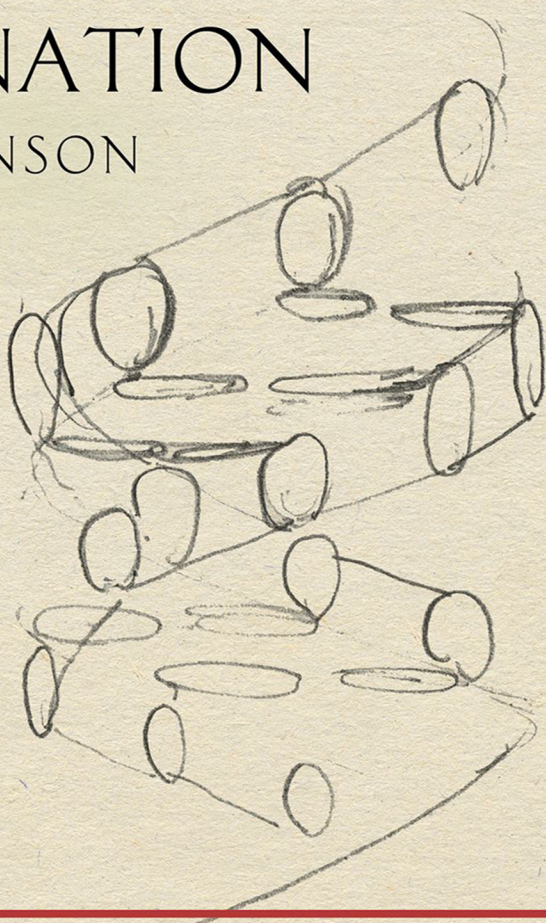


OXFORD

GENETICS AND THE LITERARY IMAGINATION

CLARE HANSON



OXFORD TEXTUAL PERSPECTIVES

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CLARE HANSON

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This book is for my extended family, with love.

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Introduction: The Secret of Life

On the morning of 28 February 1953, James Watson and Francis Crick finally realized how the base pairs of DNA could fit together in a double helical structure, and at lunchtime on the same day, Crick rushed into the Eagle pub to tell everyone that they had discovered the secret of life.¹ Or rather, that is the story James Watson tells in *The Double Helix*, but Crick always denied that he had said such a thing, and at a meeting at Cold Spring Harbour to mark the centenary of Crick's birth, Watson admitted that he had made the story up for dramatic effect.² Both Watson and Crick had a gift for vivid exposition and each played a part in shaping the discursive framework in which DNA was positioned as the logos of life in the years that followed, when the genetic 'code' was cracked and recombinant DNA techniques were developed. Scriptural metaphors linking the language of life with biblical myths of origin became a staple of genetic discourse and the idea that life itself could be read from the genomic text was built into the mandate for the Human Genome Project (HGP) which was established in 1990 under Watson's direction. However, as the choice of the term genome suggests, by then the object of study was shifting from the gene

¹ James Watson, *The Double Helix* (London: Penguin Books, 1999), p. 155.

² See Matthew Cobb, 'Happy 100th Birthday, Francis Crick (1916–2004)', Why Evolution is True website, available at <https://whyevolutionistrue.wordpress.com/2016/06/08/happy-100th-birthday-francis-crick-1916-2004/> [accessed 17 July 2019].

(as protein-coding DNA) to the genome (as a system of interacting macromolecules). This process has intensified as research in epigenetics has expanded our understanding of the extent to which gene expression is modified by other chemical components of the cell. The genome is now seen as a reactive system whereby the cell responds to its internal and external environments, and the neo-Darwinian 'thought style' associated with Watson and Crick has given way to a postgenomic era in which, as Richardson and Stevens suggest, there is considerable uncertainty about 'the proliferating objects, relationships, and levels' involved in the relationship between DNA and the organism.³

