

Bicycles, Centaurs, and Man-Faced Ox-Creatures: Ontological Instability in Flann O'Brien, Lucretius, Empedocles, and Piero di Cosimo.

As is well known, the publication of Darwin's *On the Origin of Species* in 1859 caused considerable psychological insecurity for many people, over the place of humanity in the 'scale' of Nature, and over our relationship to other creatures and to God. In this paper I shall concentrate on a few ancient and modern expressions of such worries.

Although Darwin was by no means the first to put forward a theory of the evolution of humans from animals, the Chevalier Lamarck being the most outstanding of earlier evolutionists,¹ perhaps the majority of people in the early nineteenth century had become comfortable with the idea of a clear God-given division between humans and animals. The two creation stories in books one and two of *Genesis*, although their accounts differ considerably, do agree at least on one point; that animals and humans were created separately, and that the divide between them was a deliberate part of the Creator's plan. The great taxonomist Carl Linnaeus could state with confidence in 1758, that: 'There are as many species as originally fashioned by the creator'.² Darwin's theory of course destroyed such a notion: there was no longer any great difference between humans and animals, and humans were just another species of animal.

Darwin himself was often caricatured as having his head on the body of an ape; an image made more compelling by a certain unfortunate simian cast to Darwin's features.³ The Bishop of Oxford, Soapy Sam Wilberforce, famously enquired whether it was on his mother's or his father's side that Thomas Huxley was descended from an ape, and Philip Egerton in his 'Monkeyana', in *Punch* of 1861, humorously complained about the lack of

¹ Lamarck, J. B., *Philosophie Zoologique* (Paris, 1809), and id., *Histoire Naturelle des Animaux sans Vertèbres*, (Paris, 1835). For the theories of Lamarck see especially Burkhardt, R. W., *The Spirit of System: Lamarck and Evolutionary Biology* (Cambridge, Mass., 1995). The essential difference between Lamarck's and Darwin's theories is that Lamarck's did not rely on the extinction of species in a 'struggle for life', but upon the inheritance of acquired characteristics as its driving force.

² Quoted from Niles Eldredge, *Reinventing Darwinism: The Great Evolutionary Debate* (New York, 1995), 10.

³ See 'A Venerable Orang-Outang. A Contribution to Unnatural History', *The Hornet*, March 22nd 1871, image available online at <http://www.galapagos.to/DARWIN-2.HTM>

a clear human / animal divide in Darwin's theory of evolution, and about the resulting ontological insecurity:

Am I satyr or Man?
Pray tell me who I am,
And settle my place in the scale.
A man in ape's shape,
An anthropoid ape,
Or a monkey deprived of his tail?...

Note that Egerton's first description of a creature suffering from Darwinian human / animal boundary crossing is a Satyr, a classical compound creature, ancient forerunner of the Darwin / orang outang creature and, in another way, of Bishop Wilberforce's vision of one of Huxley's ancestors mating with an ape. Creatures compounded from human and animal components such as Satyrs, Centaurs, the Minotaur and others, were, in the ancient world, and clearly still in the nineteenth century, symbols of the disastrous results of such a crossing of the human / animal divide, and as well, symbols of the triumph of nature over culture, as has been well examined by Page Dubois in her book *Centaurs and Amazons*.⁴

This use of compound creatures to attack Darwin's theory I find strikingly similar to ancient and modern criticisms of the ability of the atomic theory to account for the regularity of nature and the ontological integrity of species. The view that humans are animals would of course have been quite familiar to anyone in the ancient world who knew the ideas of the Presocratics and later, the Epicureans, and attacks upon their theories and upon Darwin's tend to follow similar lines.⁵

The basis of such a criticism of the Epicurean atomic theory is perhaps most clearly expressed by Cicero's Balbus in *De natura deorum* 2.94: if the random collision of atoms was able originally to form an entire world, with all its complexity, why does it not also create easier things today, like temples, houses, and cities? In short, what is to stop things suddenly appearing out of nowhere? Why do things stay the same, and then again,

⁴ Dubois, P., *Centaurs and Amazons, Women and the Prehistory of the Great Chain of Being* (Ann Arbor, 1982).

by extrapolation, why do *we* stay human, and do not suffer disastrous ontological instability? Lucretius of course, claims that *only* the atomic theory can account for the regularity of nature, as he says in *DRN* 1.159-66:

nam si de nilo fierent ex omnibu' rebus
omne genus nasci posset, nil semine egeret.
e mare primum homines, e terra posset oriri
squamigerum genus et volucres erumpere caelo;
armenta atque aliae pecudes, genus omne ferarum,
incerto partu culta ac deserta tenerent.
nec fructus idem arboribus constare solerent,
sed mutarentur, ferre omnes omnia possent.

