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Romanticism and Victorianism on the Net

Epic Poetry and the Origins of Evolutionary Theory

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Abstract

In this article I will examine how Erasmus and Charles Darwin responded to the epic tradition in their writings, and how the legacy of epic was worked into their respective evolutionary visions. Erasmus Darwin formulated a brief sketch of his evolutionary theory in prose in his medical textbook *Zoonomia*, but when he came to flesh out his conception of evolution in imaginative and empirical detail he turned to verse. His poem *The Temple of Nature*, published posthumously in 1803, self-consciously evokes epic conventions and engages intertextually with Milton, Lucretius and Ovid in particular. One of the poems that Erasmus Darwin replied to in his verse – *Paradise Lost* – was by Charles Darwin’s account his constant companion during his voyage on the *Beagle*. Through exploring how both Darwins responded to Milton’s vision of Creation, and to the counter-visions offered by other epic poets and by Satan within Milton’s own poem, it is possible to see how fundamental epic poetry was to the generation of evolutionary theory and the forms it came to take.

Biographical note

John Holmes is Professor of Victorian Literature and Culture at the University of Birmingham. He was Chair of the British Society for Literature and Science from 2012 to 2015, and is currently Secretary to the Commission on Science and Literature. His books on literature and science include *Darwin’s Bards: British and American Poetry in the Age of Evolution* (Edinburgh UP, 2009), *The Pre-Raphaelites and Science* (Yale UP, 2018), and the edited collections *Science in Modern Poetry: New Directions* (Liverpool UP, 2012) and *The Routledge Research Companion to Nineteenth-Century British Literature and Science* (2017, co-edited with Sharon Ruston).

1. In his 1978 bestseller *On Human Nature*, the evolutionary biologist and ecologist Edward O. Wilson identified epic as the “narrative form” of the “mythology” of scientific naturalism (192), remarking “the evolutionary epic is probably the best myth we will ever have” (201). In 2000, the historian of science James Secord defined the “evolutionary epic” in a specifically Victorian context as “book-length works that covered all the sciences in a progressive synthesis” (461). Since these interventions, the concept of the “evolutionary epic” has gained considerable currency among scientists, historians and literary scholars. As a narrative genre, its type specimen, following Secord, is Robert Chambers’ *Vestiges of the Natural History of Creation* (1844). Closely related forms include Winwood Reade’s *The Martyrdom of Man* (1872) and Edward Clodd’s *The Story of Creation* (1901). In hunting down further specimens, recent scholars have extended the category to include other well-known scientific syntheses such as Erasmus Darwin’s *Zoonomia* (1794-96) and Alexander von Humboldt’s *Cosmos* (1845-62); non-evolutionary geological lectures by Gideon Mantell and Hugh Miller; periodical essays by Herbert Spencer, Arabella Buckley and Grant Allen; and, in a resurgence of the form in our own time, both the Big History movement led by David Christian and popular retellings of evolution as an inspiring narrative, including Loyal Rue’s *Everybody’s Story: Wising Up to the Epic of Evolution* (2000) and Eric Chaisson’s *Epic of Evolution: Seven Ages of the Cosmos* (2006).¹
2. Whether they are concerned with science itself or its history, accounts of the evolutionary epic share two features in common. The first is that the term “epic” is used loosely, at times very loosely. In Secord and Wilson’s accounts, it refers to a grand, rhetorically commanding narrative, an evolutionary cosmogony equivalent to Hesiod’s *Theogony* or Milton’s *Paradise Lost*. As Ralph O’Connor has recently pointed out, however, “most so-called ‘evolutionary epics’ contain strikingly little past-tense narrative” (“Science for the General Reader” 166). Although they do make use of vivid, elevated rhetoric at key moments, including allusions borrowed from epic poems themselves, these typically stand out as interjections or perorations, while many of the texts which have been claimed for the genre, such as Richard Owen’s *Palaeontology* (1861) and E. Ray Lankester’s *Degeneration* (1880), establish their scientific credentials rather through a studiously measured and factual language. None of the canon of texts, which have been used to define the genre, makes use of verse or myth except in

occasional quotations, and many are not even on a large scale. All told, the “evolutionary epic” bears only a very limited resemblance to the epic proper.

3. The second commonality is that, in all these accounts, evolution is prior to epic within the evolutionary epic. For Wilson, “the true evolutionary epic, retold as poetry, is as intrinsically ennobling as any religious epic” (*Consilience* 295). Epic is thus the “narrative form” which the history of evolution takes as it is “retold,” whether in prose or verse. Richard Dawkins envisages the same process in *Unweaving the Rainbow* when he invites his readers “to imagine Beethoven’s ‘Evolution Symphony’, Haydn’s oratorio on ‘The Expanding Universe’, or Milton’s epic *The Milky Way*” (24). In their focus on popularization, historians of science similarly present the “evolutionary epic” as principally a mode of disseminating and interpreting science for the laity. In O’Connor’s words, “epic provided nineteenth-century writers on the history of life with an empowering cultural resource” which “helped them communicate with new audiences and establish the authority of new disciplines,” showing in the process “why science mattered” (“From the Epic of Earth History” 219).
4. In this essay I want to challenge the presumption that evolution precedes the epic within the history of science through a more precise engagement with epic itself. Rather than identifying more or less epic qualities within prose accounts of evolution, I will explore how epic poetry shaped the thinking of two of the most original and influential evolutionary theorists of the nineteenth century. My contention is that the evolutionary theories of Erasmus and Charles Darwin took form through direct engagements with epic poetry. In an influential study, Lucy Newlyn has noted that, over the course of the eighteenth century, John Milton’s *Paradise Lost* “acquired the status of a biblical text,” at least “in the popular imagination” (19). Because of the presumption that God created species, and that human origins at least were much as the Bible described them, Milton had considerable authority in the field of natural history too. His poem reinforced the dominance of natural theology within establishment science, whether that expressed itself as a casual presumption, as in Gilbert White’s *Natural History of Selborne* (1789), or, increasingly, as a closely argued case, as in William Paley’s *Natural Theology* (1802) and the treatises on “the Power Wisdom and Goodness of God as Manifested in the Creation” (Kirby) commissioned by the Earl of Bridgewater in his will in 1829 (1833-40). William Kirby, for example, who contributed two volumes on zoology to the Bridgewater Treatises, cites the Fall of Man, as described by Milton, as a natural-historical fact (1: lxiv-v, 10). Yet for both Darwins, Milton’s poem was a crucial stimulus to the development of

evolutionary counter-narratives to scientific creationism. As we shall see, these counter-narratives took form through further engagements with other epic poems and myths.

5. Newlyn teases out an “apparent contradiction” in Romantic culture “between the ‘Milton’ who is constructed through conscious and explicit acts of appropriation and the Milton who emerges from carefully receptive and imitative habits of allusion” (4). The first of these is “a model of authority, intentionality, and religious certainty,” the second “a collocation of ambiguities and uncertainties” (4-5). In the first section of this essay, I will examine how Erasmus Darwin contests Milton’s authority in his poem *The Temple of Nature; or, The Origin of Society*, published posthumously in 1803. Erasmus Darwin had included a brief account of the argument for organic evolution in the first volume of his medical textbook *Zoonomia* (500-09). But to imagine in detail how this process had shaped the natural world, and to explore its metaphysical and ethical implications, he reached for poetry, specifically epic poetry. In *The Temple of Nature*, he mobilises classical epic to conceive of an alternative to Milton’s account of creation. The poets he turns to – Lucretius and Ovid – had themselves reimagined the possibilities of epic, creating hybrid forms that could encompass didactic verse, materialist philosophy and a rampant narrative impulse that exceeds any single heroic story. Darwin’s own poem combines these same features, even as it weaves together sophisticated allusions to all three poets and others, playing them off against one another in constructing its own original synthesis. Epic poetry for Erasmus Darwin is not merely a mode of communication, then, but a mode of thought grounded at once in literary tradition and poetic form.
6. Milton’s significance for Darwin’s grandson is much more ambiguous although, I suggest, no less fundamental, in keeping with the second component of Newlyn’s account of his role. When Charles Darwin was exploring South America as the naturalist on the Beagle voyage, he too read Milton attentively, but he left only the sparsest clues as to precisely *how* he read him. In the second section of this essay I will tease out the implications of Charles Darwin’s few direct references to Milton, following this strand of allusion through into the notebooks in which he first worked out his theory of evolution by means of natural selection, and tracing its shadowy presence within his most famous and influential books, *On the Origin of Species* (1859) and *The Descent of Man* (1871). As I will show, for Darwin as for his grandfather, Milton’s epic poetry was a crucial catalyst for his evolutionary thinking, but where Erasmus Darwin opposed Milton’s vision of the natural world from without, Charles Darwin incorporated Milton’s own counter-discourse into his critique of natural theology: the voice of Satan in *Paradise Lost*,

reverberating too in Byron’s sequel to Milton’s poem, the closet drama *Cain* (1821). Even as he rejected as stultifying Milton’s prohibition against the fruit of the Tree of Knowledge, Darwin hybridised the Tree of Life with the ancient Norse myth of Idrasil – informed by his reading of Thomas Carlyle – to form a new and enriching counter-myth which has been the foundation of evolutionary biology ever since.

