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Contents

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About the JLS

The Journal of Literature and Science (JLS) is a peer-reviewed academic journal presently published annually. It is hosted by the Research Centre for Literature, Arts and Science at the University of Glamorgan. Each issue appears online only and is free to access. Each individual essay within an issue is made available in PDF format for download.

The journal is dedicated to the publication of academic essays on the subject of literature and science, broadly defined. Essays on the major forms of literary and artistic endeavour are welcome (the novel, short fiction, poetry, drama, periodical literature, visual art, sculpture, radio, film and television). The journal encourages submissions from all periods of literary and artistic history since the Scientific Revolution; from the Renaissance to the present day. The journal also encourages a broad definition of 'science': encapsulating both the history and philosophy of science and those sciences regarded as either mainstream or marginal within their own, or our, historical moment. However, the journal does not generally publish work on the social sciences. Within these confines, essays submitted to the journal may focus on the literary and scientific productions of any nation or group.

All essays should be interdisciplinary in focus, offering an original view of both the literary or artistic subject matter and the science or sciences under consideration. While essays on individual examples of literary and artistic production are welcomed, these should also seek to show the wider significance of their analyses and interpretations. The journal does not publish essays focused exclusively on literature or art, or exclusively on the history and philosophy of science.

Submission and Citation Information

The JLS invites essays in English of 6000-8000 words in length. Contributors are encouraged to contact the Editor prior to submission, including an abstract of the proposed essay. All manuscripts should be submitted electronically to the Editor-in-Chief, Martin Willis, at mwillis@glam.ac.uk. Manuscripts should be double spaced in 12 point Times New Roman font. Any illustrations should be submitted separately and their placement within the essay clearly indicated. All submissions should follow MLA guidelines (see this issue for an example article). The JLS sends out all manuscripts for peer review anonymously and all Readers' Reports are returned anonymously. The editors aim to return Readers' Reports to authors within 3 months of submission and, wherever possible, to publish all accepted essays within 12 months of first submission.

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Claire McKechnie and Emily Alder, "Introduction": 1-4

Introduction: Literature, Science, and the Natural World in the Long Nineteenth Century

Claire McKechnie and Emily Alder

In the twenty-first century, nature occupies a crucial position in social, environmental, and economic debates about global sustainability. Many of these debates over humanity's relationship with the natural world are not new, but emerged in response to an Enlightenment worldview positing human capacity to control nature through science and technology. The circulation of ideas about the impact of new technologies, the use and misuse of resources and landscapes, and human responsibilities towards the environment and its preservation intensified over the nineteenth century, due partly to the growth of industrialism and the new discourses to which it gave rise. "And what is impossible to science?" asked Friedrich Engels in 1844, arguing against the existence of natural limits in light of human ingenuity (qtd. in Dresner 14). Yet humanity's ability, and its right, to control nature were also debated and questioned over the course of the nineteenth century, a period which saw rapid social, industrial, and scientific change, bringing the natural world to the forefront of the Victorian cultural imagination. John Ruskin's image of clouds as meteorological omens of the effects of modern industrialisation in *The Storm-Cloud of the Nineteenth Century* (1884) encapsulated nature's central function as metaphor as well as the focus of scientific investigation; the natural world itself responded to changing times and a changing Britain. The natural world was intricately bound up with how Victorians thought about themselves and how they related to their social world, to the extent that we can hardly extricate the idea of nature from the idea of the nineteenth-century imagination.

Traditionally, literary studies of nature in the nineteenth century have tended to focus on the Romantic period. As Onno Oerlemans and P. M. Harman have recently shown, conceiving Romanticism as a movement towards the construction of scientific thinking in literature has led to the placement of nature and the natural world at the centre of how we think about the Romantic imagination. Part of the aim of this special issue is to extend this attention to how nature was perceived and imagined to focus on writers in the latter half of the nineteenth and early part of the twentieth centuries. By doing so, the four essays that follow this introduction provide fresh literary and historical context for studies of nature during this period and bring to light the ways in which both well-known and understudied writers engaged with science and nature through the century, from Charles Kingsley to Richard Jefferies and D.H. Lawrence. These essays explore the boundaries between urban and natural, real and imagined, past and present, place and time to reveal the complexities of Victorian and early twentieth century attitudes to the natural environment and how these influenced the popular imagination through fiction.

Scholars of the nineteenth century broadly agree that nature itself is scarcely a fixed or stable concept, existing rather as "multiple, socially constructed and contested 'natures,' each operating from within different, historically specific constellations of social, discursive, and material practices" (Hess 5). As a flexible concept, then, the idea of nature is continually reconstructed in literary texts and is deployed for a range of political and didactic purposes. The essays in this special issue each engage with different formulations of nature in literature, and explore how

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these function within their specific cultural and historical contexts. They show how constructions of nature are bound up within a wider cultural web of concerns and preoccupations drawn from social and scientific developments of the nineteenth century, particularly those relating to industrial progress, imperial expansion, religion, and education.

Over the course of the nineteenth century, science became both a topic and a means of education. As literacy levels and child participation in state education increased, scientific knowledge could be more widely communicated, and helped to stimulate a widespread practical curiosity about the natural world and activities such as fossil collecting or aquarium keeping. However, scientific discoveries and influential publications such as Charles Darwin's *Origin of Species* (1859) also had philosophical implications, construed as questioning human kinship with the animal world and bringing biological materialism into conflict with Christian doctrine. Literature had an influential part to play in exploring these implications and thinking through, for example, their consequences for the role of religion and spirituality in an increasingly materialist modern world. Ruth Murphy's essay argues that children's literature was a genre that particularly lent itself to the didacticism of science in the mid-nineteenth century. Science, she points out, was seen to be morally and spiritually improving and, in literary form, it provided a moral compass for both adults and children. Concepts of nature were shaped and controlled through the generic space that literature and science created in Victorian culture. As Murphy's paper shows, children's literature also played an important role in educating less literate adults, promulgating the reach of nature education beyond the lectures and publications of scientists themselves.

Major scientific debates almost always took place in London and Britain's other major cities, such as the famous confrontation between T. H. Huxley and Bishop Wilberforce. However, the ripples of change and progress eddied far beyond urban centres. Rural communities, far more than city dwellers, while benefiting from new farming techniques and machinery, also confronted a rapidly changing landscape and the prospect of the loss of ancient heritage or traditional practice. Rebecca Welshman's essay examines the binary of past and landscape in the fiction of Thomas Hardy and Richard Jefferies. Writers like Hardy and Jefferies, as Welshman explores, negotiated this ambivalence between progress and tradition, between the permanency of natural features of the landscape and their ongoing transformation.

Certain modernist writers were ambivalent in their attitude towards Victorian literature, seeking to distance themselves from outmoded narrative strategies and systems of thought, including discourses about the natural world. In her article, Sarah Bouttier extends the discussion into the early twentieth century, putting the concept of nature into a Modernist framework. She argues that Lawrence conflates evolution and sequential time by re-conceiving 'presence': both in opposition to 'absence' and in terms of the 'the present' in time. She concludes that we should position Lawrence between Victorian and Modern in that he combines the Victorian conception of evolutionary time with the Modernist desire to express the experience of living through time. Re-evaluating perspectives on the natural world in this way, Bouttier provides a new way of thinking about temporality in literature. The newness of Modernist literary models both demanded and drew upon new models of natural science, including reconsiderations of Darwinian biology and its implications for human existence, as Bouttier's essay explores. D. H. Lawrence, writing in the period between the two world wars, reflects in his poetry a fragility of existence in the present moment quite distinct from mid-Victorian confidence. Such fragility is legible

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within developing twentieth century concerns over the potential destructiveness of modernity, particularly through science, technology, and war, and its impacts on the functionality, biodiversity, or aesthetic value of the natural world.

The ways in which writers of the long nineteenth century imaginatively negotiated such changes and explored the cultural significance of nature remain important because the questions with which they grappled still resonate with twenty-first-century global social and environmental problems. This special issue, appearing at a time of burgeoning interest in ecocritical approaches to literature following an "environmental turn" in literary studies (Buell), highlights ways in which the natural world played an important part in nineteenth-century fictions concerned with education, science, morality, urbanisation, human identity, and with a rapidly modernising world.

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Ruth Murphy, "Darwin and 1860s Children's Literature": 5-21

Darwin and 1860s Children's Literature: Belief, Myth or Detritus

Ruth Murphy

> Everyone found themselves living in a Darwinian world in which old assumptions had ceased to be assumptions, could be at best beliefs, or myths, or, at worst, detritus of the past.
>
> (Gillian Beer, *Darwin's Plots* 6)

In the immediate aftermath of the publication of Darwin's *Origin of Species* (1859), three significant children's literature texts were published: Margaret Gatty's *Parables from Nature* (third series; 1861-64), Charles Kingsley's *The Water-Babies* (1863) and Lewis Carroll's *Alice's Adventures in Wonderland* (1865). The impact of Darwin and evolution on these three texts has been noted and examined, but critical readings tend to neglect one key trope that links these three texts: they are *children's* literature, written and marketed with the child reader in mind. Yet because books for children are generally bought and read by adults before children access them, children's literature inevitably has a dual audience of both children and adults. The texts considered here, which are ostensibly *for* children, are in fact more *about* children, and function to educate both the child and adult reader about what childhood and children are in the wake of Darwinian challenges to popular understanding of nature, the child, and the role of science-based literature. That fiction should reflect and react to contemporary controversies and changes in the construction of the natural world is not surprising, but these three texts do far more than simply register the impact of Darwinian ideas on Victorian society, or seek to explain the correct response to the new ideas to child readers. *Parables from Nature, The Water-Babies* and *Alice's Adventures in Wonderland*, published in quick succession so close to the *Origin*, represent three divergent responses to the Darwin-inspired controversy which was circulating through both scientific circles and the general public. These texts reflect, reinterpret, respond to and help to shape the new ideas of nature and the child, and so exemplify the way that old constructions of nature and the child became, in Beer's words, "beliefs, myths or detritus" in the post-Darwinian world.

Margaret Gatty's *Parables from Nature*, Charles Kingsley's *The Water-Babies* and Lewis Carroll's *Alice's Adventures in Wonderland* all used children's literature as an arena in which to explore the changing construction of nature in a post-Darwinian world. Gatty and Kingsley attempted to use the medium to take control of what nature means, and to educate the reader in what the texts present as the correct way to respond to the Darwinian controversy. Gatty used children's literature as a socially acceptable medium to challenge the arrogance and materialism she saw in Darwinian evolutionary theory, and to appeal to her readers to trust in religious faith and continue to embrace traditional constructions of nature as evidence of God. Despite her insistence on the importance of belief, however, the new theories implicitly change the text's construction of childhood, subverting the overt didactic message of her evangelical text. Kingsley also used children's literature to try to educate the reader about how to respond to evolutionary ideas, but turns to fantasy to provide a new myth, integrating Christian faith with Darwinian evolution, and redefining the child as recapitulative. However, the text remains ambivalent about the relationship between religion and science, and becomes focused more on explaining

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childhood to the (adult) reader than science to the child. In contrast, Carroll did not respond directly to the evolutionary debate, and *Alice* does not try to dictate the reader's response to evolution, but instead assumes that the science-religion debate has rendered old constructions of nature and the child redundant, or "detritus," as Beer suggests. Carroll used children's literature as a space to explore the implications and possibilities of a post-Darwinian understanding of nature and childhood. Yet in doing so, Carroll's text creates a new construction of the child, suggesting that the text is not, in fact, aimed at children or explaining science, but is explaining children and childhood to adult readers. These three texts respond very differently to the scientific controversy of the 1860s, but by turning to children's literature as a medium for their responses, they all address fundamental issues raised by Darwin and evolutionary theory: what is nature and what is the child? And how should nature be used to educate and understand the child in the post-Darwinian world?

Science and Children's Literature in the Nineteenth Century

While Robert Chambers' *Vestiges of the Natural History of Creation* had ignited controversy and introduced evolutionary ideas into non-scientific society in 1844, it was the storm of discussion, debate and denial that followed Darwin's theory of natural selection described in the *Origin*, and its revelation of a violent, chaotic and uncaring nature, that irrevocably changed the way the Victorians thought about humanity, animals and the natural world (Bowler, *Evolution*). [1] Bowler argues that the *Origin* "ignited the debate that converted the scientific world, and everyone else, to evolutionism" (*Non-Darwinian Revolution* 47). The *Origin* itself was carefully ambivalent, focusing entirely on animal development without reference to humanity; however, scientific and public debate focused on human evolution from apes, and the ethical problems of reconciling a brutal, indifferent nature with a benevolent and omnipotent God (Bratchell 71). The Huxley-Wilberforce Oxford debate in 1860 and T.H. Huxley's long-running battle with Richard Owen over the exact relationship of humans to the higher primates through the early part of the decade kept the public focused on the problem of human descent, while the more conservative religious groups argued that accepting the new materialistic theories of nature would lead to social collapse, as there could be no morality in a world where divine laws were questioned (Desmond and Moore 492-499; Cosans 52-58; Bratchell 70-79). "From the start," Bowler argues, "the theory was a religious, philosophical, and ideological battleground, and the scientific debates can be understood only in this context" (*Evolution* 177). Equally, the literary reaction to the Darwinian controversy can only be understood by realising that science and literature were inextricably intertwined, and already functioning as a space in which the popular understanding of science and nature could be shaped and controlled. Children's literature was no exception, and played an important role in terms of educating children to receive and respond to the new scientific ideas.

Literature provided a popular arena where scientific debate flourished, both about the truth and implications of a given theory, but also about the nature of science and fiction, and what was appropriate for each (Paradis and Postlewait xii). The 1850s and 1860s represent a mid-point in the Victorian appreciation of science.[2] By the end of the century the intellectual elite would claim science as a profession, with its own language and cultural context, but in the middle of the century science remained accessible to the general public as a fashionable and respectable interest (Lightman, *Victorian Popularizers* 2). Science – specifically, nature studies – was also recommended as a good topic for children to study, as it provided a practical

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education, virtuous recreation and also, through natural theology, an appreciation of Christian faith (Fyfe 282). Science seemed the perfect hobby for children: it encouraged outdoor activity, rational thought and was morally and spiritually improving. In the early nineteenth century, scientific texts for children that combined factual knowledge with moral instruction flourished, such as Sarah Trimmer's *Easy Introduction to the Knowledge of Nature, and Reading the Holy Scripture, Adapted to the Capacities of Children* (1780), Priscilla Wakefield's *Domestic Recreation; or, Dialogues Illustrative of Natural and Scientific Subjects* (1805), and Jane Marcet's *Conversations on Natural Philosophy* (1819), which confidently blended natural theology and natural history in a fictional narrative. These texts described and explained natural phenomenon but packaged their educational and moral content in a fictional frame (Myers; Lightman, *Victorian Popularizers;* Layton; Lightman, *Victorian Science*; Chapple; Pickering, Jr.). Children's literature in the late eighteenth and early nineteenth century was dominated by an evangelical tradition of overtly didactic literature aimed at teaching proper behaviour and religious faith to the child, who was assumed to be an innately sinful being requiring careful education and discipline (Hunt 48). Children's literature was seen to be formative, teaching the child how to understand and respond to the world, and so represented an opportunity to improve the future by shaping the child reader into a model individual.

However, children's literature was not as distinct in its readership from adult literature as it is assumed to be now. Gillian Avery claims that the writers of evangelical children's literature "seemed to feel the cottager child and parent had the same needs and tastes in literature" (82). Avery notes that although such books often featured a central child character and seem intended for lower class readers, they were often given indiscriminately as prizes for middle class children, or as gifts from servants to their employers. There is an implicit assumption that both child and adult readers of both classes would benefit from the practical and moral lessons found in children's fiction. U.C. Knoepflmacher credits Margaret Gatty with establishing a mode of addressing both the child and adult reader that would be "imitated, complicated and refined" by the fantasy writers who established the 'Golden Age' of children's literature (502). Although children's literature is ostensibly for children, it is written by adults, and is usually marketed to and bought by adults, rather than children (Rose 2). Children's literature must, therefore, address both the child they hope to educate, and the adult who will choose which books to give to the child (Nodelman 5). Children's texts were and are often read by adults before being given to children, to assess suitability, or read directly to children for education or entertainment. In the mid-nineteenth century, the boundaries between adult's and children's literature were less defined than they are assumed to be now, and so what we categorise as Victorian children's literature was often read simply as literature in its own right by adults. Texts for children that explained science, or dealt with the relationship between scientific knowledge and the social and spiritual world, provided a layman's guide to science and faith for scientifically naive adults (Myers; Pickering, Jr). Children's literature therefore provided a wide audience and a space to teach a very specific message in an openly didactic style which may have been contested in adult literature.

Margaret Gatty's *Parables from Nature*

Margaret Gatty was a naturalist, an expert on seaweeds, a correspondent of other famous naturalists of the 1830s and 1840s, and the author of the popular scientific text *British Seaweeds* (1862). She also wrote for and edited *Aunt Judy's Magazine* (1866-

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85) for children, raised a family, including her more famous literary daughter, Juliana Ewing, and found time to write five series of stories under the title *Parables from Nature* from 1855 to 1870. [3] Gatty's *Parables from Nature* are largely forgotten, but were immensely popular through the second half of the nineteenth century. Gatty was a prolific writer in the natural theology tradition, which represented a harmonious, ordered world of nature, with fixed and immutable laws proceeding from God. Natural theology, as exemplified in William Paley's watchmaker analogy, defined nature's complexity as proof of God, with each individual and species carefully designed by God to be perfectly fitted to its environment. This led to nature being regarded as God's book, a world made for humanity's dominion and designed to be read and understood in the same way as scripture. Nature's beauty and abundance existed for the use of God's special creation, humanity, and is organised for human need and appreciation. Natural theology interpreted the spiritual truth behind the material fact of nature for the reader; careful study of nature was believed to reveal evidence of God's wisdom, benevolence, omnipotence, and His immanence in Creation. On first reading, the *Parables from Nature* appear to be exactly what the title suggests, that is, a series of short Christian allegories, using animals, plants and personified natural forces to teach moral and religious lessons to children. Gatty uses accurate information from her own scientific observations to explain Christian faith. For example in 'Not Lost, but Gone Before,' the transformation of a Grub into a Dragonfly and its move from the underwater world to the air above is a metaphor for death and the ascent into heaven; and in 'Authority and Obedience' a discontented worker bee learns that everyone must submit to the rule of authority for their own good and the good of the community. For Gatty, "the instincts of nature confirm the reasoning conclusions of man" (15). To emphasise the link between the two, her allegorical stories are followed by detailed notes explaining which specific species of dragon-fly's larvae and pupae she refers to by 'grub,' or exactly which flower produces poisonous honey, implicitly linking her documented and factual scientific knowledge with her religious inference. Gatty also uses the *Parables* to emphasise proper social behaviour and to endorse the power relations of Victorian society by establishing a natural and beneficial hierarchy: "Animals under man – servants under masters – children under parents – wives under husbands – men under authorities – nations under rulers – all under God" (257).

Suzanne Le-May Sheffield reads the *Parables* as both teaching the reader appropriate moral and religious lessons through natural allegories and also showing the reader how to use their own nature studies to reinforce religious truths, in keeping with the accepted role of a Protestant female populariser of science (47). As a devout believer in natural theology, Gatty was extremely hostile to evolution and decisively rejected Darwin and natural selection. She raged, in her private correspondence, about the arrogance and lack of faith she saw in the *Origin*, viewing it as a challenge to the Bible and irreconcilable with religious belief. Gatty was equally horrified by the support evolutionary theory was gaining in scientific and popular circles, calling it, in her letters to Bell, her publisher, a "great man's *blunder*" and hoping it would be "*found out* by somebody and exposed" (Lightman, *Victorian Popularizers* 156). Gates and Shteir suggest that Gatty felt a responsibility as a religious and moral teacher in her writing for children, and as a committed opponent of scientific materialism and Darwinian theory it is not surprising she turned to her children's literature to express her outrage (14). Gatty chose to use her fiction for children to directly challenge the materialism she saw in evolution, rather than her factual text, *British Seaweeds,* which was published around the same time, as children's literature provided a mixed

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audience of both children and adults. Lightman attributes this choice to Gatty's belief that it was not appropriate for women to speak publicly on scientific issues and especially not to argue against the opinions of male authors, even those who might be perceived as wrong or offensive, such as Darwin (*Victorian Popularizers* 158). Children's literature, however, was an acceptable medium in which women could act as authority figures. As an authorial voice, Gatty was able to express her opinion of both the scientific issues and the male authors she would not challenge in public, and teach an alternative response to the changing perception of nature in society to a varied and responsive audience. Gatty's children's fiction provided a space for her to be more subversive, even as she authorised the hierarchy which excluded her voice from scientific debate.

Gatty's subversive counter-argument to evolution is made explicit in "Inferior Animals," from the third series of *Parables* published in 1861. Gatty wrote to a friend that in this story she had "combated the Darwin presumption as far as I could in a small way," and the narrative is a deliberate denouncement of Darwin and evolutionary science (Lightman, *Victorian Popularizers* 157). In this tale, the narrator dreams that they are watching a parliament of rooks, who have assembled to explain their belief that man is a devolved and inferior rook. The rooks debate "the origin" of man and dismiss claims of human superiority, arguing that humans are physically less able than rooks (27). They posit that "gradual change [. . .] over ages and ages" turned some rooks into inferior humans (32); the story describes at length the ridiculous arguments of the rooks and their dangerously incorrect assumptions, such as their belief that guns do not kill, but rather frighten young rooks into unconsciousness, and that the unharmed rooks are then taken by humans to act as teachers so that humans might re-evolve into birds. But rather than presenting the rook's evolutionary musing as comical or amusingly mistaken, the narrator ferociously condemns their arrogance and ignorance and extols the reader to trust faith over scientific knowledge. It is "arrogant nonsense" (27) for the rooks as "imperfect beings to hope to fathom the higher nature" (33). Gillian Beer points out that in this story, Gatty parodies both the content and the language of Darwin's *Origin*, emphasising the conditional nature of Darwin's syntax and theory and exposing the anthropomorphism hidden in it (130-1). Tess Cosslett reads the rooks as "a parody of human scientific behaviour and pretensions" (148), and comments on how the story revolves around the impossibility of inferior beings comprehending the true nature of superior beings, a theme often explored in Gatty's pre-Darwinian *Parables*.

However, "Inferior Animals" reveals more than Gatty's objections to Darwinian theory. By addressing the evolutionary debate in children's literature, Gatty had access via their parents, to a wide and varied audience of adult readers or listeners, and it is for this audience of doubting and implicitly non-scientific adults that the polemic of "Inferior Animals" and the post-Darwinian *Parables* seems intended. "Inferior Animals" reveals a shift in the construction of the child; whereas the child in the earlier natural theology text was assumed to be fallible and in need of education, here children are identified as more pure and spiritual than the implicitly corrupted adults. There is a tension between the construction of an implied child reader, who is uneducated and therefore at risk of accepting evolutionary arguments, and the narrative construction of a Romantic-inspired heavenly and innocent child within the text who can lead the adult reader back to salvation:

> Who would not be a child again? Reader, can you hear this and remain unmoved, or shall you and I become children in heart once more? Come!

