, makes far better doctrinal sense, as the occurrence of *voluntas* is not necessitated but the feeling of *voluptas* - although varying ever so slightly by individual, effectively is. Also, as we have seen, Lucretius shortly before characterizes *voluptas* as the '*dux vitae*' (DRN 2.172). For discussion which concludes in favor of Lambinus, cf. e.g. Fowler 1983: 334-6.

¹²² Here '*per terras ... animantibus*' seems to mean all living creatures 'throughout the [planet] Earth' rather than to merely refer to land creatures.

¹²³ The ambiguity in '*ubi*' actually allows it to encompass both meanings, and thus refer to both ideas in '*nec tempore certo | nec regione loci certa*'.

¹²⁴ Fowler 1983: esp. 332-4.

¹²⁵ Cf esp. OLD §1, 3, 5, 10.

¹²⁶ By this we should understand 'changes in motion' (as all bodies are really always moving) which are not caused by either weight or collisions.

only within a range of probability circumscribed by natural law. Similarly 2.251-62 claims (consistently with 2.269-71 above) that, at the level of the *mens*, *voluntas* initiates the motion and thus the sequence of motions involved in taking action. Those actions, like the swerve-as-motion (2.292-3), can occur at unfixed times and places.¹²⁷ As Long and Sedley note, such echoes suggest that the swerve may well be involved in its phenomenal counterpart.¹²⁸ Their similarity is reinforced by the repetition of *declino*, the four uses of which all occur in 2.216-93. By '*declinando*' (2.253), Lucretius recalls the earlier two uses of the verb, also characterizing the undetermined motion of non-living bodies (2.221, 2.250).¹²⁹ These are echoed by '*declinamus*' (2.259), describing the motions of living creatures initiated by the *voluntas* of the *mens*.¹³⁰ However, the swerve as a new motion of a non-living body (be it a *primordium* or *concilium*) only has the potential to initiate a new sequence of motion when it brings that body into contact with other bodies.¹³¹ *Voluntas*, on the other hand, occurs on the phenomenal level with respect to a living body and by definition initiates new motion in-and-of itself, irrespective of whether the creature meets with other bodies.

If one does meet with other bodies such that one's motion is forced, it is possible to rein in these compelled motions. Lucretius compares non-necessitated motion which begins from the *mens* and causes action to necessitated motion which begins from one's interaction with something external. This is set up by the repetition of *procedo* (2.270, 2.272) and the comparison which links them. Regarding the action which proceeds from *voluntas*, Lucretius says:

nec similest ut cum impulsi procedimus ictu
viribus alterius magnis magnoque coactu;
nam tum materiem totius corporis omnem
perspicuumst nobis invitis ire rapique,
donec eam refrenavit per membra voluntas.
iamne vides igitur, quamquam vis extera multos
pellat et invitos cogat procedere saepe
praecipitesque rapi, tamen in esse in pectore nostro
quiddam quod contra pugnare obstareque possit?
cuius ad arbitrium quoque copia materiai
cogitur interdum flecti per membra per artus
et proiecta refrenatur retroque residit

Nor is this the same as when we, struck by a blow, proceed by means of the great strength and mighty compulsion of another. For it is evident that then all the matter of the whole body goes and is hastened along despite us, until *voluntas* has reined this in throughout the members. Now, therefore, do you see that, although an outside force drives many men and often compels that the unwilling advance and are hastened headlong, nevertheless there is a certain thing in our *pectus* which can fight against and thwart that? According to the

¹²⁷ Compare '*nec tempore certo | nec regione loci certa*' (Lucr. *DRN* 2.259-60) with '*incerto tempore ferme | incertisque locis spatio*' (2.218-19) and '*nec regione loci certa nec tempore certo*' (2.293).

¹²⁸ Long and Sedley 1987: ii.111. Bollack 1976, for example, also sees the *clinamen* and *voluntas* as analogous motions with a causal connection.

¹²⁹ These two uses occur in the framing passages of the account of the swerve of non-living bodies, regardless of size - i.e. Lucr. *DRN* 2.216-50.

¹³⁰ Fowler suggests it may also be parallel to '*flecti*' (Lucr. *DRN* 2.282) and offers useful discussion of the word more generally; Fowler 1983: 335-6.

¹³¹ Which it will probably do at some point in the infinity of time and space, cosmogonically speaking.

arbitrium of this certain thing the abundance of matter is also at times compelled to be steered throughout the members and limbs and, when it has been thrust forward, is reined in and settles back.

Lines 2.272-6 pertain to all living creatures; their interaction is analogous to a collision between one moving *primordium* and one (relatively) stationary one.¹³² A creature does not have to continue on the trajectory which a sufficient external force ('*viribus magnis ... magnoque coactu*') compels. First the compelled motion of the abundance of matter in the bodily frame is transmitted from the members to the *anima* and then to the *pectus*. Then the *voluntas* of the *animus* can rein it in; a new underlying chain of motion is transmitted back to the rest, coordinate with a new motion at the level of the whole.¹³³ This curbs the compelled motion. Using the first person plural *procedimus* Lucretius transitions from the example of horses (2.263-71) to this general point.¹³⁴ Lines 2.277-80 demonstrate this with an example from human experience ('*multos*', 2.277). This passage closes with three lines summarizing the two functions of *voluntas*, common to all creatures - namely: steering ('*flecti*') the matter of the body in a new way, i.e. taking action, and reining in ('*refrenatur*') its motions. Both, and especially the latter, are commonly used of the guiding of horses. Their conjunction and the context of 2.263-71 support this interpretation of the verbs and are consistent with the reading '*equorum*' (2.264).¹³⁵

Both the nature of the claims in 2.277-83 and the use of *refreno*, repeated from 2.276, indicate that *quiddam* and, by extension, *cuius* refer to *voluntas*. Note also the repetition of *cogo* at 2.278 and 2.282 (cf. 2.291). This suggests that, like the motions initiated by interaction with an external force, those initiated or curbed by *voluntas* are compelled. In other words, once *voluntas* occurs, the course of the consequent motions is essentially necessitated (presumably at least until another force of sufficient magnitude intervenes).¹³⁶ Nevertheless, their proximate cause itself, as with the swerve, is *per se* and not necessitated.

Having seen what *voluntas* causes and that all living creatures have it, it now behooves us to further develop what it is, ontologically speaking. The anaphora of the

¹³² Like billiard balls.

¹³³ We will return to this shortly.

¹³⁴ Compare how, in the previous general statement (Lucr. DRN 2.251-62), '*progredimur*' (2.258) also refers to all living creatures ('*animantibus*', 2.256).

¹³⁵ Cf. Fowler 1983: 336-7, *OLD* §7 and §1 respectively; we will return to 3.95f and 3.139, 3.144 below.

¹³⁶ This does not rule out the possibility that some of the constituents moving thus may yet swerve, but, if so, they do so without giving rise to a phenomenal difference - either for lack of numbers or insufficient subsequent interactions.

question ‘*unde ... haec*’ which is bracketed within ‘*libera ... voluntas*’ (2.256-7) is picked up by means of an echo at 2.286 and thus answered definitively at the end of the account of deliberate motion of living creatures, which also serves to conclude the larger account of the swerve:

quare in seminibus quoque idem fateare necessest,
 esse aliam praeter plagas et pondera causam
 motibus, unde haec est nobis innata potestas,
 de nilo quoniam fieri nil posse videmus.
 pondus enim prohibet ne plagis omnia fiant
 externa quasi vi; sed ne mens ipsa necessum
 intestinum habeat cunctis in rebus agendis
 et devicta quasi cogatur ferre patique,
 id facit exiguum clinamen principiorum
 nec regione loci certa nec tempore certo.

DRN 2.284-93

Therefore it is necessary to confess that the same thing also exists in our seeds; i.e. another cause of motion exists besides weights and blows, from which cause we have this innate *potestas*, since we see that nothing can come into being from nothing. For weight prevents all things in us from occurring by means of blows as though by an external force. But in order that the *mens* itself does not have internal necessity in all the things it does¹³⁷ and in order that it is not compelled, as though conquered, to act and react - a tiny swerve of the first-beginnings, in no fixed region of space and at no fixed time, effects this.

Lines 2.284-93 treat the relationship between the *per se* motions of a living creature and the various causes of the motions of its constituents as non-living bodies;¹³⁸ it is not specifically about the motion of the first-beginnings.¹³⁹ Lucretius’ general practice, continued from 2.251, is to employ the experiences of living creatures to reveal details of their underlying mechanisms. With ‘*unde haec est nobis innata potestas*’ and the greater context of 2.251-93, it seems that 2.284-93 refers in the first instance to the constituent *primordia* of living creatures (particularly those of their *mentes*). These things explain the inference of ‘*in seminibus ... idem*’ from *quiddam* (2.280); these are not just any seeds but those of the creature in question. Similarly, the use of ‘*quasi*’ to set up an analogy between blows and external forces follows if ‘*plagis*’ refers to the internal interactions of a creature which take place through collision.¹⁴⁰

This interpretation also supports Lambinus’ conjecture *mens* (over the MS reading *res*) at 2.289, recalling ‘*ipsa tulit mens*’ (2.260) and ‘*mens avet ipsa*’ (2.265); the juxtaposition with *fero* at 2.260 is thus elaborated by its use at 2.289-91 (and coordinated

¹³⁷ I.e. all of its functions.

¹³⁸ Cf. p.31.

¹³⁹ Although this segues back into the subject of atomic motion itself, Lucretius does not resume this until DRN 2.294.

¹⁴⁰ As distinct from the collision of a body with another which is external to it (with ‘*externa vi*’ here, cf. ‘*vis externa*’ at Lucret. DRN 2.277), such as *simulacra* striking the eye or a collision between two *primordia* in the void.

with the idea inherent in *avet*).¹⁴¹ In 2.260, Lucretius claims that through *voluntas* the *mens* bears one wherever in a non-necessitated manner in-and-of itself. In 2.289-91, using language connoting an enslaved captive (e.g. '*devicta*', as opposed to '*libera*', *OLD* §1, cf. 2.256), he argues that the swerve of the first-beginnings prevents the *mens* from being made ('*cogatur*') to act and react - e.g. to bear us against our will and suffer whatever experience brings us. Contra Johnson,¹⁴² these are precisely the necessitated motions with which the *mens* is not obliged to comply according to Lucretius' demonstration in the immediately preceding lines, 2.272-83 (to which we will return shortly).

Returning to his question '*unde exstat animantibus haec ... voluntas*' (2.256-7): Lucretius affirms that there is a cause of motions in one's seeds or constituents '*unde haec est nobis innata potestas*'. These intratextual echos thus confirm that *voluntas* is a power or ability with which all living creatures are born. As we have seen above, it is *libera* in the sense that its manifestations are not-necessitated. Certain things ('*rebus agendis*'), but not all ('*cunctis*'), which *mens* does are therefore not compelled by external or internal forces, but by a manifestation of *libera voluntas*. This degree of freedom is on some level caused by ('*facit*') the ability of the first-beginnings to swerve ('*clinamen principiorum*') at unfixed times and places. The reading *res* at 2.289 would include the first-beginnings, such that the power of the first-beginnings to swerve would be caused by a manifestation of that power; as this is a logical absurdity, *mens* is preferable. The power of *voluntas* therefore emerges partly from ('*exstat*') the potential of the *mens*' constituents to swerve; manifestations of this potential (i.e. actual swerves) are also part of the mechanism by which *voluntas* operates.¹⁴³

Thus, through both explicit statement and intratextual echoes, Lucretius establishes that - with respect to living creatures - *voluntas* and the swerve are coordinate *eventa* on different ontological levels as well as causally related. Certain actions and their proximate cause are therefore entirely *per se*, or in-and-of the creature.¹⁴⁴ *Voluntas*, moreover, is a

¹⁴¹ Similar readings are supported by, e.g. Fowler 1983: 337-8, Long and Sedley 1987: ii.112, Furley 1967. Rist 1972: 92-4. Other readings are preferred by, e.g. Bollack 1976: esp. 183-6, Avotins 1979. Purinton 1996: 157-60. Sedley 1983: 47 n.64 does not come down conclusively, but states advantages for both; he seems to be leaning towards *mens*, which fits in better with his interpretation of the relationship between swerve and *voluntas*.

¹⁴² Johnson 2013 falls into this mistake (and consequent ones) by effectively equating *voluntas* with something occurring *sponte sua*, which, as far as this investigation has found, is an expression never used in proximity, in unambiguously related contexts, or with words like *volo* and *invitus*. Again, this is because *sponte sua* generally refers to *per se* processes which are necessitated by their proximate cause - e.g. by natural law rather than by divine providence; cf. esp. p.27 n.85.

¹⁴³ Cf. Long and Sedley 1987: ii.111.

¹⁴⁴ One may be inclined to follow where *voluntas* leads, but that is not guaranteed, as we shall see shortly.

property of the portion of the *animus-anima* complex concentrated in the *pectus*; it can thus be described as the ability to initiate a sequence of motion proceeding from the *mens* to the rest of the complex and body as well as the manifestation of that ability. As we have seen, such transmissions of motion are likely to begin from the stirring of the nameless fourth constituent of the complex. Although the nameless fourth is the most easily stirred, Lucretius has established that any body, living or not and however large, is capable of such a ‘*momen mutatum*’ (2.220).¹⁴⁵ He also explicitly links the freedom of the *mens* to the *principia* themselves, not to the *anima animae* or any other constituent *concilium*. Therefore, *pace* Fowler, the swerve of any constituent of the *animus*, however small, may be said to stir - generally in the first instance - the nameless fourth and thereby initiate a new chain of motion;¹⁴⁶ on the macro-level, *voluntas* seems to be this mechanism and interaction. It occurs specifically in the portion of the complex that is the *animus*¹⁴⁷ because the constituents of the complex in the *pectus* are so densely concentrated that a swerve is considerably more likely to result in an interaction between two constituents and that the interaction would stir the second sufficiently to begin a new chain of motion.

This immediately raises two problems. Do living creatures have control over their non-necessitated actions? If so, how does that work? Lucretius states here and elsewhere that *voluptas* leads each creature; it is the guide of life. *Voluptas*, properly understood, may therefore lead creatures, but it does not compel them. Lines 2.263-71 and 4.1045-8 above emphasize the directedness of desire, which naturally is towards pleasure. *Voluntas* is somehow instrumental in our pursuit of *voluptas*. This again implies that *voluntas* and the subsequent internal motions of the *animus-anima* complex occur after an experience (at the level of the *mens*) of desire. But if we are not compelled to follow our desires, how do we follow them by choice? Must we act right away or wait until a suitably directed swerve allows us to act?¹⁴⁸

¹⁴⁵ Cf. esp. *Lucr. DRN* 2.220 and 3.188.

¹⁴⁶ While Fowler 1983: 342-4 rightly notes (i) that the nameless fourth is the most likely to stir and (ii) its role in the general sequence of the transmission of motion among the primary constituents of the *animus* and to the rest of the complex and body, he nevertheless argues that the swerve necessarily takes place in the atoms which comprise the nameless fourth; moreover, his explanation of the relationship between the swerve and ‘an act of *voluntas*’ is somewhat reductionistic.

¹⁴⁷ Fowler 1983: 338-9, following Long 1977 contra Furley 1967, suggests that the swerve only has an effect, or at least a decisive one, in the *animus*. While this has just been shown to not be the case, the following will venture why it is more likely to have an effect in the *animus* and why, when it does, that effect is relatively profound.

¹⁴⁸ It seems that the latter would not take long at all (relative to perceptible time), given the speed and constant occurrence of the motions of such a vast number of *primordia*.

The time and place of the swerve may not be fixed, but, like the trajectory, they occur within a range of probability which is governed by natural law - according to the proximate cause with respect to the body in question, which cause is *per se*.¹⁴⁹ Similarly, the time and place at which one's *voluntas* occurs is to some extent predictable, given the circumstances. The range of actions initiated in this way include one's ability to control one's own thoughts.

Living creatures phenomenologically seem to be able to think of whatever they will, whenever they will. However, Lucretius' main aim in 4.779-806 is to dispel the reader's false belief in the simultaneity of *voluntas* and the thoughts or perceptions of the *mens*.

quaeritur in primis quare, quod cuique libido
 venerit, extemplo mens cogitet eius id ipsum.
 anne voluntatem nostram simulacra tuentur
 et simul ac volumus nobis occurrit imago
 DRN 4.779-82

Firstly, we ask why, whatever thing the desire for¹⁵⁰ has come to anyone, his *mens* should immediately think of that very thing. Do the *simulacra* watch our *voluntas* and, at the same time as we will, an image presents itself to us, ...

The idea that *simulacra* stand in abundance awaiting our will is not dissimilar in process from the alleged *animae* which await the sexual union of animals so that they can insinuate themselves into the body of the offspring;¹⁵¹ in the latter case it was the idea that immortal *animus-anima* complexes did so which Lucretius found absurd, in the former it is the timing. The coincidence of will and thought is only apparent (cf. 'an ... ergo', 4.794-806, answering 'an', 4.781). We have seen that interactions seem to take place at the same time because they occur much faster than the speed of phenomenal perception. What is not contested is that both desire (*lubido* or *libido*) and *voluntas* precede the interaction of the *mens* with particular thought-*simulacra*. One's encounter with particular *simulacra* is contingent upon one's *studium* and one's *studium* is - at least at times - within one's control. Moreover, 4.1045-8 indicates that the perception of the *mens* can also precede desire and, in turn, *voluntas*.

The self-preparation or attuning of the *animus*, exemplified by 4.802-6, therefore works cyclically. One's *studium mentis* is open to interaction with particular sorts of *simulacra*. Interaction stirs the *animus* and gives rise to the experience of thought. Desire (for e.g. pursuit, avoidance) may then occur. If it does, *voluntas* may occur - partly by

¹⁴⁹ Contra Long and Sedley 1987: ii.110, a swerve cannot be directed by *voluntas*, otherwise it would not occur *per se*. Both things occur *per se*.

¹⁵⁰ Bailey 1947, iii: 1275 suggests 'the desire for thinking of'.

¹⁵¹ Lucr. DRN 3.776-83.

means of the swerve (likely of one of the *animus*' primary constituents or their first-beginnings) initiating a new chain of motion through interaction with the nameless fourth. The new sequence of motions in question occurs entirely within the *animus* and entails the reconfiguring of its passages such that its *studium* is either reinforced or refined, adjusting the possible interactions to which one is open and thereby affecting subsequent interactions with *simulacra*. This is not inconsistent with each interaction priming the *mens* for the next because the *mens* moves as least as swiftly as a single interaction with a single *simulacrum* occurs; as we have seen, even a one-off *simulacrum*, such as a centaur, can effect the thought of a centaur.¹⁵² Through this *per se* non-necessitated process all living creatures are able to think of what they will.

Deliberate action of the whole occurs by an extension of this mechanism from the internal motions of the *animus* to those of the entire complex and the rest of the body. The configuration of both the *mens* and the rest evolves in all-but continuous manner through this process.

nunc qui fiat uti passus proferre queamus,
cum volumus, varieque datum sit membra movere,
et quae res tantum hoc oneris protrudere nostri
corporis insuerit, dicam; tu percipe dicta
DRN 4.877-80

Now I will say how it happens that we can carry our steps forward when we will and how it has been allowed that the members move in various ways and what thing has accustomed this great bulk of the weight of our body to thrust forward. You, perceive¹⁵³ my sayings.

dico animo nostro primum simulacra meandi
accidere atque animum pulsare, ut diximus ante.
inde voluntas fit; neque enim facere incipit ullam
rem quisquam, quam mens providit quid velit ante;
id quod providet, illius rei constat imago.
ergo animus cum sese ita commovet ut velit ire
inque gredi, ferit extemplo quae in corpore toto
per membra atque artus animai dissita vis est;
et facilest factu, quoniam coniuncta tenetur.
inde ea porro corpus ferit, atque ita tota
paulatim moles protruditur atque movetur.
praeterea tum rarescit quoque corpus, et aer
(scilicet ut debet qui semper mobilis extat)
per patefacta venit penetratque foramina largus,

I say that first *simulacra* of moving reach our *animus* and strike the *animus* as I said before. Then *voluntas* happens; for someone does not begin to do any thing before the *mens* has foreseen what it wills. That which it foresees, an image of that thing is present to it. Therefore, when the *animus* so sets itself in motion that it wills to go and advance, it immediately strikes the *vis* of the *anima*,¹⁵⁴ which has been scattered in the whole body, throughout the members and limbs; and this is easy to do, since the *anima* is held joined-together with it.¹⁵⁵ Then this¹⁵⁶ strikes the body as a whole, and thus the whole bulk is gradually thrust

¹⁵² The interpretation presented here is broadly consistent with Englert 1987 and Fowler 2002b: 440-1. Fowler 1983: 341 is correct that '[w]hat we concentrate on depends on our *voluntas*' and that *voluntas* is not directly caused by sense-perception (a position which he seems to contradict on p.343), and his criticisms of Furley 1967 (esp. 214-15) are well noted; however, his positing of *φαντασία* and his dismissal of the evidence of dreams (e.g. not noting that *voluntas* and actions even occur during dream-sleep) undermines the rest of his reading of the mechanisms under discussion and their relationship.

¹⁵³ With '*percipe*' Lucretius is again employing a related double meaning, one physiological and one phenomenal: thoroughly capture the stimuli and (thereby) perceive my sayings.

¹⁵⁴ Again, the literal translation is maintained to retain Lucretius' emphasis on the *vis* which is a *coniunctum* of the *anima* (whose manifestation is an *eventum*), rather than on the *anima* itself. As the next lines suggest, the *vis* along with the *anima* is scattered throughout the bodily frame.

¹⁵⁵ I.e. with the *animus*, cf. Lucr. DRN 4.886.

¹⁵⁶ Either the *anima* or, more likely, the *animus-anima* complex as a whole.

et dispargitur ad partis ita quasque minutas
corporis. hic igitur rebus fit utrimque duabus,
corpus ut, ac navis velis ventoque, feratur
DRN 4.881-97

forward and moved. Moreover the body then also rarefies, and air (as it obviously should, inasmuch as it is always mobile) comes through the openings and an abundance penetrates the passages and thus disperses to each tiny part of the body. Therefore this action happens by means of both things jointly, with the result that, the body - like a ship, by both sails and wind - is borne along.

This passage adds to our knowledge of the processes of *per se* movement in living creatures in a few ways. First, for movement of the whole body to take place, one's *studium* must be attuned to *simulacra* of the movement itself and is contingent upon their reaching it, as Lucretius embodies in the structure of lines 4.882-3.¹⁵⁷ Since *simulacra* do not move their members and limbs, '*simulacra meandi*' is likely a periphrasis for the stimuli and process by which we perceive, e.g., dancers dancing. Lucretius portrays this as a kind of foresight, no doubt referring to the thoughts which arise from such interactions and the confirmation bias which this can engender in one's *studium*. But this is only foresight of possibilities; to put it another way, one has the idea of an action. The consequent desire which occurs (although not explicitly stated here) for pursuing or avoiding those possibilities would be a more accurate prediction of what we will actually do. *Voluntas* - which is somewhat distinct from willing - again occurs subsequently, initiating a new sequence of motion coordinated with willing the action (esp. '*velit*', 4.886; cf. '*velit*', 4.884, '*volumus*', 4.879). As the result clause introduced by '*ita ... ut*' indicates, the chain in fact underlies the action. The *animus* must sufficiently stir itself up ('*sese ... commovet*') for the experience of willing the action to occur. Then the *animus* immediately transfers its motion to the portion of the complex which is scattered throughout the rest of the body (i.e. to the *anima*). It in turn stirs the body, rousing it presumably with a kind of snowball effect.¹⁵⁸ At effectively the same time as the transmitted motion reaches throughout the body-as-system, the bodily frame unfurls its metaphorical sails. The body increases its capacity for movement by taking into its passages and distributing greater numbers of the second most mobile of its constituents (after the nameless fourth);¹⁵⁹ this facilitates both its general mobility and the particular motion being compelled by *voluntas*. Lines 4.896-7 thus liken the body-as-system to a ship, with the two joint causes of the

¹⁵⁷ The verb *accido* takes the dative '*animo nostro*', and the hyperbaton iconically mirrors the action of the *simulacra* arriving into the *animus*. The verb *accido* - like the *simulacra* which are its subject - also 'reaches' beyond its own syntactical construction to the *animus* by means of two double elisions: *accider(e) atqu(e) animum*.