7. As I will show, then, epic is not subsequent to evolutionary theory but constitutive of it as it comes into being in the nineteenth century. One implication of this argument, given the profound influence of Charles Darwin’s theory in particular, is that the evolutionary process as we apprehend it already bears the hallmark of epic poetry. Another – to frame the same conclusion within a more realist philosophy of science – is that acts of reading and writing epic poetry made direct and significant contributions to the discovery of organic evolution. Whichever way you look at it, the study of the epic itself becomes profoundly significant to the study of evolutionary thought and its history.

I. Evolution in the Epic Tradition: Classical versus Christian Epic in *The Temple of Nature*

8. Erasmus Darwin signals his epic ambition clearly in the opening lines of *The Temple of Nature*:

By firm immutable immortal laws
Impress’d on Nature by the Great First Cause,
Say, Muse! how rose from elemental strife
Organic forms, and kindled into life... (I, 1-4)

In his address to the Muse, Darwin recalls the openings of the four poems that form the core of the epic tradition in English: Homer’s *Iliad*, as translated by Alexander Pope (“Declare, O Muse! in what ill-fated hour / Sprung the fierce strife ...” [ll. 9-10]); his *Odyssey*, translated by Pope and others (“The man for wisdom’s various arts renown’d, / Long exercis’d in woes, O Muse! resound” [ll. 1-2]); Virgil’s *Aeneid*, translated by John Dryden (“O Muse, the causes and the crimes relate / What goddess was provoked, and whence her hate” [ll. 11-12]); and Milton’s *Paradise Lost* (“Of man’s first disobedience ... / Sing heavenly Muse” [ll. 1-6]). Even in these opening lines, however, it is clear that Darwin is recasting epic as a form that can encompass not one but multiple narratives, and natural philosophy as well as mythopoeic poetry.² In this, he follows Lucretius and Ovid, two more classical epic poets, who reinvented the form for comparable purposes in late Republican and early Augustan Rome.

9. Darwin’s debt to Lucretius’s *Of the Nature of Things (De rerum natura)*, a poem that recasts natural philosophy as an epic endeavour, is relatively well known. He signals Lucretius’s presence within the poem through a second address, this time to Love:

Immortal Love! who ere the morn of Time,
On wings outstretch’d o’er Chaos hung sublime;
Warm’d into life the bursting egg of Night,
And gave young Nature to admiring Light!
You! whose wide arms, in soft embraces hurl’d
Round the vast frame, connect the whirling world!
Whether immers’d in day, the Sun your throne,
You gird the planets in your silver zone;
Or warm, descending on ethereal wing,
The Earth’s cold bosom with the beams of Spring;
Press drop to drop, to atom atom bind,
Link sex to sex, or rivet mind to mind. (I, 15-26)

Martin Priestman has pointed out in his electronic edition of Darwin’s poem that this passage echoes both Milton’s address to the Holy Spirit who “with mighty wings outspread / Dovelike satst brooding on the vast abyss / And made it pregnant” (I, 20-22) at the beginning of *Paradise Lost* and Lucretius’s address to Venus at the beginning of *Of the Nature of Things* (I, 1-49).

10. This may seem like a balanced gesture, acknowledging both Christian and pagan precedents, yet Darwin’s invocation of Love reveals his allegiance to Lucretius over Milton in several ways. Both Venus and the Holy Spirit can be equated with Love, but the Love invoked here by Darwin, like Lucretius’s Venus, is an expressly carnal force that draws the component parts of nature together. Darwin’s embrace of atomism is another clear endorsement of Lucretius, but by the time we reach that moment he has already given an indirect indication that his wider worldview is Lucretian. The movement from daylight through the warmth of Spring to the erotic desire that links sex to sex recapitulates exactly the same movement in Lucretius, as translated by Thomas Creech in 1682:

The well-pleas’d Heav’n assumes a brighter ray
At thy approach, and makes a double day.
When first the gentle Spring begins t’inspire

Soft wishes, melting thoughts, and gay desire,
And warm Favonius fans the amorous fire. (I, 17-21)

The final indicator that Darwin is aligning himself with classical pagan epic against Milton is at once less overt and more pervasive. By the end of the eighteenth century, successive poems by James Thomson, Edward Young, Mark Akenside and William Cowper had entrenched blank verse as the dominant form for extended philosophical poetry, in part in homage to Milton (Newlyn 22). Darwin’s choice of heroic couplets as his medium is a deliberate return to the late seventeenth- and early eighteenth-century aesthetic of Dryden, Pope and their satellites, including Creech, whose most elevated poems were their translations of the Greek and Latin epic poets. The high register, rhetorical exuberance and rapidity of Darwin’s poem align it with these translations specifically – occasionally shading into mock-epic in moments of parody – by contrast, for example, with the measured precision and restraint typified by Pope’s *Essay on Man*.³ Darwin’s familiarity with these translations as well as the original poems reveals itself in subtle but direct echoes which, as we will see, pervade his poem. One such echo occurs towards the end of his address to Love. In Creech’s translation, Lucretius appeals to Venus to “Polish my lines” (I, 40). Darwin in turn asks Love “with your polish’d arrows write my verse!— / So shall my lines soft-rolling eyes engage” (I, 28-29). In appropriating Creech’s vocabulary, Darwin underscores his affinity with both the Roman poet and his seventeenth-century translator.

11. Lucretius provides Darwin with a poetic model for articulating much of his materialist worldview, in opposition to Milton’s Christian creationism. Yet Lucretius’s conception of biology is not sufficiently flexible for Darwin to identify wholly with his philosophy. Having reached the conclusion in *Zoonomia* that organic life evolves over time, Darwin needs to be able to imagine and articulate such transformations. Milton’s account of the creation of animals in book VII of *Paradise Lost* is taxonomically too rigid for Darwin, as each type is created individually. But Lucretius’s zoology is of limited use in turn, because he too rejects the idea that there might be slippage from one kind of creature to another. In dismissing the existence of centaurs, chimaeras and other composite animals from mythology, Lucretius concludes:

Yet nothing proves, that things of different kind,
That disagreeing natures should be joined ...
But each arising from its proper cause
Remains distinct, and follows Nature’s laws. (v, 973-74, 977-78)

Darwin has no desire to defend the existence of composite animals as such, and he too aims to set out natural laws, not to catalogue divine acts of creation. But the “immutable ... laws” Darwin uncovers in his poem are laws that operate through the very mutability of living things which transform into different kinds over time and which cannot be regulated by the taxonomical categories which humans look to impose on them.

12. To imagine a natural world in which there are no fixed kinds, Darwin draws on another pagan epic. Like Lucretius, Ovid reimagined the possibilities of epic poetry in *Metamorphoses*, creating in his case a poem on an immense scale, which encompasses cosmogony, cosmology, myth, history and philosophical speculation, all unified by the principle of flux and processes of transformation, and driven by a furious energy that often spills over into grotesque comedy. Darwin first hints at the importance of Ovid’s *Metamorphoses* as a model for his own epic poem by introducing the figure of Proteus, the classical sea-god who can change his shape at will

While chain’d reluctant on the marble ground,
Indignant Time reclines, by Sculpture bound;
And sternly bending o’er a scroll unroll’d,
Inscribes the future with his style of gold.
—So erst, when Proteus on the briny shore,
New forms assum’d of eagle, pard, or boar;
The wise Atrides bound in sea-weed thongs
The changeful god amid his scaly throngs;
Till in deep tones his opening lips at last
Reluctant told the future and the past. (I, 79-88)

As Priestman notes in his edition, this scene derives most immediately from book IV of *The Odyssey*, where Menelaus – here called by his patronymic Atrides – is instructed to wrestle with Proteus, subduing him until he finally stops changing shape and answers Menelaus’s question as to what his future will hold. Indeed, Darwin directly echoes Elijah Fenton’s contribution to Pope’s version of Homer’s poem here, taking Proteus’s “scaly throngs” from the “flocks of ocean” who are seen “thronging” (IV, 603-4) around him in Homer’s poem. But an equivalent scene from *Metamorphoses* is closer to Darwin’s in the significance it ascribes to Proteus. In Samuel Garth’s 1717 edition of Ovid’s poem, translated by Dryden and others, the river Achelous answers a question from Theseus, who is “inquisitive to know / From Gods

what wondrous alterations grow” (VIII, 1110-11), by citing Proteus as the type of metamorphosis more widely. In *The Odyssey*, Menelaus is told Proteus “will prescribe your destin’d course” (IV, 526). In *Metamorphoses*, by contrast, Theseus is told that Proteus exemplifies the general principle that “Some, when transform’d, fix in the lasting change; / Some with more right, through various figures range” (VIII, 1114-15). Darwin combines these two ideas, so that Proteus, who stands in *The Temple of Nature* as an analogue for Time, reveals the movement of the future and the past not within the life of a single hero but rather as a universal principle in which change is the norm and fixity only ever circumstantial even when it appears lasting.