For if things came into existence from nothing, all kinds of things could be born from all things, and would need no seed. First, humans could arise from the sea, scale-bearing herds from the earth, birds could burst from the sky, and cattle and other herds and the whole race of wild beasts, with random birth, would live in fields and deserts. Nor would the same fruits stay constant to the trees, but all would change: all trees might bear all fruits.

Without atoms, Parmenides' tenet that Lucretius appropriates and inverts here, that nothing can arise from nothing, and nothing be destroyed into nothing, would be wrong, and anything could arise from anything. There would in short be no limit, no 'law' controlling nature, and no stability to the world.

However, later, in *DRN* 2.700-10, he argues that simply having atoms alone cannot account for the ontological stability of creatures: a limit on atomic combinations is necessary, otherwise compound creatures, and other impossibilities of mingled species would exist:

nec tamen omnimodis coniecti posse putandum est
omnia. nam vulgo fieri portenta videres,
semiferas hominum species existere et altos
interdum ramos eigni corpore vivo,
multaque coniecti terrestria membra marinis,
tum flammam taetro spirantis ore Chimaeras

⁵ Humans are animals, cf. Lucretius 5.925ff, Epicurus fr. 333 Us., Anaximander DK12 A30, Empedocles DK31 B71, Xenophanes DK21 B27, B29, B33, Archelaus DK60 A4, Anaxagoras DK59 A1, Pythagoras DK 58 C6, Democritus DK68 A139, and Diodorus Siculus 1.7.

pascere naturam per terras omniparentis.
quorum nil fieri manifestum est, omnia quando
seminibus certis certa genetrice creata
conservare genus crecentia posse videmus.
scilicet id certa fieri ratione necessust.

However, it should not be thought that all atoms can be joined in all ways. Because then you would see monsters arise everywhere, half-bestial species of humans would arise, and high branches would grow from a living body, and many terrestrial forms would be joined with sea-creatures, and then Nature throughout the Earth, the all-parent, would nourish Chimaeras breathing flame from their foul mouths. It is clear that none of this happens, for we can see that all creatures are born from fixed seeds and from a fixed parent, and can keep their own species as they grow. It must be that this happens according to a fixed law.

If any atom could join with any other atom, then the critics would be right, and atomism *would* produce universal chaos: Chimaeras, Centaurs, and suchlike creatures would be seen, and not simply the boundaries of genera or species but even the boundaries of the plant and animal kingdoms would be breached and tree branches would grow from animal bodies. The basis of these atomic laws, the *foedera naturae*, that set such a limit on nature and ensure that species remain fixed and unable to mutate into one another, may be reconstructed from *DRN* 2.661ff. As Susan Blundell puts it:⁶

This theory of the fixity of species was seen by Lucretius as a deduction from an atomic law of combination. Elsewhere he has argued that all compounds are made up of atoms of different classes (that is of different sizes and shapes), but that there is a limit to the combinations of classes which can be achieved: every class of atom is not capable of combining with every other class. If this were possible, you would see animals of mixed species coming into existence, but as it is, everything keeps to its own species, because every species is characterized by their distinctive atoms, which when brought together make distinctive arrangements and perform distinctive movements. In living things, these distinctive atoms are passed on from parent to child, and then they proceed to absorb compatible atoms from the nourishment that is consumed. But it is not just living

⁶ S. Blundell, *The Origins of Civilization in Greek and Roman Thought* (London, 1986), 92-3. Epicurean sources: Epicurus *Ep. Hdt.* 42-3, Lucretius *DRN* 2.478-531, 2.700-29, 5.440-2, and 5.923-4. See also A. A. Long, 'Chance and Natural Law in Epicureanism', *Phronesis* 22 (1977), 63-88, P. De Lacy, 'Limit and Variation in the Epicurean Philosophy', *Phoenix*, 23 (1969), 104-13, A. A. Long, and D. N. Sedley, *The Hellenistic Philosophers* (Cambridge, 1987), vol.1, 56.

things that conform to this atomic law: every atomic compound including the land, the sea, and the sky, is kept distinct by the limit on combination.

The stability of nature at the macroscopic level then, depends upon this limit of combinations at the molecular level: because there is a limited number of atomic shapes, only a limited number of types of molecule, and so of matter, can come into existence. At the genetic level, each creature preserves its ontological stability by inheriting a fixed atomic essence that ensures it cannot mutate. Although, sadly, we have no other details of it, this is clearly a genetic code theory similar to DNA, but with the fundamental difference that in Epicurean genetics, there seems to be no flexibility in the code to allow the sort of mutation that Darwinian evolution relies upon to produce new varieties. Indeed, the idea is put forward by L. as an explanation for the obvious and apparent *fixity* of species. This species fixity was nearly universally accepted in ancient scientific thinking, and even today evolutionary mutation can only be observed by studying the fossil record, and so is a perfectly reasonable supposition according to the apparent facts. So, an argument that in an atomic world, cross-species mutation would be possible is not an accusation that the Epicureans had an evolutionary theory of the origins of species, but an argument that the theory would produce things that are patently impossible, and so must be false. Sir Richard Blackmore in his anti-Lucretian poem *Creation* of 1712, turns Lucretius' own argument against him, putting it in what, I imagine, was its original form against atomism: an argument Lucretius had already appropriated from critics of Epicurus, and turned to his own advantage, *Creation*, 3.161-72:⁷