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> own with me how hateful were the lessons which undeceived us from our earlier instincts of faith and sweet companionship with all created things: and let us go forth together, and for a while forget such teaching. (25)

This passage clearly addresses an adult reader, who has been turned from proper "instincts of faith" and must return to an unsullied childhood state in order to absorb the message of the narrator's dream. The child within the text has become so innately pure and spiritual that they are immune to the rook's nonsense. The spiritual child is superior to the doubting adult reader being addressed, which implies that children do not need to read the narrative, unless they have already been corrupted by adult education and are no longer "children in heart." The implied child reader all but disappears from the intended audience of "Inferior Animals" as Gatty strives to convince the adult reader of the importance of maintaining faith in the face of materialistic science. Gatty's religious objections to the materialism she saw in Darwinism have had a startling effect on her construction of the child in her moral children's literature: the sinful child in need of moral and spiritual edification found in Evangelical literature and Gatty's pre-Darwinian *Parables* has been transformed into a spiritual and morally superior child akin to the Romantic child of Wordsworth. As nature and nature studies became a site of doubt, the fictional child becomes a religious redeemer, leading the adult reader from the sin of desiring to be like God in knowledge. The child reader seems to be ignored in favour of an attempt to convince the adult reader to choose faith over science. Gatty's plea for the corrupt adult to return to a childlike state of grace implicitly disrupts the hierarchies she endorses; the concept of childhood constructed in this anti-Darwinian narrative for an adult reader subverts and undermines the didactic message of the child-focused narratives.

Charles Kingsley's *The Water-Babies*

Although Gatty's *Parables* continued to be published and widely read until the end of the nineteenth century, her writing represents the end of a tradition of confident natural theology in scientific texts for children. But where Gatty felt compelled to defend her theological belief against scientific advancements, Charles Kingsley balanced his belief in evolution with his religious faith. Kingsley believed that natural theology and evolutionary theory were reconcilable, by rewriting the evolutionary process as proceeding from God, with science demonstrating how nature worked, and Christian faith explaining why struggle and conflict were necessary in the world. As the canonical first 'Golden Age' fantasy for children, *The Water-Babies* has received a great deal of critical attention (Carpenter; Prickett; Manlove). Most criticism focuses on its role as a fantasy, or in relation to Kingsley's personal life, but the text's response to Darwin and the evolutionary debate of the early 1860s is often commented on, as a consequence of Kingsley's personal involvement with the evolutionary debate (Beer 121; Levine 85). Humphrey Carpenter acknowledges Kingsley's innovation in blending an original fantasy with social commentary, natural history and moral education, but is largely dismissive of *The Water-Babies*, reading the text in biographical terms as a psychological release for Kingsley the destructive sexual sadist, commenting that he "was the first writer in England, perhaps the first in the world [. . .] to discover that a children's book can be the perfect vehicle for an adult's most personal and private concerns" (37). Lilia Marz Harper counters this limited reading with an extensive discussion of the positioning of *The Water-Babies* as a children's text, and its continued popularity through the nineteenth century and slow decline in the twentieth. Harper argues that the appeal of *The Water-Babies* to

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Victorian parents was its repackaging of evolutionary ideas within a familiar moral framework, to "clarify a moral and religious position that accommodated natural selection" (121). Harper argues that Kingsley provided Victorian parents with a way to explain the evolutionary debate to their children and to themselves, emphasising the dual audience of the text. *The Water-Babies* was initially serialised in *Macmillan's Magazine* from August 1862 to March 1863; Jonathan Padley points out that this makes the initial audience for this apparent children's text highbrow middle- to upper-class gentlemen, who might then read the story to their children, or purchase the book for the children to read themselves (53).

The Water-Babies describes the physical and moral evolution of a neglected chimneysweep, Tom, who is transformed into a water-baby after drowning. Tom progresses through a series of adventures by meeting the accurately-realised inhabitants of the river and the ocean, being taught by the moral sisters Mrs Bedonebyasyoudid and Mrs Doasyouwouldbedoneby, and setting out to find the spirit of evolution, Mother Carey, who sits "quite still" and "make[s] things make themselves" (164-5). Along the way, Tom learns that physical change is the consequence of moral choice, as exemplified in the lesson of the Doasyoulikes, who regress from men to gorillas as a result of laziness. Although not as overtly didactic as Gatty's *Parables*, *The Water-Babies* contains a variety of moral and social lessons, as Tom is punished for bad behaviour, such as bullying and stealing, and rewarded for good behaviour, such as altruism and compassion. Jessica Straley reads Tom's evolution from a dirty, "little black ape" (15) to "a great man of science" (199) as mimicking, or recapitulating, the evolutionary struggle from primitive life to humanity, in keeping with the latest contemporary theories of childhood development (584). Moral improvement is aligned with a physical change from animal to human, defining evolution as progressive and teleological, as both the soul and body advance from bestial savagery to a civilised, Christian self. *The Water-Babies* anticipates the concept of the recapitulative child that became dominant at the turn of the century, where the individual development of a child was considered to reveal the progression of the human race from animal to modern man as the child literally re-enacted the entire evolutionary history of humanity in its growth from infancy to maturity (Shuttleworth; Bowler). Straley explores how Kingsley's evolutionary narrative relies on, and explains, the new concept of the child as recapitulative, and so teaches the adult and child reader what childhood and children are, and offers a model of natural education.

However, as well as repackaging the new evolutionary theory in an understandable and acceptable form for the non-scientific public and child readers, *The Water-Babies* conceptualises a new understanding of the child as an evolutionary being in the figure of Tom. The (male) child is a liminal figure, poised between beast and man and with the potential to grow into either, no longer either a Romantic innocent or a sinful being in need of Evangelical redemption, but a complex creature blending humanity's animal past and its socialised present. But while the text confidently uses Tom to demonstrate how the savage child becomes a civilised man, a close reading of *The Water-Babies* reveals an underlying uneasiness with the emerging professional and materialistic scientific discourse and its implications for faith. The text is therefore not as confident in its endorsement of evolution and the recapitulative child as critical readings assume. There are two key moments of ambivalence in the text, where it retreats from its commitment to science and instead returns to natural theology. Both passages discuss materialistic proofs of the human soul and human evolution respectively, and both invoke famous naturalists and

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contemporary debates in meandering passages that halt the fantasy narrative in order to directly address the reader. When chimneysweep Tom is first turned into a water-baby, the narrative departs abruptly from Dickensian realism and at this precise moment the narrator halts the story for a long dialogue between himself and an imagined reader about the possible existence of water-babies in reality. Invoking a roll-call of famous naturalists including "Professor Owen," "Professor Huxley" and "Mr. Darwin," the narrator insists that nature is essentially unknowable and that lack of empirical proof is no barrier to personal faith:

> "But there are no such things as water-babies."
>
> How do you know that? [. . .] no-one has the right to say that no water-babies exist, till they have seen no water-babies existing; which is quite a different thing, mind, from not seeing water-babies.
>
> "[. . .] But surely if there were water-babies, somebody would have caught one [. . .] and sent one to Professor Owen, and one to Professor Huxley, to see what they would each say about it [. . .] a water-baby is contrary to nature."
>
> [. . .] You do not know what Nature is, or what she can do; and nobody knows; not even Sir Roderick Murchinson, or Professor Owen, or Professor Sedgwick, or Professor Huxley, or Mr. Darwin, or Professor Faraday, or Mr. Grove [. . .] They are very wise men; and you must listen respectfully to all they say: but even if they should say, which I am sure they never would, "That cannot exist. That is contrary to nature," you must wait a little and see; for perhaps even they may be wrong. (38-9)

On first reading, this passage seems to be invoking the naturalists to support the possible existence of creatures as yet unknown to science, but it is in fact making the same underlying point as Margaret Gatty's "Inferior Animals." Despite arguing that nature provides evidence for God, Kingsley here retreats from science as a way to understand the world and instead seems to advocate faith, regardless of the absence of evidence or even in the face of evidence against God. But this dialogue is not quite the direct, didactic address to the child, instructing them what to believe. It is uncertain if the text is addressing a child reader or an adult. It seems strange for the narrative to interrupt its flow in order to convince a child reader that the fantasy is grounded in actual, scientific possibility; the text does not attempt to define the fairies or magical lands Tom later visits as potentially real. The language used is also much more diffident than Gatty's strident pleas: "even if"; "I am sure they never would"; "wait a little and see"; "perhaps"; "they may be wrong." The narrative voice cannot confidently instruct the reader to trust in science or to trust in faith, but instead remains ambivalent.

The second episode rejecting materialistic science is the "great hippopotamus test" (88). The text again detours from the plot to give a satirical summary of Richard Owen and T. H. Huxley's hippocampus debate. Owen and Huxley carried out a very public and personal argument over the relationship of man to the great apes, with Owen insisting that humans had a specific structure in the brain –the hippocampus minor - and that apes did not. He argued that this was proof that humans are not related to primates and are therefore a separate, unique species (Cosans 52-58). By 1863, Huxley definitively proved that apes did have a hippocampus minor, and asserted that this was proof that humans had evolved from an ape-like ancestor and were therefore primates. Kingsley followed the debate avidly and inserted into *The*

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Water-Babies a description of Professor Ptthmllnsprts (Put-them-all-in-spirits), a composite of Owen and Huxley, who first voices Huxley's opinion and then seamlessly switches to that of Owen, leaving the reader, and presumably the Professor, utterly confused by the whole issue:

> [The Professor] declared that apes have hippopotamus majors in their brains just as men have [. . .]. Nothing is to be depended on but the great hippopotamus test [. . .] always remember that the one true, certain, final, and all-important difference between you and an ape is, that you have a hippopotamus major in your brain, and it has none. (87-8)

The narrator follows by rejecting the materialistic definition of the debate by defining humanity as "being able to speak, and make machines, and know right from wrong, and say your prayers" (87-8). The text dismisses the intense contemporary scientific debate defining humans in terms of their physical bodies as irrelevant, arguing that it is intelligence, morality and religious belief which separate humans from other animals. The rest of the chapter emphasises its rejection of empirical materialism, giving a lengthy and ridiculous description of Owen/Huxley's punishment for refusing to believe in water-babies, even when presented with one.

Kingsley originally wrote this passage as a skit for his friends while attending one of the Owen-Huxley debates at the British Association in 1862, and then modified it slightly for *The Water-Babies* as it was being serialised in *Macmillan's Magazine* (Browne 160; Rupke 221). For Kingsley, it seems, scientific knowledge is all well and good when it functions as an allegory to reveal the essential goodness of God's creation, but its focus on empirical evidence and its threat to destabilise religious readings of nature make it ultimately untrustworthy. Harper suggests that these episodes argue that science is not a "source for all information" and that "this message may have provided parents with a much needed way of explaining religious and scientific conflicts" (132-3). This reading of the pedagogical message of these disruptive passages seems correct, but the text is not as certain of itself as Harper implies. Victorian parents may have recognised their own confusion in the text's promotion of the latest evolutionary theory and simultaneous reluctance to endorse scientific materialism, but the text provides no clear explanation for how to reconcile specific conflicts between religious and scientific authority, seemingly advising the reader to wait and see which wins out in the long run. Kingsley himself may have been confident that eventually science and Christianity would reconcile, and that "God's earth and God's word will never contradict each other" (304), but the text itself is more ambivalent, hesitating to completely endorse the reconciliation of science and faith it is apparently teaching to the reader.

But who is the implied reader of these passages? *The Water-Babies*, like Gatty's *Parables*, is using children's literature as a space to address an adult reader, to plead for the privileging of religion over science and faith over fact. However, where the child reader disappears entirely from Gatty's polemic, to be replaced with a textual construction of a redemptive and faithful child, in *The Water-Babies* the text struggles to address both a child and adult reader. The first readers of the hippocampus passage were Kingsley's friends, then the wider audience of the educated, intellectual gentlemen readers of *Macmillan's Magazine*, and only then the child reader. Following Padley's argument that *The Water-Babies* was written to appeal to and challenge a scientific elite, and Harper's suggestion that part of that appeal was the text's demonstration of how to reconcile evolutionary theory and

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Christian belief, then it becomes apparent that *The Water-Babies* is not really literature *for* children, but literature *about* children. The child reader is excluded from what is ostensibly their literature, as the text explores the nature of the evolutionary child. Yet the text's underlying ambivalence towards the science it attempts to reshape also affects its construction of the child. The child within the text is a scientific one, as Straley shows, but in ultimately rejecting science in favour of faith, the text also implicitly rejects its own construction of the recapitulative, evolutionary child. The text's retreat from materialistic science offers the possibility that its own rewriting of the child as evolutionary and recapitulative may be wrong, and the reader must again wait and see. *The Water-Babies* is a product of, and a response to, the rapidly changing constructions of nature, faith and childhood focalised by the debates surrounding Darwin and the *Origin*, but also represents the changing nature of children's literature. Kingsley's text draws on the established tradition of moral and scientific fiction for children, but is also a new genre of original children's fantasy, blending realism, religious allegory, satirical skits and inventive fantasy sequences. *The Water-Babies* is therefore a transitional text, mediating between old and new concepts of science, religion and literature, and, as such, remains hesitant, unwilling to completely commit to its own new constructions of nature and the child.

Lewis Carroll's *Alice's Adventures in Wonderland*

Despite accepting Darwin's theory, Kingsley remained a staunchly Christian naturalist, not a materialist scientist, and his text is, finally, a moral tale, ultimately insisting that faith must always outrank fact and affirming Margaret Gatty's and the natural theologians' credo that knowledge must not be the limit of belief. Unlike Gatty and Kingsley, Lewis Carroll did not deal directly with the evolutionary arguments raging through society in his fiction for children, and his personal views on evolution remain unknown, as his diaries for 1853 to 1863 are missing or destroyed (Leach 48-52). However, as a post-Darwinian text, *Alice* has a choice between two visions of nature – nature as a forum for physical, moral and religious progression towards perfection, or nature as a violent, chaotic struggle for life in the face in extinction. *Alice's Adventures in Wonderland,* with its multiplicity of possible readings, is a difficult text that has already received extensive critical attention. Evolution has been of particular interest to critics: particularly how the Darwinian 'struggle for life' infects and inflects what is perhaps the archetypal Victorian children's fantasy. As Grey Meyers points out, *Alice* retains elements of the didactic science tradition Gatty and Kingsley drew on; the plot is based on exploration of the world, much of the dialogue is in a question and answer format, with definitions of words explored, and the child protagonist is always aware of her role and of proper behaviour (195). Unlike the *Parables* and *The Water-Babies*, *Alice* does not overtly discuss evolution, nature or scientific authority; however, evolutionary ideas suffuse the text, and evolutionary readings of *Alice* focus on her rapidly changing size, her obsession with eating, and the relocation of the human as part of a violent, predatory animal kingdom, as in William Empson's now classic 1935 reading. For Empson, the pool of tears Alice falls into is a primordial sea, from which she and all other creatures emerge, and the Caucus-Race, where all win and must have prizes, a parody of natural selection. Empson notes the repetition of death references, which Humphrey Carpenter uses to summarise his biographical reading of Carroll's books, commenting that "in its exploration of Nothingness and Not Being [*Alice*] denied the old certainties about the physical world, just then being shaken in another fashion by Darwin [. . .] *Alice* was, therefore, far more than its author realised, a tract for the times" (69).

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But the evolutionary nature of Wonderland is more fundamental than a series of physical changes or death jokes. Kincaid argues that Alice is not an innocent child of nature but a cultured, socialised being who tries to impose the social rules she has learned onto her environment. Kincaid reads Alice as a cannibalistic embodiment of culture disrupting the natural, playful relations between the Wonderland creatures (6). Marah Gubar counters this reading by showing that the text draws attention to the predator/prey power relations implicit in size, as Alice is unafraid of animals the same size as her, such as the Caterpillar, Pigeon or the White Rabbit, but is frightened that the enormous puppy "might be hungry" (36), respectful to the Cheshire Cat because of his "very long claws [and] great many teeth" (66) and deliberately cruel to a smaller lizard. Unlike *The Water-Babies*, where physical change is a direct result of moral laxity, Alice's body is in a state of flux, reacting to environmental, not moral, changes. In fact, as Alice progresses through Wonderland she becomes more aggressive and less tied to conventional morality, kicking Bill the lizard without consequence, snapping at the Duchess and the Queen of Hearts and finally dismissing the entire population as a pack of cards. Rose Lovell-Smith explores Alice's encounter with the Pigeon, identified as a Darwinian animal, and argues that the animals of Wonderland resemble animals found in natural history books more than fairy-tale or fable creatures. Lovell-Smith suggests that the *Alice* books "frequently bring Alice under nature's eye," repositioning her as part of the natural world, an interactive "fellow creature" rather than a detached "human observer" (28). She suggests that when read through a natural history – and evolutionary – context, Wonderland becomes a thematically consistent place, where human superiority over animals is repeatedly confronted, undermined and replaced with a post-Darwinian insistence that humans are merely clever animals, interchangeable with other species.

Rather than presenting a human reconsidering her identity in nature, as Lovell-Smith and Gubar imply, *Alice* constructs a child being re-written and re-identified by nature. It is not Alice's humanity that defines her engagement with nature, but her physicality, positioning her as potential predator, prey or equal, with the resulting behaviour motivated by appetite and aggression. Nature projects a reading on to her, defining her in a hierarchy of physical, rather than moral or social relationships. Despite interrogating her about her identity, once the inhabitants have established she is not a threat to them, they show no interest in her safety, in helping her resolve her identity crisis or in explaining how to survive in Wonderland. With few exceptions, nature is careless and uninterested in Alice and her survival or extinction, in direct contrast to the representations of nature as an essentially benevolent space for learning in both *The Water-Babies* and the *Parables*. Instead of finding an education in Nature, Alice finds only random change and bewildering variety. Her own identity becomes suspect as her knowledge of the world and her place in it is revealed to be "wrong from beginning to end" (54). Her own voice sounds "hoarse and strange" (23) as she recites her moral lessons, only to find that they have been corrupted to fit the amoral, Darwinian Nature she is immersed in: the industrious bee is a predatory crocodile who grins while swallowing fish and pious Father William is now a gluttonous, argumentative acrobat. Most frighteningly of all, Alice's body is no longer stable, but repeatedly transforms as she is subject to environmental stimulus. Alice receives a first-hand lesson in the 'survival of the fittest' as she is forced to adapt her behaviour to her place within the predator/prey physical hierarchy; once she gains the ability to regulate her size herself she uses her newfound understanding of size and power relations to control her encounters with the Wonderland creatures.

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Alice has adapted to Wonderland by regulating her size to ensure she is no longer potential prey and has become more confident and aggressive as a result. By the courtroom scene, Carroll's curious child, returning to her biologically correct larger size without interference, has become physically aggressive, impatient with social hierarchies and unafraid of challenging authority's explanations as meaningless – a far cry from the polite, well-mannered girl who fell down the rabbit-hole trying to recall facts and figures. Her last act in Wonderland is to denounce the court, try to fight off the pack of cards and give "a little scream, half of fright and half of anger" (129). Rather than engage logically with the legal system, Alice reacts physically, with an animalistic fight-or-flight response which causes her to wake up in her sister's lap. John Goldthwaite comments that Alice "reasons and argues as fast as she can for her very survival" (75) but it is not her rational or scientific speech that helps her survive, but the passive or aggressive behaviour that depends on her relative size to her fellow creatures. The text is not directly promoting a reading of Darwinian nature, but instead takes it as fact, and then explores how this might change the concept of childhood. Alice, the perfectly socialised and civilised Victorian drawing-room child, progresses – or regresses, depending on perspective – into a 'natural' child: aggressive to the weak and small, cautious when faced with a possible predator and impatient with the language and displays of culture. Instead of progressing from beast to human, like Tom in *The Water-Babies*, Alice reverts to aggression in a world of purely physical and environmental relations. Implicitly, the text teaches both the adult and child reader what childhood is in the post-Darwinian world.

The belief in the essential goodness of nature, the need to reconcile theology and evolution, and the insistence on the importance of faith for the child and adult reader that dominate Gatty and Kingsley's texts are irrelevant here; the old ways of thinking and understanding have become detritus for Alice and for the reader, put aside in favour of exploring a new construction of nature and childhood. In 1864, Benjamin Disraeli articulated the question at the heart of the evolutionary debate, asking: "Is man an ape or an angel?" (Kebbel 612) Like many contemporary conservative thinkers, Disraeli chose 'the side of the angels' over the prospect of humans as apes, but *Alice* replies that humanity – in the form of the child – is both, and it is circumstance and company that determines whether the individual acts like a beast or a saint. Alice, however, refuses to define the human and the animal as a binary opposition or different places on an evolutionary hierarchy, instead constructing both the child and the human as just another strange and fluid creature in a violent and competitive world of nature. *Alice*'s insistence that what you are depends on your environment is a far more unsettling approach to the recapitulative child than Kingsley's teleological progression, and anticipates the fin-de-siècle and Freudian interest in civilisation as a mask overlying the essential animal nature of humanity.[4]

The *Parables*, *The Water-Babies* and *Alice in Wonderland* exemplify how the evolutionary debate spread through literary society and culture in the 1860s. Gatty turned to children's literature to try and convince both adult and child readers of the importance of faith over science, using her mostly realistic *Parables* to reaffirm her belief and the validity of the old assumptions about nature. Kingsley had already written for children, and saw the educational and didactic possibilities of turning evolution into fantasy, using *The Water-Babies* to try to rewrite the book of nature as a new myth, both evolutionary and divine. Carroll used children's literature as a space for what would be unspeakable in an adult novel, creating a world of danger,

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predation and death, where the certainty of old theories and old knowledge are 'detritus' in the new, Darwinian world.

Gatty, then, is the last flourish of natural theology, unable to refute the science of Darwinism and so urging a return to faith over science. Yet by addressing a potentially corrupted adult reader, Gatty relies on a concept of the child as innately spiritual, and so inadvertently disrupts the very hierarchies that the *Parables* are designed to teach to children, and also excludes child readers from their own literature. Kingsley and Carroll represent the future: they rewrite and interpret scientific theory and reshape and define public understanding of evolution and Darwinism. Hailed as the first Golden Age children's texts, Kingsley's and Carroll's novels had a huge impact on the reading public, both adults and children, helping to shape popular science just as much as science shaped them. Like many Victorian children's texts *The Water-Babies* is no longer popular among child readers, having become instead part of the academic canon, perhaps partly because the text's educational purpose is no longer relevant, but also because its inherent ambivalence reveals that it may not really be a book for children at all. *Alice*, however, thrives and multiplies as a cultural phenomenon, still affecting how children and childhood are understood. Read together, these three texts ultimately reveal that *The Parables from Nature* and *The Water-Babies* are holding on to their faith-based knowledge and "behold the face of nature bright with gladness" (Darwin 65) at all costs, but it is Alice, scrambling through the "entangled bank" (Darwin 426), shedding her old assumptions and adapting her body and her behaviour in order to survive, who represents a new, Darwinian vision of nature and the child.

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Notes

1. As Bowler details, Darwin was not the first individual to suggest evolution: theories of transmutation of species, adaptation and cumulative change were debated through the first half of the nineteenth century. However, in Britain, theories based solely on physical causes, without reference to God, were associated with socialism, atheism and revolutionary politics, and so remained outside of the conservative, natural theology based approach to natural history.

2. Lightman notes that "those who could claim to speak on behalf of science gained immense cultural authority and intellectual prestige" (*Victorian Popularizers* 5). In the 1860's, the voice of scientific authority was still unstable, with many groups striving to convince the public that their interpretation of science was correct. Church officials, gentlemen philosophers, the new professional scientists and a variety of literary authors all laid claim to a true understanding of science and therefore of the nature of the world. Science offered a rational basis for a new worldview in a society profoundly changed by industrialisation, urban growth and the emergence of the middle class (Lightman, *Victorian Science* 3).

3. The difficulty in dating the Parables is well known; I am following Tess Cosslett ("Animals Under Man?") in dating the first series to 1855 and the third series to between 1861 and 1864.