¹⁵⁸ Cf. Lucr. DRN 4.989-906, and e.g. pp.42-3, 59-61, 145.

¹⁵⁹ This is perhaps not dissimilar from how imbibing wine, by increasing the relative proportion of fiery constituents, predisposes one to experience certain emotions.

former's motion being the willed rousing of its constituent matter and the assumption of a greater quantity of mobile constituents.

The immediately following lines bear out further the analogy between a living body and a ship, as well as a machine.¹⁶⁰ The analogy in 4.898-906 specifically concerns the mechanics of the systems which cause these things to move. Here, the wind is akin to the *animus-anima* complex in its ability to drive a large object, such as a ship, by means of the motions of small bodies. Of particular interest is this:

et manus una regit quantovis impete euntem
atque gubernaculum contorquet quolibet unum
DRN 4.903-4

Both one hand governs the ship, going with
however-much momentum, and one helm
turns the ship to wherever it pleases.

Here Lucretius likens the *mens* to a ship's helm or rudder¹⁶¹ and, depending on which ontological level one considers, likens either *voluntas* or the will to the hand. These comparisons recall and elucidate certain imagery used near the outset of book three, when Lucretius began to develop his account of the nature of the *animus-anima* complex, some of which we have seen already:

Primum animum dico, mentem quam saepe vocamus,
in quo consilium vitae regimenque locatum est
DRN 3.94-5

First, I say that the *animus*, which we often
call the *mens*, in which is located the
consilium and *regimen* of life, ...

nunc animum atque animam dico coniuncta teneri
inter se atque unam naturam conficere ex se,
sed caput esse quasi et dominari in corpore toto
consilium quod nos animum mentemque vocamus.
...
cetera pars animae per totum dissita corpus
paret et ad numen mentis momenque moventur
DRN 3.136-9, 143-4

Now I say that the *animus* and *anima* are held
yoked together among themselves and from
themselves form together one nature; but the
head, so to speak, is the *consilium* which we
call the *animus* and *mens*, and it rules the
whole body. ... The remaining part of the
animus-anima complex,¹⁶² dispersed through-
out the whole body, obeys and is moved
according to the *numen* and *momen* of the
mens.

The word *regimen* refers to the control or steering of, primarily, a ship or a horse, as well as to the apparatus of steering (e.g. rudder).¹⁶³ It thus looks back to horse imagery in book two¹⁶⁴ as well as forward to this ship imagery in book four, linking the two. The relevant semantic range of *consilium* includes the capacity of reason and judgment,¹⁶⁵ the exercise of judgement - i.e. a choice or deliberate action, and a deliberative assembly which makes

¹⁶⁰ With '*commovet ... machina*' (Lucr. DRN 4.906), cf. '*animus ... sese ... commovet*' (4.886); the '*levis nisus*' in 4.906 may be analogous to the small beginning of motion initiated by *voluntas* and its underlying swerve(s).

¹⁶¹ They are connected on a ship.

¹⁶² I.e. the *anima*.

¹⁶³ Cf. *regimen*, OLD §1, 2.

¹⁶⁴ Cf. esp. *refreno* (Lucr. DRN 2.276, 2.283) and *flecto* (2.282).

¹⁶⁵ Perhaps to that extent it is potentially synonymous with the meaning of '*animi ... sententia*' (Lucr. DNR 3.448).

judgments or choices.¹⁶⁶ Lucretius states that it and the power of the *animus* in general develop with the life cycle.¹⁶⁷ At 3.139 both its use and context suggest that ‘*consilium vitae regimenque*’¹⁶⁸ should be taken as an hendiadys with *vitae* modifying the resulting meaning, rather than being a strictly ἀπὸ κοινοῦ construction. It can be rendered ‘the rational control of life’, but simultaneously carries the other valences of meaning. On some level, Lucretius explains the capacity of the *mens* through the physical entities which the words also suggest. In turn, ‘*consilium ... locatum*’ (3.95) indicates that 3.139 is both brachylogy for ‘*consilium ... regimenque*’ and a case of metonymy. That argument is strengthened by the equation of *consilium* with the *animus* or *mens* and the conjunction of both with language typical of ruling¹⁶⁹ such as we have seen used of the *animus* as helmsman and *gubernaculum*.¹⁷⁰ Therefore at 3.139-44 Lucretius is emphasizing that the physiological structure of the *animus* has the property of rational control over the whole bodily system; *consilium* can here be rendered ‘deliberative assembly’, by analogy with a governing council which decides the affairs of state, allowing 3.136-144 to more effectively develop the point of, especially, 2.281-3.

Identical in construction to ‘*consilium vitae regimenque*’ is the phrase ‘*numen mentis momenque*’. Similarly, both the elements and the expression as a whole are significant. Here ‘*numen*’ refers to the will itself and, in conjunction with ‘*paret*’, the nod of a ruling deity, indicating its choice - which shall be obeyed. Such a nod is a motion of the bodily frame which would begin from a non-necessitated *per se* motion of the *mens*.¹⁷¹ With one exception (2.1169), Lucretius uses *momen* in mechanistic contexts; these denote movements ranging from a swerve (2.220), to the push one body receives from its collision with another (3.188, 3.189), and the movement of the sea (6.474); in other words

¹⁶⁶ Cf. *consilium*, OLD esp. §3, 6, 8. The noun occurs seven times in the poem: Lucr. DRN 1.1021, 3.95, 3.139, 3.450, 3.615, 5.127, 5.419 (1.1021-3=5.419-21).

¹⁶⁷ Lucr. DRN 3.445-58.

¹⁶⁸ Bailey 1947, ii: 1007 (discussing Lucr. DRN 3.95) states ‘*consilium*: probably Lucr.’s rendering of τὸ λογικόν, as *regimen* certainly is of τὸ ἡγεμονικόν’. This is certainly wrong. As we have seen in ch.1, Lucretius does not posit τὸ λογικόν. Moreover, τὸ ἡγεμονικόν imposes Stoic terminology and concepts on Lucretius. According to the Stoics, the ἡγεμονικόν of animals lacks rationality; they are governed rather by life, feeling, and impulse; cf. Chrysippus SVF 2.821 and discussion in Newmyer 2011: 3-4. Lucretius here is discussing the ‘*consilium vitae regimenque*’ of all living creatures. His conception of it, as we shall see, is particularly far from the Stoic conception of the animal ἡγεμονικόν.

¹⁶⁹ Esp. ‘*dominari*’ (Lucr. DRN 3.138), but also ‘*caput*’ (3.138, as leader, cf. p.169, ‘*numen*’ (3.144, on which cf. below).

¹⁷⁰ Lucr. DRN 4.903-4.

¹⁷¹ The seventeen other instances of *numen* in the poem, suggest that that this use is meant to evoke both motion and volition: Lucr. DRN 1.154, 2.168, 2.434, 2.614, 2.623, 3.18, 4.1233, 4.1239, 5.122, 5.309, 5.1161, 6.61, 6.74, 6.95, 6.1271. In DRN, as in Latin literature more generally, *numen* is often associated with the nod of the gods, a voluntary motion indicating and/or interchangeable with their will or command. At 2.633 it lacks the divine association, but still indicate a nodding motion and perhaps also volition. At 4.179 the concept is used to personify the impersonal forces by which *simulacra* move.

it encompasses non-necessitated *per se* motion and both sorts of necessitated motions.¹⁷² Thus at 3.144 it can be understood to include the full range of the movements of the *mens* with, in this context, particular emphasis on those movements which begin with *voluntas*. The full expression thus can be rendered ‘the commanding motion of the *mens*’, but its meaning is considerably richer.

The juxtaposition of the metonymic *consilium* with ‘*ad numen mentis momenque moventur*’ in this context elucidates the meaning of ‘[*mentis*] *ad arbitrium*’ in its similar context (2.281).¹⁷³ Creatures will their actions in accordance with their *arbitrium*, which thus seems to mean both the ability to evaluate (itself a process) and the particular decisions or choices which result.¹⁷⁴ The ability exists and manifests at the phenomenal level; its results are experienced there, before consequent action can be initiated at the level of our constituents. This is rational control in practice. Control of our actions therefore involves top-down processes. That said, the process underlying *arbitrium* must involve *voluntas*, otherwise we would be subject to determinism.

The mechanism and imagery of the non-necessitated motions of all living creatures make clear that Lucretius believes the proximate cause to be in-and-of oneself and that one has control over these motions. They not only depend on us but are to some extent ‘up to us’; not due to chance.¹⁷⁵ If one did not have control, there would be no point to the injunction to avert one’s *animus* in order to avoid the darts of Venus and the consequent inculcation of *amor*. Similarly, one would simply be conquered by the *dicta* of the priests, rather than focusing instead on the *dicta* of Lucretius, who facilitates the choice to maintain that *studium* by expressing his teachings in pleasurable verse. In other words, the verse form, the larger didactic program, and particular teachings are all predicated on the understanding that we do at times exercise control over our thoughts, beliefs, and other actions and developments.

¹⁷² Although, of the six uses, Lucretius thrice uses *momen* with respect to the motions of *corpora* which are in living *concilia* (i.e. here at Lucr. *DRN* 3.144, and at 3.188, 3.189), these are all discussions in which the motions of those *corpora* are discussed mechanistically in the manner of non-living *corpora*. The word is never used of living creatures themselves. *Momen* does, however, clearly encompass a wide range of motions, both necessitated and unfixed.

¹⁷³ As Bailey 1947, ii: 850 notes: *arbitrium* occurs ‘here only in Lucr.; by other authors an act of will or choice is often described as *liberum arbitrium*’.

¹⁷⁴ The fact that Lucr. *DRN* 2.281-3 refers to the *mens* both steering our matter through the limbs (cf. the preceding example of the horses, ‘*equorum*’) and reining it back in (cf. the preceding example of men, ‘*multos*’) according to its *arbitrium*, evinces that *arbitrium* is an ability shared by all living creatures (cf. ‘*animantibus*’, 2.256).

¹⁷⁵ Cf. Epic. *Ep. Men.* 133, esp: ‘τὸ δὲ παρ’ ἡμᾶς ἀδέσποτον’. Long and Sedley 1987: i.107 also note this contrast. Annas 1992: 128-9 rejects the possibility that this includes ‘up to us’, which seems to reintroduce necessity. These ideas will be treated further below in relation to Epic. *On Nature* 25.

All creatures have thus the capacity for moral responsibility, at least in the sense of being causally responsible for their choices and certain actions (whether or not other circumstances permit one to follow through on them¹⁷⁶) - for which they can be praised or blamed.¹⁷⁷ Some scholars, such as Fowler and Gill, agree that this causal responsibility is free will and thus that the choices and actions are deliberate;¹⁷⁸ others, such as Bobzien, O'Keefe, and Johnson, call it autonomy or effective agency, find it effectively determined by internal necessity, and deny free will to animals.¹⁷⁹ This capacity for moral responsibility follows from the limited probabilistic indeterminism with respect to the new motions which depend on us and over which we experience top-down control, at least of the possibilities open to them.¹⁸⁰ Control extends even to the deliberate attuning of one's *studium mentis* and thereby to what follows from it. Hence, as we will see, one's behaviors are generally consistent with one's *natura animi* (including the inherent, the

¹⁷⁶ E.g. A paralyzed creature may chose to walk and go through most of the aforementioned process, but at a certain point the motions of the complex will cease to be transmitted to the legs and walking will not be able to occur. Cf. the idea that the future is to some extent ours, and to some extent not ours, in Epic. *Ep. Men.* 127.

¹⁷⁷ Cf. Epic. *Ep. Men.* 133: 'τὴν δὲ ὑπὸ ... πέφυκεν'; Epicurus' three categories here correspond roughly to Lucretius' categories of the causes of motion of living creatures (cf. esp. p.31). On the connection between moral responsibility, reason, choice, learning, and justice, cf. Sorabji 1993: ch.9, esp. 115-16, 121. On this definition of moral responsibility, cf. Sorabji 1993: 108-9, and, particularly with respect to the Epicureans, Bobzien 2006: esp. 206-7, 210. According to Frede 2011: 8: 'The notion of a will, then, is the notion of our ability to make such choices or decisions which make us act in the way we do.' Frede also argues that Plato and Aristotle have no notion of a will itself, but only the desire of reason (based on what it recognizes to be good and not) and its consequent choices - i.e. to do X (vs failing to chose to do X); Frede 2011: 19-30. But the fact that Lucretius does (and indeed of one which is *libera*) should caution against Frede's identification (Frede 2011: 31-88) of the notion's origin with the Stoic Epictetus. Fowler 1983: 349-50 (also on the basis of Epicurus *On Nature* in Arr.² 34.27 = Laursen 1997: 35-6 and Diog. Oen. fr.54 col.II.3-col.III.9 Smith) sees moral responsibility as being inherently linked to free will and the swerve, and includes animals in this. Sorabji 1993: 115 suggests that Lucretius may differ from Epicurus in allowing animals free will and (by implication) reason, but not moral responsibility. Long and Sedley 1987: i.107 suggest that Epicurus was the first to recognize the importance of the so-called Free Will Question. Cf. Sedley 1983, Sedley 1988, Annas 1993.

¹⁷⁸ Gill notes well that agency is predicated upon the structure of the whole creature behaving as a system and is not adverse to Epicurean animals being 'agents capable of ethical agency and responsibility'; Gill 2009: 137-8, cf. Gill 2006: 61 that animals count as agents in that they have free will and initiate motion. Lucretius' account of the role of *voluntas* in doing Y instead of X, supports this - e.g. reining in a motion after having been pushed, pursuing pleasure - presumably according to the calculus which prefers natural, necessary, and long-term pleasures; horses were explicitly seen to do this, cf. pp.223, 227 (incl. n.307). On this ability, cf. Epic. *Ep. Men.* 127-32 (128 applies this to τὸ ζῷον explicitly, either as an animal or living creature in general), Epic. *KD* 8-10, 15-21, 25-6, 29-30. In other words, contra e.g. O'Keefe 2009: 145, what Lucretius is describing is 'two-sided free will'!

¹⁷⁹ Bobzien 2000: 292, 337 argues that Epicurean moral responsibility is tantamount to a consequence of autonomy (i.e. lack of coercion) and does not involve free choice, but rather one is fully determined by one's dispositions (of which one is also the cause); cf. O'Keefe 2009: 144-6, Johnson 2013: esp. 127-30. This position is predicated upon notions such as: a mere break in the causal chain at some point in the universe frees the world from absolute determinism and Epicureanism requires no more than this. Against such a position, cf. esp. Sedley 1983. For examples of other scholars who deny animals moral responsibility, cf. p. 301.

¹⁸⁰ Further on this, cf. below. Because the non-necessitated *per se* cause of their actions cannot be reductively explained at the level of the *primordia* (even though it operates through and can be partially described at that level) it is proper to say that agency, and with it the capacity for moral responsibility, is emergent. Contra, e.g., Morel 2009: 77 who sees the *clinamen* as merely a 'necessary condition' for but 'not a true cause of free or voluntary action'.

developmental, and the variable aspects thereof),¹⁸¹ and there is a great deal more about the ontogeny of that *natura* for which one is responsible.

III. LEARNING

Memory, for Lucretius,¹⁸² includes a kind of holding on by the *animus* to traces of things that have happened ('*vestigia gestarum rerum*') and, the sequence in which they occurred; without this the perception of time could not exist. This retention of what has been done ('*actarum ... retinentia rerum*') is an ability within and contingent upon the greater *potestas animi*.¹⁸³ In the infinity of time and matter, identical arrangements with the same powers would certainly have developed; yet, even if this extended to the development of identical memories, one would not recall having had them previously.¹⁸⁴

Lucretian memory encompasses what we might term recognition and recall. Recognition seems to involve a kind of comparison between, for example, a perception which is occurring and memories or traces of those which previously occurred. The comparison identifies identity, similarity, difference, and novelty - and seems to be involved in learning, for example in the formation of ideas.¹⁸⁵ As we have seen, among the natural laws which govern the generation of created things are the principles that like is drawn to like, the complementarity or fit of one shape with others governs many processes, and different shapes will interact differently when they come into contact. If our past perceptions and ideas are physically encoded in memory, then these laws may govern the said process. Recall can occur with respect to perceptions or ideas, and can be caused by either or by one's will. Epicurean didactic strategies suggest that they believed recall to be facilitated by repetition.¹⁸⁶

¹⁸¹ As Fowler 1983: 344 puts it, because of his constitution, Epicurus is not going to wake up a religious maniac tomorrow due to some random swerve of his soul-atoms; cf. Epic. *On Nature* 25 = Arr.² 34.22, 34.26-7 = Laursen 1997: 22, 32-6. Nevertheless, *pace* Fowler, the swerve is not random.

¹⁸² According to Sorabji, on memory, 'the Epicureans characteristically display a division of opinion', to the extent that, on the one hand, 'Diogenes of Oenoanda ... subordinates memory to thought (*dianoia*), because in memory thought receives likenesses of what was formerly perceived: new fr. 5.3.3-14, Smith. On the other hand, Epicurus' successor Hermarchus treats at least some memory as irrational (*alogos*) and contrasts it with reasoning (*epilogismos*): Hermarchus ap. Porphyrius *Abstinence* 1.10'; Sorabji 1993: 52 (incl. n.14).

¹⁸³ Lucr. *DRN* 3.672-6.

¹⁸⁴ Lucr. *DRN* 3.847-61. They existed, but did not come into being as such from one moment to the next; the arrangements would have had to develop, just as we did.

¹⁸⁵ As we shall see below, this process is related to concept formation and encompassed by *ratio*.

¹⁸⁶ Epic. *Ep. Hdt.* 35-6, 45, 83, *Ep. Pyth.* 84, *Ep. Men.* 122-3, 135. D.L. 10.16. Cf. esp. Clay 1983: who builds up to this argument over the course of ch.2 and elaborates it at pp.176-85.

The fact that Lucretius believes both sorts of memory, as well as anticipation, are common to all living creatures is first suggested in book one by the analogy between seeking knowledge and seeking prey.

multaque praeterea tibi possum commemorando
argumenta fidem dictis conradere nostris.
verum animo satis haec vestigia parva sagaci
sunt, per quae possis cognoscere cetera tute.
namque canes ut montivagae persaepe ferai
naribus inveniunt intactas fronde quietes,
cum semel institerunt vestigia certa viai,
sic alid ex alio per te tute ipse videre
talibus in rebus poteris caecasque latebras
insinuare omnis et verum protrahere inde.
DRN 1.400-9¹⁸⁸

By recalling many additional arguments, I can sharpen your belief¹⁸⁷ in our sayings. But for a keen *animus* these small tracks are enough; through these tracks you should be able to learn the rest. For indeed as dogs frequently by means of their nostrils discover the resting places, covered with foliage, of mountain-ranging animals, once they have happened upon certain traces of the path - thus you yourself on your own will be able to see one thing from another in such matters and arrive at all unseen hiding places and drag the truth out from there.

The significance of this passage is highlighted by the emphatic nature of the addresses to the reader, built up through pleonasm and the agency implied in ‘*possis ... tute*’ and ‘*per te tute ipse videre ... poteris*’. Lucretius here moves from human to animal and then animal to human (‘*ut ... sic*’)¹⁸⁹ on the basis that both creatures are performing actions which require deductive reasoning. Dogs have a nose which is particularly well-constituted to facilitate the perception of smells. Thus they recognize that there is a scent which is of interest and what sort of animal left it, as well as recall whether that animal is a threat to it (or vice versa); from these things they deduce the trail of the animal¹⁹⁰ and whether they should pursue it or flee - anticipating that pursuit will lead them to the source-object itself. Polystratus denies animals these abilities (inferential reasoning, foresight, memory, and assessment, among others) and thus thinks that they lack reasoning (*λογισμός*) or at least reasoning like humans.¹⁹¹

Similarly, humans have an *animus* which is particularly suited to facilitate perceptions useful for deducing one bit of knowledge from another. Both are *sagaces*. We have seen that this is important to the reader’s potential to learn Epicurean truth; as Clay notes, here (1.402-3) and elsewhere (e.g. 5.1281-2), using similar language, Lucretius

¹⁸⁷ Although *conrado* usually means ‘scrape together’ (cf. *corrado*, *OLD* §1), it here seems to mean something like ‘more thoroughly refine’ (cf. *corrado*, *OLD* §2). This translation stresses the sense that something mechanistic is going on here - e.g. that the ‘*multa ... argumenta*’ function like the drops of water on stone, i.e. by fashioning the constitution physically.

¹⁸⁸ With *Lucr. DRN* 1.406-9, cf. 1.1114-17.

¹⁸⁹ This move is not dissimilar to the move of the titular line of this thesis.

¹⁹⁰ N.B. Chryssipus’ story of the hunting dog who performed the deductive syllogism while tracking its quarry; Sorabji 1993: 21.

¹⁹¹ Polystr. *On Irrational Contempt* 1-7 in Indelli 1978: 109-11; cf. Annas 1992: 135-6, Annas 1993, against which, Sorabji 1993: 55 argues that Polystratus ‘does not deny animals memory, but denies only that they remember in such a way as to secure benefits or avoid repeated harm, because they cannot recognise consequences or signs’.

depicts the reader as able to discover the truth about the nature of things on his/her own.¹⁹² The *studium* of the reader is primed by sufficient introduction to the *vestigia*, and the reader is able to recognize the *vestigia* when s/he encounters them. The reader must also recall whatever was already associated with those or related traces in order to add to or otherwise modify that knowledge. Lucretius is here taking a common analogy and making concrete the metaphor; by applying the same process to *vestigia*, the dogs are learning the nature and location of their quarry and the reader is learning the true nature of things. If dogs can do it, Memmius, so can you!

Lucretius' belief that animals too are capable of recognition and recall, as well as of inductive reasoning, is perhaps best illustrated by his account of the mother cow searching for her own calf, which she knows from all the others - i.e. the *vitulus*. We will return later to those lines. Their immediate function is to demonstrate that animals know their own offspring. As we have seen, each creature of even a given kind differs from the others with respect to its particular shape (2.347-8, cf. 2.665-6).

nec ratione alia proles cognoscere matrem
 nec mater posset prolem; quod posse videmus
 nec minus atque hominem inter se nota cluere
 DRN 2.349-51

Nor in another way could offspring know¹⁹³
 their mother, nor the mother her child; we see
 that they can do and are known clearly among
 themselves no less than men.

By this Lucretius implies that all creatures can distinguish between the different perceptions which result from the different stimuli. Thus when a calf is slain on the altars of the gods, the mother cow typically (*'nam saepe [2.352]... at'*) searches for it, in vain, and recognizes that the other members of her species which she sees are not her own kin. Lucretius then goes on to demonstrate that offspring know their mother using two further species: kid goats and the lambs of sheep. This is true to such an extent that a particular offspring even knows its own udder,¹⁹⁴ which implies recognition, recall, discernment, and - as it was not born with a pre-assigned udder - learning. Here, through the ideas expressed and the anaphora of *'nec'*, Lucretius emphasizes that all living creatures, both humans and animals, know their own offspring (and parents) in the same way and according to the

¹⁹² Clay 1983: 225. Camardese 2010: 181-202 also notes this parallel between the faculties of dogs and those of humans. Solmsen 1970 also comments on these passages, wondering at what he perceives as a sort of omission following the passage of book five, by analogy with the case from book one and another at Lucr. DRN 6.532-4. Bailey 1947, iii: 1525, on the other hand, takes the Solmsen's 'omission' as deliberate and an illustration the way in which Lucretius' mind works.

¹⁹³ Here syntax indicates that *'cognoscere'* is 'to know by learning'; cf. Lucr. DRN 1.404.