13. Following Ovid, Darwin introduces Proteus as an allegory for the constant flux of time, held steady as an object of scrutiny by science but also by the arts, which are represented by sculpture within the poem and through the poetry itself. He goes on to relocate this mythic figure within the living world as one among a catalogue of micro-organisms “view’d through crystal spheres in drops saline” (I, 281):

insect Proteus sports with changeful form

Through the bright tide, a globe, a cube, a worm. (I, 291-92)

This second Proteus – an amoeba – at once parodies its mythic precursor and naturalises him. Proteus may only be able to transform himself from an eagle into a panther or a boar in a poem, but an organism does exist which can squeeze itself from a globe into a cube or a worm. This second Proteus represents one stage in a process, which begins as:

Quick-shooting salts in chemic forms combine;

Or Mucor-stems, a vegetative tribe,

Spread their fine roots, the tremulous wave imbibe. (I, 282-84)

Darwin’s own note to line 283 specifies that “Mucor, or mould ... is spontaneously produced on the scum of all decomposing organic matter,” but the crystalline salts seem to suggest an even more primitive origin for life than this, as their recombination is not only fast but hints at a quickening. Darwin’s microscope and his poetic language together reveal a Nature that is truly protean, as inorganic salts come to life and minute plants drink up water as though they were animals.

14. Darwin relishes such moments when science and poetry combine to break down preconceived natural categories. In one of his notes to the poem, he discusses moths and butterflies which “seem to pass from a reptile leaf-eating state, and to acquire wings to flit in the air” for the

purposes of reproduction (II, 302n). After intimating that the transition from caterpillar to moth might parallel the evolution of a reptile into something more like a bird, Darwin goes still further, claiming that a naturalist of his acquaintance:

thought it not impossible that the first insects were the anthers and stigmas of flowers, which had by some means loosened themselves from their parent plant, like the male flowers of vallisneria, and that other insects in process of time had been formed from these, some acquiring wings, others fins, and others claws, from their ceaseless efforts to procure food or to secure themselves from injury. (II, 302n)⁴

Supposedly, in the view of this unnamed naturalist – perhaps Darwin himself – “none of these changes are more incomprehensible than the transformation of caterpillars into butterflies” (II, 302n). This is natural-historical speculation at its most unrestrainedly Ovidian, yet it appears within the prose notes which document the science and scholarship, underwriting the extravagance of Darwin’s verse. In the “Apology” to his earlier poem *The Botanic Garden*, he had expressly defended “Extravagant theories” in “those parts of philosophy where our knowledge is yet imperfect” on the grounds that “they encourage the execution of laborious experiments, or the investigation of ingenious deductions, to confirm or refute them” (1: vii). Even as they attest to Darwin’s constructive openness to such speculation and his poem’s scientific legitimacy, notes such as this confirm too that acts of the imagination themselves are fundamental if we are to apprehend the extravagance of nature itself.

15. Darwin defines his Ovidian vision of nature against both Lucretius’s rejection of centaurine forms and the distinct creations recorded by Milton. In book VII of *Paradise Lost*, Milton follows Genesis in rehearsing the creation of plants on the third day, marine animals and birds on the fifth, and land animals and finally man on the sixth. As Raphael describes it to Adam, the result of these separate acts of creation was a strictly ordered world, subdivided into elements and spaces, in which “air, water, earth, / By fowl, fish, beast, was flown, was swum, was walked” (VII, 502-3). In *The Temple of Nature*, Darwin cuts across these distinct categories, cataloguing at length plants and animals, which in one way or another straddle the divide between water and air. Some, including the tadpole and the mosquito, undergo metamorphoses of their own in moving from an aquatic to an air-breathing form. Others, such as the *Diodon* or porcupine fish and the lamprey were believed to possess both lungs and gills, joining “disagreeing natures,” to use Creech’s term (Lucretius, v, 974). Darwin’s list culminates with the whale:

With gills pulmonic breathes the enormous Whale,
And spouts aquatic columns to the gale. (I, 361-62)

In his extended note to this passage, Darwin remarks that “The respiratory organ of the whale, I suppose, is pulmonary in part, as he is obliged to come frequently to the surface ... and may nevertheless be in part like the gills of other fish, as he seems to draw in water when he is below the surface, and emits it again when he rises above it” (Additional Note v). This is the scientific justification for his account of the whale’s “gills pulmonic,” but as well as being legitimate speculation on the basis of empirical evidence, his description of the whale participates in the epic tradition as a parodic allusion to “leviathan, / Hugest of living creatures” (VII, 412-13), the finale to Milton’s own catalogue of sea-life, which “at his gills / Draws in, and at his trunk spouts out a sea” (VII, 415-16). Darwin echoes Milton’s language and, as far as the whale itself goes, corroborates and refines his natural history, yet he does so with the “comic excessiveness” which Priestman has shown to be a defining characteristic of his poetry (*Poetry* 3). In providing a scientific vocabulary for Milton’s natural history, Darwin also playfully derides it. Raphael acknowledges the existence of “The river horse and scaly crocodile” as animals that are “ambiguous between sea and land” (VII, 473-74), but he passes over them swiftly, as if embarrassed by their liminal existence between two elements. Darwin dwells on precisely such liminal creatures for thirty lines, closing with the whale, which proves to be not the most magnificent animal whose natural element is water but the biggest single piece of evidence to show that nature is not made up of discrete natural kinds at all.

16. Within Darwin’s poem, amphibious animals and plants expose the porous boundaries between types. They also reveal evolutionary transformation in process, as creatures born to life in one element become fit for another. After setting down his catalogue of microscopic protean forms and hinting that life might have originated through the combination of inorganic compounds, Darwin asserts boldly that “Organic Life beneath the shoreless waves / Was born” (I, 295-96). He goes on to imagine how the transition from marine to terrestrial life might have occurred:

In countless swarms an insect-myriad moves
From sea-fan gardens, and from coral groves;
Leaves the cold caverns of the deep, and creeps
On shelving shores, or climbs the rocky steeps.
As in dry air the sea-born stranger roves,

Each muscle quickens, and each sense improves;
Cold gills aquatic form respiring lungs,
And sounds aerial flow from slimy tongues. (I, 327-34)

Read in the light of Darwin’s account of Mucor and his note floating the theory that insects may be descended from flowers, these lines hint at a similar elision of plant into animal as the sea-fans and corals – themselves animals which live as though they were plants and are described accordingly – erupt into swarms of underwater insects. In the second couplet finely-judged alliteration combines with a rare anticipation of the end-rhyme to represent in sound the halting, straining movement from sea onto land before the creatures adapt fully to their new environment. As Darwin’s note to the first of these lines argues, the origin of the frog as a tadpole or the gnat as a larva may be simply the persistence of an aquatic stage through which all terrestrial life once passed. Similarly, the whale’s “gills pulmonic” are a half-way stage between “gills aquatic” and “respiring lungs.”

17. In the same note, Darwin states with confidence that “new microscopic animalcules would immediately commence wherever there was warmth and moisture, and some organic matter, that might induce putridity.” He adds, more tentatively, that they “may gradually acquire new powers to preserve their existence; and by innumerable successive reproductions for some thousands, or perhaps millions of ages, may at length have produced many of the vegetable and animal inhabitants which now people the earth” (I, 327n). To imagine this happening in the flesh, and not merely in the abstract, Darwin again reaches for Ovid. He does not simply describe micro-organisms evolving by stages into large animals. Instead, he represents this process figuratively through a complex intertextual engagement, which pits Ovid and Lucretius against Milton. In book 1 of *Metamorphoses* Ovid describes Egyptian peasants finding half-formed creatures in the mud left behind by the receding waters of the Nile. Darwin paraphrases this story in his poem, glossing it in a note as “a poetical account of the opinions of the magi or priests of that country; showing that the simplest animations were spontaneously produced like chemical combinations, but were distinguished from the latter by their perpetual improvement by the power of reproduction” (I, 417n). Through his note, Darwin implicitly identifies his own paraphrase of Ovid as an allegory for a process of evolution and “perpetual improvement” beginning with the spontaneous generation of micro-organisms.
18. Darwin draws directly on Dryden’s translation of Ovid here. Dryden’s Ovid relates how the Egyptians find creatures in the Nile mud:

Some rude, and yet unfinish'd in their kind:
Short of their limbs, a lame imperfect birth:
One half alive; and one of lifeless earth. (I, 571-73)

Darwin pays homage to Dryden by borrowing his vocabulary and repeating his rhyme:

Bird, beast, and reptile, spring from sudden birth,
Raise their new forms, half-animal, half-earth. (I, 409-10)

As Darwin contracts Dryden's third line into a half-line, he stresses the novelty of the forms of life that he is describing. He goes on to imagine individual animals coming into being:

The roaring lion shakes his tawny mane,
His struggling limbs still rooted in the plain;
With flapping wings assurgent eagles toil
To rend their talons from the adhesive soil;
The impatient serpent lifts his crested head,
And drags his train unfinish'd from the bed. (I, 411-16)

The suddenness of these creatures' birth in Darwin's poem seems to run counter to the gradualism of the process of evolution as he imagines it, but it is qualified as the passage continues. The animals are not, in fact, fully formed. Instead they are in transition, "half-animal" indeed, but equally still "half-earth."