4. I refer here to Freud's theories of the id, ego and super-ego, and totems and taboo, rather than Freudian readings of Alice itself. See *The Cambridge Companion to Freud* (edited by Jerome Neu) for discussions of Freudian theory and its wider impacts.

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"The Riddle of this Painful Earth": Late Victorian Literature and Archaeology During the Great Agricultural Depression

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In 1888 the Reverend Monro Gibson, writing for *The Sunday at Home*, likened the agricultural depression of the late nineteenth century to a cloud that hung over the country:

> "Depression, depression, depression!" How sadly familiar the word has been for many years. It is not an unfamiliar word at any time, but lately it almost seems as if it had come, not to visit, but to stay. The depression in agriculture and commerce has been so long continued, that it is almost a weariness to speak of it. And though we may take a hopeful view of the outlook, with the expectation that the clouds may roll away, and the sun appear, there still remain burdens sufficient to weigh heavily on those who are thoughtful enough to vex themselves with "the riddle of this painful earth." (5)

An era of change and uncertainty, the agricultural depression introduced new farming methods and alternative ways of thinking about the landscape. At the same time, the rise of archaeology as a science encouraged wider recognition of the importance of the land as a preserve of past human activity. The farmland of the counties forming historical Wessex concealed archaeological evidence of Iron Age and Roman farming communities – signifying not only the emergence of civilisation in Britain, but a tradition of working the land that had been passed down through generations to the nineteenth century. The writing of Richard Jefferies and Thomas Hardy, who were both born in Wessex counties,[1] is rooted in this formative time for agriculture and archaeology; in chronicling emergent understandings of the soil both authors sought to address "the riddle of this painful earth."

There are affinities between the gradual development of nineteenth-century archaeology as a discipline and the understanding and practice of agriculture over time. These can be seen best in Hardy's and Jefferies's fiction and non-fiction. Andrew Radford has explored the relation between the experience of rural landscapes and the developing knowledge of the human past, and has discussed the imaginative significance of contemplating past human activity in agricultural landscapes. In his discussion of the work of Hardy and Jefferies, Radford concludes that the nineteenth-century imagination, dislodged by social revolution, could not be sufficiently sustained by a human past which was ultimately remote and inaccessible (55). Roger Ebbatson has considered ways in which Hardy's and Jefferies's phenomenological experiences of place might be better understood in the context of Heideggerean theory, and how both authors innovatively employ agricultural technology in their representations of landscape and nature ("Sensations of Earth; "Landscape and Machine"). other research has identified the nineteenth-century difficulty of perceiving continuity between past and present human societies due to the dissolution of "the Georgic vision of nature [. . .] [in] an era of rapid rural and agricultural change" (Parker 32). Yet despite such attempts to align the mind with the land's own past, the potential for the relation between agriculture and archaeology to yield

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constructive insight into the relation between mankind and the environment has not been given due attention. Nevertheless, Hardy and Jefferies engage deeply with the imaginative implications of archaeology, and their writing suggests that the close proximity of a prehistoric human past – which Victorian archaeology revealed as rich and multifarious – gave weight to the idea of continuity in the human condition and facilitated connection rather than "rupture" (Radford 55) with traces – or "survivals" (E.B. Tylor qtd. in Radford 155) – of past human activity in the landscape.

For Hardy and Jefferies, whose work was deeply grounded in their native southwest landscapes, the presence of the human past within the agricultural settings of Dorset and Wiltshire afforded an accessible, and largely unexploited, avenue of thought. Hardy's Wessex, an agricultural landscape rich in prehistoric archaeology, intersects with Jefferies's Land which includes the ancient Wiltshire Downs and Ridgeway. Further consideration of the significance of the close association between the subterranean human past and the dynamic agricultural present can provide new insights into both authors' experiences of the landscapes they wrote about. Hardy's lifelong interest in archaeological settings and the ways in which they shape human experience in the present affords new perspectives on his perception of time. An archaeo-agricultural reading of Jefferies's work, which is under-researched and traditionally prescribed to the genre of nature writing, reveals how he used landscape as an experimental holding ground in his search for a more meaningful present.

Both authors' interests in agricultural labour developed alongside their knowledge of antiquities. Jefferies first gained national recognition for his letters to the *Times* on the Wiltshire labourer in 1872, and in the following year he gave a paper on the antiquities of Swindon to a meeting of the Wiltshire Archaeological and Natural History Society. Charles Longman, editor of *Longman's Magazine,* commissioned articles from both Jefferies and Hardy in 1883 on the condition of agricultural labourers in their respective counties.[2] At this time Hardy began attending excavations in Dorset and presented a paper about Romano-British relics and skeletons found at his house, Max Gate, to the Dorset Natural History and Antiquarian Field Club in 1884. These developments in both authors' careers were consonant with the rise of archaeology as an independent discipline and its acceptance within the scientific field. This movement was identified by the antiquary and scientist Sir Daniel Wilson in 1851 who stated that archaeology had transcended the "laborious trifling" of the amateur antiquary to join "the circle of the sciences" (Wilson xii). The rise of archaeology contributed to its subsequent popularisation, and in 1882 a reviewer of *The Antiquary* magazine in the *Saturday Review* declared that "archaeology has outlived ridicule, and become fashionable" (*Saturday Review* 772-3).

Although the processes of archaeology and agriculture may not appear to have much in common – archaeologists worked to preserve the material record, while the process of farming often destroyed it – both occupations worked with, and were motivated by, the layered formations of the soil and their potential yield. The imaginative implications of the human history that lay beneath the soil, and the physical process of its disturbance through agricultural activity, contributed to the growing late-nineteenth-century awareness of the immense significance of the human past. In 1867, Jefferies wrote in a letter that his agricultural homeland was "a mine for an antiquary," noting the numbers of unidentified earthworks and artefacts which would come to light through agricultural work. He notes having observed "traces of former habitations, and former generations, in all directions – here Roman coins here

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British arrowheads – cannon balls, tumuli, camps,' and that "the country seems alive with the dead" (*Letters* 32).

In his fictional sketch "A Roman Brook" (1884) Jefferies records how the remains of a Roman fort by a stream at Wanborough, near Swindon, have been revealed through the erosive action of the passing water and by agricultural activity. He writes that "all life loved the brook," noting that horses and cows wander from the fields to drink from it, and birds bathe there. Just as the water draws to it the life of flowers and grasses and all shapes and sizes of birds and animal, it also attracts different classes of people – labourers, farmers, and the lone wanderer. He states that "there is something in dipping water that is Greek – Homeric – something that carries the mind home to primitive times" (38). Yet the presence of the past in the spot is more tangibly felt by the landowner himself, described by Jefferies working an orchard by the brook:

> He was busy with his spade at a strip of garden, and grumbled that the hares would not let it alone, with all that stretch of grass to feed on. Nor would the rooks; and the moor-hens ran over it, and the water-rats burrowed; the wood-pigeons would have the peas, and there was no rest from them all. [. . .] On a short branch low down the trunk there hung the weather-beaten and broken handle of an earthenware vessel; the old man said it was a jug, one of the old folks' jugs – he often dug them up. Some were cracked, some nearly perfect; lots of them had been thrown out to mend the lane. There were some chips among the heap of weeds yonder. These fragments were the remains of Anglo-Roman pottery. Coins had been found – half a gallon of them [. . .] That was all he knew of the Caesars. (39)

The processes of nature – the activities of the water rats, pigeons, and moorhens – impair the worker's efforts to produce a good yield from the site. While this natural activity above the soil impedes the process of agriculture, the very act of digging reveals a rich subterranean record of past human activity. By referring to the Roman occupants of the site as "old folks," the man infers a degree of familiarity with the past which he has gained through unearthing different types of Roman relics. Yet more than this, due to the close proximity of the orchard to the brook, the area has revealed an even more specific and surprising discovery. Where the bank has been undermined by water rats, "within a few inches of the water," is a human skeleton, which Jefferies identifies as "a sorrowful thing" lying unheeded in the presence of the "sparkle of the sunshine'; "the living water'; and the "voice of the cuckoo" (40). In his account Jefferies infers the close relation between agriculture, nature and archaeology, suggesting that the process of reworking the same area of land over time can reveal the presence of a human past that is close, tangible and accessible. This recognition of the proximity of former times reflects mid-nineteenth-century developments in prehistoric archaeology which established ancient British society as developed, and closer to the Victorian era than previously imagined, signifying a move away from simplistic early nineteenth-century accounts which identified the ancient Britons as primitive.[3] Moreover, the revealed presence of the skeleton in the ground suggests that the subterranean human past has a role in shaping the character of the soil that the landowner creates his livelihood from, and as such is actively shaping the present.

The close relation between agriculture and the archaeological imagination is further illustrated by an anonymous contributor to the miscellaneous magazine *Once a*

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Week (1869), in which the author depicts the imaginative implications of finding a Roman site within an agricultural landscape:

> A large arable field on the Huntingdonshire side of the river Neve [. . .] is said to be the Roman Durobriva mentioned in the *Antonine Itinerary.* This was the principal Roman encampment of the midland counties, and the mass of coins, and the number of tessellated pavements discovered in it, prove how long it must have been occupied. Every now and then, the plough turns up the long-buried refuse heaps of the former kitchens. Broken pottery, shells of the whelk, bones and horns of the red deer, and of a small extinct species of ox, *Bos longifrons,* all mixed up together. (*Once a Week* 393)

The orderliness normally associated with domestic habitation – represented by the pottery, the preparation of whelks, and the presence of a refuse site—is brought into direct association with the random and indeterminate churning of the plough. As the author continues, it is "these homely things [that] shorten time, and make nearly 2000 years ago seem but as yesterday" (393). The "large arable field" becomes a conceptual holding ground for a more powerful strain of thought and feeling; a fusion between the archaeological imagination and the observation of nature within the landscape, wherein the meeting places between past and present suddenly become tangible. In light of the social and economic uncertainties and associated estrangement from nature posed by the agricultural depression, such clear and direct experiences of the natural world became all the more important. This form of engagement with the natural and human worlds, without a third party – whether a book, machine, or vehicle – provided space away from the idea of linear progress, allowing the mind to momentarily step out of time to reconnect with the environment. In a society aware of encroaching change, engagement with the natural world afforded a tangible link with past generations who had lived and worked in the same area.

Answers to the late-Victorian questions of human existence were being drawn from the earth itself – either intentionally during archaeological excavation – or accidentally, through agricultural practices such as ploughing, digging for chalk, or building. These discoveries followed those made during the construction of the railways in the 1840s. Close affinity developed between the appreciation of nature, agriculture, and archaeology not least because systematic developments in archaeology were consistent with agricultural changes during the Depression, such as the introduction of mechanisation. General Pitt-Rivers, close friend of Hardy, and the son-in-law of Sir John Lubbock, is recognised as the "father of modern excavation" (Cleere 55) for his archaeological fieldwork in Wessex during the late nineteenth century when he applied some of the first systematic techniques. As archaeologists dug the earth to learn about the origins of human societies, agriculturalists worked the land more intensively with new technical knowledge. In "Patchwork Agriculture" (1875),[4] Jefferies documents modern farming techniques to be creating a "patchwork" effect of old and new, which is visible in the landscape. In one field an old man and a boy walk slowly beside oxen pulling a plough "unchanged since prehistoric times" (856), and in an adjacent field a steam plough travels noisily up and down. The introduction of steam traction engines, which "tore up" (856) the ground, threatened the sense of continuity in the way in which people worked and experienced the land. Moreover, the introduction of new farming practices began to alter agricultural workers' physical contact with the prehistoric past. The operation of steam engines

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from a seat, several feet off the ground, with the noise of its operation deterring wildlife, entailed less contact between the worker and the natural environment. Traditional methods, however, with the worker walking quietly alongside the oxen or horse, would have encouraged workers to notice coins or objects on the surface of the soil and to engage with the sights and sounds of their surroundings. In "History of Swindon," originally published in the *North Wilts Herald* (1867), Jefferies mentions the presence of coins in fields near Avebury: "Ancient coins, supposed to be British, are said to be frequently picked up by the plough-boys in the adjacent fields, especially after the heavy rains have washed away the soil." (*Jefferies' Land* 179).

Such rapid changes displaced customs and traditions which had been consistent features of the agricultural world for centuries, and consequently threatened the personal and social identities of the agricultural working classes. Alterations in how the land was managed and worked upset relationships between farmers and workers, leading to disputes about the costs of rent and wages and the working conditions of agricultural labourers. *Hodge and His Masters,* first serialised in *The Standard* between 1878-1879, was intended by Jefferies to "remedy [. . .] the ills of the depression years of the 1870s" (vi), which were a result of bad harvests, falling crop prices, and increase in foreign imports. In his account of labouring conditions and the history of farming, Jefferies writes in the knowledge that agriculturalists had – as a partial consequence of the popularisation of archaeology – a general level of awareness of the types, variation and locations of archaeological finds. As he points out in *Hodge and his Masters* the traditional farmer, represented by the character "Harry," has worked the same tract of land all his life, and "knew enough of archaeology to be able to tell any enthusiastic student who chanced to come along where to find the tumuli and earthworks on the Downs" (65). Harry owned Roman coins, found on his farm, which were "produced to visitors with pride" (65). Writing in his own new vein of agricultural journalism, which depended upon direct observation and time spent in the company of farmers and labourers, Jefferies achieves a form of synthesis between the scientific and rural imagination. His observation that "Harry really did possess a wide fund of solid, if quiet, knowledge" (65) illustrates how Jefferies sought to represent the spectrum of life as it really was and not only imagined to be. Such portrayals reveal that awareness and knowledge of archaeology was not limited to the middle classes, but rather could be acquired over time through familiarity with the land; something that Hardy similarly explored through his fiction.

The idea of an agricultural worker knowing a landscape, and the implications of being drawn away from it during an era of social change, is a theme of Hardy's *The Return of the Native* (1878), serialised in *Belgravia* in the same year as Jefferies's *Hodge*. Through the drama of Dorset-born Clym Yeobright's return to Wessex to become a furze cutter, Hardy draws upon the rich archaeological heritage of the area to deepen the characters,' and the reader's, engagement with the landscape. In the opening pages of the novel Hardy presents Egdon Heath as essentially unchanging and unaffected by human activity. The prehistoric Rainbarrow is "almost crystallised to a natural product" by time and "everything around and underneath had been from prehistoric times as unaltered as the stars overhead" gives "ballast to the mind adrift on change, and harassed by the irrepressible New" (14). "Prehistoric Times" was the title of the seminal book published by Lubbock, later known as Lord Avebury, in 1865. The book was a major contribution to the new science of prehistoric archaeology, and Hardy's use of its title reflects his awareness and interest in the unfolding anthropological and archaeological debates of the time. In his description

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of the Rainbarrow – a Bronze Age bowl barrow – Hardy presents the monument as testament to a once thriving human society, which, having fallen subject to cultural change, is now as lifeless and still as the heath itself. Human impact on the landscape is minimal, and almost superfluous. Moreover, the remoteness of the barrow lends it protection from encroaching agricultural change: "not a plough had ever disturbed a grain of that stubborn soil," and as such it remains accessible and attractive to the archaeologist: "In the heath's barrenness to the farmer lay its fertility to the historian" (22). The heath's immunity from agricultural disturbance means that there lies an intact and yet unknown subterranean world beneath the soil. Hardy's use of the word "fertility" suggests that this darkness harbours a potential yield that will be of interest or even profit to the archaeologist. Hardy may be referring here to the trend of "barrow digging" which peaked during the mid-Victorian era, and which resulted in the plundering of thousands of prehistoric burial sites across the UK. During an era of agricultural upheaval, which threatened disconnection from the past, such latent potential – which for Radford "impact[s] in potentially surprising ways upon the modern moment" (Radford 37) – afforded imaginative and stabilising links with former human activity in the landscape, thus securing the late-Victorian mind, described by Hardy as "adrift on change" (*Return* 14).

For Diggory Venn, the reddleman who travels the land to provide dye for sheep farmers, the barrow on Egdon Hill is an imaginative point of contact between himself and the ancient inhabitants of the site. Hardy points out that reddlemen are "one of a class rapidly becoming extinct in Wessex," and as such Venn is "a curious, interesting and nearly perished link between obsolete forms of life and those which generally prevail" (*Return* 16). In his description of Venn's view of the heath Hardy makes a distinction between the solid form of the prehistoric Rainbarrow on Egdon Heath – which he terms "the pole and axis of this heathery world" (19) – and the ambiguous space of the sky above. The image of a "celestial globe" (19) connects the limited topographical knowledge of the mind of man with the larger unknown space of the sky; similarly linking the grounded experience of the agricultural worker, lodged in the present, with the ambiguous activities of his Celtic predecessors. Hardy describes the barrow as occupying the "loftiest ground of the loneliest height that the heath contained" (19), suggesting that, for the individual mind seeking to secure itself, this height afforded greater potential for imaginative insight than the lower lying heathland. This distinction between low and high ground was something widely appreciated by prehistoric societies, who engineered earthworks of great heights as a means of protection from attack, but also, as in the case of Hardy's Rainbarrow, for prominence – the visibility of a barrow in a landscape keeping alive the memory of the ancestor interred within it. As Venn watches, a chain of agricultural workers make a pile of furze faggots on "the crown of the tumulus" and set it alight. The event of the fire brings life to the still barrow, and alters the meaning of ordinary time:

> It was as if these men and boys had suddenly dived into past ages, and fetched therefrom an hour and deed which had before been familiar with this spot. The ashes of the original British pyre which blazed from that summit lay fresh and undisturbed in the barrow beneath their tread. The flames from funeral piles long ago kindled there had shone down upon the lowlands as these were shining now. Festival fires to Thor and Woden had followed on the same ground and duly had their day. (23)

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The innate impulse to light fires in the landscape transcends cultural change to connect the agricultural workers with their environment and with the activities of their prehistoric ancestors. In imagining back, to "prehistoric times," the past becomes fluid – enough to "dive into." The accumulated soil strata, which contain ashes from the similar practices of ancient communities, strengthen the physical "height" and presence of the monument and imbue it with symbolic significance. Just as fire, as a source of light and warmth, was a connective force within prehistoric communities, and was important in some prehistoric burial traditions, so it continues to facilitate human interaction in late-nineteenth-century agricultural society. The reddleman's observations from his comfortable resting place, which connect him with the great tradition of human activity in the area, implicitly suggest that it is only his cultural status – his class and occupation – which are becoming eclipsed by social and agricultural change, whereas the inclination to continue certain rituals in the landscape remains. Allison Adler Kroll suggests that these funereal monuments in Hardy's landscapes "collectively shape and are shaped by the human activities that take place around them" (342), a process which facilitates continued cultural engagement with the land over time. Perhaps more than this, Hardy's observation of how the barrow is used by farming communities over time suggests that the human mind has the ability to transcend the linear boundaries of distance and time and connect with the past consciousness of the prehistoric people who shaped the landscape. In doing so, Hardy implicitly suggests that this connection with the past affords partial consolation for the rapid changes which were causing crises in personal, social and cultural identities.

In the novel Hardy considers the significance of the routes which thread the Wessex landscape and which were carved and used by prehistoric farming communities. He describes the road near the Rainbarrow as intermittently "over[laying]" ancient tracks which "branched from the great Western road of the Romans, the Via Iceniana, or Icknield Street" (20). In nineteenth-century archaeology many of what were termed "ancient British track-ways" were "discovered and laid down in maps" (*New Monthly Magazine* 237) by Sir Richard Colt Hoare in his *Ancient History of North and South Wiltshire* (1812-1819), and his contributions to the eleven volumes of the *History of Modern Wiltshire* (1822-1844). In the above passage Hardy imbues the road with a "clear" durability, highlighting its importance as a means of travel and communication in the otherwise "confuse[d]" and otherworldly heath. At the time Hardy was writing, ancient trackways were still travelled by foot, and were frequently used by labouring classes, with wealthier people making use of stagecoaches and the new-built steam railways. Hardy knew the ancient routes of Dorset, noting that for the first time in human history, since the introduction of new farming techniques, industrialisation, and more sophisticated means of communication, some prehistoric paths were ceasing to be used (*Jude* 15).

The prehistoric road, known as the Ridgeway, connects Jefferies's Land with Hardy's North Wessex, and was once a cornerstone of the prehistoric world. In *Jude the Obscure* (1895), the spot where the ancient Roman Road (the Icknield Way) crosses the Ridgeway on the way to Oxford is imbued with imaginative significance for the young aspiring Jude: "At the very top it was crossed at right angles by a green "ridgeway" – the Icknield Street and original Roman road through the district [. . .] now neglected and overgrown" (15). The location of Jude's family in Lewton Bassett near "Alfredston" (Wantage) – near the ancient Ridgeway – appears to have been carefully chosen by Hardy as the setting for his most controversial novel. At the crossroads, in the midst of the agricultural landscape, stands the Brown House, "a weather-beaten old barn" (15) which becomes a metaphorical crossing point in

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various stages of Jude's development: as a boy, first glimpsing Oxford through the mist, then as an adolescent courting the flirtatious Arabella, and finally, on his broken-hearted return from his failed union with Sue Bridehead. Each event in Jude's life that facilitates his encounter with the spot denotes a further development in his own journey. The ancient route, once an integral part of agricultural life, is "neglected" and its barren associations are linked with Jude's disastrous marriage to Sue. Hardy repeatedly uses distances, landmarks, and local villages to locate the "Brown House," which itself features in varying moods and circumstances associated with Jude's female relationships.

Adler Kroll, citing the work of archaeologist Christopher Tilley, notes that:

> Because the pasts of locales and landscapes are "crucially constitutive of their presents," the paths which traverse such spaces accrue meaning as well; "a journey along a path" in fact constitutes "a paradigmatic cultural act, since it is following in the steps inscribed by others whose steps have worn a conduit for movement which becomes the correct or "best way to go." (347)

Kroll recognises that ways in which Hardy uses paths aligns his "archaeological vision" with Tilley's – "the Roman road and the ancient highway in *The Return of the Native*, the road which encircles Casterbridge in *The Mayor of Casterbridge*, the path through Little Hintock in *The Woodlanders*, the way into Blackmoor Vale in *Tess*, the road to Marygreen in *Jude* – all of these paths make and remake local history in their respective narratives" (347). In *Jude,* the story of the acrimonious parting of his parents at the Brown House, where the Ridgeway crosses the modern road – imparted to him by his grandmother – becomes a memory of his own, reinforced by repeatedly passing the spot as he walks to work, and becomes internalized print by Sue as an ill-omen to their impending marriage. In response to the changing social and cultural conditions of the late nineteenth century, they forge a new route to happiness, through unknown territories and irrespective of the warnings of the past. Although they ultimately fall victim to its strangeness the brave move forward anticipates what D.H. Lawrence was later to term "heaving into uncreated space" (Lawrence 431). The Lawrentian search for new psychic terrain is tentatively attempted by Sue – the "modern woman" (Schaffer 230) – through a shared psycho-physical experience of a landscape imbued with memories of past generations. However, the couple's attempt to disregard the experiences of their predecessors is marred by the persistent "living hand," as Hardy puts it in *A Laodicean* (1881) (205-6), of the past that sculpts the present.