This book explores the impact of genetics, genomics, and postgenomics on British fiction over the last four decades, focusing on the challenge posed to novelists by gene-centric neo-Darwinism and examining the recent rapprochement between postgenomic and literary perspectives on human nature. The term neo-Darwinism requires some initial explanation, as its meaning has shifted over time. It was first coined by George Romanes in 1895 to refer to the evolutionary theories of Alfred Russel Wallace and August Weissman and was a slightly derogatory term intended to emphasize the difference between their theories and those of Darwin. Darwin argued that evolution was primarily driven by natural selection operating on particles of inheritance but also allowed for the possibility that such particles, which he called 'gemmules', could be modified by the environment, leading to alternative forms of inheritance. In contrast with Darwin's pluralistic approach, Wallace promoted a rigid selectionism which ruled out the idea, associated with Jean-Baptiste de Lamarck, that characteristics acquired during the life of an organism could be inherited. Weissman took this line further by arguing for a separation between the germ cells which were thought to carry inheritance and the body's somatic cells, a separation which became known as Weissman's barrier and which implied that the germ cells were immutable and impervious to external influences. Weissman also proposed that the sole driver of evolution

³ *Postgenomics: Perspectives on Biology after the Genome*, ed. by Sarah S. Richardson and Hallam Stevens (Durham and London: Duke University Press, 2015), p. 6. Further page references will be given within the main text. Ludwik Fleck's term 'thought style' is used here in preference to Kuhn's 'paradigm' as it captures the sociocultural dimensions of scientific theories.

was spontaneous generation or what would now be called random mutation. Together, Wallace and Weismann had established the core principles of neo-Darwinism, which were that inheritance was particulate, that the units of inheritance were ‘sealed’ from the environment and that the single force behind evolution was random mutation.⁴ These commitments were carried through into the classical genetics of the early twentieth century and also underpinned the ‘Modern Synthesis’ of the 1930s and 1940s which united evolutionary theory, Mendelian genetics, and population genetics. However, it was in the post-war period that neo-Darwinism mutated into what Eva Jablonka and Marion Lamb term ‘molecular neo-Darwinism’ (30–4). In this iteration, the gene of the Modern Synthesis became the DNA sequence which codes for protein, in a one-way process whereby in Crick’s words, ‘DNA makes RNA, RNA makes proteins, and proteins make us’.⁵ DNA became the ‘master molecule’, DNA sequences were characterized as instructions or information, and Francois Jacob and Jacques Monod introduced the concept of a genetic ‘programme’ which governed cellular processes.⁶ As these metaphors suggest, this was a top-down model of inheritance in which traits emerged according to a pre-existing blueprint. While the molecularization of genetics proceeded apace, evolutionary biologists were concerned with a related problem, the level on which natural selection acts. They were particularly exercised by the concept of group selection, which was associated with the rather vague idea that individuals acted for the good of the group or species. The ‘good for the species’ explanation of altruistic behaviour did not satisfy the evolutionary biologist W.D. Hamilton and in its place he offered the theory of kin selection, whereby organisms can act in a way that damages their own interests if the action nonetheless ensures

⁴ For an authoritative overview of Darwinism and neo-Darwinism see Eva Jablonka and Marion J. Lamb, *Evolution in Four Dimensions: Genetic, Epigenetic, Behavioural, and Symbolic Variation in the History of Life* (Cambridge, MA and London: MIT Press, 2005), pp. 10–21. Further page references will be given within the main text.

⁵ Francis Crick, ‘On Protein Synthesis’ (1957), quoted in Evelyn Fox Keller, *The Century of the Gene* (Cambridge MA and London: Harvard University Press, 2000), p. 54.

⁶ Although Jacob and Monod are usually seen as originating the idea of the genetic programme, Ernst Mayr developed the concept independently. For a discussion of the genesis of the genetic programme see Alexandre E. Peluffo, ‘The “Genetic Program”: Behind the Genesis of an Influential Metaphor’, *Genetics* 200 (2015), 685–96. doi:10.1534/genetics.115.178418

the survival of kin with the same genes. Richard Dawkins took up Hamilton's idea and extended it, arguing that 'the gene's eye view' can help us to understand the evolution of all adaptive traits, and as Jablonka and Lamb suggest, by drawing on Hamilton's evolutionary theories he was able to 'generalize' the molecular neo-Darwinian approach in his hugely influential *The Selfish Gene* (36).