If Chance alone could manage, sort, divide,
And, Beings to produce, your Atomes guide;
If casual Concourse did the World compose,
And Things from Hits Fortuitous arose,
Then any Thing might come from any Thing,
For how from Chance can constant Order spring?
The Forest Oak might bear the blushing Rose,
And fragrant Mirtles thrive in *Russian* Snows.
The fair Pomgranate might adorn the Pine,

⁷ For Sir Richard Blackmore and Lucretius see W. B. Fleischmann, *Lucretius and English Literature 1680-1740* (Paris, 1964), 228-34. For the 18th and 19th century reception of Lucretius generally, W. R. see Johnson, *Lucretius and the Modern World* (London, 2000), 79-133, and G. Hadzsits, *Lucretius and His Influence* (New York, 1963), 317-32.

The Grape the Bramble, and the Sloe the Vine.
Fish from the Plains, Birds from the Floods might Rise,
And lowing Herds break from the Starry Skies.

He goes on to argue that other mixed species would be possible under atomism if there were no divine guidance, *Creation*, 5.131-50:

And might not other Animals arise
Of diff'rent Figure, and of diff'rent Size?
In the wide Womb of Possibility
Lye many Things, which ne'er may actual be:
And more Productions of a various Kind
Will cause no Contradiction in the Mind.
'Tis possible the Things in Nature found,
Might diff'rent Forms and diff'rent Parts have own'd.
The Boar might wear a Trunk, the Wolf a Horn,
The Peacock's Train the Bittern might adorn.
Strong Tusks might in the Horse's Mouth have grown,
And Lions might have Spots, and Leopards none.
But if the World knows no Superior Cause,
Obeys no Sovereign's arbitrary Laws;
If absolute Necessity maintains
Of Causes and Effects the fatal Chains;
What could one Motion stop, change one Event?
It would transcend the wide, the vast Extent,
The utmost stretch of Possibility,
That Things, from what they are, should disagree.

Blackmore is clearly unimpressed by Lucretius' claim that the guiding hand of Providence, designing creatures and keeping them in their distinct species, can be replaced by a simple mechanistic limit on atomic combinations, which does the same job. Note that Blackmore's illustrations of the consequences of a world ruled only by atomic chance and necessity are also compound creatures.

But why were Centaurs and other such monstrous mixed creatures, such a good weapon against the Epicurean view of the world, and why compound creatures as illustrations of species instability rather than perhaps humans taking on horsey characteristics such as hairiness or eating grass? Firstly, just as with Darwin, there is no clear animal / human divide in the Epicurean world-view, and so perhaps for those for

whom such a clear divide was a given certainty, just as Philip Egerton's mind turns naturally to thoughts of Satyrs as the result of such a lack, so ancient minds turned to Centaurs, with humans having been divided from animals in the minds of ancient and modern Creationists and then put together again by theories that humans are actually animals: for the Epicureans this results in no ontological instability, but for the critics the joining of humans and animals has gone wrong.

But secondly, Lucretius also *invites* such criticisms by the closeness of his account of the origin of species to that of Empedocles, cf. *DRN* 5.837-48:⁸

multaque tum tellus etiam portenta creare
conatast mira facie membrisque coorta
androgynum interutrasque nec utrum utrimque remotum
orba pedum partim manuum viduata vicissim
muta sine ore etiam sine vultu caeca reperta
vinctaque membrorum per totum corpus adhaesu
nec facere ut possent quicquam nec cedere quoquam
nec vitare malum nec sumere quod foret usus
cetera de genere hoc monstra ac portenta creabat
nequiquam quoniam natura absterruit auctum
nec potuere cupitum aetatis tangere florem
nec reperire cibum nec iungi per Veneris res.

At that time the earth also attempted to create many monsters which arose with amazing appearances and limbs: the hermaphrodite, between the two sexes, yet not either, sundered from both, and some bereft of feet, some again, without hands, others were found also dumb without mouths, without faces, others bound by the adhesion of their limbs along their whole body, so that they could not do anything or go anywhere, or avoid danger, or take up what would be useful to them. She created other monsters and prodigies of this type, in vain since Nature prevented their growth, and they could not reach the desired flowering of age, or find food, or be joined by the works of Venus.