¹⁹⁴ Lucr. DRN 2.367-370. Anyone who has spent significant time on a farm raising sheep can attest to the fact that lambs generally do, as Lucretius says, run to their own udder on mum; many thanks for this fact to Lorna Ferguson of the award-winning Charollais sheep breeding and rearing Ferguson family, Co. Cork, Ireland.

same mechanism. One recognizes a perception of the distinctive appearance and recalls that the familiar source-object is one's relative. Both forms of memory are involved in any creature knowing, upon perception, that X is X and that Y is not X.

Lucretius' treatment of dreams not only shows that animals, like humans, possess memory, but also that their memory is affected in the same way in dream-sleep. During dream-sleep, as we have seen, only the *animus* is still perceiving. In this state we seem to see (i.e. with our eyes) the dead.¹⁹⁵

praetera meminisse iacet languetque sopore,
nec dissentit eum mortis letique potitum
iam pridem, quem mens vivom se cernere credit
DRN 4.765-7

Moreover, remembering lies low and is weak in sleep,¹⁹⁶ nor does it protest that he whom the *mens* believes itself to perceive alive has for a long time already been mastered by death and destruction.

Lines 4.766-7 in particular imply that one recognizes the dead person and recalls who he is; one simply does not recall that he is dead - any more than one recalls where one actually is.¹⁹⁷ If recall did not function at all during dream-sleep, it would not be possible for men to speak of important matters and bear witness against themselves.¹⁹⁸ Hence, it is proper to say that the manifestation of the power of memory is somewhat inhibited in dream-sleep; it is not temporarily inactive like the *sensus corporis*.¹⁹⁹ Rather, recognition functions properly and recall is limited. Similarly, we do not marvel in dreams at figures which morph within our grasp. We recognize that the same entity is present but do not recall that shape-shifting cannot really happen. Lucretius specifically attributes this lack of marveling to sleep-induced forgetfulness ('*sopor atque oblivia*',²⁰⁰ 4.822).

According to Lucretius, it is the same for animals during dream-sleep.²⁰¹

at consueta domi catulorum blanda propago
discutere et corpus de terra corripere instant
proinde quasi ignotas facies atque ora tuantur.
DRN 4.988-9, 1004²⁰²

But the charming progeny of small dogs, ones accustomed to the home, hasten to bark and tear their body from the earth just as if they behold unknown faces and appearances.

These dogs realize that the faces of which they dream are not familiar to them, indicating that their *studium* is configured in a way that permits interaction with *simulacra* from the sort of source-objects which they expect to encounter, as well as, presumably, the specific

¹⁹⁵ Lucr. DRN 4.757-64.

¹⁹⁶ This is one of the cases where *sopor* is used interchangeably with *somnum*.

¹⁹⁷ Cf. esp. Lucr. DRN 4.453-61.

¹⁹⁸ Lucr. DRN 4.1018-19, 5.1158-60.

¹⁹⁹ This fact must be reflected in the translation which one chooses for '*iacet languetque*'. Schrijvers, on the other hand, claims that memory fails: 'das Gedächtnis gerade im Schläfe versagt'; Schrijvers 1980: 141.

²⁰⁰ This expression should be read as an hendiadys, with '*oblivia*' being the subject of '*curant*'.

²⁰¹ Cf. the above discussion of Lucr. DRN 4.984-6.

²⁰² According to Rouse and Smith 1992 *ad loc*, Lucr. DRN 4.1000-3 repeats 4.992-5 and must be ejected.

individuals which they do generally encounter. It also implies that animals can distinguish particular members of a different species from one another, recognizing familiar from unfamiliar even in sleep. These dogs also recall the proper behavior upon seeing someone unknown and potentially unwelcome. They simply do not recall the actual context and activity of their own bodies - namely, that they are asleep and dreaming. Thus, in the absence of contradictory information from the perceptions of the *sensūs corporis*, both humans and animals judge the visions of the *animus* to be true. As a result, one feels the emotions which one would feel if experiencing the same in waking life, but they are *inanis*.²⁰³ Similarly, *voluntas* and its consequent actions occur, as we have seen.

Line 4.988 indicates that this is true of a variety of types of dogs. ‘*Consueta*’ suggests that they have become habituated or trained for domestic life, implying learning. But this process was not necessarily a one way street; although ‘*blanda*’ may be a transferred epithet, the idea of charming progeny recalls the ‘*blanditiae*’ (5.1018) by which *pueri* first led the earthborn generation into communities,²⁰⁴ and the behavior of the dreaming dogs suggests that the utility which they give humans - on which basis interspecies alliances are formed - is guarding the home. The emphasis on progeny here also suggests that this behavior during dreams is both characteristic and hereditary of these various sorts of smaller dogs.²⁰⁵

The retention of *vestigia* and the process of comparison between current and past perceptions which underlies recognition are also involved in the formation of ideas and knowledge, both of which are encompassed by Lucretius in the word *notitia* (alternatively, *notities*).²⁰⁶ Given that, as we have seen, the *sensūs* are the primary criterion of truth, it is not surprising they are involved in the formation of at least some ideas, including those of truth and falsehood. In his account of the self-refutation of the Sceptics, Lucretius says he would ask such a man:

unde sciat quid sit scire et nescire vicissim,
notitiam veri quae res falsique crearit,
et dubium certo quae res differre probarit.
invenies primis ab sensibus esse creatam
notititem veri neque sensus posse refelli
DRN 4.475-9

... from what does he know what it is to know and, in turn, to not-know; what thing created the *notitia* of truth and that of falsehood, and what thing proved that a questionable thing differed from a sure one. You will discover that, firstly, the *notitia* of truth was created from the *sensūs* and that the

²⁰³ Cf. e.g. Lucr. DRN 3.112-16, esp: ‘*motus et curas cordis inanis*’, discussed on pp. 65-6, 137.

²⁰⁴ Therefore, if ‘*consueta domi catulorum blanda propago*’ is a periphrasis, it is significant.

²⁰⁵ Larger dogs presumably being less useful for the home on the basis of their size?

²⁰⁶ Between the two forms *notitia* and *notities*, the word occurs eight times in the poem: Lucr. DRN 2.124, 2.745, 4.476, 4.479, 4.854, 5.124, 5.182, 5.1047. Below we will return to it and its relationship to Epicurus’ πρόληψις.

Ideas or concepts are not only of abstract things,²⁰⁸ but also of material ones, like a person. This fact and their origin in sense-perception forms part of Lucretius' argument against divine creation. Lucretius rhetorically asks, if creation were true, then:

exemplum porro gignundis rebus et ipsa
notities hominum dis unde est insita primum,
quid vellent facere ut scirent animoque viderent,
DRN 5.181-3

Further, from what was the model of generating things and the very *notities* of man first implanted in the gods, that they might see with the *animus* and know what they wished to make?

The formulation of this question suggests that the gods too, even if involved in the creation of worlds, would have to have gained their idea of what things they wished to create through the *sensūs*. Thus, they could not have been involved, as there was initially no basis for such ideas.²⁰⁹ Similarly, and using some close intratextual echoes, in his account of the non-teleological origins of language, Lucretius states:

praeterea si non alii quoque vocibus usi
inter se fuerant, unde insita notities est
utilitatis et unde data est huic prima potestas,
quid vellet facere ut sciret animoque videret
DRN 5.1046-9

Besides if others were not also using the *voces*²¹⁰ amongst themselves, from what was the *notitia* of their *utilitas* implanted and from what was the the ability first given to this man that he might see with the *animus* and know what sounds he wished to make?

The alleged name-giver,²¹¹ could not have made names for things, because he would not have known that certain sounds would be useful for designating certain things unless they already were. Moreover, as all members of the species innately share the power of speech at least in potential, there is no reason why one person should have possessed it ahead of others. The ability developed with the race as its first members grew up and interacted. This is well illustrated by the juxtaposition of *notitia* and *utilitas* in another anti-teleological context.

According to Lucretius, the parts of the body and their abilities precede their uses and were thus not created for the sake of them. The sense-organs and members are examples of things which were born first and then (after) granted us '*suae ... notitiam utilitatis*' (4.854).²¹² Putting *notitia* before perception, is thus putting the cart before the

²⁰⁷ Cf. e.g. Lucr. DRN 1.422-5, 1.699-700.

²⁰⁸ *Utilitas*, *verum*, and *falsum* are all abstract things of which one has *notitiae*.

²⁰⁹ On the lack of divine involvement in any phenomena of the cosmos, cf. Epic. *Ep. Hdt.* 76-7.

²¹⁰ The meanings of this term will be discussed below; here it likely refers in the first instance to relatively articulate sounds made by the voice - such as the first names for things.

²¹¹ The name-giver (of myth, Plato's *Cratylus*, and the Hebrew Bible) was as much of an adynaton for Lucretius as a providential creator divinity; cf. Reinhardt 2008: esp. 136-7 on Lucretius' case against the existence of a name-giver.

²¹² These lines will be treated in greater detail in the next section.

horse. Furthermore, all creatures which developed such uses of their faculties also have the ability to form *notitiae*; thus animals do.²¹³ Lines 5.181-3 and 5.1046-9 also suggest that both the configuring of one's *studium* and the utterance of language are examples of deliberate actions which are contingent upon *notitiae*. In other words, like a thought, an idea can be the result of the vision of the *animus* and deliberate action, as well as a co-cause initiating those mechanisms.

Notitia, as idea or concept, thus occurs in the *mens* and can be remembered.²¹⁴ Its formation involves a kind of synthesis of sense-perceptions.²¹⁵ Πρόληψις overlaps thus far with this usage, at least with respect to material things (vs abstract ones). However, the formation of πρόληψις generally happens 'automatically' or in a necessitated *per se* manner; it is not within our control.²¹⁶ The formation of at least some *notitiae*, on the other hand, involve willed inference (i.e. judgment-based evaluation and induction) and choice.²¹⁷ Regardless, all three are *eventa* of place and space, not Platonic forms; otherwise, there would be no point, e.g., to arguments about the nature of justice.²¹⁸

The second thing which the word can denote is knowledge, i.e. a correct idea about the nature of things or a correct system of ideas. Lucretius' first two uses of *notitia*, at the least, lean towards this interpretation of the term and require willed inference, perhaps akin to ἐπιλογισμός,²¹⁹ not just a kind of automatic process of comparison. The first

²¹³ Philodemus, on the other hand, seems to deny animals the ability to form concepts; cf. Phld. *D.* 1.12.10, Sorabji 1993: 32.

²¹⁴ Lucr. *DRN* 2.745.

²¹⁵ This includes the *sensūs* of the body and of the *animus*. In the cases of concepts of gods and centaurs, the perceptions of the *animus* alone are at stake; cf. Lucr. *DRN* 4.739: '*ex vivo centauri non fit imago*'. This sort of synthesis may be a case of synaesthesia.

²¹⁶ On πρόληψις, cf. D.L. 10.33. Cic. *ND* 1.43-9; cf. Long and Sedley 1987: i.145, ii. 149. On πρόληψις formation by a kind of 'sorting process', cf. Asmis 2009: 86-90. According to Asmis, there are a range of them, some of which involve drawing connections involving others (not just a synthesis of remembered perceptions), and some of which involve inference or calculation in the sense of attending to similarities and differences.

²¹⁷ They are perhaps closer to Epicurus' ἐπίνοια; cf. D.L. 10.32. Glidden also reaches this conclusion; Glidden 1992: 442.

²¹⁸ On the concept of justice as an *eventum*, cf. e.g. Epic. *KD* 36-8. Nevertheless, as Denyer 1983: 144-9 notes well, Epicurean justice is not as relative as it may seem, as all ideas of justice are based on mutual usefulness. For a more recent take on the issues with which Denyer was dealing, cf. Campbell 2002. While the specific utility at stake in each instance is relative, the same conception (e.g. usefulness) led to the same outcome, namely pacts. On the nature of justice, cf. also, e.g., Brown 2009: 191-5; however, on p.192 he excludes animals from both the conception of justice and from pacts which are preconditions of it.

²¹⁹ On the interpretation of ἐπιλογισμός as inductive inference (in various contexts) from accumulated experience, contingent upon memory, or as a product thereof, cf. De Lacy 1958 (contra Arrighetti) and the De Lacy and De Lacy 1978 edition of Philodemus' *On Signs*. Asmis 1984: 177-8 interprets it more generally as calculation or analysis, and Sedley 1973, after surveying all of the Epicurean evidence, concludes 'reasoning based on empirical data'; Sedley 1973: 27. Schofield 1996 surveys all of these and proposes instead that the term means 'assessment' or 'appraisal' (i.e. 'comparative judgment', referring in the first instance to our everyday practices and making this the basis for the more technical employment of the term, which becomes the basis of inference, including by the similarity method and analogy; cf. Sedley 1973: 31-2 and Sedley 1982a (e.g. on the Epicurean preference for the inductive similarity method over the deductive elimination method).

instance of the term occurs in the metapoetically, ontologically, and - particularly for the present purpose - epistemologically critical dust-mote passage. Their motions arise from and mirror those of the *primorida*

conicere ut possis ex hoc, primordia rerum
 quale sit in magno iactari semper inani.
 dumtaxat rerum magnarum parva potest res
 exemplare dare et vestigia notitiae
 DRN 2.121-4

... with the result that you can infer from this
 how it is that the first-beginnings of things are
 always tossed about in the great void - so far
 can a small thing provide a model of great
 things and the traces of *notitia*.²²⁰

One does not think of an idea (or knowledge), according to Lucretius' account of thought; only material entities generate thought-*simulacra*. Here, *conicio* implies a literal putting-together (deliberately), as well as forming a conclusion or *notitia* from that.²²¹ However, one can recall, evaluate, and apply an idea. An idea can be applied as a tool for judging a perception or another idea. The idea of refraction (or the knowledge of its existence and how it works), for example, can be used for suspending the belief that the oar, which appears to be bent,²²² is indeed bent, until one has had a chance to pull it out of the water and examine it.

Some judgments about perceptions seem to happen automatically as we perceive. These necessitated *per se* inferences, or *opinatūs animi*, occur through the comparison process.²²³ Not only would this entail juxtaposing current perceptions to one another, it would also involve comparison with past perceptions and ideas. In other words, automatic evaluation occurs by degree of analogy. One is predisposed by such processes to take the similarities between Y_1 and X_1 as signs that Y_1 is really X_2 or $(X+1)_1$ - i.e. that we have just perceived either the same thing as we once did or something very nearly like it. With respect to a series of examples in which one seems to perceive that things are somehow different from the way that they truly are, Lucretius states:

cetera de genere hoc mirande multa videmus,
 quae violare fidem quasi sensibus omnia quaerunt
 nequiquam, quoniam pars horum maxima fallit
 propter opinatus animi quos addimus ipsi,
 pro visis ut sint quae non sunt sensibus visa.

To a remarkable degree we see many other
 things of this sort which all endeavor to
 profane our faith, as it were, in the *sensūs* -
 in vain, since the greatest part of these
 deceive due to inferences of the *animus* which

²²⁰ Here: knowledge.

²²¹ Cf. *conicio*, OLD §1, 13.

²²² A judgment.

²²³ With the following, cf. D.L. 10.32 explanation of why αἴσθησις is a criterion of truth, quoting Epicurus "πᾶσα γὰρ," φησίν, "αἴσθησις ἀλογός ἐστι μνήμης οὐδεμιᾶς δεκτική: οὔτε γὰρ ὑφ' αὐτῆς οὔτε ἑτέρου κινήσεισα δύναται τι προσθεῖναι ἢ ἀφελεῖν ..." (For all αἴσθησις is non-rational and incapable of memory for it is neither set in motion by itself nor, when set moving by something else, does it have the ability to add or subtract something.) If this is consistent with Lucretius, it may, according to the above analysis, suggest that (i) *per se* motion which is deliberately initiated is a criterion of *ratio*, and (ii) the capacity of memory is somehow related to the ability to add *opinatūs animi* to perceptions resulting from interactions with external stimuli.

nam nil aegrius est quam res secernere apertas
ab dubiis, animus quas ab se protinus addit
DRN 4.462-8

we ourselves add to our perceptions, with the result that things which have not been seen by the *sensūs* are regarded as thing seen. For nothing is more difficult than to distinguish the evident things from the questionable ones which the *animus* immediately adds on from itself.

These automatic inferences which are additions of the *animus* to perceptions, according to Lucretius, often lead to error²²⁴ - presumably both when waking and sleeping.²²⁵

deinde adopinamur de signis maxima parvis
ac nos in fraudem induimus frustraminis ipsi
DRN 4.816-17

Moreover we make great conjectures from small signs and plunge ourselves into the deception of an error.

Making such judgments on the basis of sensory perception is therefore a *per se* process which is necessitated by the developed configuration of one's *animus-anima* complex and that which arises from it - specifically by one's memory and by the inherent and developmental *natura animi* common to one's species. The potential for error actually lies in believing judgments such as additions to perception and other judgments involving the evaluation of perception.²²⁶

Belief is a second order judgment; it is a voluntary judgment that one's initial judgment (e.g. about a perception) was correct or incorrect. In other words, belief seems to be not an assent to a perception, but to a judgment about perception. On this reading, the belief, for example, that something is or is not desirable and choice-worthy would follow from the preceding steps, and the second level of judgement (i.e. the step of assent) would require calculation. Only then could one chose whether to take further action on the basis of those beliefs. Believing that something is choice-worthy will not necessitate pursuing it, as evinced by the fact that we will sometimes pursue what we believe will entail short-term pains if we reckon it will result in what we believe to be long-term pleasures. This is consistent with *sensus* generally being an accurate reflection of objective reality, and with the implicit suspension of judgment (or at best provisional belief) involved in the Epicurean ἐπιμαρτύρησις / οὐκ ἀντιμαρτύρησις epistemological strategy. Belief can also be an assent to an idea. It is a sort of learning over which one has control. Also, animal

²²⁴ Cf. Epic. *Ep. Hdt.* 50-1, on which cf. Bailey 1947, iii: 1207.

²²⁵ Lucr. DRN 4.807-15 can be taken as a comparison between the *studium* of the eyes and that of the *animus*, but the two can only be coordinated while one is awake.

²²⁶ Konstan, on the other hand, argues that false beliefs arise from unconscious symbolic substitutions and metaphorical confusion on a phenomenological level, through language. cf. Konstan 2008: xii-xiii, xvi, and esp. ch.2.

contract-making requires belief - e.g. that humans would not cause them harm²²⁷ - and is contingent, like all actions which proceed from *voluntas*, upon anticipation and inference.²²⁸

Exercise of the faculties of recall, recognition, and *notitia*-formation are all involved in the ability to discern, and are no less important for these higher order judgments. They are aspects of the greater faculty of *ratio*. For Lucretius, such judgment or evaluation - e.g. of sensory perceptions - is too. Explaining the truth of alleged optical illusions, and immediately subsequent to the example of one's shadow apparently moving with oneself, Lucretius states:

nec tamen hic oculos falli concedimus hilum.
nam quocumque loco sit lux atque umbra tueri
illorum est; eadem vero sint lumina necne,
umbraque quae fuit hic eadem nunc transeat illuc,
an potius fiat paulo quod diximus ante,
hoc animi demum ratio discernere debet,
nec possunt oculi naturam noscere rerum.
proinde animi vitium hoc oculis adfingere noli
DRN 4.379-86

Nevertheless we do not concede that the eyes are here deceived at all. For it is theirs to behold where light and shadow are. But whether these are the same lights and whether the same shadow which was here now passes there, or rather what I said a little before happens - only the *ratio* of the *animus* ought to discern this, and the eyes cannot learn the nature of things. Therefore, do not falsely attribute to the eyes this error of the *animus*.

The eyes perceive light and shadow, and the things we have discussed like color, size, and shape, and their location relative to one another. But they cannot interpret those sensory-perceptions. This is explicitly the task of the *animus*, to which the *sensus*-bearing motions are transmitted. The faculty of *ratio* is here clearly identified as a property of the complex and, by the repetition of the word, specifically of the *animus*. It carries out the comparative process and is responsible for recognition, which is here seen to be a kind of evaluative judgment ('*discernere*'). Moreover, *ratio* is also essential to learning (*noscere*) - specifically to learning the nature of things. However, unlike *sensus*, it can err. From what we have seen, this means that it sometimes makes judgments which are not consistent with the nature of things.

Ratio arises from *sensus*²²⁹ to the extent that sense-perceptions are the raw data upon which *ratio* operates - either directly, through the perceptions themselves, or indirectly, through memory and ideas. Lucretius also indicates that *ratio* should also be

²²⁷ Beliefs about the future can also be termed 'expectations' and require 'foresight', things which other Epicureans deny animals, as we have seen. Philodemus at most allows animals analogues of beliefs, including analogues of belief about the future; cf. Sorabji 1993: 58.

²²⁸ As per the actions of horses and elephants in warfare and the case of the *vitulus* below, this can be a false belief. Philodemus, on the other hand, thinks that animals lack belief and have dull future-directed impulse rather than foresight and expectation proper; cf. Sorabji 1993: 55.

²²⁹ Lucr. DRN 4.483-4, cf. 4.513-21. Cf. D.L. 10.32, quoting Epicurus: "πᾶς γὰρ λόγος ἀπὸ τῶν αἰσθήσεων ἤρτηται ..." and Epic. *Ep. Hdt.* 39.

able to discern when *sensus* is not performing up to snuff and to disregard that information in its calculations accordingly - but without, figuratively speaking, tossing out the baby along with the bathwater.²³⁰

non modo enim ratio ruat omnis, vita quoque ipsa
concidat extemplo, nisi credere sensibus ausis
praecipitisque locos vitare et cetera quae sint
in genere hoc fugienda, sequi contraria quae sint
DRN 4.507-10

For not only would all *ratio* fail, also life itself would immediately collapse, unless you dare to trust the *sensūs* and avoid the dangerous places and other things of this sort, which must be fled, and follow the things which are the opposite of dangerous.

Lucretius portrays trusting the accuracy of *sensus* as a choice - one must dare to believe, but not blindly. This trust is represented as a quasi-faith, as we have seen at 4.463,²³¹ which must not be violated or profaned. *Ratio* must seek out the causes of why, for example, the tower which appeared round at a distance is square when viewed from close-by. If one realizes that there was an incorrect interpretation of *sensūs* or that *sensus* is having one of its exceptional failures (or encouraging things contrary to the long term pleasure-pain calculus) - then it is up to one's *ratio* to recognize this and seek the opposite. Otherwise the whole edifice will be undermined, like a house built with a faulty ruler.

iam ruere ut quaedam videantur velle, ruantque,
prodita iudiciis fallacibus omnia primis,
sic igitur ratio tibi rerum prava necessest
falsaque sit, falsis quaecumque ab sensibus ortast
DRN 4.518-21

... so that certain things already seem to wish to fall to ruin, and do, having been betrayed in the first place by fallacious judgments. Similarly, therefore, it is necessary that your *ratio* is skewed and wrong, whatever of it has risen from inaccurate²³² *sensūs*.

Fallacious first judgments may refer to the inferences which *ratio* makes on the basis of the perceptions, including *opinatūs animi*. Willed *iudicium* is clearly identified as an essential aspect of *ratio* at 2.1040-2. Indeed, false beliefs in providential design, in *religio*'s version of the nature and causes of things, and certain attributions to and oversights about one's lover, are respectively represented as '*perversa ratio*' (4.833), '*caeca ratione*' (6.67), and blindness ('*cupidine caeci*', 4.1153) comparable to the quest for power ('*honorum caeca cupido*', 3.59).²³³ The various manifestations of judgment, then, are all subsumed under the faculty of *ratio*.

²³⁰ Cf. Epic. *KD* 23-4.

²³¹ See also the above discussions of Lucr. *DRN* 4.505 and 1.401.

²³² Inaccurate in the ways discussed above.

²³³ These may suggest that a process of distortion by learning corrupts one's innate nature and thus undermines or usurps the basis of our seeking pleasure and avoiding pain; cf. Cic. *De fin.* 1.30. Similarly the proem to book two conflates the correct view and Epicurean wisdom, representing these as the opposite of the '*pectora caeca*' who do not see correctly with their *ratio*.