Similar route crossings of the Wiltshire Ridgeway are observed by Jefferies in *Wild Life in a Southern County* (1879), but are perceived as conduits to a more holistic experience of the landscape than in Hardy's work. Jefferies describes the Ridgeway as "a broad green track" which is itself crossed by waggon tracks and "is distinct from the hard roads of modern construction which also at wide intervals cross its course, dusty and glaringly white in the sunshine" (52). In contrast to Hardy's depiction of the same area in *Jude* – in which the modern road is crossed intermittently by ancient "ridgeways" – Jefferies, writing from the perspective of the natural historian travelling on foot, identifies the Ridgeway itself as the most direct route across the Wiltshire Downs, bearing its own "course," and being "entirely independent of the roads of modern days" (53). He goes on to recount the history of the track through different archaeological epochs:

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> The origin of the track goes back into the dimmest antiquity; there is evidence that it was a military road when the fierce Dane carried fire and slaughter inland, leaving his 'nailed bark' in the creeks of the rivers, and before that when the Saxons pushed up from the sea. The eagles of old Rome, perhaps, were borne along it, and yet earlier the chariots of the Britons may have used it - traces of all have been found; so that for fifteen centuries this track of the primitive peoples has maintained its existence through the strange changes of the times, till now in the season the cumbrous steam-ploughing engines jolt and strain and pant over the uneven turf. (Jefferies, *Wild Life* 53)

The Ridgeway, which has endured the "strange changes of the times," is not only a route to travel on foot, but also a metaphysical route which encourages the thinker to consider the prehistoric significance of the landscape, and the implications of this for the modern mind. Jefferies refers to the "great earthwork," Liddington Castle, the spot where he would go to think, and where he began composing his spiritual autobiography, *The Story of My Heart* (1883). Surrounding the earthwork is an archaeological landscape which has grown into and around the natural world; akin to Hardy's barrows "almost crystallised to natural products by long continuance" in *The Return of the Native* (15).

The "chain of forts," which are "all connected by the same green track" (Jefferies *Wild Life* 53) denotes the uniformity of prehistoric organisation, and contrasts with the ground that "sinks," and the "bending" and "swaying" crops. Beside the track, which conceals hares in the long grass at its edges, steam engines appear as incongruous animals which "jolt and strain and pant over the uneven turf" (53), representing a new form of labour which has diverted away from the course of prehistoric tradition. The place where the old track "happens to answer the purposes of modern civilisation" (57) is a sudden, accidental occurrence; much as, for rural populations in Wiltshire, traditional ways of farming continued until they were forcibly eclipsed by modern techniques. As the ancient Ridgeway continued to connect sites which were thousands of years old – despite the unpredictable threats of modern change – the archaeological imagination afforded a stable avenue for the late-Victorian thinker; one that tangibly connected past and contemporary ways of living through the landscape.

Roger Ebbatson notes that for Jefferies, "Nature represents a kind of exit from the historical process," and that Hardy offers a quite different interpretation of history (*Heidegger's Bicycle*, 69). Hardy's work was more closely guided by scientific works of the period, and in *The Woodlanders* (1887) he draws upon the work of Charles Lyell to explore how agricultural workers adapted to their changing environment. When Marty's father, the agricultural worker Mr. South, is struck down by an irrational fear of the elm tree growing by the house and is too ill to work, Marty sits up all night creating his thatching spars. By the fireside in the dark little cottage, her activity recalls the manufacturing methods of her prehistoric ancestors:

> On her left hand lay a bundle of the straight smooth hazel rods called spar-gads – the raw material of her manufacture: on her right a heap of chips and ends – the refuse – with which the fire was maintained: in front a pile of the finished articles. To produce them she took up each gad, looked critically at it from end to end, cut it to length, split it into four, and sharpened each of

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> the quarters with dexterous blows which brought it to a triangular point precisely resembling that of a bayonet. (10)

The crafting of thatching spars was a cottage industry which, unlike other agricultural practices, such as mowing and threshing, was not likely to be eclipsed by the arrival of the machine. During the 1870s and 1880s archaeologists and anthropologists around the world were conducting further studies to try and shed light on the manufacturing practices of prehistoric societies (Jones Jnr, "Primitive Manufacture of Spear and Arrow Points"; "Centres of Primitive Manufacture in Georgia"). These studies were largely guided by Charles Lyell's accounts in *The Antiquity of Man* (1863), which clearly stated the case for ancient flint weapons being the handiwork of prehistoric man, and confuted theological evidence concerning the history of humanity. In his book Lyell discusses flint implements found in the Somme Valley, which he dates to the Pleistocene era. C. Evans had previously written in *Archaeologia* that the flints possessed "a uniformity of shape, a correctness of outline, and a sharpness about the cutting edges and points, which cannot be due to anything but design" (Evans 288). Lyell's description of flint weapons excavated from a pit at Abbeville gives one of the first accounts of prehistoric manufacturing practices:

> It has often been asked, how, without the use of metallic hammers, how so many of these oval and spear-headed tools could have been wrought into so uniform a shape. Mr. Evans, in order experimentally to illustrate the process, constructed a stone hammer, by mounting a pebble in a wooden handle, and with this tool struck off flakes from the edge on both sides of a Chalk flint, till it acquired precisely the same shape as the oval tool. (Lyell 118)

In both Lyell's and Hardy's accounts the raw material is shaped by repeated heavy blows to create a spear-headed tool. Marty's cutting and splitting of the hazel poles and sharpening "each of the quarters with dexterous blows [. . .] to a triangular point," recalls Evans' reconstruction of a flint arrowhead, in which he seeks to create a "spear-headed tool" of a "uniform shape" by striking "flakes from the edge on both sides of a Chalk flint, till it acquired precisely the same shape as the oval tool." Hardy's description of Marty working the spars by the fireside therefore resembles the process of crafting prehistoric weapons. Marty has "the raw material of her manufacture" on one side, and "a heap of chips and ends" on the other, which Hardy terms "the refuse." At the time Hardy was writing, archaeologists were recognising the value of refuse heaps in determining the motivations, lifestyles and practices of prehistoric peoples. The word "refuse" had become increasingly associated with prehistory – not only through the work of Lyell, but also John Lubbock who published a paper on Danish Shell-Mounds, or "Kitchen Middens" – known as refuse heaps – in the *Natural History Review* in 1861 (497). Moreover, nineteenth-century excavations had established prehistoric weapon manufacture as methodical; flints were chipped into arrowheads and knives with clear areas for refuse on one side, and flint cores on the other.[5] Hardy's use of the term "bayonet" thus draws implicit parallels between nineteenth-century and prehistoric weaponry. Through this comparison Hardy could well be suggesting that cottage traditions such as spar-making might be in danger of becoming extinct through the arrival of modern ways of living. Yet further, he is observing the long continuance of humans' ability to create tools from natural materials to aid their survival, and, perhaps more importantly, the

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method of this process remains relatively unchanged since prehistoric times. For Marty, the working of the spars is her last defence against the encroaching threat of poverty and homelessness which result once her father passes away.

Later in the novel Hardy explains the deep connection between Marty and her fellow agricultural worker, Giles Winterborne, which points towards the redundancy of scientific knowledge in a rural setting (326-7). Giles and Marty have a "clear gaze" that sees beyond the "casual glimpses" of the "ordinary" observer into the character of the woodland itself. This form of instinctive, primitive engagement with nature is not savage or rudimentary but is achieved through sustained "intelligent intercourse" with the sights and sounds of the woods. Throughout the novel Hardy presents Marty South as alone, without family, purpose or future, but his revelation at the very end of the story of her "counterpart" role seems to suggest a redefining of his attitude to Darwinian ideas of individuality. Rather than being a lonely product of biologically determined processes,[6] it is Marty's individuality – that she "alone, of all the women in Hintock and the world" could have known and understood Giles – that threatens Giles's lover Grace, who had mistakenly thought herself to be his equal. Marty's individuality arises not from nature or culture, but from an instinctive way of being "inherited from her Teutonic forefathers," which, through its joint expression with Giles, allows her to experience a sense of community with the natural world, and causes her social isolation to seem less important. Hardy writes that their environment has its own language; the wind has a voice that "murmurs" and the trees communicate their health by the "state" of their branches. These "remoter signs and symbols" of "runic obscurity" make sense when Giles and Marty collect them to "form an alphabet"; a unique language of the woodland environment. Agricultural work, using traditional methods, thus becomes a process of discovery of instinctive inner knowledge, passed down through generations, which aligns the mind with the subtle character of the landscape.

By contrast, in *Tess of the D'Urbervilles* (1891), the incongruity between new mechanised farming methods and the well-being of agricultural workers is symbolic of a post-Romantic loss of balance between the mind and the land. Moreover, this loss is identified to have partly arisen through adherence to outdated ancestral social structures which could no longer meet the needs of families who had worked the land for centuries. In a letter to Rider Haggard in March 1902, Hardy expressed concern that his own experience of agricultural life was "too exclusively on the domestic side to be of much use" (Purdy and Millgate 9). Similar doubts were cast concerning Hardy's knowledge of archaeology when a critic in *The Antiquary* (1908) perhaps unfairly labelled Hardy's account in the *Times* concerning the excavation of Maumbury Ring as "non-archaeological" (402). Yet despite Hardy's not being considered an expert in either agriculture or archaeology, his knowledge of both subjects added depth and dramatic intensity to some of the most memorable scenes in his novels. When Tess, bereft of her child and pursued by her tormentor, Alec D'Urberville, is working the steam-threshing machine she is "shaken bodily by its spinning" and "thrown [. . .] into a stupefied reverie, in which her arms worked on independently of her consciousness." The threshed straw forms a "yellow river" which unnaturally "runs uphill" (Hardy, *Tess* 322-3); the antithesis to her "whimsical fancy" that "would intensify natural processes around her till they seemed a part of her own story" (91). Tess's alienation from the machine symbolises her social predicament as an unmarried mother and "fallen woman." As a product of her family's misplaced adherence to a faulty aristocratic system, Tess loses her independence and eventually her life. Kingsbere, the ancestral seat of the

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D'Urbervilles is a "half-dead townlet [. . .] where lay those ancestors of whom her father had spoken and sung to painfulness" (348). Hardy's implicit suggestion that ancestral social structures were an outdated product of civilisation was a view already in debate during the 1850s. An article in the *Manchester Times* (1851) discusses how "we are acknowledged to be the most aristocratic people on earth" with "various grades of nobility"; this characteristic of the nineteenth century had been absent from prehistoric societies – the "democratic character" of which had "preserved [. . .] the original spirit of the race, the spirit of individual independence." The land was farmed and managed under this hierarchical structure until the agricultural revolution brought new types of squires who had connections in the city, and sometimes overseas, and who did not necessarily have an ancestral seat in the area.[7] For Tess's husband Angel Clare, farming abroad in the Colonies promises "independence without the sacrifice of [. . .] intellectual liberty" (121).

Tess's inability to feel "at home" in the world is finally, yet only temporarily, resolved when she and Angel flee from the police to Stonehenge, the largest megalithic monument in Europe. When she lies upon the altar stone she states: "One of my mother's people was a shepherd hereabout, now I think of it. And you used to say at Talbothays that I was a heathen. So now I am at home" (379). In the ancient enclosure and burial ground, where prehistoric societies once celebrated death, Tess makes the greatest sacrifice of all – not that of her own life – but her letting go of her husband so that he might be free to live on without her and marry her sister Liza-Lu. The altar stone symbolises freedom from the laws and expectations of nobility; a liberty associated with the Neolithic people who constructed it. Despite the myths surrounding its purpose and construction, nineteenth-century accounts identified the monument as a centre of religious and economic importance for Britain's earliest farmers. Angel's identification of the "lofty stone set away [. . .] in the direction of the sun" (380) infers his knowledge of these former times when the land had been managed in accordance with solar and lunar cycles. Within the complex "web" (340) of Victorian class and social structure this form of fertile and meaningful engagement with the natural world – which Tess had glimpsed as a "Pagan fantasy of [her] remote forefathers" (109) – is no longer possible. With the loss of these centuries-old traditions, the ancestral system – represented by the mouldering D'Urberville tombs – offers only a "half-dead" and barren psychic ground without light or potential. Thus, Tess perceives her ancestors as "useless" and "she almost hated them for the dance they had led her" (108). Tess's condition as a fallen woman and murderess has no place in the present, yet finds a 'home' in the lawlessness of the prehistoric setting, where former "sacrifice [. . .] to the sun" (380) celebrated the relationship between life and death. Hardy thus hints that connections between past and present people, which for the most part exist on a subterranean unconscious level, can be illuminated through dramatic moments in the landscape where the human past suddenly becomes tangible.

Despite latent differences in their imaginative interpretation of archaeology during the great agricultural depression, Jefferies's and Hardy's comparisons of modern and ancient farming practices, gained through the increasing availability of knowledge of how ancient societies lived and died, allowed greater insights into the relation between humans and the landscape over time, and forged new connections between Victorians and their ancestors. Placing agricultural change in the broader perspective of past human life revealed the consistent importance of farming to communities over time, and through observing contemporary human activity in the landscape it became possible to understand ways in which the past continued to exist.

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Consonant with this process were new ways of thinking and feeling about the relation of the individual to both wider and prehistoric society, and suggested what Hardy termed the "continuance" (*Woodlanders* 327) of the prehistoric state in the psyche, rather than it being a separate or dysfunctional past. Paths in the landscape and mindscape could still be followed, despite the lapse of time since their original construction. These "Ridgeways" of thought and feeling, which continued to be traversed over centuries, offered a means of experiencing the landscape in ways similar to ancient communities who inhabited and farmed the same area. That some of these tracks were observed to have been "neglected" during the nineteenth century points to the late-Victorian awareness of the loss of traditional ways of living and a weakening connection with the past. However, the repetition of certain customs and rites in the landscape expressed the human impulse to reconnect with the environment, and were perceived to transcend social and cultural change, thus placing the individual – coming to terms with the implications of the Agricultural revolution – in a grander sequence of life, which remained essentially unchanged since prehistoric times.

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Notes

1. Jefferies was born in Wiltshire and Hardy in Dorset.

2. Thomas Hardy's article, "The Dorsetshire Labourer" appeared in *Longman's* in July 1883, and Jefferies's "The Wiltshire Labourer" was published four months later in November 1883.

3. See, for example, an account of an excursion by the Cardiff Naturalists Society in 1874 that visited cromlechs on the Duffryn Estate. In an address delivered while standing on top of one of the cromlechs the president of the society hints towards a more sympathetic understanding of past peoples: "Here were deposited, in a remote period of history, the remains of British chieftains, of parents whose burial may have caused many a scene of sorrow – deep and touching as the scenes so frequently witnessed in our modern cemeteries." ("Cardiff Naturalist's Society" 6).

4. The discovery of this previously unknown essay in *The Examiner* establishes that Jefferies wrote on agricultural subjects for the magazine; a weekly review of politics, literature, science, and art published in London.

5. The association between the crafting of weapons and refuse heaps had been established through excavation. See, for example, Auguste Demmin. *Weapons of War: being a history of arms and armour from the earliest period to the present time*. Trans. Charles Christopher Black. London: Bell and Daldy, 1870, p. 80, who in his discussion of polished flint weapons alludes to 'alluvial soils in which great quantities of these beautiful weapons have been found (in the so-called Kiokkenmoedinge or kitchen-refuse heaps)'.

6. For readings which suggest that Hardy incorporates biological determinism into his novels see Jane Mattison, *Knowledge and Survival in the novels of Thomas Hardy* (2002) Chapter 4, and Richardson in Wilson 54-69. Readings that closely affiliate Hardy with Darwin might exercise more caution in the use of terms such as "staunch humanist" and "evolutionary meliorist" to describe him (see, for example, Mallikarjun 37), and pay more attention to Hardy's ambivalence towards Darwin.

7. For further reference see "Old Squires and New." *Blackwood's Edinburgh Magazine* 126. 770 (1879): 723-739.

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Sarah Bouttier, "Fitness and Presence in D. H. Lawrence": 38-54

"Wherein Does Fitness Lie?": Darwinian Fitness and Presence in D. H. Lawrence

Sarah Bouttier

There are numerous studies on the influence of evolution in Lawrence's works,[1] and as many on Lawrence's reappraisal of time.[2] Yet few consider these together. Anne Fernihough posits that linear evolutionary time eroded presence and was therefore to be subverted by Lawrence: "For Lawrence, the linear version of time upon which Darwinian theory rests can never capture 'presence,' since it is based on the method in which presence is continually deferred. It posits itself [. . .] on absence rather than presence" (177). This idea is particularly useful in understanding the conflict between fitness and presence: a Darwinian notion of fitness is at odds with presence because it inserts the life of an organism into a linear conception of time for which the present has in itself no value, since it is only considered in its relationship to the future (will the creature or the characteristic survive?). Presence, in this context, refers to an object's material and historical existence, what Lawrence believes all art should aim to express. Presence amounts to the "existence of matter" (Lawrence, *Phoenix* 568) as opposed to "the abstracted reality" (*Phoenix* 569) of things as we usually perceive them through our logical minds.

In her seminal study, Fernihough frames this thought within a general appraisal of Lawrence's aesthetics but her point is not specifically to address evolutionary images in Lawrence's texts. For Ronald Granofsky, the tension generated by Lawrence's endorsement of a Darwinian notion of fitness is mainly due to his own anxiety of survival, his health being notoriously weak (Granofsky 8). This biographical explanation encompasses but does not dwell on Lawrence's emphasis on presence rather than progress. This article will argue that other factors, such as Lawrence's reappraisal of fitness as illness rather than health when one is facing a noxious environment, trigger creative conflicts within Lawrence's texts. In that point, this article differs from Granofsky's study, which comments upon the clash between fitness and presence thus: "Lawrence may be said to 'inherit' from Darwin and Spencer the circularity of his argument at this point, but the result in his fiction is unfortunate. It has the sanction of the very evolutionary theory Lawrence claims to reject" (33). Rather, this article will show that where Lawrence's texts grapple with the antagonism of the notion of fitness with his will to represent creatures in the present time, the relating conflict underlying his works can be creative.

Indeed, Lawrence's revision of Darwinian fitness is original in many ways. Its main characteristic, its ecological dimension, draws on another famous evolutionary trope, Darwin's 'entangled bank' as it is described in the last paragraph of *The Origin of Species*, in which Darwin shows a certain fascination for the interconnectedness of all living beings. However, Lawrence's revision focuses on the individual and its presence rather than on the abstract snarl in which all creatures are trapped, which is a more common interpretation of this trope. Moreover, the inevitable tensions led by the introduction of the notion of fitness in literary texts – the impossibility of reconciling fitness and presence, and its corollary, the impossibility of defining criteria a priori – add depth and intensity to the creatures represented, as the latter struggle to remain fit while not being abstracted by their fitness. In the context of literary history, Lawrence's revision of Darwinian fitness combines a linear account of evolution,

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which recalls some Victorian thinkers and novelists, with a Modernist attempt to subvert this linearity and to emphasise the presence of his poetic objects. In this genuinely Lawrentian vision, a creature acquires fitness through its insertion and reaction to a system which must be far-reaching and perpetually evolving, be it the entire cosmos, or a network of images in a poem.

In *On the Origin of Species* (1859), Darwin assessed fitness retrospectively, leading him to theorise the workings of natural selection. Lawrence, on the other hand, was a writer who wanted to capture his creatures and characters' presence, not to abstract them by inserting them into a grander narrative such as evolution; however, his work is, as Granofsky showed and as the quotation in the title of this article implies, pervaded with questions of fitness and survival. Lawrence's writing elaborates a personal conception of fitness, requiring him to eschew the theoretical frame of natural selection, and to consider fitness as more than an ability to survive. Conceptually, this disentanglement is contentious, perhaps accounting for Lawrence's reluctance to define his own criteria of fitness:

> The quick is God-flame, in everything. And the dead is dead. In this room where I write, there is a little table that is dead: it doesn't even weakly exist. And there is a ridiculous little iron stove, which for some unknown reason is quick. And there is an iron wardrobe trunk, which for some still more mysterious reason is quick. And there are several books, whose mere corpus is dead, utterly dead and non-existent. And there is a sleeping cat, very quick. And a glass lamp, alas, is dead.
> What makes the difference? *Quien sabe!* But difference there is. And I *know* it. (*Phoenix II* 419)

Here, Lawrence struggles with the impossibility of giving an abstract definition of what it is to be quick, fully alive. Margot Norris ascribes this difficulty to Lawrence's reluctance to reduce the flame to its components or to a law of nature (178). It could be reformulated in terms of fitness and presence: the iron stove's fitness *is*, and saying more would be inserting it into an abstract causal logic which would diminish its immediate presence at the moment of the description. However, this quotation shows a major feature of a potential Lawrentian fitness: what counts for Lawrence is not so much the definition of vitality as the interactions between quick things and dead things. The quickness of a thing or creature depends on its difference, that is to say on its insertion within a system in which it may be compared to other creatures and interact with them. Fitness, when it becomes Lawrentian, thus acquires an ecological dimension, in the sense that it is concerned with the relations of organisms to one another and to their surroundings.

Conversely, bodies absolutely disconnected from their environment, as in the poem "Bathing Resort" (*Complete Poems* 826) offer additional clues as regards the Lawrentian conception of fitness. Bathers lying on an Austrian lakeshore are ironically deemed "healthy":

> All of them healthy
> ……
> Their skins all neat
> With full-fed meat
> Biologically admirable
> They'd be good to eat. (42-49)

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This health is equated with a form of biological perfection, overtly criticised by the poet. Indeed, the adjective "admirable" gives the impression that the sunbathers' bodies are the result of a successful manipulation. Lawrence's awareness of the question of fitness, and the evolutionary vocabulary of the poem, which mentions "epochs" and refers to the bathers by a species name, "the humans," suggest that this manipulation is no less than a form of natural selection, whose aim is to produce individuals as fit to their environments as possible. However, this biological perfection is criticised as it does not come along with a perfect insertion in one's environment; on the contrary, Lawrence's sunbathers are inert, and do not interact with their surroundings:

> Great thighs that lead nowhere
> Yet are fleeced with soft hair.
> Breasts that wink not
> Heads that think not
> Bellies that shrink not
> In the white air. (26-31)

In this poem, Lawrence clearly distances himself from biological accounts of fitness: if what is judged 'biologically admirable' is also described as inert and failing to connect with its environment, then Lawrence's own account of fitness differs from a biological account of fitness. A genuinely Lawrentian fitness must depend on a will, even an unconscious one, to enter into contact with one's environment, a tendency of which the bodies on the beach are deprived. A 'fit' body for Lawrence would be a body in movement, connecting itself to its surroundings.

For Lawrence, basing a creature's degree of fitness upon an ecological criterion allows the natural world to become a system and no longer a mass of disconnected species that have happened to survive. In this natural environment, a creature's fitness is conditioned by its degree of interaction with others. How, then, is this Lawrentian fitness distinct from a Darwinian fitness? The distinction lies in the fact that the effort to reach out is essential to Lawrence while it is only necessary in natural selection if it conditions survival. Indeed, for Darwin, "natural selection acts by life and death, by the survival of the fittest, and by the destruction of the less well-fitted individuals" (239). Therefore, the only criterion for the fitness of a form of life or of a characteristic in the theory of natural selection is its survival, an idea that underlies many of Darwin's developments, as the following:

> Natural selection may modify and adapt the larva of an insect to a score of contingencies, wholly different from those which concern the mature insect; and these modifications may affect, through correlation, the structure of the adult. So, conversely, modifications in the adult may affect the structure of the larva; but in all cases natural selection will ensure that they shall not be injurious: for if they were so, the species would become extinct. (99)

It is apparent here that all modifications implemented by natural selection necessarily work towards more fitness at a given time, since modifications of any other kind would provoke the species' extinction. Therefore, only survival can condition fitness: whatever is not fit has simply not survived. This take on fitness faces what Mills and

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Beatty have named "the charge of explanatory circularity": only what is fit survives, and only what survives is fit (161).