Empedocles Strasbourg fragment a(ii) 23-30 Martin and Primavesi:⁹

⁸ See D. J. Furley, 'Variations on Themes from Empedocles in Lucretius' Proem', *BICS*, 17 (1970), 55-64. D. N. Sedley in his *Lucretius and the Transformation of Greek Wisdom* (Cambridge, 1998), 19-21 played down the resemblances between the two passages, but now is readier to accept them, D. N. Sedley, 'Lucretius and the New Empedocles' (forthcoming).

⁹ A. Martin, and O. Primavesi (eds.), *L'Empédocle de Strasbourg: (P. Strasb. gr. Inv. 1665-1666)* Berlin/Strasbourg, 1998).

[δεί]ξω σοι καὶ ἂν ὄσσ(ε)ῖνα μείζονι σώμ[ατι κύρει',]
 [π]ρώτον μὲν ξύνοδόν τε διάπτυξιν τε [ε γενέθλης]
 ὄσ[σ]α τε νῦν ἔτι λοιπὰ πέλει τούτοιο τ[όκοιο',]
 τοῦτο μὲν [ἂν] θηρῶν βριπλάγκτων ἀγ[ρότερ' εἶδη',]
 τοῦτο δ' ἂν ἀ[νθρώ]πων διδυμον φύμα, [τοῦτο δ' ἂν ἀγρῶν']
 ῥιζοφόρων γέννημα καὶ ἀμπελοβάμ[ονα βότρυν'.]
 ἔκ τῶν ἀψευδῆ κόμισαι φρενὶ δείγματα μ[ύθων·]
 ὄψει γὰρ ξύνοδόν τε διάπτυξιν τε γενέθλη[ς].

I will show you to your eyes too, where they (i.e. the elements) find a larger body: first the coming together and the unfolding of the stock, and as many as are now remaining of this generation, *on the one hand among the wild species of mountain-roaming beasts, and on the other hand the twofold offspring of men*, and in the case of the produce of the root-bearing fields and of the cluster of grapes mounting on the vine. From these accounts convey to your mind unerring proofs: for you will see the coming together and unfolding of the stock (*fragment breaks off*). (Trans. M&P).

Fragments 57, 59, 60, 61, describe the zoogony under Love, when the separate limbs of creatures are combined.

DK31 B57:

ἦι πολλοὶ μὲν κόρσαι ἀναύχενες ἐβλάστησαν,
 γυμνοὶ δ' ἐπλάζοντο βραχίονες εὐνίδες ὤμων,
 ὄμματά τ' οἴ(α) ἐπλανᾶτο πενητεύοντα μετώπων.

Here many heads sprang up without necks, bare arms were wandering without shoulders, and eyes needing foreheads strayed singly. (Trans. Wright).

DK31 B59:

αὐτὰρ ἐπεὶ κατὰ μείζον ἐμίσητο δαίμοι δαίμων,
 ταῦτά τε συμπίπτεσκον, ὅπῃ συνέκυρσεν ἕκαστα,
 ἄλλα τε πρὸς τοῖς πολλὰ διηνεκῆ ἐξεγένοντο.

But as god mingled further with god [i.e. the four elements], they fell together as they chanced to meet each other, and many others in addition to these were continually arising. (Trans. Wright).

DK31 B61:

Πολλὰ μὲν ἀμφιπρόσωπα καὶ ἀμφίστερνα φύεσθαι,

βουγενῆ ἀνδρόπρωρα, τὰ δ' ἔμπαλιν ἐξανατέλλειν
ἀνδροφυῆ βούκρανα, μεμειγμένα τῆι μὲν ἀπ' ἀνδρῶν
τῆι δὲ γυναικοφυῆ σκιεροῖς ἡσκημένα γυίοις.

Many creatures with a face and breasts on both sides were produced, man-faced ox-creatures arose and again ox-faced men, (others) with male and female nature combined, and the bodies they had were dark. (Trans. Wright).¹⁰

B60 (Plut. *Adv. Colot.* 28.1123b):

ταῦτα μέντοι καὶ πολλὰ τούτων ἕτερα τραγικώτερα τοῖς
'Ἐμπεδοκλέους ἔοικότα τεράσμασιν ὧν καταγελωσιν εἰλίποδ'
ἀκριτόχειρα καὶ βουγενῆ ἀνδρόπρωρα.

'Roll-walking creatures with hands not properly articulated or distinguishable', 'ox-headed man-creatures' (Trans. Wright).

That Lucretius knew Empedocles' zoogony is now made certain by the proof the new Strasbourg fragments offer that he translates part of it at *DRN* 2.1081-2:

invenies sic montivagum genus esse ferarum
sic hominum geminam prolem....

...thus is the mountain-wandering race of wild beasts
thus the twofold offspring of humans...