Learning seems to be a faculty of the *animus-anima* complex and subject to *ratio*; that which one has learned is comprised of the system of one's particular memories, e.g., of one's perceptions, ideas, and beliefs. This system is experienced as one's understanding. It is not hereditary; we do not acquire it through the seed of our parents, our gestation in the womb, or any other such hereditary means. In his demonstration of the mortality of the *animus-anima* complex and that both the complex and its abilities develop along with the rest of the body, arguing specifically against intraspecies metempsychosis, Lucretius states:

sin animas hominum dicent in corpora semper
 ire humana, tamen quaeram cur e sapienti
 stulta queat fieri, nec prudens sit puer ullus
 nec tam doctus equae pullus quam fortis equi vis
 DRN 3.760-2, 764²³⁴

But if they say that the 'spirits' of men always go into human bodies, then I will nevertheless ask why a stupid one can be made from one with theory-driven wisdom, why no boy has practical wisdom, why the mare's foal is not as learned as the strong *vis* of the horse.

Line 3.764 could as easily be translated as 'the powerful strong horse' but Lucretius' use of transferred epithet and periphrasis, typically, highlights the fact that learning is an ability of the horse (and indeed of the humans) which, like physical strength, has the potential to increase with maturity. This twist on a conventional epic periphrasis is furthered by the fact that it echoes verbatim 3.8, wherein Epicurus is likened to this horse, with Lucretius as a kid goat on trembling limbs by comparison in the metaphorical race of philosophy.²³⁵ Lucretius thus represents understanding, good-sense, and knowledge in general as states of the *animus-anima* complex which develop along with the rest of the body and which are a possible outcome of learning from life experience and, where relevant, Epicurean philosophy.²³⁶ We have already seen that animals are capable of learning in the account of animals in warfare, as well as of choosing to disregard what they have learned - for example, if they believe that continuing to act as they have been taught to do would endanger the survival on account of which they initially entered into alliances and communities with humans. From the *sensūs*, as we have seen, both formed the *notitia* of *utilitas*. These social contracts between humans and animals, like those between humans and other humans, were pacts of mutual expediency. They are therefore the result of both learning and choice on the part of both humans and animals. Lucretius provides

²³⁴ According to Rouse and Smith *ad loc.*, 3.763 is the same as 3.746 and was deleted by Lachmann.

²³⁵ On Lucr. DRN 3.6-8, the periphrasis, and the relationship implied between Epicurus and Lucretius, cf. Sedley 1998a: 58.

²³⁶ 'Prudens' is a hapax in the poem, but its antonym occurs at Lucr. DRN 5.1009; we will return below to the dichotomy between *sapientia* and *prudencia* (and related terms).

another example of both human and animal learning in his account of the origins of intraspecies communication.

IV. LANGUAGE, A CASE STUDY IN LEARNING²³⁷

The nature of the relationship between language and *ratio* was the subject of controversy in Greco-Roman philosophy, as now, but it was generally presumed that some relationship existed. The equation of the Greek term λόγος with both was perhaps as much a cause as a symptom of their confounding. This had no small implications for ancient views on the extent to which animals might possess *ratio*. Sorabji claims that Aristotle's denial of reason to animals on the basis of their lack of human language was a landmark in the debate; the Stoics similarly denied them these and - by extension - moral responsibility.²³⁸ In Latin, *lingua*, meaning both tongue and language, might seem to point in the opposite direction. On its own this would not necessarily extend to *ratio*, but Lucretius calls the tongue '*animi interpres*'.²³⁹ In chapter three we saw that animals do not seem to exhibit language to same extent that humans do. Lucretius' account of the origin of language in the infancy of the world can help us to better understand the relationship between language and an individual's *ratio*, as well as the extent to which the faculty of language is common to all living creatures.

In Lucretius' account, the development of language occurs in two ways: (1) the development of each creature's ability to communicate as an individual, and (2) each species' development of a system of conventional signifiers and meaning. With varying degrees of sympathy, Campbell, Atherton, and Reinhardt, for example, see the account as resting on an analogy or comparison between humans and animals.²⁴⁰ Gale suggests that

²³⁷ My thanks to Tobias Reinhardt for discussion of and feedback on an early draft of this material, as well as for his open-mindedness. May the following be regarded as fruitful and respectful disagreement.

²³⁸ Sorabji 1993: esp. part I, N.B. 78-86 specifically with respect to speaking and understanding language, Newmyer 2007: esp. 164-5, Osborne 2007: ch.4. On views about animal communication in Greco-Roman thought more generally, as well as an overview of modern research on the commonalities and differences between human and animal communication, cf. Fögen 2014. A promising avenue for further research into ancient views on animal capacities is the genre of fable, since in fable animals are often granted human speech in conjunction with stereotypical animal natures (not dissimilar to those we encountered in the previous chapter). Fables also often manipulate the human-animal boundary, not only to portray humans through partially anthropomorphized animals, but also to deal with authentic concerns about real animals; Lefkowitz 2014: esp.7-15. Further consideration of the relevance of fable to the topic at hand would require a separate discussion beyond the scope of this thesis.

²³⁹ Lucr. *DRN* 6.1149.

²⁴⁰ Of the three, Campbell is certainly the most sympathetic to the analogy; Campbell 2003: esp. 310-11, 314, 321-2. Atherton is the least so; she denies animals language on the basis that they lack choice and thus the ability to control their 'vocalisations' (and, by implication, that they reason) - and hence finds Lucretius' logic that the two are comparable to be a 'non-sequitur'. She thus reduces animals to effectively automata determined by their hormones and environment; Atherton 2005: esp. 114. Reinhardt 2008: 137 calls the 'analogy, misleading at best'.

Lucretius is focusing on the first of the three stages in Epicurus' account of the development of human language, i.e. when *natura* was the primary factor in what sounds were made and when, before convention (stage two) and deliberate introduction (stage three).²⁴¹ If so, this focus may represent an attempt by the poet to strengthen the apparent similarity between human and animal language, not only with respect to aetiology, but also with respect to result.

According to Lucretius, language develops both ontogenically and phylogenically. It developed among the earthborn humans and each newborn child since has had to develop it; in this, as Atherton puts it, 'linguistic ontogeny, on the whole, recapitulates phylogeny'.²⁴² The phylogenic development, Holmes argues, mimics the physiological process of crafting of speech in book four.²⁴³ Lucretius introduces glossogenesis as an example of how all creatures develop on the basis of their inherent *naturae* as well as their circumstances - in the form of *utilitas*, meaning (i) utility (as in expediency) and/or (ii) need (as in what is required for the survival of oneself and others under one's protection), which gives rise to usefulness.²⁴⁴

At varios linguae sonitus natura subegit
mittere, et utilitas expressit nomina rerum,
non alia longe ratione atque ipsa videtur
protrahere ad gestum pueros infantia linguae,
cum facit ut digito quae sint praesentia monstrent.
sentit enim vis quisque suas quoad possit abuti
DRN 5.1028-33

But the nature of the tongue compelled them to send off various sounds, and *utilitas* formed the names of things. In a quite similar way the very infancy of the tongue seems to bring children to gesture, when it makes them show with a finger the things which are present. For each creature feels to what extent it can make use of its powers.²⁴⁵

Although, as Bailey notes, '*varios linguae sonitus ... mittere*' is nearly repeated at 5.1044,²⁴⁶ the emphasis here on ontogeny and the parallel with 4.834-55 (cf. below) suggest that *linguae* should either be taken with *natura* or with both *natura* and *sonitus*.

²⁴¹ Gale 2009: 187. On the three stages, cf. also e.g. Bailey 1947, iii: 1486-91. Konstan, following Vlastos, suggests that the second stage is present but barely so; Konstan 2008: 101. Others, e.g. Reinhardt 2008: 127-9, restricts the process to two stages, the emergence of names and the refinement of the lexicon, and argues that there is no explanation present of how we control the sounds we make. For an elaborate, but controversial reconstruction of the process of glossogenesis, cf. Verlinsky 2005. Cf. Diog. Oen. fr.12.ii.11-v.14 Smith.

²⁴² Atherton 2009: 214.

²⁴³ Holmes 2005.

²⁴⁴ As Long and Sedley 1987: i.135 aptly characterize it, nature and convention are not mutually exclusive; both explanatory concepts are at work, 'with utility as the causal factor that links them together'. They also note that this applies to the development of both language and social organization. Because of this relationship between the meanings of *utilitas*, here and elsewhere, the alleged opposition between the two interpretations of *utilitas* in this context are not as strong as Reinhardt 2008: 131 (N.B. n.15) suggests. He interprets it as 'need', against the 'usefulness' contented by particularly Schrijvers 1999: ch.5 and Atherton 2005: esp. 105 n.14. Gale 2009: 187 also supports 'usefulness'.

²⁴⁵ This interpretation of Lucr. DRN 5.1033 largely concurs with Bailey 1947, iii: 1492. '*Vīs*', here and elsewhere, is accusative plural; it means powers or faculties. Here '*quoad*' likely encompasses both 'to what extent' and 'to what end' (i.e. 'for what purpose'). The translation cannot capture this.

²⁴⁶ Bailey 1947, iii: 1491, cf. 1284.

This obviates any intimations of necessity²⁴⁷ which reading ‘*linguae*’ with ‘*sonitus*’ alone might carry. It also explains why different sorts of tongues are capable of different sorts of sounds.²⁴⁸ There may also be some play on *lingua* as both ‘tongue’ and ‘language’.²⁴⁹

Lucretius here emphasizes that the phylogenetic origin of language also occurred through learning.²⁵⁰ The tongue and its sounds and names are compared with (i) young children communicating by means of pointing with their finger, and - in the lines immediately following - with (ii) other body parts of animals and what they use them for. Reinhardt treats this (5.1028-40) as a case of multiple-correspondence simile.²⁵¹ That said, the tongues of all creatures are capable of pressing out as well as forming (‘*expressit*’) things - at least to varying degrees;²⁵² Lucretius indicates as much in his account of various mechanisms. These uses of the tongue, finger, horns, claws, feet, teeth, and wings are characterized as the manifestation of particular powers or abilities of each creature.²⁵³ Sedley suggests that the particular animal examples, as well as Lucretius’ rendering of lion cubs with the Greek *scymni* (5.1036), indicates that ‘this instinctive use of innate

²⁴⁷ As though by some external force, e.g. *Natura* (cf. Atherton 2009: 208-9), or - *pace* Gale 2009: 187 and the implication of Reinhardt 2008: 135-6 - instinct. There is no quasi-Stoic conception of innate knowledge at work here (even indirectly, *pace* Dierauer 1977: 198 n.21). Whether or not Lucretius is debating the Stoics at various points in *DRN* is beyond the scope of this study (on which topic, one influential interpretation is Furley 1966). The reading ‘instinct’ could only work if it would mean: the (non-deterministic) tendency towards actions which are likely to follow from one’s inherent nature (cf. Lucr. *DRN* 4.486, 5.1033 and p. 280 n.247). If so, then ‘instinct’ would be no more teleological than the Cradle Argument and probably partly follows from it; i.e. pleasure and pain may be involved in the continual process of discovering through trial and error how to use our powers. Cf. Warren 2014: e.g. 4-6 that there are pleasures involved in learning. As we will see below, whether or not *natura* should be read as instinct, such things as words and powers are discovered and refined in a non-teleological manner. Finally, Proclus, writing on Plato’s *Cratylus*, notes that Epicurus thinks that the names for things came about not through experience-based knowing (ἐπιστημόνως) but through one’s nature (φυσικῶς), as is the case with animals and their sounds (Usener 335); Reinhardt 2008: 137 n.35 seems to read this testimonium somewhat differently.

²⁴⁸ The use of *natura* in the opening line of the discussion of language, Lucr. *DRN* 5.1028 (cf. 5.846), is significant, as is the idea that particular *sensūs* partly compel one’s expressions. These should be compared with Epic. *Ep. Hdt.* 75: ‘ὄθεν καὶ ὀνόματα ἐξ ἀρχῆς μὴ θέσει γενέσθαι, ἀλλ’ αὐτὰς τὰς φύσεις τῶν ἀνθρώπων καθ’ ἕκαστα ἔθνη ἴδια πασχούσας πάθη καὶ ἴδια λαμβανούσας φαντάσματα ἰδίως τὸν ἀέρα ἐκπέμπειν στελλόμενον ὑφ’ ἐκάστων τῶν παθῶν καὶ τῶν φαντασμάτων, ὡς ἂν ποτε καὶ ἡ παρὰ τοὺς τόπους τῶν ἔθνων διαφορὰ ἦ’ (text here from Long and Sedley 1987: ii.98). The emphasis is mine and concurs with Reinhardt 2008: 127’s reading of this as ‘men’s own natures’ (in line with a constitutional difference between ἔθνη). Atherton 2005: 101 translates it similarly, but interprets the whole account as being about involuntary vocalisations, which - on the reading of our investigation - would lessen the potential parallel with Lucretius.

²⁴⁹ On the etymological gloss on *infantia* in ‘*infantia linguae*’, cf. Reinhardt 2008: 131, Gale 2009: 187.

²⁵⁰ Cf. Epic. *Ep. Hdt.* 75-6, that the refinement of language varied with how quickly the λογισμός of men with different natures developed the initial sounds which they made under various circumstances.

²⁵¹ Reinhardt 2008; one need not agree with all of his conclusions about potential pairings and the implications thereof (e.g. for the meaning of the expressions in particular cases) to find plausible the cumulative point.

²⁵² On this dual sense of *exprimo*, cf. Bailey 1947, iii: 1491 and Reinhardt 2008: 130-4. We will return to this shortly.

²⁵³ Here ‘*pueros infantia*’ (Lucr. *DRN* 5.1031), although only linked by association of ideas and by position, may well echo ‘*puer ... infans*’ (5.222-3) and thereby recall 5.222-34 which indicates that the faculties of animals are far better suited to enabling survival than are those of humans. On that passage, P. Fowler 1997: 208 aptly states that Lucretius is ‘demonstrating that human beings do not occupy a privileged position among the species of the world’; cf. Holmes 2013, who, as we have seen, interprets it as even more unfavorable towards humans.

powers is the same the world over, even though the nature of the powers themselves may vary from region to region'.²⁵⁴ Language is therefore a power - here, at least of mature humans; the infant perhaps has it potentially, as the first humans may have had. Lines 5.1028-33, in the larger context of 5.1028-40, thus indicate that - with respect to individual creatures - certain powers develop as one's constitution matures. That said, the earthborn humans may not have developed it fully until they were already mature, as indicated by their attempts to communicate, however imprecisely ('*balbe*'), with their voices or sounds ('*vocibus*') and gesture ('*gestu*') in attempt to form the first communities.²⁵⁵ There was at least some prelinguistic communication within the human species at least in the seduction of mates and collective hunting. The company of other members of one's species may facilitate the process of learning or developing language.²⁵⁶

Lucretius says earlier (as part of a more generally anti-teleological argument), that unlike the advent of things such as combat techniques, limbs and other body parts were not invented for their use. He labels such claims '*praepostera*' based on skewed or '*perversa ratione*' (5.833) and instead argues:²⁵⁷

nil ideo quoniam natumst in corpore ut uti
possemus, sed quod natumst id procreat usum.
nec fuit ante videre oculorum lumina nata,
nec dictis orare prius quam lingua creatast,
sed potius longe linguae praecessit origo
sermonem, multoque creatae sunt prius aures
quam sonus est auditus, et omnia denique membra
ante fuere, ut opinor, eorum quam foret usus;
haud igitur potuere utendi crescere causa.

...
haec igitur possunt utendi cognita causa
credier, ex usu quae sunt vitaque reperta.
illa quidem seorsum sunt omnia quae prius ipsa
nata dedere suae post notitiam utilitatis.
quo genere in primis sensus et membra videmus

DRN 4.834-42, 851-5

Therefore, since nothing was born in the body in order that we might use it, but that which has been born creates use. There was neither seeing before the lights of the eyes were born nor speaking with words before the tongue was created. But rather the origin of the tongue by far preceded speech, and the ears were created much before sound was heard, and finally all the members existed, as I believe, before their use came into being. By no means, therefore, were they able to grow up for the sake of using. ... Therefore these things which were discovered from use and life²⁵⁸ can be believed to have been learned for the sake of using. Different indeed are all those things which themselves were born first - and after granted the *notitia* of their *utilitas*. We see that first of this sort are the *sensūs* and the members.

The *sensūs* (here likely the sense organs) were generated before their existence gave rise to manifestations of their specific faculties²⁵⁹ and thus, by extension, before the idea

²⁵⁴ Sedley 1998a: 56.

²⁵⁵ Lucr. *DRN* 5.1022.

²⁵⁶ Reinhardt 2008: 135 also suggests this, but on the basis of a different logic.

²⁵⁷ Their etymological as well as transferred meanings should be understood. These are absurd and perverse or skewed in the sense of being turned about. This concurs with the interpretation of these terms and Lucr. *DRN* 4.832-3 more generally in Sedley 1998a: 47-8.

²⁵⁸ E.g. battle tactics. As we have seen, the account of using animals in warfare is about learning through trial and error about what battle tactics are effective. Bailey prefers to take this expression as an hendiadys. Bailey 1947, iii: 1284.

²⁵⁹ Initially they would only have existed in potential.

developed of how these powers could be used. Here, the speech of the tongue is grouped with the powers of sense-organs and limbs, just as if it were the faculty of taste.²⁶⁰ The potential for their respective uses existed as *coniuncta* of their natures but the uses of all of these body parts developed later. Taking 5.1028-33 and 4.834-42 together, it is possible to say that the power of language is a *coniunctum* which emerges to some extent from one's constitution (both the *natura animi* and the *natura linguae*), but individuals learned of its existence and, in due course, how to use it effectively. Given 4.837-8, speech was thus not initially something invented for the sake of its usefulness, but refined by it. This may be alluded to by the apparent distinction between '*linguae sonitus*' and '*nomina rerum*' (5.1028-9). But lest these lines imply that animals lack language, consider the use and juxtaposition of *mitto* and *exprimo* in 5.1029. Not least in the context of the nexus of words related to the production of the sounds which constitute language in 5.1028-33, this is perhaps meant to recall and activate our intratextual associations with Lucretius' earlier account of that mechanism.

Lucretius' account of the mechanism underlying the use of language is largely contained in book four. Just as the mechanism of hearing is, for Lucretius, consistent across all living creatures, so too is the mechanism by which they deliberately emit sound. Recall from chapter two that hearing is caused by particular stimuli which we called hearing-causing bodies. Of these, Lucretius distinguishes two sorts: *vox* and *sonus*.²⁶¹

In the context of his account of the mechanism of hearing, *vox* seems to be a sound emitted from deep within a living creature and given further shape by the tongue and lips of creature just prior to its release:

Hasce igitur penitus voces cum corpore nostro
 exprimimus rectoque foras emittimus ore,
 mobilis articulat verborum daedala lingua
 formaturaque laborum pro parte figurat
 DRN 4.549-52

Therefore when we form these *voces* deep in
 our body and emit them straight out from the
 mouth, the swift tongue, inventive of words,
 articulates them and the shaping activity of
 the lips for its part pronounces them.²⁶²

The actions of generation, emission, and shaping must occur with incredible rapidity, as alluded to by the tongue's *mobilitas*, because the entire process seems to happen instantly (i.e. within the smallest perceivable moment of time). As they seem to entail a number of new chains of motion, *voluntas* must be involved and *voces* thus deliberate. '*Exprimimus*'

²⁶⁰ Verlinsky 2005: 97 suggests it constitutes an 'inborn faculty to signify objects'.

²⁶¹ Lucr. DRN 4.524-7.

²⁶² We will treat the idea-play and multiple meanings inherent in *articulo* and *figuro* in the discussion of this passage. On these lines in general, cf. esp. Holmes 2005: 534-46.

here refers to the generation of the assemblies, which entails giving them a shape or degree of form.²⁶³ The assemblies are not pre-gathered and waiting on the *voluntas* of living creatures to speak or cry out any more than spirits are assembled and waiting on the mating of animals for a new mortal body to inhabit.²⁶⁴ The uses of *articulo* and *figuro* here are multiply determined; they have the conventional meanings of, respectively, articulate and pronounce (as translated above), as well as meanings which evince concrete physical changes in the stimuli, as follows. In this context Lucretius evinces that uttering (distinctly) in these ways happens partly through physiological functions of the tongue and lips. These body parts give greater definition to the shape of the forthcoming assemblies in different ways - the tongue by making the joints and limbs of the shapes more distinct, the lips by some further forming - perhaps a sharpening of the contrasts.²⁶⁵

The shaping process seems to be deliberate and associated with the meaning or signification of the sound. The shaping process must apply to each and every assembly of a given emission equally, because, once emitted, the *vox* disperses into many *voces*, each of which causes the same word or sound to be heard by the listeners.²⁶⁶ *Vox* can thus be understood as voice or the articulated sounds which a voice makes.²⁶⁷ *Sonus*, on the other hand, seems to be a 'sound' or 'noise' in general. It is usually linked by Lucretius to *vox* and *verba* in cases where their bodies have been blunted and otherwise lost their shape prior to interacting with the ear,²⁶⁸ but 4.565-7 make clear that *vox* is a type of *sonus*.²⁶⁹ In demonstrating that hearing-causing bodies are corporeal, and thus that '*voces verbaque*' (4.532) are, Lucretius differentiates *clamor* from *vox* as consisting of a greater quantity of the same first-beginnings, resulting in a greater roughening of the passage(s) through which both sorts of noises are emitted (4.528-32). Further proof that the *vox* (5.40) is corporeal comes from the loss of body one undergoes by giving a speech ('*sermo*', 4.537) - particularly one delivered with '*summo ... clamore*' (4.539) - or by talking a lot

²⁶³ Pace the translation of Rouse and Smith 1992, '*exprimimus*' is being used here in a slightly different sense than in the mechanism of taste, at Lucr. *DRN* 4.618 and 4.620 (the only two places in the poem where it is repeated exactly); rather here it is more akin to '*exprimat*' (4.299) and, crucially for this study, to '*expressit*' (5.1029), discussed above.

²⁶⁴ Lucr. *DRN* 3.776-83.

²⁶⁵ Reinhardt 2008: 131-4 also makes this point, doing so on the basis of Lucr. *DRN* 4.549-67 and the evidence of grammatical handbooks. However, with certain inarticulate sounds (e.g. *gemitus*) made by both humans and animals, it is the *semina vocis* (rather than the articulate *vox*) which are pressed out ('*exprimitur*') en masse; Lucr. *DRN* 3.495-7; cf. 3.297.

²⁶⁶ Lucr. *DRN* 4.563-7, 4.603-6. Cf. pp.93-4 regarding the physiological process by which hearing occurs.

²⁶⁷ At Lucr. *DRN* 4.554 *vox*, articulated and pronounced in the ways just described, is equated with *verbum*.

²⁶⁸ Lucr. *DRN* 4.557-62 (describing the process by which *voces* as *verba* degenerate back into mere *sonūs*), 4.568-71, 4.607-8, 4.613-14.

²⁶⁹ For a different interpretation of the relationship between *vox*, *verbum*, and *sonus*, which is more perceiver-dependent, cf. Holmes 2005: esp. 543-5.

(‘*multa loquens*’, 4.541).²⁷⁰ *Clamor* in this context seems thus to be inherently linked to *vox*, perhaps as volume, rather than to *sonus*.

It is likely, but not certain (due to textual corruption),²⁷¹ that Lucretius here (4.547-8) includes the swan as an example of a non-human creature with a *vox* (as voice, i.e. the ability to make articulate sounds). There are many such animal examples. Animal *vox* is explicitly indicated with respect to: birds in general at 2.146 (‘*liquidis*’), 5.1081 (here both named species and winged races in general), and 5.1379 (‘*liquidas*’); swans at 4.542 (inclusively) and 4.548; roosters at 4.711 (‘*clara*’); goats (including kids) at 2.367; dogs in general at 4.992; Molossian hounds at 5.1063-72; ‘*pecudes mutae*’ and ‘*saecla ferarum*’ at 5.1059-60; and ‘*muta ... animalia*’ in general at 5.1087-8. *Querella* is explicitly linked to *vox* at 4.549 and 6.1245, and used of human speech at 3.955, 4.584, 4.1182, 5.1384, 6.16, and 6.1159. With the (partial) exception of music at 4.584 and 5.1384, *querella* thus seems to constitute an articulate lament, as opposed to the wailing (*vagor*, *vagitus*), e.g., of the (*infans*) *puer* at 2.576-80 and 5.222-7, comparably to one meaning of *gemitus* above. *Querella* is used of animals at 2.358 and 4.549 (‘*liquidam*’); the latter is in conjunction with the *vox* of the swan, the former with the *vox* of the mother of the *vitulus*. Thus Lucretius’ usage of *querella* constitutes further evidence that Lucretius believes animals possess language.