By making the reaching out, the interaction, an end and not a means to ensure survival, Lawrence avoids this Darwinian tautological structure in which fitness is equated with mere survival and which does not include any other criterion for fitness, as well as avoiding the abstraction problematic to an illustration of the notion of survival. Fitness and an emphasis on the present time coexist in Lawrence's writing. Indeed, it is really in its relation to the present time, the moment lived by individuals, that Lawrentian fitness is distinguishable from Darwinian fitness. In order to fully understand this distinction, one must compare what, in Lawrence, pertains to the movement of living matter as a whole and what pertains to the movement defining an individual's fitness. It appears that for Lawrence, living matter is animated by a movement of self-preservation, an eternal return to the centre and the origin of life, with no other aim than the continuity of its existence. In that, it differs greatly from the movement animating a 'fit' individual in a Lawrentian text. In terms of time-frame, the movement of living matter is only perceptible in the abstract, longer time of natural history while the movement of the individual is perceptible in the present moment.

That is why, when comparing the behaviour of living matter in the shape of an undifferentiated "living plasm" ("Poetry of the Present," *Complete Poems* 182) with the behaviour of the bodies lying on the beach in "Bathing Resort" (*Complete Poems* 824) and "August Holidays" (*Complete Poems* 826), one understands that the characteristics of the movement of living matter do not necessarily ensure fitness when they apply to a Lawrentian individual. Indeed, in Lawrence's texts, the perpetual struggle for self-preservation and the escape from the linearity of finality and the passage of time are sources of wonder when ascribed to living matter as a whole, but condemned when characterizing an individual. For example, the movement for self-preservation takes the form of a fascinating vibration when it comes to matter ("the living plasm vibrates unspeakably") (*Complete Poems* 182), while the bathers abandoned to the sole movement of their breathing are despised for their apathy: "They lie on the shore and heave / Deep panting breaths, like great beasts ready for slaughter" ("Bathing Resort 15-16). The simple movement of breathing is enough to fascinate the poet when he describes the movement of living matter, but seems insufficient to satisfy him when it animates individual bodies.

Similarly, the absence of finality is celebrated in "Poetry of the Present"'s apology of living matter ("There is no plasmic finality, nothing crystal, permanent") while it is condemned in the bathers' behaviour: "Now wet, now dry / Without wherefore or why / Back and forth in a blind movement" ("August Holidays" 31-33). Finally, the escape of living matter from a linear vision of time is praised: "The living plasm [. . .] inhales the future, it exhales the past, it is the quick of both, and yet it is neither." (*Complete Poems* 182), while it is seen in a negative light when pertaining to the sunbathers: "All that will be, all that has been / - There is nothing between - / Now is nothing!" ("August Holidays" 20-22). In those quotations, it appears that Lawrence marvels at the sheer, purposeless being of matter, but sees it as preventing individual bodies from being connected satisfyingly with their environment and from living fully in the present.

Whereas the Lawrentian living matter exists only through this vibrating movement of eternal return to itself, Lawrentian individuals endowed with vitality must transcend this movement in order to connect with each other, inscribe their existence in the historical present, and react to their environment. That is exactly what

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the sunbathers by the Austrian lakeshore fail to do, as they are repeatedly described as apathetic. Lawrence opposes an ideal form of living: "The upright is temporal, is effort, is outreach," with the bathers' inertia: "Horizontal eternity, fluid or null" ("Bathing Resort" 22-23).

In that sense, fitness and the movement of living matter have diametrically opposite attributes in Darwinian theory and in the Lawrentian conception of life: whereas in natural selection, living matter, in the form of species, evolves eternally but not in each creature (which does not prevent the latter from being 'fit'), for Lawrence, living matter preserves itself eternally but makes a movement, an effort (and thereby, evolves) in each creature. Not only does the movement of evolution happen in the present time for Lawrence, but it also conditions its fitness, while in Darwinian evolutionary theory, an individual can be fit without manifesting any movement of adaptation. Indeed, Darwin situates adaptive change between the generations: no evolutionary change or movement of adaptation happens during a creature's lifetime, as Darwin establishes that adapted creatures only reproduce more than others, and therefore that it is from one generation to the other that, very slowly, adapted characteristics appear:

> [. . .] If variations useful to any organic being ever do occur, assuredly individuals thus characterised will have the best chance of being preserved in the struggle for life; and from the strong principle of inheritance, these will tend to produce offspring similarly characterised. This principle of preservation, or the survival of the fittest, I have called natural selection. (Darwin 160)

Since even the initial "variation" is actually present in the individual from its birth, it appears that in a Darwinian time-frame, no interesting change happens to an individual during its lifetime: the movement of adaptation to one's environment is therefore not visible at the level of the individual. Conversely, Lawrence, in locating fitness in the individual's reaching out, in its own movement towards its environment, allows fitness to be manifest at the level of each individual, in the present time, and not only within the longer time-frame of the history of species and living matter.

The behaviour of Il Duro, a young Italian whom Lawrence meets in San Gaudenzio in 1912 and describes in *Twilight in Italy* (1916) allows us to define more precisely the movement and interaction necessary to Lawrentian fitness. It is, indeed, very different from the movement of adaptation to one's environment present in the theory of natural selection. At first sight, however, both behaviours could be taken as one and the same, since Il Duro lives in perfect harmony with the earth out of which he seems to have emerged:

> He mixed the messy stuff, cow-dung and lime and water and earth, carefully with his hands, as if he understood that too. He was not a worker. He was a creature in intimate communion with the sensible world, knowing purely by touch the limey mess he mixed amongst, knowing as if by relation between that soft matter and the matter of himself.
>
> Then again he strode over the earth, a gleaming piece of earth himself, moving to the young vines. (*Twilight in Italy* 177)

Il Duro is a very 'fit' character in Lawrentian terms because he maintains a vital connection with his environment. However, Lawrence mentions Il Duro's previous

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illness: "He had been ill two years before. His cheeks seemed to harden like marble and to become pale at the thought. He was afraid, like marble with fear" (175). Here is one of the recurring and paradoxical characteristics of Lawrentian fitness: it adapts with, or even generates, a certain degree of illness, of proximity with death.

Therefore, being fit according to Lawrence's vision does not ensure survival, and may even sometimes hasten one's death. Thus, in *Lady Chatterley's Lover* (1928), Mellors is close both to the purest vitality and to death, as the first description of him reveals:

> He was in trousers and flannel shirt, with a grey tie, his hair soft and damp, his face rather pale and worn-looking. When the eyes ceased to laugh, they looked as if they had suffered a great deal, still without losing their warmth. But a pallor of isolation came over him – she was not really there for him. And she felt a curious difference about him, a vividness; and yet, not far from death itself. (68)

This odd association may be explained by the Lawrentian idea according to which illness in fit bodies amounts to a healthy defence, a survival reaction and thus the expression of the greatest 'fitness,' against the devitalizing process undergone by modern humanity. This theory is notably articulated by Rupert Birkin, in *Women in Love* (1920)*:* "'Maybe,' he said. 'Though one knows all the time one's life isn't really right, at the source. That's the humiliation. I don't see that the illness counts so much, after that. One is ill because one doesn't live properly – can't. It's the failure to live that makes one ill, and humiliates one'' (125).

If an intense reaction to one's environment is the *sine qua non* for a Lawrentian fitness, this reaction is not necessarily that of Darwinian adaptation: for Lawrence, if the environment is noxious, it appears better to reject that environment, even if it means becoming ill, than to slavishly adapt to it. A Darwinian reaction of survival, on the contrary, involves adaptation at all costs, with no further insight than what serves survival at a given time:

> As natural selection acts by competition, it renders the inhabitants of each country perfect only in relation to the other inhabitants; so that we need feel no surprise at the species of any one country, although on the ordinary view supposed to have been created and specially adapted for that country, being beaten and supplanted by the naturalised productions from another land. (559)

For Darwin, then, if an alien factor such as the introduction of a new species happens to change a given environment, fitness to the environment's previous state becomes of no use. The extreme relativity of this notion of fitness is distinct from Lawrence's selective conception of fitness, his injunction, uttered by Birkin, to "live properly" (125). In this, Lawrence also differs from another author concerned with Darwinian notions of survival: Hardy, who, in spite of his own horror at such amorality, pictures the characters who survive (and therefore the fittest) as often not the 'purest' but the best adapted to their harmful social environment (Richardson 16).

Lawrentian fitness may thus be better illustrated by an interaction that is always faithful to a general principle of life than by the survival and reproduction of an individual because it bears adaptive characteristics. Darwinian evolutionary theory, locating, as mentioned earlier, the movement of evolution between the generations,

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could be said to deprive individuals of a sense of responsibility. This is visible in Darwin's comparison of natural selection with the selection operated by breeders on domestic species (Darwin 91-97), and in his conscious personification of nature:

> It may metaphorically be said that natural selection is daily and hourly scrutinising, throughout the world, the slightest variations; rejecting those that are bad, preserving and adding up all that are good; silently and insensibly working, whenever and wherever opportunity offers, at the improvement of each organic being in relation to its organic and inorganic conditions of life. (96)

In this conception of natural selection, no latitude is given to the individual, which appears as the passive object of the workings of nature. Lawrence, on the other hand, seems to consider that the changes making for the evolution of a species happen within an individual's lifetime, so that this individual must react, and not only survive, to its environment.

Lawrence, therefore, is sometimes successful in distinguishing his own vision of fitness from a Darwinian vision of fitness. However, what he appears to find problematic in Darwinian fitness (its incompatibility with the present moment as lived by the individual, since it is only defined retrospectively by its survival) seems to affect his own notion of fitness as well. Indeed, a comparison of Lawrence's representations of Darwinian fitness with his own representation of fitness shows that they are faced with the same limit (as any kind of fitness is at odds with the author's will to give primacy to the present time) and that the conflict gives rise to creative tensions.

"August Holidays" and "Bathing Resort" include aspects of Darwinian fitness against which Lawrence pitches his own notion of fitness, as an intense and unceasing interaction with one's environment. Yet more fundamentally, by representing the sunbathers as apathetic, Lawrence criticises the absence of a 'present' in the time of natural selection:

> They are making the pause
> Between the epochs.
> The life without laws
> The time without clocks
> Between the epochs.
> When nothing is said
> And nothing is done. ("August Holidays" 34-40)

Even though the bathers' bodies are 'biologically admirable,' their existence is trapped between evolutionary 'epochs,' much longer than their own lifetimes, so that they do appear apathetic. This can be interpreted as a Lawrentian critique of the Darwinian version of fitness. Indeed, unlike his predecessors, Darwin, as mentioned earlier, situates adaptive change between the generations: no evolutionary change happens during a creature's lifetime, the slowness of the process is often emphasised: "That natural selection will always act with extreme slowness, I fully admit. [. . .] I do believe that natural selection will always act very slowly, often only at long intervals of time, and generally on only a very few of the inhabitants of the same region at the same time" (108). For Lawrence, on the contrary, the emphasis must be laid on the creature's presence, the immediacy of its experience. That is why the introduction of a

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Darwinian vision of fitness in his poem gives rise to such apocalyptic visions of inert bodies.

It must be noted that in these poems, Lawrence identifies a version of Darwinian fitness which is even more at odds with presence than the original notion of Darwinian fitness – the interpretation popularised by Victorian thinkers, according to which fitness, redefined as physical health, is an aim in itself. This vision seems endorsed here by the sunbathers:

> Health is everything, health is all –
> Money is merely
> The wherewithal
> ……
> They are all healthy, healthy, healthy. ("Bathing Resort" 1-3, 9)

This reveals Lawrence's move away from Darwin who did not directly equate fitness with health. In *The Origin of Species*, even though he often refers to the idea of biological perfection which reminds us of the sunbathers' "biological admirability," marvelling, for example, at the complex structure of an eye, he deems an organ perfect only in that it perfectly serves a purpose such as seeing, or flying (Darwin 223-226). On the contrary, popularisers such as the social theorist philosopher Herbert Spencer emphasise the need for biological perfection, seeing the 'perfect man' in the 'perfect society' as the endpoint of evolution, and establishing ideal rules to follow in order to reach it: "For the average man [. . .] the desideratum is, a training that approaches nearest to perfection in the things which most subserve complete living, and falls more and more below perfection in the things that have more and more remote bearing on complete living" (11). In Lawrence's poems, this perfection has been reached, but with the result that the present time is not only considered non-existent, but also moved into a form of transfixed, apathetic eternity:

> Along the lake, like seals, like seals,
> That bask and wake, oh high and dry
> High and dry
> The humans lie. ("August Holidays" 1-4)

While within the frame of evolutionary time, the present is not considered important, individual lives are still anchored within a greater natural history, made of 'epochs.' The present time is not the moment in which events take place, but at least it is a necessary step in the unfolding of this natural history. Yet in the case of the sunbathers, even this vision of the present is dismissed, in favour of plain apathy. Then, the sunbathers are trapped between a linear evolutionary time necessarily deprived of a present, and an attempt to escape it which results in even less presence. Natural selection, the theoretical frame of Darwinian fitness, appears at odds with presence, yet the sunbather's interpretation of natural selection appears even more so. This gives rise to tensions which allow for and sustain the poetic vision of humans abandoned by evolution.

More surprisingly, among Lawrence's own interpretations (or, given that he overtly criticises Darwinian fitness, subversions) of Darwinian fitness, some are also at odds with presence. In those cases, his loyalty to presence creates greater and more fruitful tensions with his illustration of fitness. Indeed, very often, the texts featuring very fit characters along Lawrentian criteria (connection to one's environment, loyalty

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to a general principle of life) are confronted with the same limits Lawrence denounces in the system implied by a Darwinian fitness – namely, the incompatibility of 'fitness' with a full acknowledgement of the present time. Just as the evolutionary time Darwinian fitness imposes in "Bathing Resort" and "August Holidays" nullifies the present, the primacy of 'presence' often prevents Lawrence's characters and creatures from being complete expressions of fitness, even Lawrentian fitness. However, this limitation can be fruitful.

This fruitfulness can be found in the descriptions of Il Duro, the Italian peasant of *Twilight in Italy*. Indeed, Lawrence, at first sight, appears to be describing in this character a type of fitness not incompatible with an ability to live fully in the present. Il Duro is both fit along Lawrentian criteria, being intensely connected to the earth he cultivates, and able to reach a certain degree of plenitude in the present, without even resorting to the mediation of consciousness, as he is depicted cutting vines, "swiftly, vividly, without thought" (177). However, the 'perfect' fitness that Il Duro has reached seems to freeze him into a cold statue whose qualities are clearly not that of Lawrentian fitness as all the links with his surroundings seem severed: "It was too complete, too final, too defined. There was no yearning, no vague merging off into mistiness [. . .] He was clear and fine as semi-transparent rock, as a substance in moonlight. He seemed like a crystal that has achieved its final shape and has nothing more to achieve" (176).

In being absolutely fit, Il Duro is simultaneously a lively figure whose very kinship with the earth is expressly emphasised, and an inert, unresponsive glass statue, later likened to stone and marble (175). When Lawrence focuses on that aspect of the villager, he no longer emphasises his presence but, on the contrary, his complete abstraction: Il Duro is then depicted as "curiously indifferent [. . .] as if none of what he was doing was worth the while" (173). This tension, generated by the character's inability to be perfectly fit and perfectly present at the same time, produces enough intensity to provoke a hostile reaction in the narrator ("it filled me with a sort of panic to see him") (175) as well as in the villagers, as Il Duro is always markedly alone. As fitness does not show in the present, his perfect fitness, even as a Lawrentian one, makes him paradoxically inimical to his surroundings and the present time, and, therefore, 'unfit'.

Lawrence's fascination with perfectly fit creatures (along his own criteria of fitness) equals his urge to anchor his texts to the present time, and the resolution of these conflicting views not only gives rise to tensions which intensify the description of 'fit' characters but sometimes affects the structure of his narrations. Lawrentian fitness is based on an intense connection to one's environment rather than mere survival. Such fitness is exemplified by St. Mawr, the stallion in the eponymous 1925 novella: "St. Mawr flew on, in a sort of *élan*. Marvellous the power and life in the creature. There was really a great joy in the motion" (49). This *élan* reminds us of Bergson's *élan vital*, placing the horse in a tradition of vitalism that avoids the materialism and the linearity inherent in Darwin's natural selection. Throughout the novella, St. Mawr unceasingly dashes towards things and people, either to embrace or to destroy them: his response to his surroundings is therefore very intense, and the stallion can be considered fit along Lawrence's criteria. For that reason, his arrival in Mexico, presented as an intensely vital environment, should signal the apotheosis of his fitness – yet none of this happens:

> St. Mawr arrived safely, a bit bewildered. The Texans eyed him closely, struck silent, as ever, by anything pure-bred and beautiful. He was

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> somehow too beautiful, too perfected, in this great open country. The long-legged Texan horses, with their elaborate saddles, seemed somehow more natural.
> Even St. Mawr felt himself strange, as it were naked and singled out, in this rough place. Like a jewel among stones, a pearl before swine, maybe. But the swine were no fools [. . .]. They could see St. Mawr's points. Only he needn't draw the point too fine or it would just not pierce the tough skin of this country. (130)

This anticlimactic scene is St. Mawr's last appearance. Suddenly, St Mawr is no longer fit but, on the contrary, absolutely disconnected from his new surroundings. Why should it be so difficult to depict a climax of fitness? It seems that however distinct Lawrentian fitness may be from a biological or Darwinian one, it faces the same limit: just like the sunbathers,' St. Mawr's perfect fitness cannot be fully shown in the present. As a result, St.Mawr abruptly disappears from the narration. Lawrence cannot show full fitness, even the type of Lawrentian fitness identified in St. Mawr, as Cézanne, in Lawrence's essay on art quoted in the introduction, shows fully existing apples, because fitness and presence are at odds. This may explain the sudden disappearance of the stallion even though he is central to the narration, and the shift of focus in favour of the life in the mountains of New Mexico: if St. Mawr has become fully fit, perfect, he can no longer be 'present,' whereas presence is what Lawrence struggles for.

Following this shift of focus, the characters of the novella leave town and finally reach a place where presence is possible – though no longer associated with fitness. Indeed, they arrive in the mountains in autumn, the season which, according to Lawrence is the only one really present in such a desert:

> It was autumn, and the loveliest time in the south-west, where there is no spring, snow blowing into the hot lap of summer; and no real summer, hail falling in thick ice from the thunderstorms: and even no very definite winter, hot sun melting the snow and giving an impression of spring at any time. But autumn there is, when the winds of the desert are almost still, and the mountains fume no clouds. But morning comes cold and delicate, upon the wild sunflowers and the puffing, yellow-flowered greasewood. For the desert blooms in autumn. In spring it is grey ash all the time, and only the strong breath of the summer sun, and the heavy splashing of thunder rain succeeds at last, by September, in blowing it into soft puffy yellow fire. (*Saint Mawr* 134)

Here, the tension between fitness and presence has given rise to a shift in focus, privileging presence over fitness. Even though the image of pure fitness represented by St. Mawr has disappeared from the narration, it has allowed for a representation of pure presence instead, a presence which is the complete antithesis of the situation of the sunbathers in "Bathing Resort" and "August Holidays." Indeed, those poems show the dreadful consequences of privileging fitness over presence, a process which makes the present void as opposed to a larger time-frame, natural selection, in which events actually take place. Conversely, this passage of *St. Mawr* shows characters reaching the only moment in the seasonal cycle which does really exist in the present ("But autumn there is").

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Another form of tension appears from the conflict between Lawrence's own interpretation of fitness and his urge to anchor his texts in the present time. As demonstrated in this analysis of *St. Mawr*, if natural selection introduces the negation of 'presence,' fitness cannot show, or be fully acknowledged, in the present. While it is not an issue for science to explain the fitness of characteristics retrospectively, it may become one when the notion of fitness is introduced in literature, especially for an author like Lawrence, who tries to grasp 'presence,' and the present time and attempts to apply it to the notion of fitness. In particular, Lawrence is confronted with the difficulty of establishing other criteria for fitness than mere survival. Ronald Granofsky has said that in Lawrence's texts, natural selection is replaced by authorial power, the narration becoming the arena where the character's fitness may or may not be established:

> Lawrence self-reflexively applies to his own writing this same method Norris describes in Darwin, allowing some ideas and characters to survive the crucible of conflict, while others perish. Lawrence himself becomes, in effect, the animal predator, or perhaps more accurately the breeder or calculator whom Darwin speaks of as practicing a form of human selection that is akin to the natural kind. (24)

In such a system, the author must somehow let some characters or creatures manifest a form of fitness *before* they survive or perish, which amounts to establishing criteria for his idea of fitness. As the following analysis shows, this enterprise proves very difficult.

The difficulty is manifest in "Rabbit Snared in the Night" (1917) (*Complete Poems* 240), a poem in which Lawrence attempts to describe a rabbit before killing it. Since the rabbit is not dead at the beginning of the poem, we expect to be shown clues of his fitness or unfitness (ability or inability to survive), followed by his survival or death. However, we are never given those clues. Somewhat insincerely, the persona repeatedly claims that he killed the rabbit because the rabbit had lured him into that slaughter through some obscure trick. It would then be the rabbit's 'desire' which made it unfit. However, the very rhetorical devices used to persuade us of the rabbit's complicity cast a doubt on this claim:

> It *must* have been *your* inbreathing, gaping desire
> that drew this red gush in me;
> I *must* be reciprocating your vacuous, hideous passion.
> …….
> It *must* be you who desire
> this intermingling of the black and monstrous fingers of Moloch
> in the blood-jets of your throat. (34-36, 40-42) [my emphasis]

'Must' introduces some uncertainty, as if the persona tried to persuade himself and the reader of his innocence. Similarly, the use of imperatives, supposed to validate what the poet already sees, may be understood as plain orders:

> Yes, bunch yourself between
> my knees and lie still.
> Lie on me with a hot, plumb, live weight,
> heavy as a stone, passive,

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yet hot, waiting. (5-9)

Finally, the open question concerning the rabbit's behaviour, "why do you spurt and sprottle like that, bunny?" is answered by the following interrogation: "why should I want to throttle you, bunny?" The rabbit "sprottle[s]" only so that the poet may want to "throttle" him: he is thus given no freedom to reveal criteria of fitness or unfitness. Instead, the poem is trapped in retrospective legitimization, in a tautological structure where the lack of fitness is only assessed by the rabbit's death. If the rabbit's presence, in its unpredictability, is not rendered, the tension arising from the conflict between representing fitness and anchoring one's text in the present time is nonetheless creative: this enterprise of legitimization and the controversial claim that the rabbit actually desires its death provoke a feeling of unease which gives the poem its depth.
Thus, it appears that most forms of fitness at work in Lawrence's text are bound to clash with his will to represent the present time, the lived moment in all its plenitude. However, this conflict is often creative, endowing the description of the sunbathers in "Bathing Resort" and "August Holidays," of Il Duro in *Twilight in Italy*, of the "Rabbit Snared in the Night," and of the landscape deprived of the stallion in *St. Mawr* with the depth and intensity of oxymoronic images: peaceful sunbathers now become evolution's castaway, the unsettling vision of a rabbit willing to die, an Italian peasant both wonderfully alive and resembling a statue, and a miraculously blooming desert.