19. Here Darwin's dialogue with Milton surfaces again. Darwin's new-formed animals derive not only from *Metamorphoses* but also from *Paradise Lost*. In his account of the sixth day of creation, Raphael describes how the earth obeyed God's instruction to bring forth life:

and straight
Opening her fertile womb teemed at a birth
Innumerable living Creatures, perfect forms,
Limbed and full grown. (VII, 453-56)

The fundamental difference between Milton's account and Darwin's lies in the word "perfect." In Milton's poem, creation is sudden and complete; for Darwin, it is an on-going process. This is vividly realised in Darwin's parody of Milton's newly created lion. According to Raphael:

now half appeared
The tawny lion, pawing to get free
His hinder parts, then springs as broke from bonds,
And rampant shakes his brinded mane. (VII, 463-66)

Both lions shake their manes, but where Milton’s lion frees himself into independent existence and the present tense with a bound, Darwin’s remains “rooted in the plain.” The lion’s embarrassment is shared by the eagle, which for Milton is the first of birds, and the serpent, who, far from being the “subtlest beast of all the field” (VII, 495), is ungainly and “unfinish’d.”

20. Darwin’s reimagining of creation as an allegory of evolution in his poem is at once mythic and parodic. He draws on Ovid to challenge Milton, but all three poets ultimately look back to Lucretius’s account of the origins of mammalian life in book v of *Of the Nature of Things*:

Next beasts, and thoughtful Man receiv’d their Birth:
For then much vital heat in Mother Earth,
Much moisture lay: and where fit place was found,
There wombs were form’d, and fasten’d to the ground. (v, 857-60)

The three later poets all dispense with Lucretius’s bizarre literalism, in which Mother Earth has actual wombs, not to mention breasts and milk. But both Ovid and Darwin retain the basic assumption that heat and moisture are the preconditions for life, which is generated spontaneously, without divine intervention. In *Metamorphoses*, as in *The Temple of Nature*, the story of creatures being generated in the mud of the Nile is presented as an analogue for the creation of terrestrial life as a whole:

The native moisture, in its close retreat,
Digested by the sun’s ethereal heat,
As in a kindly womb, began to breed:
Then swell’d, and quicken’d by the vital seed.
And some in less, and some in longer space,
Were ripen’d into form, and took a several face. (I, 560-65)

In the image of animals being ripened by the heat of the sun, Dryden’s Ovid collapses the distinction between plant and animal life, as Darwin does himself in his image of the lion “rooted in the plain.” As before, Ovid provides a model for imagining and articulating a vision of nature in which categories are not absolute and natural kinds transition into one another.

21. In his poetic gloss on his own account of the myth of the creation of animals from the earth, Darwin recalls both Dryden’s Ovid and Creech’s Lucretius:

As Warmth and Moisture blend their magic spells,
And brood with mingling wings the slimy dells;
Contractile earths in sentient forms arrange,

And Life triumphant stays their chemic change. (I, 417-20)

Milton’s brooding Holy Spirit from the opening of *Paradise Lost* has been replaced with the material conditions of warmth and moisture identified by Lucretius and Ovid as essential for the generation of life. These material conditions are characterised as performing magic, apt to the poetical myth of the Egyptian magi Darwin finds in Ovid. Yet within four lines, he moves from the fanciful language of “magic spells” to the scientific diction of “contractile earths” undergoing “chemic change” to produce the “sentient forms” of life. This is very much Darwin’s own idiom, the triumph not only of Life but of Enlightenment science. But this triumph is achieved through working with the imaginative and conceptual legacy of the pagan epic poets and the texture of their translators’ language to repudiate the dominant narrative of creation enshrined in Milton’s Christian epic.

22. For Milton, the creation of humanity is a separate act in which creation as a whole culminates. For Darwin, as for Lucretius, human beings are another product of the same generative process as the rest of the living world. Before he even begins his catalogue of amphibious creatures – which itself precedes his reworking of Ovid, Milton and Lucretius on the creation of animals – Darwin lists the predominant species within each natural kind or element. He takes first the oak, then the whale, the lion and the eagle – the three animals with which Milton heads his lists of fish, beasts and birds. Darwin’s creation appears, like Milton’s, to reach its apex in humanity:

Imperious man, who rules the bestial crowd,
Of language, reason, and reflection proud,
With brow erect who scorns this earthy sod,
And styles himself the image of his God. (I, 309-312)

As so often, Darwin directly echoes Milton here. Milton’s God begins his final act of the creation with the words “Let us make now man in our image” (VII, 519), words to which Milton’s narrator in this passage, the Archangel Raphael, returns, telling Adam “in his own image he / Created thee, in the image of God / Express” (VII, 526-28). Raphael stresses too that God ordained humanity to “rule” (VII, 520) and hold “dominion” (VII, 532) over the rest of nature. But for Darwin this claim to dominion is “imperious”, indicative of our pride as much as our capacity. The structural and sonic parallels between his two pairs of rhymes here imply too that the claim, underscored so insistently by Milton, that humanity is made in God’s image is another symptom of human pride. Instead, like the oak, the whale, the lion and the eagle, we:

Arose from rudiments of form and sense,

An embryo point, or microscopic ens! (I, 313-14)

As we have seen, the whale, lion and eagle are all reimagined by Darwin as liminal creatures, embodying transitions from life in the sea to air-breathing and from inert matter to life itself. The clear implication is that, for all our vanity, as well as our genuine achievements, including science and the arts, we too are transitional animals, evolved from a microscopic form like the Proteus just as we each individually grew from an “embryo point” within our mothers’ wombs.

23. In a critique of Darwin’s theory of transmutation, the natural theologian William Paley remarked that “No changes, like those which the theory requires, have ever been observed,” adding that, if it were true, “All the changes in Ovid’s *Metamorphoses* might have been effected” (225). Paley was right to note the affinity between Darwin’s ideas and Ovid’s poem. In the absence of any directly observable evidence for evolution, *Metamorphoses* provided Darwin with the means to imagine, represent and reveal evolutionary transitions in process. His vision of evolution combines Ovidian metamorphoses with the materialism of Lucretius and the poetics of seventeenth- and eighteenth-century epic translation. By fashioning it through such a meticulous yet bounteous reworking of the epic tradition, he is able to contest the poetic vision, scientific accuracy and unique cultural authority of the preeminent epic of Christianity in English, *Paradise Lost*. At the same time, he can apprehend for himself and his readers the shape and processes of the evolving world with remarkable subtlety and complexity.

II. The Devil in the Detail: Charles Darwin, *Paradise Lost* and the Prospect of Evolution

24. Erasmus Darwin tackles Milton head-on in an epic poem of his own in *The Temple of Nature*. He repeatedly invokes *Paradise Lost* to parody, reject and correct its account of the natural world and our place within it in order to substitute evolution for creation. For his part, Charles Darwin recorded in the autobiography he wrote for his family in 1876 that *Paradise Lost* had been his favourite poem when he was young, remarking “in my excursions during the voyage of the Beagle, when I could take only a single small volume, I always chose Milton” (*Autobiographies* 48). Gillian Beer (*Darwin’s Plots* 29-32; “Darwin’s Reading” 554-57), Robert Richards (537-38) and George Levine (140-41) have all speculated on how Milton’s poetry might have shaped Darwin’s imaginative response to the natural world, stressing the

poet’s and the scientist’s shared sense of the abundance of nature and of how, within creation, processes that seem evil can ultimately lead to good. In the remainder of this essay, I want to extend this analysis to propose that Milton’s poem stimulated and shaped Darwin’s evolutionary theorising itself. At the same time, I will argue that Darwin’s response to Milton’s poem was more fraught and ambivalent than the stress laid by previous critics on their affinities would suggest.