The swan, a bird sometimes associated with Venus,²⁷² is elsewhere characterized by Lucretius as a singing bird whose ‘*parvus ... canor*’ is similar to his own ‘*suavidicis ... versibus*’ and better than the *clamor* of cranes.²⁷³ Similarly, he likens Epicurus to a swan for his ‘*aurea dicta*’.²⁷⁴ This is strengthened by Lucretius’ emphasis in 4.542-8 on the shape of the first-beginnings of *vox*, which affect its suitability for our hearing,²⁷⁵ and the emphatic contrast between the creature’s *vox* and the implied *clamor* of the *tuba*, a trumpet

²⁷⁰ Cf. also Lucr. *DRN* 4.528-34.

²⁷¹ Cf. Bailey 1947, iii: 1246, Rouse and Smith 1992 *ad loc.*

²⁷² Lazenby 1941: 42. Cf. Attic red-figure lekythos, Aphrodite riding a swan, Ashmolean Museum AN1891.451 (5th c. BCE) and Pistoxenos painter, Attic red-figure kylix, Aphrodite riding on a swan, British Museum D2 (ca 480-70 BCE).

²⁷³ Cf. Persius, *Choliambis* which also makes a connection between birds and the poetic voice.

²⁷⁴ Lucr. *DRN* 3.6-13, 4.180-2, 4.909-11. Lucretius also likens his own exposition to ‘*suaviloqui | carmine Pierio*’ (1.945-6, 4.20-1). In addition to a swan, Epicurus is also likened to a horse (with Lucretius himself as comparatively a kid goat and swallow, respectively) at 3.6-13. On the significance these comparisons for Lucretius’ depiction of his relationship with Epicurus, cf. Sedley 1998a: 58, 140-1.

²⁷⁵ Cf. esp. p.75 on shape with respect to *tactus*-as-contact and its relationship to the five *sensūs corporis*.

or war-trumpet which was effectively synonymous with loud sound.²⁷⁶ Lucretius thus allows that animals have voices; they do not make inarticulate sounds only.

In book five, Lucretius suggests further aspects of both the mechanism of language use and language learning. As we have seen, particular *sensūs* compelled the first *voces*, and these events postdate a certain degree of know-how with respect to the limbs and sense-organs. Also and again, neither humans nor animals - neither individually in youth nor as species in the infancy of the world - initially possessed language. It seems that different feelings affected similar individuals in similar ways, such that they made similar sounds under similar circumstances, and thus recognized the meaning when another did so.²⁷⁷ The *notitia* of their *utilitas* may have arisen from this. It is logical that such a process would begin from common internal states, like feelings, rather than from pointing at external things. The relevant lines bear repeating:

postremo quid in hac mirabile tantoperest re,
si genus humanum, cui vox et lingua vigeret,
pro vario sensu varia res voce notaret?
cum pecudes mutae, cum denique saecula ferarum
dissimilis soleant voces variasque ciere,
cum metus aut dolor est et cum iam gaudia gliscunt.

...
ergo si varii sensus animalia cogunt
muta tamen cum sint, varias emittere voces
quanto mortalibus magis aequumst tum potuisse
dissimilis alia atque alia res voce notare

DRN 5.1056-61, 1087-90²⁸⁰

Finally, what in this situation is so very marvelous if the human race, for whom the *vox* and *lingua* are lively, were marking things with a different *vox* for a different *sensus*, when *mutae* herds - when even generations of wild animals²⁷⁸ - are accustomed to produce different and various *voces* when there is *metus* or *dolor* and when now *gaudia* swell up. ... Therefore, if various *sensūs* compel animals,²⁷⁹ although they are nevertheless *muta*, to emit various *voces*, how much more fitting is it that humans were able then to mark different things by means of a different *vox*.²⁸¹

In these lines one could say that *vox* is used to mean both voice and sound, depending on the extent to which the noise in question resembles human language,²⁸² but a less anthropocentric reading is more likely, as we have seen. Both humans and animals were motivated to communication by their common feelings. Perhaps for this reason Lucretius

²⁷⁶ The example of the *tuba* does not undermine this interpretation of *clamor* as a type of *vox* because the hearing-causing bodies involved should be thought of as originating from within a human (and altered by a tool). The idea of shouting may also be implicit in 'obtundere' at Lucr. DRN 5.1053-5: 'neque enim paterentur | nec ratione ulla sibi ferrent amplius auris | vocis inauditos sonitus obtundere frustra'.

²⁷⁷ The questions of precisely how particular sounds are related to particular things and of how that relationship came about according to the Epicurean account(s) of glossogenesis are beyond the scope of this investigation.

²⁷⁸ Campbell 2003: 318 suggests that these are exemplified by the subsequent treatment of birds.

²⁷⁹ It is clear from context that 'animalia' here refers specifically to animals, and not to all living creatures.

²⁸⁰ Content, context, and the strong verbal echoes encourage this juxtaposition of Lucr. DRN 5.1056-61 and 1087-90. On the verbal echoes, cf. Gale 2009: 190.

²⁸¹ For some further bibliography on this passage from 1896 through 1990, cf. Atherton 2005: 114 n.30.

²⁸² Cf. the uses of *vox* and the verb *voco* throughout the larger context of the account and the discussion thereof by Campbell 2003: 311, 313.

uses one word to signify the articulated sounds of both groups.²⁸³ As an illustration that the ability to mark different things with particular sounds, i.e. to give different names to things, evolved gradually through learning (*'soleant voces'*),²⁸⁴ Lucretius concludes his account of the development of language with *'alia atque alia'*, a case of word and sound play involving repetition, alliteration, and double elision, with both of the identical elements modifying *'voce'*. This may relate back to Lucretius' celebrated mimesis of animal sounds in the intervening lines (5.1063-86).²⁸⁵

Claiming and thus demonstrating that animals emit different articulated sounds in response to different feelings, Lucretius builds on the idea that animals can distinguish one another, perhaps even have names for one another (*'inter se nota cluere'*, 2.351), as humans do (*'notare'*, 5.1090).²⁸⁶ Perhaps then, contra especially Atherton and Stevens,²⁸⁷ at least some animal sounds are deliberately expressed and related in the first instance to objects in the world.²⁸⁸ Molossian hounds, horses, and various sorts of birds all make particular sounds under different circumstances; moreover, different species of birds also make different sounds under the same circumstances.²⁸⁹ Therefore, no relationship between manifest articulated sounds and things can be necessitated for two reasons. First, *voluntas* is necessarily involved in initiating the motions which result in all articulated

²⁸³ Cf. Epicurus' use of φθόγγος (a clear and distinct sound) at, e.g. Epic. *Ep. Hdt.* 38, which Atherton 2009: 202, following Everson, suggests may include 'talk', 'speech', and the 'sounds' made by birds, animals, and even the wind - and argues that it is conspicuous that Lucretius avoids making it clear whether 'the "sounds" in question are specifically human'. If so, that just increases the similarity of the species' communications.

²⁸⁴ This phrasing may imply that they learned through trial and error, becoming gradually habituated to what worked and what did not; cf. below on Lucr. *DRN* 5.1052.

²⁸⁵ On which mimesis, see in particular Friedländer 1941: 352, Bailey 1947, iii: 1494-6, Atherton 2005: 105, Campbell 2003: 314-21, Gale 2009: 189. This may suggest the following implicit argument: o Reader, if Lucretius can make poetry and philosophy out of imitating animal sounds, e.g. by alliteration and onomatopoeia, perhaps they do in fact constitute language. Moreover, Gale 2009: 190 suggests that the verbal echoes linking 5.1056-61 and 5.1087-90 give it the effect of a QED; if so, perhaps *'alia atque alia'* qualify the meaning of 5.1089-90 a touch - not least when read aloud.

²⁸⁶ Lucr. *DRN* 2.349-51.

²⁸⁷ Atherton 2005: 137 concludes that 'animals' vocal responses to their feelings' are involuntary and do not constitute 'designative or naming activity'; this is the central thesis of Stevens 2008. Bailey and Konstan, e.g., hold points of view similar to theirs; Bailey 1947, iii: 1494, 1497, Konstan 2008: 98

²⁸⁸ According to Lucretius, humans too make some involuntary noises based on certain feelings, like crying out in pain and moaning during sex.

²⁸⁹ Lucr. *DRN* 5.1063-86 (with respect to winged creatures specifically: 5.1078-82). The horse is a somewhat peculiar case here, as Lucretius acknowledges that some of its sounds are emitted through its nostrils, not through its mouth like neighing. Lucretius nevertheless stresses that at least the differentiated neighing sounds are language; cf. 5.1073-7. The expression *'genus alituum variaequae volucres'* (5.1078, on which cf. Gale 2000: 237, Gale 2009: 190) is a marvelously economic way of expressing the variety of winged things and birds, and should not be taken as a pleonasm or hendiadys; winged things can include, e.g., bats after all. Lucretius also mentions explicitly a number of predatory birds: hawks, bearded vultures (cf. Campbell 2003: 319, contra Costa 1984: 125), and divers, as well as crows and ravens (which, as we will see, were common Roman pets). It is unclear on what basis Atherton 2005 (esp. 115) adamantly claims that Lucretius is not describing communicative effort. This study reads 5.1063-86 as describing precisely that, as well as articulate expression of feelings (e.g. the animal equivalent of someone swearing when frustrated or after stubbing a toe), irrespective of a listener.

sounds, obviating some of Atherton's difficulties with Lucretius. Second, different constitutions lend themselves to different but equally valid languages. The crucial distinction would seem to be one of degree; the human '*vox et lingua vigeret*' (5.1057) by comparison.²⁹⁰ This suggests that animals possess both, but humans generally (i) use language more often, and (ii) possess (and develop) the potential to articulate sounds more precisely - resulting perhaps in a greater vocabulary and more elaborate syntax, capable of more complex and nuanced expression.²⁹¹ Therefore the label *mutus* does not entail lacking language (either potentially or manifestly) but merely, as Gale implies, lacking human language.²⁹² Specifically, animals generally lack the ability to produce human speech, not articulate speech.

Lucretius' account of language could be taken as subverting the predominant tendency in Greco-Roman philosophical discourse to equate animals' lack of (human) language with a lack of reason.²⁹³ Aristotle denied speech (λόγος) and reason (λόγος) to animals; he also denied reason (or at least a full share of it) to children, women, and slaves - all of whom not only possess language, but indeed human language.²⁹⁴ Aristotle (and others who believed similarly) was also aware of the existence of parrots and their ability to produce human speech.²⁹⁵ Discussing bird prone to mimicry, he says:

καὶ γὰρ τὸ Ἰνδικὸν ὄρνειον ἢ ψιττάκη, τὸ λεγόμενον
ἀνθρωπόγλωττον, τοιοῦτόν ἐστι • καὶ ἀκολαστότερον
δὲ γίνεται ὅταν πῖη οἶνον.

Arist. *HA* 597b27-9²⁹⁶

Moreover the Indian bird, the parrot, who speaks human language, is also of this sort; and it becomes still more unbridled whenever it drinks wine.

²⁹⁰ With *vox* here meaning both voice and the capacity for deliberately making articulate sounds, and *lingua* here meaning both tongue and language, but emphasizing the first meaning in both cases.

²⁹¹ One probable exception is birds, many of which seem to talk and/or sing, as we shall see.

²⁹² Lucr. *DRN* 5.1059, 1088. Cf. Gale 2009: 189: that they are 'dumb' or 'inarticulate' in the sense of lacking human language, because they 'lack the vocal organs necessary for articulate speech'. Campbell 2003: 313 posits a weaker version of this argument.

²⁹³ As Tobias Reinhardt was kind enough to point out, the reading of this investigation suggests that Lucretius subverts the equation even just by not having a simple dichotomy.

²⁹⁴ He denies speech to animals beyond the ability to indicate pain and pleasure, making human language the ability to indicate moral qualities. Arist. *Pol.* 1253a 9-19. He believes that women and, above all, slaves and animals do not have reason but participate in it only insofar as they apprehend that their natural masters have it. For these it is useful and just to be ruled; 1254b 10-24, 1255a 1-2. With respect to other humans, this is because the slave lacks the deliberative part of the ψυχή, i.e. τὸ βουλευτικόν. The female has τὸ βουλευτικόν, but without authority or to a lesser degree (ἄκυρον), and a child has it but incompletely or not fully-formed (ἀτελής); 1260a 11-14. Cf. 1332b 5-6 that man alone has reason. By extension, animals too lack λόγος through lack of τὸ βουλευτικόν. We have seen above that Lucretius believes all living creatures have his nearest equivalent of this, i.e. the *mens/animus* in its capacity as '*consilium regimenque vitae*'.

²⁹⁵ Cf. Clarke 2000: 81-4, 164-8; my thanks to Gillian Clark for pointing me to this, to Richard Sorabji for guidance on the question of the dissemination of knowledge of parrots in the Greco-Roman world, and to Louise Calder for kindly helping me obtain access to some of the materials necessary to answer that question.

²⁹⁶ In Balme 1991: 138.

However, this comes across as a throw-away comment in the context of bird migration. He does not seem to consider the significance of this, here or elsewhere.²⁹⁷ The first Greek to write about them (and indeed about the elephant) was Ctesias, a Greek physician at the Persian court in the 5th century BCE.²⁹⁸ It is not unlikely that Aristotle was drawing on Ctesias' *Indica*²⁹⁹ and thus that this was circulating in Athens by the time of the Garden. The knowledge of such birds spread due to their exhibition by the Ptolemies in the 270s³⁰⁰ and perhaps trade networks with the east set up by the conquests of Alexander.³⁰¹

However widespread the knowledge of parrots and the like were by the time Epicurus developed his ideas on language, they seem to have been well enough known by Lucretius' day, including in public shows and in poetic traditions.³⁰² Parrots and other *aves loquaces*³⁰³ were common household pets by the Late Republic.³⁰⁴ Given this, it may initially seem odd that Lucretius at any rate does not include them in his account of language.³⁰⁵ However, Lucretius does include the crow (*cornix*, 5.1084) and raven (*corvus*,

²⁹⁷ He may not have had personal experience of their ability. Bigwood 1993: 322, 326 notes that the bird would have been rare at best in Greece prior to Alexander's Indian campaign (ca 327 BCE) and was still remarkable to his captain Nearchus. The date of the *HA* is disputed, but generally placed about twenty years earlier. Nevertheless, it is not inconceivable that Aristotle may have revised it over the course of his life, expanding particularly on creatures encountered through the conquests of his pupil, such as the elephant; cf. Peck 1965: lviii-lix.

²⁹⁸ Lazenby 1941: 12-13, Bigwood 1993, Hünemörder 2007: 558.

²⁹⁹ Photius' summary of Ctesias is likely abbreviated, as knowledge of parrots was quite common by the 9th century CE, but the parallel in Photius' summary of this section of Ctesias' *Indica* reads: 'καὶ περὶ τοῦ ὀρνέου τοῦ βιττάκου, ὅτι γλῶσσαν ἀνθρωπίνην ἔχει καὶ φωνήν.' (And concerning the bird, the parrot, this has human speech and voice.) Photius's summary however also notes that the parrot is not limited to one human language and that these are learned languages, hence that the animal is capable of learning. 'διαλέγεσθαι δὲ αὐτὸ ὡσπερ ἄνθρωπον Ἰνδιστί, ἂν δὲ Ἑλληνιστί μάθῃ, καὶ Ἑλληνιστί.' (And the bird itself converses in Indian just like a man, and, if it learns Greek, also converses in Greek.) Cf. Bigwood 1993: 323, quoting Jacoby's Ctesias F 45.

³⁰⁰ Lazenby 1941: 13, Bigwood 1993: 322.

³⁰¹ They probably came this way at least by the time of the later Ptolemies; cf. Jennison 1937: 40. On the parrot as evidence of trade-networks with India, cf. Lazenby 1941: 6.

³⁰² Toynbee cites Varro on this; cf. Toynbee 1973: 248. One can at least say, according to Deschamps 1997: esp. 113, that Varro and Lucretius shared a culture and intellectual atmosphere, among other things. The Romans of the late Republic often imported for display animal curiosities associated with Egypt, which the parrot was by this period thanks to the Ptolemies; Jennison 1937: 41. Callimachus mentions them by way of deriding orators; Hünemörder 2007: 559. Ovid seems to be the first Roman poet to treat them, not least with respect to the death of his mistress Corinna's favorite (*Amores* 2.6); cf. Toynbee 1973: 248. For other Greek and Roman references to parrots and art depicting parrots, cf. Lazenby 1941: 17-18, Lazenby 1949, Hünemörder 2007: 558-9.

³⁰³ Also *vocales*. The *aves loquaces* included: parrots, thrushes, blackbirds, starlings (termed '*doctae aves*' by Statius, cf. Lazenby 1941:15), magpies, partridges, and - especially, the raven; cf. Lazenby 1941: 10-42.

³⁰⁴ According to Lazenby 1941: 10-42 both the archaeological and literary record, indicates that parrots and indeed other *aves loquaces* were common household pets by the Late Republic. Confirming that parrots were pets, cf. Toynbee 1973: 247-9, Bigwood 1993: 323, Hünemörder 2007: 559, MacKinnon 2014: 276.

³⁰⁵ Particularly if Schrijvers and Tutrone are correct that Lucretius drew heavily on the *HA* for his information on animals; Schrijvers 1997, Tutrone 2006, Tutrone 2012a: 85-95. The differences, however, seem at least as compelling as the similarities, which similarities could be attributed to many things - including: similar observations, widespread beliefs, and common sources.

5.1085),³⁰⁶ both considered by the Romans to be among the *aves loquaces* and the latter often kept as pets for this reason, including by the lower classes.³⁰⁷ It is thus likely that the Roman reader would have noticed that Lucretius at first glance seems to characterize them as singing birds instead (literally as birds who ‘*mutant cum tempestatibus ... raucisonos cantus*’, 5.1083-4). But there is considerable slippage between speaking and singing.³⁰⁸ Indeed the latter may be for Lucretius a more advanced form of the former.

We have seen above that Lucretius likens the song of swans to his own ‘*suavidicis versibus*’, containing *vera dicta*, and contrasts it with the harsh *vox* of the orator.³⁰⁹ Moreover, consistent with his denial of *religio*, Lucretius presents it as implausible reported wisdom (‘*dicitur*’) that certain birdsongs imply some attempt at communication with the divine, begging (‘*poscere*’) and summoning (‘*vocare*’) changes of weather.³¹⁰ Nevertheless, that implausibility seems predicated on the gods’ non-intervention in the world and, perhaps, the birds’ lack of false belief that gods do. Lucretius does not seem to be attempting to undermine the underlying assumption that birdsong is communicative in nature and has specific content. Rather, in the context of 5.1078-86 (and 5.1056-90 more generally), he seems to present the variations in their song as a kind of talking amongst

³⁰⁶ Speaking birds were not uncommon in mythology, such as in the story of how the raven had his feathers turned black for reporting incommodious information to Apollo about one of his lovers; cf. Athenian red-figure kylix No.585/B, Archaeological Museum of Delphi (ca 445 BCE), and *Ov. Met.* 2.531-632.

³⁰⁷ With respect to the crow, cf. e.g. *Ov. Met.* 2.547-8: ‘*garrula*’, *Ov. Fast.* 2.89: ‘*loquax*’. With respect to the raven, cf. *Ov. Met.* 2.534-41: *loquax* (twice). Cf. Jennison 1937: 120, Lazenby 1941: 17-18 (also that these were indigenous talking birds), implying that their ability would have been known for some time. A number of accounts of these talking birds, including some roughly contemporary with Lucretius, are recounted also by Toynbee 1973: 273-5. Porphyry’s partridge was also said to converse with him; cf. Lazenby 1941: 23, Lazenby 1949: 249. For further ancient references to the belief that birds could speak human language, cf. Campbell 2003: 321. On birds in the popular imagination, Persius’ *Choliambis* is also a point of comparison.

³⁰⁸ Songbirds (*aves cantrices, oscines*), could also be trained - including, in the case of the nightingale, to speak both Greek and Latin, increase their vocabulary, and even form long sentences, but were more often kept in aviaries than as pets (there is evidence of both); Lazenby 1941: 6-10.

³⁰⁹ *Lucr. DRN* 4. 907-15 and 4.542-8 respectively.

³¹⁰ *Lucr. DRN* 5.1084-6, cf. 4.710-11: ‘*gallum ... | auroram clara consuetum voce vocare*’. *Epic. Ep. Pyth.* 98 and 115 also claim that natural causes are behind living creatures’ making signs (ἐπισημασίαι) in advance of changes in weather, rather than divine beings waiting upon their summons. Epicurus, however, stresses something like migrations (ἐξοδοί) being the nature of the signs, rather than *voces*. *DRN* 1.12-13 is ambiguous as to how the birds signify the arrival of Venus. For discussion of these beliefs about birds in antiquity, cf. Campbell 2003: 320-1, Gale 2009: 190, and, on animals and divination more generally, Struck 2014: esp. 312-14 on birds (who had a privileged place therein), not least in Roman religion and society.

one another, perhaps analogous to whale song.³¹¹ The basic criteria for language are that its utterances³¹² are deliberately made, intended to express oneself or to communicate, contain propositional content, and have syntax and grammar.³¹³ Animals have thus far been shown to meet all but the last ones. Birdsong, however, also suggests these - and not just through the above analogy to verses containing doctrines. Music meets all of the basic criteria for language and today is considered by many to be one. According to Lucretius, earthborn humans (*'genus terrigenarum'*, 5.1411) first developed music by gradually learning how to imitate the clear *voces* (*'liquiditas voces'*, 5.1379) of birds and eventually birdsong in their tuneful poetry.³¹⁴

Much of this is not present in Epicurus' compressed account of glossogenesis. Lucretius may simply be following a fuller account than Epic. *Ep. Hdt.* 75-6 on language, with particular emphasis on the first stage. However, given what Lucretius' readership would have known about talking birds, it seems more likely that here and indeed throughout 5.1063-86 Lucretius is deliberately focusing on intraspecies communication among different groups of animals, perhaps so as not to contradict Epicurus. In other words, he is focusing on instances of them using their own language, not ours, and of their communicating with one another, not with humans (even in cases when they can).

Thus, when Lucretius calls animals *muta*, he seems to mean that they are not using human language as a means of communicating with one another, rather than - as noted above - by way of indicating that they lack language.³¹⁵ He also uses the term of an overly reticent, but loved, woman.³¹⁶ Finally, Iphigenia is mute with fear (*'muta metu'*, 1.91),

³¹¹ It is likely that Lucretius would have known of whales and the like, but unclear whether he would have been aware of their songs, or that their songs constitute language. On ancient knowledge of whales, and that detailed knowledge of certain aspects were available at least by the time of Aristotle, cf. Kitchell 2014: 197-9, and, on the whale in the Roman world, cf. Toynbee 1973: 208. There seems to have been considerably better and earlier knowledge of the dolphin. Aristotle is quite familiar with it. Literary references go back as far as Homer. It figures in a number of well-known myths, and the iconographic record traces it as far back as Minoan art. Dolphins' similarity with and penchant for interacting with humans is also well documented; Kitchell 2014: 53-7. It is thus not implausible that some awareness of dolphin's means of intraspecies communication existed in the Hellenistic period. For example, Toynbee 1973: 206 notes the Roman world's fascination with the dolphin's 'alleged passion for music, especially for part-singing and the strains of the water-organ'.