As well as offering productive creativity, this specifically Lawrentian outlook on fitness also affects the structure of his poetry. "Sicilian Cyclamens" (1923) (*Complete Poems* 310), for example, features the blooming of little bunches of cyclamens in Taormina. At the beginning, the flowers do not seem to match any classic criterion of fitness:

Frost-filigreed
Spumed with mud
Snail-nacreous
Low down. (18-21)

Their environment, mud, frost, toads and snails, seems to smother rather than nurture them, and "low down" as they are, they do not seem to be able to adapt to it: unlike Darwinian creatures, the cyclamens will not derive their vitality from perfect adaptation through gradual mutation. The flowers, however, will bloom later in the poem, as more elaborate images associate them with various creatures. Even though the associations are incongruous, they seem to condition this blooming. For example, through the metaphor of little greyhounds, the cyclamens are given a chance to open:

And cyclamens putting their ears back.
Long, pensive, slim-muzzled greyhound buds
Dreamy, not yet present,
Drawn out of earth
……
Folding back their soundless petalled ears. (24-27, 37)

By giving them a metaphorical muzzle, Lawrence even allows them to breathe; a vital, if not strictly vegetal, activity. Their metaphorical action ("folding back their soundless petalled ears") echoes the actions of a hare later in the poem ("The hare

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suddenly goes uphill / Laying back her long ears with unwinking bliss") and of savages earlier in the poem ("when he pushed his bush of black hair off his brow"), while they become more and more active and alive:

> Muzzles together, ears-aprick,
> Whispering witchcraft
> Like women at a well, the dawn-fountain. (52-54)

There seems to be a correspondence between the blooming of the cyclamens – the revelation of their fitness – and their ability to metamorphose: as opposed to a Darwinian slow mutation whose purpose is to adapt to an environment, transformations of the cyclamens involve their own being and are ephemeral. Through their allotropy, their ability to vary and to be associated with different images while keeping their own nature, they gain the "fullness" of life, the ability to "do more than survive" (*Phoenix II* 468), which Lawrence conceived as his notion of fitness. By the end of the poem, their fitness has been so well established that they are declared to have survived since before the Greek classical period, when the Erechteion was built: "Dawn-pale / Among squat toad-leaves sprinkling the unborn / Erechteion marbles" (61-63). Lawrence insists that the very cyclamens he sees are those already present before the Greeks. He makes clear that the fitness of his flowers allows them to do more than survive as a species: they are indeed able to survive themselves as individuals, thus transcending survival in Darwinian terms of continuation of the species.

In the cyclamens, presence and fitness have been reconciled: it seems that from a literary point of view, it is through confronting the creatures to incongruous images, and having them metamorphose, rather than gradually mutate, in order to fit into a network of images, that Lawrence ensures the simultaneous presence and fitness of his creatures. In other words, the use of varied and multiple metaphors allows the poetic object to continue to be present in the poem (which could be considered as a form of literary 'survival' due to the poetic object's 'fitness') and to acquire a fuller presence within the text, as the intricate network of images gradually built around the object provides the reader with the sense of a more and more comprehensive vision of the poetic object.

In the context of literary history, Lawrence's revision of the notion of fitness is unique, in that it differs both from a Victorian appraisal of time and from a Modernist one. Lawrence combines a Victorian concern towards the link between evolution and a conception of time with a Modernist will to reflect individuals' experience of time. Victorians often reacted to evolutionary theory by understanding it as temporally linear: in their assessment of Victorian temporality, Hughes and Lund (1991) claim that evolutionary thought, even though it could give rise to both linear and chaotic accounts of natural history, often led Victorians to consider creation as "a slow unfolding of life forms over vast amounts of time." They link this phenomenon to Victorian historicism, which, "like serial emplotment, emphasised non-reversible sequences of events essential to cultural development, and history was viewed as an analogue to the developmental process of nature" (169).

Modernists were more aware that time was not necessarily linear. Many explanations are given for such a shift in the perception of temporality in the early twentieth century: Hughes and Lund ascribe this to "the displacing of biology by physics as dominant science" arguing that "the work of twentieth century physics actively resists such a framework [the evolutionary, linear one] and calls into question

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not only linearity but also simplified notions of causality" (167). In *Modernism and Time* (2000), Ronald Schleifer considers Modernism as the age of the collision between past and present, a shift in the perception of time triggered by the second Industrial Revolution which brought out abundance instead of need and thereby a sense of complexity and crisis which undermined Victorian historicism (145).

Therefore, it was not in relation to time and presence that Lawrence's contemporaries considered evolutionary thought, instead associating evolutionary thought and the notion of fitness with matters related to social Darwinism and with the question of the legitimacy of artificially accelerating natural selection. As David Bradshaw points out in his chapter on eugenics in *The Concise Companion to Modernism* (2003), in the early twentieth century, eugenicist ideas were not yet tainted with fascist overtones, and writers such as T. S. Eliot, Virginia Woolf and Lawrence himself embraced them to varying degrees. Anxieties also still attended the blurred boundaries between human and animal, and the possibility of degeneration: evolution is still considered in its effect upon the qualities of present-time men and women, but not in its effect upon the primacy and reality of the present time in itself.

Thus, among Modernist writers, linearity is subverted through other means than a critique of the evolutionary account of time, such as free indirect speech in Joyce or the multiplicity of narrative voices in Woolf, devices which Lawrence would consider disembodied and 'self-conscious.'[3] Unlike his contemporaries, Lawrence attempts to anchor a non-linear account of time in the physical world, and therefore to link it with the evolutionary thought which informs the time's ideas on nature. This proves all the more problematic as he considers that the Darwinian theory of evolution entails a linear conception of time: in *Mornings in Mexico*, 1927, he states, derogatorily, that the process of evolution is a "long string hooked onto a First Cause" (4). Therefore, his account of fitness, that is of the expression of the workings of natural selection within the individual, is bound to clash with his Modernist attempt to express a nonlinear temporality. Lawrence's endeavour to associate a preoccupation for his creatures and characters' presence with a revision of fitness positions him as a unique figure in the history of literary responses to evolutionary thought.

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Notes

1. See, for example the first part of Jeff Wallace's *D. H. Lawrence, Science, and the Posthuman* (2005).

2. For instance, a section of Ronald Schleifer's *Modernism and Time* is devoted to an analysis of temporality in *The Rainbow* (1915, 139-146).

3. Michael Bell notes that for Lawrence the "formal self-consciousness of modernist art and writing" did not restore a depth of consciousness in the present time but amounted to "a further, indulgent symptom of the condition" of modernity as abstracting presence (182).

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John Holmes, "Roundtable: Introduction": 55

Historicism in Literature and Science: A Roundtable – Introduction

John Holmes

The five papers in this roundtable originated in a plenary session at the seventh annual conference of the British Society for Literature and Science in 2012 at the University of Oxford. Since the foundation of the BSLS, the papers presented at its conferences and the books reviewed on its website have been very largely historicist in their approach, following a tradition that goes back to the earlier work of critics such as George Rousseau on the eighteenth century, Gillian Beer and George Levine on the nineteenth century, and Ian F. A. Bell on modernism (each of whom has either spoken at or been honoured by the BSLS itself). Given the dominance of historicism in this field, especially in Britain, we felt that it was important to examine its conceptual possibilities and methodological demands. What, we wanted to ask, are the specific challenges for historicism in literature and science, as distinct from those facing historicism more generally? Why might historicism be both particularly crucial and particularly vexed in our field? What difference, ultimately, does it make that we are working on science, which is not only an immensely complex cultural phenomenon but an authoritative body of knowledge and a highly effective set of methods for generating understanding in its own right?

The panellists were invited to participate on account both of their own substantial contributions to the field and their different vantage points on it. We were keen to garner opinion from scholars working on a range of different periods, to avoid too narrow or parochial a perspective. For the same reason, we wanted to include at least one voice from North America, a range of literary preoccupations and genres, and a range of scientific areas of interest too. Finally, we were keen too to draw on the collective experience of the BSLS – the conferences, book reviews and book prize – in taking stock of the field. The final panel comprised: Leah Knight, Associate Professor at the Centre for Medieval and Renaissance Studies at Brock University in Ontario, who contributed both expertise in the early modern period and a North American angle; Sally Shuttleworth, Professorial Fellow in English at St Anne's College, Oxford, best known for her work on Victorian fiction and periodicals; John Holmes, Senior Lecturer in English Literature at the University of Reading, and a critic of Victorian and modern poetry; Michael Whitworth, Oxford University Lecturer in 20th Century Literature, Tutorial Fellow at Merton College, and an expert on modernism and science; and Peter Middleton, Professor of English at the University of Southampton, who has been working for a number of years on a book on science in post-war and contemporary American poetry. At the time of the panel itself, Michael Whitworth was the Chair of the BSLS, Peter Middleton was the Secretary, and John Holmes the Reviews Editor. All five contributors have been judges for the BSLS book prize at different times, while Leah Knight and Sally Shuttleworth have both won the prize themselves. Each panellist spoke at the conference, and each has written up their paper for publication here. In so doing, we turn a reflexive gaze onto historicism as both the dominant method and the primary preoccupation of literature and science scholarship, suggesting that, while it has an excellent track record in generating and enabling exciting and insightful research, it is neither uncomplicated nor necessarily unquestionable.

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Leah Knight, "Roundtable: Historicising Early Modern Literature and Science": 56-60

Historicising Early Modern Literature and Science: Recent Topics, Trends, and Problems

Leah Knight

How to historicise early modern literature and science? The question has been answered occasionally, if only by example, since at least the nineteenth century, when it was generally (if tacitly) answered: read Shakespeare, quote all things science-y or some declared subset, and discuss them as sprigs on a larger cultural wallpaper of scientific ideas, many now quaintly wrong. Publish.

Now the question of how to historicise these materials is answered more variously, not least because the scope of historicisation is more particular, pinpointing local cultural variants with an ever pointier pin, if often with a concomitantly narrower sense of the cultural point of such studies. Given the predilection in early modern scholarship for the local, the fragment, and the curious survival over the system or master narrative – and based on my selective engagement with the scientific and literary culture of a vast period identified not only as early modern but as late medieval, or post-medieval, or 'the' (but which?) Renaissance – I will offer some observations on recent happenings with historicism in the period. After a whirlwind literature review that identifies stand-out themes and approaches, I will outline half a dozen wider habits likely to resonate with work in later periods. This compressed topical literature review appears *sans* citations with the exception of noting two excellent reviews of the state of the art of literature and science studies in relation to early modern England: Carla Mazzio's recent introduction to the latest ways with "Shakespeare and Science" and Howard Marchitello's slightly earlier essay on "Science Studies and English Renaissance Literature."

Recent studies have built on seminal work from the last decade of the twentieth century in order to treat the changing manifestations of social qualities such as the civility and curiosity involved and invoked in discourses of both scientific and literary endeavour. In such work, the figures exhibiting such qualities have less often, lately, been gentlemen *virtuosi* than more conventionally marginal figures such as midwives or radical puritans (especially, it seems, Cotton Mather). Similarly, the study of the material productions and residues of textual culture has directed attention not just to the idea-mongers of early modern literature and science but to the roles played and *poeisis* evinced by artisans, technicians, instruments, and their makers. More broadly, pressure has been put on modes of transmission – the spoken word, print, or manuscript, Latin and vernacular, figurative language and plain speech – and their material formats. Also productive has been a focus off the page and on the staging and spectating of science in Elizabethan, Jacobean, and Restoration theatres, and not just those that featured plays, but ones designed for the demonstration of experimental knowledge. Relationships between science and other non-'literary' (in a conservative or conventional sense) but still textual subcultures – such as collecting and antiquarianism—have also extended the field.

Proleptic forms of science fiction have been detected not only in old standbys like More's *Utopia* (1516) and Bacon's *New Atlantis* (1624) but in Francis Godwin's *Man in the Moone* (1638) and the works of Margaret Cavendish. The latter is experiencing a heyday, perhaps because of her uniquely gender- and genre-defying interventions in literature and science. Cavendish may be paired with Aphra Behn

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among early modern women who have earned the most attention lately; among men, John Wilkins and Thomas Browne have caught scholarly eyes. Moving from the margins back into range of the canon, *Paradise Lost* remains fruitful for harvesting relations between literature and science, particularly in an ecological light; Shakespeare's *oeuvre* is as unstoppable in this context as any other, with cognitive science the latest window on his works; *The Faerie Queene* remains, as usual, less of a starter. Further afield, transatlantic, trading-post, and colonial focal points and texts have offered rich sites for regarding science as a discursive exchange among peoples, objects, ideas, and values.

The textual remains of mad and bad pre-modern sciences (astrology, alchemy, and their ilk) are regularly analysed for rhetorical dovetailings with more mainstream and emergently 'modern' knowledge-making, with ideas of scientific evolutions evolving from the now extinct conception of the singular Scientific Revolution. Yet the rhetoric of science, particularly that theorised and actuated by proponents of a Baconian-inspired New Science – and especially its oft disavowed but inevitable basis in narrative and trope, but also its increased reliance on number and measure (the latter themselves now conceivable as rhetorical) – remains perpetually ripe for new configurations, not least in the journal *Configurations*. Engagements with Galenic and Paracelsian medicine have decoded representations of health, illness, and the passions on the page and the stage; literal and literary anatomies are equally important for students of the early modern body and body politic. But this example makes clear that, owing to its different disciplinary arrangements, to study literature and science in this period, or even its scholarship, is to encroach on the many other 'ands' (such as 'and medicine') of the interdisciplinary humanities – an encroachment that yields a problem and a potentiality I discuss below.

These topical manifestations highlight some of the larger developments in this field. The broadest development ranges from a quiet disaffiliation from to a winking debunking of some central tenets of what was once known as New Historicism. This is in part simply because everything new is old again, but scholarly fashion aside, some of the excessive earnestness of late twentieth-century rehearsals of episodes of Foucauldian subversion and containment is now more muted and sometimes even repudiated for the master narrative of cultural possibility it helplessly re-inscribes. That said, some early proponents did try valiantly to expose the politics built into conventional critical readings of literary texts in relation to a determining cultural context, and to level the ground that could be played on by *all* forms of textuality – with that term enlarged to encompass any type of cultural production. All this effort was to the good, certainly with respect to the respect afforded to studies that saw literature and science as reciprocally influential. But I have lately sensed a wake of disappointment with the tendency of such scholarship to revert to a binary formulation of text and context, foreground and background, servant and master, even against its own desires. This problem of privileging one source or field over another might have particular resonance in literature and science studies, where the distribution of attention is inevitably a matter for individual argument, but in which it seems important that neither term become merely the explanatory vehicle for the other.

In place of an aging New Historicism has arisen something sometimes referred to as a new formalism, or aestheticism, or philology, and sometimes the particular kind of newness is explicitly declared to be 'historical.' In these cases novelty derives from the contextualised attention brought to such governing considerations as form, aesthetics, and language. Practitioners take pains to characterise their studies as nuanced in response to specific, plastic circumstances, rather than as chases after the

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transcendent and universal unities sought by at least a straw-man version of the New Critic. These are meant to be table-turning approaches, resuscitating rather than beating dead horses in order to offer differently-informed work on genre, structure, style, rhetoric, and linguistic artfulness, areas that for some years almost seemed forbidden territory (if a bit too fusty to be quite that).

Also apparent is the burgeoning of what used to be called History of the Book but is now conceived to accommodate texts not confined by spines and covers, thereby ecumenically corralling such things as a scholar's index cards and laboratory notes and even blank pages. Much of this work is guided by a new alertness to artefacts that supplement the works more conventionally taken as objects of literary study and also conventionally taken as lacking a material dimension that really mattered much. Somewhat surprisingly, the theoretical explosion of the definition of 'text' has led to a plethora of archival opportunities that force interpretations of the hard facts of things one can see and touch. The interest in grounding the cultural history of textual practices in material remains may sometimes lead to a newly naïve empiricism or positivism of a sort identified with the 'Old Historicism' of the bad old days, or to thinly theorised data compilation. But there may be an especially significant role for such attention to artefacts in the interfield of literature and science, in which the material and the textual often interrelate in unique and telling ways.

Many early modern scholars seem increasingly to recognise that to be interdisciplinary is not only increasingly necessary, it is also hard work. (It sounds like a rare treat these days to study georgic poetry without also boning up on neoclassical agronomics.) One rationale for some of the developments itemised above – such as a grounding return to what may be salvaged from form, artefacts, and empiricism – might be a growing sense that there is simply "too much to know," as it was aptly put by one scholar of early modern literature and science (Blair). *Too Much To Know*, however, is the title of a book by Ann Blair not about our own intellectual climate, but about sixteenth-century polymathic scholarly culture, with its tight intertwining of literature and science. If scholars then felt overwhelmed by such interdisciplinarity, how are we to cope?

One answer, oddly, may be found in increasingly narrow forms of specialization that may be achieved, not through the simple pairing of literature with something else but by triangulating one's field. The literature review above suggested that much early modern scholarship now appears in such a format: literature and science and religion, or literature and science and politics, or literature and science and travel. This dependence on the copula appears another legacy of New Historicism, since its consultation of the non-canonical textual-cultural cache made 'literature and X' almost a necessary premise; but the ante lately seems to have been upped, with another round of 'and'-ing under way. An alternative to expressing one's particular interdisciplinary recipe as an ungainly triplet is to blend the ingredients, as in Tribble and Sutton's "Cognitive Ecology as a Framework for Shakespearean Studies." But are the resulting mash-ups narrower or broader forms of specialization? And what does the felt need to be not just inter- but *multi*-disciplinary do to solitary scholars braiding together so many threads? Might such expansive specialist tendencies put pressure on humanities scholars to embrace more collaborative research? So far I have not seen overwhelming evidence of a turn to collaboration (that mainstay of scientific method) to underwrite claims to multiple expertises.

One final trend to consider originates with the fact that not everyone agrees that historicising literature and science, or anything else, is necessary. So much has been suggested by Rita Felski in "Context Stinks!", where she suggests that '[t]hough

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we cannot as yet speak of a posthistoricist school, a multitude of minor mutinies and small-scale revolts are underway' (576). She endorses trans-temporal work that defies what she calls history-in-a-box, the result of what others like her characterise as excessively periodised scholarship. Her approach is less anti-historicist than it is against the *professionalisation* of historicism – the tacit agreement, as among visitors to Las Vegas, that what happened in early modernity should stay in early modernity – and the exclusionary mysticism of its means and ends. Felski is not alone in her desire to see past this way of seeing the past, since she can cite recent calls for 'unhistoricism' from queer theorists as well as "[s]cholars of the Renaissance [who] are reclaiming the term "presentist" as a badge of honour rather than a dismissive jibe, unabashedly confessing their interest in the present-day relevance rather than historical resonance of Shakespeare's plays" (576). Some claims to present relevance might be cynical ways to reach deeper into the few pockets of funding that still remain for the Humanities, but surely there is a continuum between what we caricature as 'historicism' and 'presentism,' and a place on it where both might find due consideration, as in the interfield of literature and science.

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Sally Shuttleworth, "Roundtable: The Dangers of Being Useful": 61-66

Historicism, Science and the Dangers of Being Useful

Sally Shuttleworth

> For he to whom the present is the only thing that is present, knows nothing of the age in which he lives.
>
> (Oscar Wilde, "Mr Pater's Last Volume")

Oscar Wilde is perhaps an unlikely figure with which to open a discussion of historicism, but he captures succinctly the importance of historical modes of understanding, not merely for their own sake, but for living in the here and now. Wilde offers a helpful corrective to the presentism of our own culture, in which 'historicism,' as the OED notes, is often used as a pejorative term, suggesting an approach weighed down by the baggage of the past, and an inability to respond flexibly to the delights and challenges of the fast-changing contemporary world. In Wilde's view, such flexibility and depth of engagement can only be attained through historically informed modes of understanding.

In what appears to be an almost global phenomenon, Humanities scholars are currently being exhorted to change their ways, and to make themselves useful. Social Scientists produce reams of empirical data relating to contemporary issues to justify their existence, but what do the Humanities do? One clear way in which we can make ourselves useful, it is suggested, is by working directly with scientists. For academics in the field of literature and science, this appears on the face of it an attractive proposition, replicating in our own practice the interdisciplinary engagement we track with such enthusiasm in earlier eras. My concern lies, however, in the question of whether in following this path we will necessarily find ourselves loosening our own historical roots, adopting styles of work which tend to side-line historically informed modes of understanding.

Over the last thirty years we have seen a wonderful blossoming of literature and science studies, with works, for example, by Gillian Beer in the UK and George Levine in the US offering richly historical and finely nuanced readings of both literary and scientific texts, tracing the forms of interaction between literary and scientific practice. It is noticeable, however, that in literature and science studies there is a considerable divergence between the representative professional bodies in the US and the UK in terms of their practices and sense of mission. The Society for Literature, Science and the Arts (or SLSA), which was founded in the US in the late 1980s, states on its website that it:

> Welcomes colleagues in the sciences, engineering, technology, computer science, medicine, the social sciences, the humanities, the arts, and independent scholars and artists. SLSA members share an interest in problems of science and representation, and in the cultural and social dimensions of science, technology and medicine.

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The ordering, which was no doubt much debated, is telling. The sciences are welcomed first, with the humanities and arts figuring way down the list, very much as handmaidens to the sciences. Although "representation" is mentioned, there is no reference to historical study, or indeed literature. By contrast, the more recently founded British Society for Literature and Science (BSLS) defines itself on its website as "a scholarly society which promotes interdisciplinary research into the relationships of science and literature in all periods." Science and literature are given equal billing, and that reference to "all periods" suggests a real engagement with historical analysis.

There has of course been much excellent historical work on the interactions of literature and science in the US, but the ethos of the SLSA and its journal, *Configurations,* has been more focused on analysis of the rhetoric and practice of contemporary science. One possible reason for this disparity between the two countries lies in the prevalence in the US of writing programmes, with courses often designed specifically for science majors; *Configurations* itself was originally based at Georgia Institute of Technology. Such institutional structures generate their own forms of scholarship. Although the broad curriculum of US universities generally offers a much healthier interdisciplinary range than we manage in the UK, there remains the danger that literature departments could be demoted to service industries for the sciences. Given the encouragement to scientists to participate in SLSA it would be interesting to discover what proportion of members are directly involved in science, and whether current work on the interface of rhetoric and science has had an impact on scientific practice.

There are three recognisable areas at present where literary scholars seek to engage directly with contemporary scientific and medical practice: medical humanities; literary Darwinism; and neuroscientific approaches to literature. The first is well established in the US, where graduate-only medical training and a broad undergraduate curriculum have opened up spaces for literature in the pre-training of medics. In the UK, under the stimulus of Wellcome Trust funding, the area is developing rapidly, but there are grave dangers here of tokenism, and of literature being mined as source material with little attention paid to literary texture or historical context. Literary Darwinism has made great claims for itself and attracted commensurate attention (see the ongoing debate stemming from Jonathan Kramnick's article in *Critical Inquiry*).[1] In its cruder forms it offers the paradoxical construction of a form of analysis which adopts an historical structure of explanation, but then drains out all understanding of historical specificity. More interesting is the engagement with neuroscience, which is fulfilling nineteenth-century dreams of tracing the cerebral localisation of functions. It is clear (at least to humanities scholars) that neuroscience has a lot to gain from the humanities: the data on neural processes of language can be illuminated by an understanding of the structures of language offered by linguistics, or theories of mind and consciousness offered by philosophy. It is less clear that the gains are fully reciprocal, and that we are now, for example, in a position to gain a fuller understanding of a complex literary text from tracing the neural processes of reading. Science can be seductive, but, as Steven Rose has been warning from within the neuroscience camp, it can also be hubristic and reductionist. Part of our role as humanities scholars must be to bridge the gap between the physiological and the social, and to highlight the importance of social, cultural and historical complexity.

In thinking about the ways in which literature and science might develop as a field it is instructive to look at the recent positioning of History of Science as a

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discipline. With all the concern shown by recent governments for the Public Understanding of Science, one might, naively, expect that money would have flowed to departments dedicated to studying the history and philosophy of science. In reality, we find that those units are small, often under threat. It is symptomatic of the problem that when the media want a commentator on famous scientists, or scientific developments in the past, they invariably turn to a scientist, who can often have but a hazy understanding of the development of his own discipline. Interestingly, the study of literature and science seems to have escaped some of the distrust and hostility levelled at the history of science, since the study of scientific texts alongside those of literature can be seen to enhance the cultural authority and prestige of science.