Things have changed significantly since the completion of the Human Genome Project, which brought the news that human beings had far fewer genes than was anticipated, between 20–25,000 as opposed to a projected 80,000. This invited the question of what the extragenic DNA was for and the ENCODE project which was set up to explore this has found that much of this so-called 'junk' DNA is involved in processes of cellular regulation.⁷ Meanwhile, research in epigenetics has rehabilitated the Lamarckian concept of the inheritance of acquired characters, which was considered more-or-less taboo throughout the twentieth century. It is now clear that genomes respond to signals from the environment and that they modify cellular function accordingly. In addition, there has been a return of interest in the role of cooperation and symbiosis in driving evolution, as research on the microbiome has demonstrated the importance of mutual dependencies between organisms. Again, this is in sharp contrast with the neo-Darwinian model of competitive struggle between genes and organisms. Finally, there has been a decisive move to a conceptualization of the genome as a dynamic system which is nested within other dynamic systems, and a renewed interest in the autopoietic theories developed by Humberto Maturana and Francisco Varela, who see living systems as self-organizing and structurally coupled with their environment.⁸ To an extent, then, postgenomics can be seen as the return of the repressed of neo-Darwinism, although as Richardson and Stevens warn, it does not represent a clean break with older modes of research and there are many continuities between twentieth-century genetics and the post-genomic present (3–4). Notably, the reductionism and determinism of neo-Darwinism continues to structure much research, especially that

⁷ See the ENCODE Project Consortium, 'An Integrated Encyclopedia of DNA Elements in the Human Genome', *Nature* 489, 7414 (2012): 57–74.

⁸ See Humberto R. Maturana and Francisco J. Varela, *Autopoiesis and Cognition: The Realization of the Living* (Dordrecht: D. Reidel, 1980).

which has a biomedical orientation: in the context of the need for therapeutic applications, there is pressure to identify specific causal mechanisms at the molecular level. Yet although neo-Darwinian assumptions continue to inflect postgenomic practice, the holistic theories associated with postgenomics have a transformative potential which has been recognized across disciplines, including philosophy and literary studies.

This brings us to the assumptions that underlie this book and its understanding of the relationship between literature and science, which has traditionally been conceptualized in two ways. The first is the 'influence' approach, effectively a one-way model which traces the impact of science on literature. This tends to assume a hierarchical relationship between science and literature, granting epistemological and ontological priority to science, and as Rachel Crossland notes, while its exponents are happy to argue for the influence of science on literature, they are reluctant to make any stronger causal claim than that literature may 'anticipate' scientific developments.⁹ The other approach explores parallels between literature and science, which it sees as rooted in a common cultural matrix or shared milieu. In this model, it is assumed that writers and scientists share what Gillian Beer has called 'the moment's discourse' and that in consequence literature and culture do not simply reflect scientific findings but are engaged in what Sally Shuttleworth terms 'a dynamic, reciprocal set of relations with scientific practice and the development of scientific ideas'.¹⁰ Like most books concerned with literature and science, the present study combines the two approaches and suggests that in practice they are difficult to disentangle. In relation to neo-Darwinism, for example, this thought style clearly has a long history in evolutionary biology and was consolidated in the heroic age of molecular biology: in this sense, the impetus comes from science and literature responds. However, as Beer argues, literary responses to science are by no means passive and are best understood in terms of transformation rather than translation

⁹ Rachel Crossland, *Modernist Physics: Waves, Particle and Relativities in the Writings of Virginia Woolf and D.H. Lawrence* (Oxford English Monographs) (Oxford: Oxford University Press, 2018), p. 5.

¹⁰ Gillian Beer, *Open Fields: Science in Cultural Encounter* (Oxford: Oxford University Press, 1996), p. 171; Sally Shuttleworth, 'Life in the Zooniverse: Working with Citizen Science', *Journal of Literature and Science* 10 (2017), 46–51 (p. 46).

from one sphere to another. An example in relation to neo-Darwinism would be Ian McEwan's mobilization of concepts from evolutionary psychology to radically reconfigure our understanding of the literary trope of the unreliable narrator. At a macro-level, it is also clear that scientific theories are forged in the context of broader cultural narratives and respond, to a greater or lesser degree, to their social and historical moment. E.O. Wilson's sociobiological theories, for example, with their bleak view of human nature, are imbued with a sense of angst which can be traced back to his reading of existentialist literature and to a wider post-war climate which demanded reflection on the banality of evil, to invoke Arendt's resonant phrase.