25. To uncover Charles Darwin’s response to Milton requires a very different kind of intertextual reading from that demanded by his grandfather’s poetry. By his own admission, Darwin read *Paradise Lost* repeatedly and enthusiastically during the Beagle voyage, and yet, unlike his grandfather, he barely quotes Milton in his writings at all and he did not write poetry of his own. Aside from his autobiography, there are only three original documents from the Beagle voyage itself where Darwin refers to Milton’s poem and two brief references across all his published books. This scarcity of direct testimony recalls the case studies that Erik Gray examines in *Milton and the Victorians*. According to Gray, Milton became so pervasive in the Victorian period that it was no longer necessary to refer to him directly. For the critic, he suggests, the challenge is how to “understand how Milton can continue to exert a powerful influence while largely disappearing from view” (24). In the case of Darwin, this means acknowledging how scant the immediate sources are while being prepared to follow the train of thought that they hint at through Darwin’s early transmutation notebooks, his later correspondence and finally to the major books in which he set out his contentious evolutionary ideas in depth. The findings of this kind of investigation are necessarily speculative, because the evidence lies in passing allusions and their reverberations, not the deliberate and sustained response of one writer to another that we see in *The Temple of Nature*. These glimpses of the younger Darwin’s keen but more casual reading suggest in turn that Milton exercised a very different form of shaping influence on him. The resonances of *Paradise Lost* within Darwin’s thinking become audible once he turns his mind to working through the significance of his discoveries from the Beagle voyage soon after his return. But while sometimes they can be heard with clarity, more often they are overheard, and Darwin himself may not have apprehended consciously their presence within his own thinking. As we shall see, it is not Milton’s poem as a whole but certain key moments – in particular the temptations of Eve in books IV and V and book IX – which exert pressure on his imagination as he works to formulate

his own evolutionary worldview, yet that worldview itself would emerge as the most comprehensive and ultimately final refutation of Milton’s epic vision of the creation as a whole.

26. The first of the three direct references to Milton to survive from the Beagle voyage is a diary entry. On October 24, 1832, Darwin described the phosphorescence of the sea between Bahia Blanca and Montevideo, remarking that “It was impossible to behold this plain of matter, as it were melted & consuming by heat, without being reminded of Miltons [sic] description of the regions of Chaos & Anarchy” (*Beagle Diary* 111). Exactly a month later, on November 24, he wrote to his Cambridge mentor John Henslow about “one little toad” he had found near Bahia Blanca:

I hope it may be new, that it may be Christened “diabolicus”.—Milton must allude to this very individual, when he talks of “squat like [a] toad”, its colours are by Werner, *ink black, Vermillion red & buff orange*.⁵

The third reference is the most enigmatic, comprising simply the word “Milton” sandwiched between the words “Blacking” and “Clothes” in a page of a notebook that Darwin used in May 1835 when staying in and around Coquimbo in Chile (*Notebooks* 480). Together, these notes confirm that Darwin did indeed read Milton on several occasions during the voyage. The first two, which allude to books II (ll. 890-916) and IV (l. 800) of *Paradise Lost*, suggest that he may have been reading the first third of the poem through in late 1832; the third indicates that *Paradise Lost* was in his pocket again two and a half years later.

27. Beyond this limited corroboration of Darwin’s later claim, the most striking thing about Darwin’s direct allusions to the poem from 1832 is that they both invoke the darker, satanic side of the poem. Satan is admitted by Sin to the turbulent, undifferentiated world of primeval Chaos, while the toad is one of the forms he takes in Paradise. Milton’s Satan does not seem to enter at all into Erasmus Darwin’s engagement with *Paradise Lost* – indeed, he is noticeable only in his absence. That Charles Darwin should be more drawn to Satan is a sign of his times. The Romantic interpretation of the poem, which casts Satan as its hero is well known. Among recent Milton scholars, John Leonard (2: 415-19) and Neil Forsyth (75-76) have documented the growth of this interpretation in the years before the Beagle voyage. Public articulations of this argument that Darwin may have known include Hazlitt’s *Lectures on the English Poets* (1818); the preface to Shelley’s *Prometheus Unbound* (1820), which was included in the 1829 Galignani edition of the collected poetry of Coleridge, Shelley and Keats referred to in

Darwin’s notes (Beer, “Darwin and Romanticism” 7); and Macaulay’s essay “Milton,” which appeared in the *Edinburgh Review* in August 1825, the most recent issue at the moment when Darwin himself arrived in Edinburgh to begin his medical training. The infernal aspects of Milton’s writing were a common resource too for early nineteenth-century geologists reaching for analogues in Milton to describe unfamiliar scenes and creatures. Charles Lyell (408-9) and Henry Bennet (303) helped their readers to visualise volcanic landscapes through allusions to Milton’s Hell, for example, while William Buckland characterised a new species of pterodactyl as “like Milton’s fiend” (“On the Discovery” 219) who “With head, hands, wings, or feet, pursues his way, / And swims, or sinks, or wades, or creeps, or flies” (II, 949-50) across the realm of Chaos.⁶

28. As Newlyn has shown, Romantic readings of *Paradise Lost* tended to amplify the questions Milton raises at the expense of the theological certainties into which he seeks to resolve them. The Romantics’ famous emphasis on Satan’s role in the poem, she argues, is not indicative of “ideological certitude, but of moral and political *angst*” (7). What goes for morality and politics goes for natural history in Darwin’s case. Although Lyell and Buckland joined in the Romantic fashion for Milton’s Satan, they use *Paradise Lost* as an imaginative aid to science, without implying anything unorthodox. Indeed, Buckland even quoted his own account of the satanic pterodactyl in his contribution to the Bridgewater Treatises (*Geology and Mineralogy* 1: 224), showing that references to Milton’s fiend were perfectly compatible with the pursuit and promotion of natural theology. The difference between Buckland’s allusion to Satan and Darwin’s comes into focus, however, when we look at how Darwin reframed his account of the diabolical toad in the first of his references to Milton in his published work, in the *Journal of Researches*, better known as *The Voyage of the Beagle*, which came out in 1839:

Amongst the Batrachian reptiles, I found only one little toad, which was most singular from its colour. ... If it is an unnamed species, surely it ought to be called *diabolicus*, for it is a fit toad to preach in the ear of Eve. (114-15)

In returning to the toad, Darwin reveals the significance of the quotation from Milton in his letter to Henslow. Satan takes the form of a toad when he first tempts Eve, whispering in her ear so as to appear to her in a dream.

29. It is striking that Milton’s Devil should have resurfaced in Darwin’s imagination when he revisited this toad, writing more than four years after he had first seen it. In Eve’s dream, she is

woken by a voice. Going to see if she can find Adam, she finds herself at “the tree / Of interdicted knowledge” (v, 51-52), where she sees an angelic figure, who addresses the tree itself:

And O fair plant, said he, with fruit surcharged,
Deigns none to ease thy load, and taste thy sweet,
Nor god, nor man; is knowledge so despised? (v, 58-60)

This is one of several moments in the poem when Satan queries God’s prohibition against eating the fruit of the Tree of Knowledge. Soon after he first arrives in Eden, he overhears Adam rehearsing this prohibition to Eve. Satan’s soliloquy in response is contemptuous:

One fatal tree there stands of knowledge called,
Forbidden them to taste: knowledge forbidden?
Suspicious, reasonless. Why should their Lord
Envy them that? Can it be sin to know,
Can it be death? And do they only stand
By ignorance, is that their happy state,
The proof of their obedience and their faith? (IV, 514-20)

Satan’s motives are malign, yet his indignation at the insistence that humankind, or anyone, should remain dutifully and thus wilfully ignorant rings true.

30. In book IX, Satan again tempts Eve with the promise of knowledge. Now in the guise of the serpent, he claims to have eaten the fruit of the Tree of Knowledge – addressed here as “O sacred, wise, and wisdom-giving plant, / Mother of science” (IX, 679-80) – and thereby acquired a “capacious mind” with which he has “Considered all things visible in heaven, / Or earth, or middle, all things fair and good” (IX, 603-5). These speeches of Satan’s must have been particularly piquant for Darwin. On the one hand, Satan is deliberately seeking to bring about the Fall. He coaxes Eve – and through her humanity as a whole – to taste the fruit and so gain knowledge of evil as well as good, suffering the consequences in the expulsion from Eden and the curse of mortality. When Eve sees Satan pluck the fruit in her dream she tells Adam that “damp horror chilled” (v, 65) her, and when Adam learns that Eve has succumbed to temptation “horror chill / Ran through his veins” (IX, 890-91). These phrases seem to have resonated for Darwin. His only other direct reference to Milton in his published writings is in *The Expressions of the Emotions in Man and Animals*, published in 1872, forty years after his

encounter with the diabolical toad.⁷ Here he comments that “He who dreads, as well as hates a man, will feel, as Milton uses the word, a horror of him” (304-5), associating that horror with a sensation of intense cold (307), as Milton does in these two moments in particular. There is a parallel here with Darwin’s own horror of publication, which kept him from disclosing his theory for twenty years.