Discussions of theoretical models for the study of literature and science have encompassed one culture, the two cultures, and the third culture, with ingenious variations. Despite this mathematical promiscuity, it is no doubt the case that all current practitioners in the UK would subscribe to some form of model of reciprocal interaction between the fields. Such theoretical allegiance is probably more based on wishful thinking than actual practice, however, since in so many studies it is medicine or science which emerges as the dominant partner. The difficulty of finding incontrovertible cases where literature has influenced the development of medicine or science grows as the sciences themselves become more specialised, in both form and language. It is also undoubtedly easier in the human sciences. Although I did not set out to find it, I was gratified to discover, in my work on ideas of child development, that literature did indeed play a leading role in the formation of the sciences of both the psychology and psychiatry of childhood (*The Mind of the Child: Child Development in Literature, Science and Medicine 1840-1900*). The new ways of thinking about the child mind opened up by the great novels of child development of the nineteenth century laid the ground for the emergence of these sciences. *Dombey and Son* supplied the defining case study of educational overpressure for more than seventy years, whilst *The Mill on the Floss* was a foundational text for one of the first books on child psychiatry.

Whilst working on the book I was constantly struck by the parallels with contemporary society, and also the general historical amnesia which seems to prevail currently. I was working on cases of child suicide, or children who murdered in the nineteenth century, whilst newspaper headlines screamed out that our society was witnessing such problems for the first time. Even more telling were the parallels between nineteenth-century and current discussions of educational pressures on the young. Such a sense of immediacy creates its own challenges, particularly in a culture in which we are all being enjoined to engage in outreach and to ensure our work exerts impact on social policy. To write a book which focused only on the parallels, however, would be to lose the very sense of historical depth and texture which gave meaning to the work. In the end I alluded to parallels, but did not elaborate, leaving readers to pursue their own connections. Perhaps the best way through this professional impasse is to produce two forms of work – the historical monograph itself, and more popular spin offs, designed for a wider audience – but such additional activity will carry personal costs.

There are purists in our profession who argue strongly against any suggestion that historical research should be used to inform our understanding of the present. This is to take the argument against utility too far. I would argue, conversely, that we need constantly to draw on historical understanding to inform and extend contemporary responses and debate. Current discussions of biological determinism, for example, are extraordinarily limited when compared to the depth and richness of

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discussion in the work of J. S. Mill, or the subtle analyses of George Eliot. As literary scholars, we can bring valuable new dimensions to discussions of contemporary science. Following in the footsteps of the writers we study, we should be prepared to work across the disciplines, and engage with contemporary science and medicine. Yet, if our primary research is historical, such engagement, and other forms of 'outreach,' will usually require additional strands of labour. The challenge we face is to maintain and enhance the value accorded to historically based research, whilst also ensuring our voices are heard within contemporary debates.

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Notes

1. The debate has been continued through the year, with a range of responses in the most recent issue (38:2).

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John Holmes, "Roundtable: Literature and Science vs History of Science": 67-71

Literature and Science vs History of Science

John Holmes

Twelve years ago I was chatting to an ancient historian over lunch. He asked what I had been working on. When I told him about my approach to Victorian poetry he remarked that, like most literature academics these days, I was really a historian myself. At the time I felt quite self-satisfied. My first ambition had been to become a historian, and a historian's approval still seemed the mark of proper scholarly rigour. Nowadays I am not so sure. Literature and science scholars routinely and rightly draw on work in History of Science to build up their understanding of the state of scientific knowledge and the concerns of scientific debates within the periods they are studying. Even so, we should be cautious about deferring too readily to the authority of History of Science, in case we allow its priorities, assumptions and methodologies to circumscribe the work that we can do in our own field. Historicist literary criticism does not need to be held to account according to the standards of what is after all a different discipline. We have our own approaches to the past, which need to be as rigorous as we can make them, but we should not be bound by the methodology of historians of science, nor to their findings if the past we discover through our research does not look quite the same as theirs. We should not even feel compelled to foreground historical context at all, so long as we are aware of it and do not dismiss it in ignorance.

History of Science is a discipline which traces in meticulous and precise detail the practices of individual scientists, the intricacies of particular debates, the politics of institutions, and the emergence of ideas. The detail which historians of science require for the recovery of these aspects of past science is not necessarily available to scholars working on the interface between literature and science. It is rare for us to be able to show precisely how such-and-such a novelist or poet or dramatist came to know about this or that scientific idea, and even rarer that we can demonstrate when and how a particular scientist read a given poem or novel or saw a given play. The documentary sources often do not exist and where they do they may not be especially revealing. We have it on Thomas Hardy's own authority that he was "among the earliest acclaimers of *The Origin of Species,*" (Hardy 153) and we know from a letter that George Meredith attended the meeting of the British Association for the Advancement of Science in Cambridge in 1862 at which T. H. Huxley demolished Richard Owen's claim that the human brain was unique in including a hippocampus minor (Cline 1: 165). But even in the case of these two writers who are routinely discussed as responding to evolutionary theory in their work there are only a few isolated glimpses like these to bolster from outside interpretations grounded very largely in the internal evidence of the works themselves. By their very nature as fiction or poetry, these literary works rarely identify specific sources or make direct pronouncements, so the critic's role is typically to tease out by inference their scientific implications. We depend, then, upon sources that cannot sustain the kind of definite claims that historians of science are often able to make. Yet if we are discouraged from putting forward interpretations because they are not sufficiently empirically robust, we may end up consigning to oblivion that very substantial tranche of the past's engagement with science which has not left a firm enough imprint to be traced in more definite lines.

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This may seem alarmist. The very fact that there are numerous books and articles on Hardy and science would seem to give the lie to any suggestion that such work is disallowed. Yet it remains the case that if we want our work to gain a wider hearing beyond ourselves – if we want literature and science to be taken as seriously as a discipline as History of Science is, indeed if we want historians of science to take as much account of our work as we do of theirs – then we need to defend our own practices, to explain how and why it is that we make the claims we do, and what our work contributes that History of Science on its own may lack. At the same time, we need to make it clear that the standards of judgement for the two disciplines, although equivalent, are not the same.

The nature of the engagement between literature and science is often nebulous, at least on first impressions. To give an example from my own recent research, the Pre-Raphaelites repeatedly cite science as a model for their art in the essays published in their short-lived periodical *The Germ*, which ran for four issues in 1850. However, they do not define clearly what they mean by science, nor precisely how they imagine that art should go about imitating its practice. One approach to this question, grounded in the methodology of History of Science, would be to try and place Holman Hunt, Frederick George Stephens, Dante Gabriel Rossetti and the other Pre-Raphaelite artists, critics and poets in relation to contemporary debates on scientific method between William Whewell, John Stuart Mill, George Henry Lewes and others. This would be to presuppose that the Pre-Raphaelites read these debates, however, or at least that they had their own precise understanding of scientific method that could be formulated in the same terms. But there is little evidence to suggest that this is the case. What they did have was an idea of science which, though vague, was nevertheless of central importance both to their rhetoric and to their conception of their own practice. To try to place this idea precisely within the history and philosophy of science is to chase a chimera, yet to assume therefore that there is nothing interesting or rigorous that can be said without this kind of precision is to fail to recognise the key significance of science to the most original and influential Victorian art movement. In case this reads as though I am attacking a straw-man, it was on just these grounds that a piece of work I wrote on this subject was turned down for publication by a major English Literature journal.

We have an intellectual responsibility to ensure that our work is as rigorous on our own terms as we can make it. This was made painfully clear to me when I gave a paper on Darwinism and poetry several years ago in Sheffield. I took Robert Bridges's poem "Poor Poll," written in 1921, as my text, reading it as a meditation on the cultural impact of Darwin's ideas (albeit one addressed to a pet parrot). I drew attention to Bridges's emphasis on kinship between different species, to his use of the language of adaptation and environment, to the recurrence of monkey imagery, to hints at geological time, to the ways in which the parrot is identified with the church and churchmen, to the narrative thread in which a British sailor to South America unseats her from paradise, and so on. Afterwards a professor of linguistics took me to task for doing what, as she saw it, all literary critics do, which was to impose my own reading onto the text. In this case I would still defend my reading, taking support from the knowledge that Bridges responded to Darwin directly and repeatedly in other experimental poems he wrote after 1900, from *Now in Wintry Delights* (1903) to *The Testament of Beauty* (1929). But the experience itself brought home to me how important it is to be sure that the interpretative claims we make are robust and convincing. By prioritising the literary texts themselves we can offer readings of them that are internally consistent and persuasive. If the evidence is there in the texts, it

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does not ultimately matter whether or not there is supporting evidence elsewhere. Even so, we should be frank about the nature of that evidence, and not be betrayed into making claims it cannot support. It is better to admit that the material we are working on cannot be precisely inserted into debates on the history of science than to assert on the basis of flimsy analogies or passing resemblances that Hunt took Whewell's side against Mill or vice versa, or that Rossetti had any given physicist in mind when he used the term 'ether' in "The Blessed Damozel." By not over-reaching ourselves as historians of science we can make the case more convincingly that our own methods and sources reveal things about the reception and reworking of scientific ideas, and about their implications and significance, that History of Science alone cannot discern with the same subtlety.

As well as having its own methodologies, History of Science has a firm ideology. It defines itself against the familiar Whig view of science as the progressive discovery of knowledge still favoured by many scientists themselves. This is essential if History of Science is not to be merely the tame chronicler of science itself. But it can nevertheless lead to certain aspects of the past being given priority over others. Historians of science such as M. J. S. Hodge, Peter Bowler, Jim Secord, James Moore and others rightly object to Darwin being treated as of paramount and unique importance within Victorian biology merely because he happened (in some regards) to get things right. They have devoted themselves to understanding Darwin's own thinking *in toto*, not merely those bits of it that have been vindicated by subsequent science, and to recovering the evolutionary theories of his antecedents, contemporaries and successors, which jostled with his own for attention and authority in the nineteenth and early twentieth centuries. This work has been intensely interesting and immensely valuable. This has led, however, to a situation where, in Hodge's words, "historians are now agreed" that natural selection 'was accepted hardly at all for nearly half a century after Darwin's death" (Hodge 114). As a literature scholar approaching evolution in this period through the writings of novelists, poets and indeed scientists themselves, this conclusion appears to me to be patently false. Echoing Theodosius Dobzhansky's famous adage that 'Nothing in biology makes sense except in the light of evolution,' a great deal of late Victorian and Edwardian culture makes no sense if we presume that natural selection was an idea with no currency. H. G. Wells's science fiction, Hardy's novels and poetry, the rise of eugenics and Huxley's counter attack in *Evolution and Ethics*, Edwin Ray Lankester's columns in the *Daily Telegraph* and the interventions by *Nature* into the debates round Darwin's legacy at his centenary – all bear witness to the vitality of natural selection as an idea both within biology and in the wider culture during the so-called 'eclipse of Darwinism' around the turn of the century. From outside History of Science, it looks as though the intellectual ideology of the discipline itself has so shaped its perspective as to determine the picture of the past that the historians see. If we see the past from a different angle, we should not be ashamed to own it, nor to supplement their picture with our own. Equally, we should be cautious about depending too heavily on the authority of historians whose angle of vision differs markedly from that of our own subjects – the authors and readers of the works we are discussing.

There is one final sense in which we should feel free to emancipate ourselves from the History of Science, which is to consider how far we want our own enquiries to defer to history at all. We may choose to take not only the culture of science, historically conceived, as our subject, but science itself. 'Presentism' is a dirty word in the lexicon of historicist criticism, and clearly we must not forget that the present,

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like all moments, is embedded in history, both diachronically and synchronically. But for all that History of Science is right to call into question the linear, progressive model of the growth of science, while progress may not be linear, current science remains nonetheless our best approximation to knowledge of the workings of the universe. We read literature first and foremost in the present moment too – if it did not live for us today, then the study of literature would be just a branch of archaeology. Literature in its broad sense – the deliberate, creative and imaginative use of language – is humanity's most sophisticated device for exploring its own condition. Science itself and the knowledge that science gives us also falls within that purview. Poets, novelists, dramatists and scientists themselves respond to new knowledge as they receive it. If the broad foundations of that knowledge remain in place, for all that the details may have changed, their responses remain as pertinent today as they were when they were first set down. By reading literature alongside science today, we can explore what it is to live in the world science reveals to us, not for the present moment only, but for as long as that science remains a satisfactory account of the world we live in.

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Michael Whitworth, "Roundtable: Versions of History, Versions of Chronology": 72-76

Versions of History, Versions of Chronology

Michael Whitworth

For this roundtable, I would like to raise two large questions. First, when we deal with the relations of literature and science in an historical way, whose version of history are we working with? Second, how do we deal with various forms of anachronism?

When practiced in an historicist mode, literature and science studies are undeniably indebted to the practices and publications of historians of science, but at times the historical questions that interest literary scholars occupy the margins of published works of science history, and the practices of literary scholars value things – mostly obviously language and form – that are less significant for historians, or that touch them in different ways. For example, take Lorraine Daston's remarks about E. A. Burtt's 1925 publication *The Metaphysical Foundations of Modern Physical Science*. In a brief appreciation of the book, Daston remarked that it had been neglected by the scientific journals of the time (Daston). Whatever the truth of that claim, Burtt could not be said to have been neglected by the literary and generalist journals of his time. Reviews appeared in the literary sections of political weeklies (*The Nation and Athenaeum*, *The Spectator*, and *The Weekly Westminster*), in a large-circulation literary review (*The Times Literary Supplement*), and in three little magazines (*The Calendar of Modern Letters*, *The Dial*, and belatedly in 1931, *The Criterion*).[1] It was quickly picked up by the authors of popular scientific works, and alluded to by Aldous Huxley in his novel *Point Counter Point* (269).[2] Burtt's treatment of the concept of the 'Spirit of Nature' was alluded to soon after publication by one of the founders of the field, Marjorie Hope Nicolson (422). This evidence does not refute Daston's contention, but indicates one of the ways that the history of books within the scientific community does not necessarily correlate with the history within other communities and intellectual sub-cultures. Similar examples could be drawn from history-of-science accounts of the reception of relativity theory: accounts focusing on the scientific community take their terminal date as 1919, whereas in considering materials that circulated among literary writers and readers we must extend 10 years or more after that date, and will find relatively little before it.[3] Whose history? The historian of science's account is not always sufficient for the needs of literary scholars. When my doctoral studies began to focus on the 'new physics,' I became aware that no published history provided the sort of account that I was looking for, and that I would have to assemble the information myself (Whitworth, "Physics and the Literary Community").

Historians of science don't always interest themselves in the same topics as scientists, or produce accounts of science that scientists find credible. In particular, scientists tend to favour whiggish histories in which the value of past science is determined by the extent that it anticipated the present state of the field, while historians of science have been far more open to exploring lines of development that later science has disavowed. Literature and science has tended to favour the scientific mainstream in this regard: Darwin and Einstein rather than lesser known contemporaries. Though I'm as guilty as anyone else in this regard, I wonder whether ether theory, the theory of gravitation overthrown by the Michelson-Morley experiment and then by Einstein, might have made an impact upon the literary consciousness. Certainly Oliver Lodge continued to disseminate the theory through

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the mass media well into the 1920s.[4] It takes a certain kind of bravery, however, to commit to a defunct scientific theory that seems without any kind of credibility. While the rediscovery of spiritualism, mesmerism, and parapsychology under the rubric of 'weird science' has opened the doors somewhat, and while the recent conference on scientific canons implicitly raised the question of which sciences we choose and why, 'weird' science and (retrospectively) 'wrong' science are marginal in very different ways.[5] I suspect it is also easier to be taken seriously by a book publisher if one is dealing with a science that has been confirmed as valuable by later developments. In the world of popular history publishing, the current trend towards subtitles that spell out the point of the book favours events and theories that did something, that led somewhere, or that prove someone's point: we're unlikely to see a book titled *Ether: How One Theory of Gravitational Force Proved to be Over-Complicated and Wrong*, or *Phlogiston: Why Things Burned in the Eighteenth Century* (though if anyone wants to borrow these titles I'd be delighted to be proved wrong).

Anachronism is anathema to historicist methodology, and yet, practically speaking, it cannot be completely avoided. One difficulty in studying literature and science historically is the incommensurability of the archives that each provides. Science sets great store by being cumulative and sequential, and a scientific work that seems to overlook significant work in its field risks being accused of being unscientific: if there are giants available, you must stand on their shoulders. The importance attached to being fully informed of the latest work is inseparable from the importance attached to priority of discovery; the latter may also owe something to the applied sciences and the importance of acquiring intellectual property rights to discoveries with commercial applications. One consequence of science's concern with sequentiality is that dating becomes significant. Histories of science can very often provide precise dates for crucial experiments and for submissions of papers to journals.

Science is not absolutely different from literature in this regard. Indeed, one effect of T. S. Eliot's insistence on 'tradition' as a process was greater recognition of the ways in which a literary author builds on what has been done before, and a concomitant relegation of the independent genius model of literary creativity (Whitworth, *Pièces d'identit*).[6] However, although literary criticism has recognised the importance of accumulation, and although it may be part of many literary writers' creative process, there are no professional incentives for literary writers to date their manuscripts with precision. The published text of a scientific paper at the present time might record the date of submission, the date of the revised paper, and the date of publication. There is a distinctive bibliographic code surrounding it which has no equivalent in literary production. When first published, lyric poems are not accompanied by 'date of inspiration,' 'date of composition,' 'date of revision,' or 'date of submission,' though later scholarly editors might manage to recover some of this information. Though both scientific and literary production operate within a chronology – for most modern authors, we can establish the publication dates of books at least to a year, and very often to a precise day – the degree of precision available is not compatible.

For example, to cite a case I have considered elsewhere, might the ray of light in Wilfrid Wilson Gibson's sonnets "Chambers" (published in *The Athenaeum* 1 July 1919) owe anything to the discussions of relativity theory and rays of light that had appeared in the same journal in April and May of the same year? (Whitworth, "Within the Ray of Light"). The sonnets do not present themselves as 'topical,' but they may nevertheless incorporate recently aired ideas. It is equally possible that they may have

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been on the author's or the editor's desk for a matter of months. If we did not know of J. W. N. Sullivan's articles on relativity in the *Athenaeum*, which were unusual in anticipating A. S. Eddington's announcement of the experimental proof of relativity in November 1919, we might be inclined to see Gibson as uncannily anticipating the imagery of scientific exposition which became available so widely after November 1919; as it is, the case looks more like one of prosaic borrowing. But as so often in matters of literary inspiration, the language of the poem is only loosely connected to the language of expositions of the scientific theory, and those expositions are, in the case of a mathematical science, one stage removed from the mathematical formulation of the theory. The language in itself does not offer solid proof of borrowing; that would occur only where novel terminology was employed. The language of the 'ray of light' might owe as much to the language of divine illumination as it does to contemporary science. Of course some such cases are resolvable, because the author kept diaries that record composition or reading. But in the literary sphere such attention to the chronology of production is far more rare than it is in the scientific. For astronomical reasons, we know exactly when Eddington made his eclipse observations in 1919, and, for socio-historical ones, we know exactly when he announced his findings. In the case of Gibson and thousands like him, we know next to nothing.

One solution to such problems is to cut the Gordian knot and to assert the supremacy of the literary imagination, a facility so penetrative that it can anticipate scientific discoveries by decades and detect nascent theories as they vibrate through the ether. There's a significant sub-genre of criticism that works in this way. A formative moment for me was reading an article by Hugh Kenner that related Ezra Pound's *Cantos* to the then-voguish (and admittedly fascinating) topic of fractal geometry. *The Cantos*, it turned out, exhibited the same self-similarity that was to be found on many a lurid book cover and poster. While Kenner's main theme was not that Pound had anticipated the work of Mandelbrot et al., he nevertheless falls into the rhetoric of critics who make such claims: Pound was "fishing for fractals" and "is even predicting a geometrician who'll discover them" (729). While there's a case to be made for the article – that by using fractal geometry it makes a case for there being a form to Pound's apparently formless epic – there's also something self-contradictory about its relation to the authority of science. On the one hand it wishes to give creative primacy to the poet as one who invents a new formal language, yet on the other its case implicitly rests on the authority of mathematics. Kenner's article was formative for me because it became the paradigm case of something to avoid. The 'anticipations' that we discover in literature are too often anachronisms and self-projections. However, I'm left with an opposite if not quite equal feeling that historicism cannot completely bracket off history from the present; that what we find interesting in the past will be interesting because of something happening in the present, and that the questions we put to it will derive from the present. As Sally Shuttleworth discusses in her article here, the problem is how to present the parallels; how to preserve the independence of past and present, allowing neither to determine the other, while at the same time allowing the reader of one's criticism to create dialogues between them.

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Notes

1. The reviews in question were by: J. W. N. Sullivan, *TLS*, 4 June 1925, p.376; Bertrand Russell, *Nation and Athenaeum*, 37 (13 June 1925), p.326; J.W.N. Sullivan, *The Calendar of Modern Letters*, (July 1925), pp.400-03; J. W. N. Sullivan, *Weekly Westminster*, 15 August 1925, p.406; Bertrand Russell, *The Dial*, 79, no.3 (September 1925), pp.255-8; Alan Porter, *The Spectator*, no.5079 (31 October 1925), 778-9; William Empson, *The Criterion*, 10, no.38 (October 1930), pp.167-71.

2. See also Rice and Ward.

3. For the scientific reception of relativity from 1907 to 1919, see Sanchez-Ron, "The Reception of Special Relativity in Great Britain."

4. Oliver Lodge's *Ether and Reality* (London: Hodder and Stoughton, 1925) was based on BBC radio broadcasts earlier in that year.

5. See the special issue of *Victorian Review* 26.1 (2000) on 'Weird Science,' edited by Martin Willis. A conference with a similar focus (on "Scientific Canons") was held at University of East Anglia, 6 May 2011, organised by Adelene Buckland.

6. On Eliot, tradition, and science, see Whitworth, "*Pièces d'identité.*"

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Peter Middleton, "Roundtable: Historicising Science and Poetry Since 1950": 77-82

Dark Matters: Historicising Science and Poetry since 1950

Peter Middleton

As I was writing this essay, ENCODE project members simultaneously published six papers in *Nature* about a major project that "provides information on the human genome far beyond that contained within the DNA sequence," notably on "the functional genomic elements that orchestrate the development and function of a human" (Ecker et al 52). Publication of so many papers at once is a sign of the exceptional importance attached to the work. The research findings have, however, not been met with unalloyed joy. *New Scientist* sums up the concerns: "It seems, though, that the more we learn about the genome, the less we know" (Geddes 43). A medical researcher, Alasdair Mackenzie, echoing what is becoming a commonplace amongst researchers in this field, asks, "how much of this mysterious genomic 'dark matter' exists within our cells?" (Mackenzie 7). A *Guardian* report based on Mackenzie's talk and the stir caused by ENCODE is bluntly titled "Dark Matter of the Genome," making even more explicit the suspicion that biology has succumbed to the same dark forces as physics, which currently struggles to understand two vast areas of darkness, dark matter and dark energy. Instead of scientific advances bringing greater certainty to our knowledge of the world, they appear to be diminishing it.