The relationship between literature and biology is especially close, as of all the sciences, biology touches most directly on our self-understanding and the way in which we envisage social relations. Indeed, evolutionary thought was from the outset closely entwined with social theory: Darwin was initially inspired by reading the political economy of Thomas Malthus and Karl Marx was in turn influenced by Darwin's theories, seeing a connection between natural history and class struggle. After the publication of *The Origin of Species*, the social implications of evolutionary theory were widely debated by figures such as Thomas Henry Huxley, who argued that the qualities that fit us for success in the 'struggle for existence' are in conflict with law, morality, and ethics but that we must be prepared to combat such evolutionary pressures.¹¹ On the other side of this argument, Herbert Spencer, a Lamarckian whose work is often linked with Social Darwinism, contended that competitive struggle was necessary in order to maximize individual self-development. In the twentieth century, particularly after the revelation of Nazi atrocities, genetics sought to position itself as a neutral science working for the benefit of all mankind but with the advent of neo-Darwinism, the controversies that had surrounded the publication of *The Origin of Species* were, in Gillian Beer's words, 'raised anew in a more immediate form'.¹² The issues were similar in

¹¹ See T.H. Huxley, *Evolution and Ethics*, Prolegomena, 1894, Project Gutenberg, <https://www.gutenberg.org/files/2940/2940-h/2940-h.htm> [accessed 17 July 2019].

¹² Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction*, 2nd edn (Cambridge: Cambridge University Press, 2000), p. xxiii.

that they turned on the conflict between evolutionary processes and the ethical ideals of humanity and in this sense, Dawkins reiterates T.H. Huxley's point when he argues in the peroration to *The Selfish Gene* that human beings should discuss ways of 'deliberately cultivating and nurturing pure, disinterested altruism' in order that we can 'rebel against the tyranny of the selfish genes'.¹³ The issues were more immediate because neo-Darwinism offered a perspective on evolution that differed from that of Darwin in being both reductionist and deterministic (as many have pointed out, Darwin was no neo-Darwinist). This led to a sharper sense of the conflict between ethics and evolutionary biology. The logic of neo-Darwinism is that human behaviour is impelled by genetic self-interest and to the extent that this is so, human agency is circumscribed. Both Wilson and Dawkins urge a kind of ethical resistance to genetic imperatives, but this is a possibility for which they can find little evolutionary justification. The implications for personal and social relations and hence for the literary categories of character and plot are a recurring theme in the literary texts which engage with their work.

The relationship between literature and biology, then, is one that has involved both reciprocity and conflict and it is also, crucially, a mediated relationship. Most writers do not access scientific knowledge by reading original papers, which are subject to strict protocols surrounding the representation and discussion of results. Instead, they access the sciences through the medium of popular science, a hybrid genre which mediates between science and the wider public. The origin of this form is usually dated to the scientific revolution of the eighteenth century and historians of science have argued that it expanded in the second half of the nineteenth century due to the increasing specialization of science, which led to a perceived need for scientific findings to be 'translated' for the general public. As science has become ever more specialized and fragmented, popular science has stepped in to bridge the gaps between scientific sub-disciplines as well as between science and the general public. As historians of science also contend, popular science need not entail dumbing down but can open new intellectual territory, as for example connections are made between different areas

¹³ Richard Dawkins, *The Selfish Gene*, 2nd edn (Oxford: Oxford University Press, 1989), pp. 200–1. Further page references will be given within the main text.

of specialism. And as Richard Dawkins points out, the task of making science accessible can prompt the author to 'push novelty of language and metaphor' to the point where 'a new way of seeing' emerges which can 'in its own right make an original contribution to science' (xi). This is particularly true of the books which appeared during the popular science boom of the period between the mid-seventies and the new millennium. Dawkins' *The Selfish Gene* and *The Extended Phenotype*, Stephen Hawkins' *A Brief History of Time* and Steven Pinker's *The Language Instinct* not only synthesized existing knowledge but offered a distinctive interpretation of the writer's own field. In this sense, there is no clear-cut separation between science and its popularization but as Salman Rushdie notes in a review of *A Brief History of Time*, there has nonetheless been an increasing tendency to make grandiose claims in popular science: 'these days' he writes 'the creation of Creation is primarily the work of scientific, rather than literary or theological, imaginations'.¹⁴ Popular science in the first half of the twentieth century, as Peter Bowler has shown, was sober in style and largely aimed at self-improvement but there was a shift in genre expectations as a new kind of popular science book emerged in the 1960s and 1970s, sometimes with a TV tie-in, David Attenborough's *Life on Earth* being the classic example.¹⁵ In this context, it became more common for popular science to make claims about the importance of science for human self-understanding as well as plumbing the secrets of the universe.