31. On the other hand, taking the tree of knowledge to stand as a symbol for material knowledge as well as moral knowledge, the insistence that humanity curtail its intellectual ambitions, abstain from independent investigation and settle for “ignorance” was as untenable to Darwin as it is to Satan, or indeed to his fellow devil Belial, who demands, even in the pit of Hell, “who would lose, / Though full of pain, this intellectual being, / Those thoughts that wander through eternity...?” (II, 146-48). Satan’s characterisation of the Tree of Knowledge as the “Mother of science” connects the moral crux of the Fall to Darwin’s own investigations, as the word “science” had begun, by Darwin’s moment, to resolve itself into its current meaning, substituting for the earlier term “natural philosophy,” as in the British Association for the Advancement of Science, founded in York in September 1831, three months before the *Beagle* set sail. In *Paradise Lost*, Raphael explains the restrictions set by God on Adam’s desire for knowledge, demanding he keep it “within bounds” (VII, 120) and insisting “beyond abstain / To ask, nor let thine own inventions hope / Things not revealed” (VII, 120-22). In these words, Raphael underscores the limit set to science by the doctrines of religion. Satan, by contrast, repeatedly contests the received wisdom of the angels. Leonard identifies Edward Paxton Hood’s *John Milton: The Patriot and the Poet* (1852) as the first critical study of Milton to cast Satan as an intellectual whose besetting sin, and the temptation he offers, lie in his refusal to restrain the impulse to enquire (2: 422-24). Hood’s interpretation of Satan is prefigured, however, in Lord Byron’s sequel to *Paradise Lost*, the closet drama *Cain*, which Darwin read in February 1840 (“Books to be read” and “Books Read” notebook 7v from back), and possibly earlier, as Byron was one of his favourite poets as a young man (*Autobiographies* 84). Byron’s play is informed by the French palaeontologist Georges Cuvier’s account of prehistory as a succession of distinct creations erased by successive catastrophes. In an extraordinary cosmic tour through space and time, Lucifer – the light-bringer, Byron’s more ambiguous name for Satan – shows Cain the prior creations destroyed by God, calling into question both man’s significance and God’s benevolence. Cain calls the Tree of Knowledge “the tree of science / And sin” (I, 444-45), but Lucifer will not allow that the exercise of reason is a fault, insisting

“let it not be over-sway’d / By tyrannous threats to force you into faith / ’Gainst all external sense and inward feeling” (II, ii, 460-62). Again, these are words, which resonate with Darwin’s own predicament. Even before he meets Lucifer, Cain refuses to accept his parents’ “One answer to all questions, ’twas his will, / And *he* is good.” (I, 75-76), anticipating the persistent argument in *On the Origin of Species* that the claim that created nature is as it is because it pleased God to make it so is insufficient explanation.

32. In *The Temple of Nature*, the nymphs attendant on Urania – the same Muse that Milton invokes in book VII of *Paradise Lost* – visit the “Tree of Knowledge” (II, 440) and offer the Muse “The now no longer interdicted taste” (II, 442). Erasmus Darwin defies both Milton and his God in this passage, refusing to accept that knowledge of the natural world should be disallowed merely because it does not agree with revealed religion. For Charles Darwin, the problem of how to respond to limits imposed on scientific enquiry by the prior assumptions of revealed religion was intensified by a more fraught relationship to Christian belief, both personally, in the matter of his own faith, and professionally, at a time when the English scientific establishment and his own education were dominated by Oxbridge natural theologians. In his *Cours de Philosophie Positive*, Auguste Comte proposed that scientific thinking developed through three stages, from the theological through the metaphysical to the condition of positive knowledge. On reading Comte in October 1838, Darwin noted with frustration “Zoology itself is now purely theological” (Notebook N 12).⁸ As he gradually emancipated himself from the constraints of theology, Darwin developed his own evolutionary understanding of zoology which bears multiple traces of Milton’s poem, both in its structures of thought and, at rare but revealing moments, in its articulation of those structures.
33. In July 1837, on finishing the *Journal of Researches*, Darwin opened a notebook, marked B on the cover, in which he began to work through his thoughts on transmutation. He called it “Zoonomia,” in a clear homage to his grandfather. Several ideas that Darwin broaches in this and subsequent notebooks are prefigured in *Paradise Lost* in the thinking of Milton’s devils. According to Milton’s God, each creature is made to be fitted for its own element. Hence, when he presents the animals to Adam for naming, he has to excuse the fish their absence on the grounds that “they cannot change / Their element to draw the thinner air” (VIII, 347-48). Early on in his theorising, Darwin rehearses Milton’s biblical account of the creation of life in the seas, air and land, remarking that “The Creator has made tribes of animals adapted pre-eminently for each element” (Notebook B 45).⁹ Later, however, though still within the same

notebook, he argues that “Every species is due to adaptation & hereditary structure” (225). The possibility that a being’s inherent structure might be modified over time to adapt to new conditions is imagined within Milton’s poem, but not by the Creator. In the council in Hell, Mammon anticipates that over time the devils may themselves adapt to their new element of fire:

Our torments also may in length of time
Become our elements, these piercing fires
As soft as now severe, our temper changed
Into their temper. (II, 274-77)

The fires of Hell are at once the element which the devils inhabit and, internalised as their torments, a component part of themselves. According to Mammon’s logic, adaptation is not a given condition but a process, as it becomes within Darwin’s own theory.

34. As Darwin reimagines nature in the devils’ terms, so he recasts key players within Milton’s Christian mythology in debased forms. Adam, “our first father” (IV, 495), returns in Darwin’s “Zoonomia” notebook as “the father of mankind” (231), now merely the prospective fossil of an antecedent type. Perhaps the most surprising evidence of Darwin’s thinking on evolution taking shape through a dialogue with Milton lies in the presence of angels in the “Zoonomia” notebook. Darwin claims that “If all men were dead, then monkeys make men. — Men make angels —” (169). Towards the end of the notebook, he returns to this same idea. By now, he has recognised that “monkeys will never produce man, but both monkeys & man may produce other species.” Nonetheless, “physical changes” and possibly the acquisition of “intellectual being” might lead to “other species or angels [being] produced” (214-15). That Darwin is considering the evolution of man into angels here suggests that his own biology is itself residually theological at this stage. But his theology is decidedly unorthodox. Firstly, it decentres humanity, as we become a temporary product of an evolutionary process that may produce something much like us again, “some intellectual being though not man,” as he put it in his next notebook (C 74). Secondly, it reimagines angels not as distinct created beings but rather as humanity’s own potential destiny, an imagined biological type in some unspecified sense equivalent to God’s first, higher spirits in Milton’s poem. During the war in Heaven in *Paradise Lost*, the seraph Abdiel challenges Satan “Shalt thou give law to God ... / ... who made / Thee what thou art?” (v, 822-24). Satan replies by calling this very act of creation into question:

That we were formed then sayst thou? ...

... who saw

When this creation was? Rememberest thou

Thy making, while the maker gave thee being? (v, 853, 856-58)

Leonard has noted that “Satan’s rebuttal of Abdiel is strongly prophetic of Darwin” (2: 423), but Darwin knew that Satan posed this question. In his “Zoonomia” notebook, he answers it directly in the negative. Angels were not formed in an act of creation, he implies, but may yet be formed through a process of evolution – a process of evolution giving rise, in Belial’s resonant phrase, to “intellectual being.”¹⁰

35. In Darwin’s early notes, we humans have the prospect that our descendants may become angels. This possibility is raised by Milton too, in two different contexts. According to Raphael, it is a prospect enjoyed by unfallen humanity, who may, “perhaps / ... turn all to spirit, / Improved by tract of time, and winged ascend / Ethereal” (v, 496-99). In proposing this, Raphael is rehearsing what he has learnt from God, whom he quotes as declaring his intent to allow humanity to “open to themselves at length the way / Up hither” to Heaven (vii, 158-59). For his part, in tempting humanity, Satan offers to shortcut this lengthy process, making humanity’s potential to become angels literal and explicit. Whispering in her ear, he invites “fair angelic Eve” (v, 74) to eat the fruit of the Tree of Knowledge which, he says, is “only fit / For gods, yet able to make gods of men” (v, 69-70). Both he and God use the term “gods” to refer to the angels, fallen or otherwise. Later, in impersonating a serpent that has gained human abilities by eating the fruit, Satan fraudulently models an equivalent transition, duping Adam into deducing that humans could in the same way:

attain

Proportional ascent, which cannot be

But to be gods, or angels demigods. (ix, 935-37)

Reading the poem literally, it would seem that both Satan and God are lying, Satan because his aim is to bring about the Fall of Man, God because he must know that it will not be through their own merit that human beings will achieve an angelic condition, but through the sacrifice of the Son. Giving God the benefit of the doubt, it may be that he is speaking the truth in a form that is open to misinterpretation by Raphael, and that what he is in fact referring to is the efforts of fallen humanity to redeem itself through following the teachings of Christ and humankind’s posthumous redemption in the Apocalypse. For Darwin, however, as Satan promises, humans

can attain to the condition of angels in this world, not the next – a tantalising possibility held out by the evolutionary process itself.