³¹² Either vocal or gesticular - e.g. in the case of sign language.

³¹³ Lucretius does not discuss the development of grammar and syntax.

³¹⁴ *Lucr. DRN* 5.1379-81; cf. 5.1382-1411, esp. 5.3182-7 on the development of musical instruments.

³¹⁵ Some, like parrots and other talking birds, as we have seen above, were known by this time to be able to communicate with humans using human language; *Lucr. DRN* 5.1059, 5.1088. Arguing that they lack language altogether, and possibly, by extension, reason, cf. e.g. Bailey 1947, iii: 1497, Konstan 2008: 97-8, Camardese 2010: 78. For a survey of opinions on the subject, cf. Campbell 2003: 283-94.

³¹⁶ *Lucr. DRN* 4.1164; she is not incapable of communication with other humans by means of human speech.

indicating that some feelings and/or the beliefs associated with them lead to the deliberate avoidance of speech.³¹⁷

Although Lucretius' account of the infancy of the world is not strictly chronological, the main body of the account of language's origins, both human and animal, occurs after the first families (e.g. first offspring born of humans) and communities are formed, the latter through imprecise intraspecies communication. Just as there was no chronological moment when the human race became articulate,³¹⁸ there was probably no distinct moment when animal species became so; this again suggests that there was no radical difference in their respective ontogenic or phylogenic processes. As we have seen, the first interspecies communities were formed on the basis of mutual utility between equal agents for their own sakes, and language evolved to a certain degree on the basis of utility (perhaps partly resulting from need). This suggests that the earthborn races, both human and animal living creatures, were able to achieve some level of non-spoken interspecies communication, which was mutually understood.

Animals are thus not merely some analogy which is included to show that the human race developed language by using their natural powers, just as infants do individually. Epicurus emphasizes that different human ἔθνη in different places developed different languages,³¹⁹ and that language is therefore (to use Lucretian terminology) an *eventum* of place and space, as well as one's own constitution. However, as Atherton notes,³²⁰ in book five Lucretius represents the human race's development of language as a collective enterprise. After the Persian Wars the Greek term βαρβάροι had come to connote those whose reason, judgment, or degree of civilization (so to speak) may at times be questionable.³²¹ Nevertheless, given the ad hoc acquisition and administration of the Roman empire even by the Late Republic, it seems doubtful that one would have thought

³¹⁷ *Mutus* is elsewhere used of fish, which are not mentioned among in the account of language, cf. Lucr. *DRN* 2.342, 2.1082. Other uses are more obviously metaphorical, referring to things which are unexpressed or 'individuals' who are silent, cf. 2.625, 4.1057, 5.842. Cf. the metaphorical use of deaf (*surdus*) at 5.1052, for men who do not listen rather than lack the ability to hear, on which Gale 2009: 189.

³¹⁸ Konstan, on the other hand, places it after the development of communities and suggests that the allying humans did so by communicating in the manner of infants' noises and gestures. For him, this is as far as animal language gets, because the second stage requires reason, which - again - Konstan sees as a biological difference between humans and animals; Konstan 2008: 96-104. Cf. Schrijvers 1999: ch.5, esp. 57-8, Atherton 2005: 110-21.

³¹⁹ Epic. *Ep. Hdt.* 75-6; cf. p.280 n.248, Konstan 2008: 99, Long and Sedley 1987: i.97.

³²⁰ Atherton 2005: 104-5: 'Lucretius does not distinguish variation *between* human languages from variety *within* them ... as for the principle that local variation is partially responsible for the variety of tongues, it is nowhere visible ... there is no sign of Epicurus' attempt to transfer natural variation amongst human populations to their languages'.

³²¹ Cf. the testimonium of Epicurus (or his school): 'οὐδὲ μὴν ἐκ πάσης σώματος ἔξωθεν σοφὸν γενέσθαι ἄν οὐδ' ἐν παντὶ ἔθνεϊ' (D.L. 10.117).

those unable to speak Latin less than human or as lacking *ratio*. Indeed many Romans thought the Greeks effeminate (not unlike the Greeks did the Persians), but still looked to them in matters of philosophy. Similarly today, it would be unusual - at least among the educated - for two people who did not understand one another's languages to assume that the other lacked language or indeed reason. Regarding the latter, someone with greater vocal facility, like an opera singer or someone who speaks many languages fluently, is not necessarily thought to have better reasoning abilities than, for example, a philosopher with a stutter, someone unable to carry a tune, or a person who only speaks one language. Moreover, Lucretius shows that animal species did evolve their own languages, learning to use the potential for this inherent in their own respective natures - even illustrating the extent of their development by mimesis. Lucretius merely focuses on intraspecies language, and not all animals exhibit or manifest this as clearly to the human ear as birds do. Therefore, the ἔθνη that Lucretius chooses as alternatives to other humans are other living creatures - namely animal species.³²² Language thus initially varied according to constitution at the level of species and was generally aimed at communication with one's own kind. It is possible that Lucretius would say that human language evolved into multiple languages at a later stage than that which he is discussing in book five.³²³ Finally, as animals do possess language and develop it through learning in the same way as humans do, one cannot exclude Lucretian animals from having *ratio* for lack of language.³²⁴

V. THINGS LEARNED AND *RATIO*

Things which have been learned can be transmitted from one creature to another through communication. In other words, teachings or *doctrina* can be transmitted through, for example, sayings or *dicta*, such as those contained by Lucretius' poem. Lucretius introduces the noun *doctrina* and the verb *sapio* in the very same verse - in the proem to book two.

sed nil dulcius est bene quam munita tenere
edita doctrina sapientum templa serena
despicere unde queas alios passimque videre
errare atque viam palantis quaerere vitae

But nothing is sweeter than to occupy lofty
serene temples, well-fortified with the
teachings of wise men, from which you can
look down upon others and see that they

³²² Cf. Gale 2009: 188.

³²³ That Lucretius does acknowledge the existence of different languages, perhaps at different states of development (the development of his own being one he seems engaged in), cf. e.g. Lucr. *DRN* 1.136-9, 1.830-4, 3.260, 4.969-70, 5.336-7.

³²⁴ On justice, *ratio*, and ἔθνη, cf. esp. pp.208-10.

With these lines Lucretius asserts that the detachment which results from learning the true nature of things - namely from the '*doctrina sapientum*' - brings the highest form of tranquility.³²⁵ The discovery of the path of equanimity, according to Lucretius, elevated Epicurus to the ranks of the divine, who by their complete detachment possess exemplary tranquility. It was Epicurus

qui princeps vitae rationem invenit eam quae
nunc appellatur sapientia ...

DRN 5.9-10

who first discovered that path of life which
now is called wisdom ...

This true path is not just the *doctrina* of Epicurus, but that of nature. That said, not all teachings are created equal; they do not all reflect well the nature of things. It is necessary for one to distinguish. Lines 5.1117-1135 strongly recall the proem to book two by both content and intratextual echoes; they also indicate in a similar way that wisdom is a choice.

quod si quis vera vitam ratione gubernet,
divitiae grandes homini sunt vivere parce
aequo animo; neque enim est umquam
penuria parvi ...

DRN 5.1117-9

But if someone should steer his life on the
true path, then for this man great riches are
living sparingly with a tranquil *animus*; for
there is never lack of a little.

In this context, *guberno* seems to recall the *animus* as helmsman and *gubernaculum* (4.903-4); '*vera ... ratione*', by contrast with the ill-fated *iter* (5.1124, 5.1132), recalls '*viam vitae*' (2.10) and '*vitae rationem*' (5.9). *Vera ratio* also denotes 'by true reason'. But all do not steer well their life

quandoquidem sapiunt alieno ex ore petuntque
res ex auditis potius quam sensibus ipsis

DRN 5.1133-4

since indeed their understanding³²⁶ comes
from the mouth of a stranger³²⁷ and they seek
things according to what they have heard
rather than according to the *sensūs*
themselves.

As Long notes, for Lucretius it is ignorance of causes and poverty of reasoning which leads humans to false belief, but when 'we are reasoning correctly about the world ... there is no gap between ourselves and nature'.³²⁸ The value of the *doctrina* of Epicurus, then, and of Lucretius' own *dicta*, is that their theory-driven wisdom or understanding

³²⁵ The word *doctrina* occurs four times in the poem: Lucr. DRN 2.8, 3.307, 3.1036, 5.727. For Lucretius, its connotations are neither inherently positive nor inherently negative. The implied value varies with the source and with the teachings' consistency with the nature of things.

³²⁶ As theoretical wisdom.

³²⁷ I.e. not just any other (*alio*), but a stranger (*alieno*) - perhaps a stranger to the true path of life and true wisdom.

³²⁸ Long 1997: 130.

(*sapientia*) is in accordance with nature as experienced through the *sensūs*, which are accurate. The alternative is dire, as we have seen: *miseræ mentes* with ‘*pectora caeca*’ - condemned to wander in shadow and danger for failing to understand (‘*nonne videre*’) what one’s own *natura* cries out for.³²⁹ Lucretius may be drawing on the etymology of *sapio* and its derivatives. A root meaning of *sapio* is to sense (well), particularly by means of taste and smell, or to have sense-perception; the latter seems to be his meaning when discussing the relationship of the *mens* to the rest of the *animus-anima* complex and living body:

idque sibi solum per se sapit, id sibi gaudet,
cum neque res animam neque corpus commovet una
DRN 3.145-6

And this³³⁰ alone has perception on its own
and for itself: this alone has joys when at that
time nothing stirs either the *anima* or the
body.

Sapio can also mean to be particularly discerning in matters of sense-perception. From this, the meaning extends to having understanding or being wise. Therefore, it is related to being *sagax*, and, whether the reader chooses to follow one’s own *sensūs* or the teachings of Epicurus and Lucretius, s/he will be on the true path and developing real wisdom. But choosing the false wisdom from the teachings of others will lead to an entirely different outcome.³³¹ These poor choices - sooner or later preventing or detracting from painlessness and tranquility - follow from false beliefs and generate further false beliefs, in a mutually reinforcing cycle.

In one of Lucretius’ arguments that the faculties and other properties of living things are emergent, he relates a number of these terms related to learning. Concluding a *reductio ad absurdum*, whereby the *primordia* could feel just like a living creature and thus exhibit all of the other abilities,³³² Lucretius states:

quod si delira haec furiosaque cernimus esse,
et ridere potest non ex ridentibus auctus,
et sapere et doctis rationem reddere dictis
non ex seminibus sapientibus atque disertis,
qui minus esse queant ea quae sentire videmus
seminibus permixta carentibus undique sensu
DRN 2.985-90

But if we discern that this claim is crazy and
mad, and if one not grown from laughing
things is able to laugh, and if one can be wise
and express *ratio* with learned sayings,
without originating from wise and eloquent
seeds, then how can we not see that those
things which are able to feel are assembled
from constituents completely lacking *sensus*?

One cannot physically see the seeds from which living things are comprised or their *simulacra* (if they are large enough to have them), with the vision of either the eyes or the

³²⁹ Lucr. DRN 2.14-19. On this sort of failure to perceive, intellectually and morally, cf. Lehoux 2013.

³³⁰ I.e. ‘*mens animusque*’, Lucr. DRN 3.142.

³³¹ Cf. e.g. The proem to book two of DRN and Lucr. DRN 5.1117-1160.

³³² Lucr. DRN 2.973-84.

animus. Moreover, Lucretius is here dispelling a belief which is contrary to the nature of things. Therefore ‘*videmus*’ here, like ‘*cernimus*’, refers to a kind of knowing through abstract reasoning - i.e. reasoning about and with ideas - specifically through non-necessitated inferences and beliefs. Learning (‘*doctis ... dictis*’) here is associated with possessing *ratio*. Line 2.987 is also something of a pleonasm as it is by ‘*reddere dictis*’ that one demonstrates having *sapientia*. People possess the faculties of learning, speech, and *ratio* more generally, and are comprised of constituents without these *coninucta*; thus all things which are able to feel are comprised of constituents which lack *sensus*. The fact that the latter is characterized as no less obvious (‘*qui minus ... videmus*’) suggests at least analogical argument - more if it rests on the assumption that anything which possesses learning, speech, and *ratio* also has *sensus*.³³³ Also, because such faculties emerge partly from *sensus* (itself an emergent faculty) and because animals possess them,³³⁴ 2.973-90 may support the claim that all living things (‘*animalia*’) have (i) *ratio*, including (ii) speech, and (ii) the ability to learn, as well as (iv) at least a degree of understanding.

This brings us back to one of Lucretius’ arguments for the vast majority of the nature and abilities of the *animus-anima* complex being proper to each species and breed, as well as being hereditary and developmental.³³⁵ As we saw in chapter four, Lucretius predominantly discusses animals and then makes the extension to humans. The relevant lines bear repeating. Regarding the ‘*certa ... vis animi*’ (3.746-7), he states:

quod si immortalis foret et mutare soleret
 corpora, permixtis animantes moribus essent:
 ...
 desiperent homines, saperent fera saecula ferarum
 DRN 3.748-9, 753

... but if it were immortal and accustomed to
 change bodies, then living creatures would
 have been thoroughly mixed-up in their
 behaviors. ... Men would lack understanding;
 the wild races of animals would have
 theoretical wisdom.

Lucretius is not contrasting humans with all animals (which he sometimes renders ‘*ferae*’) but specifically with wild ones, hence the emphatic adjective *fera* and the alliteration (‘*fera ... ferarum*’). The list of reversed behaviors as *adynata*³³⁶ collapses in its conclusion. In *DRN*, *desipio* (and its derivatives) is only used with respect to humans. Lucretius uses it of men undergoing an epileptic fit to mean something like ‘to rave’ or

³³³ Otherwise the claim that the *primordia* lack *ratio* would not necessarily imply that they also lack *sensus*. This only follows if these faculties are contingent upon the faculty of *sensus*; as we have seen, *sensus* is necessary but not sufficient for these. If this logic is correct, then proof of one faculty would entail proof of the others, and vice versa, as a sort of interentailment argument - ergo all creatures which possess *sensus* also possess the other faculties.

³³⁴ As a synchronic reading and/or hindsight indicates.

³³⁵ Lucr. *DRN* 3.741-53, cf. pp.211ff.

³³⁶ Cf. p.218.

‘speak nonsense’;³³⁷ it is used similarly of men supposing or claiming something which is contrary to the nature of things.³³⁸ Indeed, it is used to mark the absurdity of three key false human beliefs which *DRN* undermines, namely: (i) the *animus-anima* complex is immortal and yoked to a mortal body, (ii) the world is immortal and created by divine intelligent design, and (iii) language was given to humans by some name-giver.

What is at stake here are the characteristic behaviors or practices which tend to follow from a creature’s inherent *vis animi*. Nowhere does Lucretius suggest that animals hold false beliefs or behave in a way which is inconsistent with the nature of things; nor is this pseudo-*adynaton* meant to suggest that they do. Beliefs are learned and can be unlearned, including false beliefs.³³⁹ Humans who hold false beliefs do lack correct understanding and thus theoretical wisdom regarding the true nature of things. They also use their *ratio* to deliberately subvert their self-preservation - more skillfully doing what they once did due to lack of the wisdom derived from experience (*inprudentes*).³⁴⁰ The very existence of *DRN* attests to the prevalence of such false beliefs, as the poem aims to remedy this. If they were not prevalent, then animals - even those living outside of interspecies communities based on mutual utility and justice - would not be wise by contrast. Nevertheless, animals would not become diminished in their understanding by *DRN*’s success. Indeed, all creatures equally would willingly steer their life along the true path - i.e. according to the true nature of things. That said, there is nothing in the poem to suggest that animals, particularly wild ones, have developed the sort of reflective systematic philosophical discourse about the nature of things which can also be suggested by *sapio*. Insofar as this argument from omission can be ruled in, perhaps wild animals’ lack of application of their *ratio* to such things is another point of divergence from humans; nevertheless, this would not entail lack of *ratio* itself and would certainly allow for *prudencia* at least - which, according to Epicurus, suffices for leading the ideal pleasurable life.³⁴¹

³³⁷ Lucr. *DRN* 3.490, 3.499.

³³⁸ Lucr. *DRN* 3.802, 5.165, and 5.1043. On the last two instances, cf. Gale 2009: 124 and 188 respectively. Recently Buglass has argued for the resurrection of Lambinus’ conjecture *desiperest* at *DRN* 3.361, a comparable context; Buglass 2014.

³³⁹ Further on this below.

³⁴⁰ Lucr. *DRN* 5.1009-10; cf. pp.103-4.

³⁴¹ E.g. as it relates to the pleasure-pain calculus (on which, cf. Warren 2014: ch.8), cf. Epic. *Ep. Men.* 127-132, esp. 132: ‘τούτων δὲ πάντων ἀρχὴ ... ἀχώπιστον’. N.B. φρόνησις also entails learning and justice; cf. Epic. *KD* 5. For a very different interpretation of Lucr. *DRN* 3.748-53, cf. Camardese 2010: 78, who views it as evidence of ‘il conflitto fra due nature costituzionalmente inconciliabili’.

Learning is thus a faculty of the *animus-anima* complex of all living creatures; what we have learned influences our choices and whether we learn is at times a matter of choice. Learning is a means by which the configuration of one's *animus-anima* complex develops over the course of one's life. To the extent that learning is within our control, these developments represent the non-necessitated constitutional variations which are 'up to us'. They also differentiate one creature from another of effectively the same nature, even (although Lucretius does not use the example) with respect to identical twins. The close relationship of learning to agency, language, and judgment suggests that all are faculties which are encompassed by another; that faculty - as we have seen - is *ratio*. In turn, as animals possess the various faculties which comprise *ratio*, they also possess *ratio*.³⁴² Their particular wisdom, which generally exceeds that of non-Epicurean humans, would be impossible without it.

Recall that Lucretius describes the *animus-anima* complex as consisting of four primary constituents and that when one experiences a particular emotion, the *animus* temporarily takes on the nature of the surging constituent. Immediately subsequent to these two points, as we have seen, Lucretius discusses the inherent *natura animi* of animals, specifically with respect to the relative proportion of the four primary constituents and the resulting penchant for exhibiting particular emotions and behaviors.³⁴³ Then, still with respect to the nature of the complex and the *animus* in particular,³⁴⁴ Lucretius crucially equates human and animal psychological faculties:³⁴⁵

sic hominum genus est: quamvis doctrina politos
constituat pariter quosdam, tamen illa relinquit
naturae cuiusque animi vestigia prima.
nec radicitus evelli mala posse putandumst,
quin proclivius hic iras decurrat ad acris,
ille metu citius paulo temptetur, at ille
tertius accipiat quaedam clementius aequo.
inque aliis rebus multis differre necessest
naturas hominum varias moresque sequacis;
quorum ego nunc nequeo caecas exponere causas,
nec reperire figurarum tot nomina quot sunt

The race of men is the same way: although teaching may constitute certain men as equally polished, nevertheless those first traces of the nature of each man's *animus* remain. It must not be thought that faults can be completely eradicated, so that this man does not more hastily rush into rages, that man is not attacked by fear a little more swiftly, but a third does not accept certain things more calmly than is proper. And it is necessary that in many other things the

³⁴² Contra, e.g. Philodemus, for whom man is the definitive rational creature according to our πρόληψις; cf. Phld. *Sign.* 52: 'ὅ[σ]περ ὅταν | εἰπόμεν ... καὶ τὸν ἄνθρωπον ἢ ἄνθρωπος | ζῶιον λογίον', Phld. *D.* 1.13.1-7 in Diels 1916: 21-2, contending that animals act according to their nature and impulse (ὁρμή) without ἐπιλογισμός and δόξαι, and Phld. *D.* 1.15.28 (in Wurster unpublished 2015): 'τοῖς δ' ἀνθρώ[π]οις λογισμός'.

³⁴³ Lucr. *DRN* 3.294-306.

³⁴⁴ N.B. 'est ... animo' (Lucr. *DRN* 3.288), 'haec igitur natura' (3.323), and 3.323ff. What follows is not an interruption or differentiation, but an equation which further develops the account of the *natura animi* writ large.

³⁴⁵ On the other hand, Camardese and O'Keefe, for instance, see these lines as differentiating between humans and animals, such that only the humans can use *ratio* to learn Lucretian teachings in order to live a life worthy of the gods; Camardese 2010: 78. O'Keefe 2009: 150. They fail to recognize: the importance of 'sic hominum genus est', that animals possess *ratio*, and that animals already live such a life.

principiis, unde haec oritur variantia rerum.
illud in his rebus video firmare potesse,
usque adeo naturarum vestigia linqui
parvola quae nequeat ratio depellere nobis,
ut nil inpediat dignam dis degere vitam
DRN 3.307-22

various natures of men and consequent practices differ. I cannot set forth the hidden causes of these differences now, nor discover all the names of the shapes - as many as there are first-beginnings - from which this variety of things arises. I see that in these matters I am able to confirm the following: the remaining traces of the natures which *ratio* is unable to cast off from us are so small that nothing hinders one from conducting a life worthy of the gods.

The natures of individual *animi* vary, as we have seen in this passage and chapter four, both across and within species. Nevertheless, the mechanisms which govern how that nature arises and its workings are shared by all living creatures.³⁴⁶ There is a coordinate human example here for each animal example in the preceding lines (3.294-306). Not only are men, like animals, inclined towards certain emotions and behaviors by their particular constitution, but animals too govern the development of their respective natures by means of *ratio*. Variety of constituents is directly correlated with variety of inherent *naturae animorum*, which is stable. Learning does not alter that *natura*; these lines show that it alters beliefs and thus behaviors.³⁴⁷ *Vestigia* here suggests both the constituents themselves and the developments - through learning - of the physiological structures which they form. That which is ineradicable or unable to be torn up by the roots (*'radicitus evelli'*) looks forward to the instilling of ideas by implanting or grafting (*insero*, cf. 5.182, 5.1046).

Those things which are configured through judgment and memory are those which *ratio* can alter through further learning, at least partly in a top-down manner. In other words, (Epicurean) *doctrina* can potentially refine (*'politos'*) men's *animi* and constitutions more generally³⁴⁸ to such an extent that they choose behaviors (*mores*) which are consistent with what is natural and necessary, i.e., lacking pain and living on a little with a tranquil *animus*. This is possible because there are no false beliefs ingrained in one's inherent *natura*, at whatever stage of maturity. The only other time Lucretius uses the verb *depello* (2.219) is to describe the motion of the swerve with respect to all bodies,³⁴⁹ confirming that even the operations of *ratio* on the *animus* itself are not

³⁴⁶ Contra e.g. Kenney 2014: 117, who claims of 3.311-13, that 'the analogy between men and animals cannot be pressed too closely, as indeed is to be implicitly acknowledged at lines 314-18; human behaviour is considerably more complex than that of animals'.

³⁴⁷ Cf. e.g. Lucr. DRN 2.1-61, 3.1045-52, 5.18-21, 5.43-54, 6.24-41, Epic. KD 10-3, Epic. Ep. Men. 132 on what generates a pleasant life: 'ἀλλὰ νήφων λογισμὸς ... θόρυβος', and Usener 221 on philosophy as a cure for (negative) πάθη. As Long and Sedley 1987: i.135 note, the 'reasons for wrong-doing, like the misplaced ambitions for power and status with which they are frequently linked, stem from misunderstanding the means of obtaining security and tranquility'. Beliefs and the behaviors which tend to follow from them are thus the primary target.

³⁴⁸ Cf. Lucr. DRN 1.401: *'conradere fidem'*.

³⁴⁹ Perhaps synonymously with *declino*, which is used exclusively in the context of the swerve and *voluntas*.

determined, but up to us. We - both humans and animals - are thus responsible for our own development, including moral development. It may operate by this mechanism. One's understanding of the nature of things may constrain the range of the possibilities of time and place open to *voluntas*, limiting the possible variations such that the more correct one's understanding is, the more likely one would be to will one's actions in accordance with the nature of things.