This shift to generalizing claims encouraged the perception that biology was moving into the territory of the humanities and undermining its foundations. Specifically, popular books by Dawkins, Wilson, Ridley, and others explained human values and human behaviour in terms of algorithmic processes, in a move which radically decentred the humanist subject. When Dawkins represented human beings as 'lumbering robots' created for the benefit of self-replicating genes, he was striking a blow at human self-understanding which in some respects resembled the anti-humanism of poststructuralism and

¹⁴ Salman Rushdie, *Imaginary Homelands: Essays and Criticism 1981–1991* (London: Penguin, 1991), p. 262.

¹⁵ See Peter J. Bowler, *Science for All: The Popularisation of Science in Early Twentieth-Century Britain* (Chicago: Chicago University Press, 2009), p. 268.

postmodernism. As Rosi Braidotti has argued, postmodernism offered a powerful critique of the unified subject construed in terms of autonomy and self-determination, while Derridean poststructuralism construed the subject as an effect of *différance* and as a crossing point of discourses.¹⁶ Neo-Darwinism similarly challenges the idea of human self-determination and frames the human as a crossing point of *genetic* inscriptions. However, here the parallels with poststructuralism and postmodernism end, as in place of a world of shifting signifiers and mobile identities, neo-Darwinism offers a decisive picture of human nature and history, a Lyotardian 'grand narrative' backed by the epistemological authority of science. The category of the human may have been decentred but in place of our traditional self-conception, neo-Darwinism tells us that much of our behaviour stems from dispositions which evolved in the ancestral past. In this view, the origin and end of life is reproduction and what we might have thought of as ethical behaviour, for example parental love or kindness to a stranger, is reconfigured in terms of genetic self-interest (now termed kin altruism and reciprocal altruism). As Steven Pinker acknowledges, this borders on a tragic vision and it is one which displaces long-held beliefs about 'the perfectibility of man'.¹⁷ Nonetheless, there was a public appetite for this perspective, which according to A.S. Byatt was perceived as liberating precisely because it challenged the orthodoxies of poststructuralism and postmodernism.¹⁸

Novelists responded to this incursion into the territory of the humanities in multiple and strategic ways. Although they were not able to query the epistemological or ontological status of the biological arguments, they could point to the inflated and potentially misleading rhetoric employed by writers like Dawkins and Wilson. As we shall see, the epideictic, declamatory tone of neo-Darwinian popular science, evident especially in the work of popularizers such as Matt Ridley, is the object of fictional pastiche which draws attention to the clichés that

¹⁶ Rosi Braidotti, *The Posthuman* (Cambridge: Polity Press, 2013), p. 37. Further page references will be given within the main text.

¹⁷ Steven Pinker, *The Blank Slate: The Modern Denial of Human Nature* (London: Penguin, 2003), p. 287.

¹⁸ A.S. Byatt, 'Faith in Science', *Prospect Magazine* 20 November 2000, <https://www.prospectmagazine.co.uk/magazine/faithinscience> [accessed 18 July 2019].

can inform such writing.¹⁹ Writers were also well-placed to draw attention to the problematic use of literary techniques, particularly metaphor, in popular science. Metaphors are intrinsic to scientific thought, enabling novel conceptualizations of the material world, but become problematic when they are used in the crossover genre of popular science. The fiction discussed here explores the multiple and often contradictory meanings of the metaphors most often associated with genetics, such as information, code, and programme. However, the novel's most significant contribution has been to draw attention to the limitations of neo-Darwinism's third-person perspective on human nature. The Pulitzer prize-winning novelist Marilynne Robinson has written eloquently about this, arguing that neo-Darwinians offer an impoverished view of humanity because they exclude 'the felt life of the mind' and the 'experience and testimony of humankind' from their evidential base.²⁰ To compensate for this, they extrapolate from limited scientific data to make what Robinson calls 'parascientific' claims about humanity and its purposes. For Robinson, parascience (as exemplified by the work of E.O. Wilson in particular) is a genre that proceeds from 'the science of its moment, from a genesis of human nature in primordial life to a set of general conclusions about what our nature is and must be, together with the ethical, political, economic and/or philosophical implications to be drawn from these conclusions' (32–3). Subjectivity is invoked only to be dismissed as a source of illusions which disguise the true purpose of our behaviour from us: so for Wilson, love, courage, and generosity are 'illusory sensations', merely the means by which the genes that have colonized us manipulate us for their purposes (61). For Robinson, in contrast, subjectivity is 'the ancient haunt of [...] long, long thoughts' and the most important resource for understanding what it means to be human. In this context,