Compare Strasbourg fr. a(ii)26-7:¹¹

τοῦτο μὲν [ἀν] θηρῶν ὀριπλάγκτων ἀγ[ρότερ' εἶδη']
τοῦτο δ' ἀν ἀ[νθρώ]πων διδυμον φύμα...

on the one hand among the race of mountain-wandering wild beasts

¹⁰ Cf. Ovid's version (of the Minotaur), *Tristia* 4.7.18: *semibovemque virum semivirumque bovem*, see J. S. Rusten, 'Ovid, Empedocles, and the Minotaur', *American Journal of Philology* 103 (1982), 332-3, and P. Hardie, 'The Speech of Pythagoras in Ovid's *Metamorphoses* 15: Empedoclean Epos', *Classical Quarterly*, NS 45 (1995), 204-14 at 214.

¹¹ See Martin and Primavesi ad loc.

on the other among the twofold offspring of humans...

The hermaphrodites are present in both accounts, and Lucretius' creatures rendered immobile by the adhesion of their limbs to their bodies are reminiscent of Empedocles' 'Roll-walking creatures with hands not properly articulated or distinguishable' in B60.

Both Lucretius and Empedocles have all possible creatures created randomly from the earth in one great burst in the beginning. Those creatures that were formed by chance so that they had the 'correct' attributes for survival, survived, but the others, nearly endless varieties of monsters, simply died out there and then. And so the formation of species is explained as the simple interaction of chance and necessity, without the need for divine guidance or any pre-existing pattern on which creatures and species may be formed.

The main difference between Lucretius' and Empedocles' theories is that Empedocles uses compound creatures such as the ox-headed man-creatures to illustrate the unviable monsters randomly produced, while Lucretius' monsters are wrongly assembled but without any mixing of parts from separate species. Thus Lucretius gives a hostage to fortune when he borrows from Empedocles' zoogony, and lets Centaurs in by the back door as it were.¹²

Of course, Empedocles 'ox-faced man creatures' and vice-versa, although they are intended to argue the opposite, play straight into the hands of critics of the anti-teleological view of the world: this is, they would say, what we would get if Creation had occurred by such a random mechanistic process without divine guidance, and we would see such mythical creatures as the Minotaur and Centaurs. Knowing the connection between his and Empedocles' theories, and that the Epicurean theory is vulnerable to attack by Centaurs, Lucretius in *DRN* 5.878-881 argues vehemently that Centaurs and such compound creatures were never possible *at any time*.

DRN 5.878-881:

sed neque Centauri fuerunt nec tempore in ullo
esse queunt duplici natura et corpore bino

¹² For a more detailed study of ancient theories of evolution see G. Campbell, 'Zoogony and Evolution in *Timaeus*, The Presocratics, Lucretius and Darwin', in M. R. Wright, (ed.), *Reason and Necessity: Essays on Plato's Timaeus* (London/Swansea, 2000), 145-80.

ex alienigenis membris compacta potestas
hinc illinc par vis ut sat par esse potissit.

But Centaurs never existed, nor at an time can there exist creatures with a double nature and twin body, with their faculties put together from alien born limbs, equal on both sides, in such a way that their strength could be equal enough.

But at the end of his long defence, at *DRN* 5.916-24, we are given a glimpse of an anti-atomic argument to which I assume he is also replying: that some people claim that if there were very many productive atoms in the earth in the beginning, then the resulting creatures would include Centaurs.

DRN 5.916-24:

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 animantum,
propterea quia quae de terris nunc quoque abundant
herbarum genera ac fruges arbustaque laeta
non tamen inter se possunt complexa creari
sed res quaeque suo ritu procedit et omnes
foedere naturae certo discrimina servant.

For the fact that there were many seeds of things in the Earth at the time when she first poured forth the animals, is however, no indication that creatures were able to be created mixed between one another, or that the limbs of living creatures could be put together, since the species of grasses, crops, and fruitful trees which even now spring forth abundantly from the earth cannot however, be created intertwined with one another, but each creature carries on in its own manner, and all preserve their distinctions by a fixed law of nature.

Someone has picked up on Epicurus' argument put forward in *DRN* 2.581ff that the earth contains a vast variety of different atoms from which she creates all things, and has used it to argue that this would lead to instability in nature, and especially that originally it would have produced compound creatures. And so what starts as a refutation of Empedocles' zoogony and the 'man-faced ox-creatures', and an attempt to disassociate himself from them, comes back round again to a defence of the ability of the *atomic theory* to account for the regularity of nature. The link between the two: Empedocles' zoogony and the atomic theory of the creative abilities of the earth, and between the

atomic arguments in the latter half of book two of *DRN* and the scheme of the origin of species in book five, is clearly shown by Lucretius' use of Empedocles' *zoogony* in 2.1081ff as proved by the new fragments. We now know that Lucretius had Empedocles in mind in the passage in book two.