36. This trajectory from monkey to human to angel suggests that, at its inception, Darwin’s concept of evolution was more teleological as well as theological than it would later become. Even in the “Zoonomia” notebook he is increasingly careful not to imply that the evolution of angels is an inevitability. Darwin’s angels nonetheless hint that he was projecting the moral growth of the species through evolution in very similar terms to those that Tennyson was developing at much the same time through the successive lyrics of his poem *In Memoriam*.¹¹ The angels very soon disappear from Darwin’s notes, but the Devil continues to haunt him. As we were briefly set to become angels in some distant future, so Satan becomes incorporated into our evolutionary past. In a notebook started in 1838, later titled “The Book full of Metaphysics on Morals & Speculations on Expression,” Darwin remarks “Our descent, then, is the origin of our evil passions!! — The Devil under form of Baboon is our grandfather!” (Notebook M 123) Milton’s Satan, the inveterate shape-shifter, is here imagined taking yet another form. In casting the Devil as a Baboon and our own ancestors as the Devil, Darwin reinforces his view that the evolutionary trajectory is, in our case, also a moral and intellectual trajectory, yet in Milton’s world this view is itself Satanic.
37. Given the close company Darwin was keeping with Milton on the Beagle voyage, Satan and the other devils’ insistent questioning of the prohibition against knowledge in *Paradise Lost*, and of the presumption that nature is the product of deliberate acts of creation, must surely have been a significant stimulus to his own interrogation of nature’s processes. Several components of Darwin’s evolutionary theory itself – the rejection of special creation, adaptations, the fleeting prospect that men might become angels just as monkeys had become men, above all the refusal to keep his pursuit of knowledge within the parameters set by religious authority – are to be found in the epic poem he read repeatedly just before he began to devise it, during the voyage which was so formative for all his subsequent thinking. All of them are attributed by Milton to devils, and Darwin was well aware that his conception of nature was, at least potentially, diabolic. In *Cain*, the upshot of the hero’s encounter with Lucifer and his questioning of received narratives is that he murders his own brother. On January 11, 1844, Darwin famously wrote to Joseph Hooker that admitting to a belief that species were not immutable was “like confessing a murder.” Yet neither Cain’s murder of Abel nor Darwin’s own murder of the

immutability of species disproves Satan/Lucifer’s arguments for freedom of enquiry, nor the conclusions they draw from them, even if they seem to discredit them on moral grounds.

38. In the period when Darwin was working up his theory for publication, he would again find himself thinking of the Devil. On July 13, 1856, he remarked to Hooker in another well-known letter “What a book a Devil’s chaplain might write on the clumsy, wasteful, blundering low & horridly cruel works of nature!” Four years later, on August 8, 1860, he jokingly signed off a letter to T. H. Huxley “My good & kind agent for the propagation of the Gospel i.e. the Devil’s gospel.— Ever yours C. Darwin”. Huxley returned the compliment a decade later still, addressing Darwin on June 22, 1870, as “oh Coryphaeus diabolicus”, the leader of the devilish chorus. In *On the Origin of Species*, however, Darwin was assiduously careful not to play the role of the Devil’s chaplain, striving to offer a hopeful counter-vision to Milton’s falsified Paradise and the bleak cynicism of Byron’s Lucifer. Darwin’s account of the processes of creation is indebted to Milton’s Satan, not his God, yet he scrupulously performs the role of one for whom the mission of science is to discover “the laws impressed on matter by the Creator” (488). His Nature, who, as he admitted to Hooker, is every bit as red in tooth and claw as Tennyson’s, emerges in his book as a benevolent demiurge which, through natural selection, “acts solely by and for the good of each” (201).
39. If these moves seem like compromises or evasions, Darwin’s reimagining of the Tree of Life as an emblem of the evolutionary process is a much more positive act of myth-making. As Gillian Beer (*Darwin’s Plots* 33, 247n) and Fiona Stafford (295-96) have both noted, Darwin appropriates the Tree of Life too from Milton, turning it into a symbol of the common descent of all living things. In Beer’s words:
- Darwin’s problem in relation to the theology of his age is expressed in the image of two contrasted trees – life versus knowledge. In his argument and its expression he found a means of condensing this image so that the two opposed trees could prove to be one. (33)
40. The Tree of Life would eventually become the emblem of the vitality, as opposed to the brutality, of Darwinian nature, yet in wresting it from Milton’s grasp Darwin had first to do violence to the image. Where Erasmus Darwin revived Milton’s Tree of Knowledge, imagining its “widening boughs” (II, 440) “emerging from its ancient roots” (II, 439), Charles Darwin saw decay at the heart of his Tree of Life, its base “utterly rotten & obliterated in the course of ages” (Notebook C 152). Like his grandfather, Darwin is working with Milton’s

imagery and his vocabulary to create a new conception of nature, which stands in opposition to that of Milton’s God. But where Erasmus Darwin converts his own vision of evolution into a positive counter-myth in his poetry, Charles Darwin, at least while his prose remains private, can imagine and confront a stark reality in the place of the Edenic ideal.

41. While Milton and the Bible provide the name and the idea of the Tree of Life, the ultimate source for the form it would come to take in Darwin’s imagination is the body of Norse mythological writing known as the *Eddas* – not an epic in its own right, but both a source for and an analogue to the national epics that emerged across Europe in the nineteenth century. There is no reason to believe that Darwin knew these texts directly, but he did encounter them at one remove through the writings of Thomas Carlyle.¹² Darwin’s “Books to be read” and “Books Read” notebook (4v, 6v, 11r, 14r, 18r from back), which he kept from the late 1830s until 1851, reveals that from 1839 to the mid-1840s he was an assiduous reader of Carlyle. Among other books, he read *On Heroes and Hero-Worship* in February 1841 and *Past and Present* in May 1843. As Jude Nixon has discussed, in both these books Carlyle invokes Igdrasil, the Tree of Existence in Norse mythology, as a symbol of all living things and all lived experience. Carlyle’s revitalised myth will have helped Darwin himself to reimagine “the great Tree of Life, which fills with its dead and broken branches the crust of the earth, and covers the surface with its ever branching and beautiful ramifications” in *On the Origin of Species* (130). In this crescendo at the end of Chapter IV, Darwin offers his readers something to believe and trust in, a new myth to replace Milton’s Tree of Life, lost to humanity at the Fall, as his grandfather had reclaimed his interdicted Tree of Knowledge.¹³
42. The imaginative power of Darwin’s Tree of Life was recognised early in mythic poems by his younger contemporaries. In his late Romantic “Ode to the Spirit of Earth in Autumn” (1862), George Meredith would ask “Great Mother Nature” to “Teach me to feel myself the tree, / And not the withered leaf” (141, 154-55).¹⁴ In “Hertha” (1871), Algernon Swinburne would revive an ancient Germanic goddess, attested to by Tacitus, as a personification of the life-tree, with human beings among her flowers, leaves and fruit.¹⁵ In *Sigurd the Volsung* (1876), William Morris would make the Branstock, the great tree at the centre of the Volsungs’ hall, a key symbol of life and continuity within an epic poem in which human animality, symbolised by the taking on of a wolf’s skin, is a central theme. Darwin’s own dialogue with Milton’s epic reached its own conclusion in his most heterodox book. The toad which first prompted Darwin to think of Milton’s Satan in ways that would spark evolutionary speculations returns in *The*

Descent of Man, and Selection in Relation to Sex. There is still something remarkable, even monstrous, about it, with its “body as black as ink ... spotted with the brightest vermillion,” as we are told that it “crawled about the bare sandy or open grassy plains of La Plata under a scorching sun.” “These colours,” Darwin continues, “may be beneficial by making this animal known to all birds of prey as a nauseous mouthful” (2: 25-26). The toad is still poisonous but, far from its poison corrupting humanity, it now saves its own life. Evil has become good. As well as redeeming the toad from Milton’s Satan, he redeems the baboon from his own Devil. In the penultimate paragraph of his book, Darwin writes that he would be as happy to be descended from one “old baboon” that, as he tells us, heroically rescued a younger animal from a pack of dogs, as from a brutish savage “haunted by the grossest superstitions” (2: 404-5). Human morality is not the providential gift implied by anthropocentric religions; instead, it has its roots in our connection, down the branches of the Tree of Life, to other animals who deserve our moral respect.