¹⁹ The uneasy combination of hard science and clichéd rhetoric that marks much popular science writing is satirized in Zadie Smith's *White Teeth*, where a geneticist co-authors a popular book with a novelist, creating a 'split-level, high/low culture book' (Zadie Smith, *White Teeth* (London: Penguin, 2001), p. 416). For an excellent analysis of Smith's treatment of the fictional dimension of genetics see Josie Gill, 'Science and Fiction in Zadie Smith's *White Teeth*', *Journal of Literature and Science* 6 (2013), 17–28.

²⁰ Marilynne Robinson, *Absence of Mind: The Dispelling of Inwardness from the Modern Myth of the Self* (New Haven and London: Yale University Press, 2010), p. 35. Further page references will be given within the main text.

it is important not to conflate subjectivity with narcissism, for the subject is not only a subject to itself but is also a subject to and of others. Subjectivity is inherently dialogic, and it is in this sense that it has been at the heart of the novel since the inception of the genre in the eighteenth century. The novel is psychologically attuned to both interiority and to social context and in reading a novel, as Patricia Waugh suggests, as we ‘hear more insistently and become aware of thought as a play of voice [...] we become aware too of how what is me is always already constituted out of the voices of the other’.²¹ So in dramatizing interiority, the novel also engages with the intersubjective relations which are the starting point for a more objective understanding of the world. As Thomas Nagel has famously argued, subjectivity and objectivity are not opposed but exist on a continuum and we approach objectivity as we ‘detach gradually from the contingencies of the self’.²² The novel is centrally concerned with this continuum and with the convergence and divergence between subjective and objective points of view, and as Ian McEwan has suggested, it is uniquely able to mediate between these perspectives and register the points at which they are incommensurable.²³

Robinson makes it clear that her objections to neo-Darwinism are related to her religious beliefs and in this respect her critique must be placed in the context of a wider pattern in the USA in which neo-Darwinian science was—and is—routinely pitted against creationism and intelligent design. This cultural schism forms the backdrop of Robinson’s intervention and is implicit in Daniel Dennett’s vigorous defence of neo-Darwinism in *Darwin’s Dangerous Idea*. Indeed, as John Dupré has noted, there is an isomorphic quality in the relations between religion and neo-Darwinism, as ‘extreme neo-Darwinists sometimes share with creationists the yearning for an all-encompassing

²¹ Patricia Waugh, ‘The Novel as Therapy: Ministrations of Voice in an Age of Risk’, *Journal of the British Academy* 3 (2015), 35–68 (50).

²² Thomas Nagel, *The View from Nowhere* (Oxford: Oxford University Press, 1989), p. 5.

²³ Ian McEwan, ‘Literature, Science, and Human Nature’, in *The Literary Animal: Evolution and the Nature of Narrative*, ed. by Jonathan Gottschall and David Sloan Wilson (Evanston: Northwestern University Press, 2005), pp. 5–19 (p. 6).

scheme, a single explanatory framework that makes sense of life'.²⁴ However, in the largely post-religious British context there was little sense that neo-Darwinian theory posed a challenge to belief; it was more often perceived as a challenge to a residual humanism which was itself a substitute for religion. This is a point made by A.S. Byatt in an essay on post-war fiction in which she links F.R. Leavis's 'great tradition' of English literature with the Comtean 'Religion of Humanity' which had replaced religion in the nineteenth century. Writing in 1979, she suggests that the religion of humanity is being displaced in its turn and that that novelists now exist in an 'uneasy relation to the afterlife of these literary texts [...] They are the source of enlightenment, but not true'.²⁵ As we shall see, the fiction of Byatt and McEwan is marked by nostalgia for the kind of literary humanism invoked in Byatt's essay, which was under pressure not only from postmodernism and post-structuralism but from the scientific humanism espoused by figures like Wilson, Dawkins, and Pinker. Now more often known as secular humanism, scientific humanism rejects transcendentalism in all its forms and privileges scientific rationality as the means to knowledge.