The specific argument in book two, in which the Empedocles fragment appears, is that there are other inhabited worlds. This comes right after the proof of the infinity of the number of worlds. Epicurus in the *Letter to Herodotus* 74 discusses the various different shapes of the other worlds before going on also to argue that there are other inhabited worlds. The scholion on 74 tells us that the former topic, at least, comes from Epicurus' *On Nature* book twelve, and so it may be reasonable to suppose that the latter, that there are other inhabited worlds, also was found there. The other topics of book two: the limited number of atomic shapes and so on, were found in book two of *On Nature* as Sedley argues, so it may well be that this overlap between the topics of books two and five of *DRN* arises from a similar overlap in books two and twelve of *On Nature*.¹³ Lucretius avoids mentioning atoms in the zoogony of book five, except for the refutation in 5.916 of misunderstandings that arise from *atomism* itself. The atomic background for the theory of the origin of species and genetics is found in book two but does not appear where we should expect it in book five. Epicurus' discussion of the different shapes of other worlds and other inhabited worlds in *Ep. Hdt.* 74 and presumably in book 12 of *On Nature*, are based on atomic arguments, and so we could reasonably expect Epicurus' discussion of zoogony to go into atomic detail. Lucretius' avoidance of atomism in his zoogony then, I suggest, arises from his knowledge of the difficulties later Epicureans had experienced in defending the theory from attack and his desire to avoid them. I suggest he returns to Empedocles' zoogony the better to illustrate the Epicurean theory at the macroscopic level, leaving out the atomic arguments on genetics he found in *On Nature* twelve. Ironically, as I see it, this Empedoclean treatment has allowed even greater opportunity for criticism, and has in fact closed the circle between Epicurus and Empedocles. Hence his long argument against Centaurs.

But even Lucretius' vehement defence was not successful in removing Centaurs from his prehistoric landscape, and they are always lurking on the fringes ready to invade his

¹³ *Lucretius and the Transformation of Greek Wisdom*, 110-16.

early world. The Renaissance painter of the late 15th and early 16th century, Piero di Cosimo was fascinated by Lucretius' prehistory, and in a series of three panels, takes great pleasure in repopulating Lucretius' prehistory with Centaurs, and Satyrs, as can be seen from the two paintings, 'The Hunt', and 'Return from the Hunt' both based on Lucretian prehistory.¹⁴ An even more interesting detail appears in his 'The Forest Fire', a painting whose subject is more elusive, but which is also thought to be a Lucretian prehistory painting, combining disparate features from the prehistory in book five. The fire itself, just as in the other two panels, is often thought to be a reference to Lucretius' description of the forest fire at 5.1241ff, to the importance of fire in human evolution, and also a reference to his primeval humans' inability to control fire. The animals rushing from the fire on the left and leaping across the river, echoes Vergil's argument with Lucretius in *Georgics* 3.209ff over the civilizing effects of love, where he borrows the Lucretian image from the proem to book one of *DRN* where the arrival of Venus in spring causes the animals to leap with joy, climb mountains and cross rivers. Vergil uses the motif to argue that love is a kind of mania. He also takes issue with Lucretius' picture at *DRN* 5.1011ff of love as a powerful force in human evolution, softening and civilising bestial people, and has tame animals become wild under the effects of love, and wild animals becoming even wilder.

The great variety of birds in the 'Forest Fire' seems to allude to Lucretius' frequent stress on the atomic theory's ability to account for the variety of nature in which he uses the motif of the variety of birds, *variae volucres*. The painting is divided in two by the tree in the foreground, and the left hand half seems to depict an earlier world than the right. Note particularly the wild aurochs on the left of the tree and the modern domestic cow on the right. There are many other mysterious details, but the strangest is the human faces of the animals on the left. There are no true Centaurs or Satyrs in this painting but, as an afterthought, as X-ray examination has shown, Piero has added the human faces to the animals on the left, producing 'Empedoclean' 'man-faced pig creatures' and 'man-

¹⁴ See C. Whistler and D. Bomford, *The Forest Fire by Piero Di Cosimo*, Ashmolean Museum (Oxford, 1999), C. Whistler, 'A Renaissance Enigma: Piero Di Cosimo's Forest Fire' (forthcoming), and E. Panofsky, 'The Early History of Man in a Cycle of Paintings by Piero di Cosimo', *Journal of the Warburg Institute* (1937), (repr. in id. *Studies in Iconology*, Oxford, 1939).

headed deer creatures', and so even more slyly ironically undercutting Lucretius' theory of the origin of species than in the other two paintings, and clearly indicating that he was fully aware of the connection between Lucretius' and Empedocles' theories of the origin of species. We do not know whether the idea was Piero's own or that perhaps of a learned patron or visitor to his studio, but it does indicate at least that Lucretius' connection with Empedocles' zoogony was recognised in the early sixteenth century, and as the painting is of the *spalliera* type, intended usually to provide material for learned discussion, Piero perhaps would have expected the detail to be understood and appreciated by his patron and his friends. Piero's predilection for fantasy and monsters however, and his taste for classical prehistory motifs suggests the idea was his own.