43. In *The Descent of Man*, Darwin at last offers a complete picture of our place in nature that squarely rejects, as Erasmus Darwin had done, the epic of creation as told by Milton. The origins of his own conception of nature in his reading of Milton’s poem nearly forty years earlier are barely visible now, mere vestigial traces of an earlier stage in the evolution of his ideas. In naturalising the toad and the baboon, he seems at last to lay the Devil to rest. But even here Darwin cannot fully part company from his Satanic mentor, as his final peroration reveals: we must acknowledge, as it seems to me, that man with all his noble qualities, with sympathy which feels for the most debased, with benevolence which extends not only to other men but to the humblest living creature, with his god-like intellect which has penetrated into the movements and constitution of the solar system – with all these exalted powers – Man still bears in his bodily frame the indelible stamp of his lowly origin. (2: 405)

44. In planning the Fall, Satan sets out his aims:

Hence I will excite their minds
With more desire to know, and to reject
Envious commands, invented with design
To keep them low whom knowledge might exalt
Equal with gods... (IV, 522-26)

Behind Darwin’s celebration of humanity’s ascent from our “lowly origins” to a “god-like intellect” with “exalted powers” stand Milton’s Satan and his compatriot Belial too, committed

to letting his thoughts wander through eternity whatever the cost. For Satan, this knowledge will lead to death: “aspiring to be such,” he continues, “They taste and die: what likelier can ensue?” (IV, 526-27) Darwin’s worldview requires its own acceptance of our animal mortality, with no privileged access to the divine. Like the slave whispering to a Roman emperor that even in his triumph he is not immortal, Darwin closes his book not on our exaltation but on our indelible lowliness.

* * *

45. As this essay has shown, evolutionary theory took shape in England through the Darwins’ complex and sustained engagements with epic poetry. By mobilising the formal and allusive qualities of the epic tradition, Erasmus Darwin was able to substitute for Milton’s creationism a scientific worldview that was essentially Ovidian, in which mutability was a fundamental fact of nature and metamorphosis the engine of creation. His choice to do so in a poem allowed him to realise his vision of evolution as an epic in its own right. Sadly, its rarefied poetics have left *The Temple of Nature* stuck in something of a scientific and cultural cul-de-sac. Charles Darwin knew his grandfather’s poetry, but it was Milton’s to which he responded more intensely and creatively. In Byron’s play, Lucifer remarks to Cain “Fear not – without me thou / Couldst not have gone beyond thy world” (II, i, 204-5). Darwin’s reading of *Paradise Lost* was instrumental in seeding the questions he would ask of nature during and immediately after the Beagle voyage, and in hinting towards many of the answers he would eventually give. Although he no doubt could have gone beyond his previous view of the world without the stimulus given by Milton’s Satan, the fact remains that he read Milton keenly at this crucial period in the development of his ideas and that he was alert to Satan’s temptations and the promise of knowledge he offers. A counterfactual history, which excluded Milton from Darwin’s inner world, would be false to the imaginative processes which led to the formation of the theory of evolution by natural selection as Darwin articulated it and as we have inherited it.
46. Epic literature has been a fertile source of ideas and images for evolutionary science. Erasmus Darwin’s evolutionary worldview emerged through a dialogue in his reading and his writing between three prior epic poets, Milton, Lucretius and Ovid. Charles Darwin’s mature writings on evolution bear the impress of his earlier reading of Milton again, and of his awareness, through Carlyle, of myths derived from Norse heroic and cosmological poetry and prose. More

recent instances include James Lovelock’s revival of the ancient goddess Gaia – a key figure in Hesiod’s *Theogony* and the addressee of one of the Homeric Hymns – as the personification of the Earth as a self-regulating system, and Mike Morwood’s imaginative apprehension that a new diminutive hominid he has discovered, *Homo floresiensis*, was a real-world analogue to the hobbits from J. R. R. Tolkien’s epic fantasy *The Lord of the Rings*.¹⁶ In all cases, the epics existed prior to their incorporation into evolutionary theory and history, while evolution itself came to be imagined as and through mythology, becoming a counter-epic in its own right. To understand fully the emergence of scientific theories, then, we need to consider the literary sources in play in their inception and their articulation, just as, when studying literary texts, we now habitually consider them alongside their scientific sources. Detailed intertextual reading is often the only way to tease out the significance of these interplays between literature and science, as direct references are often thin at best, as with Charles Darwin’s reading of *Paradise Lost*. One objective of such reading is to place these literary sources back into the history of science, but there is another. Setting epic poetry alongside evolutionary theory to uncover the cross-fertilisation and synergies between them enables us to see that evolution has its own myths and that mythic literature offers its own ways of thinking through the meanings of evolution. From *The Temple of Nature* and the Beagle voyage to Gaia theory and the discovery of the “hobbit,” epic literature and the myths it recreates have had and still have a profound impact on how we understand the evolution of ourselves and the planet we live on.

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¹ For discussions of the “evolutionary epic” as a form of nineteenth- and twentieth-century scientific popularization, see Amigoni and Elwick; Hesketh; Lightman 219-94; and O’Connor, “From the Epic of Earth History.” On Erasmus Darwin as a contributor to this genre, see Griffiths 54-55.

² Darwin’s modern critics disagree over how apt the term “epic” is to his poetry. For Harris, his three major poems – *The Botanic Garden*, comprising *The Economy of Vegetation* and *The Loves of the Plants*, and *The Temple of Nature* – together form a single “enlightenment epic.” For Griffiths, *Zoonomia* reveals *The Botanic Garden* to be a coherent epic and is itself a foundational text for Secord and Lightman’s prose genre of the evolutionary epic, while *The Temple of Nature* is a “mature epic” in its own right, albeit one that struggles to resolve what Griffiths sees to be the tension between “the unitary narratives of the epic” and “the diversity of natural forms” (54-55). For Priestman, by contrast, “epic” is an “unhelpful” term for discussing “Darwin’s vast poems” because of “their almost complete lack of narrative drive” (*Poetry* 27). I will be showing how *The Temple of Nature* specifically lays claim to and enacts its own place in the epic tradition.

³ Following Julia List’s research for her unpublished doctoral dissertation *Erasmus Darwin and the Poetry of Science*, U of Melbourne, 2011, Priestman notes that Darwin’s poetry also engages with a strand of anti-Lucretian didactic poetry from earlier in the eighteenth century, written in couplets and typified by poems on an epic scale such as Richard Blackmore’s *The Creation* and Henry Brooke’s *The Universal Beauty* (*Poetry* 26).

⁴ In his Editor’s Note to l. 293, Priestman notes in corroboration “In *Economy of Vegetation* Additional Note XXXIX, the naturalist to whom Darwin attributes this idea is only identified as an acquaintance.”

⁵ Letters from and to Darwin are cited from the *Darwin Correspondence Project*. The reference here to Werner is to the German geologist Abraham Gottlob Werner, whose colour scheme, originally devised for describing minerals, was adapted for the arts and sciences more generally by the painter Patrick Syme. The Beagle’s library included a copy of the second edition of Syme’s *Werner’s Nomenclature of Colours*, published in 1821. The catalogue of the Beagle library is available online at http://darwin-online.org.uk/BeagleLibrary/Beagle_Library_Catalogue.htm [accessed 8 March 2018].

⁶ Adelene Buckland discusses Buckland and Lyell’s engagements with Milton in more detail in *Novel Science* (100-2, 125-26); Katherine Ford discusses William Buckland’s characterisation of the pterodactyl in *The Role of the Royal Society in Victorian Literary Culture* (191-96).

⁷ I am grateful to Gregory Radick for drawing my attention to this reference.

⁸ Excepting the Beagle notebooks, Darwin’s notebooks are cited from *The Complete Work of Charles Darwin Online*.

⁹ Darwin wrote, “adopted,” but the editors of his notebooks online suggest that this was a slip of the pen and that what he meant to write was “adapted.” This reading is persuasive, and I follow it here.

¹⁰ I am grateful to Martin Priestman for pointing out this echo of Milton’s phrasing.

¹¹ For a discussion of how Tennyson conceptualized evolution independently, see Holmes, “Challenge” (43-46).

¹² For a discussion of Carlyle’s role in the emergence of national epics in the nineteenth century in relation to Norse and Germanic sources, see Dentith (64-71).

¹³ Stafford points out that Darwin’s Tree of Life also “removes from the history of mankind both the Apocalyptic promise of a collective ending, and the myth of an original state of perfection” (296).

¹⁴ For a discussion of evolution in Meredith’s “Ode,” alongside Tennyson’s “Lucretius,” see Holmes, *Darwin’s Bards* (245-59).

¹⁵ For discussions of evolution in Swinburne’s “Hertha,” see Holmes, *Darwin’s Bards* (47-49) and “Algernon Swinburne” (28-31).

¹⁶ Lovelock recounts how he adopted the name Gaia for his theory, on the suggestion of the novelist William Golding (3, 240-41); Morwood and van Oosterzee discuss the decision to name *Homo floresiensis* the “Hobbit” (151-53).