An important hub for neo-Darwinism in the UK was the Darwin Seminar at the LSE which ran for over a decade from 1995 and was convened by Helena Cronin, a philosopher and key supporter of Dawkins.²⁶ The seminar, which was more of an intellectual salon, hosted influential speakers including John Maynard Smith, Daniel Dennett, and Steven Pinker and attracted audiences from across disciplines, including novelists such as Byatt and McEwan.²⁷ However, neo-Darwinism was generally viewed with hostility in the humanities and social sciences, due to the long history of the use of biology to justify oppression on the grounds of race and sexuality. Genetics is

²⁴ John Dupré, *Processes of Life: Essays in the Philosophy of Biology* (Oxford: Oxford University Press, 2012), p. 160. Dupré cites Daniel Dennett's *Darwin's Dangerous Idea* as an example of this tendency, as Dennett uses natural selection to explain 'everything from the breeding behaviour of bees to the deliberative processes of the human mind'.

²⁵ A.S. Byatt, 'People in Paper Houses: Attitudes to "Realism" and "Experiment" in English Post-war Fiction', in *Passions of the Mind: Selected Writings* (London: Vintage, 1993), p. 167.

²⁶ For example in the preface to the second edition of *The Selfish Gene* Dawkins warmly acknowledges Cronin's help with the new chapters in the book (p. xiii).

²⁷ An archive of the seminar is available at <https://digital.library.lse.ac.uk/collections/publiclectures/subject> under the heading 'Evolution (Biology)'.

implicated in this history by virtue of its association with eugenics, which Hilary Rose has identified as genetics' shadowy twin.²⁸ As the historians of science Staffan Müller-Wille and Hans-Jörg Rheinberger have shown, classical genetics developed in a context that was preoccupied with questions of eugenics, racial identity, and sexuality 'in short, a biopolitics of what came to be called the "racial body"'.²⁹ After the Second World War, despite the revelation of Nazi atrocities, eminent geneticists including Francis Crick continued to endorse the idea that humanity should take control of its destiny through genetic manipulation of the population, as is evident in his comments at a 1962 CIBA symposium on 'Man and His Future'.³⁰ Neo-Darwinian theory is linked to eugenics through E.O. Wilson, who expressed support for both conventional eugenics and genetic engineering in his popular book *On Human Nature*. While no other neo-Darwinian expressed such views, Wilson's comments point to the continuing porosity of the border between genetic and eugenic thought. Neo-Darwinism also raised concerns because of its perceived genetic determinism, which could be used to underwrite racist and sexist stereotypes. To the extent that it argued for a universal human nature neo-Darwinism undermined the category of race, and in its guise as evolutionary psychology it explicitly rejected the race concept. Nonetheless, by continuing to explore the extent to which there might be genetic differences between races, figures like Wilson and Pinker retained the implicit connection between race and biological difference.³¹ Neo-Darwinism is also predicated on the assumption that genetically inscribed differences between the sexes have evolved because of their differential investment in

²⁸ See Hilary Rose, 'Eugenics and Genetics: the Conjoint Twins?', *New Formations* 60 (Spring 2007), pp. 13–26 (p. 14).

²⁹ Staffan Müller-Wille and Hans Jörg Rheinberger, *A Cultural History of Heredity* (Chicago: Chicago University Press, 2012), p. 185.

³⁰ See Francis Crick, 'Discussion: Eugenics and Genetics', in *Man and His Future: A Ciba Foundation Volume*, ed. by Gordon Wolstenholme (Boston: Little, Brown & Co., 1963).

³¹ For example, Steven Pinker notes that 'some racial distinctions [...] may have a degree of biological reality' in *The Blank Slate* (144). This was only a few years after Richard Herrnstein and Charles Murray were making the case for racial differences in intelligence in the infamous *The Bell Curve*. See Richard J. Herrnstein and Charles Murray, *The Bell Curve: Intelligence and Class Structure in American Life* (New York: Free Press, 1996).