Assuming that Lucretius would not advance ideas which contradict the claims of Epicurus, some brief reflections on *On Nature 25* are in order.³⁵⁰ A number of ideas are consistent: (i) One has control over at least some amount of one's non-inherent nature,³⁵¹ including beliefs, and one's behaviors generally follow from one's nature (inherent and not). (ii) This developed nature³⁵² - in conjunction with one's choices - can lead to disturbances at the micro-level with respect to one's constituent bodies, as well as lead to actions, thoughts, openness to interacting with particular stimuli more generally, and further developments of one's nature. (iii) With Sedley, Long and Sedley, Masi, and Gill,³⁵³ certain developments of one's constitution which are emergent properties can affect the body's constituents in a top-down manner; control exists at the phenomenal level. (iv) One is responsible for the aspects of one's nature over which one has control and for the choices which tend to follow from one's nature. Not only is this reading of Epicurus' ideas broadly consistent with the findings of Masi's analysis (which takes *On Nature 25* as its basis and focus),³⁵⁴ but also independent analysis of *DRN* has yielded

³⁵⁰ A full treatment of the implications would be a promising direction for further research but is beyond the scope of this investigation. Here we are considering primarily the fragments of Epic. *On Nature 25* which correspond to Long and Sedley 1987: 20B, C, j (i.e. ii.105-8, 113), drawing on the readings and commentary of Sedley 1983 (as does the commentary in Long and Sedley 1987: i.107-12); earlier, these were marked as Arr.² 34.21-2, 34.26-30, and 34.25.21-34, respectively. A more recent edition of these fragments (and others) is that of Laursen 1997: 19-22, 32-41, and 31 respectively, built principally on the last twenty-four columns of *PHerc.* 1191 and the corresponding columns of *PHerc.* 697 and *PHerc.* 1056. The readings follow those of Long and Sedley, in consultation with those of Laursen and Arr.². The numbering follows Laursen.

³⁵¹ E.g. the developments through learning, what has above been called one's variable *natura animi*.

³⁵² Developed presumably through both maturation and learning. The relevant terms in Epicurus' discourse include ἀπογεννημένα, διάθεσις, σύστασις, and, of course, φύσις. The scholarly debate about the precise signification of these terms and how they relate to one another is beyond the scope of this study. Significant contributions to the debate include: Sedley 1983, Grilli 1983, Sedley 1988, Annas 1993, Purinton 1996, Purinton 1999, O'Keefe 2005, Gill 2006, Masi 2006.

³⁵³ The version of supervenience offered at Masi 2006: 216 seems to correspond to emergence at least in the sense of epistemological non-reduction, but her overall conclusions ultimately favor something closer to a non-dualistic version of what we earlier cast as emergent dualism (on which categories, cf. p.33), i.e. the interpretation favored by Sedley and by Long and Sedley. Gill's characterization (similar to Masi's), for example, suggests that the emergent whole, which is nevertheless physical, shapes its physical make-up in a top-down manner through physical means; Gill 2006: 61. Annas 1992: e.g. 130-1 prefers what she calls a 'physicalist' reading which is only saved from determinism by reason's somehow exploiting an inherent potential in our seeds; for an even more physicalist reading cf. Fowler 1983: esp. 351.

³⁵⁴ Masi 2006: esp. ch.5-6 and 256-62, where her overall conclusions are synthesized with commendable clarity.

strikingly similar results; this coincidence supports the conclusions of both analyses and demonstrates - as one would expect - that Lucretius and Epicurus share the same fundamental views on philosophy of mind.

This has implications for how one reads the passages in *On Nature* which treat animals.³⁵⁵ With respect to *PHerc.* 1191 -22--18/697 3,1,2-3/1056 5,2-3 specifically:³⁵⁶ we therefore fight and hate certain individuals who, although capable of overcoming a nature which is inherently prone to disturbance³⁵⁷ through learning, have not done so; their developments³⁵⁸ - including those for which they are held responsible - thus follow from their innate nature, as is the case with all animals.³⁵⁹ It is not that we hate all animals or that their nature is inherently prone to disturbance.³⁶⁰ We simply recognize that what they learn and do generally is in accordance with their inherent nature (as it matures over one's lifetime); it just so happens that, unlike humans, they have no need to overcome it. *PHerc.* 1191 -15--13/697 3,2,4-5/1056 6,2³⁶¹ puts something of a caveat on this, suggesting that the correspondence of inherent nature and developments over which one has control is particularly true of those animals which have not entered into pacts with humans '[τ]ὰ ἄγρια τῶν ζώων'; it is these that we hate but tend not to blame for their actions.³⁶² By implication, those whose choices could be seen as departures from what would follow purely on the basis of their natures - e.g. reflecting some calculation of utility and learning which leads to actions other than those which they would engage in outside of human-animal society - are thereby treated as self-determining.³⁶³ Hence, as per *PHerc.* 1191 -15--13/697 3,2,4-5/1056 6,2,³⁶⁴ these are subjected to praise and blame for at least those actions which potentially follow from such learning, in order to reform them by education.

³⁵⁵ On which, in relation to these issues, cf. esp. Sedley 1983, Long and Sedley 1987: i.107-12 and ii.105-8, 113, Laursen 1988, Annas 1992: esp. 134-5, Annas 1993, Verlinsky 1996, Bobzien 2000, Gill 2006.

³⁵⁶ Laursen 1997: 19-22.

³⁵⁷ Cf. e.g. the man who too easily rushes into anger, because of a relative abundance of fiery *primordia* in his *animus-anima* complex.

³⁵⁸ Not necessarily referring to emergent properties, but perhaps affecting them. Such developments may include not only maturation of constitution more or less through natural law, which maturation is to some extent influenced by us (e.g. through what food we eat, what environment we live in, and how much we exercise), but also certain things learned - both automatically and voluntarily.

³⁵⁹ This sympathizes with the reading of Verlinsky 1996: 136 up to the point where he places with necessity the responsibility for animals' developing and acting in accordance with their nature.

³⁶⁰ Contra, e.g., Annas 1992: 133.

³⁶¹ Laursen 1997: 31.

³⁶² According to Long and Sedley 1987: ii.113, ἄγρια is a conjecture for αερια. Laursen 1997: 31-2 seems to regard ἄγρια with more certainty.

³⁶³ Irrespective of whether we humans behave as though certain animals are self-determining or automata, all living creatures are in fact self-determining - explicitly including, as Long and Sedley 1987: ii.113 suggest, race-horses and all animals capable of forming inter and intraspecies pacts. As we have seen, all living creatures were once wild, so to speak, and all are capable of forming pacts, but not all chose to; whether they do so or not is a question of utility, not capacity.

³⁶⁴ Laursen 1997: 35-6.

However, those animals which have not developed their nature in such ways, although still in control of their developments and actions, cannot be rightly blamed for acting contrary to human interests and we do not generally bother to attempt teaching them (further).³⁶⁵ Nevertheless, contra, e.g. Huby and Verlinsky,³⁶⁶ they too are morally responsible, self-determining agents with free will.

Conclusions

In sum, this chapter has explored Lucretius' account of the various faculties of the *animus-anima* complex which are specific to the concentration that is the *mens*, with particular emphasis on *studium mentis*, *voluntas* and agency, learning, language, as well as memory, judgment, and belief. All of the aforementioned can be considered aspects of the faculty of *ratio*. It has advanced the knowledge of the mechanisms which relate these faculties and demonstrated the extent to which *mens* controls both these functions and those of the rest of the body in a non-necessitated manner. The result is a picture of interrelated emergent faculties which (i) are not completely independent of their causes, (ii) operate by physical means, and (iii) can exert causal influence upon each other and what underlies them. In the process, the chapter has demonstrated that Lucretius believes animals to possess these each of these faculties and mechanisms, including control, in the same manner that humans do, and are thereby morally responsible agents. Let us conclude by considering a passage which compares humans and animals on these grounds.

As we have seen, Lucretius claims that, with respect to all living creatures, parents and their offspring know one another from the other members of even their own species

³⁶⁵ Massaro 2011: 278-80 posits that this is actually a failed attempt to reshape them. Perhaps for the same reasons, Lucretius finds hard to believe that people would not have foreseen the outcome of experiments with trained *saevae ferae* in warfare.

³⁶⁶ Huby 1969, Verlinsky 1996: esp. 128; cf. also pp.265-6 for further examples. Verlinsky 1996: 129 claims that in *DRN* there are 'no indications to conclude what kind of animals we can blame in the way of admonition and correction and what kind we cannot'. He concludes that Epicurus made no distinction between wild and tame animals with respect to the issue of free will and responsibility, preferring to attribute to them something like Aristotle's doctrine of the voluntary in *EN* 3.4.1111 a24-6, b7ff; for this Verlinsky offers an Epicurean comparandum in *Phld. Jr*; Verlinsky 1996: 133 n.20. However, we have seen that, for Lucretius, those animals which have entered into pacts with humans can held accountable for their choices as morally responsible beings, but only for actions related to the terms of those pacts; hence lions, bulls/aurochs, and boars are no longer used in warfare, but horses are.

because, as Sharrock notes, ‘individual instantiations of a species are not identical with each other’.³⁶⁷ He shows that animals do so no less than humans³⁶⁸ using these lines:

nam saepe ante deum vitulus delubra decora
turicremas propter macatus concidit aras,
sanguinis expirans calidum de pectore flumen;
at mater viridis saltus orbata peragrans
quaerit humi pedibus vestigia pressa bisulcis,³⁶⁹
omnia convisens oculis loca si queat usquam
conspicere amissum fetum, completque querellis
frondiferum nemus adsticens et crebra revisit
ad stabulum desiderio perfixa iuveni;
nec tenere salices atque herbae rore vigentes
fluminaque illa queunt summis labentia ripis
oblectare animum subitamque avertere curam,
nec vitulorum aliae species per pabula laeta
derivare queunt animum curaque levare:
usque adeo quiddam proprium notum requirit
DRN 2.352-66

For before the handsome shrines of the gods, a calf often collapses, slaughtered near the incense-burning altars, spurting a river of hot blood from his *pectus*. But the bereft mother mother, searching³⁷⁰ the green woodland pastures, seeks the tracks pressed into the earth by cloven feet, thoroughly examining all the places with her eyes - in case she could anywhere spot her lost young child. And, when pausing, she fills the leafy wood with her laments, and repeatedly re-checks the stable, pierced with grief for her calf. Nor can those tender willows and grasses thriving with dew and rivers slipping over their high banks delight her *animus* and turn away her sudden *cura*. Nor can the appearances³⁷¹ of the other calves throughout the fertile pastures divert her *animus* and lighten her from *cura* - so persistently she seeks a certain thing known to be her own.

The sound and structure of 2.352-4, as Segal describes, illustrate the spectacle of sacrificial slaughter, which rite Lucretius’ readers probably would have witnessed countless times³⁷² - but not the consequences. In the ensuing spectacle,³⁷³ the mother of the *vitulus* exhibits most if not all of the psychological faculties which we have been analyzing.³⁷⁴ She manifests the retention of facts, recognition of that which is not her calf

³⁶⁷ Sharrock 2006: 265. According to some, including Plato, the degree of recognition of likeness and form involved in knowing one’s kin suggests reason; Sorabji 1993: 62.

³⁶⁸ This immediate context, *pace* Gale 1991: 422-3 and Sharrock 2006: 267, indicates that the following is not really personification or anthropomorphizing. Gale (forthcoming b) highlights Lucretius’ ‘sympathetic portrayal’ of the mother cow as exemplifying Lucretius’ strategy of ‘illustrative material overtly introduced to clarify a particular theoretical point ... chosen for its symbolic value as much as its immediate contribution to the argument’. Its emotive effect and symbolic value are also related to the broader arguments of the poem about animals’ natures, deployed, as we have seen, through the more overtly philosophical sections, as well as through imagery (or illustrative material), which is no less philosophical or integral to the philosophical argument. The immediate arguments here concern variation within a species and the importance of a species’ individual members at least to one another. This last recalls (at least in spirit) the importance of human children to their parents and of all children to the survival of their respective species.

³⁶⁹ On the corruption in this line, N.B. the discussion of Bailey 1947, ii: 862.

³⁷⁰ As Bailey notes, ‘searching’ with the sense of ‘scrutinizing’; Bailey 1947, ii: 862. *Pace* Sharrock 2006: 266 n.25, the point is that the mother cow would recognize the tracks of her baby *if* she would see them, but does not; hence the fruitless search goes on until she realizes her calf is ‘*amissum*’ and thus that she is ‘*orbata*’ in the fullest sense.

³⁷¹ Here ‘*species*’ refers back to the means by which creatures differentiate and know one another - e.g. outward shape, form, markings and of course the *simulacra* by which the aforementioned reach us.

³⁷² Segal 1970: 105-6.

³⁷³ Perhaps rendered more plausible by its introduction.

³⁷⁴ Tutrone 2012b: 60-1 also suggests that they reflect human-like cognitive abilities. Thus, while Bailey 1947, ii: 861 is correct that this is Lucretius ‘at his best’, Bailey is nevertheless mistaken that ‘much of the detail is irrelevant to the argument ... [that] no other calf could satisfy the mother’. Lucretius’ depiction of the mother shows that the key argument - stated above - is much bigger and at the same time much more fundamental than has generally been recognized. It also explains why no other calf would do. Thus, *contra* Sharrock 2006: 268 n.27, neither this passage nor those which are intratextually related to it are ‘digressions’.

or of her calf, recall of kinship relations and the places where she might be likely to find her child, and the ability to track and evaluate potential traces; this calculation is memory and knowledge based. She steers her own actions while searching for her calf, choosing to not avert her *animus* from her *cura* (thus keeping her *studium mentis* configured to facilitate the search) and to express her laments when she deliberately pauses her walking. The fact that the lament is juxtaposed to a pause in the search and the experience of being pierced by grief,³⁷⁵ suggests that her judgments have led her to the belief that her young calf is - in the same line declared - ‘*amissum*’. These discerning calculations are, as we have seen, aspects of *ratio*.³⁷⁶ The lamenting suggests a form of deliberate communication with propositional content, whether or not it was directed at a particular listener and regardless of whether humans can understand its specific articulations. With respect to the faculties discussed in earlier chapters, the mother cow possesses or manifests the *sensūs corporis*, particularly the vision of the eyes, and the *sensūs animi*, particularly the perception of time, the potential to feel pleasure with respect to her *animus*, and the emotions of grief and *cura*.³⁷⁷ Feeling certain extreme emotions is exceptional for her species, as the *animus-anima* complex of cows has a relatively large proportion of air, from which their generally calm nature partly arises; but it is based on exceptional and appropriate circumstances, not false belief.

Although Lucretius advocates that death is nothing to us who die,³⁷⁸ *pace* Sharrock, Lucretius does acknowledge that the loss of a loved one may matter a great deal to those who are left behind;³⁷⁹ otherwise what *utilitas* (with respect to the individual) is behind a pact to protect one’s offspring? Fear of one’s own death may be a false belief, but grief, e.g., at the death of another - as long as it does not consume the mourner - is a natural and appropriate feeling, as Warren and Konstan note.³⁸⁰ Moreover, care for one’s offspring was

³⁷⁵ On ‘*desiderium*’ as both ‘grief’ and ‘longing’, cf. p.65. As Sorabji states, ‘Lucretius clearly thinks that the mother’s anguish is a bad thing, when the calf is removed for sacrifice’; Sorabji 1993: 208-9.

³⁷⁶ This suggests primarily inductive reasoning, which the Epicureans preferred, but also deductive reasoning (e.g. that the calf is dead).

³⁷⁷ On the intelligence and emotions exhibited or implied by the mother cow through her activities, cf. Sharrock 2006: 266.

³⁷⁸ Lucr. *DRN* 3.820-1094.

³⁷⁹ Other evidence may include: Lucr. *DRN* 2.358-60, 3.904-11, 6.1243-6, 6.1247-51. Cf. Sharrock 2006: 267-8, 274.

³⁸⁰ Cf. The testimonium D.L. 10.120: ‘καὶ λυπηθήσεσθαι δὲ τὸν σοφόν, ὡς Διογένης ἐν τῇ πέμπτῃ τῶν Ἐπιλέκτων’. But for a better way to approach death, albeit perhaps a species of grief, cf. Epic. *KD* 40 and *SV* 66. On grief and death cf. esp. Warren 2004: 39-41, as well as Konstan 2013b, and Warren 2014: 197-8. Konstan takes animals’ ability to experience grief, esp., as evinced in the case of the mother cow, as evidence that it is not a proper cognitive emotion. However, the mother cow’s grief (*querella*, *desiderium*) and *cura* seem contingent upon judgment, calculation, and belief, not just sense-perception.

thought by many to be a hallmark of *ratio*, as well as of moral responsibility.³⁸¹ The mother of the sacrificed calf exhibits extensive *cura* for her lost offspring, sacrificed by humans in the name of their false belief in *religio* and thus - with Segal and Gale and *pace* Sorabji³⁸² - violating their contract to protect the animals. This passage is rightly related by scholars to Lucretius' portrayal of Agamemnon's willing sacrifice of his daughter Iphigenia, for the sake of *religio* and war, which portrayal evokes Empedocles.³⁸³ The implicit praise of the mother cow and explicit condemnation of the man follow from the fact Lucretius sees both as morally responsible agents.³⁸⁴ The mother's feelings and behavior are far more appropriate to her parental status, i.e. to the natural order - including survival of the individual, children, and species, than are Agamemnon's crimes and foul deeds.³⁸⁵ This further suggests that, unlike humans, animals do not chose to form beliefs contrary to the nature of things. They have not undergone some radical inversion of values as humans did in the early days of civilization in a vain effort to better secure their survival,³⁸⁶ but rather continued to pursue only natural and necessary desires in accordance with the true nature of things.³⁸⁷ Hence, those animals which entered into social contracts with humans sought to preserve their survival when humans failed to hold up their end of the bargain. The horses balked at being thrown into warfare with lions and refused to charge. All domestic animals abandoned the cities when the humans could not protect them from the plague. The mother of the *vitulus*, perhaps like a sort of corrected

³⁸¹ Sorabji 1993: 79.

³⁸² Gale 1991: 425 notes that the calf's sacrifice represent a '*perversion* of this relationship' and Massaro 2011: 280 suggests - partly on this basis, following Segal 1990: 111-12 - that humans have perverted the natural order more generally. For fuller treatment of the *vitulus* passage, cf. Segal 1970. Sorabji 1993: 208-9 rightly notes that the sacrifices of the *vitulus* and of Iphigenia exemplify the *mali* (1.101) to which *religio* can drive us, but does not see that injustice is at least part of the nature of the wrongs committed. In both cases humans were under contract to protect the sacrificed creature. Cf. p.226 n.302 on the intratextual echoes between the two passages and the slaughter of the elephants in warfare, also a violation of contract. Tacit or not, as we saw in chapter four, the contract exists in both cases and is no less binding for being tacit, spoken (or otherwise articulated, such as by preverbal or non-verbal communication), or written.

³⁸³ Lucr. *DRN* 1.80-101. Cf. e.g. the scholarship mentioned in n.389 above, Shelton 1996: 55-7, 64, Betensky 1972, Konstan 2013b, and the following. Furley, Sedley, and Gale suggest that *DRN* 1.80-101 is reminiscent of Empedocles' objections to animal sacrifice, which include killing one's child who has become an ox through transmigration; cf. Furley 1970: 62, Sedley 1998a: 30, Gale 2000: 104-5, who suggests the Empedoclean connection also applies at 2.352-66. As Sharrock 2006: 269 notes, if correct, this may establish still stronger links between *DRN* 1.80-101 and 2.352-66. On the possibility of Hesiod as an intertext as part of Lucretius' attack on traditional Roman piety, cf. Gale 2013: esp. 30.

³⁸⁴ Regarding other possible targets of Lucretian criticism and by extension the cow's moral superiority or exemplarity, cf. Segal 1970.

³⁸⁵ Lucr. *DRN* 1.82-3: '*quod contra saepius illa | religio peperit scelerosa atque impia facta*'. Crime is a violation of contract; Lucr. *DRN* 5.1151-1160 (with '*foedera pacis*' (5.1155), cf. '*pacemque secuta*' (5.868)). Perhaps, in the case of Agamemnon, as with the animals in warfare passage, Lucretius is partly illustrating the lengths that humans will go to for the sake of military advantage (cf. Shelton 1996: 60) as well as that of *religio*.

³⁸⁶ Cf. esp. Lucr. *DRN* 5.1105-50, Epic. *KD* 6-7.

³⁸⁷ Note Virgil's parallel of the bull who has lead an exemplary Epicurean life at *Geo.* 3.526-30; cf. Gale 1991: 422-3. For this and other imitations in antiquity, cf. Bailey 1947, ii: 861-2.

Clytemnestra figure,³⁸⁸ likely regretted the day that she chose to enter herself into the fellowship of man.

³⁸⁸ Sharrock also implies that Clytemnestra is lurking behind the mother cow; Sharrock 2006: 268-9. Lucr. *DRN* 1.80-101 does not seem to - as Sedley 1998a: 30 notes - have a direct model in extant Greek tragedy. Nevertheless, this does not mean that Lucretius was unaware that one existed and or that he was not in dialogue with it. Aeschylus' *Agamemnon* is not an unlikely candidate. On resonances between the sacrifice of Iphigenia in Greek tragedy (beginning from Aeschylus' *Agamemnon*) and both Lucr. *DRN* 1.80-101 and 2.352-66, cf. Segal 1970: 111-12. Moreover, the *Agamemnon* was being staged in Rome around the time of *DRN*'s composition. Perhaps not coincidentally it was also a key intertext in Catullus 68 - not least with respect to the Iphigenia episode. On these points, cf. Gale 2012: esp. 9-11 with respect to *DRN* and contemporary knowledge of both Aeschylus and the *Agamemnon* (which may have been more general than specific).

CONCLUSION

In analyzing Lucretius' use of animals and his account of philosophy of mind in the *De rerum natura*, this thesis has reached a number of general conclusions.

Firstly, Lucretius' account of philosophy of mind must be understood on its own terms and according to its own paradigm. One cannot assume, for example, that any of Lucretius' technical terminology represents an *ad verbum* translation of Epicurus' vocabulary. Sometimes, as in the case of *primordia* vs ἄτομοι, Lucretius is emphasizing different aspects of the thing's nature. At other times, he employs related concepts to discuss a particular topic; *coniuncta* and *eventa* do not neatly map onto συμβεβηκότα and συμπτώματα. Ψυχή is functionally approximated by the *animus-anima* complex, not by a single word. Even if one does hold with the scholion to *Ep. Hdt* 66 (which this thesis does not), Lucretius does not posit an equivalent of τὸ λογικόν and τὸ ἄλογον (τῆς ψυχῆς) or similar expressions. Still other Lucretian terminology has a different semantic range than its nearest counterpart in Epicurus. *Sensus* encompasses αἴσθησις, παθῆ, and αἰσθητηρία. *Notitia* has a broader signification than πρόληψις. Nowhere in the surviving evidence does Epicurus mention the *clinamen*. Therefore each case of potential equivalence should be assessed individually, if one desires to compare the two authors, or indeed any others. Lucretius' account of the ontological paradigm follows from and is consistent with his own terms.

This methodology has revealed that Lucretius believes in a metaphysical continuum. Different ontological levels are aetiologically coordinated. The *coniuncta*, *eventa*, and internal organization of more complex material entities arise from the *coniuncta* and *eventa* of their material substrata. Only certain properties of the more complex entities, which are also *coniuncta* of the first-beginnings, can potentially be explained reductively, as the sum of the constituents and their arrangements and motions. The rest of the properties are emergent. A micro-level point of view is conducive to understanding, particularly with respect to vertical causation, the processes and mechanisms which underlie the manifest and the potentially manifest. A phenomenal point of view is conducive to understanding certain relationships between the manifest, and thus particularly horizontal causation. The goal of such observations is not to build up an aggregate of data in order to predict phenomena, such as the course of a disease. Nor is the goal to divide a human - or indeed any living being - into discrete parts with distinct functions. It is understanding the nature of things, including causally.