This story points to one of the many surprises that I have encountered during research for a book about American poetry and science in the Cold War, and an encyclopaedia article on science and poetry ("Science and Poetry"). Literary theory repeatedly defined itself in relation to the sciences, either building hostile barriers, or swooning into an uncritical embrace of the latest scientific ideas. Poets were much more informed about scientific developments than I had realised, and more influenced by them. The sciences have been far more diverse, complex, and above all pervasive, than I thought; whatever you do or think or feel, a scientist may be looking over your shoulder. What counted as science included disciplines that I had not thought were considered sciences. Authoritative science journals published articles on archaeology, urban studies, nuclear deterrence, and until the end of the 1960s on 'the negro,' articles on race science that with hindsight look strongly racist. I have also found reputable scientific papers still advocating eugenics in the 1960s. And instead of scientific knowledge progressively increasing certainty, its growth has also increased the scientific unknown.

I didn't set out to study such a wide field of interrelations between science and poetry. I began with the conviction that epistemic values played a much larger part in the poetry of the avant-garde than has been recognised by literary studies because I was trying to explain a sudden change in American poetry that took place about half way through my chosen period of 1948-1989. I conjectured that the change in poetic style was partly due to the shift from one publicly dominant model of science to another, as high-energy physics gave way in public esteem to molecular biology, a shift from energy to information.

Pursuing this research therefore led me to revise a number of my assumptions about science and literature, and these I shall explore in the remainder of this article. The first assumption was that despite the disputes within literary theory and the philosophy of science it must still be possible to synthesise a broad methodology for the study of science and poetry using key ideas from both domains. But as I

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proceeded I realised that because the intellectual tools we use tend to be the products of this same era, an intense reflexivity is at work. Thomas Kuhn's theory of paradigm shifts was taken up not only by science studies but also by many literary theorists, as John Guillory has shown, so that our cultural theory is partly Kuhnian, and we cannot then just expect our theory toolkit to give us an objective account of the history of interactions between science, philosophy of science, and poetry (Guillory). Theorists of literature were influenced by both the sciences and the philosophies, and to a more limited extent the philosophers and even perhaps the scientists were consequently influenced by what the literary and cultural theorists proposed.

The effects of such feedback loops are especially evident in the history of literary theory since mid-century. Conflicts and affinities between science and poetry have had a profound effect on the conceptual architecture of modern literary criticism as it either tries to keep out science or to trump its authority over methodology and knowledge. New Criticism strove to separate science and poetry into two entirely disjunct cultures and in doing so formulated many key principles of literary criticism. In 1950, Douglas Bush looked back on the modernists in a founding text for the study of science and poetry, and said that "all modern poetry has been conditioned by science, even those areas that seem farthest removed from it" (151). Was this also true of the post-war poets? I asked myself. The difficulty in answering this question was partly that whereas the now debunked New Criticism strove to keep science out of poetry, the more expansionist and more confident literary theories in the structuralist mode attempted to develop their own literary science. Tilottama Rajan suggests that such developments can be described as "the extension of the human sciences paradigm, by way of structuralism, into a literary criticism also anxious for scientific and technobureaucratic legitimation" (25). Roman Jakobson, in his key essay "Linguistics and Poetics," writes that "poetics deals with problems of verbal structure," and "since linguistics is the global science of verbal structure, poetics may be regarded as an integral part of linguistics" (18). Poetics is a science, and major poets can be called scientists: Hopkins, for instance, is an "outstanding searcher in the science of poetic language" (18). Studying science and poetry since the mid-century therefore requires a self-consciousness about method that is very different to that required by earlier periods of literature.

What about the sciences themselves, how have they changed? Some aspects of science that confront the researcher into the relations between science and poetry are simply amplifications of difficulties facing researchers into any period. "Come out and talk to me" shouts the "Poet to Physicist in his Laboratory" as the title of David Ignatow's widely anthologised poem strikingly has it (*Poems 1934*-1969 188).[1] The laboratory continues to epitomise the inaccessibility of scientific knowledge, which Hilary Putnam aptly calls the "unformalisable practical knowledge" of scientific research, the craft knowledge and first-hand experience of the entities and equipment central to most scientific research (72). Some difficulties studying the late twentieth century are simply the result of the researcher's temporal proximity to the still evolving sciences. But other difficulties are result of radical changes in the sciences that are not yet well understood. Over the past sixty years the sciences increasingly employed new forms of communication (the now highly specialised rhetorical structures of scientific papers, the institutionalised peer review system, and the technical journals targeted at expert readerships), new structures for organising research, new types of modelling (usually dependent on a technical shorthand nearly impenetrable to lay persons – the labelling of DNA genes is a notable example), and new mathematics. Some of the best conceptual studies of recent sciences, like those of

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Evelyn Fox Keller on molecular biology, are studies of metaphors (*The Century of the Gene; The Mirage of a Space*). Authoritative and inclusive histories of the science of this period are still understandably in relatively short supply.

At the start of this period the dream of a unified science, and the small size of the profession made it possible to talk of 'science'. By the end of this period the enormous expansion of the sciences into many new fields, new methodologies, and new types of institution, makes it impossible to use the term 'science' except as a rough shorthand. Big teams have spread out of physics into other sciences: the ENCODE articles I mentioned earlier have several hundred authors and some scientific papers have had authorships running into the thousands, and as Peter Galison argues, the 'we' inscribed in the scientific paper appears to function as the "collaboration-as-experimenter" or "the collaboration-as-author" What, he then asks, is "the constitution of the collective self" that authors these papers? (329). This new scale affects everything, from the role of the scientist to the idea of a scientific author. Several physicists have rivalled Einstein's brilliance but science no longer has a place for singular figures like Darwin, Einstein or Freud.

Another big change is the growth of secrecy. At the start of this period, many thinkers were praising science for its cosmopolitanism and its democratic openness, even as wartime necessities required the Manhattan project to close down access to knowledge of new research in particle physics. After the Second World War such secrecy became a new norm as nuclear science was made a tool of foreign policy and much of its research a closely guarded secret asset, while other scientific research increasingly became a trade secret as commercial imperatives became uppermost. When his enemies wanted to punish J. Robert Oppenheimer for his opposition to the hydrogen bomb, they took away his security clearance, effectively excluding him from participation in much of the new research in nuclear physics. Today many scientists have to sign non-disclosure contracts to protect commercial investment in universities. Secrecy plays a role in the difficulty of getting the scientists to come out of the laboratory and talk to the poets, and in some of the poets' visionary responses to science.

How did my poets learn about science and indeed how much did they know? Here too were surprises. The poets made far more effort to read authoritative sources than I anticipated. Even poets known for their love of sheer poetic imagination turned out to be reading the *Scientific American* (which for at least two decades was an authoritative record of new scientific work to be read by professional scientists), and some of my poets were subscribing to *Nature* or reading specialist journals in everything from ecology to physics. As in earlier periods, however, on the whole the poets no more got their knowledge of Heisenberg's uncertainty principle (frequently invoked by poets as an example of scientific endorsement of the ineliminability of the subject's own perspective) from reading the original scientific papers, than did their eighteenth-century counterparts learn directly from Newton. The difference is that in the late twentieth-century there have been many more channels of information about the sciences: the radio, the television, newspapers, magazines like *Life*, films, books and latterly the internet. Elizabeth Leane has shown how many misconceptions have been set loose by popularisations of physics, saying that "almost every quantum phenomenon has been leapt upon with alacrity and assigned one or more literary parallels," and all too often the metaphors that popularisers use, "like the equations employed by particle physicists, are all vehicle and no tenor" (412, 420). Documenting the varying accuracy of this onslaught of information about the sciences has barely begun.

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How might this broad picture be summed up? I have come to think that the epistemological primacy of the sciences meant that their expansion into every area of human life, even those private intensities special to poets, has led to a widespread competition for epistemic authority. Models and metaphors developed in one prominent science are rapidly appropriated by others. Poets have played their part in this, and for me this is one of the most exciting areas of investigation. But I am tempted to conclude by saying that much about the interrelations between poetry and science in this period remains a dark matter, though I should add, that like the willingness to talk about the dark matter of the genome, such allusions to 'dark' uncertainty, whether literary or biological, are leveraging themselves by borrowing epistemic authority from another science. Reflexivity is everywhere in this period.

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Notes

1. The poem is included in John Heath-Stubbs and Phillips Salman's *Poems of Science* (290).

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Review: Budge on Henderson: 83-84

Andrea Henderson, "Magic Mirrors: Formalist Realism in Victorian Physics and Photography." *Representations* 117 (2012): 120-150.

In this interpretation of the work of the Victorian photographer, Clementina, Lady Hawarden, Andrea Henderson mounts a far-reaching case for the relationship of aesthetic formalism to developments in British science in the mid nineteenth century. Photography plays a key role in the relationship she proposes between formalism and the British physics of Faraday, Maxwell and John Herschel due to the centrality of theories of light in the mid nineteenth-century development of electromagnetic field theory. Henderson interprets these physicists' abandonment of Newtonian particle-based theory in favour of the wave theory of light as formalistic in its implications, in that it privileges relationships of force over inherent properties. Drawing attention to the manipulation of formal properties in Hawarden's photographs, particularly as exemplified in her tendency to present photographs in contrasting sets, Henderson presents a reading of Hawarden's work which sets out an alternative to prevailing feminist accounts, in that she sees Hawarden as responding to her South Kensington social milieu, the home of an influential network of scientists and artists (133).

Noting the important role played by photography in recent critical discussions of nineteenth-century realism, Henderson suggests that photography's exemplification of the "relational, rather than [. . .] essentialist logic" (121) of British physics can furnish a new critical paradigm for thinking about realism, in terms of correspondences of formal structure rather than content. She shows that Victorian writers about photography did not regard its realism as consisting so much in the reproduction of detail, as in its direct participation in the series of transformations which connected it with physical processes. In this context, realism was not defined in terms of representation, but in terms of structural correspondence. Henderson charts the development of this conception of realism from the emphasis on polar forces in Romantic *naturphilosophie*, stressing that conceptions of photography are assimilated to the model of polarity through adoption of the terminology of negative and positive, and that thinkers such as John Herschel describe the spectrum of light itself in terms of opposition between the polarities of infrared and ultraviolet. Although Henderson sees the tendency among nineteenth-century scientists to explain phenomena in terms of oppositions between forces as leading away from Romantic *naturphilosophie*'s essentialist emphasis on intrinsic properties, she underlines British scientists' theoretical commitment to the inherent reality of the relationship between scientific models and natural processes, as expressed in their preference for geometry over abstract mathematical formulas and their related assumption that mechanical modelling of physical processes would always ultimately be possible. Mid-nineteenth-century British science thus provides the model for a kind of realism in which formal relationships are paramount, rather than analytic detail.

Henderson draws on Michael Fried's work to argue that the move in nineteenth-century realist painting from the attempt to convey a supposedly "unmediated" presentation of physical reality, as in the work of Courbet, to the "deliberate exposure of painterly artifice" (132) by artists such as Whistler (who are, for example, prepared to paint inverted images as seen in a mirror rather than transposing them so that they appear real) corresponds to this formalist version of

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realism, whose veracity is conceived as consisting in a structural relationship to the real, rather than exact reproduction. She interprets the prominent role played by mirrors in many of Hawarden's photographs as emptying her images of any Romantic symbolic significance, effacing "any world beyond that summed up by the photographic process itself" (134) in a way which confronts the viewer with the physical reality in which the photograph participates. The subject of the photograph becomes the process of its own making, in a way which anticipates later modernist developments in abstract painting.

Henderson's provocative argument suggests a plausible aesthetic alternative to the postmodernist interpretation of modernism which has dominated critical thinking for the past forty years: art can be formalistic and self-reflexive in a way which is not simply arbitrary, in the manner of Saussurean linguistic oppositions, but which is motivated by structural correspondences or homologies. It would have been helpful if Henderson had indicated the relationship of this conception of a formalist realism to the debates about novelistic realism with which many of her critical sources are engaged, but this may represent the next stage in her highly interesting critical project.

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Review: Salvey on Finnegan: 85-86

Diarmid A. Finnegan, "Exeter-Hall Science and Evangelical Rhetoric in Mid-Victorian Britain." *Journal of Victorian Culture* 16 (2011): 46-64.

The Victorian 'crisis of faith' fascinates scholars: it has been categorically accepted as a historical event and then categorically complicated and contradicted (indeed, Finnegan's article appeared in the journal with three others on Victorian religion). Victorian science – whether biological or geological – often gets the blame. But scholarship in the last two decades has painted a more complex picture, highlighting the sheer variety of configurations of science and religion in the Victorian era. Finnegan's article adds specific detail to this scholarly picture of Victorian faith, investigating the multiple rhetorical strategies used to 'harmonise' evangelicalism and science in a series of YMCA-sponsored lectures at London's Exeter Hall. Considering the effect of site on sermon, Finnegan argues that these syntheses of science and evangelicalism were "a fragile local accomplishment conditioned by the reputation of the venue" (64).

Finnegan's well-organised article first gives the history of Exeter Hall and the YMCA lecture series that found its home there in the 1840s. Opened in 1831 and seating over 3,000 people, Exeter Hall quickly became both the leading platform for evangelical causes and a "metonym for evangelical attitudes" (48) – and for the shortcoming of evangelicalism. Through the discourses of its leaders and critics, Exeter Hall became "a clearly demarcated rhetorical zone policed by the Hall's proprietors" (49). The YMCA's lectures series moved easily into this space, concerned as it was with providing edifying entertainment and instruction to young men in need of spiritual instruction. Yet the lecture series also had to counteract Exeter Hall's reputation for religious enthusiasm and irrationality. Seeking "cultural credibility," it turned to science as a rational, while auxiliary, component of Christian piety and practical morality (53).

After outlining general methods used to harmonise science and religion, Finnegan explores two specific links made in the lectures between science and evangelical values forged by the venue itself. Invoking Exeter Hall's abolitionist rallies of the 1830s, lecturers turned to science to prove that all humans were of one race, supporting both evangelical zeal for abolition and the evangelical doctrine of original sin. Science also justified missions as progress was only achieved through the work of humans, particularly Christians, and provided a tool for missionaries engaged in intellectual debate with pagans. Thus the lectures harmonised science with Christianity through its construction of other peoples and the British relationship to them. But they also integrated science into the personal, moral, and practical of Christian life. Re-capturing science for Christianity, they constructed science as part of evangelical self-culture, rather than a threat to moral development, as long as it remained subordinate to the Bible.

Finally, Finnegan turns from the successful harmonisations of "evangelical piety and scientific credibility" (46) to the challenge Richard Owen's 1863 YMCA lecture offered them. Contravening Exeter Hall convictions and conventions, Owen gave science authority over the Bible, seeing it as the key to correctly interpreting certain passages, like the Genesis creation account. The ambivalent responses to Owen's lecture from the YMCA leadership reveal the tensions within evangelicalism

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towards science. These tensions, coupled with wider cultural shifts and with the reputation of the venue, contributed to the decline of the lecture series in the 1860s.

Like many studies that focus on the varieties of religion or science in the Victorian period, Finnegan's article is rich in detail and information – both a blessing and a curse. The detail makes his argument compelling and revelatory of cultural variety. Yet this close-up effect obscures the connections between what is happening in the detail image and the larger cultural patterns. Although Finnegan mentions that his snapshot fits within the broader cultural trends of platform culture, public science, and integrated oral and print cultures, he does not show exactly how it does so. For example, he concludes that the lectures responded to "changing norms of public speech" (64) but he does not explain what those changing norms were nor how exactly the lectures responded to them. Thus, with its detail, the article reads like the core evidence used to support a larger argument – perhaps a much broader research project.

What is most innovative about this article is what makes it relevant to scholars of literature and science: Finnegan focuses on the *rhetoric* used to integrate science into evangelicalism and how that rhetoric responded to the place in which it was spoken. He uses the methodologies of the geography of knowledge to understand the rhetoric and function of Victorian public science in a religious context. Implicitly, he suggests that scholars need to think about spaces and places when they think about literature and science in any period.

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Review: Willis on Belling: 87-88

Catherine Belling, "A Happy Doctor's Escape from Narrative: Reflection in *Saturday*." *Medical Humanities* 38 (2012): 2-6.

Medical humanities scholarship, and especially that dealing with fiction, is often sceptically received in literature and science communities; it is often regarded as superficial, usually due to a lack of the requisite literary-historical knowledge and skills on the part of the author. Catherine Belling's short article on Ian McEwan's 2005 novel *Saturday* is a welcome exception, exploring with an appropriate understanding of literary discourses the role that such a novel might play in the reflective education of medical students. *Saturday* has been widely discussed by literature and science scholars, more often in seminars and conference presentations than in writing (although David Amigoni's contribution to Sharon Ruston's edited collection of essays, *Literature and Science*, is a fine example of the latter), and it may seem unlikely that there is new territory to be mapped. However, as Belling reveals, to consider how the novel traces different modes of reflection through the character of the neurosurgeon Henry Perowne, is certainly one way to find a fresh perspective.

Belling's article begins by exploring the position of the humanities as they are applied to medicine, arguing that "they have become almost synonymous with narrative" (2) and in turn have created a new area of research generally called narrative medicine. One key area of this work is the exploration of reflective practices in medical education, designed to "nurture coherent and ethical professional identity" (2) in new medical professionals. Belling notes a weakness in the principles of this research: the study of narrative in such contexts seems less attuned to the activity of reflection than the lyric mode. It may be, she argues, that "it is time [. . .] to distinguish more explicitly between narrative and those forms of literary discourse that require writer and reader to withdraw from the demands of passing time" (2) as the lyric does.

To exemplify some of the differences, and the impact of them, Belling turns to McEwan's novel as a short case study. *Saturday*, she argues, is an "irresistible text" (3) for anyone interested in the relationship between literature and medicine, and in particular for its staging of the climactic scene where a reading of Matthew Arnold's poem *Dover Beach* trumps neurological diagnosis in averting a potentially fatal encounter between the Perowne family and a London gangster. Belling's interest, however, lies not in what this might say about the respective roles of the doctor and the poet but rather in the collisions between narrative (plot) and lyric (reflection). The meaning of the novel is not to be found, Belling claims, in the "momentum of its plot but in its multiple modes of evading plot" and in particular "its present-tense focus on the protagonist's mental responses to his environment [which] approaches the lyric mode" (3). That is, Henry Perowne is characterised by a wilful and ongoing self-reflection, which is overcome by ecstatic happiness only when he is undertaking surgery. The absence of this continual self-assessment in the specific medical encounter leads Perowne to wonder if there is something wrong with him (a lack of empathy, perhaps) and leads Belling to ask what this pathological happiness might mean in the context of narrative medicine.

Working through various categories of pathology – medical, aesthetic, and ethical – Belling has cause to ask whether Perowne (and the lyric mode he represents) should be characterised as damaged, irrelevant or complacent. She concludes that the

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value in Perowne's solipsistic reflection is to be found in his ability to read himself; to accept "the essentially fractured nature of ourselves" (5) and to turn that understanding into insight about the self. This, for Belling, might be valuable in and for itself as a mode of reflection for the medical student to aspire to.

However, Belling's final point is more vital, and has intriguing possibilities for future research. She concludes by linking this notion of insight into the self with the experience of reading, or rather the practice of reading, and reading closely so as to experience, respond to, and analyse a text simultaneously. Although Belling does not explicitly say so, this practice of close reading is, of course, remarkably like the professional reading practices of the literary scholar. To understand that such reading is valuable in medical contexts may, Belling contends, allow us "to question the old distinction between 'hard' and 'soft' cultures" by, for example, "pointing to the affinities between the precision of medical technology and the technical demands of close reading, where attention to exact detail is what makes possible the non-reductive observation of the construction of meaning" (6).

As brief as this essay is, and as much as it ignores a great deal of the scientific world-view which McEwan wishes to explore in *Saturday*, the sharp focus of Belling's work, particularly her own resistance to the reduction of a literary text to a statement on whether a doctor is good or bad, makes this a very fine piece of literature and science scholarship. In its concluding and tentative assessment of the relationship between close reading and medical technology it also presents future scholars with a challenge: how to push forward narrative medicine to take account not only of stories or texts but also those other material objects that also constitute our scientific culture.

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Notes on Contributors: 89-90

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Sarah Bouttier received her PhD, entitled "Writing the Non-Human in D. H. Lawrence's Poetry" from La Sorbonne Nouvelle in 2011. She has published several articles on Lawrence, in *Etudes Lawrenciennes* and in a book entitled *Lines of Resistance: Essays on British Poetry from Thomas Hardy to Linton Kwesi Johnson*. She is now teaching at the University of Stockholm and is interested in ecocriticism and the representation of the non-human in English-speaking poets.

Gavin Budge is Senior Lecturer in English Literature at the University of Hertfordshire. His work focuses on the romantic period, and especially in its literary and medical cultures. His most recent book is *Romanticism, Medicine and the Natural Supernatural: Transcendent Vision and Bodily Spectres, 1789-1852* (Palgrave Macmillan, 2012).

John Holmes is Senior Lecturer in English Literature at the University of Reading and the present Chair of the British Society for Literature and Science. He has written extensively on the relationships between poetry and evolution: most recently in his book *Darwin's Bards: British and American Poetry in the Age of Evolution* (2009) and in editing the collection *Science in Modern Poetry: New Directions* (2012).

Leah Knight is Associate Professor of English Language and Literature at Brock University, Canada. She is the author of *Of Books and Botany in Early Modern England: Sixteenth Century Plants and Print Culture* (2009), which won the BSLS Book Prize in 2010. She currently holds an SSHRC grant to investigate the reading experience of the seventeenth century writer Anne Clifford.

Peter Middleton is Professor of English at the University of Southampton. He has written extensively on modern and contemporary poetry and performance, and on literature and science. He is presently working towards the completion of a book on American Poetry and Science in the Cold War and is a contributor to the AHRC-funded 'Beyond the Gene' project led by his colleague Clare Hanson.

Claire McKechnie is a postdoctoral researcher at the University of Edinburgh, where she runs the Medical Humanities Research Network and teaches English Literature. She also lectures in Gothic fiction at Stirling University. Her book, *The Gothic Animal: At the Limits of the Human in Victorian Literature and Scientific Culture*, is forthcoming with Manchester University Press. Other publications include papers in the *Journal of Victorian Culture* and *Nineteenth-Century Prose*.

Ruth Murphy is studying for a PhD at Cardiff University on the construction of the recapitulative child in post-Darwinian Victorian children's fiction. Her research looks at the interplay between children's texts and evolutionary science and changing

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constructions of evolution, nature and the child in texts for children through the second half of the nineteenth-century. Her most recent work is a chapter entitled "Kipling's Just So Stories: the Recapitulative Child and Evolutionary Progress" for the forthcoming volume of essays *The Child Savage, 1890–2010 - From Comics to Games*.

Courtney Salvey is completing a doctoral thesis at the University of Kent on religion and nineteenth-century technology. She has interests in literature and technology and has recently published an article on technology and gender in Zelda Fitzgerald's "Save Me the Waltz" in *LIT: Literature, Interpretation, Theory*.

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Rebecca Welshman is completing a PhD titled "Imagining Archaeology: Nature and Landscape in the Late Nineteenth Century." Rebecca works with the Thomas Hardy and Richard Jefferies Societies to promote opportunities for students of landscape and literature. Her research on Dickens, conducted for the Global Circulation Project at the University of Exeter, contributed to the bi-centenary Dickens celebrations in London in 2012. Rebecca is interested in research that considers the relation between thought, setting and the past. She has a chapter titled "Archaeology" in *Hardy in Context* (Cambridge University Press, 2012) edited by Phillip Mallett.

Michael Whitworth is University Lecturer and Fellow of Merton College, Oxford and the co-founder and former Chair of the BSLS (2009-12). With wide interests in the social and intellectual contexts of modernist writing, he is the author of *Einstein's Wake: Relativity, Metaphor and Modernist Literature* (2001).

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