So far I have spoken about Centaurs and man-faced ox-creatures, so now I must bring in the bicycles. Thomas O'Grady ('O'Grady Says...' *Boston Irish Reporter*, June 1998), discusses the frequency of the bicycling theme in Irish literature, and says:

Pre-eminent Joyce scholar Hugh Kenner has even argued that the many bicycle-riding Irishmen in Samuel Beckett's novels—Molloy, Moran, Mercier and Camier, among others—are 'Cartesian Centaurs'. Observing how the Greeks 'united the noblest functions of rational and animal being, man with horse' in imagining the race of Centaurs. Kenner observes further: 'For many years, however, we have had accessible to us a nobler image of bodily perfection than the horse. The Cartesian Centaur is a man riding a bicycle, *mens sana in corpore disposito* [a sound mind in an orderly-arranged body]'.

(Available online at <http://omega.cc.umb.edu/~irish/june1998.htm> accessed 11th Jan. 2000).

So here we have a link between bicycles and Centaurs in Irish literature. Further, William Empson in his poem 'Invitation to Juno' compares Lucretius' rejection of Centaurs to Johnson's rejection of bicycle riding.¹⁵ Here Darwin appears, oddly perhaps, as the unifier of disparate parts and faculties, and soother of ontological uncertainties:

Lucretius could not credit Centaurs
Such bicycle he deemed asynchronous.
'Man superannuates the horse;
Horse pulses will not gear with ours.'

¹⁵ I am grateful to Gillian Clark for this reference.

Johnson could see no bicycle would go;
'You bear yourself, and the machine as well.'
Gennets for *germans* sprang not from Othello,
And Ixion rides upon a single wheel.

Courage. Weren't strips of heart culture seen
Of late mating two periodicities?
Could not Professor Charles Darwin
Graft annual upon perennial trees?

But the link between bicycles and centaurs is made most clearly in Flann O'Brien's novel *The Third Policeman*,¹⁶ not published until after his death in 1967 because it was considered too strange, and here we come back round again to the problems of atomism. O'Brien brilliantly plays on the necessity for a 'law' of nature. In the parallel universe of 'The Parish', it is necessary for three policemen to control and set limits to the damaging effects of the workings of the Atomic Theory, by the use of complicated and mysterious machinery. However, despite their efforts, as the people of the Parish ride their bicycles, the atoms of human and bicycle become exchanged, and so Sergeant Pluck also takes more direct action to limit the damage done to people's ontological integrity by stealing their bicycles on a regular basis and then 'finding' them again after a few days. This theft slows down their metamorphosis into bicycles, but of course, there are similar dangers involved in walking and horse riding, too. Sergeant Pluck's great-grandfather turned into a horse because of too much horse riding. He and the horse kept their outward appearances, as do the bicycle people, but the horse developed the worst behavioural characteristics of both horse and human, as we should expect in a Centaur, and eventually had to be shot. Of course it is a moot point whether it was the horse or the man that was shot. *The Third Policeman*, 1967, 72 ff.:

'The Atomic Theory' I sallied 'is a thing that is not very clear to me at all.'

¹⁶ See in particular Keith Hopper, *Flann O'Brien: A Portrait of the Artist as a Young Post-Modernist* (Cork, 1995), 226-69, and A. Spencer, 'Many Worlds: the New Physics in Flann O'Brien's *The Third Policeman*', *Éire-Ireland: a Journal of Irish Studies*, 30:1 (1995), 145-58.

'Michael Gilhaney' said the Sergeant 'is an example of a man that is nearly banjanxed from the principle of the Atomic Theory. Would it astonish you to hear that he is nearly half a bicycle?'...

'Are you certain about the humanity of the bicycle?' I inquired of him. 'Is the Atomic Theory as dangerous as you say?'

'It is between two and three times as dangerous as it might be' he replied gloomily.

'Early in the morning I often think it is four times, and what is more, if you lived here for a few days and gave full play to your observation and inspection, you would know how certain the sureness of certainty is.'...

'The gross and net result of it is that people who spend most of their natural lives riding iron bicycles over the rocky road-steads of this parish get their personalities mixed up with the personalities of their bicycle as a result of the interchanging of the atoms of each of them and you would be surprised at the number of people in these parts who are nearly half people and half bicycles.'...

The Sergeant's face clouded and he spat thoughtfully three yards ahead of him on the road. 'I will tell you a secret' he said very confidentially in a low voice. 'My great-grandfather was eighty-three when he died. For a year before his death he was a horse!'

'A horse?'

'A horse in everything but extraneous externalities. He would spend the day grazing in a field or eating hay in a stall'...

'I suppose your great-grandfather got himself into this condition by too much horse riding?'

'That was the size of it. His old horse Dan was in the contrary way and gave so much trouble, coming into the house at night and interfering with young girls during the day and committing indictable offences, that they had to shoot him ... but if you ask me it was my great-grandfather they shot and it is the horse that is buried up in Cloncoonla churchyard.'