Lucretius generally approaches causation as a process. In one sense *eventa* are necessary or unfixed and *per se* or not *per se*, according to their proximate cause. Nevertheless, the faculties of living creatures and their manifestations involve complex, interrelated, and interdependent (if not inextricable) aetiological mechanisms; from this and the nature of the *animus-anima* as a complex, it follows that Lucretian philosophy of mind encompasses a considerably broader range of faculties than we today might consider faculties of mind. To the extent that they have been discussed separately, this served the convenience of the investigation. Lucretius aims to reveal the nature of living creatures as dynamic systems and within dynamic systems. These systems exist and operate according to natural law, not divine will. For Lucretius natural law is probabilistic, not deterministic. First principles thus offer a complete ontological and aetiological account of all things, but the ability to predict contingencies is limited. Observable contingencies which deviate from the normal patterns are of particular interest to Lucretius, insofar as they reveal further details and complexities of the underlying processes. On its own, however, a top-down approach is fallible because many roads can lead to the same observable outcome.

To elaborate: the nature and structure of the material substrata do help to explain - to varying degrees - the ontologically higher *coniuncta* and *eventa* of a relatively complex material entity. Life, *sensus*, and *ratio* are all examples of strongly emergent properties of the *animus-anima* complex in conjunction with the rest of the body, including certain other necessary structures; they emerge from the nexus of structures, motions, relationships, and interactions. Both *sensus* and *ratio* are contingent upon life and encompass a number of faculties. Each of the faculties encompassed by *sensus* involves its own specific sort of interactions and a discrete mechanism which is partially unique. Each of the faculties encompassed by *ratio* is involved in the mechanisms of the others. Lucretius is concerned with causation - including what occurs in-and-of itself, rather than through an outside force, and what is necessitated and not-necessitated. With the exception of unfixed *per se* motions, causation is generally construed as a process of interaction. The dichotomy of rational vs irrational does not apply, even at the phenomenal level. The importation of other philosophical schools' terminology and distinctions is inappropriate to understanding Lucretius and often misleading.

Top-down causation can occur, at least with respect to living things. When a creature chooses to initiate a voluntary motion - i.e. wills an action - the choice occurs at the phenomenal level; the creature is responsible for it. However, that action will arise in the

mens partly from a new chain of motion at the level of its first-beginnings. The intermediary process seems likely to be a temporary physiological constraining of the physical and temporal possibilities open to a swerve which has the potential to begin the chosen action. That said, the mechanism of choice itself and of each reconfiguration of the chess-board, metaphorically speaking, will involve a swerve as well. The most extreme example of top-down causation thus would probably be choosing to end one's own life.¹ One's evaluation of and belief about, for example, a particular set of sensory interactions can also cause the surging of constituents from which emotion arises.

Lucretius also does not believe in any radical disjunction between the nature of material entities. Insofar as fundamental distinctions do occur, they are these: first-beginnings vs generated assemblies, non-living things (including plants) vs living things, a member of one species vs a member of another species, and species themselves vs hybrid races. Nevertheless, there are continuities which cross all of these boundaries save the last. First-beginnings and assemblies share certain properties. Non-living assemblies and living ones are capable of growth, decay, and generating living things; they also exhibit analogous types of motion which are initiated by similar sorts of proximate causes. All living creatures - both humans and animals - possess the same psychological faculties, which arise from and operate according to the same underlying structures and mechanisms, however they happen to manifest due to constitutional variation. There is also both continuity and variety amongst the individual members of a given species, not least the human race. Therefore, for Lucretius, there is no sharp division between humans and other animals on the basis of their natures; as animals, so humans, and vice versa. In this way, Lucretius believes that there is a continuum of all material entities and, in particular, a continuum of life.

These continua are both at work in Lucretius' conception of the relationship between a creature's physiology and its psychology. For Lucretius, the psychological is ontologically and aetiologically inextricable from the physiological. They represent, with respect to living creatures specifically, the same coin viewed from two sides: the

¹ Hence the irony of Democritus' suicide being described as *sponte sua* (i.e. *per se* and necessitated), as we have seen.

phenomenology on the one hand and the underlying mechanism on the other.² Systematically understanding the latter is essential for fully understanding the former (and the relationship between the two), but the former can also reveal further nuances about the latter.³ All living creatures are therefore psychophysiological wholes.⁴ Because the *animus-anima* complex, its properties (including its emergent faculties), and their operations are bodily in this way, there is no question of dualism; the mind/body problem is entirely obviated.

Because all animals have been shown to possess each and every one of the psychological faculties which humans possess, as well as because Lucretius does not operate with the categories of rational and irrational, we can conclude that he does not think of animals as irrational creatures; no living creature lacks *ratio*.⁵ According to Lucretius, young creatures, for example, are still learning how to use their faculties. They have also built up less knowledge from experience. However, their faculties are innate. If any creatures should be held less accountable (e.g. for their judgments, beliefs, behaviors or actions, and other choices) it is those who are not - or not yet - in full command of their faculties. Animals are thus as responsible for or in control of their own development and actions as humans are, but, as we have seen, humans may have less control than they believe. Similarly, those animals which enter into social contracts are just as subject to the justice which those pacts entail as are the humans who have entered into such contracts; those who have not made such pacts⁶ cannot violate them and their interactions with others are governed only by the pleasure-pain calculus, primarily with respect to individual survival. This has implicit consequences for how humans treat one another and especially other animals. For example, the unnecessary slaughter of animals in one's care (or others

² Therefore, *pace*, e.g., Fowler 1983: 351, these faculties are neither disembodied mental events nor are they or their manifestations purely physical occurrences.

³ This is in addition to the phenomena reflecting coordinate levels of reality by analogy (both from the phenomena to the underlying and from the underlying to the phenomena).

⁴ Cf. Gill 2006 and Gill 2009 with respect to his concept of the 'psychophysical holism' of the structured self (i.e. the structures which make up one's nature) as presented especially in Gill 2006 (N.B. esp. pp.46-66), which had been influential in formulating some of the key ideas of this investigation. The essence of his concept is this: '[h]uman beings, like other animals, are seen as psychophysical and psychological wholes or units. They are not seen as a combination of a psychic or mental core or essence and a body, or as a complex of distinct psychic parts, conceived as independent sources of motivation' (Gill 2006: xvii) and thus that the essential distinctive nature of human beings is not simply mind or reason, nor are such things valued above the rest.

⁵ Contra the Stoics and various Epicureans who believe that animals lack it, as well as Aristotle that animals, women, children, and slaves lack it - and thereby, e.g. Schrijvers 1997: 159-61 who thinks that not only do Lucretian animals lack *ratio* but that its status as the distinguishing mark of humans in *DRN* is drawn from Aristotle, particularly from the *HA*.

⁶ Either directly, as men do, or indirectly by proxy, as certain women and children do under the authority of a sort of *pater familias*.

protected by mutual no-harm pacts), and particularly the sacrifice of the young and healthy in the name of *religio*, constitutes an immoral, unjust, and lamentable abomination.

The possession and exercise of one's innate psychological faculties are crucial to the survival of species and their individual members. Lucretius' theory of survival of the fittest includes the fixity of species; he does not believe in evolution. A degree of variation is possible within each species and sub-group; hence, although no two members are identical, mating is possible and their natures share characteristic features. Individual natures are essentially stable systems, but can undergo minor ephemeral variations due to sleep, sickness, drunkenness, and the like; in extreme cases such things disrupt our faculties, with epistemological consequences. Individual natures also develop to some extent, e.g. through maturation and learning, over the course of one's life. However, neither the things which one has learned nor any other development can be inherited. Acquired knowledge is transmitted by teaching. Although the technological progress of the human race coincided, for Lucretius, with ethical regress, there was no fundamental change in human nature. Epicurus is no superhuman, but an everyman whose knowledge of the true nature of things set him apart; gain this, and you too can live a life worthy of the gods - as animals do.⁷

Lucretius claims that a key moment in human history occurred when Epicurus '*intellegit ... vitium vas efficere ipsum*' (understood that the vessel itself caused its own flaw, 6.17) and thus taught the truth about the nature of things.⁸ Tantamount to the blinding of *ratio*, this defect has been acquired by learning and transmitted from person to person;⁹ hence it can be corrected by Epicurean teaching.¹⁰ Any flaw in the inherent *natura animi* of a species would not be correctable in this way. One's system of beliefs could be called one's 'understanding';¹¹ this is the part of our knowledge which, for Lucretius, is interpretative and thus within our control. Our beliefs shape our actions - partly by constraining the possibilities of a swerve's time, place, and trajectory. Thus, by correcting

⁷ Nussbaum 1994: 255-7 intriguingly suggests that Lucretius' animals are more like the gods than humans are, particularly ethically in that they are self-sufficient, but her argument for this is unconvincing.

⁸ Lucr. *DRN* 6.9-34; cf. the speech of *Natura* against the riddled *vas* at 3.931-62 and the analogy of the Danaids' task at 3.1003-10. On the possible resonances of the *vas* metaphor with the imagery of philosophical intertexts, cf. Görler 1997, with respect to Empedocles, Garani 2007: 193-4, and, with respect to Plato, e.g. in the *Republic* and *Gorgias*, cf. Park 2012: ch.1. Lucretius' critique of such people and the attribution of the insight to Epicurus suggest that critiques on the basis of such metaphors for Epicurean pleasure, e.g. by Plutarch, were unfounded; cf. Warren 2014: 90-4, 198-200.

⁹ Lucr. *DRN* 5.1113-35; esp. 5.1133-4: *quandoquidem sapiunt alieno ex ore petuntque | res ex auditis potius quam sensibus ipsis*.

¹⁰ E.g. Lucr. *DRN* 5.18-21, 5.43-54, 6.24-42, 6.53-84, Usener 221.

¹¹ It seems that Lucretius may not have a specific word for this, but the concept is there.

one's false beliefs about (or understanding of) the nature of things, Lucretius aims to correct the will and, by extension, the actions or behaviors which are initiated by it.¹² Perfect understanding is probably reserved for the gods and perhaps Epicurus. Nevertheless, the reader who has learned the lessons of the poem is thereafter continually meant to track and approach that perfect understanding, like hunting dogs after their prey, using the proper epistemological method. The irony of human civilization's apex¹³ and nadir¹⁴ is that both cases illustrate a need for humans to use their *ratio* to correct their understanding¹⁵ and thus become more like the earthborn humans. These ancestors, untaught and living 'more ferarum' (5.932), pursued and fled according to what was natural and necessary. Although their knowledge of things was imperfect,¹⁶ they initially harbored no false beliefs or baseless fears, like the belief that gods intervene in the natural order or the fear that the sun might not rise tomorrow.¹⁷ They ensured the survival of the human race, and of other species, by forming alliances: first families and small communities, including with animals.¹⁸ In due course leaders formed cities, which initially valued appearance and strength as well as *ingenium*.¹⁹ Then false beliefs arose and undermined this. In other words, through correct understanding we aim to become - ethically speaking - more like animals.²⁰

¹² This is consistent with Warren's conclusions from the Epicurean pleasure-pain calculus (or what he calls 'hedonistic prudential reasoning') as set out esp. in *Epic. Ep. Men.* 129-30, namely that 'Epicurean therapy is aimed at the removal of 'false beliefs' and the re-education of desires, which is an intellectual process' (emphasis mine); Warren 2014: 180. Similarly, Long 1997: 128 argues that 'Lucretius is at great pains to show that human beings are a part of the natural world, and also that our well-being depends upon accepting nature as it revealed by science'. Gale suggests that Lucretius aims to remove our false beliefs through recognition and then correction of the false ones which are at the roots of our problems, rather than by emphasizing the negative consequences of such beliefs, as Philodemus does; Gale (forthcoming a). False beliefs are bad choices and lead to other bad choices, including empty emotions; recognition that they are false opens up the possibility of choosing well.

¹³ This is an apex (cf. *cacumen*, *Lucr. DRN* 5.1457 - being the last word of book five) with respect to humans' ability to meet (and even exceed, cf. 5.1448-52) their natural and necessary needs and thereby ensure their own survival and that of their offspring. It thereby had the potential for the greatest ἀταραξία and ἀπονία for the greatest number, and Athens stood as the vanguard. But this potential went generally unrealized until Epicurus; cf. 5.7-21, 6.1-23. On Lucretius' historical consciousness and views on the development of Epicurean philosophy in relation to historical trends, cf. e.g. Clay 1976.

¹⁴ I.e. the plague, cf. *Lucr. DRN* 6.1138-1286. Even the pre-civilization existence of the earthborn contained some things pleasing to human *pectora* specifically as well as to their bodies as wholes; cf. 5.936-7.

¹⁵ Cf. Gale 2004.

¹⁶ Cf. the fact that they sometimes poisoned themselves inadvertently; *Lucr. DRN* 5.1009-10.

¹⁷ *Lucr. DRN* 5.970-87, 5.1161-1240.

¹⁸ The fact that interspecies communities formed prior to the formation of cities is confirmed not only by the structure of the narrative but also by Lucretius' claim that the first rulers doled out cattle (*pecua*) or perhaps herd or flock animals including cattle (*pecudes*); *Lucr. DRN* 5.1110. On the MS issues, cf. Bailey 1947, iii: 1501 and Gale 2009: 86.

¹⁹ In other words, not just looks but those particularly fit for survival with respect to both body as well as *animus-anima* complex. After the partial inversion of values (cf. *Lucr. DRN* 5.1113ff), the first two ceased to be valued and the third tended to be used for purposes contrary to the common good and in many cases the relevant individual's good.

²⁰ Cf. *Lucr. DRN* 5.1105-35. Massaro 2011: esp. 261-4, 281-3, for example, makes points similar to this.

Animals seem to lack the false beliefs and values which humans adopted early in the history of civilization - and not because they are 'mirrors of nature' set apart from humans by (relative) lack of *ratio*.²¹ Rather, animals have not used their *ratio* to make judgments and convince themselves of ideas which are inconsistent with the nature of things. Thus they behave consistently with it. They pursue pleasures and avoid pain according to what is natural and necessary - i.e. conducive to their survival, propagation, painlessness, and tranquility, for which they are relatively well equipped.²² The mother cow laments the loss of her offspring and charge; Agamemnon devises it - for the sake of *religio* and war. Unlike humans, animals do not rush into unnecessary battles which would endanger them, and exit social contracts when the other side of the bargain has not been upheld. Hence the horses who balked at the prospect of battle with violent predators were not acting unjustly - i.e. in bad faith with respect to the social contract between themselves and their riders or drivers, who were meant to protect them from such creatures. Their belief that humans would protect them had been proven false, so they chose to react accordingly.²³ The communities and relationships which animals form, whether with humans or with each other, are apolitical and exist for mutual utility in the first instance. These things and the numerous descriptions of animals living in harmony with or even embodying the natural order²⁴ all stand in contrast to the '*tempore iniquo*' (1.41) of himself and Memmius, as well as the Sisyphean quest for wealth and power represented as the downfall of Lucretius' contemporaries.²⁵ Even living under the protection of another's authority is preferable, as long as that pact guarantees peace (*pax, quies*),²⁶ because, as Fowler notes, what 'matters for the Epicurean is the chance to lead a quiet life'.²⁷ All of which strongly suggests that Lucretius thinks of animals as ethical exemplars.

²¹ Pace e.g. Gale 2000: 94 that '[i]n Lucretius ... there is a kind of dialectic between the view that animals act as 'mirrors of nature', showing us how we *should* behave, and the idea that we are distinguished from them by the capacity for reason'.

²² Lucr. *DRN* 5.222-34.

²³ This and the mother cow's implied belief that humans would protect her and her offspring suggest that animals can form false beliefs, e.g. through misjudging human intentions; but animals do not tend to form false beliefs about the nature of things.

²⁴ E.g. Lucr. *DRN* 1.10-20, 1.250-64, 2.317-22, 2.342-70, 4.1192-1208, 5.228-34, 5.1379-1411 (cf. 2.29-33).

²⁵ Cf. e.g. Lucr. *DRN* 2.7-16, 2.24-61, 3.37-86, 3.995-1002, 5.1120-32. Schiesaro 2007 gives a useful survey of the ways in which *DRN* questions the foundations of 'civilized society', including: the inherent preeminence of Rome, its government and religion, its values and pursuit of honor wealth and power, its 'military prowess' and 'imperialist ambitions', moral progress and bankruptcy, and its ability (or that of any civilization) to survive.

²⁶ Cf. esp. Lucr. *DRN* 5.1129-30: '*ut satis multo iam sit parere quietum | quam regere imperio res velle et regna tenere*', Epic. *KD* 7, 14.

²⁷ Fowler 1989: 145.

That said, animals are emphatically not exemplars in the sense for which the Epicureans are so often criticized, namely that all animals allegedly care about is a full stomach.²⁸ A number of modern scholars also make the point about animal exemplarity (properly understood) in *DRN*, to varying degrees. Betensky restricts it to *pecudes*, as she interprets them.²⁹ The Epicurean picnic of 2.29-33, as Gale notes, is an ideal of human life and related to aspects of the pastoral *locus amoenus*.³⁰ Moreover, it is foreshadowed at 1.257-61 (cf. 2.316-23) by its animal counterpart, which is presented as something one can witness at this time. What Gale calls the 'primitive forerunner' of the Epicurean picnic, i.e. 5.1392-1411, actually begins from what earthborn ('*genus ... terrigenarum*', 5.1411) learned from animals, at 5.1379-81, and then from their non-living natural environment, at 5.1382-9. In other words, animals gave and continue to give humans a model of the ideal life, which animals still live.

Horses are perhaps the most human-like of animals, according to Lucretius' representation;³¹ as we have seen throughout this thesis - he often juxtaposes the two species. They are employed as exemplars with respect to free will, love, language, dreams and action during dream-sleep, social contracts, emotions comparable to those of their riders or drivers during warfare (suggesting a typical *natura animi* not-dissimilar from that of the human), and learning. Epicurus himself is even compared to one!

The advances which this thesis has made with respect to Lucretian philosophy of mind also shed light on his didactic strategy. We have seen indications throughout the thesis that not only the poetic form (in its pleasurable nature)³² but also the form of the poetry are instrumental to Lucretius' strategy in inculcating these doctrines. There are many instances where Lucretius uses the structure of his verses to illustrate and reinforce their meaning, such as the numerous double elisions linking *animus* to *anima* illustrating that they are a single entity with - at least in some senses - a single nature. The addresses to the reader at times take this tendency a step further, as we have seen particularly in book four. Their language and structure reflect Lucretius' account of our psychological faculties and cater to the way in which he represents them as functioning. In other words, Lucretius has crafted his poem according to the way in which he believes that we learn in order to maximize the efficacy of his teachings.

²⁸ On such anti-Epicurean polemics, cf. e.g. Warren 2002b: 129-36 and Warren 2014: 94-5.

²⁹ Cf. Betensky 1972: ch.3 and, on her interpretation of *pecudes*, pp.33-9.

³⁰ Gale 2007: 67-8.

³¹ Virgil may be capitalizing on this in his portrayal of horses in the *Georgics*; cf. Gale 1991: 417-18.

³² E.g. Lucr. *DRN* 1.926-50, 4.1-25.

The further implications of this analysis for our understanding of Lucretius' social and ethical theory and for his didactic strategy are promising avenues for future investigation.

Finally, the thesis reflects a bit of light onto the relationship between the works of Lucretius and Epicurus. Insofar as the surviving evidence suggests, the lack of corresponding terminology, the differences on particular topics, such as *amor* and poetry, and especially the originality of Lucretius' ideas regarding animals, all offer a cautionary note for those who would read Lucretius as a means of reading Epicurus. These provide further evidence that, despite Lucretius' self-representation as an Epicurean fundamentalist and the extent to which he made direct use of Epicurus' corpus of work, *DRN* is a selective synthesis of Epicurean philosophy. Lucretius' work is not only original in its medium and structure of presentation, but also in many of the specific details of the representation and a number of the ideas expressed. Some of these reflect his own didactic intent. *DRN* is designed - with respect to both form and content - in such a way that that reading it should be sufficient to correct the reader's understanding of the nature of things and provide the tools for avoiding false beliefs in the future.

Returning animals to their central place in *DRN* allows us to recognize more revolutionary aspects of Lucretius' program. For example, although the state of the evidence on Epicurus and other Epicureans does not permit much direct comparison regarding animals, it does suggest that - with respect to animals - Lucretius was further developing Epicurus' ideas on the nature of life, rather than merely transmitting received wisdom.³³ Reestablishing Lucretius' continuum of life also allows us to see him in a line of thinking that has struggled for a voice in western dialogues since Descartes and to some extent since Aristotle.

This thesis has shown that one of the false beliefs which Lucretius aims to dispel is the misconception that animals are psychologically less in some way than humans are. Lucretius believes that animals are fully ensouled sentient beings which possess the same psychological faculties as humans do. For Lucretius, any apparent difference between the

³³ This supports the recent suggestion by Gale that Lucretius' handling of human-animal relationships constitutes a case where, through change of emphasis, Lucretius 'gives his own distinctive slant to Epicurean doctrine, without, however, departing radically from his model'; Gale (forthcoming b). Annas 1992: 136 is correct that Epicurus left the door open for this by not 'denying a sharp cutoff between humans and other animals', but - at least for Lucretius - wrongly thinks that Epicurus' philosophy of mind would have benefitted from doing so. Newmyer, on the other hand, thinks that Lucretius was breaking with the orthodoxy of the school, particularly with respect to human-animal contract-making and οἰκειῶσις; Newmyer 2014: 526.

species with respect to these faculties is actually one of expression, not essence. The fundamental underlying structures and mechanisms which contribute to the emergence of these faculties are effectively identical. What finally sets humans and animals apart is not the possession of certain faculties, but how they manifest and how they use them. Insofar as differences between humans and animals manifest, Lucretius accounts for them by the same sort of constitutional variation which physiologically differentiates one species, and indeed one human being, from another, namely, with respect to gender, race, age, health, intelligence, build, and something like genetic code. Unfortunately the belief that animals are psychologically inferior to humans is still prevalent today; perhaps it has anachronistically kept many modern readers of Lucretius from realizing the full extent of his demonstration and its contribution to the history of animal philosophy of mind.

DRN is pervaded by references to animals. Its fuller descriptions of their behavior are not digressions, eccentricities, or purple passages with poet triumphing over philosopher, as they are so often regarded.³⁴ Taken together, Lucretius' treatments of animals constitute a philosophical argument. Lucretius both depicts and explains a fundamental kinship between humans and animals - or, perhaps more accurately, between humans and other animals. This is but one instance of how in *DRN* 'poetic convention and philosophical principle coincide, or can be made to do so' by Lucretius.³⁵ He transcends animals' conventional use as comparanda in his chosen genres in order to correct our beliefs about their true nature and thus our understanding of their place in the true nature of things. Generally Lucretius neither represents humans as bestial nor humanizes animals;³⁶ he simply does not 'Other' animals.³⁷ The evidence for the continuities and differences between species thus speaks for itself.³⁸ Proceeding from the ground up has shown that animals are fully integrated into the poem's philosophical system and crucial to

³⁴ Listing every instance of such claims (even in context), sometimes in far less complimentary wording, would not have advanced this project. Whether based in a failure to understand aspects of *DRN* or in modern biases against animals, such claims do not do credit to the scholars who have advanced them or to Lucretius.

³⁵ Gale (forthcoming b).

³⁶ Cf. Gale 1991 and Gale 2000 regarding Virgil's - perhaps Lucretius' most astute reader - grappling with such ideas in the *Georgics*, particularly through engaging with Lucretius' work as an intertext and either inverting or otherwise problematizing what *DRN* presents.

³⁷ E.g. on the basis of any *a priori* assumptions, like we have seen among some other Epicureans, as well as some modern scholars, that man is the rational creature. Similarly (to put it another way, which is related but not identical), Lucretius is neither zoomorphizing humans nor anthropomorphizing (or personifying) animals.

³⁸ Indeed, in emphasizing continuities and similarities, rather than categorizing differences, Lucretius seems closer to the PreSocratic (and particularly pre-Aristotelian) tendencies in their attitude towards animals, as characterized, e.g. by Newmyer 2007 and Newmyer 2014: esp. 507-17.

Lucretius' conception and representation of life. Lucretius' audience was human and remains all-too human, but his actual category of enquiry was all living creatures.

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