In Flann O'Brien's imaginary world, only the active intervention of an intelligent and guiding 'law' can prevent the people of the Parish from becoming secret Centaurs like the old horse Dan, or secret 'half-man half-bicycle' Centaurs like poor Michael Gilhaney. Flann O'Brien's critique of the atomic theory *may* seem merely frivolous, but his humour should not blind us to the seriousness of his argument.

Flann O'Brien seems to have been deeply interested in the relativity theories of Einstein and in quantum mechanics. As has often been argued, as Keith Hopper has noted in his excellent book *Flann O'Brien: A Portrait of the Artist as a Young Postmodernist*, O'Brien was disturbed by the theory of relativity and feared its consequences for a world governed by divine reason. But further, as Hopper points out, much of the strangeness of the world of the *Third Policeman* derives directly from ancient science. In particular the theory of the eccentric sage de Selby that the world is

sausage shaped is based on the theory of Anaximander that the world is a cylinder three times longer than it is broad (p. 81-2),¹⁷ and de Selby's theory that night occurs because of an accretion of black air around the earth rather than because of the setting of the sun is a parody of the Epicurean theory of vision, in which the darkness of a dark room is caused by its being filled with dark atoms. Again, de Selby's theory that names have a direct relationship with their owners mocks the Epicurean theory that the names of things arise by nature. De Selby takes the Epicurean theory of names to ludicrous extremes in which entire racial groups are defined by their names, and so racism, inadvertently by the humanist de Selby, is given a scientific basis. O'Brien's subtle postmodernist technique of layering meaning and nonsense perhaps precludes a simple allegorical reading of *The Third Policeman*, but that ancient mechanistic physics is used to mock Einsteinian and other modern mechanistic readings of the world with, as O'Brien sees it, their dehumanising consequences, seems to be one solid conclusion we can reach about a work of such shifting perspectives and meanings. Accordingly, O'Brien's extrapolation of the consequences of Atomism to such ludicrously metamorphic lengths is not simply a straight critique of Atomism itself, but a *reductio ad absurdum* of all mechanistic theories that introduce the endless flux of all things, from the Presocratics to Einstein. Darwin, of course, may be numbered amongst those whose present a picture of the world in constant flux, with no stability of species. For Darwin, as Niles Eldridge argues, species had no real existence but: 'became simply progress reports in the history of life' (Eldredge, 1995: 10). Further, Darwin's theories have also been used in a dehumanisingly reductionist way, especially in deterministic views of the evolution of behaviour which often seem to remove human free-will by attributing all behaviour to evolutionary advantage. Lucretius could justifiably complain that such a use of Epicurean atomism to mock scientific determinism is unfair since Epicureanism goes to great lengths to rescue free-will from the clutches of Democritean physical determinism, but Epicureanism is perhaps guilty of seeking to reduce the world to the interaction of atoms and void and chance and necessity. Further, O'Brien's picture of ontological instability by the mingling of atoms of different species, and even of the animate and inanimate, of human and machine, goes directly against Lucretius' explicit claim that species and all matter are

¹⁷ Ps. Plutarch *Strom.* 2, Hippolytus *Ref.* 1.6.3

kept distinct because of limits imposed at the atomic level, and so again O'Brien's use of atomism to criticize the Darwinian view of the endless flux of species could be considered unfair. On the other hand O'Brien is under no obligation to accept Epicurean genetics at face value, and indeed he follows an ancient tradition in not doing so and ignoring the Epicurean theory of the atomically imposed laws of nature. His criticism is more sophisticated, however, than those of the anonymous ancient critics of Epicureanism, of Piero di Cosimo, or of Sir Richard Blackmore, in that his new half-man half-bicycle creatures are not composed of disparate limbs, but are truly atomistic creations, mingled at the *microscopic* rather than the *macroscopic* level. In this O'Brien parallels the advance Epicurean genetics made on Empedoclean genetics: in Epicurean genetics embryology is explained at the atomic level, while in Empedocles tiny preformed limbs combine to form an embryo, just as the man-faced ox-creatures are formed.¹⁸

If the science of Flann O'Brien's parallel universe is weird it is because it is composed from elements drawn from Presocratic, and Epicurean science, from Darwinian evolution and Einsteinian theories of relativity. O'Brien follows a tradition of criticizing the ability of the atomic theory to ensure the stability of nature arguing that it would produce Centaurs, but does so at the atomic level itself, instead of at the macroscopic level. In doing so he undoes the careful work of Lucretius who avoids atomism as much as possible in his theory of the origin of species, as I argue deliberately in order to avoid such criticism.

¹⁸ Aristotle *Gen. an.* 722b17-30. See D. Balme, *Aristotle De Partibus animalium 1 and De generatione animalium 1* (Oxford, 1992), ad loc.